SCH #84062703
SBC #84-EIR-7
OCS Study MMS #85-0020
SLC-EIR #379

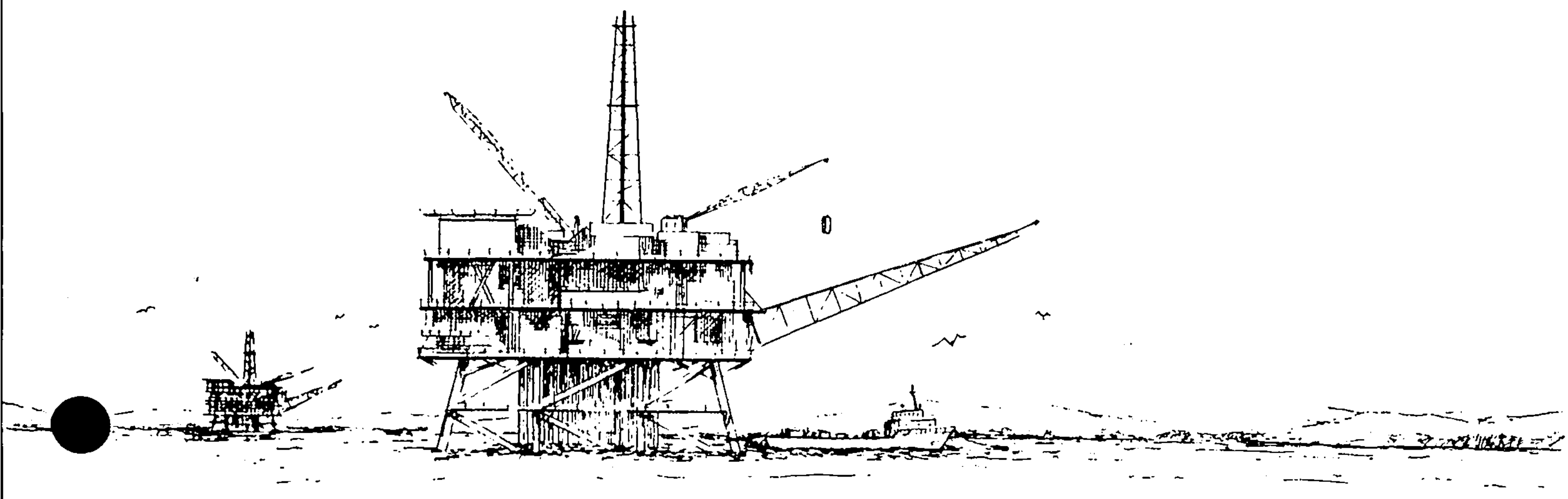
Union Oil Project / Exxon Project Shamrock and Central Santa Maria Basin Area Study EIS/EIR

Final Report
Volume 1

Prepared for:

County of Santa Barbara
U.S. Minerals Management Service
California State Lands Commission
California Coastal Commission
California Office of Offshore Development

June 24, 1985



Prepared by:

Arthur D. Little, Inc.
Santa Barbara, California

UNION OIL PROJECT/EXXON PROJECT SHAMROCK AND CENTRAL SANTA MARIA BASIN AREA STUDY EIS/EIR

This document contains copies of all comments on the Union/Exxon Draft EIS/EIR (received by Santa Barbara County on or before May 5, 1985). The agencies and the consultants have responded to all comments, and these responses are also contained in this document.

NOTICE OF UPCOMING PUBLIC HEARINGS ON THE PROJECT.

Certification of the EIS/EIR by Santa Barbara County	Monday June 17, 1985 6:00 PM, City Council Chambers Lompoc City Hall
Presentation of Staff Recommendations to Planning Commission	Thursday, June 27, 1985 9:30 AM, City Council Chambers Lompoc City Hall
Continuation of Planning Commission Hearing	Tuesday, July 2, 1985 9:30 AM, City Council Chambers Lompoc City Hall
Continuation of Planning Commission Hearing	Tuesday, July 9, 1985 9:30 AM, City Council Chambers Lompoc City Hall (if necessary)
Presentation of Recommendations to Board of Supervisors	Monday, July 22, 1985 Board of Supervisors Hearing Room.
	Monday, August 5, 1985 Board of Supervisors Hearing Room.

The Final EIS/EIR will be available following certification so that the Final document package can contain all information developed during the certification hearing. Release of the Final EIS/EIR is scheduled for June 24, 1985.

The above dates for the Board of Supervisors are tentative and should be confirmed through the Santa Barbara County Energy Division.

Copies of all documents prepared as part of the environmental review of this project are available through the Santa Barbara County Energy Division, 1226 Anacapa Street, second floor, Santa Barbara, CA 93101, 805/963-3434.

This document serves as the joint Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study. The Draft EIS/EIR was produced by the consulting firm of Arthur D. Little, Inc. for the Santa Barbara County Resource Management Department (lead State agency), the Minerals Management Service (lead Federal agency), the California State Lands Commission (responsible agency), and the California Coastal Commission (responsible agency).

The EIS/EIR considers the proposed offshore oil and gas OCS development of the Point Pedernales Field located in the central Santa Maria Basin offshore Santa Barbara County, California, and the related processing of produced oil at facilities proposed near Lompoc in Santa Barbara County. Union Oil and its partners are proposing to install one oil and gas drilling and production platform; on OCS-P 0441, 3 miles off the Point Pedernales coast. Exxon USA is proposing a platform on the adjacent lease, OCS-P 0440. The proposed platforms would be connected by subsea pipelines to a system of consolidated offshore and onshore lines that would carry produced oil and gas from the platforms to the dehydration facility onshore. Exxon's gas production will be reinjected; only its oil will be sent to shore. Exxon has not submitted a development plan for the onshore components of its project, this document however analyzes several options for processing and transportation of Exxon's production.

The offshore pipelines landfall north of the Santa Ynez river and continue overland across Vandenberg Air Force Base. Union has proposed an oil dehydration facility north of the City of Lompoc and the new pipelines would carry the processed oil from the Lompoc Dehydration Facility north to a pump station at Orcutt, and from Orcutt through existing lines to Union's Santa Maria Refinery in Nipomo. Gas will travel through existing lines to Union's existing Battles Gas Plant in Santa Maria.

Because of the potential for future offshore development in Central Santa Maria Basin over the next ten years, this document includes an Offshore Area Study which generally evaluates cumulative impacts associated with the installation of four additional platforms, and associated pipelines. Onshore Area Study components consider hypothetical facilities which may be needed to process and transport Central Basin production once onshore. These analyses provide for a comprehensive evaluation of impacts and may be used as planning tools for responsible planning and permitting agencies.

As required by the California Environmental Quality Act (CEQA) of 1970, amended 1984, the National Environmental Protection Act (NEPA) of 1969, and the Council on Environmental Quality's 1979 regulations for implementing NEPA, the Draft EIS/EIR describes likely impacts to the environment due to the proposed projects.

The Draft is available for a 45 day public review period. The purpose of this review period is to gather comments regarding the adequacy of the environmental analysis. Interested agencies and individuals are encouraged to submit comments as early as possible to expedite this process. All written comments must be received by the County by May 1, 1985 in order to be addressed. Due to differences in the state and federal filing requirements the federal (MMS) comment period begins March 22 and therefore extends to May 6, 1985.

Additional details are available in the following 13 individually bound technical appendices:

A. Geology
B. Air Quality/Meteorology
C. Onshore Water Resources
D. Marine Water Resources
E. Marine Biology
F. Terrestrial and Freshwater Biology
G. Cultural Resources
H. Visual Resources
I. Onshore Noise and Vibration
J. Commercial Fishing, Kelp Harvest and Mariculture
K. Socioeconomics
L. Traffic
M. System Safety and Reliability

A public hearing will be held to receive testimony regarding the Draft EIS/EIR at the following time and location:

Date:	April 17, 1985
Time:	6:00 p.m. to 9:00 p.m.
Location:	Lompoc City Hall 100 Civic Center Plaza Lompoc, California

To obtain further information on the proposed project or the Draft EIS/EIR please contact either:

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1226 Anacapa Street, Suite
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(805) 963-3434

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Pacific OCS Region
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Los Angeles, California 90017
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SCH #84062703
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SLC-EIR #379

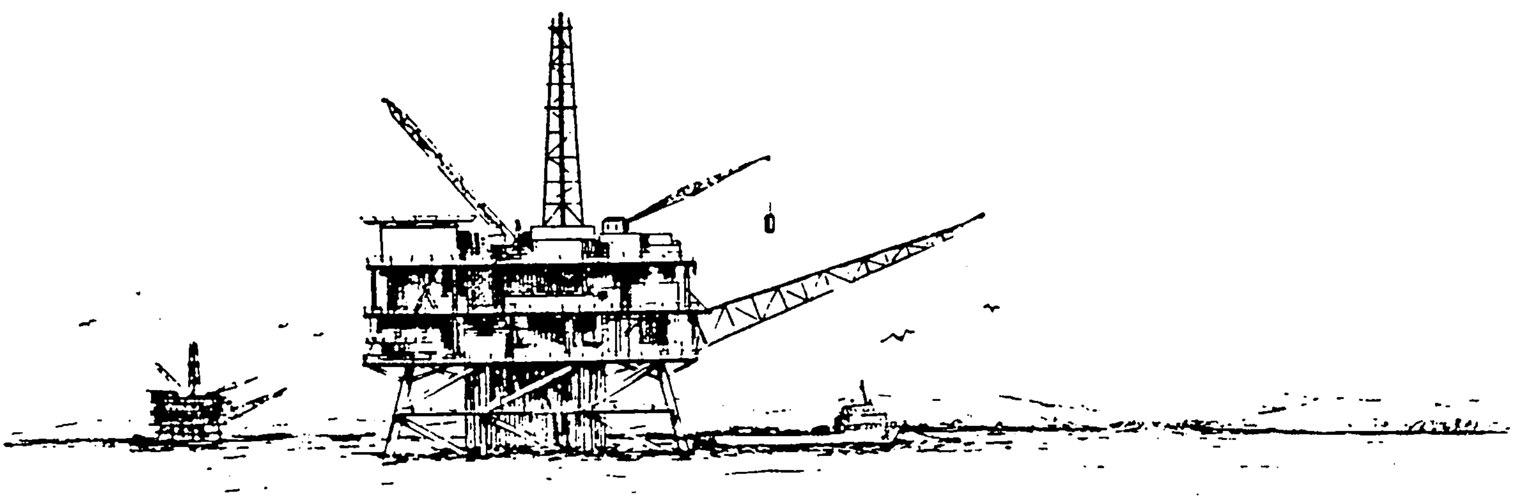
Union Oil Project / Exxon Project Shamrock and Central Santa Maria Basin Area Study EIS/EIR

PUBLIC DRAFT
Volume 1

Prepared for:

County of Santa Barbara
U.S. Minerals Management Service
California State Lands Commission
California Coastal Commission
California Office of Offshore Development

March 18, 1985



Prepared by:

Arthur D. Little, Inc
Santa Barbara, California

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EXECUTIVE SUMMARY

Preparation of Environmental Impact Statement/Report
Union Oil Project/Central Santa Maria Basin Area Study

Submitted to

County of Santa Barbara
U.S. Minerals Management Service
California State Lands Commission
California Coastal Commission
California Office of Offshore Development

June 24, 1985

Submitted by

Arthur D. Little, Inc.
Santa Barbara, California

EXECUTIVE SUMMARY

A. INTRODUCTION

The purpose of this Executive Summary is to provide the reader with a brief overview of the Point Pedernales Field development projects, their anticipated environmental effects, and the potential mitigation measures that could significantly reduce the adverse impacts associated with the project.

This summary briefly describes the proposed projects and alternatives and then discusses their respective environmental consequences for each issue area. Similar discussions by issue area are also presented for the Area Study and Cumulative Impacts scenarios. Finally, the potential mitigation measures that could reduce the adverse impact levels associated with the project are presented in a series of Impact Summary Tables.

The Joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) will be used by different agencies to make decisions on the proposed projects and potential future projects in the study area as required by the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). It will also be used as a long-range planning tool. The intended use of the document for each agency represented on the Joint Review Panel is outlined briefly below. The Joint EIS/EIR will also be the basis for all state and federal responsible agency permit decisions.

Santa Barbara County will use the document to make specific decisions and permit conditions regarding Union's application to the County for a land use rezone, a major Conditional Use Permit, a Comprehensive Plan amendment and approval of the Preliminary Development Plan for the onshore facilities within its jurisdiction.

In addition, the County will utilize the Area Study as a long-range planning tool and for information regarding cumulative impacts of offshore oil and gas development in the Central Santa Maria Basin.

The County Air Pollution Control District will use air quality information from the document in making its decisions as a responsible agency under CEQA.

The Minerals Management Service (MMS), a federal agency, will use the document to evaluate proposed and future activities in federal waters.

Since Development and Production Plans (DPP's) have been submitted for leases OCS-P 0441 (Union-Irene) and OCS-P 0440 (Exxon-Project Shamrock), a detailed site-specific impact analysis is provided in the document for these platforms. The MMS decision to approve or deny these plans will be documented in a Record of Decision.

Operators proposing additional platforms in the study area will still be required to conduct the appropriate site-specific geohazards, cultural resource and biological surveys and to submit DPPs. Documents included in these submittals are: the DPP (outlines the operator's plans and schedule for drilling and production on a specific tract), Environmental Report, Oil Spill Contingency Plan, Hydrogen Sulfide Contingency Plan, Critical Operations and Curtailment Plan, and survey data and reports. Using baseline information from the Area Study, the MMS will evaluate environmental impacts from additional development activities in subsequent Environmental Assessments or, depending on the significance of the impacts, in EIS's.

MMS has jurisdiction over the oil and gas activities on the Outer Continental Shelf (OCS) (extending seaward from 3 miles offshore). In accordance with the OCS Lands Act, MMS is responsible for the permitting of OCS platforms and pipelines, onsite inspection of these facilities during all phases of the project, enforcement of federal requirements, and royalty monitoring. Specific approvals required by MMS for this project include: DPPs, right-of-ways for offshore lines, platform verification, and Application for Permit to Drill (APD) for each well.

The State Lands Commission (SLC) has jurisdiction over state waters 3 miles seaward of the mean high tide line. The SLC will use the document in making a permit decision on Union's request for a pipeline right-of-way through these waters. Finally, the SLC will use the information for long-range planning and consideration of the cumulative impacts of related projects in the area.

The California Coastal Commission (CCC) jurisdiction ranging from concurrence with federal consistency determinations for projects on the OCS to permit responsibility in state waters and public tidelands. The CCC will use the document for a detailed project-specific and cumulative impacts analysis in considering the coastal resource issues listed in its Federal Consistency Certification Staff Report. The document will be used to identify impacts and feasible mitigation measures which can be used as conditions of approval as appropriate and to identify any environmentally preferred alternatives to the proposed projects.

As with all agencies, the Joint EIS/EIR will also provide baseline environmental impact and mitigation information to the CCC for subsequent federal consistency certifications and coastal development permits. Additional detailed information will be required by the CCC for decisions on projects not specifically described and analyzed in the document.

Additional Responsible State Agencies will have 180 days to act on permits applicable to these projects following action by Santa Barbara County.

Vandenberg Air Force Base (VAFB) has jurisdiction over that portion of the onshore pipeline that crosses the Base. VAFB will either adopt this document or develop their own NEPA document based on information contained in this EIS/EIR to permit a pipeline right-of-way across the Base.

Additional Responsible Federal Agencies (e.g., Army Corps of Engineers, Federal Aviation Administration) may use this document as a basis for making permit and approval decisions related to the proposed development.

The reader should review the entire EIS/EIR document and not rely exclusively on the Executive Summary as the sole basis for his/her judgment. The EIS/EIR is supplemented by a series of technical appendices which include data and discussions of the analytical methods for all major issue areas.

In the remainder of this Executive Summary and the EIS/EIR, impacts of the proposed projects, alternatives, Area Study development and cumulative development scenarios have been consistently divided and classified using the categories listed immediately below. The criteria for assigning impacts to any of these categories varied by discipline, and are described in the Introduction/ Methodology sections that begin each of the disciplinary discussions in Chapter 5 of the EIS/EIR (e.g., Section 5.5.1 for Marine Biology, Section 5.10.1.0 for Commercial Fishing).

Class I - Significant Adverse Impacts that Cannot be Mitigated to Insignificance: Significant impacts that cannot be effectively mitigated. No measures could be taken to avoid or reduce these adverse effects to insignificant or negligible levels.

Class II - Significant Impacts That Can be Mitigated to Insignificance: These impacts are potentially of similar significance to Class I impacts, but can be reduced or avoided by the implementation of the mitigation measures discussed.

Class III - Adverse but Insignificant Impacts: Generally, no mitigation measures are required for this Class of impacts.

Class IV - Beneficial Impacts: These impacts would improve conditions relative to the pre-project baseline. They are further subdivided as significant or insignificant.

Socioeconomic Impacts: In accordance with Section 15131 of CEQA, socioeconomic impacts are not themselves classified as significant or insignificant environmental impacts, but rather they are used to judge the significance of related physical changes in the environment.

Once divided into the above categories, impacts were further characterized as to the geographic extent of their significance ("local" versus "regional") and as to their duration ("long-term" versus "short-term"). All of these levels of characterization are shown along with mitigation measures for each impact in the Impact Summary Tables that appear at the end of this Executive Summary. The tables also identify measures that could be used to mitigate Class I and Class II impacts.

B. THE PROPOSED PROJECT AND ALTERNATIVES

The Point Pedernales Oil and Gas Field lies in federal waters about 3 to 5 miles west of Point Pedernales. Exploratory drilling has shown that the Point Pedernales Field may extend under OCS-P 0440, -P 0441, -P 0438 and -P 0437. Figure 1 shows the location of the proposed projects. The MMS has requested that the Point Pedernales Field be developed under a unit agreement, which provides for cooperation and more efficient development of the field. In response to this request Union and Exxon are currently negotiating this agreement.

The initial development of the Point Pedernales Field will be carried out by the Union Oil Company of California (Union Oil) and Exxon Company, U.S.A. (Exxon). Each of their proposed projects is briefly described below.

Union Oil

Union Oil along with Gulf Oil Corporation (now, Chevron, USA) and Superior Oil Company acquired the exclusive right to explore, develop and produce oil and gas reserves on Lease OCS-P 0441 as the result of OCS Lease Sale No. 53. This lease is located approximately 5 miles west of Point Pedernales. Union Oil has filed a DPP to develop Lease OCS-P 0441 and is proposing to ship the oil and gas production to a new onshore oil dehydration facility north of the City of Lompoc. The dry oil will then be shipped, via new and existing pipelines, to Union Oil's Santa Maria and Rodeo Refineries for processing. The gas will be transported via existing pipelines to Union Oil's Battles Gas Plant for processing. These project components are shown in Figure 1.

The main elements of the Union Oil project are as follows:

- Platform Irene, a 72-slot drilling and production platform on Lease OCS-P 0441, will be a steel-jacketed platform standing in 243 feet of water. Gas and wet oil will be separated on the platform and sent to shore in separate pipelines. Produced water will be returned to Platform Irene by pipeline from the onshore dehydration facility for ocean discharge.

- One subsea power cable and associated substation at Surf to provide electrical power to Platform Irene and Exxon Platform Shamrock.

- Three subsea pipelines -- one wet oil, one gas, and one produced water return -- between Platform Irene and a landfall just north of the Santa Ynez River on VAFB.

- Continuing pipelines from the landfall to a new oil dehydration facility north of the City of Lompoc.

- A new oil dehydration facility north of the City of Lompoc located on Union fee property where the wet oil will be heated and separated into dry oil (sent to Orcutt) and produced water (returned to Platform Irene).

- A new dry oil pipeline from the Lompoc facility north to Union's existing Orcutt Pump Station.

- Modifications to the existing Orcutt Pump Station to allow the handling of the crude oil from OCS-P 0441.

- Use of an existing pipeline to convey dry oil from Orcutt to Union's existing Santa Maria Refinery.

- Modification to the Santa Maria Refinery to allow the handling of crude oil from OCS-P 0441.

- Use of an existing pipeline to transmit gas from Lompoc to Union's existing Battles Gas Plant.

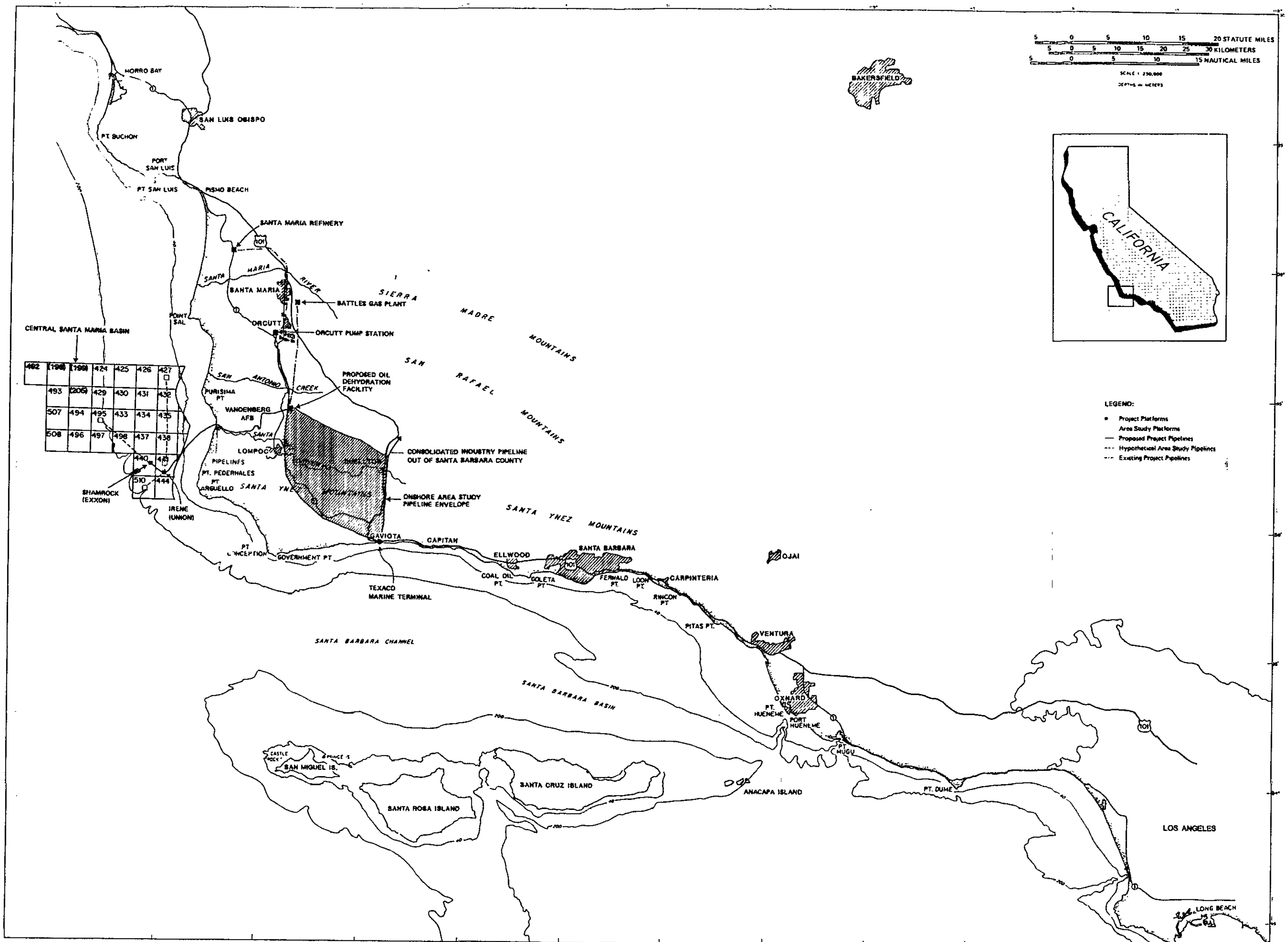

FIGURE 1 MAP OF PROPOSED UNION OIL/EXXON PROJECTS AND AREA STUDY COMPONENTS

- Use of the existing Battles Gas Plant to process the gas from OCS-P 0441, with liquefied gas by-products being delivered to customers by tank truck and the sales gas being sent out by existing pipelines.

Alternatives to the proposed Union Oil project that were investigated include:

- An alternative onshore pipeline route from Surf to the proposed Lompoc oil dehydration facility.
- An alternative location site for the Lompoc oil dehydration facility which would also be located on the Union fee property.

Exxon

Exxon acquired the exclusive right to explore, develop and produce oil and gas reserves on leases OCS-P 0440 and -P 0438, which are also located just west of Point Pedernales. Exxon has filed a DPP to develop these two leases, as well as -P 0437 which is owned by the Atlantic Richfield Company (ARCO), AMOCO, Elf, Champlin, and Aminoil. Exxon has recently submitted an application to the County of Santa Barbara covering the dry oil transportation portion of their project. This application was submitted after the release of the Public Draft. The onshore project components required to complete the Exxon project will be subject to an independent CEQA review. For this document, the options available to Exxon for transporting their dry oil out of Lompoc are evaluated as part of the Area Study analysis.

The main elements of Exxon's project are:

- The Project Shamrock platform, a 60-slot production and drilling facility on Lease OCS-P 0440, will be a steel-jacketed platform and stand in 277 feet of water. Wet oil and gas will be separated on the Project Shamrock platform, with the wet oil being sent by pipeline to Platform Irene and the gas compressed and reinjected into the oil reservoir.
- Two subsea pipelines -- one wet oil and one gas -- between the Project Shamrock platform and Platform Irene.
- One subsea power cable from Platform Irene to the Project Shamrock platform.

The alternative evaluated for the Exxon Project was to send their oil and gas production to the proposed Gaviota oil and gas processing facility via Chevron's Platform Hermosa. This alternative would require that the subsea pipelines be installed between the Project Shamrock platform and Platform Hermosa, which lies about 10 miles to the south.

Proposed Schedule Development

Union's peak production is estimated to be 20,000 barrels per day (B/D) of oil and 13 million standard cubic feet per day (MMscfd) of gas from Platform Irene. Exxon's peak production is estimated to be 20,000 B/D of oil from the Project Shamrock platform. Because of the anticipated future development of the Central Santa Maria Basin, Union Oil is designing the pipelines from Platform Irene to the proposed Lompoc oil dehydration facility for a peak capacity of 100,000 B/D of wet oil and 80 MMscfd of gas.

The construction phase for all the proposed facilities is scheduled to begin in late 1985. Specifically, Platform Irene and the Project Shamrock platform and the subsea pipelines are proposed for installation in late 1985 through early 1986. The proposed Lompoc oil dehydration facility will be constructed beginning the last quarter of 1985 and should be complete by early 1986. Offshore drilling operations are proposed to begin in early 1986 and would extend through 1990. Production operations are anticipated to last 20-25 years.

C. ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED PROJECT AND ALTERNATIVES

1. Geology

a. Proposed Project

Offshore

Geologic constraints that would require particular attention during design of offshore project facilities for Union and Exxon include: seismicity, deep faults, liquefaction and shallow gas zones. Earthquakes that could be related to the offshore Lompoc or Hosgri Faults will likely control seismic design of facilities. Sediments near shore along the pipeline corridor potentially could liquefy during an earthquake, with significant impacts on the pipelines. Drilling operations could intersect deep faults or zones of shallow gas at depth. These drilling constraints are potentially Class II, though in the central Santa Maria Basin there are no documented cases of drilling problems associated with shallow gas. None of the proposed offshore project facilities crosses or overlies any active or potentially active faults, seafloor channels, buried channels, zones of historical slope instability, or areas of active erosion or scour. Gasified sediments, shallow gas along the pipeline route and liquefaction at locations, other than nearshore, constitute insignificant constraints on the project.

Onshore

Onshore, geological constraints that would require special attention during design of the Union facilities would include: faulting, seismicity, landslides, gullying, and scour. The Lompoc-Orcutt pipelines cross the potentially active Pezzoni-Casmalia Fault. This fault also controls seismic design of onshore facilities. Old landslides in Santa Lucia Canyon and the Purisima Hills, gullying (especially in Harris Canyon), and the potential for scour during flooding of any drainage are additional constraints. Destructive removal or degradation of soil could result from an onshore oil spill due to a pipeline rupture (Class I, local).

b. Project Alternatives

Offshore

The geological constraints would be the same as those identified for the proposed project.

Onshore

The impacts and geological constraints would be the same as those identified for the proposed project.

2. Air Quality

a. Proposed Project

Offshore

During construction of Union's offshore pipelines, the state 1-hour NO_2 standard and federal 24-hour SO_2 standard may be exceeded (Class II, local) due to emissions from boats near the shoreline. Emissions from the offshore platforms during drilling and production as well as from the onshore oil dehydration facility in Lompoc are predicted to cause exceedences of the state and federal 1-hour ozone standards in the Santa Ynez Valley. The exceedences would occur as a result of the Union project, and the increment would increase with the addition of the Exxon project (Class II, regional). Potential mitigation to reduce these impacts are identified in the Supplemental Information Section and Impact Summary Tables of this document.

Onshore

Clearing and grading of the onshore sites are predicted to cause exceedences of the federal 24-hour particulate matter standard (Class II, local). The use of additional water sprays with chemical dust inhibitors will reduce the concentrations to insignificance.

The increased NO_x emissions at the Union Refinery in Santa Maria may also cause exceedences of the federal ozone standard in San Luis Obispo County (Class II, regional).

Emissions from Union's Battles Gas Plant as a result of processing gas from Platform Irene are predicted to cause exceedences of the state 1-hour NO_2 standard (Class II, regional).

b. Project Alternatives

Offshore

The alternative platform design for Exxon would include oil and gas pipelines to Chevron's Platform Hermosa and gas-fired oil heaters and turbine-driven generators. The increased emissions from this alternative are predicted to result in a greater incremental ozone exceedence of the federal standard in Santa Ynez than with the project (Class I, regional).

Onshore

Relocation of the onshore Union dehydration facility to alternate sites would result in approximately the same impacts as the primary location, mainly because emissions would remain the same.

3. <u>Onshore Water Resources</u>

a. Proposed Project

<u>Onshore</u>

Project impacts on surface water resources would be locally significant (Class II) with respect to changes in storm flow and sediment loading on a few small drainages in the Project Area. Spill impacts are considered Class III because surface water of the predominantly ephemeral drainages in the Project Area is not currently utilized and the mitigated northern proposed route makes the possibility of a spill reaching the river estuary very remote.

Project impacts on groundwater related to construction and normal operations are considered significant (Class II) because basins which would be used for supply are already overdrafted. The impacts of a spill, should one occur, are rated potentially and locally Class I because of the importance of groundwater as water supply in certain locations in the Project Area.

b. Project Alternatives

<u>Onshore</u>

Flood hazard to a pipeline crossing the Santa Ynez River at Floradale Avenue and the floodplain, required for several of the alternative pipeline alignments, is considered potentially significant Class I. Such an alignment would require special design and involves an unknown risk because of the historic unpredictability of locations and extent of river flooding drainage.

4. <u>Marine Water Resources</u>

a. Proposed Project

<u>Offshore</u>

Impacts of moderate (Class II) significance are possible due to the accumulation of pollutants in sediments around the Union and Exxon platforms from discharges of drill cuttings, drill muds, formation water, other wastewater, and minor oil spills. Some of the formation water discharged at Platform Irene is derived from oil produced at Platform Shamrock. It is possible that large areas of sediments may be affected not only during the project's operational period, but for a period of years thereafter. The magnitude and extent of the impacts to be expected are uncertain. Thus, proposed mitigation includes first a more detailed baseline study of water quality and biota and then an intensive monitoring program of platform discharges and resulting impacts. If the monitoring program indicates that further mitigation is required, additional mitigation measures could be considered. Water column impacts associated with platform and refinery discharges are expected to be of low (Class III) significance and limited generally to the zone of initial dilution which will typically be within 100-200 meters from the discharge point.

An unlikely major oil spill (an event with a probability of less than 1 percent over the project life) could result in significant (Class I) impacts on the water column and sediments. A spill from a nearshore rupture of Union's pipeline would have a high probability (40-50 percent) of reaching the shores in the Point Arguello region.

b. Project Alternatives

None of the project alternatives would lead to marine water resources impacts of different significance than those described above for the proposed projects.

5. Marine Biology

a. Proposed Project

Offshore

Potential locally to regionally significant and not fully mitigable (up to Class I) marine biology impacts such as seabird mortality, would be possible in the unlikely event of a major oil spill from either project's platforms or pipelines. Spills originating at either Platform Irene or the Project Shamrock platform would have about a five percent chance of reaching landfall at or near Environmentally Sensitive Habitat Areas (ESHAs) around Point Arguello, including three colonial seabird nesting areas and harbor seal hauling grounds. Spills from the pipeline between Platform Irene and shore would have about a 30-50 percent chance of reaching landfall at an ESHA, including the Santa Ynez River mouth. Potential locally significant but mitigable (Class II) impacts on marine organisms are possible within about a 5-kilometer radius of Platform Irene from the accumulated contaminants in produced water and processing facility discharges, which are to be combined for both projects for discharge at Platform Irene. Use by marine organisms of both project platforms and pipelines as hard-bottom substrate would be a beneficial impact (Class IV) of local significance.

Onshore

As noted above, the waste water from the Lompoc oil dehydration facility would be included in the discharge from Platform Irene. The modified effluent from Union's Santa Maria Refinery is not expected to have significant incremental marine biology impacts.

b. Project Alternatives

Offshore

The Project Shamrock Gaviota Alternative, involving a pipeline from the Project Shamrock platform to Chevron's Platform Hermosa would be expected to have potentially significant adverse (up to Class I) impacts on the biota of hard-bottom features subject to anchor-scarring along the southern half of the pipeline route. Use of the southern alternative landfall, at Surf, for the Union pipelines and power cable could avoid potentially locally significant impacts on a hard-bottom feature and/or transient marine mammals or sea birds at the proposed landfall site.

6. Terrestrial and Freshwater Biology

a. Proposed Project

Onshore

Construction, normal operations and accidents associated with Union's onshore facility could result in a number of significant impacts. Potential Class I impacts include: (1) removal of sensitive vegetation and wildlife habitats, such as Coast Live Oak Woodland, Burton Mesa Chaparral and Bishop Pine Forest, and (2) effects on vegetation and wildlife, including ten or more rare species, from offshore oil spills and toxic gas releases. Potential Class II impacts include: (1) removal of sensitive vegetation and wildlife habitats, such as Coastal Strand, Freshwater Marsh and Riparian Woodland, and (2) effects on vegetation and wildlife, including 20 or more rare species, from onshore oil spills that could affect the Santa Ynez River and its estuary, San Antonio Creek and more than ten additional drainages that are considered biologically significant. Additional Class II impacts that could result from either the proposed or alternative projects include: (1) effects of accelerated erosion and sedimentation, (2) effects of noise and human presence, and (3) damage to vegetation (including to resistant species in some areas) from increased ozone levels in the Santa Maria, San Luis Obispo and Santa Ynez Valley areas, from SO_2 fumigations in the vicinity of the Santa Maria Refinery and from increased NO_2 levels in the vicinity of the City of Santa Maria.

b. Project Alternatives

Onshore

Construction, normal operations and accidents could result in a number of significant impacts. Both Class I and Class II impacts are similar to those of the proposed projects. Vegetation and wildlife habitats that would be removed or disturbed include the same types as for the proposed project, except that, in addition, Coastal Saltmarsh would be removed during construction. The Santa Ynez River and its estuary, San Antonio Creek and an additional ten or more biologically significant drainages (not the same ones as those affected by the proposed projects) also could be affected by the alternative projects. Likewise, potential effects of onshore and offshore oil spills would be similar.

7. Socioeconomic Considerations

Socioeconomic impacts are discussed for the projects as a whole, rather than component by component, because the socioeconomic analysis required that project components be treated as a group. Impacts due primarily to specific project components will be noted, however.

a. Proposed Project

Increases in water demand induced by the Union/Exxon projects will further strain over committed water supplies in the Santa Maria/Orcutt area, Lompoc area, San Buenaventura, Oxnard, Port Hueneme cities and City of San Luis Obispo. The project induced demand increases are small compared to overall demand, but Class I since the water supply situation in these areas is already (or will be) critical during the study period.

The only other socioeconomics Class I impact is the inconsistency with existing land use policies created by the Lompoc oil dehydration facility development (Union project). Since there is no mitigation for the change of land use, this is by definition, a Class I impact.

Other significant, but mitigable, impacts (Class II) include:

- Increased demand for rental housing units and hotel rooms during construction periods for both the Union and Exxon facilities.
- Increased waste water generation (due primarily to indirect effects of the Union project) that will add further strain to constrained capacity at the Solvang Municipal Improvement District (SMID) and Buellton treatment facilities.
- Increased generation of solid wastes for disposal at the Foxen Canyon and Santa Maria landfills.
- Negative fiscal impact upon Ventura County due to induced growth associated with Union and Exxon facilities.
- Rezoning of rural agricultural land to general industry use for the Lompoc oil dehydration facility.
- Additional pressure placed upon understaffed County Fire Station Number 51 due to the construction of the Lompoc dehydration facility.

Both the Union and Exxon facilities also provide substantial beneficial (Class IV) impacts to the tri-county area. These consist of: increased employment during both the construction and operations phases of the facilities; increased expenditures in the local economies from construction and operations activities, and from the spending of workers associated with these projects; and finally net fiscal benefits to the majority of municipalities and counties (with the exception of Ventura County). An additional beneficial impact of the project is that it will help increase the country's short term energy self-sufficiency by decreasing reliance on imported oil.

b. Project Alternatives

None of the alternatives would significantly alter the impacts associated with the proposed projects.

8. <u>Cultural Resources</u>

a. Proposed Project

<u>Offshore</u>

Direct, site-specific (Class II, local) impacts may occur to a potential shipwreck located along the Platform Irene to shore pipeline-powerline corridor in State waters. Class II, local impacts may also occur to the historic Meherin Wharf due to power cable installation; SCUBA reconnaissance is needed to locate and avoid this resource. Indirect, site-specific (Class III, local) impacts may occur to unidentified anomalies with cultural significance from "masking" (i.e., concealment of unidentified anomolies by debris associated with littering from boats, construction and operational activities) or hydrocarbon leaks and spills. Because such anomalies will be avoided by Union and Exxon in compliance with MMS lease stipulations, no direct impacts will occur to these potential resources in federal waters.

Onshore

Onshore impacts would be local (site-specific) and regional to Native American values. Installation of Union's pipeline along the Northern Mitigated Route would have direct Class II impacts on ten, and perhaps 11, prehistoric archaeological sites, one historic site and plants used by Native Americans for traditional purposes.

Direct Class I impacts could result from the destruction or damage of buried sites during construction.

b. Project Alternatives

Offshore

No direct impacts are expected along the alternative Exxon pipeline route. Indirect, site-specific Class III impacts (e.g., masking) could occur.

Onshore

Installation of the proposed Union pipeline to alternative Site 8 would have direct, (local and regional) Class II impacts on 13, and possibly 14, prehistoric archaeological sites and sensitive plants used by Native Americans. Installation of the pipeline along the Southern Mitigated Route would have direct, Class II impacts on ten prehistoric archaeological sites, (including the historic village of Lompoco), and wetland plants and oak trees of importance to Native Americans. In addition, Class I impacts may result from the disturbance or destruction of buried sites.

9. Aesthetic Resources

Visual Resources

a. Proposed Project

Offshore

The appearance of Platform Irene and the Project Shamrock platform would have long-term locally significant Class I impacts on views from the shore between Surf and Civilian Beach and long-term, regionally significant impacts on views from the Southern Pacific Railroad (SPRR).

Onshore

The clearing, grading and trenching associated with installation of the proposed Union pipelines would have short-term, locally significant Class I impacts on views from 35th St. and Terra Road, and regionally significant impacts on views from SPRR. Long-term, locally significant Class II impacts on views from Terra Road and 35th Street could occur due to the potential erosion of earthen basins. Using jute mesh on berm banks should stabilize slopes, permitting full revegetation. Long-term, locally significant Class I impacts on limited views from Terra Road would occur due to pipeline where exposed at drainage crossings. Painting them earth tones would reduce the impacts somewhat. The electrical substation would have a long-term locally significant Class I impact on views from Highway 246 near Surf. The Lompoc oil dehydration facility would have short-term, locally significant Class I impacts on views from Highway 1, adjacent to the site entrance until screening vegetation matures. The size, shape, color and location of the gravel pad for the valve station would have long-term, locally significant Class II impacts on views from 35th Street, Terra Rd. and Ocean Beach County Park and long-term regionally significant impacts on views from SPRR. Direct, short-term or long-term, locally significant Class I impacts could also occur at beach areas and especially rocky headlands due to oil spills offshore.

b. Project Alternatives

Offshore

The alternative offshore pipeline would have no significant visual impacts.

Onshore

The clearing, grading and trenching associated with installation of the proposed Union pipelines to alternative Site 8 would have short-term, locally significant Class I impacts on views from 35th St., Terra Rd., and regional, short-term impacts on views from SPRR. Along the Southern Mitigated Pipeline Route to Site 4, clearing and grading through native oak woodlands would have long-term locally significant Class I impacts on views from Highway 1 and Burton Mesa Road. The electrical substation would have long-term, locally significant Class I impacts on views from 35th St., Terra Rd., and Ocean Beach County Park and long-term, regionally significant impacts on views from SPRR. If the transmission lines are buried from the substation to 13th Street, they would have long-term, locally significant Class II impacts on views from Terra Road., 35th Street, and Ocean Beach County Park and Highway 246 and long-term, regionally significant Class II impacts on views from SPRR. If the lines cannot be buried, they would cause Class I impacts.

Noise and Vibration

a. Proposed Project

Offshore

The Union and Exxon facilities would have no offshore noise and vibration impacts.

Onshore

Installation of the Proposed Pipeline to Site 4 would have Class I, local, short-term impacts at Cabrillo School, Vandenberg Village, and at the Santa Ynez River Estuary. Scheduling and routing restrictions on supply truck traffic would reduce noise slightly.

Installation of the Proposed Pipeline from Lompoc to Orcutt and construction at the Orcutt Pump Station would have Class I, local, short-term noise impacts at Clark Street, Orcutt. Partial mitigations are described above. Local, long-term, beneficial impacts would result from installing engine-driven pumps and eliminating vibration at the Orcutt Pump Station.

b. Project Alternatives

Offshore

The Union and Exxon Project Alternatives would have no offshore noise and vibration impacts.

Onshore

Installation of the Alternative Pipeline to Site 4 would have Class I, local, short-term noise impacts at the northwest corner of Mission Hills. Installing the Southern Mitigated Pipeline would have similar impacts at the Federal Correctional Institution residential complex.

Installation of the Proposed Pipeline to Site 8 would have Class I, short-term noise impacts at the north edge and northwest corner of Mission Hills, the prison residential complex and the south edge of Vandenberg Village.

Scheduling/routing restrictions on supply trucks partially mitigates the pipeline construction noise.

Odors and Smoke

a. Proposed Project

Offshore

No offshore odor and smoke impacts were identified.

Onshore

Long-term, local Class II impacts would result from the release of odors at the Santa Maria Refinery.

b. Project Alternatives

Offshore

No offshore odor and smoke impacts were identified.

Onshore

No onshore odor and smoke impacts were identified.

10. Other Uses

Commercial Fishing, Kelp Harvest and Mariculture

a. Proposed Project

Offshore

The Union project is not expected to have significant impacts on commercial fishing, kelp harvest or mariculture. Regional Class I, significantly adverse and only partially mitigable short-term impacts on commercial finfish trawling are possible through construction period preemption (i.e., reduced fishing grounds) of dragging around the submarine canyon head southwest of the Exxon Project Shamrock platform site. Up to Class II impacts on the Ellwood kelp bed could occur from Exxon crew vessel traffic. In the unlikely event of a major oil spill related to either project, significantly adverse (up to Class I) impacts would be expected due to preemption of fishing activity.

b. Project Alternatives

Offshore

The alternative Union pipeline and power cable landfalls both have insignificant potential impacts on commercial fishing, kelp harvest and mariculture. The use of the alternative pipeline connection from the Exxon Project Shamrock Platform to Platform Hermosa would have potentially significant short-term preemption impacts (Class II) on trawl fisheries. These impacts could be mitigated to insignificance by cooperative scheduling between the operator and fishermen and advanced notification of the fishermen concerning the area to be preempted in a given time period. If operated, a Shamrock to Hermosa pipeline would have a greater risk of oil spills and related fishing preemption than the proposed Shamrock-Irene lines.

Recreation

a. Proposed Project

Offshore

No offshore recreational impacts were identified.

Onshore

No significant recreation impacts were identified from the planned operation or eventual abandonment of project facilities. A short-term adverse impact will likely occur with installation of the power cable since lateral access along the beach near Ocean Beach County Park will be restricted for up to one week during October or November.

b. Project Alternatives

Offshore

No offshore recreational impacts were identified.

Onshore

The Southern Mitigated Pipeline route would generate an adverse (Class III) impact upon recreational use of the beach near Ocean Beach County Park. Construction of the pipeline may restrict lateral beach use for up to three weeks during August. This is an important impact since Ocean Beach provides the only access point for beach use in the area. Ample beach access exists however, for park users.

Traffic

a. Proposed Project

Onshore

Construction-related traffic can be expected to increase congestion on highways and intersections neighboring Union project construction activities. These are short-term adverse, but insignificant impacts, given existing and projected traffic levels without the projects.

b. Project Alternatives

Onshore

Project alternatives impacts are not significantly different from project impacts.

Military Uses

Offshore

No offshore military use impacts were identified.

Onshore

Increased usage of the 13th Street gate to VAFB and construction of the pipeline right-of-way through the base are adverse, but insignificant, impacts of the Union project and pipeline alternatives.

Commercial Shipping

There are no expected adverse impacts upon commercial shipping due to the project or project alternatives.

11. System Safety and Reliability

a. Proposed Project

Offshore

Though a major (greater than 100,000 gal or 2,400 bbl) oil spill from the projects was found to be unlikely, the impacts from such an event could be damaging in view of the numerous areas of environmental sensitivity in the region. Because of reservoir conditions, oil spills due to blowouts are considered possible for only a limited period over the project lifetime. The effects of spills on the various resources and sensitive regions are discussed in the appropriate issue sections of this summary.

Onshore

For public hazards, the most significant concern is the likely occurrence of transportation accidents resulting in spills of gas processing by-products, specifically LPG (propane, butane). Severe risks to the public are expected to occur from such accidents over the project lifetime. Union's gas pipeline accidents with public safety impacts are considered to be rare events; however, failures at particular locations along the pipeline route could result in severe consequences to the public, even though the total number of people so exposed would be limited. Transportation of hazardous waste products generated by the onshore facilities does not present any public risk, but could have effects on the environment. Such spills are much less likely than those for gas by-products due to a much smaller number of trips.

b. Project Alternatives

Offshore

The alternative of connecting Exxon's Project Shamrock platform to Platform Hermosa would somewhat increase the risk of offshore pipeline oil spills due to the increased length of interplatform pipelines and additional processing equipment requirements on Exxon's platform. However, the number of wells on the Project Shamrock platform would likely decrease, thus reducing the risks of blowouts.

Onshore

The alternative Union Oil pipeline route would result in a slightly higher public risk potential due to its longer length and somewhat closer proximity to populated areas.

The alternative oil dehydration site is somewhat closer to populated areas; however, the public risk potential would remain minimal.

D. AREA STUDY DEVELOPMENT

In addition to the proposed project, this document includes a study of the cumulative impacts associated with further potential oil and gas developments in the Central Santa Maria Basin. Potential development over the next ten years was represented by four additional hypothetical platforms and connecting pipelines as shown in Figure 1. The hypothetical platforms are assumed to be tied to proposed pipeline systems.

Offshore

The analysis of the Offshore Area Study Development Scenario assumed:

- A maximum of six platforms (Irene, Shamrock, and four hypothetical platforms).
- Installation of these platforms over a six-year period at a rate of one per year after the installation of Platforms Irene and Shamrock.
- A 20-year life for each platform.
- Peak production from the offshore area study of 67,000 B/D of dry oil in 1992 and 44 MMscfd of gas in 1993 and 1994.

Platform placement for purposes of the EIS/EIR is based on company response, state-of-the-art technology, and MMS's present knowledge of the geology of the area.

Onshore

An Onshore Area Study was developed to analyze how onshore facilities might accommodate increased production which included the following:

- An expanded version of Union's oil dehydration facility to handle up to 100,000 barrels per day of dry oil;
- A new co-located gas processing facility to handle up to 80 MMscfd of sour gas (6,000-7,000 ppm H_2S).

The proposed Lompoc oil dehydration facility could easily be expanded to handle 100,000 barrels per day of fluids by installing additional equipment (five additional heater treaters and one freewater knockout drum). The dry oil from the dehydration facility would travel via pipeline to either Gaviota or Las Flores depending on the location of the marine terminal, or to a tie-in with one of the proposed pipelines from Gaviota to either Los Angeles or Texas.

For the Onshore Area Study Scenario it has been assumed that a gas processing facility would be built adjacent to the proposed oil dehydration facility. This facility would remove sulfur, propane, butane, and natural gas liquids (NGLs) from the incoming gas. The remainder of the gas would be transported via the local natural gas pipeline network. The by-products removed from the gas would be shipped to markets via tank truck.

1. Geology

Offshore

Active and potentially active faults, gasified sediments, shallow gas, areas of historic or potential slope instability, seafloor channels, and buried channels all occur frequently in the Area Study leases. These geological hazards would need to be evaluated in the Area Study platform designs. Seismicity is also a hazard. Subsidence is a potential Class II impact from Area Study development.

Onshore

Onshore, the Santa Ynez Fault and its branches would affect seismic design of Area Study development pipelines, and would require special design consideration, should a crossing be needed. In addition, landsliding, gullying and potential for scour constitute significant constraints that should be considered in routing and design.

2. Air Quality

Offshore

Emissions from the additional offshore platforms in the Area Study are predicted to cause exceedences of the state and federal 1-hour ozone standards in Santa Ynez (Class II - regional).

Onshore

The increased NO_x emissions from the expanded oil dehydration facility and the new gas processing plant at the onshore Area Study facility site are predicted to increase peak ozone levels beyond those predicted for the offshore platform (Class III - regional).

SO_2 emissions from a new gas plant at the onshore Area Study facility are predicted to cause exceedences of the state 1-hour and federal 24-hour standards (Class II - regional).

3. Onshore Water Resources

Onshore

Impacts of Area Study development on surface water would likely be locally significant on a few individual drainages. Oil spills could be Class I impacts because of the perennial nature of some streams in the Area Study. Impacts of Area Study development on groundwater resources would be Class II because of the large water requirements associated with the gas processing facility and current state of overdraft of affected basins. Oil spill impacts are considered potentially Class I.

4. Marine Water Resources

Offshore

Total wastewater discharges to the ocean from the six-platform Area Study development would be about three times the amount from the proposed two-platform project. The probability of oil spills would increase by a factor of four to five compared with the proposed project due to increased interplatform pipeline length and increased probability of a platform blowout. With regard to normal platform operations, Area Study impacts would be the same as for the proposed project and would have the same significance level. This includes a significant (Class II) impact of sediment contamination from discharges of drill cuttings, drill muds, formation water and other wastewater. The potential impacts may be greater for platforms that are closely situated (clustered or aligned on some fault), since the areas of contaminated sediments associated with each platform could overlap and form enlarged contiguous areas. As with the proposed project, the magnitude and extent of these potential impacts are uncertain. This situation makes the proposed baseline survey and monitoring program even more important.

Onshore

Not applicable, except that the hypothetical gas plant waste water is assumed to be included in the water discharged at Platform Irene.

5. Marine Biology

Offshore

The development of four additional platforms and connecting pipelines in the Central Santa Maria Basin could have potentially significant, not fully mitigable (up to Class I) impacts on the biota of hard-bottom features in the northeast, north central and/or southwestern portions of the group of leases included in the offshore Area Study. A major oil spill would become several times more likely in the Area Study Scenario, with potentially significant (up to Class I) marine biology impacts not mitigable to insignificance. A cluster of three to four platforms on leases OCS -P 0440, OCS -P 0441 and OCS -P 0510 could contribute additive produced water and sediment contamination to stress the benthic biota within an expected several square kilometer zone of overlap. The likelihood of this impact reaching a level of regional (Class II) significance is not known, but a program for monitoring and mitigation, as necessary, is described in the EIS/EIR.

Onshore

The addition of gas treatment capacity at Lompoc would modify the produced water discharge at Union's Platform Irene to potentially have a high oxygen demand with potentially locally significant (Class II) impacts on marine organisms. Monitoring and as necessary, discharge modification, or choice of a sulfur removal system without high scrubber water chemical oxygen demand (COD) could reduce this impact to insignificance.

6. Terrestrial and Freshwater Biology

Onshore

Construction of an expanded Area Study oil and gas processing facility would result in a Class II impact based in the removal of Coastal Scrub vegetation and wildlife habitat. Some impacts to vegetation of the onshore Area Study pipeline are potentially Class I.

7. Socioeconomic Considerations

Area Study development impacts are not separated into discrete onshore and offshore components for the socioeconomic analysis because socioeconomic impacts of offshore development are experienced onshore.

There are two Class I impacts. Water use in the South Coast area of Santa Barbara County, Lompoc, Santa Maria/Orcutt, Oxnard, Port Hueneme, San Buenaventura, and San Luis Obispo would strain available supplies. Secondly, the hypothetical gas processing facility will require rezoning of the existing land use designation or would remain inconsistent with current land use policies.

Class II impacts include: increased demand for temporary rental housing and motels during 1985 and 1988; demand for additional low-to- moderate income housing units, particularly in the Lompoc area; increased wastewater generation straining the capacity of SMID, Buellton, and Laguna Sanitation treatment facilities; increases in solid waste generation straining capacity at Foxen Canyon and Santa Maria landfill sites; a fiscal shortfall to Ventura County; and the incompatibility of the Area Study facilities with the rural character of the area.

Employment would increase due to greater construction activity during 1985 to 1990, and due to expanded permanent employment associated with the facilities. Local wages and spending would also be stimulated due to increased employment. Finally, fiscal benefits to local governments (except Ventura County) would increase above those generated by the Union and Exxon projects.

8. Cultural Resources

Offshore

Direct, local, Class II impacts could occur to potential cultural resources located in State waters where avoidance is not specifically stipulated by the State Lands Commission. Additional surveys should be conducted to identify the precise location and nature of anomolies.

Indirect Class III impacts to cultural resources may result from "masking" and oil leaks or spills.

Onshore

Potential Class I impacts (local and regional) to prehistoric, historic and Native American cultural resources/values may result from damage or destruction of buried sites during pipeline and facility construction.

9. Aesthetic Resources

Visual Resources

Offshore

The six Area Study platforms would have long-term, locally significant Class I impacts on views from Surf to Civilian Beach and regionally significant impacts on views from SPRR.

Onshore

The consolidated oil and gas processing facilities would have long-term, locally significant Class I impacts on views from Highway 1.

Noise and Vibration

Offshore

The offshore Area Study development would not produce onshore noise and vibration impacts.

Onshore

Construction of Area Study pipelines could result in local, short-term Class I impacts similar to those for the project. Minimization of supply truck traffic could reduce noise slightly.

Odors and Smoke

Offshore

No offshore odor and smoke impacts were identified.

Onshore

Long-term, local, Class II impacts would result from the release of gas odors at the consolidated processing facilities. The mitigations identified for the project are applicable.

10. Other Uses

Commercial Fishing, Kelp Harvest and Mariculture

Offshore

The Offshore Area Study development could lead to a significant (Class I) short-term (construction) or longer-term preemption of important fishing grounds for the Morro Bay and Port San Luis fleets. A platform located on lease OCS -P 0510, a cluster of three platforms on leases OCS -P 0440 and OCS -P 0441, or any platforms developed in the north central portion of the Area Study tracts could potentially preempt halibut (OCS -P 0440 and OCS -P 0441) or important rockfish/sole dragging areas. Major oil spills, with potentially significant (up to Class I) impacts on fishing, increase in likelihood by several fold with Area Study Development.

Other Uses

Area Study impacts (recreation, traffic, military uses and commercial fishing) were determined to be essentially as described for the proposed project in Section C.10.

11. System Safety and Reliability

Offshore

Potential oil spills from the offshore platforms and pipelines would become four to five times more likely to occur for the Area Study development than was found for the project. Expected frequencies of all offshore oil spills over 100 barrels combined would increase from about one in 56 years from the proposed project to about one in 13 years with the additional Area

Study development. These estimates are for the early years of the project when blowout-related spills are possible. In later years, the expected spill frequencies are estimated to be one in 88 years for the project and one in 18 years for the Area Study development. The potential consequences are essentially the same as described for offshore spills from the proposed project.

Onshore

The most significant safety-related issue would be the public risks associated with the transportation of NGL and LPG by-products from the gas processing facility. Assuming that these products are transported by truck to the Los Angeles and Bakersfield areas, it is estimated that small spills would occur every two and one-half years, and large spills about one every four years. As a result of these spills, the probability of a fatality to one or more persons would be about 0.27 per year, or, on average, one or more fatalities every 44 months of operation at peak processing levels.

Other accident events related to the increased throughputs of the dehydration and gas processing facilities will also increase, but their public safety effects will remain small relative to the by-product transportation risks.

E. CUMULATIVE DEVELOPMENT IMPACTS

Two cumulative development scenarios were developed to allow analysis of reasonably likely oil and non-oil developments. Figure 2 shows the location of both the oil and non-oil related cumulative development projects considered in the analysis.

Cumulative production was assumed to peak at about 600,000 B/D dry oil and 500 MMscfd of gas in 1991. The two scenarios involve different means of processing and transporting the production. In the Base Scenario all of the oil production leaves the County by onshore pipeline, except the Santa Ynez Unit production which is processed by an expanded offshore storage and treating vessel and then tankered from the County. In the Alternative Scenario, all the oil production is processed onshore and moves out of the County via an expanded Texaco Marine Terminal (250,000 B/D) or via a pipeline to Los Angeles.

The non-oil related development projects considered in the cumulative analysis include a variety of commercial, light industrial and residential projects plus some state park expansion projects.

1. Geology

The nature of cumulative impacts related to geology are qualitatively similar to those of Area Study development, though the geographic areas of concern are different.

2. Air Quality

Emissions from the additional cumulative sources are predicted to result in exceedences of the state and federal 1-hour ozone standards in Santa Ynez, San Luis Obispo and Santa Barbara. These exceedences are predicted to occur with the cumulative sources even without the proposed projects. The fully mitigated projects and Area Study sources add only a small increment to the levels of the future cumulative levels.

3. Onshore Water Resources

Cumulative development impacts have the potential to become regionally significant because of the extent of development anticipated and the sensitive nature and limited extent of both surface water and groundwater resources. Most of the groundwater basins in the study region are presently in conditions of overdraft. Cumulative development would increase this situation.

4. Marine Water Resources

All of the impacts identified as being associated with the proposed project remain and keep their same significance levels, including Class I for a major oil spill, Class II for regional, long-term sediment contamination, and Class II for direct, water quality effects associated with platform discharges. The majority of the new oil platforms will be located in the Santa Maria Basin, and therefore this basin will receive the greatest incremental impact. The impacts may not be so severe as in the Santa Barbara Channel where discharged pollutants from a cumulative total of about 24 platforms may get trapped in the channel by the circulating current regime and the depressed Santa Barbara Basin. As with the Area Study development, potential impacts are greater in the case of closely placed platforms that could form contiguous areas of contaminated sediments. The new development in the region would increase the probability of a major oil spill to the point where it may be important to increase the capability (in terms of equipment, personnel and response time) of both private (e.g., Clean Seas) and public (e.g., Coast Guard) spill response teams.

5. Marine Biology

The presence of some 16 existing and 29 new oil production platforms and associated pipelines and (in one scenario) tanker traffic leads to an overall expectation of a major oil spill with significant, and not fully mitigable (i.e. Class I) marine biology impacts in the cumulative scenario timeframe. Coastal environmentally sensitive habitat areas between Point Arguello and Point Conception, and on the northern Channel Islands would be subject to additive cumulative oil spill risk from the Southern and Central Santa Maria Basin developments. Areas from Purisima Point to Point Buchon, including portions of the sea otter breeding range, could be at additive risk from Central and Northern Santa Maria Basin developments.

6. Terrestrial and Freshwater Biology

Construction, normal operations, and accidents associated with the Cumulative Scenarios may also result in significant Class I impacts which could not be completely mitigated. These impacts would likely be related to

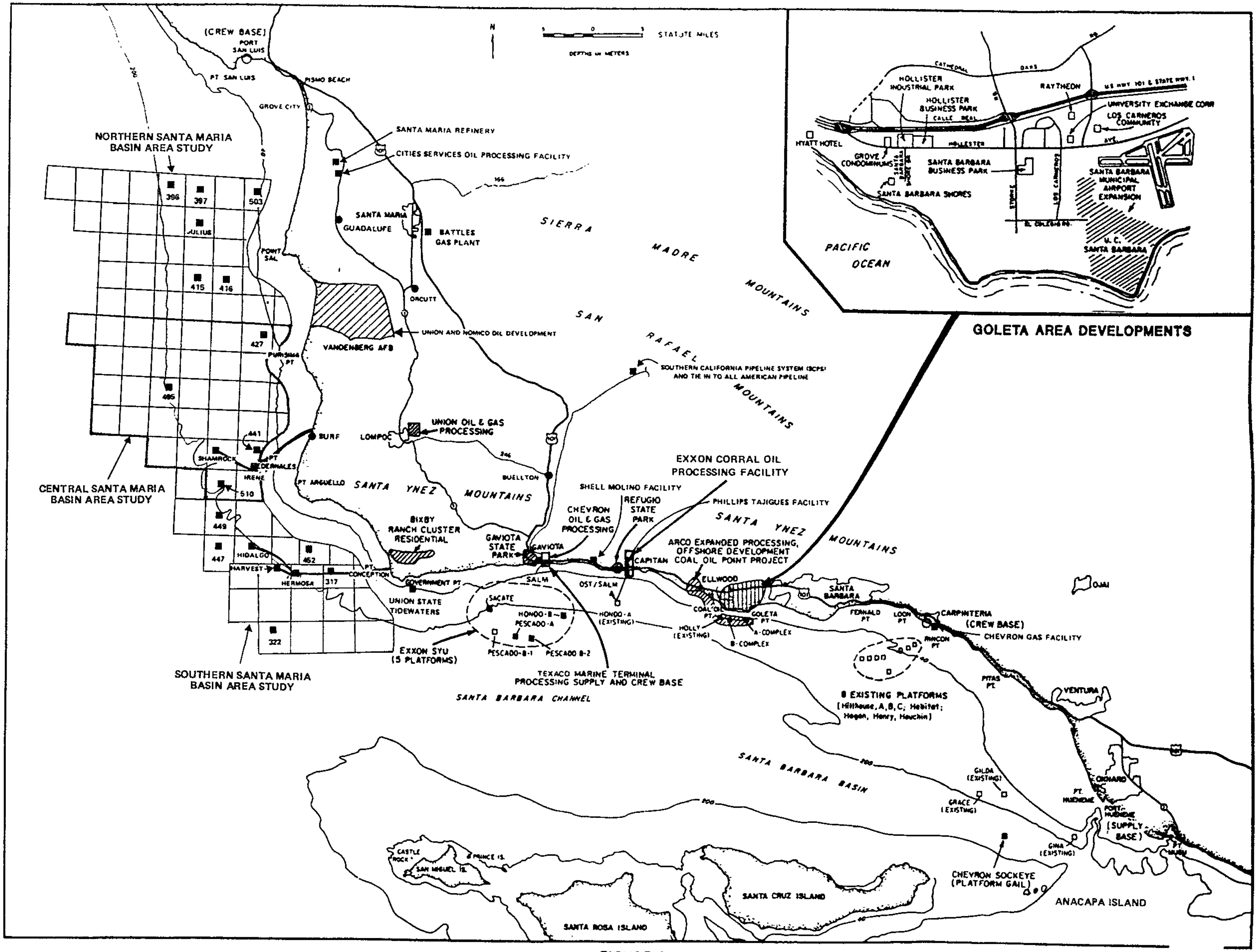

FIGURE 2

LOCATIONS OF CUMULATIVE SCENARIO DEVELOPMENT the removal of biologically important or rare habitats and species by pipeline and/or processing facility construction, or to the increased risk of oil spills, gas releases or wildfires that could adversely affect terrestrial and/or freshwater biota. Cumulative development could also result in potential Class I damage to vegetation from increased ozone levels in the San Luis Obispo, Santa Ynez and Santa Barbara/Goleta areas.

7. Socioeconomic Considerations

Cumulative assessments were conducted for both oil-related and non-oil-related projects. The Class I impacts are similiar to those for the project and Area Study development. Increases in water use further strain existing supplies in the same areas as listed for the Area Study development. The situation is made more acute by the intense non-oil development in the Goleta area. Land use incompatibility in the Lompoc area remains. Local land use plan inconsistency would be caused by industrial oil development along the South Coast of Santa Barbara County.

Class II impacts affect the same areas as discussed previously. Temporary housing demands would be increased significantly along the South Coast of Santa Barbara County. The demand for low-to-moderately priced houses increases very dramatically due to both non-oil projects and oil projects. Over 847 low-to-moderately priced units are required for non-oil project induced growth, and over 600 additional low and moderately priced housing units and rentals for oil project related growth. Demand for police and fire protection services increases to the point where new additional staff are required in Santa Barbara County and in the City of Santa Barbara as well as in Oxnard and Buenaventura. Wastewater generation increases will strain capacity along the South Coast due to non-oil-related projects, and in Santa Ynez, Santa Maria/Orcutt, City of Santa Barbara, City of Oxnard, City of San Luis Obispo, and Arroyo Grande. There are significant increases in public school enrollments in 11 districts within Santa Barbara County, and five districts within Ventura County. The majority of these public school employment increases are due to the non-oil related projects. The City of Santa Barbara will experience a revenue shortfall due to non-oil development, and Ventura County and the City of Guadalupe will experience revenue shortfalls due to oil-related project growth. There will be some change in land use character along the Santa Barbara coast from recreational/agricultural to industrial due to both oil and non-oil-related projects.

There will also be substantial benefits from the cumulative development scenario. As with the Union and Exxon projects and Area Study developments, increased employment opportunities and spending generated from construction of these cumulative projects as well as their operation will directly benefit the tri-county area. There will also be fiscal benefits to a number of local governments, particularly Santa Barbara County.

8. Cultural Resources

Offshore, local, Class II impacts could occur to Cultural Resources in State waters; further surveying is necessary to identify and avoid or salvage. Indirect, local, Class III impacts due to masking also could occur.

The cumulative impacts under the two cumulative scenarios would be the same. Direct, and indirect Class I impacts, both local and regional in scope, would result from the potential damage or destruction of both offshore and onshore cultural resource sites during widespread industrial, commercial and residential development. Mitigations include public education programs, legislative initiatives, data base creation, and jointly negotiated Memoranda of Agreement between developers and Native Americans.

9. Aesthetic Resources

Visual Resources

Overall, oil development in particular poses the principal threat to visual quality in the Tri County area. The public may perceive the Coast and inland agricultural areas as becoming increasingly industrialized, particularly given the proliferation of offshore platforms along the Southern and Central Coast. Onshore oil development, in many cases, will be unobtrusive due to siting and screening (e.g., the Lompoc dehydration facility and development in Flores Canyon). Moreover, the public's visual perception of the coastal area will be affected by current oil development and that proposed for the future. In time there will be no stretch of coastline from Point Sal south that will not be exposed to views of offshore platforms.

Noise and Vibration

The Cumulative Development scenarios would not produce onshore noise and vibration impacts, to sensitive receptors identified in the EIS/EIR.

Helicopter traffic associated with cumulative development would have local, long-term Class II impacts. Negotiating a local Letter of Agreement with all affected counties and the FAA to control routing, altitudes, and scheduling, etc. could help mitigate this impact.

Odors and Smoke

The cumulative impacts under the Base and Alternative options would be the same. No offshore or onshore impacts were identified.

10. Other Uses

Potentially significant, additive impacts on the Morro Bay and Port San Luis fishing fleets could occur in the form of fishing area preemption due to simultaneous construction of several Central and Northern Santa Maria Basin oil and gas developments. Timing or scheduling of such developments so that they do not overlap would likely reduce such temporary effects to insignificance and could also reduce oil spill probabilities.

Cumulative traffic impacts, were found to be significant. A variety of recommended mitigation measures include street improvements for the Goleta area; increased parking at Santa Barbara Airport; staggered timing of construction so as to avoid rush hours; housing offshore workers from parking to transportation facilities; scheduling offshore crew changes for midday times; scheduling heavy truck traffic for non-peak hours; development of carpool and vanpool programs; encouragement of public transit use; and encouragement of pedestrian and bicycle traffic.

11. System Safety and Reliability

Based upon historical data and engineering assumptions, the cumulative development scenarios suggest the potential for at most one blowout with oil spillage; as many as 23 platform spills, most of which would involve less than 10 barrels of oil and with some chance of a spill of 100 barrels or more; about a one in two chance of a large oil spill from a subsea pipeline; and the possibility of several small oil spills from a marine terminal during the 25-year period of concern.

Public risks will arise primarily from the transportation of gas by-products, and there is a likely chance of severe consequences from such operations during the lifetime of the various projects. Other potential safety-related impacts from gas pipelines, gas processing and LPG storage are in the likely-to-unlikely range for severe consequences, and somewhat higher for less critical impacts. The increase in the non-oil related development of the region may result in proximity of such activities to oil processing and transportation facilities, thereby increasing the potential risks of the public from energy-related accidents.

Increased transportation of waste products to Casmalia and other approved waste disposal sites will increase the potential for releases of these products into environmentally sensitive regions and resources.

F. SUMMARY COMPARISON OF PRINCIPAL ALTERNATIVES

1. Project Shamrock Alternatives

Partial comparison of the offshore portions of Project Shamrock alternatives indicates that (for this part of the project alone) the 2-mile pipeline connection to Platform Irene is environmentally preferable to the 18-mile pipeline connection to Platform Hermosa. Principal areas of difference that favor the Irene connection are marine biology, air quality, cultural resources, and system safety (oil spills).

2. Union Onshore Pipelines

Figures 3 and 4 illustrate impact issues in several subject areas for the Proposed and Alternative Union onshore Pipeline routes. Figures 5 and 6 illustrate potentially feasible measures to mitigate some of the impacts to insignificance. These measures include pipeline route realignments and the installation of catch basins and block/check valves.

A realigned mitigated version of the Proposed (Northern) Pipeline route (a combination of #2 and #1 on Figure 5) from a landfall north of the Santa Ynez River to Santa Lucia Canyon appears to be environmentally preferable to the mitigated Alternative (Southern) route. Principal areas of difference include Onshore Water and Cultural Resources where more potentially significant impacts exist for the Southern Mitigated Route. The Northern

Mitigated Route still has potentially more impacts in the area of Terrestrial/Freshwater Biology. In other resource areas, minor differences favor one route or the other, but all are mitigable or insignificant impacts. Table 1 gives a summary comparison of the impacts associated with the two mitigated pipeline routes by issue area.

In the area of Terrestrial and Freshwater Biology, the Proposed Northern Route or the Southern Alternative Route would involve pipeline placement relatively close to the sensitive wetland and wildlife resources of the lower 4.2 miles of the Santa Ynez River estuary. The mitigated realignments of both the alternative and proposed routes would increase the distance from the estuary and take advantage of buffering. This buffering, plus the use of berms and dikes on the Northern Mitigated Route would reduce the potential for an oil spill or gas leak impacting the resources of the Santa Ynez estuary. The U.S. Fish and Wildlife Service has identified a combination of the Northern Mitigated Route #2 plus the additional Northern Mitigated Route #1 in their Biological Opinion as a "reasonable and prudent alternative" to protect the endangered Least Tern. Continuing east towards Lompoc, the realignment would reduce the removal of Coast Live Oak and Burton Mesa Chaparral by using an existing firebreak for the route north of Santa Lucia Canyon along the border of Vandenberg AFB and the Union fee Property. Also, the use of the Northern Mitigated Route #2 would move Terra Road further from the estuary, thereby reducing the impacts on the estuary that are associated with travel on Terra Road.

In the area of cultural resources, use of the mitigated realignments of either the alternative or proposed pipeline routes would avoid the Santa Ynez River terrace, one of the two more sensitive segments for cultural resources in the Project Area. The remaining area of high sensitivity, the corridor between Santa Lucia Canyon and Lompoc/Casmalia Roads, would not be affected by either the mitigated Northern or Southern Routes. The Southern Mitigated Pipeline Route would, however, impact additional sites south of Highway 246 as well as the village of old Lompoco.

The Southern Mitigated Pipeline Route is almost completely in the 100-year floodplain of the Santa Ynez river and would therefore be subject to severe scour during a flood. This could be mitigated by burying the pipelines below the recorded depth of scour. In contrast, the Northern Mitigated Route is almost totally out of the 100-year floodplain. Also, the Northern Mitigated Route avoids crossing the Santa Ynez River, which is required if the Southern Mitigated Route is used.

3. Lompoc Dehydration Facility Site 4 Versus Site 8

There is no apparent environmentally preferable site between these two sites, as neither has a prevalence of significant impacts. Site 8, by virtue of its proximity to the Mission Hills residential area, has disadvantages in the areas of odors and smoke and safety. Site 4, because of its proximity to Highway 1 and the surrounding terrain, has disadvantages from the standpoint of visual quality and, to a lesser extent, air quality (inert pollutants) and terrestrial biology.

G. SUMMARY OF MAJOR IMPACTS FOR THE PROPOSED PROJECTS AND ALTERNATIVES

Impacts for the Union project and its alternatives have been analyzed in detail for the full range of components from offshore production through dry

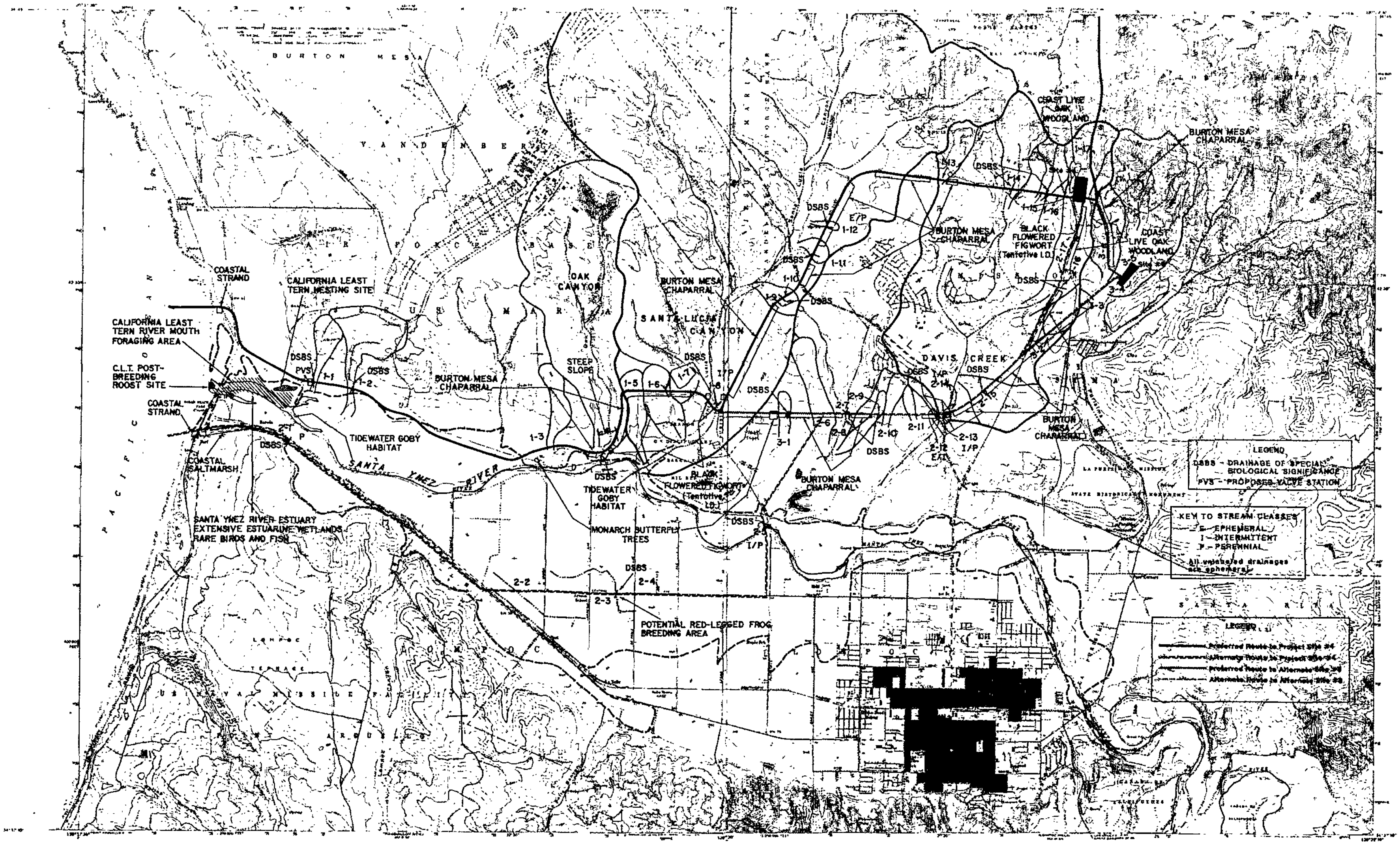

FIGURE 3 IMPORTANT IMPACT ISSUES FOR TERRESTRIAL AND FRESHWATER HABITATS AND SPECIES

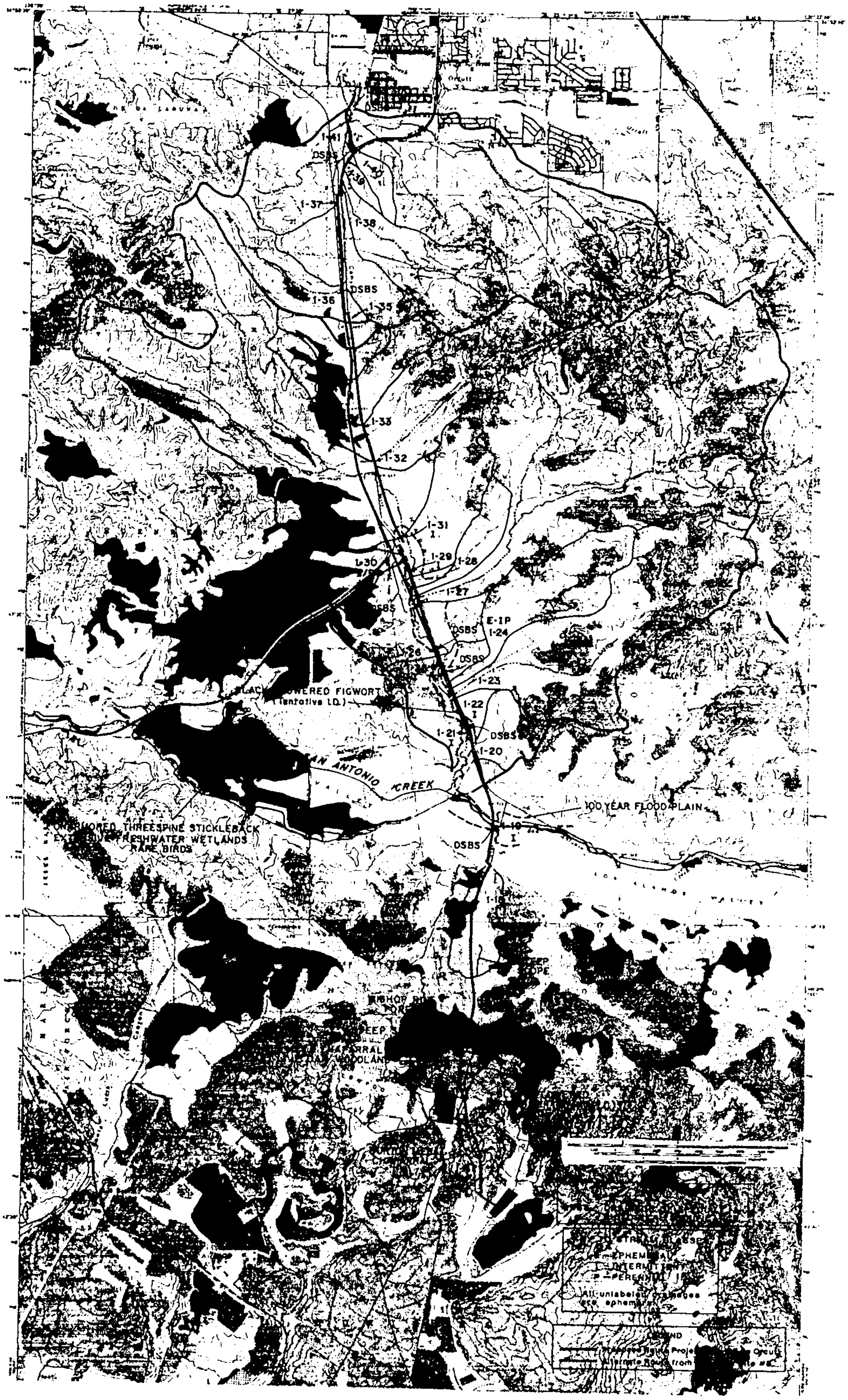

FIGURE 4. IMPORTANT IMPACT ISSUES FOR TERRESTRIAL AND FRESHWATER HABITATS AND SPECIES

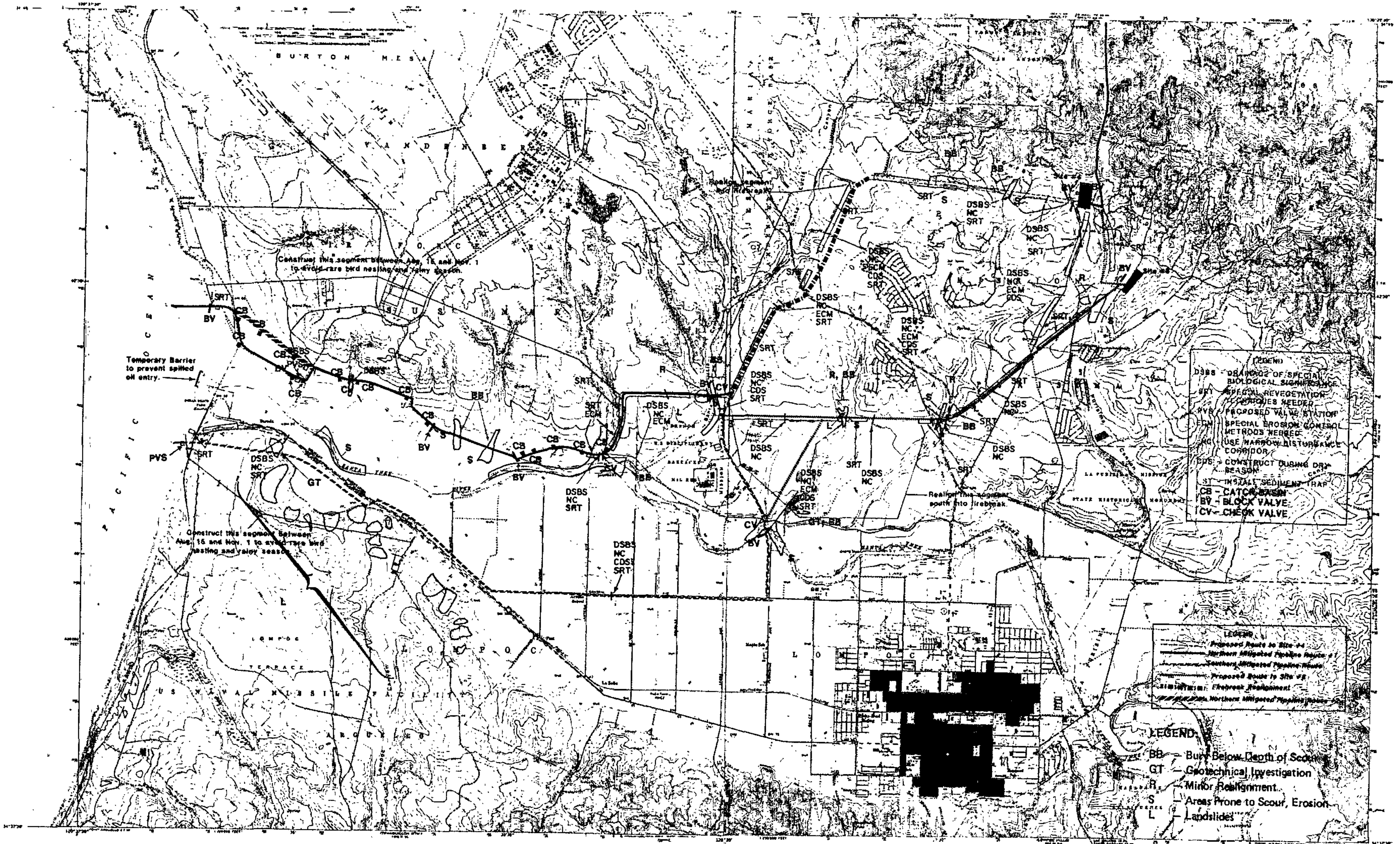

FIGURE 5 SUMMARY OF ONSHORE IMPACT ISSUES AND POTENTIAL MITIGATION MEASURES IN THE PROJECT AREA FROM LANDFALL TO LOMPOC

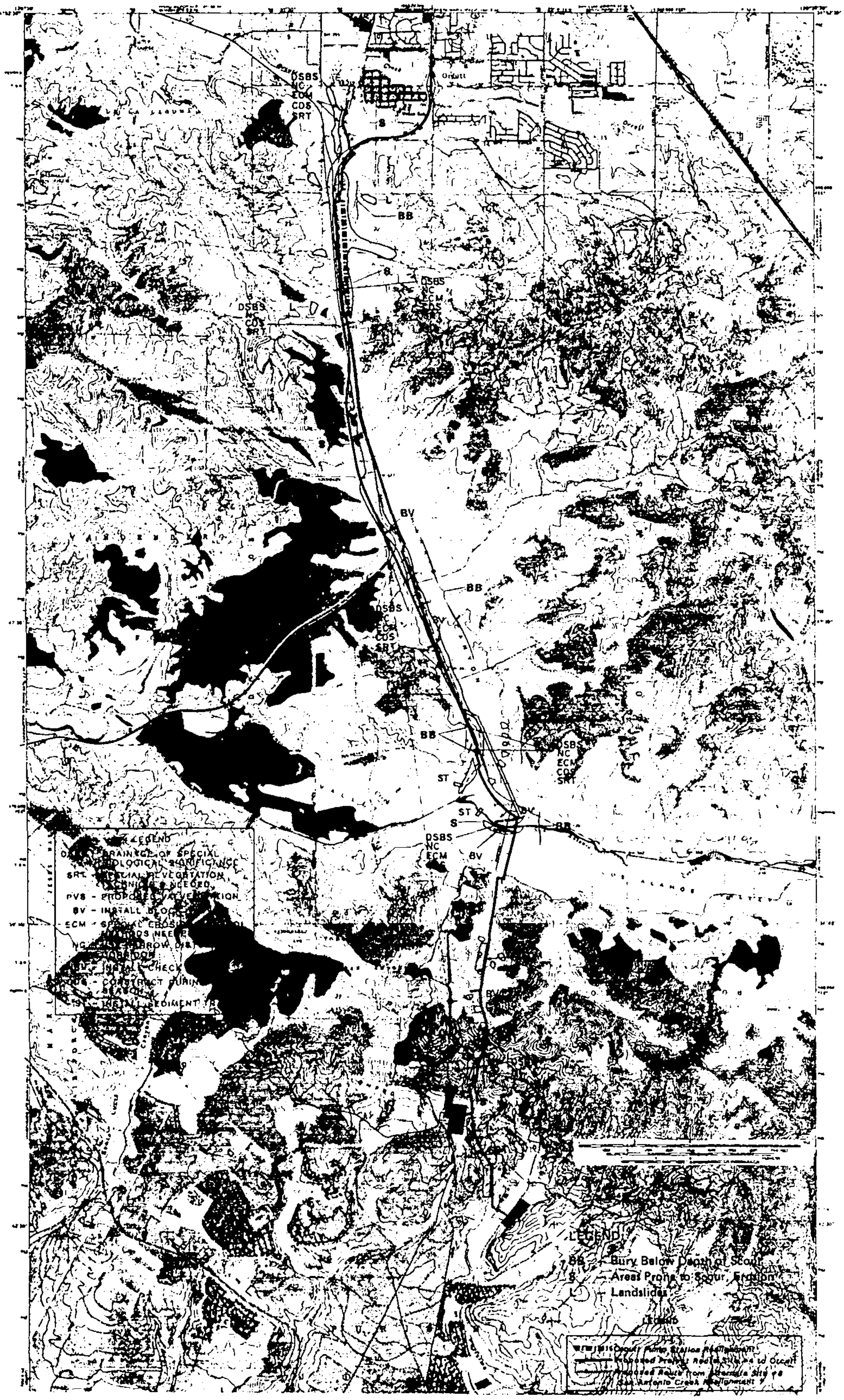

FIGURE 6 SUMMARY OF ONSHORE IMPACT ISSUES AND POTENTIAL MITIGATION MEASURES IN THE PROJECT AREA FROM LOMPOC TO ORCUTT

Table 1

COMPARISON OF NORTHERN AND SOUTHERN MITIGATED PIPELINE ROUTES

Issue Area	Northern Mitigated Pipeline Routes			Southern Mitigated Pipeline Route		
	Impact	Significance	Mitigation	Impact	Significance	Mitigation
A. Geology	1. Topographic/soil alteration due to spills	I, local long-term	Restore topography	1. Topographic/soil alteration due to spills	I, local	Restore topography
	2. Landslide at drainage crossings	II, local	Avoid	2. Old landslides on Lompoc Terrace	II, local	Geotechnical investigation and appropriate design
	3. Scour at tributary drainage crossings	II, long-term	Bury below scour depths	3. Scour throughout Santa Ynez River floodplain	II, long-term	Bury below scour depth; place in areas of low scour potential
	4. Erosion, gullying	III	N.A.	4. Erosion, gullying	II, local	Erosion control measures
B. Onshore Water Resources	1. Degradation of surface water quality due to spill	III	Spill contingency plan	1. Degradation of water quality due to spill	Potential I, depending on exact location and amount	Spill contingency plan
	2. Degradation of ground-water quality due to spill	Potential I in 0.7 mile section in floodplain	Spill contingency plan	2. Degradation of ground-water quality due to spill	Potential I in 6.5 mile section in floodplain	Spill contingency plan
	3. Flood hazard to line integrity	III	N.A.	3. Flood hazard to line integrity	Potentially I, because of unpredictable nature of river flood impacts	Place lines in areas of low scour potential and bury below scour depth
	4. Increased streamflow and sediment loading	II, at a few small drainages	Erosion control measures	4. Increased streamflow and sediment loading	III	N.A.
	5. Increase existing over-draft due to construction water requirements	II, but needs are small, short-term	Water reuse, artificial recharge	5. Increase existing over-draft due to construction water requirements	II, but needs are small, short-term	Water reuse, artificial recharge
C. Terrestrial and Freshwater Biology	1. Removal of Burton Mesa Chaparral	I, local	Revegetation, narrow corridor	1. Removal of Burton Mesa Chaparal	I., local	Revegetation, narrow corridor
	2. Removal of Coast Live Oak Woodland	I, local	Replant oaks, narrow corridor	2. None removed	N.A.	N.A.

Table 1
(continued)

COMPARISON OF NORTHERN AND SOUTHERN MITIGATED PIPELINE ROUTES

Issue Area	Northern Mitigated Pipeline Routes			Southern Mitigated Pipeline Route		
	Impact	Significance	Mitigation	Impact	Significance	Mitigation
C. Terrestrial and Freshwater Biology	3. Removal of native Coastal Strand	II, local	Revegetation, narrow corridor	3. Removal of highly disturbed Coastal Strand	II, local	Restore native vegetation
	4. Removal of Riparian Woodland at Santa Lucia Canyon	II, local	Revegetation, narrow corridor	4. Removal of Riparian Woodland at Santa Ynez River	II, local	Span river or use drilled crossing
	5. Loss of rare plants: 5 species potentially affected	II, local	Revegetation, avoidance, narrow corridor	5. Loss of rare plants: 2 species potentially affected	II, local	Revegetation, avoidance, narrow corridor
	6. Effects of noise, human presence, erosion and sedimentation on sensitive habitats and species of Santa Ynez River estuary	II, local	Scheduling, erosion control techniques	6. No effects	N.A.	N.A.
	7. Effects of oil spill from pipeline on sensitive habitats and species of Santa Ynez River estuary	II, local	Berms, containment basins, values, clean-up plans, inspection	7. Oil spill effects to estuary less likely; only in case of major break during flood	II, local to regional	Bury pipeline deeper in floodplain, drilled crossing of Santa Ynez River
	8. Sourgas leak affects sensitive species of Santa Ynez River estuary	II, local	Valves, monitor for H_2S	8. No effects	N.A.	N.A.
D. Cultural Resources	1. Disturbance of 7 prehistoric sites	II, local	Avoidance of significant sites; data salvage	1. Disturbance of 4 prehistoric sites	II, local	Avoidance of significant sites; data salvage
E. Marine Biology	1. Possible blasting damage to biota	III-II local to regional	Scheduling, drilled landfall	1. Blasting less likely	III	N.A.
	2. Possible damage to local hardbottom features	III-II local	Anchoring plan to avoid hardbottom features	2. No identified or expected features	III	N.A.
	3. Oil spill damage to biota	III-I local to regional	Cleanup, annual recovery	3. Oil Spill damage to biota	III-I local to regional	Cleanup, annual recovery

Table 1
(continued)

COMPARISON OF NORTHERN AND SOUTHERN MITIGATED PIPELINE ROUTES

Issue Area	Northern Mitigated Pipeline Routes			Southern Mitigated Pipeline Route		
	Impact	Significance	Mitigation	Impact	Significance	Mitigation
F. Other Uses						
Commercial Fishing	1. Temporary preemption of halibut fishing	III	N.A.	1. Temporary preemption of halibut fishing	III	N.A.
	2. Oil spill preemption of fishing	III-I regional	Cleanup, compensation	2. Oil Spill preemption of fishing	III-I regional	Cleanup, compensation
Traffic	1. Disruption of traffic on Terra Rd. during construction	III	N.A.	1. Construction activity may cause disruption of traffic at Floradale Bridge	III	N.A.
G. Aesthetics						
Visual	1. Linear clearing (Terra Road, 35th Street, SPRR views)	I, local short-term 2-5 years	None	1. Linear trace on hill with erosion potential (Highway 246 views)	III	Jute meshing slopes
	2. Pipelines spanning drainage (Terra Road views)	I, local long-term long-term	Partial, paint pipeline to blend	2. No similar effects	N.A.	N.A.
	3. 1 acre gravel pad for valve station (Terra Road, 35th St., SPRR views)	II, local long-term	Reduce size of pad, use dark gravel	3. No similar effects	N.A.	N.A.
	4. Erosion of earthen catch basins	II, local long-term	Use jute mesh to stabilize slopes	4. No similar effects	N.A.	N.A.
	5. Construction activities for pipelines (Terra Road, 35th St., SPRR views	III	None	5. Construction activities for pipelines (Highway 246 views)	III	None
Noise	1. Construction noise - Santa Ynez River estuary	I, local	N.A.	1. No similar effect	N.A.	N.A.
	2. No similar effect	N.A.	N.A.	2. Construction noise - Prison residential complex	I, local	Minimize supply traffic
Odors and Smoke	1. None	--	--	1. None	--	--

Table 1
(continued)

COMPARISON OF NORTHERN AND SOUTHERN MITIGATED PIPELINE ROUTES

Issue Area	Northern Mitigated Pipeline Routes			Southern Mitigated Pipeline Route		
	Impact	Significance	Mitigation	Impact	Significance	Mitigation
H. System Safety	1. Oil pipeline break or large leak	Unlikely/ major	Increase number of block valves	1. Oil pipeline break or large leak	Unlikely/ major	Increase number of block valves
	2. Oil pipeline leak	Likely/ medium	None	2. Oil pipeline leak	Likely/ medium	None
	3. Gas pipeline break	Unlikely/ minor	Increase number of block valves	3. Gas pipeline break	Unlikely/ major	Increase number of block valves
		Rare/severe	Increase number of block valves		Unlikely/ severe	Increase number of block valves
	4. Gas pipeline leak	Unlikely/no public impact	None	4. Gas pipeline leak	Unlikely/ minor	None
I. Air Quality	1. Exceedence of federal 24-hour particulate matter standard	II, local	Use of dust inhibitors	1. Exceedence of federal 24-hour particulate matter standard	II, local	Use of dust inhibitors

oil and gas transportation. For the Exxon Project Shamrock, detailed analysis of the offshore components and alternatives has been performed. Details for the onshore components have not been available for analysis. Analysis of potential impacts from the type of Exxon onshore components expected has been performed at a general level as part of the Onshore Area Study scenario. In addition, potential growth inducing impacts of the Exxon project have been considered.

1. Offshore Platforms, Pipelines and Utilities

The proposed Union and Exxon platforms and offshore pipelines could have significant impacts that cannot be mitigated to insignificance in the following categories:

- Expected visual impact from public access areas on the coast.
- Possible commercial trawl fishing preemption southwest of the Project Shamrock site.
- Unlikely major oil spills which could result in impacts to marine life and shoreline habitats.

2. Onshore Pipelines and Utilities

The proposed onshore pipelines and utilities could have impacts not mitigable to insignificance in the following categories:

- Terrestrial and freshwater biology, through removal of sensitive vegetation and wildlife habitat;
- Cultural resources, through damage to buried archaeological, historical and Native American resources;
- Disruption of land use on VAFB; and
- Major oil spills from project pipelines that could result in impacts to wildlife, habitat, and loss of soil.

Each of these impacts could be reduced for the pipeline from landfall to the Lompoc oil dehydration facility through use of a realigned version of the Proposed (Northern) Pipeline route.

3. Onshore Processing and Transportation Facilities

Union's proposed Lompoc oil dehydration facility at either the proposed or alternative site and the use of the existing Battles Gas Plant and the modified Santa Maria Refinery are predicted to have insignificant or mitigable impacts in most of the analysis categories. Potential exceptions are as follows:

- Air quality, through exceedence of SO_2 standards near the Santa Maria Refinery, with associated impacts on sensitive vegetation.

- Rural land use conversion at the Lompoc dehydration facility site would be inconsistent with local land use policy. Actual impact to the character of the area, will be adverse yet mitigable.

Detailed information for analysis of Exxon project transportation was not available at the time of preparation of this draft document. However, Exxon has just recently submitted to the County of Santa Barbara an application to cover onshore transportation. This project will undergo a separate CEQA review once the application has been deemed complete. The general impacts associated with the onshore portion of the Exxon project are covered in the Onshore Area Study impact discussion.

H. GROWTH INDUCING IMPACTS

The growth inducing impacts of the proposed project and alternatives are directly attributable to an increase in employment and local expenditures. Businesses providing direct goods and services (including labor) for the project will provide a minor contribution to overall regional growth. Businesses providing goods and services to these "direct support" businesses, as well as businesses providing goods and services for local employees, will also benefit from the project and may consequently add to regional growth, although to a very limited extent.

The project alone provides little "growth inducement" in terms of water demand, the need for new schools, police protection, and waste water treatment requirements in the Tri-County area. Realization of the project however, would remove impediments to growth in a number of ways. Approval of the project may establish a precedent with regard to local policies affecting future projects. For example, modification of County land use plans and the provisional zoning changes for the Union facilities could lead to additional industrial development in the Lompoc area. However, amendments to local planning and zoning ordinances can be prepared in such a way as to only allow the stated development on the particular parcel chosen for the facilities. In addition, local and state policies require consolidation and colocation of energy facilities in order to avoid the undesired proliferation of such facilities.

Approval of the project could also remove some impediments to development of the hypothetical facilities of the Offshore and Onshore Area Study scenarios. Approval of Union's consolidated pipeline to shore provides a means of oil transportation to shore for foreseeable development in the Central Santa Maria Basin. Approval of Exxon's Project Shamrock will lead to the requirement for new facilities onshore as analyzed in the Area Study. Potential indirect effects of Area Study related growth include increased pressure to expand public service systems which currently constrain growth (e.g., water supply, wastewater treatment) in the Tri-County area.

Since the oil and gas produced by the project will be transported out of the area, there will be little growth inducement from project-related production activities. However, exploration and drilling activities associated with the project and subsequent Area Study development will lead to a substantial amount of new geotechnical data offshore. Oil and gas resource fields will be further delineated, and structures within the Central Basin will become better understood with continued drilling. This new knowledge, in turn, could lead to further pressures on development of nearby State Tidelands.

IMPACT SUMMARY TABLES

I. IMPACT SUMMARY TABLES

The following tables summarize the impacts and mitigation measures for the proposed projects and the Area Study and Cumulative scenarios. Each mitigation measure also identifies the appropriate agencies that will consider the measure as a permit condition as part of the required agreements:

CCC	=	California Coastal Commission
CDFG	=	California Department of Fish and Game
COE	=	Corps of Engineers
DPR	=	Department of Parks and Recreation
EPA	=	Environmental Protection Agency
FAA	=	Federal Aviation Administration
MMS	=	Minerals Management Service
RWQCB	=	Regional Water Quality Control Board
SBAPCD	=	Santa Barbara Air Pollution Control District
SBC	=	Santa Barbara County
SHPO	=	State Historic Preservation Office
SLC	=	State Lands Commission
SLOAPCD	=	San Luis Obispo Air Pollution Control District
SLOC	=	San Luis Obispo County
USCG	=	United States Coast Guard
VAFB	=	Vandenberg Air Force Base

CLASS I

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

(Impacts which must be addressed in a "Statement of Overriding Consideration
if the project is approved (Section 10593), State EIR Guidelines)

GEOLOGY

Source	Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
A. Project-Related				
Union	1. Destructive removal or degradation of soil as a result of a likely oil spill from pipelines	Local, long-term	Reconstruction of topography (CCC, SBC, VAFB)	Potentially significant depending on size of spill
C. Area Study				
	1. Same as above, with slightly greater likelihood of occurrence because of additional pipelines	Local, long-term	Reconstruction of topography (CCC, SBC, VAFB)	Potentially significant depending on size of spill
D. Cumulative				
	1. Same as above, but more likely to occur because of additional pipelines	Local, long-term	Reconstruction of topography (CCC, SBC, VAFB)	Potentially significant depending on size of spill

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

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AIR QUALITY

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
A. Project Related					
Union, Exxon	1.	Accidental oil spills, NGL spill, gas release, fire, toxic H_2S release, may cause exceedances of the short-term SO_2, NO_2, CO, TSP, and Ozone standards, and/or exceedances of acceptable levels of non-criteria pollutants, odors and smoke.	Regional	See System Safety and Reliability	Significant
B. Project Alternatives					
Alternate Platform Design, Exxon	1.	Exceedances of the state and federal 1-hour ozone standards in Santa Ynez due to emissions from gas turbines and heaters on the Shamrock platform.	Regional	Use electric grid power for platform. (MMS)	Significant; emissions from the gas fired heaters on the platforms would still cause standard exceedances.
C. Area Study					
	1.	Accidental oil spills, NGL spill, gas release, fire, toxic H_2S release, may cause exceedances of the short-term SO_2, NO_2, CO, TSP, and Ozone standards, and/or exceedances of acceptable levels of non-criteria pollutants, odors and smoke.	Regional	See System Safety and Reliability	Significant
D. Cumulative					
	1.	Potential to exceed 1-hour state and federal ozone standards in San Luis Obispo, Santa Ynez and in Santa Barbara/Goleta.	Regional; high ozone levels would occur because of emissions from additional future oil-related facilities. Standards would be exceeded even without the proposed project.	Use grid power for additional platforms; Control NO_x emissions from process heaters; reduce NO_x emissions from supply boats. (MMS, SBAPCD, SLOAPCD)	Significant; would require additional emission reduction in the region through a revised AQAP.
	2.	Accidental oil spills, NGL spill, gas release, fire, toxic H2S release, may cause exceedances of the short-term SO2, NO2, CO, TSP, and Ozone standards, and/or exceedances of acceptable levels of non-criteria pollutants, odors and smoke.	Regional	See System Safety and Reliability	Significant

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

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ONSHORE WATER RESOURCES

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
A. Project Related					
Accidents, Union	1.	Degradation of groundwater quality because of likely dry oil spill, unlikely emulsion, or produced water spill.	Local, potentially long-term	Oil cleanup; aquifer restoration (VAFB,SBC)	Potentially significant to insignificant, depending on spill size, depth to groundwater, local water use
B. Project Alternatives					
Pipeline Accidents, Union	1.	Degradation of surface water quality at Santa Ynez River mouth because of unlikely pipeline spill in flood plain.	Regional, potentially long-term	Development of Pipeline Spill Contingency Plan; shutdown of lines during flood events; use of inverts for spill containment; placement of lines to minimize flood hazard. Oil cleanup. (VAFB,CDFG,SBC,RWQCB)	Potentially significant to insignificant
	2.	Degradation of groundwater quality because of unlikely emulsion, or produced water spill.	Local, potentially long-term	Oil cleanup; aquifer restoration (VAFB,SBC)	Potentially significant to insignificant, depending on spill size, depth to groundwater, local water use
C. Area Study					
Accidents	1.	Possible degradation of surface water quality, degradation of groundwater quality because of likely pipeline spill.	Local, potentially long-term	Oil cleanup; aquifer restoration (SBC,COE,CDFG,RWQCB,VAFB)	Potentially significant to insignificant, depending on spill size, depth to groundwater, local water use
D. Cumulative					
Accidents	1.	Same as above, but increased likelihood of spill.	Local, potentially long-term	Oil cleanup; aquifer restoration (SBC,COE,CDFG,RWQCB,VAFB)	Potentially significant to insignificant, depending on spill size, depth to groundwater, local water use

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

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MARINE WATER RESOURCES

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
A. Project Related					
Union, Exxon	1.	Surface oil slicks, tar balls, contamination of sediment and other adverse water quality changes (lowering of dissolved oxygen, solubilization of potentially toxic chemicals, decrease in light transmittance) due to unlikely major oil spill.	Local to regional, short- to long-term	Rapid and efficient spill clean-up (USCG, MMS, EPA, CCC, SLC)	Significant
B. Project Alternatives					
Union	1.	Impact above slightly more likely with southern Union pipeline route.	Local to regional, short- to long-term	Rapid and efficient spill cleanup(USCG, MMS, EPA, CCC SBC)	Significant
C. Area Study					
	1.	Impact above more likely due to additional platforms and pipelines.	Local or regional, short- to long-term	Rapid and efficient spill clean-up (USCG, MMS, EPA, CCC SLC)	Significant
D. Cumulative					
	1.	Impact above more likely due to additional platforms and pipelines.	Local to regional, short- to long-term	As above plus increase in capabilities (equipment and response time) of cooperative/ regional spill response terms (e.g., Clean Seas, Coast Guard).	Significant

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

(Impacts which must be addressed in a "Statement of Overriding Consideration if the project is approved (Section 10593), State EIR Guidelines)

MARINE BIOLOGY

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
A. Project Related					
Union, Exxon	1.	Mortality and disturbance of seabirds and/or marine mammals due to unlikely major oil spill and cleanup activities	Local to regional, short to long-term	Achieve adequate response time at key locations; selective use of dispersants for oil; animal recovery assistance (MMS, USCG, SLC, VAFB, CCC)	Locally to regionally significant
Union, Exxon	2.	Damage to subtidal ecology due to major oil spill	Local to regional, short to long-term	Avoid use of chemical agents (MMS, SLC, USCG, CCC)	Locally to regionally significant
Union, Exxon	3.	Damage to marine mammals due to unlikely encounters with support vessels	Regional, short- to long-term	Reporting requirements, restrictions of vessel movements (MMS, SLC, SBC, USCG, CCC)	Regionally significant to insignificant, potentially inconsistent with Federal Marine Mammal Protection Act: CCA Section 30230
B. Project Alternatives					
Exxon	1.	Impact types 1 and 2 above under Project Related more likely due to offshore Shamrock to Hermosa pipeline	Local to regional, short to long term	As above for Project Related	Significant to insignificant
Exxon	2.	Loss of hard-bottom benthos due to construction vessel anchoring along Shamrock to Hermosa pipeline route	Local individually to regional combined, short to long term	Pre-construction demarcation, restricting vessel activities, consolidated moorings, establishment of additional hard-bottom features, tie-in to Platform Hidalgo instead of Hermosa (MMS, CCC, SLC, USCG)	Locally to regionally significant, feasibility of mitigation uncertain
C. Area Study					
	1.	Impact type 2 under Project Alternatives at additional locations	As below under Project Alternatives	As above under Project Alternatives	As below under Project Alternatives
	2.	Impact types 1 and 2 under Project Related above, likely due to additional platforms and pipelines	Local to regional, short to long term	As above for Project Related plus limitation of concurrent production activities (MMS, USCG, SLC, CCC)	As above for Proposed Project-Related Accidents. Feasibility of production limitation uncertain

NNFS = National Marine Fisheries Service

CLASS I. SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

(Impacts which must be addressed in a "Statement of Overriding Consideration if the project is approved (Section 10593), State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY

Source		Impact Description	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Pipeline Construction (Union)	1.	Removal of Burton Mesa Chaparral (about 50 acres) and Coast Live Oak Woodland (including about 275 oak stems).	Regional	Use mitigating realignment: move route west into firebreak for 1.7 mile segment north of Santa Lucia Canyon (VAFB,SBC)	Significant
	2.	Removal of Bishop Pine Forest (including about 30 pine trees).	Local	Minimize width of construction ROW; reseed construction ROW with Bishop Pines (SBC).	Significant
	3.	Drainages 1-4 (Oak Canyon), 1-5 and 1-11: removal of Oak Woodland, Burton Mesa chaparral and rare plants on steep slopes.	Local	Use Southern Mitigated Pipeline Route; use mitigating realignment; move route west into firebreak for 1.7 mile segment north of Santa Lucia Canyon minimize width of construction ROW; replant oak seedlings; leave chaparral shrub root systems intact; use special soil stabilization techniques during revegetation (SBC, VAFB)	Significant
Offshore Oil Spill (Union, Exxon)	4.	Offshore oil spill reaches coastline. Impacts to vegetation, wildlife and aquatic habitats and biota, including ten or more rare species.	Local to regional	Develop site-specific cleanup and containment plans (i.e., use of temporary barriers to protect Santa Ynez River estuary). (USCG, VAFB, SLC, COE, CCC, MMS)	Significant
Sourgas Leak (Union, Exxon)	5.	Impacts to sensitive wildlife species from sour gas leak, including loss of rare species individuals.	Local to regional	Monitor or H2S; install block valves. (VAFB, SBC)	Significant
B. Project Alternatives					
Pipeline Construction (Union)	1.	Removal of Burton Mesa Chaparral (30 to 35 acres) and Coast Live Oak Woodland (1 to 8 acres, including 300 or more oak stems).	Regional	Minimize permanent ROW width; replant oak seedlings; leave chaparral shrub root systems intact; realign pipeline route into firebreak (section bordering Lompoc FCI). (SBC, VAFB)	Significant
Transmission Line Construction (Union)	2.	Removal of Burton Mesa Chaparral (4 acres)	Local	Minimize permanent ROW width; replant oak seedlings; leave chaparral shrub root systems intact. (SBC, VAFB)	Significant
(Exxon)	3.	Damage to vegetation, including to resistant species, as a result of increased ozone levels from the mouth of San Antonio Creek inland to Barka Slough and the Santa Ynez Valley caused by emissions from gas turbines and heaters on platform.	Regional	See air quality mitigation.	Significant

CLASS I. SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

(Impacts which must be addressed in a "Statement of Overriding Consideration if the project is approved (Section 10593), State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
C. Area Study					
	1.	Some impacts of the onshore Area Study pipeline are potentially Class I.	Local to regional	Siting decisions, project-specific measures and offsite measures. (SBC, CDFG)	Locally to regionally significant.
D. Cumulative					
Construction, Operations and Accidents	1.	Removal of sensitive habitats (e.g., Coast Live Oak Woodland, Burton Mesa Chaparral, Coastal Dune, Native Grassland, Butterfly Trees, Riparian and other wetlands, Vernal Pools) and impacts to rare species.	Regional	Siting decisions, project-specific measures, and offsite measures (SBC, CDFG)	Regionally significant.
	2.	Damage to vegetation including to resistant species (in some areas) as a result of increased ozone levels in the San Luis Obispo, Santa Ynez and Santa Barbara and Goleta Areas.	Regional	See air quality mitigation.	Regionally significant

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(Impacts which must be addressed in a "Statement of Overriding Consideration if the project is approved (Section 10593), State EIR Guidelines)

CULTURAL RESOURCES

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
A. Project Related					
Union	1.	Direct impact to onshore prehistoric, historic and Native American resources/ values resulting from the destruction or damage of buried cultural deposits unearthed during pipeline construction.	Long-term, local (site-specific). Specific sites/ locations unknown but high probability of buried cultural deposits exists in project area.	Education programs for construction crews to encourage early identification of cultural resources; data salvage at disturbed sites; support for Native American Heritage Program. (SBC, VAFB, SHPO)	Significant
Union	2.	Potential direct and indirect impacts of accidents and upsets to onshore cultural resources which may alter the contents of archaeological sites and disturb large areas, including unsurveyed areas, during the accident and control activities.	Long-term, local (site-specific).	Data salvage at affected cultural sites; implementation of recommended measures to prevent or reduce the frequency and magnitude of accidents. (SBC, VAFB, SHPO	Significant
B. Project Alternatives					
Union	1.	Direct impact to onshore prehistoric, historic and Native American resources/ values resulting from the destruction or damage of buried cultural deposits unearthed during pipeline construction.	Long-term, local (site-specific). Specific sites/ locations unknown but high probability of buried cultural deposits exists in project area.	Education programs for construction crews to encourage early identification of cultural resources; data salvage at disturbed sites; support for Native American Heritage Program. (SBC, VAFB, SHPO)	Significant
Union	2.	Potential direct and indirect impacts of accidents and upsets to onshore cultural resources which may alter the contents of archaeological sites and disturb large areas, including unsurveyed areas, during the accident and control activities.	Long-term, local (site-specific).	Data salvage at affected cultural sites; implementation of recommended measures to prevent or reduce the frequency and magnitude of accidents. (SBC, VAFB, SHPO)	Significant
C. Area Study					
Onshore	1.	Potential direct and indirect impacts to prehistoric, historic and Native American cultural resources/values resulting from destruction or damage of buried sites during Area Study pipeline and facility construction.	Long-term local (site-specific) areas of particular concern include La Purisima Mission and Gaviota. Although unknown, buried sites may be located throughout the Area Study triangle.	Data salvage at affected sites ethnohistorical investigations of La Purisima; genealogical studies of historic villages; support for Native American Heritage Program, data sharing to promote knowledge of site destruction, education of construction crews. (SBC, DPR, SHPO)	Significant

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CULTURAL RESOURCES
(continued)

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
D. Cumulative					
	1.	Direct impacts to onshore prehistoric, historic and Native American resources/values resulting from the destruction or damage of known and buried sites during industrial, commercial and residential development/construction.	Long-term, local (site-specific).	Adherence to environmental review process and recommended mitigation measures especially for EIS/EIRs related to specific development projects; public education programs; improved, consistent, enforced legislation, ordinances, and policies; creation of a comprehensive cultural resources data base; joint negotiated MOA between Chumash groups and developers, including oil companies to fund programs to ensure local control and cultural persistence. (SBC, SHPO, DPR, SLOC)	Significant

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AESTHETIC RESOURCES: VISUAL

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
A. Project Related					
Union	1.	Onshore Pipelines: direct impact due to clearing, grading trenching, backfilling during pipeline installation would create an uncharacteristic linear clearing.	Short-term, locally significant impact on 35th Street, Terra Road. Short-term regionally impact on views from SPRR.	None for right-of-way across gently sloping lands. (VAFB, SBC)	Low significance for 2-5 years; insignificant thereafter once operator's restoration measures take effect.
Union	2.	Electrical Substation: direct impact of utilities and screening vegetation intruding into the skyline, blocking ocean views.	Long-term, locally significant impact on views from Highway 246, near Surf.	None. Soil conditions and microclimate would not permit plantings to grow enough to fully screen facility. (SBC)	Low significance
Union	3.	Lompoc Dehydration Facility: direct impact due to industrial appearance in rural setting.	Short-term, locally significant impact on views from Highway 1 adjacent to site entrance.	Paint facilities grey-brown or grey green to blend with surroundings; use non-reflective paint. (SBC)	Moderately significant for 2-5 years; insignificant thereafter once proposed mitigation measures take effect.
Union, Exxon	4.	Offshore Platforms: direct impact on ocean views due to two platforms south-west of Ocean Beach area.	Long-term, locally significant impact on views from the shore between Surf and Civilian Beach. Long-term, regionally significant impacts on views from SPRR.	Paint platforms light blue-grey. (MMS, USCG)	Highly significant.
Union, Exxon	5.	Oil Spills: direct impacts on scenic quality, particularly of beach areas.	Short-term, locally significant impact on sandy beaches; potential for longer term, locally significant impacts on rocky headlands such as Pt. Sal and Civilian Beach.	Measures recommended to prevent or contain oil spills such as additional instrumentation and installation of additional values. (MMS,SLC,CCC,VAFB,SBC)	Highly significant until vestiges of oil are removed, probably from 1-5 years; insignificant thereafter.

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AESTHETIC RESOURCES: VISUAL
(continued)

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
B. Project Alternatives					
Union	1.	Onshore Pipelines: Alternative route route from landfall to Lompoc Dehydration Facility Site 4: direct impact due to clearing, grading, trenching, backfilling during pipeline installation through mature oak woodlands along Highway 1; would create uncharacteristic linear clearing and remove attractive vegetative features.	Long-term, locally significant impact on views from Highway 1.	Minimize width of right-of-way, adjust route to avoid mature trees. (SBC, VAFB)	Low significance; some loss of oak woodland is unavoidable.
Union	2.	Onshore Pipelines, proposed route from landfall to Lompoc Dehydration Facility Site 8: direct impact due to clearing, grading, etc. (see above) due to uncharacteristic linear clearing. Indirect effect due to erosion and mass wastage along steep slopes.	Short-term, locally significant impact on views from 35th Street, Terra Road. Short-term regionally significant.	None for right-of-way across gently sloping lands. (SBC, VAFB)	Low significance for 2-5 years, insignificant thereafter once operator's restoration measures take effect.
			Long-term, locally significant effect where route corsses steep slopes 1/2 mile east of Electrical substation.	For steep, erodible slopes, install jute mesh to stabilize slopes. (SBC, VAFB)	Effect of erosion on steep slopes would be to negligible levels.
Union	3.	Electric Substation: (alternative site): direct impact of utilities intruding into the skyline of ocean views and background of views of the estuary from County Park.	Long-term, local impact on views from 35th Street, Terra Road, Ocean Beach Park, and Highway 246. Long-term regionally significant impact on views from SPRR.	None possible. Vegetative screening may partially screen facilities but would also appear highly uncharacteristic of the area. (SBC)	Moderately significant, except for views from Highway 246, for which impact would be of low significance.
C. Area Study					
Onshore	1.	Consolidated O&G Processing Facility: direct impact of industrial facility in rural setting.	Long-term, locally significant impact on from Highway 1 (BM 867: indefinitely long; at site entrance: 10-15 years).	None possible for views from turnout at BM 867 due to viewing position. Near entrance: plant Monterey and Torrey pines and tall shrubs near road. Paint facility grey-brown or grey-green; use non-reflective paint. (SBC)	Low significance: for views from BM 867. Moderately significant: for views near site entrance for 10-15 years, insignificant thereafter.
Offshore	2.	Area Study Platforms: direct impact on ocean views due to six platforms.	Long-term, locally significant impact on views from beach area from Surf to Civilian Beach. Long-term regionally significant impact on views from SPRR.	Paint platforms light blue-grey. (MMS, USCG, CCG)	Highly significant.

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AESTHETIC RESOURCES: VISUAL
(continued)

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
D. Cumulative					
Offshore	1.	Offshore Platforms: direct impact on ocean views due the appearance of seven platforms.	Long-term, locally significant impact on views from beach area from Surf to Civilian Beach. Long-term regionally significant impact on views from SPRR.	Paint platforms light blue-grey. (MMS, USCG, CCC)	Highly significant.

AESTHETIC RESOURCES: NOISE

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Union	1.	Pipeline construction noise; 9db increase to 55LD.	Local at Cabrillo School, Vandenberg Village; short-term for duration of construction.	Schedule and routing restrictions to minimize supply truck traffic. (SBC, VAFB)	Significant for 3 weeks; insignificant thereafter.
Union	2.	Pipeline construction noise; 27db max increase at ROW to 89LD max.	Local at Santa Ynez River Estuary; short-term for duration of construction.	Schedule and routing restrictions to minimize supply truck traffic. (SBC, VAFB)	Significant for several weeks, insignificant thereafter.
Union	3.	Pipeline construction noise; 6db max increase to 66LD max.	Local at Clark St., Orcutt; short-term for duration of construction.	Schedule and routing restrictions to minimize supply truck traffic. (SBC, VAFB)	Significant for 7 weeks; insignificant thereafter.
Union	4.	Orcutt Pump Station Facility construction noise; 4db max increase to 64LD.	Local at Clark St., Orcutt; short-term for duration of construction.	Schedule and routing restrictfions to minimize supply traffic. (SBC)	Significant for 4 weeks; insignificant thereafter.
B. Project Alternatives					
Union	1.	Construction of Alternative Pipeline to Site 4; 16 db max increase to 68 LD (max)	Local at NW corner of Mission Hills; short-term term for duration of construction.	Schedule and routing restrictions to minimize supply truck traffic. (SBC, VAFB)	Significant for 3 weeks; insignificant thereafter.
Union	2.	Construction of Southern Mitigated Route; 26 db max increase to 76 LD.	Local at Prison Residential Complex; short-term.	Schedule and routing restrictions to minimize supply truck traffic. (SBC, VAFB)	Significant for 3 weeks; insignificant thereafter.

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AESTHETIC RESOURCES: NOISE
(continued)

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
B. Project Alternatives					
Union	3.	Construction of Proposed Pipeline to Site 8; 26 db max increase to 76 LD (max).	Local at Prison Residential Complex; short-term for duration of construction.	Schedule and routing restrictions to minimize supply truck traffic (SBC, VAFB)	Significant for 3 weeks; insignificant thereafter.
Union	4.	Pipeline construction noise; 9 db max increase to 55 LD.	Local at South Edge of Vandenberg Village; short term for duration of construction.	Schedule and routing restrictions to minimize supply truck traffic. (SBC, VAFB)	Significant for 3 weeks; insignificant thereafter.
C. Area Study					
	1.	Construction of Area Study pipelines; impacts similar to A, B above.	Local, short-term impacts at sensitive receptor sites for duration of construction.	Schedule and routing restrictions to minimize supply truck traffic. (SBC)	Significant for several weeks during construction in vicinity of sensitive receptors.

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OTHER USES

I. COMMERCIAL FISHING AND KELP HARVEST

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
A. Project Related					
Exxon	1.	Preemption of harvest in productive rockfish and sole tow area by construction of offshore platform for Shamrock project.	Regional, short-term	Minimize extent of offshore construction SW of site, establish notification procedures and preferred schedule with Liaison Office, prevent, locate and remove construction scars. (MMS)	Regionally significant to insignificant
Union, Exxon	2.	Preemption of harvest in any of various productive fishing grounds by unlikely major oil spill.	Local to regional, short to long term	Minimize spill response time at key locations, avoid use of sinking agents, compensate affected parties for lost revenue. (USCG, MMS, SLC, CCC)	Locally to regionally significant, failure to use sinking agent may threaten seabirds and/or marine mammals at certain sites.
B. Project Alternatives					
Exxon	1.	Preemption of halibut tow and halibut/shellfish set gear areas more likely for spill from alternative Shamrock to Hermosa pipeline.	Local to regional, short to long term	As above for project-related accidents.	As above for Project-related Accidents.
C. Area Study					
	1.	Temporary or permanent preemption of important trawling areas on lease tracts P-0440, P-0441, P-0510, P-0425, P-0430, P-0424 or P-0433.	Regional, short to long term	Minimize extent and duration of construction, establish schedules and notification procedures with Liaison Office; prevent, locate and remove construction scars; create new "rock piles." (MMS, CCC)	Regionally significant to insignificant; effectiveness of mitigation uncertain.
	2.	Impacts of accidents described above become more likely due to additional platforms and pipelines.	Local to regional, short to long term	As above for project-related accidents, plus limitation of concurrent production activities. (MMS, CCC, SLC)	As above for Project-related Accidents.
D. Cumulative					
Alternative Scenario	1.	Interference with set gear and kelp harvest activities by vessel traffic from full-scale Gaviota marine terminal and supply base.	Regional, long term	Delineate minimum width and nearshore length vessel corridors; establish new kelp plants offsite. (MMS, USCG, CCC, SLC, SBC)	Regionally significant unless alternate supply base used.
Both Scenarios	2.	Impacts of accidents described above become likely due to additional production.	Local to regional, short to long term.	As above for Area Study Development.	As above for Project-related Accidents.

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SOCIOECONOMICS

Source		Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
		Land Use			
U, A, AS, CO, CT	1.	Inconsistency of Lompoc dehydration facility with land use polices.	Lompoc - U,A, AS, CO, and CT.	None	Significant
CT	2.	Conversion of agricultural lands to industrial uses, inconsistent with local land use plans.	South Coast Santa Barbara County - CT.	None	Significant
CO, CT	3.	Inconsistency of industrial oil development along South Coast, Santa Barbara County with existing local Coastal Land Use Plan and Comprehensive Plan.	South Coast - CO, and CT.	No mitigations exist to reduce or eliminate this impact short of major project relocation or amendment to existing land use plans. (SBC)	Significant

CODES: U - Union Project; E - Exxon Project; A -Alternatives; AS - Area Study Projects; CN - Cumulative Non-Oil Projects; CO - Cumulative Oil Projects; CT - Cumulation Total

CLASS II

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GEOLOGY

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Onshore Construction Activities Union	1.	Construction activities could induce erosion, gullying, or landslides.	Landslide potential localized. Erosion and gullying potential somewhat more widespread, but of most concern at drainage crossings.	Avoidance of old landslides, stabilization or removal. Erosion control measures or avoidance, as above. (VAFB, SBC, CCC)	Insignificant
B. Project Alternatives					
Onshore Construction Activities Union	1.	Induced erosion, gullying or landslides.	Localized to Lompoc Terrace.	Stabilization and drainage of old slides. Erosion control measures: surface drainage, backfill compaction. (VAFB, SBC)	Insignificant
C. Area Study					
Area Study Production - Offshore	1.	Subsidence because of hydrocarbon withdrawal. Based on geologic conditions, not likely to occur.	Regional, long-term	Monitoring to detect; reinjection or water flooding to arrest or control. (MMS, CCC)	Insignificant
Onshore Construction Activities	2.	Construction activities could induce erosion, gullying, or landslides	Landslide potential localized. Erosion and gullying potential somewhat more widespread, but of most concern at drainage crossings	Avoidance of old landslides, stabilization or removal. Erosion control measures or avoidance, as above. (SBC, RWQCB, CCC)	Insignificant
D. Cumulative					
Cumulative Development	1.	Subsidence because of hydrocarbon withdrawal. Based on geologic conditions, not likely to occur.	Regional, long-term	Monitoring to detect; reinjection or water flooding to arrest or control.(MMS, RWQCB)	Insignificant

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AIR QUALITY

Source	Descrition of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Projects Union	1. Emissions during grading and construction at the onshore sites may result in exceedence of the federal 24-hour particulate matter standard.	Local, Short-term	Additional control plans needed for grading the sites, including the use of chemical dust inhibitors (SBAPCD, SBC).	Insignificant; Chemical additives may cause impacts on vegetation or surface water.
Union	2. Emissions from boats during construction of the pipeline near shore may result in exceedence of the state 1-hour NO_2 standards and the 24-hour PSD level.	Local, near pipeline landfall	Use retarded injection timing to reduce NOx emissions; use lower sulfur fuel to reduce SO_2 emissions (SBAPCD, SLC, CCC)	Insignificant
Union	3. Potential to exceed the state 1-hour SO_2 standard and the federal 24-hour SO_2 standard near the Santa Maria Refinery under normal operations.	Local, high levels can occur due to SO_2 emission from nearby coking plant. Standards could be exceeded due to emissions from the coke plant alone.	Install SO_2 scrubbers on exhausts at neighboring coke plant (SLOAPCD)	Insignificant
Union	4. Exceedence of the state 1-hour SO_2 standard and 24-hour standards near the Santa Maria Refinery under upset conditions (once every two years).	Local to regional; high levels would occur during failure of one of the two amine H_2S removal trains.	Reduce the throughput at the refinery to a level below the capacity of the operating amine train during the upset (SLOAPCD)	Insignificant
Union	5. Exceedence of federal ozone standard in San Luis Obispo due to emissions from Santa Maria Refinery	Regional	Use low NO_x burners at refinery (SLOAPCD)	Insignificant
Union	6. Exceedence of state/federal ozone standards in San Luis Obispo due to NO_x emissions from the Santa Maria refinery.	Regional	Use low NO_x burners at refinery (SLOAPCD)	Insignificant; background concentrations can still exceed the state standard.

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AIR QUALITY

Source	Description of Impacts	Scope	Mitigation Measures	Residual Impact
Proposed Projects Union	7. Exceedence of state 1-hour NO_2 standard near Battles Gas Plant	Local, high levels occur due to existing throughput. Increased levels would occur due to processing of gas from Irene	Replace approximately 30 percent of the engines at gas plant with electric motors, or reduce NO_x emissions by using SCR	Insignificant
Union/Exxon	8. Exceedence of federal ozone standard in Santa Ynez due to emissions from Irene and Shamrock projects	Regional, high levels can occur in Santa Ynez Valley	Use electric cement pump at Platform Irene instead of diesel; modify testing schedule for standby generators to reduce simultaneous emissions. Share a supply boat between Irene and Shamrock.	Insignificant, although state standard would be exceeded even without the projects
C. Area Study				
	1. Potential to exceed 1-hour state and federal ozone standards in Santa Ynez due to emissions from Area Study platforms and onshore processing facility in Lompoc.	Regional	Use electric grid power for all Area Study platforms, use electric pumps and cranes on platforms. Use SCR or thermal deNOx on heaters for oil and gas facility at Lompoc. (MMS, CCC, SBAPCD)	Insignificant
	2. Potential to exceed state 1-hour SO_2 standard near the proposed onshore Area Study oil and gas facility	Local; high levels can occur at elevated terrain near the facility in Lompoc.	Improve the SO_2 removal efficiency for the tail gas incinerator at the sulfur plant (SBAPCD)	Insignificant

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ONSHORE WATER RESOURCES

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Construction Activities, Union	1.	Increased streamflow because of increase in impervious surfaces.	Local, short- to long-term. A few small drainages are significantly affected.	Construction during dry season May-October. (SBC, VAFB)	Insignificant
	2.	Increased erosion and sediment loading to streams because of removal of vegetation.	Local, short- to long-term. A few small drainages are significantly affected.	Construction during dry season and use of sediment retention devices to minimize downstream impacts. (VAFB,SBC,RWQCB,COE)	Insignificant
	3.	Notching of stream banks during trenching of pipeline.	Local, short- to long-term.	Reconstruction of banks, spanning. (VAFB,SBC,RWQCB,COE)	Insignificant
	4.	Small increase in existing groundwater basin overdraft conditions in the Lompoc area to meet construction water requirements.	Local to regional, short-term	Desalination, water reuse, artificial recharge. (SBC)	Insignificant
Normal Operations of Proposed Project Facility, Union	5.	Small increase in existing groundwater basin overdraft condition in Lompoc Area to meet oil facility water needs.	Local to regional, long-term	Desalination, water reuse, artificial recharge. (SBC)	Potentially insignificant
B. Project Alternatives					
Construction Activities, Union	1., 2, 3.	Same as A-1, A-2, A-4 above, though number of drainages affected and locations are slightly different	Local, short- to long-term. A few small drainages are significantly affected. Regionally insignificant	Same as A-1, A-2, A-4 above.	Insignificant
C. Area Study					
Construction Activities	1.	Increased streamflows, increased sediment loading.	Local to regional, short- to long-term.	Same as A-1, A-2, A-4 above.	Insignificant
Normal Operations of Onshore Facilities	2.	Large increase in existing groundwater basin overdraft conditions to meet gas facility needs.	Local to regional, long-term	Desalination, water reuse, artificial recharge. (SBC)	Potentially insignificant
D. Cumulative					
Construction Activities	1.	Increased streamflows, increased sediment loading.	Local to regional, short- to long-term	Same as for project.	Insignificant

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MARINE WATER RESOURCES

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
(Individual and Combined Components) Union, Exxon	1.	Alteration of sediment texture and chemistry (e.g., incr. Ba, decr. D.O.) around platforms from discharge of drill cuttings. Extent and degree of impacts uncertain.	Regional, long-term	Institute monitoring program for impacts; if necessary, barge cuttings for onshore or deep water disposal. Could discharge at higher point (nearer sea level) for greater dispersion. (MMS, EPA)	Probably insignificant after recovery period of a few years. (Onshore disposal could have residual impact.)
Union, Exxon	2.	Alteration of sediment texture and chemistry (e.g., incr. in Ba, Cr, lignosulphonate) in radius of several km around platforms from discharge of drill fluids. Extent and degree of impacts uncertain.	Regional, long-term	Institute monitoring program for impacts; if necessary, barge muds for onshore or deep water disposal. Could discharge at greater height for more dispersion. Restrict use of problematic/toxic additives (e.g., emulsion breakers and biocides). (MMS, EPA)	Probably insignificant after recovery period of a few years. (Onshore and deep water disposal could have residual impact.)
Both Union & Exxon generate formation water; ultimate discharge by Union	3.	Alteration of sediment chemistry (e.g., incr. in Zn, Fe, As, Cr and petroleum hydrocarbons) in radius of several km around platforms from discharge of formation water. Extent and degree of impacts uncertain.	Regional, long-term	Institute monitoring program for impacts; if necessary, could treat (e.g., via activated sludge) formation water at Lompoc prior to discharge or reinject into geologic formation. Could discharge at greater height for more dispersion. Reevaluate additives (e.g., emulsion breakers) to be used at Lompoc and restrict use of any that are too toxic. (MMS, EPA, SBC)	Probably insignificant after recovery period of a few years. (Any treatment plant at Lompoc would generate residuals requiring land disposal.)
B. Project Alternatives					
Union, Exxon	1.	Basic impacts remain approximately the same for all project alternatives except for southern Union pipeline route for which pipeline break at Santa Ynez River crossing could cause oil pollution problems at ocean outfall of River.	Local for modified impact	Installation of check valves in pipeline on either side of Santa Ynez River crossing. (MMS, SBC, COE, CCC)	None for alternate pipeline route.
C. Area Study					
	1.	Impacts of Types 1-3 (above) more likely due to additional platforms and production. With platforms that are clustered or aligned, have potential for overlap of affected sediment areas (associated with impacts of Types 1-3) forming blocks or corridors of contaminated sediments which could be barrier to use or crossing by full array of benthic organisms. Have added discharge, from Platform Irene, of wastewaters produced by gas plant at Lompoc.	Regional, long-term	As described above for each impact type. Increased need for baseline study and monitoring of impacts. (MMS, EPA, CCC)	As above for corresponding impact types.

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(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

MARINE WATER RESOURCES (continued)

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
D. Cumulative					
	1.	Impacts of Types 1-3 (above) more likely due to additional platforms, pipelines and gas/oil treatment plants with ocean discharges. Platforms that are clustered or aligned, have potential for overlap of affected sediment areas (associated with impacts of Types 1-3) forming blocks or corridors of contaminated sediments which could be barrier to use or crossing by full array of benthic organisms.	Regional, long-term	As described above for each impact type. Increased need for baseline study and monitoring of impacts. (MMS, EPA, CCC, RWQCB, SLC, SBC)	As above for corresponding impact types.

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(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

MARINE BIOLOGY

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Union	1.	Disturbance of Least Tern nesting, subtidal reef, and/or transient marine mammals near landfall due to nearshore Union pipeline construction	Local and regional, short term	Construct in late September-October, restrict blasting, consolidate landfalls at Surf, avoid nearshore reefs (CCC, VAFB, MMS, SLC)	Insignificant if blasting and reef are avoided
Union, Exxon	2.	Damage to local benthos and fish due to discharge deposition near either platform or both	Local, short to long term	Pre-operations survey of sublethal pathology in benthic organisms continue during operations; as necessary further restrict discharge mode, mud components, disposal sites (MMS, EPA)	Potentially insignificant locally, short term; insignificant long term
Exxon	3.	Damage to kelp canopy off Ellwood due to Exxon crew boat traffic	Local to regional, short- to long-term	Restrict and monitor vessel movements and/or require use of alternate site without kelp canopy (USCG, CCC, SLC, SBC)	Insignificant
Union, Exxon	4.	Loss of habitat upon removal of platforms	Local, short to long-term	Create or maintain similar habitats (MMS, CCC, USCG)	Insignificant
C. Area Study					
	1.	Cumulative damages to benthos and demersal fish due to construction and operations of offshore platforms	Regional, short to long term	Monitor effects of first-generation projects, as necessary condition second-generation per measures described for proposed project under item 2 above. (MMS, EPA, CCC, SLC)	Potentially locally significant short term, insignificant long term and regionally. Feasibility of development cap uncertain.
D. Cumulative					
Both Scenarios	1.	Impact types 2 and 4 under Proposed Projects of greater magnitude due to occurrence at several sites	Local and regional, long term	As above for items 2 and 4 under Proposed Projects. (MMS,EPA,CCC)	Insignificant
	2.	Potentially additive discharge impacts of onshore processing facilities	Local to regional, long term	Discharge monitoring followed as necesary by discharge modification, relocation or reinjection (EPA, RWQCB, MMS, CCC)	Likely insignificant, depends on feasibility of discharge modification
	3.	Greater damage to kelp canopy off Ellwood or Gaviota due to supply and/or expanded crew vessel traffic	Local and regional, long term	As above for item 3 under Proposed Project	Insignificant if Alternative sites are used

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Pipeline Construction, Union	1.	Removal of Coastal Strand and Coastal Sage Scrub vegetation.	Local to regional	Minimize construction ROW width in dunes; recontour, stabilize, and revegetate dunes with local natives plants. (SBC, USAF, CCC)	Insignificant to locally significant
Transmission Line Construction, Union	2.	Removal of Coastal Saltmarsh and Riparian Woodland along Highway 246.	Local	Revegetate marsh with local native plants; replant riparian species in areas where they have been removed. (VAFB, CDFG, CCC, COE)	Insignificant
Normal Operations, Union	3.	Weedy species invade pipeline ROW and adjacent undisturbed habitats.	Local	Monitor ROW and remove invasive weeds by hand. (VAFB, CCC, CDFG, SBC)	Insignificant
Wildfire Accidents, Union	4.	Wildfire originating at the Lompoc Dehydration Facility.	Local to regional	Develop fire safety and fuel management program consistent with County fire policies. (SBC)	Insignificant to regionally significant
Onshore Oil Spill Accidents, Union	5.	Oil spill from the pipeline reaches Santa Ynez River estuary. Impacts to vegetation, wildlife, and aquatic habitats and biota, including ten or more rare species.	Regional	Use Northern Mitigated Pipeline Routes (#1 and #2); install block and check valves at designated locations; build and maintain berms and containment basins along mitigated route from landfall to Oak Canyon inspect pipeline frequently; develop site-specific clean-up plans. (VAFB, CCC, CDFG, RWQCB)	Insignificant
Union	6.	Large oil spill affecting upland areas along pipeline route. Impacts to vegetation, including ten or more rare plant species, wildlife habitats and species.	Regional	Install block valves develop cleanup and containment plans; inspect pipeline frequently; use mitigating realignment: move route west into firebreak for 2.7 mile segment north of Santa Lucia Canyon. (SBC, VAFB)	Insignificant
Union	7.	Oil spill at drainages 1-5, 1-8, 1-9, 1-10, 1-11, 1-12, 1-30, 1-35, 1-36, 1-41, 1-42. Impacts to vegetation, wildlife and aquatic habitats and biota.	Class II-III local to regional, depending on spill size.	Use mitigating realignments; Install block valves every 1-2 miles and at significant drainage crossings; develop cleanup and containment plans; inspect pipeline frequently. (SBC, VAFB, CDFG)	Insignificant
Union	8.	Oil spill at San Antonio Creek (drainage 1-19) or Harris Creek (drainages 1-21, 1-22, 1-25, 1-26, 1-27, 1-28, 1-29 (tributary to San Antonio Creek). Impacts to wetland vegetation, wildlife, and aquatic habitats and biota (potentially affecting Barka Slough).	Local to regional, depending on spill size	Realign route to east side of Highway 1; install block valves at San Antonio Creek and tributary crossings; store boom nearby that would be deployed to inhibit oil movement in case of a spill; use thicker, factory-coated pipe at creek crossing; install special cathodic protection system between block valves one and four; develop cleanup and containment plans; inspect pipeline frequently. (SBC, RWQCB, CDFG)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY
(continued)

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
	9.	Oil spill at the Lompoc Dehydration Facility.	Local	Install berms around facility to contain spill. (SBC)	Insignificant
A. Project Related and B. Project Alternatives					
Pipeline Construction, Union	1.	Effects of accelerated erosion and sedimentation, and noise (including at Santa Ynez River estuary, San Antonio Creek and Barka Slough and drainage crossings) on vegetation, wildlife and aquatic habitats and biota.	Local to regional, short- to long-term	Use Northern #2 or Southern Mitigated Pipeline route; construct pipeline through sensitive areas between mid-August and November to avoid rare bird breeding and rainy seasons; develop an erosion and sedimentation control plan that includes use of sediment traps, detention basins, and other stream protection measures; stabilize and rapidly revegetate erosion-prone areas using site-specific techniques and procedures; span the Santa Ynez River by attaching pipes to the Floradale Avenue bridge or: use a drilled crossing at Floradale Avenue, if feasible. (SBC, COE, VAFB, CCC)	Insignificant
Normal Operations, Union	2.	Damage to vegetation including to resistant species (in some areas) as a result of increased ozone levels in the Santa Maria Valley, the San Luis Obispo area, and from the mouth of San Antonio Creek inland to Barka Slough and the Santa Ynez Valley caused by emissions from the Lompoc Dehydration Facility, Santa Maria Refinery, Battles Gas Plant and platforms Irene and Shamrock.	Regional	Use SCR on oil heaters at Lompoc Dehydration Facility; use electric cranes and cement pumps at platforms Irene and Shamrock shared supply boats; install low NOx burners at the Santa Maria Refinery. (MMS, SBAPCD, SLOAPCD)	Insignificant although background concentrations could still exceed state standards.
Union	3.	Visible injury to leaves and decreased primary productivity in sensitive plants near the Santa Maria Refinery from SO2 levels that occur both during upset conditions and normal operations.	Regional	Improve efficiency of sulfur removal system for refinery gas; install SO2 scrubbers on neighboring coke plant exhaust; reduce refinery throughput during upsets. (SLOAPCD)	Insignificant
Union	4.	Visible injury to leaves and decreased primary production in sensitive plant species near the Battles Gas Plant from increased NO2 during worst-case conditions (up to two days per year).	Regional	Replace existing engines with electric motors; or use SCR on engines. (SBAPCD)	Insignificant
Support for Offshore Operations, Union, Exxon	5.	Noise effects on sensitive wildlife, including rare bird breeding, from helicopter flights over Santa Ynez River estuary.	Local to regional	Avoid flying low over sensitive areas; select alternative flight path. (SBC, FAA, VAFB)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY
(continued)

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
B. Project Alternatives					
Pipeline Construction, Union	1.	Removal of Coastal Saltmarsh, Freshwater Marsh and Riparian Woodland vegetation (including at Santa Ynez River estuary and drainages).	Local to regional	Use Southern Mitigated Pipeline Route; minimize construction ROW width; revegetate with locally-obtained native plants; span the Santa Ynez River by attaching pipes to the Floradale Avenue bridge or: use a drilled crossing of the Santa Ynez River at Floradale Avenue, if feasible. (VAFB, COE, CDFG, SBC)	Insignificant to locally significant
Union	2.	Vegetation removal, erosion, sedimentation and noise affect biota at drainages 2-1, 2-3, 2-12, 2-13, 2-14, 2-16, 2-17, 3-1.	Local	Use Southern Mitigated Pipeline Route; install block/check valves at important drainage crossings; minimize width of construction ROW; construct pipeline between mid-August and November to avoid rare bird breeding and rainy seasons; develop an erosion and sedimentation control plan that includes use of sediment traps, detention basins, and other stream protection measures; stabilize and rapidly revegetate erosion-prone areas using site-specific techniques and procedures. (VAFB, COE CDFG, SBC)	Insignificant
Union	3.	Removal of riparian vegetation, erosion, sedimentation, and noise affect biota of Santa Ynez River (drainage 2-5).	Local to regional	Span the river by attaching pipes to existing Floradale Avenue bridge, or: use a drilled crossing at Floradale Avenue if feasible. (SBC, CDFG, COE)	Insignificant
Union	4.	Removal of wetland vegetation at drainages 2-7, 2-8, 2-9.	Local	Realign pipeline route south into firebreak on northern border of Lompoc Federal Correctional Institution. (SBC, VAFB)	Insignificant
Union	5.	Removal of about 150 willows along Highway 246.	Local	Reestablish willows in areas where they have been removed. (VAFB, SBC)	Insignificant
Accidents-Onshore 1 Spills,	6.	Oil spill from the pipeline reaches Santa Ynez River estuary. Impacts to vegetation, wildlife, and aquatic habitats and biota, including ten or more rare species.	Regional	Use Southern Mitigated Pipeline Route; install block valves every 0.5 mile and at significant drainage crossings; develop cleanup and containment plans; inspect pipeline frequently. (VAFB, COE, CDFG, SBC)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY
(continued)

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
Union	7.	Large oil spill affecting upland areas along pipeline route. Impacts to vegetation, including ten or more rare plant species, wildlife habitats and species.	Regional	Install block valves every 1-2 miles; develop cleanup and containment plans; inspect pipeline frequently; use mitigating realignment. (VAFB, SBC)	Insignificant
Union	8.	Oil spill at Santa Ynez River pipeline crossing (drainage 2-5). Impacts to vegetation, wildlife, and aquatic habitats and biota, including five or more rare species.	Local to regional	Install block/check valves on both sides of river. develop cleanup and containment plans; inspect pipeline frequently; span Floradale Avenue bridge to minimize impacts from pipeline repair. (SBC, CDFG, RWQCB, COE)	Insignificant
Union	9.	Oil spill at drainages 2-1, 2-3, 2-13 (Davis Creek). Impacts to wildlife and aquatic habitats and biota.	Local to regional	Install block valves near drainages; develop cleanup and containment plans; inspect pipeline frequently. (SBC, CDFG, RWQCB)	Insignificant
Sourgas Leak, Union	10.	Impacts to sensitive wildlife species from sour gas leak, including loss of rare species individuals.	Local to regional	Monitor for H2S; install block valves. (VAFB, SBC)	Insignificant
C. Area Study					
Construction of expanded Lompoc Facility	1.	Removal of Coastal Sage Scrub (about 20 acres).	Regional	Restore equal area of offsite habitat. (SBC)	Insignificant
D. Cumulative					
Construction, Operations and Accidents	1.	Removal of disturbance of native vegetation and wildlife habitats.	Regional	Siting decisions, project-specific measures and offsite measures. (SBC)	Insignificant

Note: Some impacts of the onshore components of Exxon's Shamrock Project are potentially Class II but cannot be described accurately with currently available information.

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

CULTURAL RESOURCES

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Union	1.	Direct impacts to prehistoric archaeological sites during pipeline construction including SBa-1888; SBa-1889; SBa-1891; SBa-687; SBa-1743; SBa-1896; and SBa-1910.	Local (site-specific) long-term impact to sites, long-term regional impacts to Native Americans.	Subsurface testing to identify significance and boundaries of sites; avoidance of significant sites by pipeline realignment. Where avoidance not feasible, institute datasalvage program. Negotiate MOA with Indian community;conduct genealogical/ethnohistorical studies, especially of Naucu (VAFB, SBC, SHPO)	Insignificant
Union	2.	Direct impacts to prehistoric archaeological sites during pipeline construction: SBa-912; SBa-1890; SBa-1909; SBa-914.	Local (site-specific) long-term impact to sites, long-term regional impacts to Native Americans.	Adopt Northern Mitigated Pipeline Route #1 or #2. (VAFB, SHPO)	Direct impacts during Mitigated Pipeline Route #1 construction to prehistoric archaeological sites; SBa-1131; SBa-913; SBa-1917; and possibly SBa-1146. Local (site specific) long-term impacts to sites; long-term regional impacts to Native Americans. Northern Mitigated Pipeline Route #2 avoids SBa-1131 and SBa-1146, but impacts SBa-1762 and Isolate #7.
Union	3.	Direct impact from proposed pipeline construction to one historical site on pipeline route from Lompoc to Orcutt - Pacific Coast Railway right-of-way bed. Direct impact to newly recorded Historic Site #1, possible town of Graciosa, from Orcutt realignment.	Local, site specific, long-term impacts.	Avoidance of further disturbance of cut and fills along railroad bed; for Historic Site #1, use mitigations described above in A. 1. (SBC, SHPO)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines) (Continued)

CULTURAL RESOURCES

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
Union	4.	Direct impact to a potential shipwreck (two anomolies) in State waters.	Local, (site specific), long-term impacts along the Platform Irene to share power-corridor.	Avoidance. If avoidance is not feasible, identify and determine significance of anomolies through intensive surveying. If significant, relocate or institute data salvage programs. (SLC, SHPO)	Insignificant
Union	5.	Direct impacts to historic Meherin Wharf (submerged) due to cable installation.	Local, long-term impacts at power cable landfall at Surf. Exact location unknown.	SCUBA survey to identify location; Avoidance. (SLC, SHPO)	Insignificant
Union	6.	Direct impacts to native plants used by Native Americans for traditional food, crafts, and medicines.	Regional, long-term impacts at Santa Lucia Canyon wetlands.	Avoidance of sensitive wetlands to extent possible; minimize ROW width to limit destruction of stands of plants at any one location. (SBC, SHPO)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

CULTURAL RESOURCES
(continued)

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
B. Project Alternatives					
Union	1.	Direct impacts to prehistoric archaeological sites from construction of the proposed route to the alternate processing site: SBa-1888; SBa-1889; SBa-1891; SBa-687; SBa-1892; SBa-1893; SBa-1894; SBa-1768; SBa-1769; SBa-1771.	Local (site-specific) long-term impact to sites, long-term regional impacts to Native Americans.	Subsurface testing to identify significance and boundaries of sites; avoidance of significant sites by pipeline realignment. Where avoidance not feasible, institute datasalvage program. Negotiate MOA with Indian community;conduct genealogical/ethnohistorical studies of the historic village of Lompoc. (VAFB, SBC, SHPO)	Insignificant
Union	2.	Direct impacts to prehistoric archaeological sites during pipeline construction: SBa-912; SBa-1890; SBa-1909; SBa-914.	Local (site-specific) long-term impact to sites, long-term regional impacts to Native Americans.	Adopt Northern Mitigated Pipeline Route #1 or #2. (VAFB, SHPO)	Direct impacts during pipeline construction to prehistoric archaeological sites; SBa-1131; SBa-913; SBa 1917; and possibly SBa-1146. Local (site specific) long-term impacts to sites; long-term regional impacts to Native Americans.
Union	3.	Direct impacts of construction of the proposed pipeline to the alternate facility to abundant, sensitive wetlands containing native plants used for Native American traditional foods, medicines, and crafts.	Regional, long-term impacts between Santa Lucia Canyon and Lompoc-Casmalia Roads.	Avoidance when possible. Minimize ROW width to limit damage. (SBC, SHPO)	Insignificant
Union	4.	Direct impact to prehistoric archaeological sites from construction of the alternative pipeline route to the proposed site: SBa-219 (the historic village of Lompoc), SBa-1892, SBa-1893; SBa-1894 SBa-1768; SBa-1769; SBa-1771.	Local (site-specific long-term impacts; long-term regional impacts to Native Americans.	Subsurface testing to identify significance and boundaries of sites; avoidance of significant sites by pipeline realignment. Where avoidance not feasible, institute datasalvage program. Negotiate MOA with Indian community;conduct genealogical/ethnohistorical studies, especially of Naucu (VAFB, SBC, SHPO)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

CULTURAL RESOURCES
(continued)

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
B. Project Alternatives					
Union	5.	Direct impact to prehistoric archaeological sites from construction of the alternative pipeline route to the proposed site: SBa-1895.	Local (site-specific) long-term impacts; long-term regional impacts to Native Americans.	Southern Mitigated Pipeline Route. (SBC,VAFB,SHPO)	Direct impact to prehistoric archaeological sites: SBa-931; SBa-932; SBa-1860. Local site-specific) long-term impacts; long-term regional impacts to Native Americans.
Union	6.	Direct impacts from construction of alternate pipeline to proposed facility to sensitive wetlands containing plants used for traditional purposes by Native Americans; direct impact to sensitive, mature stand of oak trees.	Long-term, regional in Santa Lucia Canyon area; long-term, local just south of Site #4.	Avoidance when possible. Minimize ROW width to limit damage. (SBC, VAFB, SHPO, COE, CCC)	Insignificant
C. Area Study					
	1.	Direct impact to offshore cultural resources located in State waters due to platform/pipeline installation.	Local (site-specific), long-term impacts.	Avoidance. If avoidance not possible, conduct further surveys to determine significance and if significant, relocate resource or institute data salvage program. (SLC)	Insignificant
D. Cumulative Development					
	1.	Direct impact to offshore cultural resources located in State waters due to platform/pipeline installation.	Local (site-specific), long-term impacts.	Avoidance. If avoidance not possible, conduct further surveys to determine significance and if significant, relocate resource or institute data salvage program. (SLC)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

AESTHETIC RESOURCES: VISUAL

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Union	1.	One-acre fenced gravel pad for valve station: direct impact due to size, color, location, and rectilinear shape of pad.	Long-term, locally significant impacts on views from 35th Street, Terra Road, and Ocean Beach County Park. Long-term regionally significant impact on views from SPRR.	Reduce size of fenced, gravel pad and use dark gravel. (VAFB)	Insignificant
Union	2.	Onshore Pipelines: Indirect effect due to erosion and mass wasteage along steep slopes.	Long-term, locally significant impacts where route crosses steep slopes 1/2 mile east of electrical substation.	Northern Mitigated Pipeline Routes #1 or #2 avoids impact. (VAFB)	Direct impact due to appearance of pipeline aerally spanning drainage. Long-term locally significant impacts on views from Terra Road where route crosses drainage east of valve station.
B. Project Alternatives					
Union	1.	Alternate Transmission Line Line route: direct impact of utilities intruding into the skyline of ocean views and background of views as seen from County Park.	Long-term, locally significant impact on views 35th Street, Ocean Beach County Park, and Highway 246. Long-term regionally significant impacts on views from SPRR.	Bury transmission lines from electrical substation to 13th Street. (VAFB)	Insignificant

AESTHETIC RESOURCES: NOISE

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
D. Cumulative					
	1.	Direct impacts of helicopters during platform installation, drilling and production offshore -- maximum of four flights per day from Santa Barbara (1990); with 48 flights per day when all platforms are operating.	Long-term impacts, localized to flight corridors.	Negotiation of local letter of agreement with affected counties and the FAA. (SBC,VAFB,FAA)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

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AESTHETIC RESOURCES: ODORS AND SMOKE

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Union	1.	Nuisance odors from hydrogen sulfide and organic sulfur compounds at Santa Maria Refinery.	Long-term, local impacts.	Tightening and maintenance of valves and phlanges. (SLOAPCD)	Insignificant
C. Area Study					
	1.	Odors from gas processing at consolidated facility.	Long-term, local impacts.	Tightening and maintenance of valves and phlanges. (SBC,SBAPCD)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

OTHER USES: COMMERCIAL FISHING AND KELP HARVEST

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Exxon	1.	Reduction of kelp canopy off Ellwood by Exxon crew vessel traffic.	Local to regional, long-term	Delineate and enforce minimum length and width corridor through kelp bed and re-establish kelp plants offsite; or require Exxon to use Carpinteria as crew base. (SBC, USCG, SLC)	Insignificant if combined measures applied.
Union, Exxon	2.	Damage to fishing gear and/or vessels due to collision with and/or hangup onoil and gas pipelines or debris.	Regional, short- to long-term	In addition to MMS requirements, ensure timely full compensation for losses. (MMS)	Insignificant if all measures applied.
B. Project Alternatives					
Exxon	1.	Impact as below under Area Study with offshore Shamrock to Hermosa pipeline	Regional, short-term	As below under Area Study	Likely insignificant.
C. Area Study					
	1.	Pre-emption of halibut, rockfish, sole tow areas by construction activities.	Regional, short-term	Restrict construction vessel activities, cooperative scheduling/notification, post-construction removal of obstructions. (MMS,USCG,SLC, CCC)	Likely insignificant.
D. Cumulative					
Both Scenarios	1.	As above for Area Study development, of greater magnitude.	Regional, short- to long-term	As above for Area Study development.	Insignificant
	2.	Pre-emption of drag, drift, seine, or set fishing areas by concurrent construction of projects.	Regional, short-term	Schedule projects to avoid overlapping construction (MMS, CCC, SLC)	Same as individual proposed projects

NOTE: Additional details on impacts and mitigation measures appear in Section 5.10.1 and 6.10.1.

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

OTHER USES: TRAFFIC

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
D. Cumulative	Traffic congestion in Goleta will increase, primarily due to non-oil-related cumulative development.	Long-term, site specific	Require applicants to provide monies for a capital improvement fund levied increase to peak traffic movements. (SBC)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

SOCIOECONOMICS

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
Temporary Housing		Increased demand for rental units and motel rooms. Also possible interfere with visitors to see VAFB space shuttle launches.	Lompoc, U, AS, CN, CO, CT; Santa Maria CO, CT; South Coast - CN, CO, CT; Oxnard & Port Hueneme	Participate in Monitoring Program; hire local workers; participate in training programs; sign letter of intent and encourage contractors to do the same; coordinate with local Building Trades Council; coordinate with City Planning Department; avoid construction during space shuttle launches. (SNC)	Insignificant
CO, CN, CT	2.	Permanent Housing Demand for over additional low to moderately priced housing units and rentals.	Lompoc - CO, CN, CT.	Participate in Monitoring Program; assist in low income housing development; landbank; contribute to an affordable housing fund. (SBC)	Insignificant
U, E, A, AS CO, CT	3.	Water Use Increases in water demand further strain overcommitted supply or exceed the significance criteria.	Lompoc, Santa Maria/Orcutt (South Coast Santa Barbara County, the Cities of Santa Barbara, San Luis Obispo, Oxnard, Pt. Hueneme and Ventura - CO, CN, CT only).	Contribute to salt removal (desalination) facility to provide offset for water demand increase) or other local water reclamation programs. (SBC, RWQCB)	Significant
U, AS, CO, CN CT	4.	Wastewater Wastewater from project related growth exacerbates the capacity constraints existing at the treatment plants.	SMID, Buellton; U, AS, CO, CN, CT; Laguna Sanitation; AS, CO, CN, CT; 7 other districts; CN, CO, CT.	Participate in Monitoring Program and contribute to public service capital improvement fund. (SBC)	Insignificant
U, E, AS, CN, CO, CT	5.	Solid Waste Project related growth will increase solid waste disposal to sites which have reached capacity.	Foxen Canyon, Santa Maria Sites. U, E, AS, CN, CO and CT.	Contribute land and/or funds for developing or expanding landfills. (SBC)	Insignificant
CN, CO, CT	6.	Police Protection Project related growth will generate a need for additional staff.	Santa Barbara County and the Cities of Oxnard & & Ventura, CN, CO, CT; City of Santa Barbara, CN, and CT.	Provide public funds for the additional staff. (SBC)	Insignificant
CN, CO, CT	7.	Fire Protection Project related growth will generate a need for additional staff. Cumulative oil projects result in the construction and operation of a new station along the Gaviota Coast.	Santa Barbara County, City of Santa Barbara CN, CO, CT; City of Oxnard, CT.	Oil Companies contribute to a fund to assist affected agencies with expenditures incurred. (SBC)	Insignificant

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved (Section 15091), State EIR Guidelines)

SOCIOECONOMICS
(continued)

Source	Description of Impacts	Scope	Mitigation Measures	Residual Impact
Fire Protection	Project facilities will increase the pressures on currently understaffed County Fire Station #51 in Lompoc.	Santa Barbara County, U,AS, A, CO, CT.	Provide public funds for the addition of staff and purchase of any equipment required to serve the facility. (SBC)	Insignificant
Public Schools	Projected enrollment increase significantly impacts school district capacity.	Various Districts (see Table 3.6.3.6 in Technical Appendix) CN, CO, CT.	Support local oil tax; participate in Monitoring Program and public service capital improvement fund. (SBC)	Insignificant
Public Finance	Projected related growth will result in an increase in expenditures in excess of revenues received.	Ventura County. U, A, CO, and CT; City of of Guadalupe, CO, CT; City of Santa Barbara, CN.	Participate in Monitoring Program to provide basis for government assessment of local burden; contribute to public service capital fund. (SBC)	Insignificant,
Land Use	Incompatibility of rezoning rural agricultural land to General Industry (M-2 for Lompoc dehydration facility) with land use policies; development induced impacts from rezone action.	Lompoc Area, U, AS, CO, CT and A.	Require conditions of approval that restrict uses on the property and limit amount of land to be rezoned. (SBC)	Insignificant
	Lack of available land under existing S.B. County land use element to accommodate commercial growth in the South Coast unincorporated (Goleta) area.	Goleta, CN and CT.	Use industrially zoned land for commercial uses. Use Santa Barbara City land near the Airport that is designated "Airport Commerce" for commercial growth. (SBC)	Insignificant, (depletion of available commercial land in City of Santa Barbara.)
	Changes in character of coastal area from recreational/agricultural to industrial.	South Coast, CO, CT.	Increase consolidation of facilities in areas not visible from public viewing areas. (SBC)	Insignificant

CODES: U - Union Project; E - Exxon Project; A - Alternatives; AS - Area Study Projects; CN - Cumulative Non-Oil Projects; CO - Cumulative Oil Projects; CT - Cumulation Total

CLASS III

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

GEOLOGY

Source		Description of Impacts	Scope
A. Project Related			
Construction Activities-Offshore Union, Exxon	1.	Anchor scars, sediment disturbance, alteration of seafloor	Local
Development and Production Activities-Offshore Union, Exxon	2.	a. Mass wasting of cuttings piles.	Local
		b. Subsidence as a result of production from two platforms	Local, long-term
C. Area Study			
Construction Activities-Offshore	1.	Anchor scars, sediment disturbance, seafloor alteration.	

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

AIR QUALITY

Source		Description of Impacts	Scope
A. Project Related	1.	Increased ambient air concentrations of SO_2, NO_2, CO, O_3 and TSP but below the standards and allowed PDS increments. Increased levels of odorous pollutants and smoke but below the detection thresholds.	Regional; maximum concentrations would be near the onshore facilities.
B. Project Alternatives	1.	Increased ambient air concentrations of SO_2, NO_2, CO, O_3 and TSP but below the standards and allowed PDS increments. Increased levels of odorous pollutants and smoke but below the detection thresholds.	Regional; maximum concentrations would be near the onshore facilities.
C. Area Study	1.	Increased ambient air concentrations of SO_2, NO_2, CO, O_3 and TSP but below the standards and allowed PDS increments. Increased levels of odorous pollutants and smoke but below the detection thresholds.	Regional; maximum concentrations would be near the onshore facilities.
D. Cumulative	1.	Increased ambient air concentrations of SO_2, NO_2, CO, O_3 and TSP but below the standards and allowed PDS increments. Increased levels of odorous pollutants and smoke but below the detection thresholds.	Regional; maximum concentrations would be near the onshore facilities.

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

ONSHORE WATER RESOURCES

Source		Description of Impacts	Scope
A. Project Related			
Construction of Pipeline Union	1.	Drawdowns for construction water needs	Local; short-term
	2.	Spills of diesel fuel or engine oil	Local; short- to long-term
	3.	Leaks of hydrostatic test water	Local; short-term
Runoff Collection and Treatment System Discharge, Union	4.	Degradation of water quality from potentially contaminated discharge	Local; short- to long-term
Normal Operations at Processing Facility, Union	5.	Degradation of water quality due to septic tank discharge	Local, long-term
Accidental Release on Proposed Pipeline Route, Union	6.	Degradation of surface water quality.	Local
C. Area Study			
Onshore Pipeline Construction	1.	Same as A-1, A-2 above	Local; short- to long-term

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

MARINE WATER RESOURCES

Source		Description of Impacts	Scope
A. Project Related			
Union, Exxon	1.	Increases in turbidity and other pollutant parameters (e.g., BOD, metal concentration) in water column from sediment resuspension and miscellaneous discharges (e.g., sewage, desalination brine) associated with platform installation and pipelaying.	Local, short-term (Re-evaluate if near-shore sediments at pipe landfall are high in slit and organic content.
Union, Exxon	2.	Increase in temperature, suspended solids, oil and grease, BOD, ammonia, and other inorganic and organic pollutants in the water column near each platform resulting from discharges of drill cuttings, drill muds, formation water, sanitary sewage, and other wastewaters.	Local (within zone of initial dilution) and during periods of discharge only.
Union	3.	Increases in temperature, suspended solids, oil and grease, BOD, ammonia and other inorganic and organic pollutants in the water column near the Santa Maria refinery ocean outfall. Some uncertainty associated with oil treatment additives, pollutant loads from added refinery operations and nature of natural sediments near outfall.	Local, long-term
Union, Exxon	4.	Release of metal (Zn or Al) from sacrificial anodes used for corrosion protection on platforms and pipelines. Also release of heat from pipelines.	Local, long-term
Union, Exxon	5.	Increases in turbidity and a few other water parameters from activities associated with project abandonment (e.g., platform and pipeline removal).	Local, long-term
Union, Exxon	6.	Surface oil slicks, tar balls, increase in water column hydrocarbon concentrations and contamination of sediments likely from chronic small to moderately sized oil spills (e.g., less than 10 bbls ea)	Local, long-term
B. Project Alternatives			
	1.	The Class III impacts described above are not significantly changed by the Project Alternatives.	As above for corresponding impact types.
C. Area Study			
	1.	Impacts of Types 1-6 above more likely due to additional platforms and production. With platforms that are clustered or aligned, have potential for overlap of (dispersed) discharge plumes.	As above for corresponding impact types.
D. Cumulative			
	1.	Impacts of Types 1-6 above more likely due to additional platforms, pipelines, oil and gas treatment (with ocean discharges) and production. With platforms that are clustered or aligned, have potential for overlap of dispersed discharge plumes.	As above for corresponding impact types.

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

MARINE BIOLOGY

Source	Description of Impacts	Scope
A. Project Related		
Union, Exxon	1. Disruption of activity patterns of water column organisms by platform, utility and hydrocarbon pipeline construction and operations	Local to regional; short to long term
Union	2. Disruption of intertidal benthos by changes in littoral transport near pipeline landfalls	Local; short to long term; assumes no groins at landfall
Union	3. Sublethal stresses on water column and benthic organisms from modified refinery discharge	Local; long term
Union, Exxon	4. Disruption of distribution and activity patterns of any/all marine biota by proposed helicopter transport of crew, supply activities at Port Hueneme	Long term
Union	5. Damage to sandy intertidal beach organisms due to oil spills from onshore pipeline	Local; short term, assuming no mechanical cleanup
Union, Exxon	6. Disruption of activity patterns by small spills or leaks offshore	Local; short to long term
B. Project Alternatives		
Union	1. Disruption of any marine biota by construction of offshore pipeline from Platform Irene to alternate landfall at Surf	Local to regional; short term
C. Area Study		
	1. Impact types 1, 4, 5 and 6 under Proposed Project above repeated at additional locations	Local to regional; short to long term
D. Cumulative		
	1. Impact types 1 and 2 under Proposed Project and type 2 under Accidents above repeated at additional locations	Local to regional; short to long term

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

TERRESTRIAL AND FRESHWATER BIOLOGY

Source		Description of Impacts	Scope
A. Project Related			
Pipeline Construction	1.	Removal of Annual Grassland	Regional
	2.	Impact on wildlife of removal of agricultural land, Coastal Sage Scrub, Chaparral, and Grassland	Short-term, local
	3.	Noise effects on wildlife	Short-term, local
	4.	Impacts on vegetation, wildlife, and aquatic species at biologically sensitive drainage crossings 1-1, 1-2, 1-5, 1-8, 1-9, 1-10, 1-11, 1-12, 1-14, 1-16	Local
	5.	Effects of dust on vegetation and wildlife	Local, short-term
Construction of Offshore Facilities and Pipeline	6.	Disturbances of dune habitat, helicopter noise	Local
Normal Operations	7.	Use of herbicides at Valve Station and Orcutt Pump Station	Local
	8.	Trimming of Willows (trees) on transmission lines	Local
	9.	Noise at Lompoc Processing Facility	Local
B. Project Alternatives			
Pipeline Construcrion	1.	Impacts on wildlife and aquatic biota at sensitive drainages 2-7, 2-8, 2-9, 2-13, 2-14, 2-15, 2-16, 2-17, 3-1	Local
Substation Construction	2.	Removal of one acre of Coastal Sage Scrub	Local
Accidents- Onshore Oil Spills	3.	Impacts of oil spill on wildlife and aquatic biota at drainages 2-7, 2-8, 2-9, 2-12, 3-1	Local

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

CULTURAL RESOURCES

Source		Description of Impacts	Scope
A. Project Related			
Union	1.	Indirect impact of pipeline operations and maintenance on cultural resources and Native American cultural values from unauthorized artifact collecting and vandalism at sites. However, no new, permanent roads, limited maintenance activities, and restricted access should keep this impact to insignificant levels.	Long-term local (site-specific); regional impact on Native American values.
Union	2.	Direct and indirect impacts to onshore historic and prehistoric sites and Native American values due to facility abandonment/removal resulting in large scale disturbances, related in traffic and equipment.	Long-term local (site-specific); regional impact on Native American values.
Union, Exxon	3.	Indirect impact of offshore project construction and operations to anomolies with cultural potential due to "masking" by drill site and support vessel litter.	Long-term, local (site-specific)
Union, Exxon	4.	Indirect impact of oil spills and hydrocarbon leaks on offshore cultural resources which might affect environments of preservation. or create a "masking" effect.	Long-term, local (site-specific)
B. Project Alternatives			
Union	1.	Indirect impact of pipeline operations and maintenance on cultural resources and Native American cultural values from unauthorized artifact collecting and vandalism at sites. However, no new, permanent roads, limited maintenance activities, and restricted access should keep this impact to insignificant levels.	Long-term local (site-specific); regional impact on Native American values.
Union	2.	Direct and indirect impacts to onshore historic and prehistoric sites and Native American values due to facility abandonment/removal resulting in large scale disturbances, related in traffic and equipment.	Long-term local (site-specific); regional impact on Native American values.
Union, Exxon	3.	Indirect impact of offshore project construction and operations to anomolies with cultural potential due to "masking" by drill site and support vessel litter.	Long-term, local (site-specific)
Union, Exxon	4.	Indirect impact of oil spills and hydrocarbon leaks on offshore cultural resources which might affect environments of preservation. or create a "masking" effect.	Long-term, local (site-specific)
C. Area Study			
Offshore	5.	Indirect impacts of platform/pipeline construction and operations to offshore anomolies with cultural potential due to masking from littering and hydrocarbon leaks which may alter environments of preservation.	Long-term, local (site-specific)

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

AESTHETIC RESOURCES: VISUAL

Source		Description of Impacts	Scope
A. Project Related			
Union, Exxon	1.	Construction activities: with on- and offshore pipeline and platform installation, construction of valve station, Orcutt Pump Station, and Lompoc Dehydration Facility; presence and movement of heavy equipment, workforce, marine traffic and helicopter transport.	Short-term, local, negligible impact on views views from 35th Street, Terra Road, Ocean Beach County Park, beach areas, SPRR, Highway 246, Lompoc-Casmalia Road, Highway 1. Short-term, regional negligible impact on views from SPRR.
Union	2.	Onshore pipelines: direct impact due to clearling, grading, trenching, backfilling during pipeline installation would create partially visible, linear clearing at road crossings.	Short-term, local, negligible impact on views from Lompoc-Casmalia Road and Highway 1. Optional mitigation: berms and plantings adjacent to road crossings, if not intended by operator as a proposed mitigation; bury pipeline in existing firebreak. (SBC)
Union, Exxon	3.	Support Base activities: direct impact of crew transport via helicopter from Lompoc Airport over Ocean Beach County Park.	Long-term, local, sporadic and negligible impact on views from Park and adjacent beaches.
Union	4.	Electrical Substation: direct impact of utilities intruding into the skyline within Coastal Zone.	Long-term, local negligible impact on views from shore between Surf and Ocean Beach County Park. Regional negligible impact on SPRR views.
Union	5.	Lompoc Dehydration Facility: direct impact due to industrial appearance in rural setting.	Long-term, local negligible impact on views from southbound lane of Highway 1 adjacent to site entrance.
Union, Exxon	6.	Offshore Platforms: direct impact on ocean views due to two platforms southwest of Ocean Beach area.	Long-term, local negligible impact on views from 35th Street, Terra Road, and Highway 246.
Union, Exxon	7.	Abandonment: direct impact of activities involved in dismantling platforms, valve station, electrical substation, dehydration facility and Orcutt pump station.	Short-term, local negligible impact on views from 35th Street, Terra Road, Ocean Beach County Park, beach areas, Highway 246, Highway 1. Regional, negligible impact on SPRR views.
B. Project Alternatives			
Union	1.	Onshore Pipelines, Southern Mitigated Route from landfall to Lompoc Dehydration Facility Site 4: direct impact due to clearing, grading, trenching, backfilling during pipeline installation would create partially visible, linear clearing at road crossings; highly visible linear trace down hillside with potential for erosion.	Short-term, local, negligible impact on views from Lompoc-Casmalia Road and Burton Mesa Road at route corssings; short-term, local, negligible impact on views from Highway 246.
Union	2.	Onshore Pipelines, Proposed and Alternative routes from landfall to Lompoc Dehydration Facility Site 8: (road corssings, as per as per previous entry).	Short-term, local, negligible impact on views from Lompoc-Casmalia Road, Burton Mesa Road, and Highway 1 at route crossings. Optional mitigation: bury transmission lines. (SBC)

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

AESTHETIC RESOURCES: NOISE

Source		Description of Impacts	Scope
A. Project Related			
Union	1.	Operation of Dehydration Facility: levels vary with position and time throughout immediate area; 70 LD at property line.	Local, long-term permanent increase in levels but no sensitive receptors in area.
Union	2.	Construction of Santa Maria Refinery; 2 db increase to 51 LD.	Local, short-term (two weeks during construction).
Union, Exxon	3.	Crewboat/supply boat operations; short-time noise level change.	Local, long-term.
Union, Exxon	4.	Helicopter operations, short-time noise level changes.	Local, long-term.
C. Area Study			
	1.	Construction of co-located gas treatment facility.	Local, short-term.
	2.	Increases in boat and helicopter operations during platform installation, drilling and operations.	Local, long-term.

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

OTHER USES: COMMERCIAL FISHING AND KELP HARVEST

Source		Description of Impacts	Scope
A. Project Related			
Exxon, Union	1.	Pre-emption of fishing areas for species other than rockfish, by construction activities.	Local, short-term.
Exxon, Union	2.	Removal of platforms as potential mariculture sites upon project abandonment.	Regional, long term.
Exxon, Union	3.	Disruption of activity patterns of commercially valued species by offshore discharges.	Local, long term.
Exxon, Union	4.	Competition with oil industry vessels for support services at Port Hueneme.	Regional, long term.
Exxon, Union	5.	Area pre-emption by small oil spills.	Local to regional, short-term.
B. Project Alternatives			
Union	1.	As above for No. 1 under Proposed Project if alternative landfall at Surf is used.	As above for proposed projects
C. Area Study			
	1.	Impact types above under Proposed Project and impact of smaller spills would occur at additional sites.	Local to regional, long term.
D. Cumlative			
Both Scenarios	1.	Impact types above under Proposed Project and impacts of smaller spills would be of greater likelihood and would occur at additional sites.	As above for corresponding impact types.

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

OTHER USES: RECREATION

Source	Description of Impacts	Scope
Union Project	1. Disruption of recreation experience at Ocean Beach County Park due to pipeline and power cable construction	Short-term, site specific
Union Project, Area Study, Cumulative Oil Project	2. Increased use of campgrounds in South Coast, Lompoc, and Santa Maria areas during construction/installation phase(s)	Short-term, site specific
Exxon Project	3. Increased use of South Coast campgrounds during construction/ installation phase	Short-term, site specific
Union Project, Exxon Project, Area Study, Cumulative Oil Projects	4. Potential disruption of recreation experience due to offshore and onshore oil spills	Short-term, site specific

TRAFFIC

Source	Description of Impacts	Scope
Union Project, Area Study, Cumulative Oil and Non-Oil Projects	1. Increased Traffic near project components during construction phases	Short-term, site specific
Cumulative Non-Oil Projects	2. Increased traffic in Goleta due to increased employment	Long-term, site specific
Union Project, Exxon Project, Area Study, Cumulative Oil Projects	3. Increased Santa Barbara Channel Boat traffic due to platform supply and crew boat requirements. Impacts center on Port Hueneme and Ellwood Pier and any as yet unapproved supply/crew bases	Long-term, regional

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT

SOCIOECONOMICS

Source	Description of Impacts	Scope
Union Project, Area Study, Cumulative Oil and Non-Oil Projects	Temporary Housing 1. Demand for rental units during modification to Santa Maria refinery during the first half of 1986.	South San Luis Obispo County.
Union Project, Area Study, Cumulative Oil and Non-Oil Projects	Land Use 2. Short-term pipeline construction disturbances, i.e., odor, dust, noise, traffic.	Lompoc & Orcutt.
Union Project, Area Study, Cumulative Oil and Non-Oil Projects	Public Hazards 3. Risk to residential areas from pipeline route to dehydration facility.	Lompoc.
Union Project, Area Study, Cumulative Oil and Non-Oil Projects	4. Potential hazards to Mission Hills residence due to accidents resulting in oil spills or toxic flammable releases from alternative dehydration facility.	Mission Hills, Lompoc Area - U, A, AS, CO, and CT.

CODES: U - Union Project; E - Exxon Project; A -Alternatives; AS - Area Study Projects; CN - Cumulative Non-Oil Projects; CO - Cumulative Oil Projects; CT - Cumulation Total

CLASS IV

CLASS IV: BENEFICIAL ENVIRONMENTAL IMPACTS

COMMERCIAL FISHING, KELP HARVEST, AND MARICULTURE

Source	Description of Impacts	Scope
A. Project Related		
Exxon, Union	Provision of potential additional mariculture sites on project platforms.	Regionally insignificant, short- to long-term.
C. Area Study		
	As above for Proposed Projects.	As above for Proposed Project.
D. Cumulative		
Both Scenarios	As above for Proposed Projects.	As above for Proposed Project.

Additional details on impacts are found in Sections 5.10.1 and 6.10.1.

CLASS IV: BENEFICIAL ENVIRONMENTAL IMPACTS

SOCIOECONOMICS

Source		Description of Impact	Scope
Union Project, Exxon Project, Project Alternatives, Area Study, Cumulative Oil and Non-Oil Projects	1.	Employment in offshore platform construction; onshore construction work permanent operations employment.	Study Area (varies by project.)
	2.	Local construction labor expenditures and local wages.	Study Area (varies by project.)
	3.	Net revenue increase to local jurisdictions.	Santa Barbara County, San Luis Obispo Co. and most municipalities in the tri-county study area.

CLASS IV: BENEFICIAL ENVIRONMENTAL IMPACTS

AESTHETICS: VISUAL

Source		Description of Impacts	Scope
A. Project Related			
Union	1.	Orcutt Pump Station: views from Clark Avenue in the vicinity of the pump station would be improved by the screening of existing and proposed facilities.	Long-term, local beneficial impacts in 10-15 years.

AESTHETICS: NOISE

Source		Description of Impacts	Scope
A. Project Related			
Union	1.	Orcutt Pump Station Facility Operations: elimination of vibration at Clark Street residence due to installation of engine driver pumps; reduction of noise by 1 db.	Long-term, local beneficial impact.

SYSTEM SAFETY AND RELIABILITY

ACCIDENTS WHICH HAVE THE POTENTIAL TO CAUSE ENVIRONMENTAL EFFECTS AND PUBLIC HAZARDS

Causal Event	Project	Resulting From	Location	Frequency	Criticality	Mitigation	Effectiveness of Mitigation
A. Oil Spill Accidents							
1. Loss of Platform	Union Exxon	Major Impact from External Hazards	Platform Vicinity	Rare	Major (Irene) Medium (Shamrock)	-	-
2. Well Blowout	Union Exxon	Operational Error	Platform	Unlikely Unlikely Unlikely	Minor Medium Major	-	-
3. Wellhead Area Spill	Union Exxon	Loss of Reliability, Operational Error	Platform	Rare	Minor	-	-
4. Spill from Platform Processing Vessels	Union Exxon	External Impacts, Structural Failure	Platform	Unlikely	Minor	-	-
5. Pig Receiver Spill	Union	Mechanical Defects, Operational Error	Orcutt Lompoc Platform	Rare Unlikely/Rare Unlikely/Rare	Minor/Medium Minor/Medium Minor		
6. Pig Launcher Spill	Union Exxon	Mechanical Defects Operational Error	Platform Lompoc	Likely/Rare Rare	Minor Minor/Medium		
7. Subsea Pipeline Break or Large Leak	Union Exxon	Structural Failure	Offshore	Unlikely	Medium/Major	Install Subsea Valves (MMS, SLC)	Reduce Volume Spilled
8. Subsea Pipeline Leak	Union Exxon	Structural Failure Mechanical Defects	Offshore	Unlikely	Minor	-	
9. Onshore Pipeline Break or Large Leak	Union	Structural Failure	Onshore	Unlikely	Major	Increase Number of Block Valves (SBC, VAFB)	Reduce Volume Spilled
10. Onshore Pipeline Leak	Union	Structural Failure Mechanical Defects	Onshore	Likely	Medium	-	-
11. Produced Water System	Union	Mechanical Defects	Platform	Rare	Minor	Additional Instrumentation (MMS)	Reduce Frequency
12. Vessel Rupture (Storage or Process)	Union	Structural Failure, Fire, Natural Hazards	Onshore	Unlikely	Major	-	-

ACCIDENTS WHICH HAVE THE POTENTIAL TO CAUSE ENVIRONMENTAL EFFECTS AND PUBLIC HAZARDS

Causal Event	Project	Resulting From	Location	Frequency	Criticality	Mitigation	Effectiveness of Mitigation
B. Sour Gas Release Accidents							
13. Subsea Pipeline Break	Union Exxon	Structural Failure	Offshore	Unlikely	*		
14. Subsea Pipeline Leak	Union	Structural Failure, Mechanical Defects	Offshore	Unlikely	*		
15. Onshore Pipeline Break	Union	Structural Failure	Onshore	Unlikely Rare	Minor Severe	Increase Number of Block Valves (VAFB, SBC, COE)	Reduce Volume Released
16. Onshore Pipeline Leak	Union	Structural Failure, Mechanical Defects	Onshore	Unlikely	*		
17. Processing Vessel Rupture	Union	Defect, External Hazards	Onshore	Rare	*	-	-
18. Pig Receiver or Launcher Release	Union	Mechanical Defects, Operational Errors	Onshore	Unlikely/Rare	*		
C. Gas By-product Release Accidents							
19. Failure of LPG Storage Vessel	Union	Major Fire	Onshore	Unlike/Rare	Major	Improved Fire Protection (SBC)	Reduce Frequency
20. Spill During Loading Operations	Union	Operational Error, Defects	Onshore	Likely	*	Operational Procedures, Security (SBC)	Reduce Frequency
21. Spill During Transportation	Union	Vehicle Accidents	Highway	Likely	Minor/Severe	Scheduling, Routing, Training, Alternate Transportation Mode (SBC)	Reduce Frequency

* No public consequence expected.

GEOLOGICAL CONSTRAINTS THAT HAVE POTENTIAL FOR CAUSING ENVIRONMENTAL EFFECTS

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
A. Project Related					
Seismicity Union, Exxon	1.	Ground shaking, with resulting damage to structures and possible failure.	Regional, long-term	Design facilities to withstand expected levels of ground shaking (MMS, VAFB, SLC, SBC, CCC)	Insignificant for Probable Design Earthquake (PDE). Potentially significant for earthquakes which exceed the Contingency Design Earthquake (CDE), an unlikely event.
Liquefaction Union	2.	Loss of pipeline support during earthquakes in areas of sandy seafloor sediments, e.g., at mouth of Santa Ynez River.	Local, short-term	Geotechnical investigation to identify potential problems and permit adequate design (VAFB, SBC, MMS, CCC)	Insignificant
Faults-Onshore Union	3.	Possible displacement of Pezzoni-Casmalia Fault which crosses Lompoc-Orcutt pipelines.	Local, at crossing	Location and characterization of fault. Design of crossing to accommodate (SBC)	Insignificant
Landslides, Slope Instability Union	4.	Loss of integrity or damage to pipelines; possibility of rupture.	Confined to a few locations on proposed pipeline routes.	Realignment, stabilization, or removal of slide mass. Avoidance of landslide-prone areas (VAFB, SBC, CCC)	Insignificant with avoidance or proper design
Gullying Union	5.	Loss of pipeline support; possibility of rupture.	Project-localized primarily in Harris and Graciosa Canyons.	Realignment or avoidance; stabilization of gully advance (SBC)	Insignificant
Scour Union	6.	Loss of support; possibility of rupture.	Confined to major tributary drainage channels.	Spanning or burial below recent deposits (VAFB, SBC, RWQCB, CCC)	Insignificant
Fault Displacement Offshore Union, Exxon	7.	Possible shearing of well casings, but mitigated by existing regulations.	Local	NA	NA
Slope Instability Sediments, Shallow Gas, Buried and Seafloor Channel, Union, Exxon	8.	Loss of integrity or damage to project facilities, mitigated in context of existing regulations	Local	NA	NA

GEOLOGICAL CONSTRAINTS THAT HAVE POTENTIAL FOR CAUSING ENVIRONMENTAL EFFECTS
(continued)

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
B. Project Alternatives					
Flooding Hazard at Santa Ynez River Crossing and in Floodplain for Alternative Pipeline Route, Union	1.	Loss of foundation support or exposure of pipeline to high-velocity flood waters.	Local, short-term	Design of crossing to withstand expected conditions; placement of lines to minimize flood hazard; draining of line during major flood events. (SBC,COE,CDFG,RWQCB)	Insignificant
Seismicity Union, Exxon	2.	Ground staking, with resulting damage to structures and possible failure.	Regional, long-term	Design of facilities to withstand expected shaking. (MMS, VAFB, SLC, SBC, CCC)	Insignificant for Probable Design Earthquake (PDE). Potentially significant for earthquakes which exceed the Contingency Design Earthquake (CDE), an unlikely event.
Liquefaction Exxon	3.	Loss of pipeline support during earthquakes in areas of sandy seafloor sediments.	Localized area on route from Shamrock to Hermosa.	Geotechnical investigation and implementing design. (MMS)	Potentially insignificant.
Landslides, Slope Instability (Union)	4.	Loss of integrity or damage to pipeline; possibility of rupture.	Confined to a few locations on Lompoc Terrace.	Stabilization, drainage (VAFB, SBC)	Insignificant
Scour Union	5.	Loss of support; possibility of rupture.	Throughout Santa Ynez River floodplain. Special concern at river channel crossing.	Burial below scour depths. Placement in areas of low scour potential. Draining of lines during major flood events. (VAFB, SBC, RWQCB, COE)	Potentially insignificant; though thorough design essential, given river history and unpredictability of precise flood impact locations.
C. Area Study					
Seismicity - Onshore & Offshore	1.	Ground shaking, with resulting damage to structures and possible failure	Regional, long-term	Design of facilities to withstand expected levels of ground shaking (MMS, VAFB, SLC, SBC, CCC)	Insignificant for Probable Design Earthquake (PDE). Potentially significant for earthquakes which exceed the Contingency Design Earthquake (CDE), an unlikely event.
Faults-Offshore	2.	Potentially significant for siting of future development facilities.	Regional, long-term	Adherence to existing regulations (MMS, SLC, CCC)	Insignificant
Faults-Onshore	3.	Possible displacement of Santa Ynez Fault which crosses Gaviota pipeline.	Local, at crossing	Location and characterization of fault. Design of crossing to accommodate. (CCC, SBC)	Insignificant

GEOLOGICAL CONSTRAINTS THAT HAVE POTENTIAL FOR CAUSING ENVIRONMENTAL EFFECTS
(continued)

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
C. Area Study					
Shallow Gas Formations - Offshore	4.	Abnormally high pressures could lead to loss of well control at future facilities.	Local to regional, short-term	Adherence to existing regulations (MMS, CCC)	Insignificant
Liquefaction - Offshore	5.	Loss of pipeline support during earthquakes in areas of sandy seafloor sediments, e.g., at mouth of Santa Ynez River.	Local, short-term	Geotechnical investigation to identify potential problems and permit adequate design (MMS, SLC, CCC, VAFB)	Insignificant
Slope Instability, Gasified Sediments, Seafloor and Buried Channels - Offshore	6.	A variety of processes could lead to loss of integrity or damage to Area Study and other future offshore facilities	Local to regional	Avoidance or design in context of existing regulations (MMS, SLC, CCC)	Insignificant
Landslides, Slope Instability - Onshore	7.	Loss of integrity or damage to pipelines; possibility of rupture	Monterey and Rincon Formations in Santa Ynez Mountains.	Realignment, stabilization, or removal of slide mass. Avoidance of landslide-prone areas (SBC)	Insignificant with avoidance or proper design
Gullying	8.	Loss of pipeline support; possibility of rupture	Isolated features throughout Area Study envelope.	Realignment or avoidance; stabilization of gully advance (SBC)	Insignificant
Scour - Onshore	9.	Loss of support; possibility of rupture	Confined to major drainage channels.	Spanning or burial below recent deposits (SBC, RWQCB, VAFB, CCC)	Insignificant

I. OVERVIEW

1.0 INTRODUCTION

The contents of this document provides information needed by government agencies to make decisions with respect to the proposals submitted by Union Oil Company of California and Exxon Company, U.S.A., related to the development of the Point Pedernales Field. Both Union Oil and Exxon have submitted Development and Production Plans (DPP) to the Minerals Management Service (MMS) to cover the offshore portion of their projects. Union Oil has also submitted an application to the County of Santa Barbara to cover the onshore components of their project. Exxon has submitted its Application to the County covering their onshore transportation requirements for other Basin producers.

Since the Point Pedernales Field lies in an area that is expected to experience substantial future offshore development, a more general impact analysis of the Central Santa Maria Basin (referred to as the offshore Area Study) is also presented in this document. The offshore Area Study region is shown in Figure 1.0-1. An onshore Area Study scenario has also been developed to analyze, on a generic level, impacts of facilities which maybe needed to process and transport production from the Central Santa Maria Basin development.

1.1 PURPOSE AND NEED

Completion of the projects will provide access to new domestic supplies of oil and gas which will help to offset declining U.S. production and thereby contribute to the enhancement of national security and the international balance of payments. Thus, the project would help to achieve the policies of the Outer Continental Shelf (OCS) Lands Act, as amended, which states that oil and gas resources should be developed to meet the nation's energy needs as rapidly as possible, while "protecting the human, marine, and coastal environments."

1.2 THE PROPOSED PROJECTS

Union Oil is proposing to install an offshore oil and gas drilling and production platform on OCS-P 0441. Exxon proposes to install one offshore platform for drilling and production on OCS-P 0440. These two platforms are the only ones currently proposed to develop the Point Pedernales Field which lies offshore Santa Barbara County in federal waters, approximately 3-5 miles west of Point Pedernales. Figure 1.0-1 shows the location of the proposed platforms. Union Oil's platform, which has been named Irene, is proposed to be the central production platform in the Point Pedernales Field; oil production from Exxon's platform will be transported via subsea pipeline to Irene, where it would be commingled with Platform Irene's production and transported ashore via Union Oil's consolidated pipelines.

These pipelines, as proposed, will come ashore just north of the Santa Ynez River and then run approximately 12 miles east to the proposed oil dehydration facility north of the City of Lompoc.

This oil dehydration facility, as currently proposed, will have the capacity to process 36,000 barrels per day of dry oil and 36,000 barrels per day of produced water. The treated produced water removed from the oil will be sent back to Platform Irene via pipeline for ocean disposal. Union plans to send its dry oil from the proposed Lompoc oil dehydration facility to its Santa Maria Refinery, via new and existing pipelines. A new pipeline will be built from the Lompoc oil dehydration facility to an existing pump station at Orcutt. In Orcutt, the oil will be pumped into an existing pipeline to the Santa Maria Refinery in Nopomo, San Luis Obispo County. Union Oil proposes to process its gas production at the existing Battles Gas Plant in Santa Maria. Gas will be transported from the Lompoc facility to the Battles Plant via existing pipelines.

Exxon plans to process its oil production at Union Oil's proposed Lompoc Oil Dehydration Facility. Exxon has recently submitted an Application to the County of Santa Barbara to cover the transportation of its dry oil out of Lompoc. This document analyzes as part of the Area Study, the impacts associated with transporting Exxon oil out of Lompoc. Exxon plans to reinject its gas production at the platform until after the year 2000, at which time it will be recovered and sent ashore for processing at an as yet unknown location.

1.3 THE AREA STUDY

In addition to the proposed projects, this document also includes a study of the impacts from future offshore development expected in the Central Santa Maria Basin and the associated onshore components associated with this offshore development.

Because of the potential for development, this document provides a general cumulative impact analysis for the Central Santa Maria Basin, considering reasonably foreseeable developments over the next ten years. This development is represented by the two proposed platforms and by four additional, hypothetical platforms whose locations have been assumed to be as shown in Figure 1.0-1. The four additional platforms are not part of either Union Oil's or Exxon's current proposed projects, and hence are described and evaluated separately throughout this document.

Platform placement, for purposes of this analysis, is based on information provided to MMS, state-of-the-art technology, and MMS's present knowledge of the geology of the area. While preserving the confidentiality of the drilling results, the MMS assumes placement of platforms in areas where drilling has occurred, where one or more wells have been found "capable of producing in paying quantities" (OCS Order No. 4) by the MMS, and hence where future development activities are more likely to occur. Area Study platform locations are assumed to be in the center of the leases indicated.

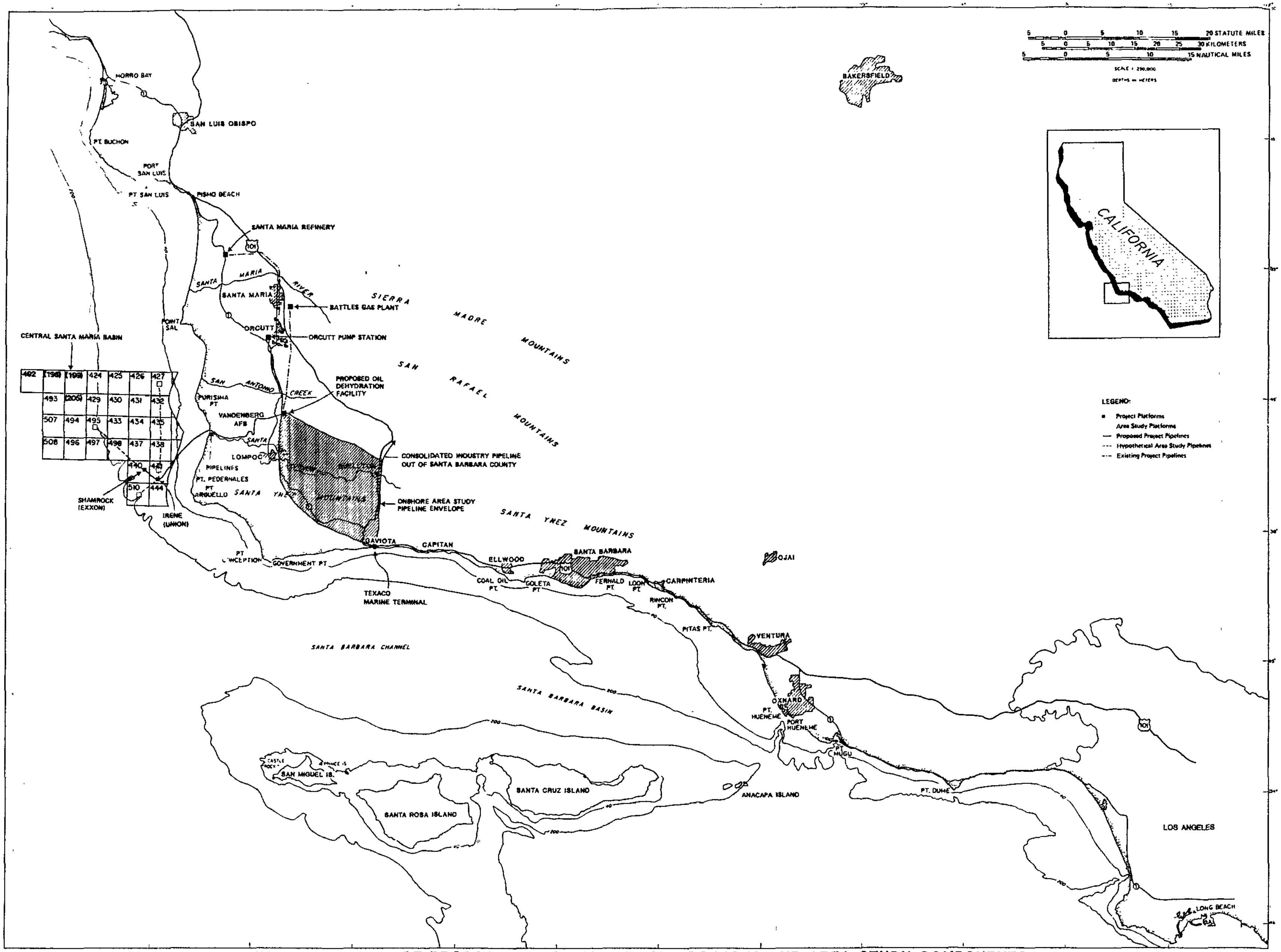

FIGURE 1.0-1 MAP OF PROPOSED UNION OIL/EXXON PROJECTS AND AREA STUDY COMPONENTS

Theoretically, any of these platforms could be placed on any of the remaining leases within the Area Study boundary. However, the number of platforms per lease and general platform descriptions depend on the characteristics of the reservoirs and are assumed, for the purposes of this analysis, to remain the same regardless of actual future sitings.

The pipelines proposed by Union Oil from Platform Irene to the Lompoc Dehydration Facility have been sized to handle the anticipated peak production for the Central Santa Maria Basin.

The onshore Area Study scenario covers facilities that might be required in order to handle the oil and gas production from the Central Santa Maria Basin. These include:

- Expand the proposed Lompoc oil dehydration facility from 36,000 barrels per day capacity to 100,000 barrels per day.
- Install a co-located gas processing facility to handle 80 MMscfd.
- Build a dry oil pipeline from the Lompoc oil dehydration facility to either Gaviota or Buellton for a tie-in to other proposed transportation projects. The Gaviota option would allow for a tie-in with the proposed Texaco Marine Terminal or pipeline, and the Buellton option would allow a tie-in with the Southern California Pipeline System (SCPS), or proposed Celeron Pipeline.

The general Area Study analysis provides an evaluation of cumulative impacts related to expected development in the area. Second, it facilitates coordination among all involved permitting and planning agencies. Finally, it gives the public and agency reviewers and decisionmakers a perspective on the development which may occur in the Santa Maria Basin and the options available for handling this production onshore.

Future facilities that are considered as part of this Area Study will be subject to a separate NEPA or CEQA review if and when they are proposed. Site specific information will be evaluated at that time, and this document will serve as a source for regional setting and cumulative impact information.

1.4 READER GUIDE TO THE USE OF THIS DOCUMENT

Two separate projects and Area Study scenario are evaluated in this EIS/EIR. The separate proposed projects are: (1) Union Oil's Platform Irene and associated pipelines; an onshore oil dehydration facility, a dry oil pipeline, electrical substation, and modifications to the existing Orcutt Pump Station; (2) Exxon's Project Shamrock platform and associated pipelines;

The document is organized into the following major chapters:

- Description of the Projects and Project Alternatives (Chapters II, III). The proposed Union and Exxon projects are detailed here, along with alternative project component descriptions and a characterization of the Area Study scenario facilities.

- Environmental and Regulatory Setting (Chapter IV). The natural and social environment is described here as it exists today. This chapter provides the environmental framework upon which project-related impacts are evaluated.

- Environmental Consequences and Mitigation (Chapter V). The impacts analysis examines each project's facilities separately and together. Mitigation measures are a key component of the environmental analysis and serve to identify and evaluate ways to reduce potentially adverse, significant project-related impacts. Because mitigation is so closely associated with the specific impact identified, the discussion of mitigation measures is included in Chapter V.

- Cumulative Impacts and Mitigation (Chapter VI). Chapter VI deals with cumulative impacts associated with potential future oil and non-oil developments that are likely to occur in Santa Barbara, Ventura, and San Luis Obispo Counties. Potential mitigation measures associated with the cumulative impacts are identified in this chapter.

This EIS/EIR has been prepared as a description and analysis of the projects and their consequences. Its size has been constrained to help the reader focus on the major issues, key assumptions, and significant findings. Additional supporting material is available to the inquisitive reader in various Technical Appendices.

1.5 AGENCY USE OF THIS DOCUMENT

The Joint EIS/EIR will be used by different agencies to make decisions on the proposed projects and potential future projects in the study area as required by CEQA and NEPA. It will also be used as a long-range planning tool. The intended use of the document for each agency represented on the Joint Review Panel is outlined briefly below. The Joint EIS/EIR will also be the basis for all state and federal responsible agency permit decisions.

Santa Barbara County will use the document to make specific decisions and permit conditions regarding Union's application to the County for a land use re-zone, a major Conditional Use Permit, a Comprehensive Plan/Coastal Plan amendment and approval of the Preliminary Development Plan for the onshore facilities within its jurisdiction.

In addition, the County will utilize the Area Study as a long-range planning tool and for information regarding cumulative impacts of offshore oil and gas development in the Central Santa Maria Basin.

The County Air Pollution Control District will use air quality information from the document in making its decisions as a responsible agency under CEQA.

The Minerals Management Service (MMS), a federal agency, will use the document to evaluate proposed and future activities in federal waters.

Since Development and Production Plans (DPPs) have been submitted for leases OCS-P 0441 (Union-Irene) and OCS-P 0440 (Exxon-Project Shamrock), a detailed site-specific impact analysis is provided in the document for these platforms. The MMS decision to approve or deny these plans will follow certification of the EIS/EIR.

Operators proposing additional platforms in the study area will still be required to conduct the appropriate site-specific geohazards, cultural resource and biological surveys and to submit DPPs. Documents included in these submittals are: the Development and Production Plan (outlines the operator's plans and schedule for drilling and production on a specific tract), Environmental Report, Oil Spill Contingency Plan, Hydrogen Sulfide Contingency Plan, Critical Operations and Curtailment Plan, and survey data and reports. Using baseline information from the Area Study, the MMS will evaluate environmental impacts from additional development activities in subsequent Environmental Assessments or, depending on the significance of the impacts, in Environmental Impact Statements.

MMS has jurisdiction over the oil and gas activities on the Outer Continental Shelf (OCS) (extending seaward from 3 miles offshore). In accordance with the OCS Lands Act, MMS is responsible for the permitting of OCS platforms and pipelines, onsite inspection of these facilities during all phases of the project, enforcement of federal requirements, and royalty monitoring. Specific approvals required by MMS for this project include: Development and Production Plans, right-of-ways for offshore lines, platform verification, and Application for Permit to Drill (APDs) for each well.

The State Lands Commission has jurisdiction over state waters 3 miles seaward of the mean high tide line. The State Lands Commission will use the document in making a permit decision on Union's request for a pipeline right-of-way through these waters. Finally, the State Lands Commission will use the information for long-range planning and consideration of the cumulative impacts of related projects in the area.

The California Coastal Commission's jurisdiction ranges from concurrence with federal consistency determinations for projects on the OCS to coastal development permit responsibility in state waters and public tidelands. The Coastal Commission will use the document for a detailed project-specific and cumulative impacts analysis in considering the coastal resource issues listed in its Federal Consistency Certification Staff Report. The document will be used to identify impacts and feasible mitigation measures which can be used as conditions of approval as appropriate and to identify any environmentally preferred alternatives to the proposed projects.

Additional Responsible State Agencies will have 180 days to act on permits applicable to these projects following action by Santa Barbara County.

Vandenburg Air Force Base (AFB) has jurisdiction over that portion of the onshore pipeline that crosses the Base. Vandenburg Air Force Base will either adopt this document or develop their own NEPA document based on information contained in this EIS/EIR to permit a pipeline right-of-way across the Base.

As with all agencies, the Joint EIS/EIR will also provide baseline environmental impact and mitigation information to the Commission for subsequent federal consistency certifications and coastal development permits. Additional detailed information will be required by the Commission for decisions on projects not specifically described and analyzed in the document.

Section C provides a representative listing of permits and approvals required for project construction/operation by various Santa Barbara County, state, and federal entities.

I. OVERVIEW

1.0 INTRODUCTION

The contents of this document provides information needed by government agencies and the public to make decisions with respect to the proposals submitted by Union Oil Company of California and Exxon Company, U.S.A., related to the development of the Point Pedernales Field. Both Union Oil and Exxon have submitted Development and Production Plans (DPP) to the Minerals Management Service (MMS) to cover the offshore portion of their projects. Union Oil has also submitted an application to the County of Santa Barbara to cover the onshore components of their project. Exxon has not yet submitted its application to the County covering their onshore treatment and transportation requirements.

Since the Point Pedernales Field lies in an area that is expected to experience substantial future offshore development, a more general impact analysis of the Central Santa Maria Basin (referred to as the offshore Area Study) is also presented in this document. The offshore Area Study region is shown in Figure 1.0-1. An onshore Area Study scenario has also been developed to analyze, on a generic level, impacts of facilities which maybe needed to process and transport production from the Central Santa Maria Basin development.

1.1 PURPOSE AND NEED

Completion of the projects will provide access to new domestic supplies of oil and gas which will help to offset declining U.S. production and thereby contribute to the enhancement of national security and the international balance of payments. Thus, the project would help to achieve the policies of the Outer Continental Shelf (OCS) Lands Act, as amended, which states that oil and gas resources should be developed to meet the nation's energy needs as rapidly as possible, while "protecting the human, marine, and coastal environments."

1.2 THE PROPOSED PROJECTS

Union Oil is proposing to install an offshore oil and gas drilling and production platform on OCS-P 0441. Exxon proposes to install one offshore platform for drilling and production on OCS-P 0440. These two platforms are the only ones currently proposed to develop the Point Pedernales Field which lies offshore Santa Barbara County in federal waters, approximately 3-5 miles west of Point Pedernales. Figure 1.0-1 shows the location of the proposed platforms. Union Oil's platform, which has been named Irene, is proposed to be the central production platform in the Point Pedernales Field; oil production from Exxon's platform, as yet unnamed, will be transported via subsea pipeline to Irene, where it would be commingled with Platform Irene's production and transported ashore via Union Oil's consolidated pipelines.

These pipelines, as proposed, will come ashore just north of the Santa Ynez River and then run approximately 12 miles east to the proposed oil dehydration facility north of the City of Lompoc.

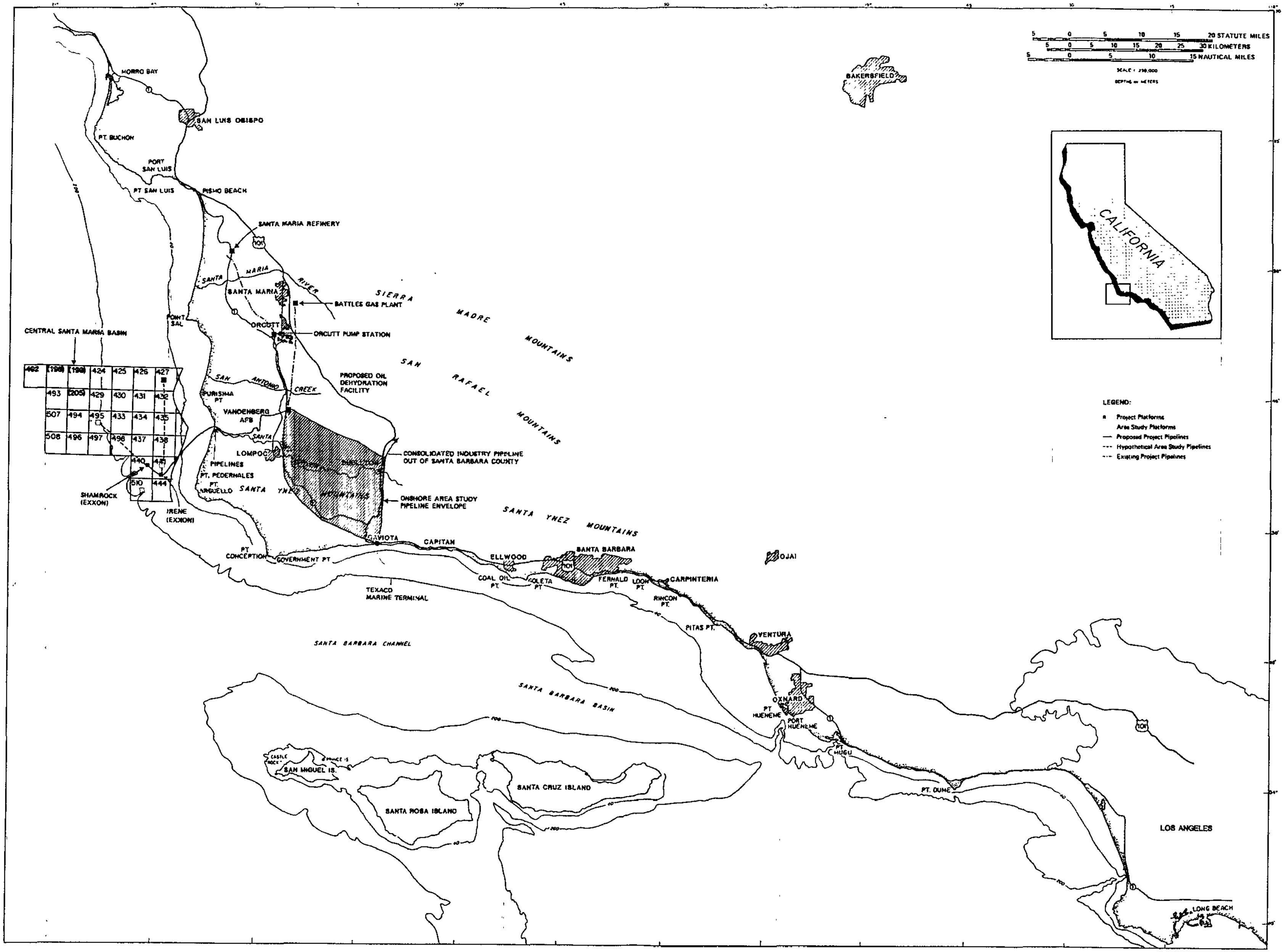

FIGURE 1.0-1 MAP OF PROPOSED UNION OIL/EXXON PROJECTS AND AREA STUDY COMPONENTS

This oil dehydration facility, as currently proposed, will have the capacity to process 36,000 barrels per day of dry oil and 36,000 barrels per day of produced water. The treated produced water removed from the oil will be sent back to Platform Irene via pipeline for ocean disposal. Union plans to send its dry oil from the proposed Lompoc oil dehydration facility to its Santa Maria Refinery, via new and existing pipelines. A new pipeline will be built from the Lompoc oil dehydration facility to an existing pump station at Orcutt. In Orcutt, the oil will be pumped into an existing pipeline to the Santa Maria Refinery in Nopomo, San Luis Obispo County. Union Oil proposes to process its gas production at the existing Battles Gas Plant in Santa Maria. Gas will be transported from the Lompoc facility to the Battles Plant via existing pipelines.

Exxon plans to process its oil production at Union Oil's proposed Lompoc oil dehydration facility. Exxon has not yet submitted an application to the County of Santa Barbara to cover the transportation of its dry oil out of Lompoc. Furthermore, no application has been made to expand the proposed Lompoc facility to handle Exxon's production. Because of this, the document evaluates several available options for the treatment and transportation of Exxons production onshore. Impacts associated with these options are generally analyzed under the onshore Area Study scenario. Exxon plans to reinject its gas production at the platform until after the year 2000, at which time it will be recovered and sent ashore for processing at an as yet unknown location.

1.3 THE AREA STUDY

In addition to the proposed projects, this document also includes a study of the impacts from future offshore development expected in the Central Santa Maria Basin and the associated onshore components associated with this offshore development.

Because of the potential for development, this document provides a general cumulative impact analysis for the Central Santa Maria Basin, considering reasonably foreseeable developments over the next ten years. This development is represented by the two proposed platforms and by four additional, hypothetical platforms whose locations have been assumed to be as shown in Figure 1.0-1. The four additional platforms are not part of either Union Oil's or Exxon's current proposed projects, and hence are described and evaluated separately throughout this document.

Platform placement, for purposes of this analysis, is based on information provided to MMS, state-of-the-art technology, and MMS's present knowledge of the geology of the area. While preserving the confidentiality of the drilling results, the MMS assumes placement of platforms in areas where drilling has occurred, where one or more wells have been found "capable of producing in paying quantities" (OCS Order No. 4) by the MMS, and hence where future development activities are more likely to occur. Area Study platform locations are assumed to be in the center of the leases indicated.

Theoretically, any of these platforms could be placed on any of the remaining leases within the Area Study boundary. However, the number of platforms per lease and general platform descriptions depend on the characteristics of the reservoirs and are assumed, for the purposes of this analysis, to remain the same regardless of actual future sitings.

The pipelines proposed by Union Oil from Platform Irene to the Lompoc Dehydration Facility have been sized to handle the anticipated peak production for the Central Santa Maria Basin.

The onshore Area Study scenario covers facilities that might be required in order to handle the oil and gas production from the Central Santa Maria Basin. These include:

- Expand the proposed Lompoc oil dehydration facility from 36,000 barrels per day capacity to 100,000 barrels per day.
- Install a co-located gas processing facility to handle 80 MMscfd.
- Build a dry oil pipeline from the Lompoc oil dehydration facility to either Gaviota or Buellton for a tie-in to other proposed transportation projects. The Gaviota option would allow for a tie-in with the proposed Getty Marine Terminal or pipeline, and the Buellton option would allow a tie-in with the Southern California Pipeline System (SCPS), or proposed Celeron Pipeline.

The general Area Study analysis provides an evaluation of cumulative impacts related to expected development in the area. Second, it facilitates coordination among all involved permitting and planning agencies. Finally, it gives the public and agency reviewers and decisionmakers a perspective on the development which may occur in the Santa Maria Basin and the options available for handling this production onshore.

Future facilities that are considered as part of this Area Study will be subject to a separate NEPA and CEQA review if and when they are proposed. Site specific information will be evaluated at that time, and this document will serve as a source for regional setting and cumulative impact information.

1.4 READER GUIDE TO THE USE OF THIS DOCUMENT

Two separate projects and Area Study scenario are evaluated in this EIS/EIR. The separate proposed projects are: (1) Union Oil's Platform Irene and associated pipelines; an onshore oil dehydration facility, a dry oil pipeline, electrical substation, and modifications to the existing Orcutt Pump Station; (2) Exxon's Project Shamrock platform and associated pipelines;

The document is organized into the following major chapters:

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- Environmental and Regulatory Setting (Chapter IV). The natural and social environment is described here as it exists today. This chapter provides the environmental framework upon which project-related impacts are evaluated.

- Environmental Consequences and Mitigation (Chapter V). The impacts analysis examines each project's facilities separately and together. Mitigation measures are a key component of the environmental analysis and serve to identify and evaluate ways to reduce potentially adverse, significant project-related impacts. Because mitigation is so closely associated with the specific impact identified, the discussion of mitigation measures is included in Chapter V.

- Cumulative Impacts and Mitigation (Chapter VI). Chapter VI deals with cumulative impacts associated with potential future oil and non-oil developments that are likely to occur in Santa Barbara, Ventura, and San Luis Obispo Counties. Potential mitigation measures associated with the cumulative impacts are identified in this chapter.

This EIS/EIR has been prepared as a description and analysis of the projects and their consequences. Its size has been constrained to help the reader focus on the major issues, key assumptions, and significant findings. Additional supporting material is available to the inquisitive reader in various Technical Appendices.

1.5 AGENCY USE OF THIS DOCUMENT

The Joint EIS/EIR will be used by different agencies to make decisions on the proposed projects and potential future projects in the study area as required by CEQA and NEPA. It will also be used as a long-range planning tool. The intended use of the document for each agency represented on the Joint Review Panel is outlined briefly below. The Joint EIS/EIR will also be the basis for all state and federal responsible agency permit decisions.

Santa Barbara County will use the document to make specific decisions and permit conditions regarding Union's application to the County for a land use re-zone, a major Conditional Use Permit, a Comprehensive Plan/Coastal Plan amendment and approval of the Preliminary Development Plan for the onshore facilities within its jurisdiction.

In addition, the County will utilize the Area Study as a long-range planning tool and for information regarding cumulative impacts of offshore oil and gas development in the Central Santa Maria Basin.

The County Air Pollution Control District will use air quality information from the document in making its decisions as a responsible agency under CEQA.

The Minerals Management Service (MMS), a federal agency, will use the document to evaluate proposed and future activities in federal waters.

Since Development and Production Plans (DPPs) have been submitted for leases OCS-P 0441 (Union-Irene) and OCS-P 0440 (Exxon-Project Shamrock), a detailed site-specific impact analysis is provided in the document for these platforms. The MMS decision to approve or deny these plans will follow certification of the EIS/EIR.

Operators proposing additional platforms in the study area will still be required to conduct the appropriate site-specific geohazards, cultural resource and biological surveys and to submit DPPs. Documents included in these submittals are: the Development and Production Plan (outlines the operator's plans and schedule for drilling and production on a specific tract), Environmental Report, Oil Spill Contingency Plan, Hydrogen Sulfide Contingency Plan, Critical Operations and Curtailment Plan, and survey data and reports. Using baseline information from the Area Study, the MMS will evaluate environmental impacts from additional development activities in subsequent Environmental Assessments or, depending on the significance of the impacts, in Environmental Impact Statements.

MMS has jurisdiction over the oil and gas activities on the Outer Continental Shelf (OCS) (extending from 3 miles to 200 miles offshore). In accordance with the OCS Lands Act, MMS is responsible for the permitting of OCS platforms and pipelines, onsite inspection of these facilities during all phases of the project, enforcement of federal requirements, and royalty monitoring. Specific approvals required by MMS for this project include: Development and Production Plans, right-of-ways for offshore lines, platform verification, and Application for Permit to Drill (APDs) for each well.

The State Lands Commission has jurisdiction over state waters 3 miles seaward of the mean high tide line. The Commission will use the document in making a permit decision on Union's request for a pipeline right-of-way through these waters. Finally, the Commission will use the information for long-range planning and consideration of the cumulative impacts of related projects in the area.

The California Coastal Commission's jurisdiction ranges from concurrence with federal consistency determinations for projects on the OCS to primary permit responsibility in state waters and public tidelands. The Commission will use the document for a detailed project-specific and cumulative impacts analysis in considering the coastal resource issues listed in its Federal Consistency Certification Staff Report. The document will be used to identify impacts and feasible mitigation measures which can be used as conditions of approval as appropriate and to identify any environmentally preferred alternatives to the proposed projects.

<u>Additional Responsible State Agencies</u> will have 180 days to act on permits applicable to these projects following action by Santa Barbara County.

<u>Vandenburg Air Force Base (AFB)</u> has jurisdiction over that portion of the onshore pipeline that crosses the Base. Vandenburg Air Force Base will either adopt this document or develop their own NEPA document based on information contained in this EIS/EIR to permit a pipeline right-of-way across the Base.

As with all agencies, the Joint EIS/EIR will also provide baseline environmental impact and mitigation information to the Commission for subsequent federal consistency certifications and coastal development permits. Additional detailed information will be required by the Commission for decisions on projects not specifically described and analyzed in the document.

Section C provides a representative listing of permits and approvals required for project construction/operation by various Santa Barbara County, state, and federal entities.

II. PROJECT DESCRIPTION

2.0 INTRODUCTION

The Union Oil Company of California (hereinafter referred to as Union Oil), along with Gulf Oil Corporation and Superior Oil Co., acquired the exclusive rights to explore, develop, and produce oil and gas resources on OCS*-P 0441 as a result of OCS lease sale No. 53. This lease is located approximately 3 miles west of Point Pedernales. Union Oil has submitted a Development and Production Plan (DPP) to the Minerals Management Service (MMS) to develop OCS-P 0441, and is proposing to ship the oil and gas production to a new onshore dehydration facility near Lompoc. The dry oil would then be shipped via new and existing pipelines to Union Oil's Santa Maria Refinery for processing. The gas would go via existing pipelines to Union Oil's Battles Gas Plant for processing. Union Oil has submitted a preliminary Development Plan Application to the County of Santa Barbara for the onshore portion of the project.

Also during lease sale No. 53, Exxon Company, U.S.A. (hereinafter referred to as Exxon) acquired the mineral rights to OCS-P 0440 and -P 0438, which are also located just west of Point Pedernales. Exxon has submitted a DPP to the MMS to develop OCS-P 0440, -P 0438, and -P 0437. OCS-P 0437 is owned by the Atlantic Richfield Company (ARCO), AMOCO, EIf Acquitaine, Champlin, and Aminoil. Exxon has not yet submitted an Application to the County of Santa Barbara covering the onshore portion of their project. Exxon's plans are to process their wet oil at Union Oil's proposed Lompoc Oil Dehydration Facility and to reinject their gas at the platform. Their plans for transporting the dry oil from Lompoc out of the County are unknown at this time. The options for moving Exxon's dry oil out of Lompoc are discussed in Section 2.10 on the Area Study, but are not analyzed at a Permit Level of detail. Any onshore components required for the Exxon project will be covered by a separate Application and will be subject to an independent CEQA review. Therefore, the impacts associated with Exxon's onshore oil processing and transportation are analyzed only of a Planning Level of detail as part of the Area Study. However, since Union oil is proposing to build the Lompoc Dehydration Facility with a design capacity of 36,000 barrels per day and they only intend to process 20,000 barrels per day, the remainder of the capacity could be used for the Exxon production. This document analyzes the impacts associated with operating the Lompoc Facility at its maximum capacity of 36,000 barrels per day.

Union Oil's proposed DPP and application submitted to the MMS and the County of Santa Barbara, respectively includes the following project elements:

*OCS -- Outer Continental Shelf

- One 72-slot drilling and production platform (Platform Irene) on Lease OCS-P 0441.
- One subsea power cable from Platform Irene to a landfall at Surf.
- Three subsea pipelines -- one wet oil, one gas and one produced water return -- between Platform Irene and a landfall just north of the Santa Ynez River on Vandenberg Air Force Base (Vandenberg AFB).
- Continuing pipelines from the landfall to a new oil dehydration facility near Lompoc.
- A new electrical substation located on Southern Pacific Railroad property near Surf.
- Replacement of existing electrical transmission lines from the electrical substation at Surf to an existing Pacific Gas and Electric power line just north of the City of Lompoc.
- A new oil dehydration facility located north of the City of Lompoc on Union Oil's Lompoc Oil Field property.
- A new dry oil pipeline from the oil dehydration facility north to Union Oil's existing Orcutt Pump Station.
- Modifications to the existing Orcutt Pump Station to allow the handling of the crude oil from OCS-P 0441.
- Modification to Union Oil's Santa Maria Refinery in San Luis Obispo County to allow processing of the crude oil from OCS-P 0441.

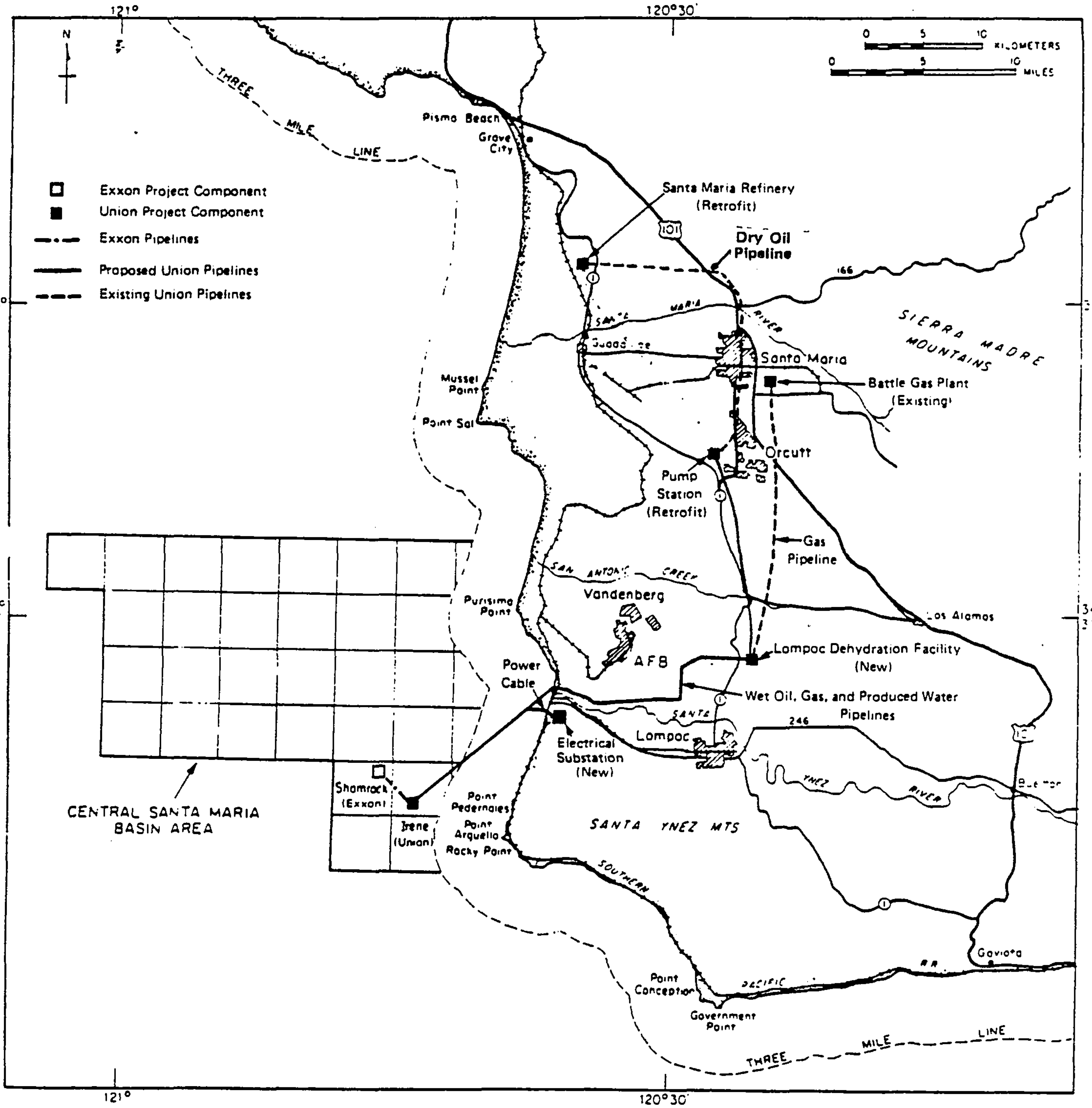
The Exxon DPP submitted to the MMS includes the following project elements:

- One 60-slot drilling and production platform on Lease OCS-P 0440.
- Two subsea pipelines -- one wet oil and one gas -- between Exxon's platform and Platform Irene.
- One subsea power cable from Exxon's platform to Platform Irene.

As can be seen in Figure 2.0-1, the two proposed platforms are located in the Point Pedernales Field, which is part of the Central Santa Maria Basin. The MMS has estimated that up to four additional platforms may be required to develop the oil and gas resources in the Central Santa Maria Basin. A

FIGURE 2.0-1

MAP OF PROPOSED UNION OIL/EXXON PROJECTS



planning level discussion of the requirement for developing the Central Santa Maria Basin is provided in Section 2.10. Sections 2.1 through 2.9 are specific to the projects proposed by Union Oil and Exxon as listed above.

2.1 PLATFORMS

2.1.1 General Platform Discussion

Union Oil and Exxon are proposing to install a single conventional platform on each of their two leases. These two platforms will be combination drilling/production platforms with an eight-leg steel jacket, bottom founded, and anchored by pilings.

The proposed platforms are very simple in design and only provide for initial separation of oil and gas on the platform. All the oil processing is performed onshore.

2.1.1.0 Design, Construction, and Installation

The principal structural components of the platforms are the jacket, piling, and deck sections. These components are shown in Figure 2.1-1. The jacket structure extends from the sea floor to approximately +15 feet mean lower low water. The jackets will be delivered and installed as a single piece, and the pilings will be used to attach the jacket to the ocean floor. The deck sections will provide the space and immediate support for production and drilling operations.

Each platform's design, fabrication, and installation will be in accordance with MMS OCS orders which include an independent third-party verification pursuant to MMS OCS Order No. 8. The platforms will be designed to withstand earthquake, oceanographic, and soil conditions for their given location, and to satisfy the requirements in American Petroleum Institute (API) RP2A "Planning, Designing, and Constructing Fixed Offshore Platforms."

Installation of the platforms will require major marine equipment which includes a derrick vessel, jacket launch barge, cargo barges, tug boats, supply boats, and crew boats. Installation procedures will be as follows:

Jacket Tow and Launch - Once the jacket is fabricated, the structure will be loaded onto a barge and towed from the assembly site to the final platform site. The jackets can be fabricated at suitable construction sites on the West Coast, in Japan, or in Korea. Union Oil's jacket is currently being assembled in Japan. The exact site will be chosen at the time of contract award. When the jacket arrives at the site it will be launched from the barge and floated horizontally in the water. Just prior to the arrival of the jacket, the derrick vessel will move to the installation site and secure itself with an eight-point anchor system. The jacket will be positioned over the proposed site using one of a number of navigational systems. These navigational systems allow the jacket to be set within 3-6 feet of the desired location. Once the vessels are positioned, sonar data can be used to verify the sites bathymetry.

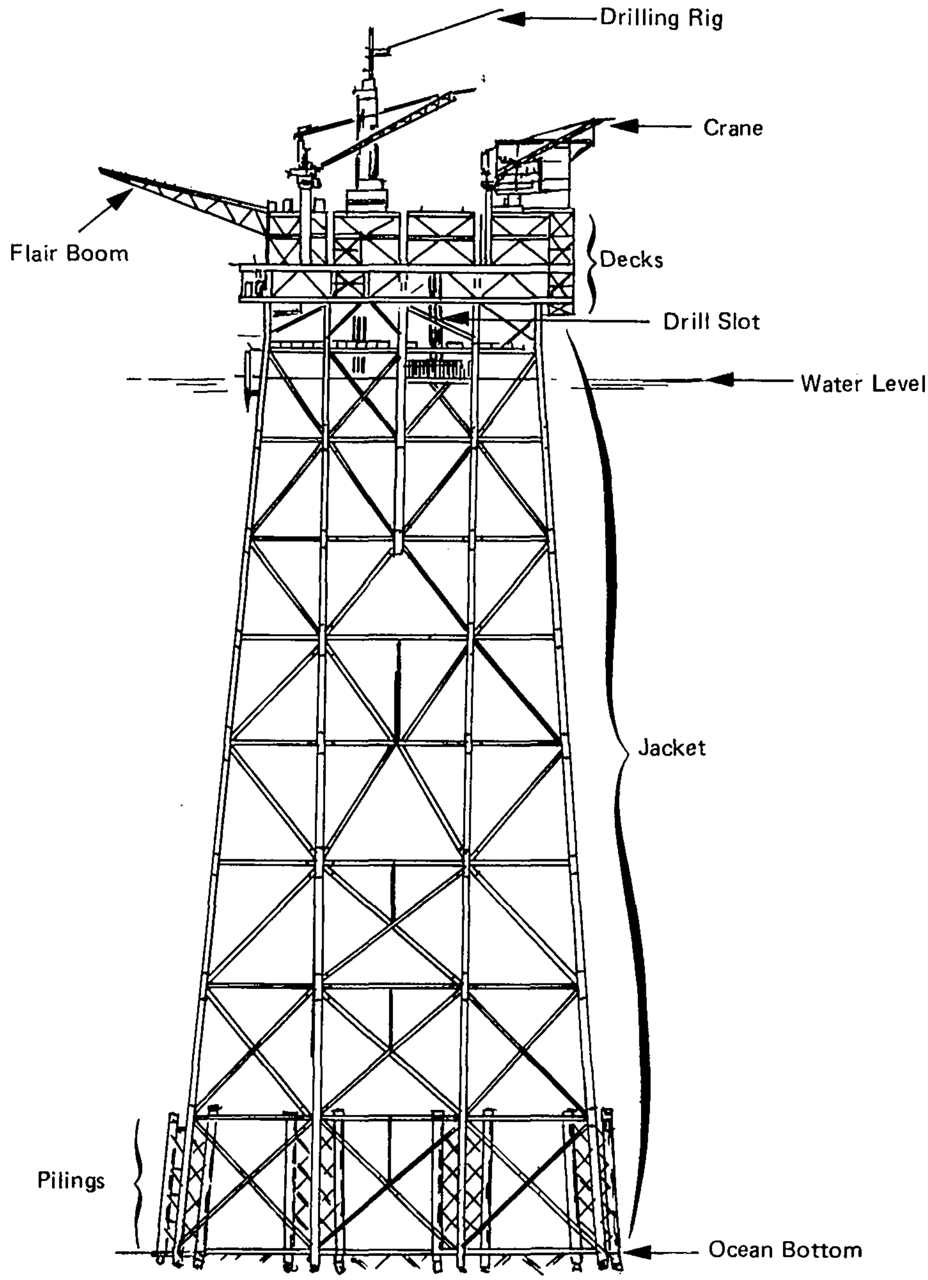


FIGURE 2.1-1 TYPICAL PLATFORM COMPONENTS

<u>Jacket Upending</u> - Once the jacket is launched it will be positioned over the installation site and uprighted by flooding selected legs with sea water. The final positioning and leveling of the jacket will be done with the cranes on the derrick vessel and by controlled leg flooding. Once the jacket is positioned and levelled on the ocean floor, the remainder of the leg pile sleeves will be flooded.

<u>Pile Installation</u> - Eight main steel piles will be installed through the jacket legs in approximately 80-foot-long welded sections. Upon reaching the ocean floor, the piles will be driven to their design penetration depth.

<u>Deck Setting</u> - The decks will be lifted by a derrick vessel and set on top of the pilings or a support structure, and welded into place. The flare boom, crew quarters, and cranes will then be lifted into place on the deck by the derrick vessel crane.

<u>Equipment Installation</u> - The equipment can be installed on the platforms either as individual pieces or in modular form. The exact method used for each platform is discussed in Section 2.1.2 for Union Oil's Platform Irene and Section 2.1.3 for Exxon's platform.

The installation of Union Oil's and Exxon's platforms, including hookup and testing of equipment, will take from 16 to 30 weeks each, will require a work force ranging from 40 to 150 people at any given time. The construction activities will require a work area of approximately 0.3 square mile (a radius of 1,680 feet from the platform site).

2.1.1.1 Drilling Equipment and Operations

Drilling activities will be in accordance with MMS OCS Order No. 2 or Field Drilling Rules, Environmental Protection Agency-National Pollutant Discharge Elimination System (EPA-NPDES) permit conditions, and accepted industry standards. The operations will include actual drilling, setting and cementing of casing, and installation of production tubing in the well. The major drilling components include:

- A derrick or mast used to raise and lower the drill string and casing into the well and to support the drill bit for drilling the well.
- A mud system used to control well pressures, lubricate the drill pipe and bit and return drill cuttings to the surface for cleaning and discharge. The composition of the drilling muds to be used by the Operators is provided in the section covering the specific platforms.
- A cementing system used to force cement down the well to seal the annulus between the casing and the borehole wall or between concentric casing strings.

- A blowout prevention system to seal the well in the event of an emergency and prevent oil from entering the environment. This system is composed of an annular preventer, blind rams, two sets of pipe rams, choke and kill lines and a diverter system.

- A power system for the drilling rig.

- A disposal system used to clean or treat effluents for ocean discharge or retain contaminated wastes for transportation to shore.

A typical well will require 30-40 days to drill and complete. Supplies and materials required for the drilling activities -- including tubular goods, drill bits, diesel fuel, mud materials, cement, completion fluids, maintenance materials and general supplies -- will be transported to the platforms by supply boats.

Periodically during drilling, clean water based muds will be discharged to the ocean through the cuttings chute in accordance with OCS Order No. 7. Should any unusual drilling conditions require use of other additives, such as an oil/diesel mixture to free a stuck drill string, the contaminated mud will not be discharged. The contaminated fluid will be either transported to shore by boat for disposal at Casmalia, or when feasible, will be transferred to a waste tank on the subdeck and then transported to the onshore treating facility in the oil pipeline. Onshore operating personnel will be notified of the shipment and will be prepared to handle the material. Treatment and separation will be accomplished by the heater treaters and free water knockout (FWKO) vessel. The hydrocarbon fraction will go into the oil stream, the water portion will go with the produced water, and any solids will be accumulated at tank bottoms and transported to the Casmalia Class I disposal site when the tank is cleaned.

Power for the operation of the rig and related equipment will be provided by a public utility via a subsea power cable. In the case where power via the subsea cable is lost, the diesel-powered cementing unit or a back-up diesel generator can be used for mud handling as needed for well control.

Blowout prevention equipment will conform to the standards of API Bulletin RP53 and the provisions of MMS OCS Order No. 2, Section 5. Before drilling below the conductor casing, a 500 psi working pressure diverter system will be installed and tested. The diverter system will be equipped with two diverter lines and full opening pnuematic valves. The system will be designed so that closing of the diverter element will cause at least one line of the system to be open to flow. In addition, all valves will be designed to be fail safe. All diverter functions will be controlled by a panel at the driller's station.

After surface casing is set, a blowout prevention system -- which includes one set of blind rams, two sets of pipe rams and one annular-type preventer -- will be installed. The blowout prevention equipment and related equipment which could be exposed to wellbore pressure, will be rated to 3,000 psi working pressure. This exceeds the maximum anticipated surface pressure. This blowout prevention equipment will include a hydraulic actuating system with sufficient capacity to repeatedly operate all functions through three cycles and a remote control station in the on-site supervisor's office. Blowout prevention systems and related equipment will be tested as suggested by API recommended practices and in accordance with OCS Order No. 2, Section 5. This testing includes testing the equipment upon installation, before drilling out of each casing string, and not less than once per week. Additionally, the testing will alternate between all control stations, and retesting will be performed should any repairs affecting a pressure seal be required.

Other blowout prevention equipment will include:

- Choke and kill lines equipped with master and control valves.
- Fill-up line.
- A choke manifold equipped in accordance with API RP53.

2.1.1.2 Production Equipment and Operations

Once a well has been drilled and the Christmas tree (i.e., wellhead valve and fitting network to control flow in a well) along with associated well control equipment has been installed, the wells will be brought online for production. The platforms will contain production equipment for the initial separation of produced gas and wet oil. The wet oil from the platforms will be sent to shore via pipelines for final treatment with all the produced water being returned via pipeline to Platform Irene for ocean disposal. The gas from Platform Irene will be sent ashore via pipeline. The gas from Exxon's platform will be reinjected.

Production operations will be conducted in accordance with MMS OCS orders, other federal regulations and industry standards. MMS will continuously monitor production activities in compliance with federal requirements throughout the life of the project. Production activities are the production of reservoir fluids, primary separation of these fluids, treatment of wastes, and placement of fluids into pipelines.

The production equipment and related facilities can be divided into three parts: 1) Production Facilities; 2) Utility Systems; and 3) Support Facilities. Figure 2.1-2 shows a simplified block flow diagram of a typical platform production facility.

The production facility for each platform will include:

- Well Bay Manifolds -- These manifolds contain a series of valves that allow each well to be connected to a number of separators such as production separator, test separator, well clean-up separators, and, as appropriate, a sweet gas separator.

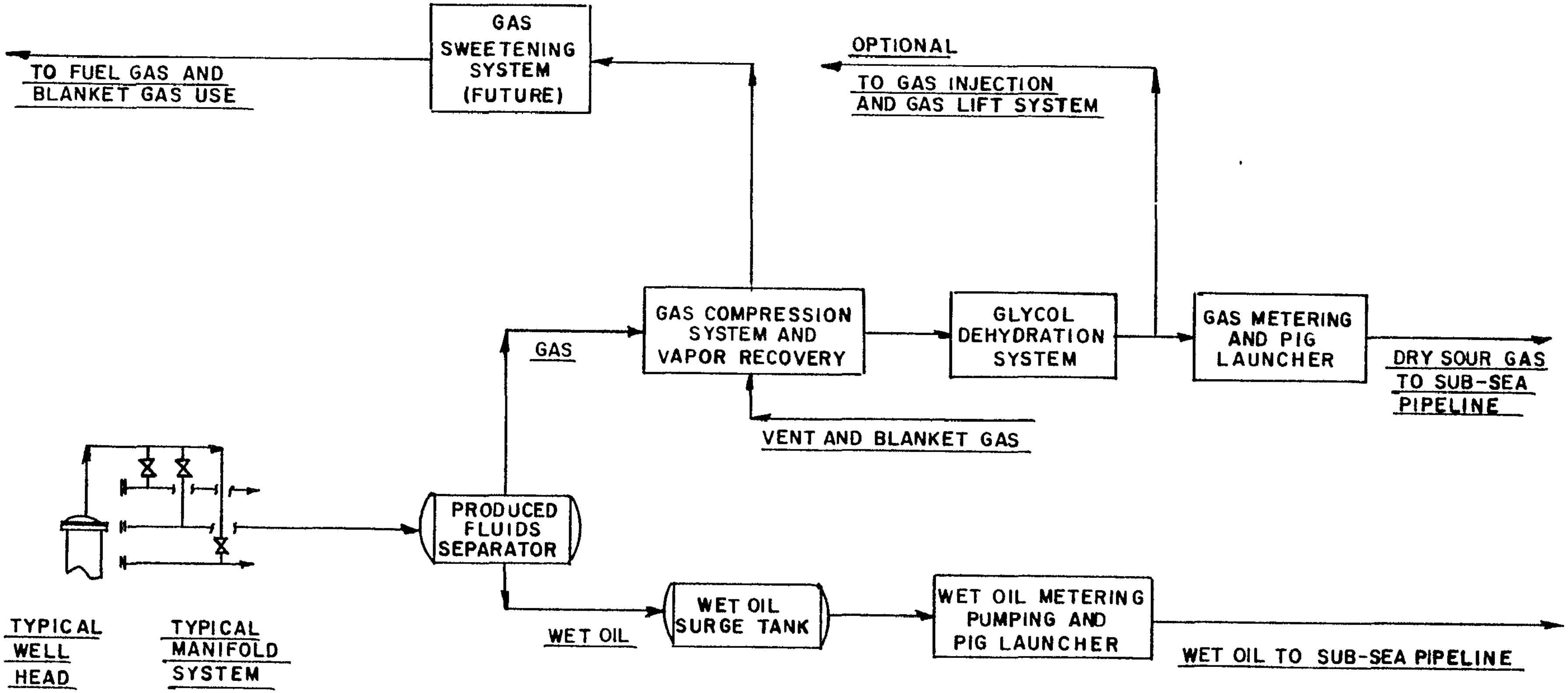


FIGURE 2.1-2
GENERALIZED PLATFORM
PROCESS FLOW

- Separators -- Each platform will be equipped with parallel oil and gas separation trains. Each train will have a gross separator for separating gas and wet oil.
- Oil Handling System -- The wet crude oil from the separators will flow to a crude oil surge tank from which it will be metered and pumped into the subsea pipeline.
- Gas Handling System -- The produced gas will be compressed in a number of stages, dehydrated in a glycol system, metered and sent to a subsea pipeline or reinjected back into the production wells for pressure maintenance. Vent gas and blanket gas from various low-pressure tanks throughout the platform will be recovered in the gas-compression system. For platforms utilizing gas lift or gas injection, a portion of the gas from the glycol dehydration system will be used. A vent and flare system will provide for the safe disposal of emergency releases of gas.

The utility system for each platform will include an electrical power distribution system and a waste water treating system. The electrical power on Platforms Irene and Shamrock will be provided by the public utility grid via subsea power cable. Standby power on both platforms will be provided by diesel-powered generators.

Fresh water requirements for the platforms will be obtained from shore or from seawater using a desalination unit. A package sewage treatment unit will be incorporated on the platforms to treat sewage. The other major utility facilities include:

- Utility Air.
- Instrument Air.
- Starting Air.
- Seawater Cooling.
- Miscellaneous Chemical Injection Tanks, Pumps.
- Vent and Flare.

Each platform will have major hazard detection and fire suppression systems. Hydrogen sulfide, fire and combustible-gas detection systems will be appropriately located. The fire suppression system will use a seawater distribution main to supply hose reels, monitor nozzles and deluge systems. Each fire water system will have multiple seawater pumps with at least one being diesel-driven. Other fire extinguishing systems will be provided as appropriate. Other support systems include:

- Escape and life-saving equipment.
- Navigational aid.
- Communication facilities.
- Control systems.
- Personnel quarters.
- Drain and gutter systems.
- Helicopter landing pad.

2.1.1.3 Safety and Monitoring Systems/Environmental Protection Measures

The design, construction and operation of the platforms will conform to the requirements of the MMS OCS Orders for the Pacific OCS Region, as well as the requirements of the applicable Environmental Protection Agency National Pollutant Discharge Elimination System (EPA NPDES) permits and the appropriate API and other industry standards.

Blowout prevention equipment will be incorporated into the drilling operations in accordance with the MMS/OCS requirements as described in the previous drilling section.

Only EPA approved generic drilling muds and additives will be utilized on the platforms and the requirements for monitoring the discharge of the drilling muds and drill cuttings will be followed as described previously. Any cuttings which cannot be discharged in accordance with EPA's-NPDES permit, will be disposed of onshore at an approved onshore Class I dumpsite (Casmalia).

During production operations, all wells will be fitted with a surface controlled subsurface safety valve at least 100 feet below the ocean floor. These subsurface safety valves are used to stop the flow of fluid from the well in the event of damage to the equipment in the wellhead. In addition, surface-controlled surface safety valves and manually operated block valves will be installed in the flow lines from each wellhead to allow positive shutoff from the well in case of problems downstream.

Safety, antipollution, and control systems will be installed on all piping, headers, machinery and vessels as required. The actual control devices will be a combination of electrical and pneumatic controls selected for their proven reliability. The major control devices will include:

- High-low pressure alarms and shutdown sensors.
- High-low liquid level alarm and shutdown sensors.
- Flow-safety valves.
- Pressure safety valves.
- Vibration sensors.
- High-low temperature alarm and shutdown sensors.
- Combustible gas and H_2S detectors -- alarm and shutdown sensors.
- Flame detectors - alarm and shutdown sensors.
- Heat detectors - alarm and shutdown sensors.
- Thermal plug - shutdown sensors.
- Platform shut-in systems.

All of the above items will be designed and installed to facilitate operational testing. Initially all of the devices will be tested monthly. After a record of reliability has been established, a test schedule, to be approved by the MMS District Supervisor, may be prepared.

All of the safety devices will be connected to a programmable computer which will cause the various preselected alarms and/or shutdown devices to be activated. In addition, an annunciator panel will identify the problem area. The sequence of events following a signal from one of the safety devices will be:

1. An alarm will sound.

2. The annunciator will indicate the problem.

3. If the problem is not corrected, the shutdown will activate.

4. When the shutdown device is activated, the platform will shut down.

The shutdown would first involve closing the surface safety valves and the subsurface safety valves and shutting down any down hole submersible pumps or gas lift system. These steps occur within the first minute of the shutdown signal and result in all the wells being shut-in. At this point, all the produced fluid and gas would continue to move off the platform through the pipelines until the pumping and compression equipment is automatically shut down by either low levels or low pressure. If the malfunction is pipeline-related, products would not be pumped off the platform but, instead, the vessels and scrubbers would automatically shut-in and contain the production and the wells would shut-in as described above. If the alarms indicate high pressure in the production vessels, the vents would open, and the over-pressured gas would be vented to the flare where it would be burned until the pressure in the vessels were below the relief valve set points.

FIRE PROTECTION SYSTEMS

A firewater system will be supplied on each platform, using electrically- and diesel-driven firewater pumps. One of these pumps will be connected to the emergency generator. The firewater will be distributed to hose reel stations, monitor nozzles and deluge systems appropriately located around the platform. Additional fire fighting systems will be incorporated, such as: fixed fire protection systems for electrical rooms; portable fire extinguishers appropriately located around the platform; and an extensive system of combustible gas detectors, smoke detectors and flame detectors to provide early warning in the event of any fire or flammable gas release. Detectors for hydrogen sulfide will be located at strategic points around the platforms.

OIL SPILL CONTROL EQUIPMENT

Before drilling and production are initiated, key platform personnel will be trained in the rapid deployment and proper use of the platform booms, oil pickup device (skimmer), sorbent material, and dispersants. This equipment can be deployed and in use almost immediately following a spill. Boats capable of deploying the boom and performing other cleanup functions will be maintained on or nearby the platforms ready for immediate response. The actual oil spill response equipment to be located on the Union and Exxon platforms are listed in Section 2.1.2 and 2.1.3, respectively.

LIFE SAVING EQUIPMENT

Each platform will be equipped with various life saving equipment that will allow the personnel to evacuate safely from the platform in the event of an emergency. This equipment will include:

- Life vests.
- Emergency oxygen supplies.
- Self-contained escape capsules.
- Evacuation ropes.

The escape capsules will be completely enclosed and will contain a water deluge system to prevent the capsules from overheating because of burning oil and gas around the platform.

CRITICAL OPERATIONS AND CURTAILMENT PLANS

All operators must develop Critical Operations and Curtailment Plans for their respective operations as required by MMS in accordance with OCS Order No. 2. Both Union Oil and Exxon have developed Critical Operation and Curtailment Plans for their respective operations. Recognizing certain operations are more critical than others with respect to well control and prevention of fire, explosion, oil spills and other discharges or emissions, these plans help ensure critical operations are performed safely, including curtailment during events of extreme environmental or other adverse conditions.

Critical operations included in the plans include:

- Drilling close to another well.
- Production testing.
- Running and cementing casing.
- Cutting and recovering casing.
- Well logging, wireline and completion operations.
- Other operations as may be deemed critical for a particular platform.

Critical operations will be curtailed during events of extreme environmental or other adverse conditions, including:

- When wind speeds, wave height, or process operating conditions are outside safety-related design parameters

- Severe earthquakes.

- Major oil spill.

- Major failure of critical production facilities equipment until the problem is resolved.

If an unusual storm that endangers the safety of the platform should occur, or if the platform is threatened by fire from a spill from another facility, all operations will be suspended and the wells shut-in in a safe and secure manner until the emergency is over. The time required to shut-in the production wells is approximately one minute. While any drilling or production operations are being undertaken on the platforms, weather forecasts will be obtained daily to aid in planning future operations and to determine when a critical operation should be avoided, suspended, or curtailed.

2.1.2 Specific Platform Irene Discussion

Union Oil is proposing to install an eight-leg template type platform structure on OCS-P 0441. This platform will be installed in 242 feet of water and will support two main decks plus a subdeck. The two main decks will support drilling and production operations. Table 2.1-1 provides some of the general characteristics of Platform Irene.

This platform will produce both gas and wet oil from OCS-P 0441, with the peak production of oil occurring in 1987-1989 at 20,000 barrels of dry oil per day and peak gas production occurring in 1994 at 13.25 million standard cubic feet per day (MMscfd).

2.1.2.0 Drilling Equipment and Operation

Platform Irene will have 72 well slots; however, it is anticipated that only 43 production wells will be drilled. The wells will be drilled using one drilling rig which will be skidded over individual well slots. The platform has been designed to accommodate two drilling rigs, but Union Oil is currently planning to drill with only one rig. If their initial production from the wells is lower than anticipated they may bring a second drilling rig onto the platform to accelerate the drilling schedule. The other 29 well slots will be used for future production, if needed, or for drilling exploratory wells into other potential hydrocarbon bearing formations.

DRILLING EQUIPMENT

The drilling equipment on Platform Irene will be owned by Union Oil; however, the personnel for operating the equipment will be provided on a contract basis. The major drilling components on Platform Irene will include:

Rig Components

These will include one land-type cantilever mast 140 feet high with a maximum drilling depth of 12,000 feet using 4 1/2-inch drill pipe. The mast will be designed in accordance with API Standard 412 for free standing masts. The drawworks will be electrically driven (rated at 1,000 Hp) and include sandreel and rotary table drive. The hook, traveling block, and crown block will have a load rating of at least 500 tons.

Table 2.1-1
PLATFORM IRENE GENERAL DATA

Operator	UNION OIL COMPANY OF CALIFORNIA
Co-Lessee	Superior Oil Company
	Gulf Oil Corporation
OCS Lease	-P 0441
Lease Sale No.	53
Lease Size (acres)	4,904.9
Location	
• Latitude	34° 36' 37.411" N
• Longitude	120° 43' 45.744" W
• UTM Zone 10	X = 708,200
	Y = 3,831,986
• Loran C	W = 16,508.8
	X = 27,811.0
	Y = 41,877.3
Platform Characteristics	
Water Depth	242
No. Well Slots	72
No. Wells to be Drilled	43
No. of Decks	3
• Drill Deck Size (elevation)	155' x 135' (+83' MLLW)
• Production Deck Size (elevation)	155' x 135' (+56' MLLW)
• Subdeck Size (elevation)	40' x 20' (+ 41' MLLW)
Maximum Platform Height	+ 223' MLLW
No. of Platform Legs (diameter)	8 (64")
Conductor Casing Size	20"
No. of Pipeline Risers	7
• Oil and produced water	3
• gas	3
• water return	1
No. of Conductors	9
• power cable	Three-6"
• sewage disposal	One-4" (+16' to -180' MLLW)
• drill cutting and muds/produced water	Two-12" (+16' to -150' MLLW)
Seawater Pump Casings	Four-14" (+16' to -70' MLLW)
No. of Boat Landings	2
No. of Cranes	One-100 ton on drill deck
	One-140 ton on drill deck
No. of Drilling Rigs	1 (can accommodate 2)
Estimated Peak Production	
-Gas MMscfd (year)	13.25 (1994)
-Dry Oil B/D (year)	20,000 (1987-1989)
-Produced water B/D	18,000-20,000 max.(estimate only)
No. of Pilings (diameter)	8 (60")
Piling Penetration	
-Corner	260 feet
-Internal	240 feet

Substructure

The substructure of the drilling rig will be capable of supporting the mast and setback loads. It will be designed to provide unobstructed clearance for the blowout prevention equipment. The substructure will be supported on a skid base, and will be equipped with a hydraulic jacking system to allow movement along the various well rows.

Drilling Mud System

The mud system will be equipped with two 1,000-Hp mud pumps along with a surge tank, mixing pump, and hopper. The systems will include a 500-barrel active mud storage tank as well as a 300-barrel reserve mud storage tank. Each of these mud tanks will be equipped with agitation devices and transfer pumps. Returned mud and cuttings will be treated with dual-tandem shakers, desanders, desilters, degassers, and a cuttings washing system. The cleaned cuttings will be discharged to the ocean through a vertical pipe or cuttings chute whose terminus will be about 150 feet below the MLLW. Mud volume and flow rate will be monitored with a pit volume totalizer, flow rate indicator, and a fill-up measurement device. These systems will be equipped with sensors for remote monitoring and audible alarms at the driller's station and onsite supervisor's office.

Cementing Unit

One diesel-powered dual pump cementing unit and four 1,000-cubic foot bulk storage tanks will be provided for well cementing and completion operations.

Wellhead Equipment

The wells will be completed with wellhead equipment in accordance with OCS Order No. 6. The wellhead completion tubing string will be designed for use of electric down hole submersible pumps. The working pressure of each wellhead section will exceed the maximum anticipated surface pressure.

Blowout Prevention Equipment

The drilling rig will be equipped with a blowout prevention system which will be operated and tested in accordance with OCS Order No. 2.

DRILLING OPERATIONS

Drilling is scheduled to begin in January 1986. The average time required to drill a well is anticipated to be about 30 days. Therefore, it will be possible to drill 12 wells per year. Assuming that only 43 wells will be drilled, the final well should be completed in June 1989.

The rig will be operated by three 5-man crews working 12-hour shifts. A Union Oil drilling supervisor and rig contractor's supervisor will be present at all times. A drilling engineer, vendor representatives, and logging and cementing crews will also be present at various times during the drilling of the wells. The platform will be inspected periodically by MMS personnel.

The anticipated drilling procedures for each well will be:

1. Drill 17 1/2" hole to 320' below mud line (BML).
2. Underream hole to 26".
3. Run and cement 20" conductor casing of 300' BML.
4. Install and test diverter.
5. Drill 17 1/2" hole to 1,020' BML.
6. Underream hole to 22".
7. Run and cement surface casing to 1,000' BML.
8. Install and test 3,000 psi blowout preventers.
9. Drill 14 3/4" hole to 3,515' BML.
10. Run and cement 10 3/4" intermediate casing to 3,500' BML.
11. Drill 9 7/8" hole to 4,500' BML or as directed by geology.
12. Run and cement 7" production liner to final depth.
13. Run production equipment 3 1/2" tubing.
14. Remove blowout preventers and install Christmas Tree valve stack down hole submersible pumps, and subsea surface controlled safety valve.

The composition of the drilling mud to be used by Union Oil is provided in Table 2.1-2. This mud is a lightly treated seawater based fluid.

Table 2.1-2

DRILLING MUD COMPOSITION

Component	Concentration (lbs/BBL)
Sepiolite	5-6
Saponite	25
Polyanionic Cellulose	2.5 - 3.0
Causticized Lignite	2 - 5
Chrome-free Lignosulfonate	1
Caustic Road	0.5 - 1
Soda Ash	0.5
Corrosion Inhibitor	0.25
Defoamer	0.01 - 0.02%
Detergent	1 -2
Barite	As required for density
Seawater	92 vol %
pH	9 - 9.5

Source: Union Oil Development Application, County of Santa Barbara, October 1983.

Each well drilled from Platform Irene is expected to produce approximately 5,053 cubic feet of drill cuttings. Periodically during drilling, clean water based muds will be discharged to the ocean through the cuttings chute in accordance with OCS Order No. 7. It is estimated that 2,310 barrels of mud per well will be discharged to the ocean.

When drilling of a well is completed the drilling mud will be displaced from the well bore with seawater prior to running the pump and other production equipment. The mud in the well, approximately 850 barrels, will not be discharged, but will be pumped into the storage tank on the production deck for reuse in starting the next well.

2.1.2.1 Production Equipment and Operations

Production operations on Platform Irene are scheduled to begin in February 1986. The operating crew will consist of four production personnel and one foreman on the day shift. Evening and night shift will require only two production personnel. A foreman will be on the platform at all times but will not be on duty during the evening and night shifts. Other workers required during the life of the project would be for well workovers. During workovers, up to six persons will be required per shift for two shifts per day.

Although it is anticipated that initially the wells will flow for a short time, electrically driven submersible pumps will be installed to deliver the produced fluid to the surface at a pressure of 200 psig. Gas from the annuli of the various wells will be gathered in the platform gas gathering system. Each well will be equipped with surface controlled subsurface safety valves on both the production tubing and the annulus as well as surface safety valves and flow safety valves. All piping to the intake of the first pressure vessel will be designed to withstand the maximum shut-in well pressure.

OIL PROCESSING

Production from each wellhead will flow to a header system. The header system will be connected to a gross separator or through diverting valves to a test separator. From the gross separator and/or the test separator, wet oil will flow to a shipping surge tank for pipeline shipment to the onshore dehydration facility. The wet oil will leave the platform at approximately 1,000 psig pressure. Shipping pumps will be of the electrically driven submersible type, completely enclosed in especially constructed pump cans. That is, there will be no exposure of the pump or sealing mechanism to the atmosphere. This system reduces the amount of fugitive emissions from the pumps.

Union Oil predicts that the water content of the produced fluid will increase over the life of the field. When the water content of the produced fluid reaches a point where the freewater can be separated without the use of heat, a freewater knockout vessel will be installed to draw off freewater and a water treating system will be installed. The water treating system will be composed of an induced gas flotation cell and the necessary pumps, filters and vessels. The treated water will then be either injected into the producing formation or disposed of under an NPDES permit.

Wet oil production from the platform will be measured through a transfer meter, immediately before entering the pipeline to the onshore site. This meter forms part of the pipeline leak detection system. A matching meter will be located at the onshore site, and readings from both meters will be continuously transmitted to a common point for comparison. A small computer will check for instantaneous differences plus short- and long-term trends. Any out-of-tolerance readings or trends will result in an alarm to the onshore and offshore operations.

GAS PROCESSING

Gas will be gathered from well annuli, and separators will be compressed to approximately 300-400 psi using electrically driven compressors. The gas will be dehydrated with glycol to prevent corrosion in the gas pipeline. All the pressure vessels on the platform will be connected to a vapor recovery system which will be connected to the gas gathering system. All pressure vessels containing gas will also be connected to an emergency vent gas scrubber and flare.

UTILITY SYSTEMS

Platform Irene will obtain its electrical power requirement via a subsea cable that is connected to the local electrical grid system. The transmission voltage will be 34.5 KV with a line capacity of 27,000 KVA.

All drilling and production equipment on the platform will be driven by electric motors except for two 140-Hp crane engines, one 50-Hp well logging unit, one 500-Hp duel cementing unit engine, and two 270-Hp emergency generator engine, all of which are diesel fueled. Approximately 50 Hp per well will be required. Oil shipping will take 1,000 Hp at 20,000 B/D, and gas compression will take 900 Hp. Other pumps, motors, lighting, etc. will operate on an intermittent basis with an average of 200 Hp.

Peak drilling loads will reach 2,500 KVA for 15 minute periods or less. Normal drilling loads will be in the 1,000-1,500 KVA range. These loads apply to one rig and will remain constant during the drilling phase. Production loads will increase gradually to 2,000 KVA as more wells are completed and placed on artificial lift. The average production load with 43 wells on pumps will be 2,000 KVA.

All normal electric power will be purchased from Pacific Gas & Electric and transmitted through a cable from shore. Two 200-kilowatt auxiliary generators at the platform will provide emergency power for safety devices, navigation aids and one fire water pump if shore power is lost. The auxiliary generators will be operated 15 minutes per week as a test.

Diesel fuel will be brought out by work boat from commercial suppliers at Port Hueneme. Six thousand gallons of storage will be provided on the platform in the crane pedestals. Fuel will be transferred by pumps on the boat and a hose between boat and platform. Fuel consumption during drilling and production will be about 20,000 gallons per year for one drilling rig. Fuel requirements for production operations only will be 1,500 gallons/year.

Potable water for crew quarters use will come by work boat from Port Hueneme. The boat has a potable water capacity of 14,000 gallons and can transfer at 200 GPM. Two hundred barrels (8,400 gallons) of potable water storage will be provided on the platform. Typical consumption for a 50-man crew is 1,500 gallons per day. Bottled water for drinking will be brought out on the work boat. Freshwater for deck wash down will be stored in the legs of the platforms. This water will be brought to the platform from shore by supply boat. Six thousand and six hundred barrels of storage will be provided.

Sewage from the quarters will be processed through a small U.S. Coast Guard (USCG) approved sewage treating unit on the subdeck. The unit uses biological action for treatment. A 1-2 ppm chlorine residual will be maintained in the effluent. No other waste streams will be connected to the sewage plant.

There are two disposal options for produced water, injection into the reservoir or discharge into the ocean at the platform. The Lompoc Oil Field is currently injecting 45,000-50,000 barrels per day of produced water into a combination of productive and underlying non-productive zones. Some adverse effects on oil production have been noted. Therefore, the preferred water disposal method at this time is to treat the water onshore and discharge it at the platform under the conditions of an NPDES permit. Treatment methods for the produced water are discussed in Section 2.4.4 of this chapter.

2.1.2.3 Oil Spill Response Equipment

The oil spill response capability will be provided by locating a large response vessel, to be operated by Clean Seas, in the Southern and Central Santa Maria Basin areas. As currently envisioned, the Clean Seas vessel will be a 180 foot vessel with the following equipment on board:

- Boom reel and hydraulics
- Tank - oil/water separator - 100 BBL
- 20KTS - 40' - 45' boat with 1,500' of 4300 Expandi boom and accessory equipment
- Advancing skimmer (ODI) (2)
- Stationary Skimmer (Walosep W-3)
- Booms - 2,000' Expandi 4300 on roto-paks
  2,000' Expandi 7000 on reel
  Sock collecting systems (for heavy oil)
- Crane - 25 - 30 ton
- Boat w/OB
- Dispersant sprayer w/outriggers - dispersant storage tank
- Radio (UHF and VHF)
- Absorbents - booms, pads, etc.
- Minimum 1,000 BBL storage capacity

2.1.2.4 Supply Base and Crew Base Support

The supply and crew base support for Platform Irene can be broken down into three categories:

- Platform installation and hook-up.

- Drilling/production.
- Production only.

Table 2.1-3 gives an estimate of the number of trips that Platform Irene will require for crew and supply support. The supply boat support will be from Port Hueneme until such time that an industry consolidated support facility becomes available in either Santa Barbara or San Luis Obispo County. Union does not currently plan to use any crew boats; all crew will be transported by helicopter. Union will use Lompoc Airport only if a flight corridor through Vandenberg AFB can be established; otherwise they will use the Santa Maria Airport.Table 2.1-4 gives an estimate of the average daily emissions for the supply boats and helicopters that will serve Platform Irene.

2.1.3 Specific Project Shamrock Platform Discussion

Exxon is proposing to install an eight-leg template type platform structure on OCS-P 0440. This platform will be installed in 277 feet of water and will support two main decks plus a mezzanine. The three main decks will support drilling and production operations. Table 2.1-5 provides some of the general characteristics of the Project Shamrock platform (hereafter referred to as Platform Shamrock since Exxon has not yet named the platform.

Exxon's platform will produce both gas and wet oil with a peak oil production of 20,000 BOPD dry in 1989. The gas will be reinjected until after the year 2000, at which time the gas will be recovered and processed. This production will be from OCS-P 0440, -P 0441, -P 0438, and -P 0437.

2.1.3.1 Drilling Equipment and Operations

Platform Shamrock will have 60 well slots; however, it is anticipated that only 43 production wells and two gas reinjection wells will be drilled. The wells will be drilled using one drilling rig which will be skidded over individual well slots. The remainder of the well slots could be used for future production or exploratory drilling.

DRILLING EQUIPMENT

The major drilling components on Platform Shamrock will include:

Rig Components

These will include one land-type standard derrick or cantilever mast 160 feet high with a maximum drilling depth of 12,000 feet using 4 1/2/inch drill pipe. This mast will be designed in accordance with API Standard 412 for free standing masts. The draw works will be electrically driven (rated at 1,000 Hp) and complete with sandreel and rotary table drive. The hook, traveling block, and crown block will have a load rating of at least 250 tons.

Table 2.1-3

PLATFORM IRENE CREW AND SUPPLY BASE ACTIVITIES

Activity	Supply Boats	Helicopters
Installation/Hookup	1 every 5 days	4 per day
Drilling/Production	1 every 5 days	7 per day
Production	1 every 5 days	4 per day

Table 2.1-4

PLATFORM IRENE CREW AND SUPPLY BASE SUPPORT ACTIVITY AVERAGE DAILY EMISSIONS

	Pollutant (lbs/day)				
Activity	NO_x	SO_2	PM	CO	VOC
Installation/Hook-up					
Supply Boat	122.7	9.3	9.5	19.7	7.2
Helicopter	14.2	2.3	1.7	17.2	3.6
Drilling/Production					
Supply Boat	122.7	9.3	9.5	19.7	7.2
Helicopter	24.9	4.2	3.1	30.3	6.3
Production					
Supply Boat	122.7	9.3	9.5	19.7	7.2
Helicopter	14.2	2.3	1.7	17.2	3.6

Table 2.1-5

SHAMROCK PROJECT PLATFORM GENERAL DATA

Operator:	EXXON COMPANY, U.S.A.
OCS Lease:	Located on -P 0440 (wells drilled to leases -P 0440, 0441, 0438, 0437)*
Lease Sale No.:	53
Lease Size (acres):	5693.18 acres
Location:	
• Latitude	34° 37' 52"
• Longitude	120° 45' 19"
• UTM Zone 10	X = 705,775 Y = 3,834,225
• Loran C	W = 16,506.54 X = 27,806.6 Y = 41,897.5
Platform Characteristics:	
Water Depth (ft)	277
No. Well Slots	60
No. Wells to be Drilled	45 (43 producers, 2 gas injection)
No. of Decks	3
• Drill Deck Size (elevation)	180' x 167' (+83' MLLW)
• Mezzanine Deck (elevation)	150' x 187' (+66' MLLW)
• Production Deck (elevation)	180' x 167' (+49' MLLW)
Maximum Platform Height	+ 278' MLLW
No. of Platform Legs	8
Conductor Casing Size	24"
No. of Pipeline J-Tubes	5 total (1 power cable)
• Oil and produced water	1
• Gas	1
• Others (future use)	2 unidentified
No. of Conductors	
• seawater/desal. brine/ seawater strainer back flush	one (+16' to -130' MLLW)
• muds/cuttings	one (+16' to -130' MLLW)
• skim pile (treated produced water/deck drains	one (+16' to -210' MLLW)
• treated sewage	one (+16' to -130' MLLW)
• seawater intakes for cooling	three (+16' to 210' MLLW)
• firewater intakes	three (+16' to 32' MLLW)
No. of Boat Landings	2
No. of Cranes	2-100 ton 1- 20 ton
No. of Drilling Rigs	1
Estimated Peak Production/Capacity	
• Gas MMscfd (year)	reinjected till after the year 2000/41
• Dry Oil barrels per day (year)	20,000 (1989)/30,000
• Produced Water barrels per day (100% left in emulsion)	14,000/14,000 (no water removed on platform)

Drilling Mud System

The mud system will be equipped with two 1,000-Hp mud pumps (triplex) along with a surge tank, mixing pump and hopper. The systems will include a 500-barrel active mud storage tank as well as a 300-barrel reserve mud storage tank and 50-barrel spill tank. Each of these mud tanks will be equipped with agitation devices and transfer pumps. Returned mud will be treated with dual-tandem shakers, desanders, desilters, degassers, and a cuttings washing system. The cleaned cuttings will be discharged to the ocean through a vertical pipe, or cuttings chute whose terminus will be about 130 feet below the MLLW. Mud volume and flowrate will be monitored with a pit volume totalizer, flowrate indicator, and a fill-up measurement device. These systems will be equipped with sensors for remote monitoring and audible alarms at the driller's station and onsite supervisor's office.

Cementing Unit

One electric-powered dual pump cementing unit and six 6,000-cubic foot bulk storage tanks, including tanks for bulk mud will be provided for well cementing and completion operations.

Wellhead Equipment

The wells will be completed with wellhead equipment in accordance with OCS Order No. 6. The wellhead completion tubing string will be designed for natural flow, and the use of gas lift for well flow control. The working pressure of each wellhead section will exceed the maximum anticipated pressure imposed on that section.

Blowout Prevention Equipment (BOP)

The drilling rig will have a blowout prevention equipment system. The blowout prevention system will be operated and tested in accordance with OCS Order No. 2.

DRILLING OPERATIONS

Drilling is scheduled to begin in August 1986 with the average time required to drill a well being about 35 days. Therefore, it will be possible to drill ten wells per year. Assuming that only 45 wells will be drilled, the final well should be completed in December 1990.

The rig will be operated by a 15-person crew on duty each of two 12-hour shifts. The crew will include an Exxon drilling supervisor and rig contractor's supervisor. A drilling engineer, logging and cementing crews will also be present at various times during the drilling of the well.

The anticipated drilling procedures will be:

1. Nipple up divereter on 24" conductor which has been driven to 300 foot BML.
2. Drill 20" hole to 1,000 feet BML.
3. Run and cement 16" surface casing to 1,000 feet BML.

4. Install and test 3,000 psi blowout preventers.
5. Drill 14 3/4" hole to 2,900 feet BML.
6. Run and cement 10 3/4" casing to 2,900 feet BML.
7. Drill 9 7/8" hole to 5,300-5,600 feet BML or as directed by geology.
8. Run and cement 7 5/8" production liner to final depth.
9. Run production equipment 4" tubing.
10. Remove blowout preventors and install Christmas Tree.

Exxon currently plans to use various drilling fluids/muds for the wells to be drilled from the Shamrock platform. Seawater will be used to drill the 20-inch hole. The 14 3/4-inch hole will be drilled using a gel-fresh water mud, and the 9 7/8-inch hole will be drilled with a gel-fresh water lignosulfonate mud. The composition of the gel-fresh water lignosulfonate mud is given in Table 2.1-6.

Each well drilled from Exxon's Platform is expected to produce about 9,994 cubic feet of drill cuttings. Periodically, during drilling, clean water-based muds and completion fluids will be discharged to the ocean through the cuttings chute in accordance with OCS Order No. 7. About 5,000 barrels well of muds and 500 barrels/well of completion fluids will be discharged to the ocean.

All used muds and cuttings which are not in compliance with NPDES discharge requirements will be shipped via the wet oil pipeline or by supply vessel to shore and then transported by truck to an approved Class I disposal site (Casmalia).

2.1.3.2 Production Equipment and Operations

Production operations on Exxon's Platform Shamrock are scheduled to begin in September 1986. The operating crew will consist of ten persons per shift, two shifts per day. The crews will work seven days on and seven days off. Other workers would be required during the life of the project for handling well workovers. During the workovers, 11 persons will be required per shift for two shifts.

The oil production from Platform Shamrock will be shipped via subsea pipeline to Platform Irene and then on to the Lompoc Dehydration Facility for treating. Some of the produced gas will be used for gas lift which will be the primary means of artificial lift. High pressure gas from the compressor discharge will be injected into the annulus of the casing and tubing. Gas will then flow down the annular space and into the tubing through gas lift valves. The introduction of gas into the tubing will aerate the produced fluid column and provide a lower pressure at the point of fluid entry into the tubing. The lower bottomhole tubing pressure will result in increased differential pressure from the reservoir into the tubing, increasing the flow of fluids from the formation. Gas injected for gas lift will be recovered in the production separators and returned to the gas compressors.

Table 2.1-6

PLATFORM SHAMROCK TYPICAL DRILLING MUD COMPONENTS

Component	Typical Concentration in Mud[1] mg/liter	lbs/barrel	Use in Drill Muds[2]
Barite	230,000	71	Increase fluid density, regulate formation pressure.
Bentonite	84,000	26	Improve hole cleaning capability, reduce water seepage.
Lignosulfonate	2,850	0.88	Reduce filtration, stabilize clays.
Lignite	2,850	0.88	Improve flow properties of mud.
Sodium Hydroxide	1,425	0.44	Raise mud pH, inhibit corrosion, neutralize H_2S.
Calcium Hydroxide	700	0.22	Remove soluble carbonates.
Sodium Bicarbonate	1,425	0.44	Counteract cement contamination.
Zinc Carbonate	2,850	0.88	Remove hydrogen sulfide from muds.

1 Reference: Exxon ER [1983].
2 Reference: Gray, et al. [1980]
3 Maximum allowable concentrations of components: barite (450 lbs/barrel), chrome lignosulfonate (6.3 lbs/barrel), drill solids (100 lbs/barrel), lignite (5.0 lbs/barrel). Source: NPDES Permit No. CA 0110516.

OIL PROCESSING

The oil processing operations on Platform Shamrock will be basically the same as that described earlier for Platform Irene, except the oil shipping pump will be located on the production deck.

GAS PROCESSING

The gas produced from the wells on Platform Shamrock will be compressed to 600 psig and then dehydrated by use of a glycol contacting system. The dehydrated gas will then be used for low pressure gas lift or compressed to 1,750 psig to high pressure gas lift or injection. This gas reinjection will help maintain reservoir productivity. A small amount of gas will be taken off the glycol dehydrated gas to serve as the fuel for the flare pilots and the glycol regenerator.

Since the produced gas is expected to contain relatively low concentrations of H_2S and other sulfur species, fuel gas sweetening is not expected to be necessary. No equipment for recovery of elemental sulfur will be installed on the platform.

UTILITY SYSTEMS

Electrical power for operation of the platform will be provided via a subsea electrical cable from Platform Irene. All equipment on the platform will be electrically drawn except for two 170-Hp cranes, one 100-Hp crane, one 1,100-Hp standby generator for production, one 1,325-Hp standby generator for drilling, and two 700-Hp firewater pumps, all of which are diesel fueled. The maximum anticipated drilling load is estimated to be 2,000 kilowatts. During operation, the maximum load should not exceed 11.5 megawatts.

Seawater will be converted to fresh water in a distillation unit and will flow to a utility water storage tank. Water from this tank will be pumped through an ultraviolet sterilizer to the pressurized potable water system. Supplemental fresh water will be delivered by supply boat.

Diesel fuel will be brought onto the platform by supply boat and stored in the pedestal columns which support the deck cranes. Pumps will transfer fuel as needed.

Air compressors will provide compressed air at a pressure of 100 psig. A desiccant absorber will dehydrate a portion of this air for use as instrument air. The remainder will be used as utility air.

Seawater will be used to cool transformer equipment and larger electric motors on shipping pumps and reciprocating compressors. Used seawater will be returned to the ocean in accordance with an NPDES permit at no more than 20 degrees Fahrenheit above intake temperature.

Utility water usage will include supplying makeup water to a closed loop cooling system used to cool glycol still reflux and overhead streams, plus reciprocating compressor jackets and lube oil systems. This closed loop system will be cooled by aerial coolers.

Sewage from the crew quarters will be treated in a USCG approved marine sewage treatment unit, where it will be aerated, biodegraded, chlorinated, and discharged through a subsea disposal tube in accordance with the applicable NPDES permit.

2.1.3.3 Oil Spill Response Equipment

Oil spill response capability will be provided as described previously in Section 2.1.2.3.

2.1.3.4 Supply Base and Crew Base Support

Table 2.1-7 gives an estimate of the number of trips that Platform Shamrock will require for crew and supply based support. Exxon plans to use Ellwood pier for their crew boat support and Port Hueneme for supply support. If and when a consolidated supply and crew facility is built in either Santa Barbara or San Luis Obispo County, Exxon would consider its use. Helicopter flights for engineering, management crew, and other miscellaneous platform support will use the Santa Barbara Municipal Airport. Table 2.1-8 gives an estimate of the average daily emissions for the supply boats and helicopters that will serve Platform Shamrock.

2.1.4 Emissions and Effluents

Emissions and effluents from Platforms Irene and Shamrock will be generated during installation, hook-up, drilling and production activities. Since the emissions associated with platform installation/hook-up are defined as "temporary facilities" under MMS air regulations, they are discussed separately.

2.1.4.0 Air Emissions

The major emissions during the construction and hook-up/commissioning of the platforms are related to transportation of the platforms to the project site, the transportation of workers and supplies to and from the platform areas, and the operation of cranes, pile drivers, barges, and welding

Table 2.1-7

PLATFORM SHAMROCK CREW AND SUPPLY BASE ACTIVITIES

Activity	Supply Boats	Crew Boat	Helicopters
Installation/Hook-up	4 per week	4 per day	4 per day
Drilling/Production	1 per day	2 per day	3 per day
Production	2 per week	1 per day	2 per day

Table 2.1-8

SHAMROCK PROJECT PLATFORM CREW AND SUPPLY BASE SUPPORT ACTIVITY EMISSIONS

	Pollutant (lbs/day)				
Activity	NO_x	SO_2	PM	CO	VOC
Construction					
Supply Boat	320.3	24.5	28.5	77.8	35.8
Helicopter	62.4	10.0	8.0	154.8	64.0
Crew Boat	953.6	71.2	82.4	208.8	92.0
Drilling/Production					
Supply Boat	560.6	42.9	49.7	136.1	62.7
Helicopter	46.8	7.5	6.0	116.1	48.0
Crew Boat	476.8	35.6	41.2	104.4	46.0
Production					
Supply Boat	160.2	17.3	14.2	38.9	17.9
Helicopter	31.2	5.0	4.0	77.4	32.0
Crew Boat	238.4	17.8	20.6	52.2	23.0

machines. Tables 2.1-9 and 2.1-10 present the average daily, peak one-hour and total air emissions generated by installation and hook-up/commissioning for Platform Irene and Platform Shamrock, respectively.

Drilling and production operations will begin after the platforms have been commissioned. The drilling and production operations of the platforms produce emissions primarily from following common emission sources:

- Transportation of workers and supplies to and from the platform.
- Cranes, fire pumps, emergency generators, etc. operated on diesel fuel.
- The flare pilot.
- Fugitive emissions.

Hydrocarbon vapors will not be vented to the atmosphere on the platforms. In emergencies, hydrocarbon vapors will be flared rather than vented. All liquid and gas storage and handling facilities will be equipped with vapor recovery systems to recover hydrocarbon and minimizing flaring. A flare pilot flame will be maintained as a safety precaution to ignite any flared gases under upset conditions.

The estimated total annual platform emissions, including from drilling and production, are presented in Tables 2.1-11 and 2.1-12 for Platform Irene and Platform Shamrock, respectively. These emissions include all associated mobile sources.

2.1.4.1 Effluents

The major effluents during the construction and hook-up/commissioning stage of the project will be related to waste water and sewage disposal. Tables 2.1-13 and 2.1-16 provide an estimate of the quantity of effluents that will be generated during the construction and hook-up/commissioning for platforms Irene and Shamrock, respectively. These also include the effluents due to offshore pipeline construction.

The major effluents during drilling and production are presented in Tables 2.1-14 and 2.1-15 for Platform Irene and in Tables 2.1-17 and 2.1-18 for Platform Shamrock. Liquids from deck drains, equipment drains, used lube oil and solvents, contaminated drilling muds and all other sources except the quarters waste will be collected on the subdeck and pumped into either the wet oil pipeline, or a supply boat for transport to shore .

Solid wastes will be segregated and collected in metal containers for shipment to shore. Used bits, thread protectors, worn valves, and other metal will be recycled by sale to scrap dealers or exchanged with the original vendor. Packing material such as bags, plastic, paper, wood, etc. will go to public landfill disposal sites.

Table 2.1-9

ESTIMATED AIR EMISSIONS FOR PLATFORM IRENE INSTALLATION AND HOOK-UP/COMMISSIONING

Platform Installation	Pollutants				
	NO_x	SO_2	CO	VOC	PM
1. Peak 1-hour (lbs)[a]	250.3	18.5	28.9	36.8	17.3
2. 24-hour (lbs)[b]	1129.3	82.8	265.3	122.0	87.2
3. Total (tons)	56.5	4.1	13.3	6.1	4.4

[a] Peak emission rates calculated by summation of major pieces of equipment which could be in operation at the same time.

[b] Calculated by dividing total project emissions by the number of days required to complete project phase.

Table 2.1-10

ESTIMATED AIR EMISSIONS FOR PROJECT SHAMROCK PLATFORM INSTALLATION AND HOOK-UP/COMMISSIONING

Platform Installation	Pollutants				
	NO_x	SO_2	CO	VOC	PM
1. Peak 1-hour (lbs)[a]	225.6	14.1	46.9	8.8	16.4
2. 24-hour (lbs)[b]	1861.9	117.1	387.6	73.3	135.2
3. Total (tons)	195.5	12.3	40.7	7.7	14.2

[a] Peak emission rates calculated by summation of major pieces of equipment which could be in operation at the same time.

[b] Calculated by dividing total project emissions by the number of days required to complete project phase.

Table 2.1-11

ESTIMATED ANNUAL AIR EMISSIONS FOR PLATFORM IRENE
DURING DRILLING AND PRODUCTION

Year	Pollutant (tons/year)				
	NO_x	SO_2	PM	CO	VOC
1986	4.76	0.314	0.334	1.03	0.634
1987	4.76	0.314	0.334	1.03	0.894
1988	4.76	0.314	0.334	1.03	1.154
1989	0.66	0.314	0.334	1.03	1.414
1990	0.66	0.314	0.044	0.54	1.094
1991	0.66	0.314	0.044	0.54	1.094
1992	0.66	0.314	0.044	0.54	1.094
1993	0.66	0.314	0.044	0.54	1.094
1994	0.66	0.314	0.044	0.54	1.094
1995 on	0.66	0.314	0.044	0.54	1.094

Table 2.1-12

ESTIMATED ANNUAL AIR EMISSIONS FOR PLATFORM SHAMROCK
DURING DRILLING AND PRODUCTION

Year	Pollutant (tons/year)				
	NO_x	SO_2	PM	CO	VOC
1986	8.6	0.9	0.5	1.7	2.3
1987	20.6	2.5	1.4	4.4	3.2
1988	20.6	2.5	1.4	4.4	3.2
1989	20.6	2.5	1.4	4.4	3.2
1990	20.6	2.5	1.4	4.4	3.2
1991	6.7	1.7	0.5	1.3	2.2
1992	6.7	1.7	0.5	1.3	2.2
1993	6.7	1.7	0.5	1.3	2.2
1994	6.7	1.7	0.5	1.3	2.2
1995 on	6.7	1.7	0.5	1.3	2.2

Table 2.1-13

WASTE GENERATION FOR PLATFORM IRENE INSTALLATION AND PIPELINE CONSTRUCTION

Waste	Treatment And Disposal	Daily Average	Duration	Cumulative	Approx. Disposal Temperature
Treated Sewage[A]	Electro/Catalytic Ocean Discharge	25 bbls	3 months	2,750 bbls	62F
Treated Waste Water (Brine)	Oil Separation Ocean Discharge	300 bbls	3 months	27,000 bbls	62F
Miscellaneous Liquid Wastes	Container Storage Transfer to Shore Weekly	5 bbs	3 months	450 bbls	---
Hydrostatic Test Water[B]	Gravity Treatment Ocean Discharge	---	---	18,000 bbls	Ambient
Miscellaneous Solid Wastes	Container Storage Transfer to Shore Weekly	600 lbs	3 months	810 tons	---

Table 2.1-14

WASTE GENERATION FOR PLATFORM IRENE DRILLING OPERATIONS

Waste	Treatment And Disposal	Daily Average	Duration	Cumulative	Approx. Disposal Temperature
Treated Sewage	Biological[A] Ocean Discharge	18 bbls	43 months	23,220 bbls	62F
Treated Waste Water (Brine)	Separation of Any[C] Oil or Grease and Settable Solids Ocean Discharge	40 bbls	43 months	51,600 bbls	62F
Clean Drill Muds	No Treatment Ocean Discharge	78 bbls	43 months	101,480 bbls[B]	62F
Contaminated Drill Muds	Transport Onshore via oil pipeline then transported to Approved Disposal Site	---	---	---	---
Drill Cuttings (Washed)	Wash for Oil and[C] Grease Removal Ocean Discharge	30 bbls	43 months	38,700 bbls	Ambient
Deck Drainage	Pumped to shore in Wet Oil Pipeline	5 bbls	43 months	6,450 bbls	Ambient
Solid Wastes	Container Storage Transfer to Shore	300 lbs	43 months	1,935 tons	---

Table 2.1-15

WASTE GENERATION FOR PLATFORM IRENE PRODUCTION OPERATIONS

Waste	Treatment And Disposal	Daily Average	Approx. Disposal Temperature
Treated Sewage	Electro/Catalytic[A] Ocean Discharge	3 bbls	62F
Treated Waste[D]		4 bbls	62F
Deck Drainage	Oil Separation Ocean Discharge	5 bbls	Ambient
Cooling Water	Ocean Discharge	10,000 bbls	AF = 5^{o}F

A Treated sewage containing less than 1 PPM residual chlorine and 50 PPM of suspended solids, discharged in accordance with existing NPDES permits requirements.

B Does not include hydrostatic test water for subsea pipelines since this water is supplied from Lompoc facility and is the test water used for the 100,000 barrel storage tank.

C Assumes reuse of 850 bbls of mud from each well upon completion of the well.

D Transported onshore via wet oil pipeline and then cleaned in waste water treatment system with produced water.

Table 2.1-16

SHAMROCK PROJECT PLATFORM AND PIPELINE WASTE GENERATION - CONSTRUCTION

Waste	Disposal Method	Daily Average	Duration	Cumulative
Treated Sewage	Oceal Disposal (Aerobic decomposition and chlorination)	120 bbls	7 months	25,400 bbls
Desalination Brine	Ocean Disposal	3,000 bbls	7 months	21,000 bbls
Miscellaneous Liquid Wastes	Container Storage Transfer to Shore Weekly	14 gal	7 months	---
Hydrostatic Test Water	Gravity Treatment Ocean Disposal	---	---	6,000 bbls
Miscellaneous Solid Wastes	Container Storage Transfer to Shore Weekly	1300 lbs	7 months	140 tons

Table 2.1-17

SHAMROCK PROJECT WASTE GENERATION OFFSHORE DRILLING OPERATIONS

Waste	Treatment And Disposal	Daily Average	Duration	Cumulative	Approx. Disposal Temperature
Treated Sewage[A]	Biodegraded and Chlorinated Ocean Discharge	112 bbls	36 months	122,000 bbls	62F
Desalination Brine	Ocean Discharge	5920 bbls	36 months	640,000 bbls	62F
Clean Drill Muds	No Treatment Ocean Discharge	139 bbls	30 months	150,000 bbls	62F
Contaminated Drill Muds	Transport Onshore to Approved Disposal Site	27 bbls	36 months	30,000 bbls	--
Drill Cuttings (Washed)	Wash for Oil and[B] Grease Removal Ocean Discharge	30 bbls	43 months	38,700 bbls	Ambient
Deck Drainage	Separation for Oil[B] And Grease Ocean Discharge	5 bbls	26 months	5,400 bbls	Ambient
Solid Wastes	Container Storage Transfer to Shore	1185 lbs	36 months	640 tons	---

Table 2.1-18

SHAMROCK PROJECT PLATFORM - WASTE GENERATION OFFSHORE PRODUCTION OPERATIONS

Waste	Treatment And Disposal	Daily Average	Approx. Disposal Temperature
Treated Sewage[A]	Biodegrated and Chlorinated Ocean Discharge	3 bbls	62F
Desalination Brine	Ocean Discharge	620 bbls	62F
Deck Drainage	Oil Separation Ocean Discharge	5 bbls	Ambient
Cooling Water	Ocean Discharge	120,000 bbls/day	82F
Produce Water	Ocean Discharge	10,000 bbls/day	?
General Refuse	Storage Container then hauled to Shore	142 lbs	--

[A] Treated sewage containing less than 1 PPM residual chlorine and 50 PPM of suspended solids, discharged in accordance with NPDES permits.

[B] Oil and grease accumulated during separation process are transported onshore as part of platform production.

2.1.5. Processing and Transportation of Products

Exxon plans to comingle their oil with the oil produced at Platform Irene. The comingled oil will then be processed at the Lompoc Dehydration Facility. The facility, as currently proposed by Union, may be able to handle all of Exxons production until 1989 at which time one additional heater treater may be necessary in order to maintain a spare unit.

Exxon has recently submitted an Application to the County of Santa Barbara covering the dry oil transportation portion of their project. This Application is to move their dry oil by pipeline to the Gaviota Marine Terminal for interim transferring and on to Las Flores Canyon provided a new marine terminal is built.

Through the year 1988, Exxon potentially could process their oil with Union's at the Santa Maria Refinery. The existing and Proposed Pipelines to the refinery would have available capacity until this time. After 1988, it is questionable as to whether the Santa Maria Refinery could process the combined production from Shamrock and Irene without further modification. Also, the pipeline from the Orcutt Pump Station to the Santa Maria Refinery would have to be replaced with a larger pipe in order to handle the estimated 40,000 barrels per day. This option, however, is not consistent with Exxons plans to process the production from Platform Shamrock at their Baytown Refinery in Texas.

2.2 PIPELINES

2.2.1 Union Oil Pipelines

Union Oil is proposing to construct three pipelines from Platform Irene to the proposed dehydration facility near Lompoc. Two of the lines will be used to move wet oil and gas with the third line being used to return the produced water to the platform for ocean disposal. Union will also install a subsea power cable from a proposed electrical substation at Surf to Platform Irene. Union has proposed to size their pipelines large enough to handle both their anticipated production and any future production from the Central Santa Maria Basin. This capacity has been proposed to minimize the number of pipeline landfalls from the Central Santa Maria Basin, and to conform to Vandenberg AFB's desire to have only one pipeline corridor crossing the Base.

The dry oil from the proposed Lompoc Dehydration Facility will then move north through a new pipeline to an existing pump station in Orcutt. From the Orcutt Pump Station the dry oil will be transported to Union Oil's Santa Maria Refinery in an existing pipeline.

The gas from the Lompoc facility will travel to the Battles Gas Plant through an existing pipeline. Figure 2.2-1 shows the Proposed Pipeline network for the Union project. The new lines are shown as solid lines, and the existing lines are shown as dotted lines.

2.2.1.0 Platform Irene to Lompoc Dehydration Facility

Table 2.2-1 provides the general design data for the three Proposed Pipelines that will be installed from Platform Irene.

OFFSHORE PIPELINES

Overview

The offshore portion of the OCS-P 0441 pipeline system is approximately 54,200 feet or 10.27 miles long, of which 2.05 miles is in federal waters. The Primary Pipeline route, as shown in Figure 2.2-2, leaves the platform on a northeasterly course heading for the coast on the most direct route. The chosen route avoids the crossing of any other adjacent federal tracts and has virtually "line-of-sight" alignment. A long sweeping curve of 6,000-foot radius will be placed in the alignment as the pipelines approach the beach. This curve serves two functions. One is to avoid the effect of the effluent (discharge) of the Santa Ynez River; the second is to approach the beach at as close to a perpendicular angle as possible to minimize surf zone action on the pipelines.

Shallow hazard studies by McClelland Engineers in Ventura have shown that the platform site as well as the entire length of the pipeline route, has a sandy firm bottom with only minor rock outcroppings. This finding includes the surf zone area as well. There are no existing lines or cables to be crossed.

The pipelines will have a landfall approximately 1/2 mile north of the Santa Ynez River, north of the sand dunes and south of the cliffs, thereby avoiding both. At this point, the offshore pipelines will be tied in to the onshore pipelines. The pipeline's beach crossing may encounter Vandenberg AFB's old abandoned 18-inch steel wastewater outfall pipeline. This line can be removed should interference occur during construction.

The offshore pipelines will be designed and built to meet or exceed all codes, specifications, and requirements set forth by ANSI, ASME, ASTM, DOT, and MMS. The pipeline will be welded steel, either electric resistance weld (ERW) or double submerged arc (DSA). The pipe will be ultrasonically mill inspected for defects prior to being shipped. All pipe will have an external polyethylene protective coating to help prevent and control corrosion. All valves and fittings will be steel and meet or exceed all design requirements. The fittings on all three lines will be 900 ANSI series.

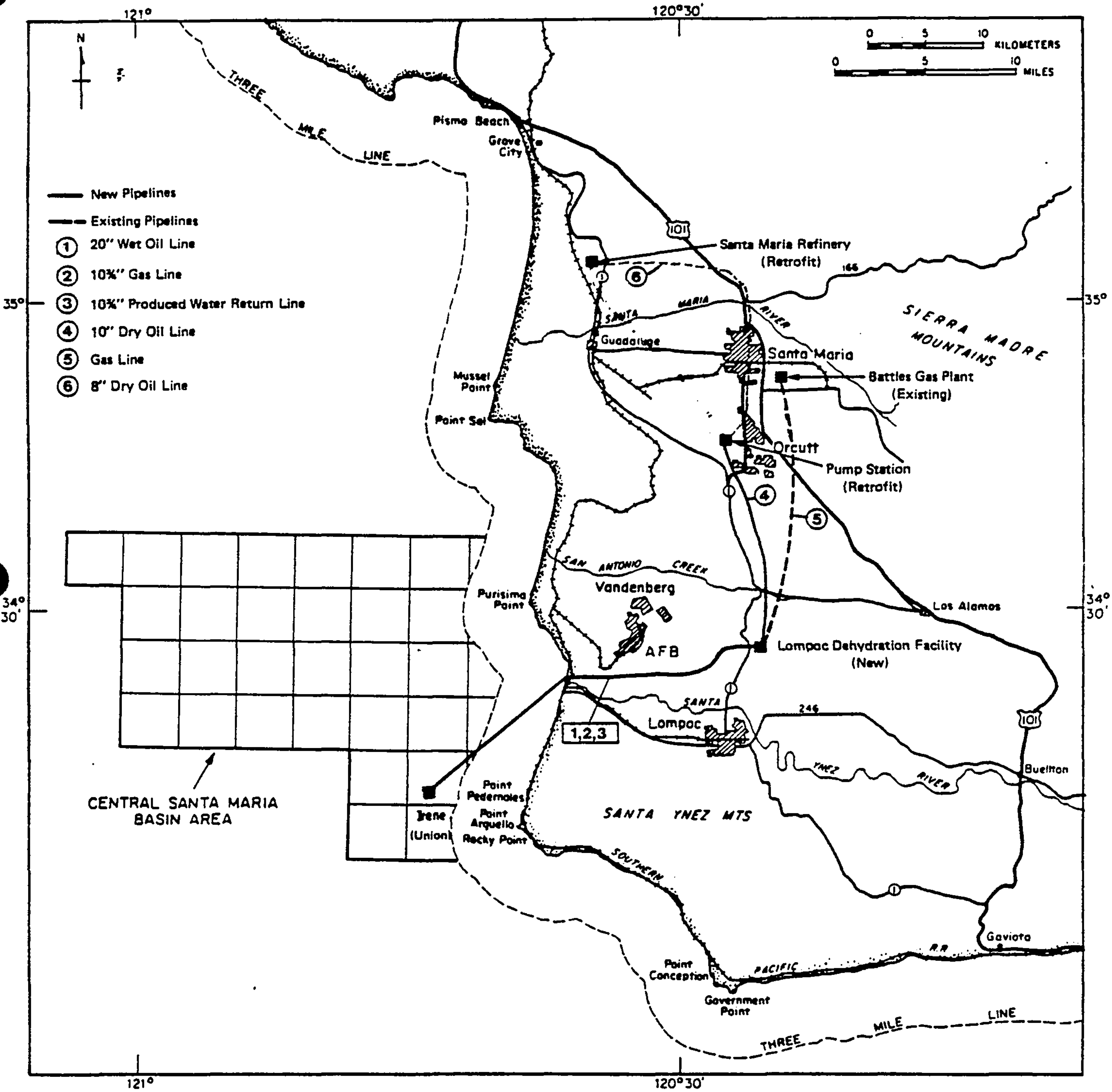


FIGURE 2.2-1 UNION OIL PIPELINE NETWORK

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TABLE 2.2.1

UNION OIL PIPELINE CHARACTERISTICS FOR PIPELINES FROM PLATFORM IRENE TO LOMPOC DEHYDRATION FACILITY

	Wet Oil	Gas	Produced Water
Size:			
- onshore	20" OD x .625 wall	10 3/4" OD x .365" wall	10 3/4" OD x .365 wall
- offshore	20" OD x .688 wall	10 3/4" OD x .500" wall	10 3/4" OD x .500 wall
Throughput:	36,000 BFPD @ 1,000 psig DP 72,000 BFPD @ 2,050 psig DP 100,000 BFPD with installation of midpoint pump station	20 mmscf/d @ 400 psig discharge 40 mmscf/d @ 900 psig discharge	30,000 BPD @ 750 psig DP
Length:			
- onshore	12.4 miles	12.4 miles	12.4 miles
- offshore	10.27 miles	10.27 miles	10.27 miles
Maximum Working Pressure	2,160 psig	2,160 psig	2,160 psig
Test Pressure	3,240 psig	3,240 psig	3,240 psig
Concrete Coating	3" through surf zone (4000 ft from beach)	3" through surf zone	3" through surf zone
Other Coatings	Polyethylene (70 mils)	Polyethylene (70 mils)	Polyethylene (70 mils)
Volume (bbls)	approx. 40,000 bbls	approx. 11,000 bbls	approx. 11,000 bbls
Buried Depth:			
- onshore	3 ft min/5 ft at stream crossings	3 ft min/5 ft at stream crossings	3 ft min/1 ft at stream crossing
- offshore	3 ft thru surf zone, none past surf zone	3 ft thru surf zone, none past surf zone	3 ft thru surf zone, none past surf zone
Pipeline Row:			
- offshore	200 ft	200 ft	200 ft
- onshore	100 ft	100 ft	100 ft

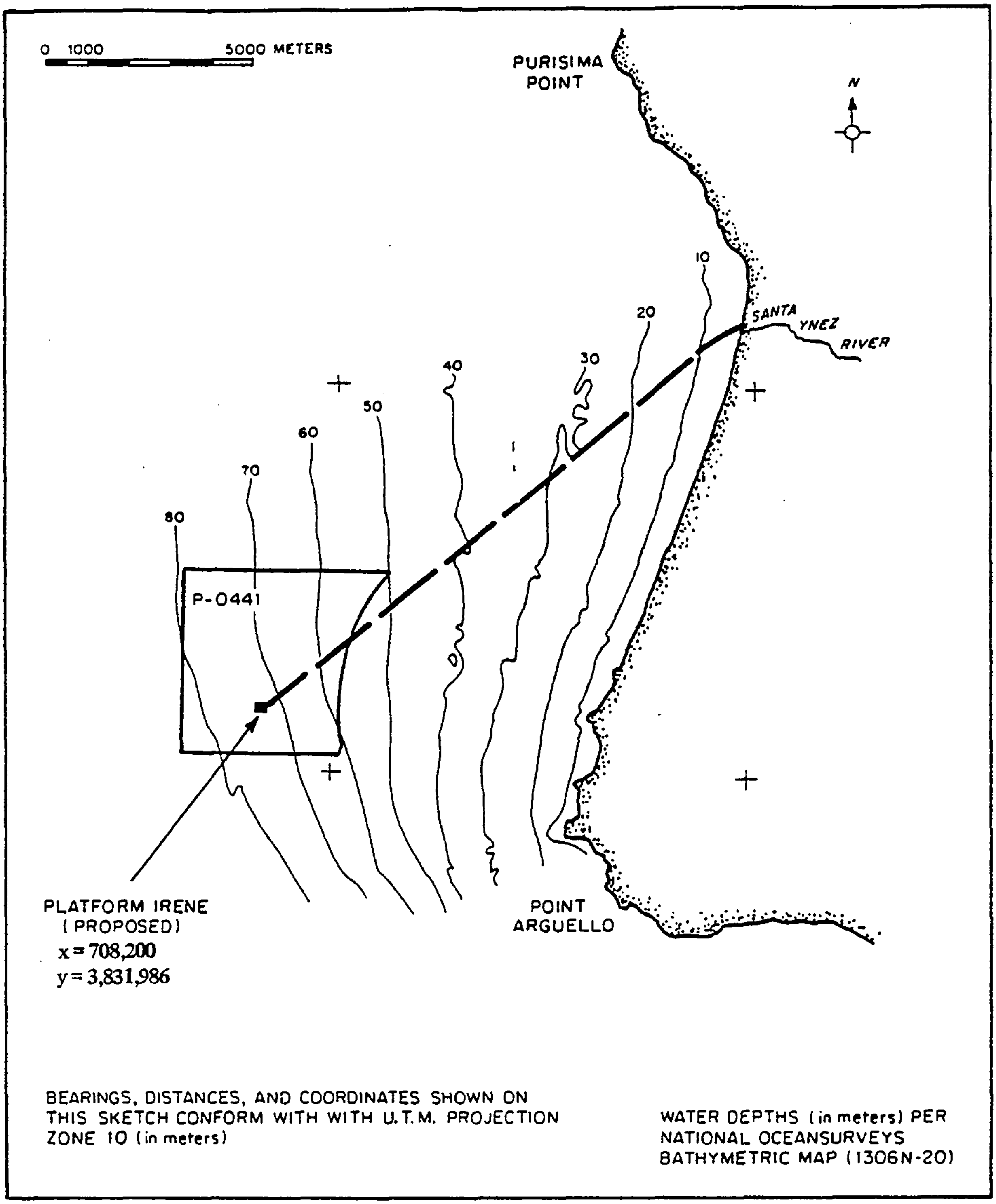


FIGURE 2.2-2 UNION OIL'S PROPOSED OFFSHORE PIPELINE ROUTE.

The exact method used for installing the offshore pipelines is not currently known; however, it is anticipated that either the barge pull or beach pull method will be used. The main difference between these methods is the location of the construction staging area.

In the beach pull method the pipelines are constructed onshore at the beach front and then pulled offshore to the installation site. In the barge pull method the pipelines are constructed offshore on a stationary (i.e., anchored) lay barge and then pulled off the barge to the installation site.

Which of these methods will be used will not be known until the pipeline contractor is selected. For this analysis, the barge pull method of installation is assumed since it represents a worst case scenario.

This pipeline has been sized to handle the anticipated peak production of the Central Santa Maria Basin.

Pipeline Construction

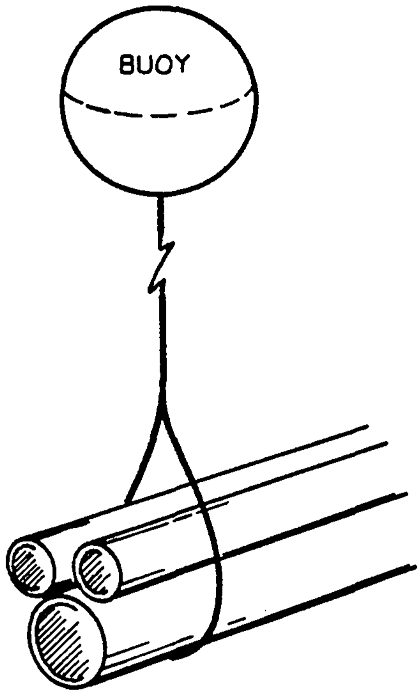
The pipe will be delivered from the Los Angeles area to Port Hueneme by rail car or tractor trailer, and then loaded onto two special barges for delivery to the installation site. The flotation buoys used for buoyancy will be trucked to Port Hueneme from either the Los Angeles or Oxnard area, and loaded on another special barge and transported to the construction site.

The pipe work barge will be outfitted at Port Hueneme with all necessary equipment and support gear for welding and installing the pipe. This equipment will include welding machines, coating materials for joints, lifting equipment, navigation and X-ray equipment. At the completion of outfitting, tug boats pulling the barges will move offshore to the project site. Approximately half the manpower will move to the site onboard the tugs and barges with the remainder being flown from the Lompoc/Santa Maria area by helicopter.

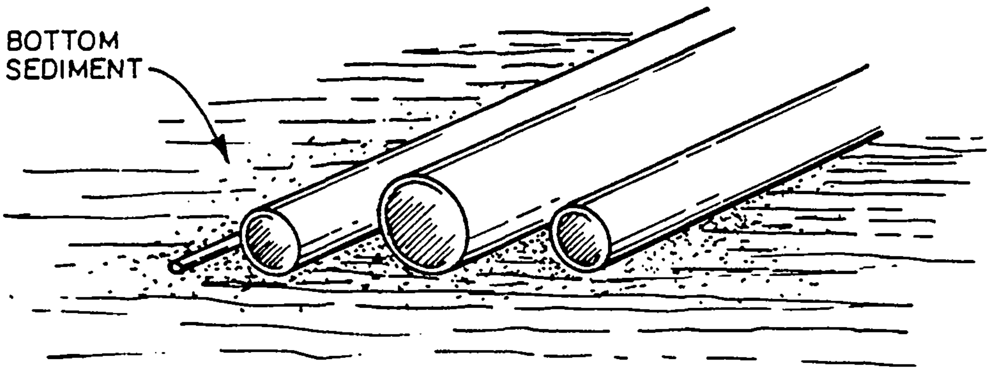
All three pipelines will be installed at once. With the pull barge method, the work barge is anchored in a stationary location well outside the surf zone. As sections of the pipelines are completed they will be pulled off the barge and into the water toward the platform. Each weld will be X-rayed for integrity and compliance with API 1104. If a reject is found, it will be repaired and then X-rayed again to insure compliance. Upon acceptance of the weld, joint material will be applied to insure a homogenous coating.

Buoys will be attached to the bundle of three pipelines to minimize drag. Figure 2.2-3 shows how the three pipelines will be attached to the buoys for pulling. Buoys and pipe will be moved from the supply barges to the pipe lay barge by crane. Tug boats will assist in the movement of the supply barges.

The pipelines will be laid in the designated right-of-way (200 feet wide) using precise navigation equipment. It is intended to make three pulls in lieu of one continuous pull. The three sections will be joined together by divers using spool pieces.



GATHERED SUBSEA PIPELINE
(Submerging Operations)



PIPELINE AND CABLE EMPLACEMENT ON SEAFLOOR
PROJECT IRENE

FIGURE 2.2-3 PIPELINE, SEAFLOOR PLACEMENT.

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When the lines have reached the platform, the barge will then be rotated toward the beach and the concrete coated pipelines laid through the surf zone to be tied into the onshore pipeline system.

A "hard tie" (welded connection) is desired between the surf zone and offshore pipelines. This would be done by lifting the ends of the lines onto the barge, making and X-raying the weld, and then laying the line back on the ocean floor. This procedure can be used in relatively shallow water; however, in deeper water, spools must be fabricated between pipeline sections.

Once the pipelines are in their intended permanent location, they will be flooded with water for stabilization, and the buoys released. Buoys will be collected and returned to the buoy barge.

The pipelines will be buried through the surf zone (shore to 4,000 feet offshore) by divers using hand held "air jets." These jets pump seawater under the pipeline to displace the sand. This action will bury the line to a depth of 3 to 6 feet.

The installation of the offshore pipelines will require a working area of 4,000 feet by 1,000 feet. The pull barge will use a three-point anchor system. The lead anchor will be 2,000 feet ahead of the barge with the two side anchors being 500 feet from the barge. This layout will allow them to pull 3,500 feet of pipe per anchor move using two pull cranes, one on the rear of the boat, the other on the front. Therefore, only 15 anchor moves will be required.

The pipelines will terminate approximately 30-50 feet from preinstalled pipeline risers on the platform. Water depth at this point is 242 feet from MLLW. Divers using a "template" and diving off the pipeline barge will set spools to connect the pipelines to the risers. A "template" is an adjustable telescoping device that is bolted to the flanges on the lead end of pipelines and the flanges at the bottom of the platform risers. From the template a pipeline spool or connection can be made to fit between the two flanges. Divers using hydraulic impact wrenches will make up the flange connections.

About four weeks will be required to construct the offshore portion of the pipelines using a maximum work force of 60 persons. The offshore construction will require one supply boat trip from Port Hueneme every five days and one helicopter trip from the Santa Maria Airport every day to the construction site.

After the offshore pipelaying operations are completed, a side sonar scan survey will be conducted to verify that the pipeline was not damaged, that it was positioned properly on the ocean floor, and that the ocean floor was not adversely altered by the operation. Corrective measures will be carried out if necessary.

After the offshore pipelines have been installed, the power cable to the platform will be laid in the same right-of-way for most of the route. At 4,000 feet from shore, the cable will depart from the pipeline route and go due east to a landfall at Surf.

Cathodic Protection

Cathodic protection of the offshore pipelines system will be provided by sacrificial anodes physically cast onto specific joints of pipe. The anodes, which are contoured to prevent snagging by fishing equipment, are installed at the pipe-coating facility in Los Angeles. Anode material will be either aluminum or zinc, depending on location. The anodes will be designed to provide protection to the pipelines for a minimum of 20 years.

Valves

There are no subsea valves planned for the offshore pipelines. However, there will be at least two valves on each pipeline at the +17 foot level on the platform. The nearest onshore valve site will be located approximately 7,100 feet easterly from the beach and on Vandenberg AFB property. This site will contain two block valves on each pipeline. One of the valves on each pipeline at each location will have "automatic shut-in" capability responding to a signal from the pipeline surveillance system, platform or Lompoc Dehydration Facility. The valves will be operated, cycled, and lubricated quarterly to insure proper operation.

Hydrotesting

At the completion of pipeline installation, each individual line (full length) will be hydrotested with fresh water to a specified pressure of 3,240 psig. This pressure will be held for a 24-hour period to test the integrity of the pipelines. The hydrotest will meet or exceed all applicable codes or regulations governing the project. Prior to hydrotesting the pipelines, however, a "pig" (a polyurethane flexible, bullet-shaped foam cylinder) will be pumped through the lines to clear them of welding slag, dirt, debris, and other items that may have accumulated during construction.

The source of water for hydrotesting the pipelines will be the water used in hydrotesting the onshore dehydration facility at Lompoc and the onshore pipeline. At the completion of the offshore testing, the water will remain in the pipelines until displaced by initial production. The water will then be treated through the dehydration facility and returned to the platform for disposal.

Operation

The lines between the platform and the onshore site will be pigged periodically at a frequency between once weekly and once daily to prevent deposition of wax or other materials in the line. The 20-inch pigs from the oil line will be returned to the platform by helicopter or supply boat for reuse. The 10-inch pigs will be sent to shore through the gas line and returned to the platform via the water line. Wax from the oil line will pass through the oil treating system and will either dissolve in the hot oil or end up as part of the tank bottom sludge. Condensate from the gas line will be separated by the gas scrubber and sent to the oil system. Before the pig traps are opened for receiving or launching pigs, the traps are depressured as far as possible into the closed drain system or vapor recovery system as appropriate. When the trap door is opened, any spillage is contained in a drip pan connected to the drain system. Pigging will be part of the normal duties performed by the platform and Lompoc dehydration facility operators.

The pipelines will be patrolled by aircraft or surface vessel once per week as directed in MMS-OCS Order No. 9. An external inspection of all pipelines by side scan sonar shall be made at least once each year to identify all exposed portions of pipelines. Records of these inspections shall be maintained by Union Oil Company. Union also proposes to use special instrumented pigs once a year to measure metal loss on the pipelines.

Since the preferred helicopter flight path is directly over the lines, the lines will be effectively patrolled several times daily if the Lompoc Airport option is approved.

Air Emissions

Table 2.2-2 provides an estimate of the air emissions due to the subsea pipeline and power cable installation. The operating emissions of the pipeline are accounted for on the platform for the gas and wet oil line and at the Lompoc facility for the produced water line. The power cable has no emissions associated with its operation. The effluents that result from the subsea pipeline and power cable installation are incorporated into the tables for platform construction shown in Section 2.1.4.

Table 2.2-2

ESTIMATED AIR EMISSIONS FOR SUBSEA PIPELINE INSTALLATION

	Pollutants				
Subsea Pipeline Installation	NO_x	SO_2	CO	VOC	PM
1. Peak 1-hour (lbs)[a]	199.5	14.8	20.0	30.3	12.2
2. 24-hour (lbs)[b]	2,112.9	150.2	444.3	265.8	194.2
3. Total (tons)	62.3	4.4	13.1	7.8	5.7

[a] Peak emission rates calculated by summation of major pieces of equipment which could be in operation at the same time.

[b] Calculated by dividing total project emissions by the number of days required to complete project phase.

Electric Power Cable

The power cable will be delivered to the worksite in one piece on a specially equipped cable handling barge, from either the Los Angeles or the Long Beach Harbor areas. The cable is manufactured and delivered in one piece to avoid potential problems with joints or splices.

Installation of the cable will take three days, one day each for the shore landing, platform connection, and main run. The cable will be laid after all pipelines are in place to prevent damage by pipe movement or barge anchors. Actual installation of the cable from substation to ocean will take one day and will be approximately as follows:

1. A pulling line is brought ashore by small boat and is used to pull the cable from the barge to the beach. Enough cable is pulled in to reach the substation.

2. The cable is buried through the surf zone by jetting.

3. The cable is buried across the beach with a backhoe; red concrete is used to protect and mark the cable.

4. The cable is buried through the dunes in the same manner.

5. The cable is placed through a conduit previously bored under the railroad tracks. The balance of the trench is filled in.

Public access along the beach will be restricted for up to one week while the cable is placed and buried. Afterwards, normal traffic may proceed unrestricted. The cable will not be visible at any point. The dunes-crossing corridor will be revegetated.

The proposed access to the work area is through the gate at the Surf station, across the tracks, then northerly along the ocean side of the tracks to the work area. A 50-foot wide corridor will be required for cable installation. The railroad will be requested to provide a train watch to insure safe operations when personnel are crossing or working near the tracks.

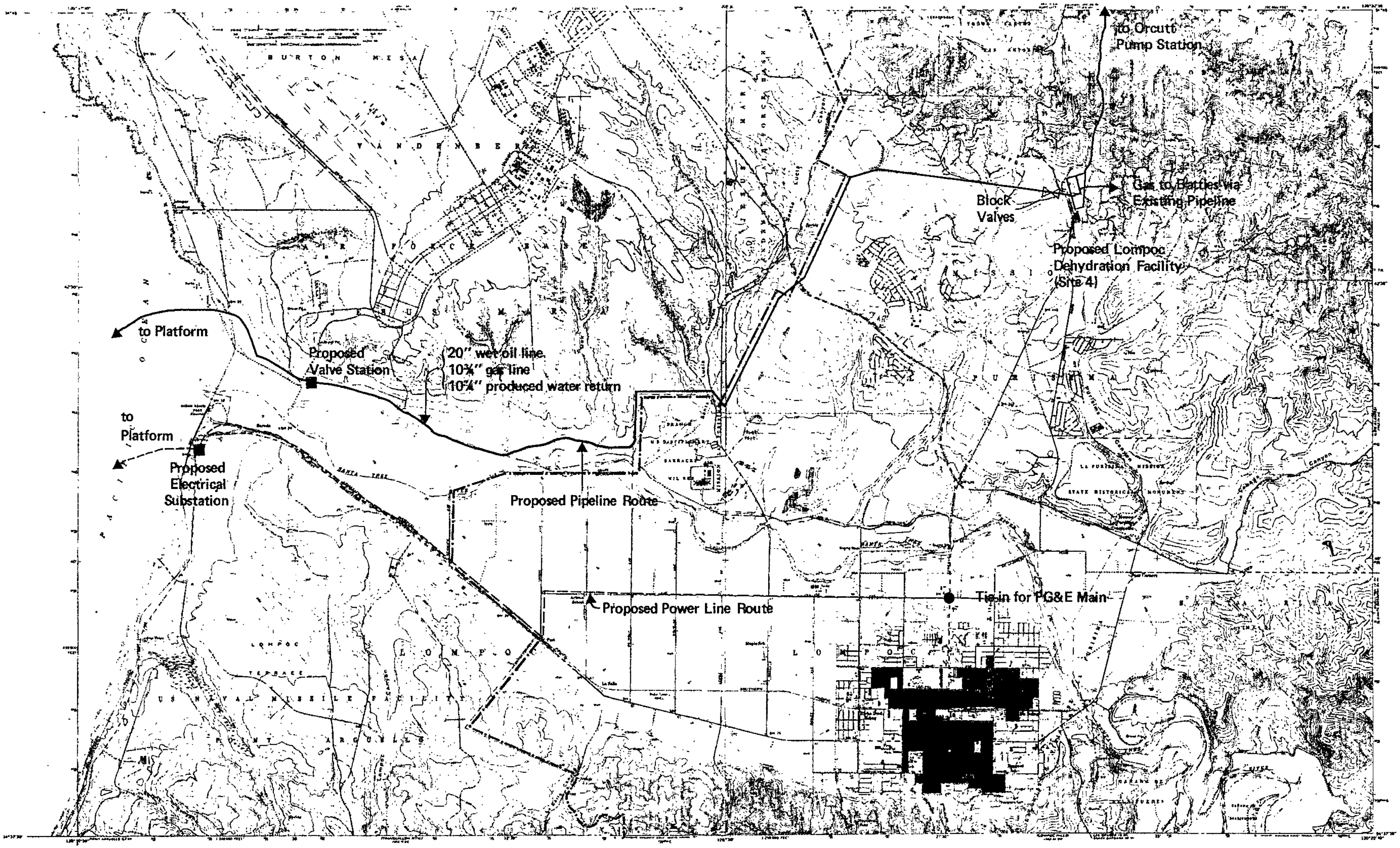
ONSHORE PIPELINES

Overview

The onshore portion of the OCS-P 0441 pipeline system is approximately 65,500 feet or 12.4 miles long. The proposed route to the proposed Lompoc Dehydration Facility is shown in Figure 2.2-4.

The pipeline route has a landfall approximately 1/2 mile north of the Santa Ynez River and crosses Vandenberg AFB property, running eastward parallel to the Santa Ynez River. The pipeline then turns northeast and follows the northern boundry of the Federal Correctional Institution. Just east of the Correctional Institution, the pipeline turns north and follows Union Oil/Vandenberg AFB property line for about 2.75 miles. The line then makes a gentle turn to the east and follow on the north side of a gas pipeline corridor for about 2.25 miles into the proposed dehydration facility site. This route causes the pipeline to pass to the west and north of Vandenberg Village.

The design for the onshore pipelines is the same as that presented for the offshore lines except the wall thicknesses are less. These revised wall thicknesses are presented in Table 2.2-1.



—·— Vandenburg AFB Boundary
—— Proposed Pipeline Route
– – – Proposed Power Cable Route

FIGURE 2.2-4

PROPOSED ONSHORE PIPELINE AND POWER CABLE ROUTES
TO LOMPOC DEHYDRATION FACILITY

Pipeline Construction

The pipe will be delivered by rail car from the Los Angeles area. The rail cars will serve as the primary storage area for the pipe, and as needed, trucks will be used to carry the pipe from the rail cars to the construction site. The pipeline will be installed using conventional land pipelaying methods and equipment, and will be buried with a minimum cover of 3 feet, except at stream crossings where the line will be buried to a depth of 5 feet below the stream bottom.

Most of the onshore pipeline construction will occur in units known as "spreads." Each spread is organized and equipped so that it is capable of moving forward, clearing the way, installing the pipeline, testing it, and restoring the land. The spread is divided into several distinct functions:

- Right-of-way clearing and grading.
- Stringing the pipe.
- Ditching.
- Welding the pipe.
- Radiographic inspection of each weld.
- Coating the joints.
- Lowering the pipe into the ditch.
- Backfill/cleanup.
- Pressure testing.
- Revegetation.

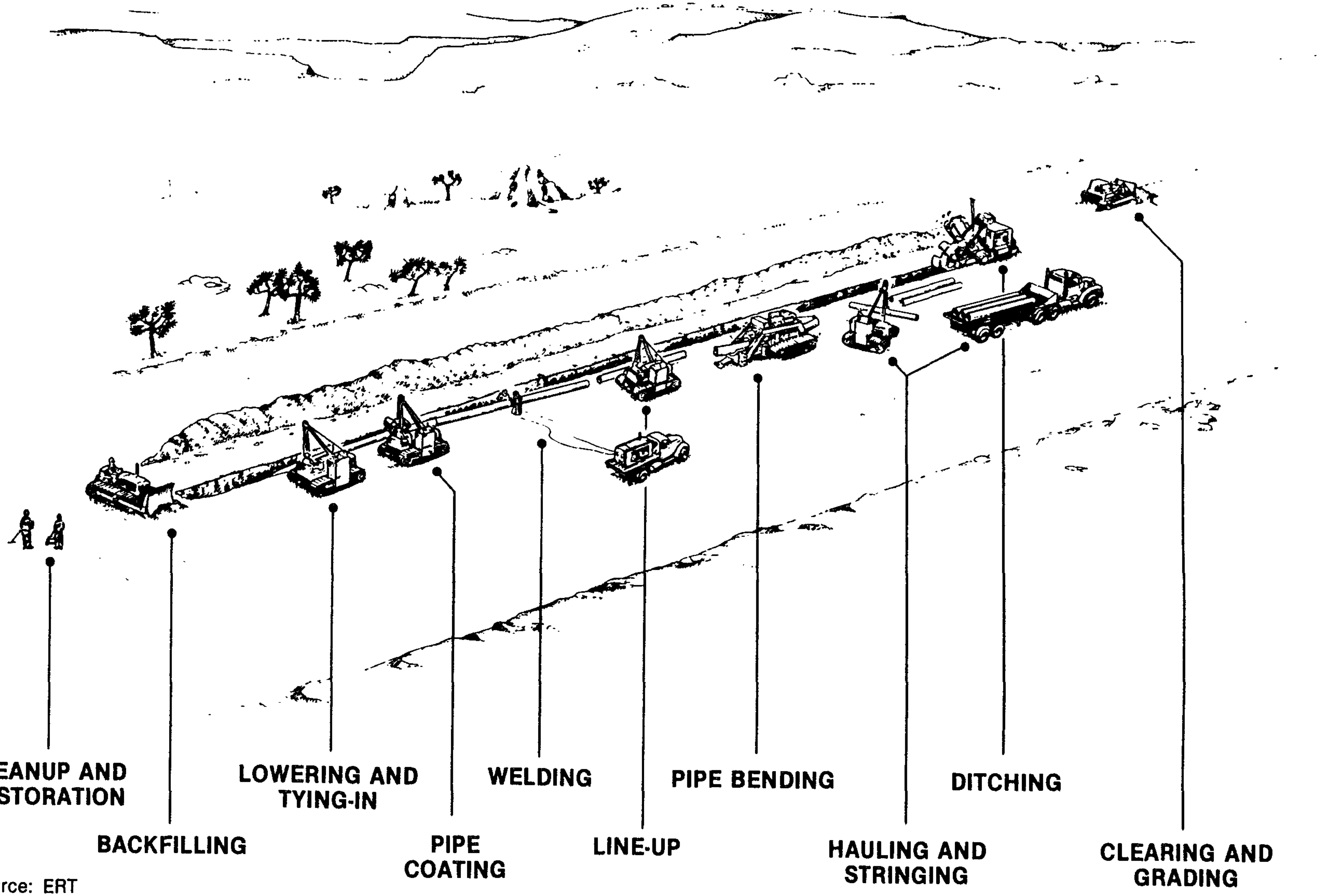
Figure 2.2-5 depicts the operations of a typical spread.

Two separate spreads will be used for the ditching through backfilling phases. Approximately 1 mile will separate the backfilling and compaction of the first spread and the ditching of the second spread.

A single spread consists of the equipment and manpower to perform the total operations from ditching to backfilling. Some equipment and manpower will be used jointly by both spreads. The lead spread will install the large diameter pipeline while the second spread will install the two smaller diameter pipelines.

The two spread method is necessary because of the magnitude of the equipment and manpower required for the single large diameter pipeline. Conflicts between two spreads working side by side would result if separation was not instituted. A very large ditch would also be required if all three pipelines were installed simultaneously and would require additional equipment such as cranes in lieu of pipelaying side boom tractors.

In areas where other pipelines or cables must be crossed, the new line will be placed 12 inches below the existing pipeline or cable. For road and railroad crossings, a hole will be bored using special crews and equipment. As the hole is bored, a casing that will be three standard pipe diameters larger than the pipeline will be driven into the hole. Once the boring is complete and the casing set, the pipe will be placed through the casing. This method of installation, though more expensive, avoids interference with the normal flow of traffic.



Source: ERT

FIGURE 2.2-5 TYPICAL PIPELINE CONSTRUCTION SPREAD

Normally, a 100-foot wide right-of-way will be required during construction to accommodate clearing and "right-of-waying," ditching, hauling, and stringing, welding, and traffic. However, it is possible to utilize a narrower right-of-way for short distances to negotiate difficult areas or to avoid impact to localized environmental concerns such as an archaeological site or a cluster of trees.

The right-of-way can be reduced to 40 feet for distances up to 200 feet by staging and assembling the pipeline on the normal right-of-way then walking it into place with side booms.

Only a 50-foot strip (portion) of the 100-foot construction right-of-way will be cleared for use. This strip will provide room for ditching and hauling and stringing. Where additional work area is necessary, the remaining 50 feet of the construction corridor will be "matted" by either "walking" or "rolling" over the existing brush and vegetation with tractors. This matting will provide a "hard surface" for vehicular traffic to travel on especially in areas of soft soil.

Trees which must be removed will be cut up and hauled away. It is expected the contractor will sell them for firewood. Wherever possible, trees in the right-of-way will be retained. Lower branches will be trimmed where necessary to allow equipment passage.

A 50-foot permanent maintenance right-of-way will be retained at the completion of pipeline installation. Areas other than fire breaks will be returned to their natural state by revegation or seeding.

In areas where the property is used for cattle grazing, a wire stranded fence will be erected across the right-of-way. A gate will be provided for right-of-way access.

Those areas of the right-of-way which are firebreaks will be left as firebreaks. In addition, the Santa Barbara County Fire Department has expressed a desire for the right-of-way crossing Burton Mesa from Highway S-20 to the onshore site to be left open as a firebreak. The decision on this request will be made by the County at the time of permit issuance. Physical and visual access to the right-of-way will be prevented by the erection of berms as detailed in the landscape plans. These berms will be used on both sides of S-20, Burton Mesa Road, Highway 1, and Rucker Road. Union Oil has estimated that the onshore portion of the pipelines will take nine to ten weeks to complete using 22 persons per shift, one ten-hour shift per day.

Cathodic Protection

A new impressed current cathodic protection system with rectifier and 300-foot deep anode will be installed near the pipeline valve site 600 feet east of Santa Lucia Canyon Road. This system will protect the lines from external corrosion in case of coating damage, and it will be located near the midpoint of the pipelines. PG&E power (1 kilowatt) will be required for the rectifier. Current and voltage readings will be monitored monthly. Insulated joints will be placed in the pipeline at four locations: at the beach between the offshore and onshore pipelines, at both valve sites, and at the processing facility. Where the pipelines pass through casing, insulating spacers will be used to isolate the carrier pipe from the casing. End seals will be used to prevent the entry of water, soil or other backfill material into the pipeline casing annulus.

Valves

Two valve sites will be installed for the onshore section of pipelines. One will be located approximately 7,100 feet easterly from the beach and on Vandenberg AFB property. This site, which is one acre in size, will contain two block valves on each pipeline with all valves located 3 feet above grade. One valve on each pipeline will have "automatic shut-in" capability by responding to a signal from the pipeline surveillance system, platform, or processing facility.

The second valve site will be located on Union Oil property east of Floradale Avenue. A single manually operated valve will be installed in each pipeline. Prefabricated concrete valve boxes will be used to house each valve. The concrete box will project approximately 1 foot above grade. The lids or covers of each valve box and the valves contained within will be locked.

Hydrotesting

At the completion of pipeline installation, each individual line will be hydrotested with fresh water to a specified pressure. This pressure will be held for a 24-hour period to test the integrity of the pipelines. The hydrotest will meet or exceed all applicable codes or regulations governing the project.

Before the pipelines are hydrotested, pigs will be blown through the lines with compressed air to clear them of welding slag, dirt, debris, and other items that may have accumulated during construction.

The source of water for hydrotesting the pipelines will be the water used in hydrotesting the new 100,000-barrel storage tank at the dehydration facility at Lompoc. The water utilized in the testing of the onshore pipelines will then be pumped into the offshore lines for hydrotesting that section. At the completion of the offshore testing, the water will remain in the pipelines until displaced by initial production.

Air Emissions

The estimated air emissions during the onshore pipeline construction phase are presented in Table 2.2-3. This table provides the one-hour peak emissions as well as the day average and total emissions. The emissions due to operating the pipeline are included with the platform for the wet oil and gas pipeline, and with the dehydration facility for the produced water line.

Table 2.2-3

ESTIMATED AIR EMISSIONS FOR ONSHORE PIPELINE CONSTRUCTION
(Landfall to Lompoc)

Overland Pipeline (to Lompoc)	Pollutants NO_x	SO_2	CO	VOC	PM
1. Peak 1-hour (lbs)[a]	49.9	3.0	65.9	6.4	3.1
2. 24-hour (lbs)[b]	233.0	16.0	260.0	30.0	13.3
3. Total (tons)	7.0	0.5	7.8	0.9	0.4

[a] Peak emission rates calculated by summatin of major pieces of equipment which could be in operation at the same time.

[b] Calculated by dividing total project emissions by the number of days required to complete project phase.

Powerline

A new powerline from the Pacific Gas & Electric (PG&E) main will be required to feed the proposed substation at Surf. PG&E currently has an existing 12 KV power line to Surf. This line will be replaced with a new 70 KV line. The new line will originate at the intersection of Central Avenue and "D" street on the north side of Lompoc. The new line will follow Central Avenue west to Union Sugar Avenue and then south to Highway 246. From the intersection of Union Sugar and Highway 246 the line will run west to the surf site between the Highway and the railroad tracks. New poles will replace the existing onesat a spacing of 350 feet. The poles will have a height of 53 feet. The proposed route is shown in Figure 2.2-4 as a dotted line. Construction of the powerline will be done as the pipeline is being installed.

2.2.1.1 Lompoc Dehydration Facility to Orcutt Pump Station

Pipeline quality oil will be shipped from the Lompoc Dehydration Facility north to Union's Santa Maria Refinery. There are existing pipelines the entire distance; however, the present pipeline segment from Lompoc to Orcutt is too small to handle 20,000 BOPD. The existing Lompoc to Orcutt line is a combination of 6-inch and 8-inch pipe. Union Oil proposes to install 11.5 miles of 10-inch pipe to transport OCS production from Lompoc to Orcutt. The proposed pipeline corridor is shown in Figure 2.2-6. This new 10-inch line could transport up to 40,000-50,000 BOPD. From Orcutt to the Santa Maria Refinery, the existing 8-inch line is adequate.

The existing Lompoc to Orcutt line collects oil from Union's Lompoc and Orcutt Hill Fields. The pumps and lines leaving these facilities are not designed to handle the higher operating pressure required of the new 10-inch

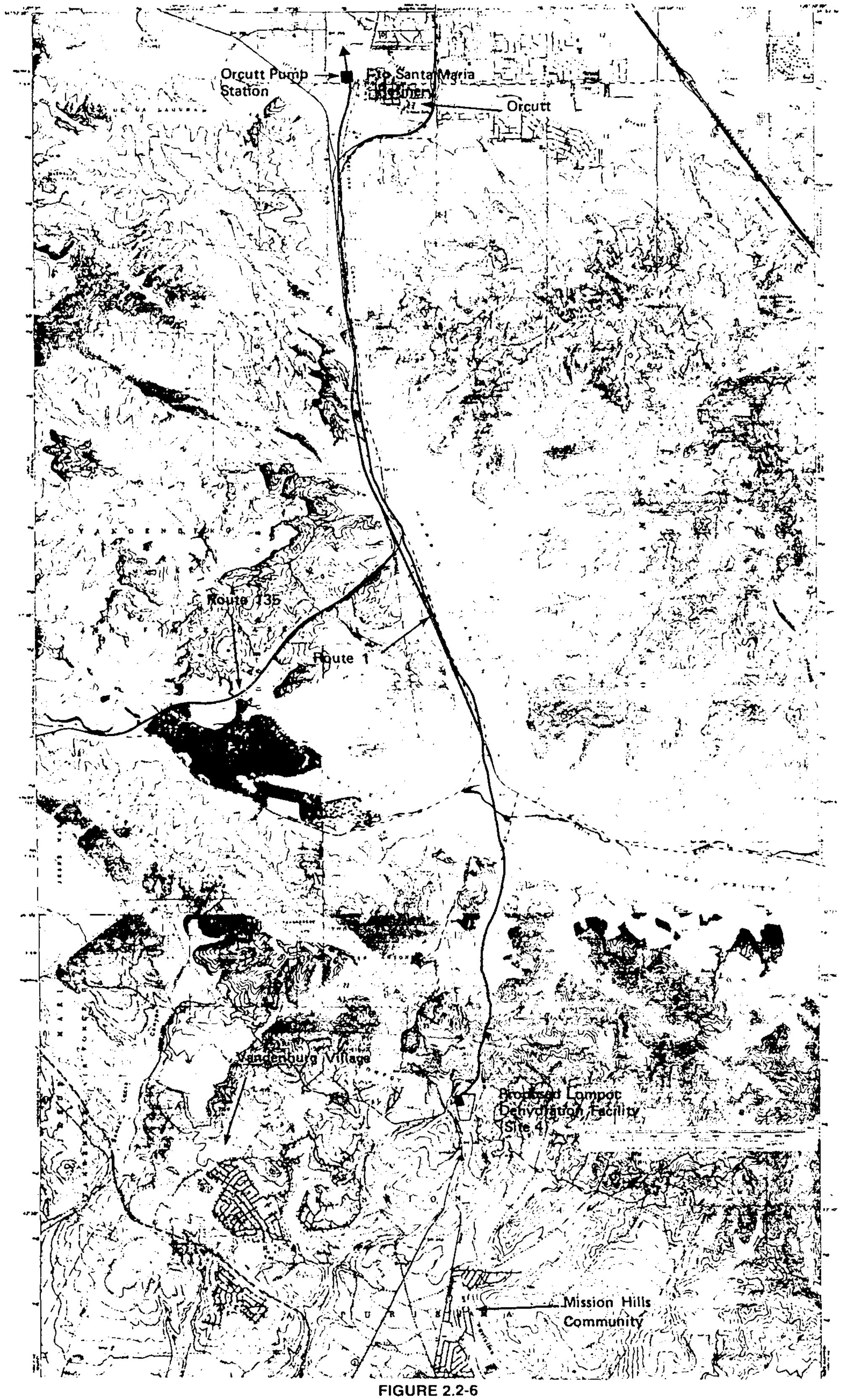


FIGURE 2.2-6

PROPOSED ONSHORE PIPELINE ROUTE FROM
LOMPOC DEHYDRATION FACILITY TO ORCUTT PUMP STATION

line. Therefore, the existing line will remain in service handling existing production. Both new and existing production will be pumped together at the Orcutt Pump Station.

The new 10-inch line will be constructed adjacent to the existing Lompoc to Orcutt lines. The existing pipeline corridor contains three lines; a 6-inch gas line and 6- and 8-inch combination oil lines belonging to Union and an 8-inch gas line belonging to Southern California Gas.

This new 10-inch line will leave the Lompoc dehydration site and run north through an existing right-of-way up and over the Purisima Hills just east of Route 1, and on down into the Los Alamos Valley where the pipeline will cross under Route 1. The pipeline will then continue north following Route 1 and Frontage Road. The northern portion of this pipeline crosses Route 1 just south of Orcutt and runs north on into the existing Orcutt Pump Station.

The pipe proposed for the line is 10-inch nominal O.D. grade X42 with a 0.25-inch wall thickness. The protective polyethylene wrap for corrosion protection and the insulation will be factory applied, probably in the Los Angeles area. The combination of pipe grade and wall thickness proposed has a maximum allowable working pressure of 1,400 psig. The expected actual operating pressure will be 800 psig.

The 10-inch pipeline will be designed and built to meet or exceed all codes, specifications, and requirements set forth by federal, state, and county regulatory agencies governing this project.

Valves, fittings, or any other pipeline appurtenances will be steel. These will meet or exceed all design requirements, specifications, and/or codes.

Construction details will be similar to the Beach-Lompoc pipelines except only one spread is needed. (See previous section for Onshore Pipelines.) Hauling pipe will take 34 loads of 25 tons each.

At the completion of pipeline installation, each section of the line will be hydrotested with fresh water to a specified pressure. This pressure will be held for a 24-hour period to test the integrity of the pipeline. Ground and aerial pipeline markers will be installed to delineate the route for patrolling and observation.

A 50-foot right-of-way will be required for construction. The permanent right-of-way will be 20 feet wide. Since the 10-inch line will be installed 5 feet from existing lines, the rights-of-way will overlap and have a net cumulative width of less than 20 feet per line.

Ample access to the line route exists so no new roads are required. This portion of the pipeline will require about seven weeks to complete using an average work force of 20 men/shift; one ten-hour shift per day. The estimated peak one-hour average daily and total emissions for the project are presented in Table 2.2-4.

Table 2.2-4

ESTIMATED PIPELINE CONSTRUCTION
(Lompoc to Orcutt)

Overland Pipeline	Pollutants NO_x	SO_2	CO	VOC	PM
1. Peak 1-hour (lbs)[a]	17.4	1.1	15.1	2.1	1.1
2. 24-hour (lbs)[b]	109.5	4.8	114.3	14.3	4.8
3. Total (tons)	2.3	0.1	2.4	0.3	0.1

[a] Peak emission rates calculated by summatin of major pieces of equipment which could be in operation at the same time.
[b] Calculated by dividing total project emissions by the number of days required to complete project phase.

This 10-inch line will be pigged once a year. The pig will be transported back to the Lompoc Dehydration Facility by truck.

2.2.1.2 Existing Pipeline Systems

Union Oil is proposing to use two existing pipelines for moving OCS-P 0441 production to existing processing facilities. The dry crude oil from the Orcutt Pump Station will be mixed with 3,000 barrels per day of lighter gravity Orcutt and Lompoc crude, reheated to 180°F and repumped through the existing 8-inch pipeline on up to Union Oil's Santa Maria Refinery.

The gas production from Platform Irene will pass through the Lompoc Dehydration Facility and connect with an existing 6-inch pipeline that feeds the Battles Gas Plant. This 6-inch line is currently handling gas production from the Lompoc Oil Field.

2.2.2 Exxon Pipelines

Exxon is proposing to install two subsea pipelines from Platform Shamrock to Union's Platform Irene. Figure 2.2-7 shows the proposed route for the subsea pipelines. The pipelines will be approximately 13,200 feet long (2.5 miles).

The wet oil pipeline will have a diameter of 10 inches, and its design capacity will be 35,000 barrels per day of fluids. The gas line will have a diameter of 6 inches, and its maximum capacity will be 60 MMscfd of gas. Both the pipelines will have a maximum working pressure of 1,500 psig. It is anticipated that the gas line will not be used for gas sales until after the year 2000. Exxon is currently planning to reinject all its gas production in

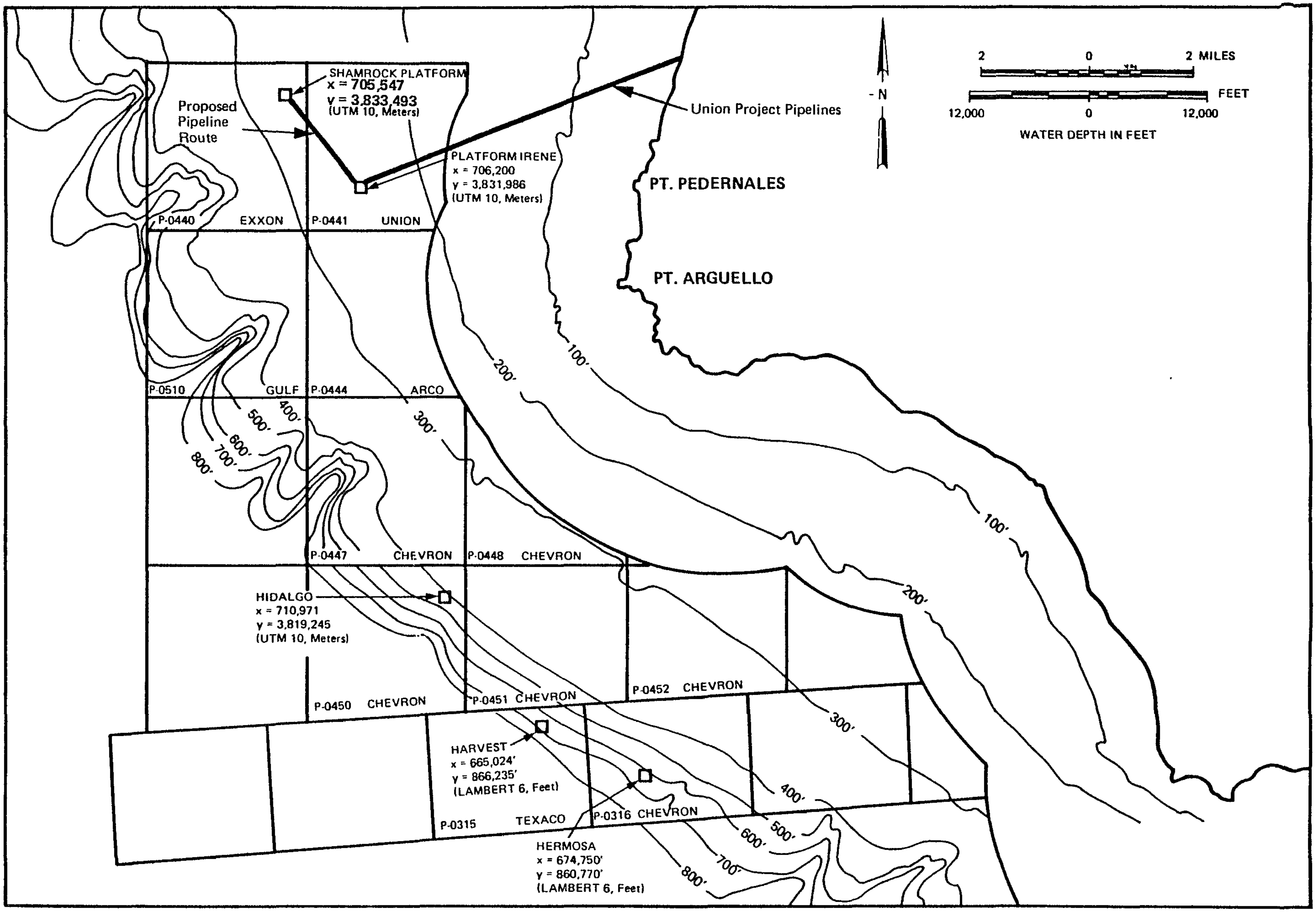


FIGURE 2.2-7

SHAMROCK PROJECT PROPOSED PIPELINE AND POWER CABLE CORRIDOR order to maintain reservoir pressure. This gas pipeline could be used by Union Oil in order to ship their gas from Platform Irene to Platform Shamrock for reinjection should this become necessary.

Conditions that might cause Union Oil to reinject its gas at Platform Shamrock would include loss of the gas pipeline to the Battles Gas Plant or shutdown of the Battles Gas Plant or need for reservoir maintenance.

2.2.2.0 Construction

It is anticipated that the pipeline will be installed using the pull barge, the reel barge, or the lay barge method. For the purpose of this analysis it is assumed that the pull barge method of installation will be employed. This method of installation is identical to that discussed for Union Oil's pipelines in the previous section.

The steel pipe that will be used for offshore pipelines will be fabricated outside the Santa Barbara Channel area. These lines will be constructed of carbon steel with a corrosion protection coating. The pipe segments will be transported by barge, truck, or rail to Port Hueneme. The pipe will then be loaded onto material barges and transported to a lay barge or stockpiled at a selected staging area for installation.

The pipelines will be connected to Platform Shamrock through the use of J-tubes. These J-tubes will be preinstalled on the platform jackets. The pipelines will be connected to Platform Irene through the use of risers that will be preinstalled on the platform jacket. The pipeline will not be buried, but just laid on the ocean bottom. The two pipelines will be installed at the same time and should require about two weeks to install, using two shifts per day. The crew boat, supply boat and helicopter requirements for the pipeline installation are included with the platform.

2.2.2.1 Cathodic Protection

All pipelines will be protected from external corrosion by a protective coating which will be supplemented for offshore pipelines with sacrificial anode-type cathodic protection. The sacrificial anode will react with corrosive elements thus protecting the structural integrity of the pipelines.

2.2.2.2 Hydrotesting

Once the pipeline is installed, the line will be hydrostatically tested with inhibited water to 1.25 times the maximum design pressure. The test water will remain in the pipeline until production begins, pursuant to NPDES permit requirements.

After the offshore pipelaying operations are completed, a side sonar scan survey will be conducted to verify that the pipeline was not damaged, that it was positioned properly on the ocean floor, and that the ocean floor was not adversely altered by the operation. Corrective measures will be carried out if necessary.

2.2.2.3 Valves

The subsea pipelines will have automatic block valves on both Platform Shamrock and Platform Irene in accordance with MMS OCS Order No. 9. Exxon's wet oil metering system on their platform will be tied into Union Oil's monitoring system at Platform Irene and the Lompoc Dehydration Facility for leak detection. The leak detection system will be composed of positive displacement meters at the platforms and the Lompoc facility. The system will monitor the volume of oil input of the platforms with the output at the Lompoc facility. If a volume difference is detected, an alarm will sound and then the pipeline system will automatically shutdown. The system will have an accuracy of approximately 1/10 of 1 percent of the throughput and the system will be temperature compensated.

2.2.2.4 Air Emissions

Estimated air emissions for the subsea pipeline installation are provided in Table 2.2-5. The major pieces of equipment used for installation will be the lay barge, tug boats and welding machines.

Table 2.2-5

ESTIMATED AIR EMISSIONS FOR SUBSEA PIPELINE INSTALLATION

Subsea Pipelines	Pollutants NO_x	SO_2	CO	VOC	PM
1. Peak 1-hour (lbs)[a]	261.6	16.5	57.7	15.9	18.6
2. 24-hour (lbs)[b]	3,349.4	212.0	739.1	203.9	239.1
3. Total (tons)	46.8	3.0	10.4	2.8	3.4

[a] Peak emission rates calculated by summatin of major pieces of equipment which could be in operation at the same time.

[b] Calculated by dividing total project emissions by the number of days required to complete project phase.

2.2.2.5 Operation

During operation, the lines will be pigged approximately once a week. The pig will be recovered at Platform Irene and returned to the Exxon Platform by helicopter or boat. The pipeline will be inspected at least once a week by air surveillance to look for small oil leaks. Once a year side scan sonar will be used to provide an external inspection of the pipeline.

2.3 ELECTRICAL SUBSTATION

A new electrical substation will be built to supply power to the subsea power cable feeding the platforms. The proposed site for the substation is near surf on a parcel of land owned by the Southern Pacific Railroad. The substation will be located approximately 700 feet north of the surf railroad station on the ocean side of Route 246.

The substation will be 60 feet by 70 feet and enclosed inside a chain link fence. The substation will contain meters, transformers, and protective devices.

Union Oil will purchase power from Pacific Gas & Electric (PG&E) at their transmission voltage of 70 KV. After metering the voltage will be transformed down to 34.5 KV for transmission to the platforms.

Construction of the proposed substation will take approximately 6 weeks with a maximum workforce of 6 persons. The emissions and effluents due to construction are presented with the onshore pipeline. Currently Union Oil proposes to minimize the visual impacts of the substation by architectural means and not landscaping. If landscaping is required one water truck every other week during dry periods would be required. Other water useage will be for washing the transformers every three months. This washing is required due to salt buildup from the close proximity to the ocean. The annual water consumption will be 680 cubic feet per year. During construction 8,000 gallons of water will be required for compaction and dust control.

The operation of the substation will require no full time employees. The station will be checked on a monthly basis, and an electrical contractor will perform the necessary preventative maintenance one day per year. The meter reader from PG&E will also visit the site once a month.

No emissions are caused by the Operation of the substation. Less than 1 kW of electricity will be used by the facility, and no solid or liquid waters will be generated during operation.

2.4 PROPOSED LOMPOC OIL DEHYDRATION FACILITY

2.4.1 Purpose of Facility

The proposed Lompoc (Oil) Dehydration Facility's primary function will be to receive the wet oil (i.e., crude oil and water) produced at Union Oil's platform and dehydrate the oil to 3 percent or less water. During this dehydration process any dissolved gas in the crude oil will be removed so that the crude oil will be acceptable as a feedstock to the Santa Maria Refinery. The water that is removed from the incoming crude oil will be treated to make it suitable for ocean disposal. The gas production from Union's platform will also be received at the proposed Lompoc (Oil) Dehydration Facility, scrubbed to remove any hydrocarbon condensate, and then reintroduced into the Lompoc to Battles Gas Plant pipeline along with any excess gas recovered from the crude oil. The facility will be designed to treat 36,000 barrels per day of 16° API gravity oil (42,000 barrels per day @ 17° API), and 36,000 barrels per day of produced water.

2.4.2 Description of Site

The onshore dehydration facility will be located within the Lompoc Oil Field on a parcel of land approximately 257 acres in size; however, only 22.5 acres are being rezoned at this time. However, Union Oil plans to only develop approximately 15 acres for the dehydration facility. The land is part of some 9,000-plus contiguous acres which Union Oil owns north of the City of Lompoc. The onshore site is located some 10 miles inland, east of State Highway 1. The facility is visible from several points from State Highway 1 ranging from 1,000 to 3,050 feet away. The site is in a partially disturbed grassy valley surrounded by oak woodlands. It is generally lower than State Highway 1. The site is very gently sloping and will require minimum grading. The general location of the site is shown in Figure 2.4-1.

2.4.3 Construction Activities

Before construction of the onshore facility can begin, the site will have to be surveyed to establish the facility boundaries. During the surveying stage, the appropriate grading stakes will be placed, and the heavy loading areas will be marked. These areas of heavy loading will be dug out and compacted in 6-inch lifts. After compaction, the final grade will be established. There will be no blasting of rock or earth required. Water will be used during the grading phase of construction for dust control. Approximately 5,000 barrels of water will be required for this purpose.

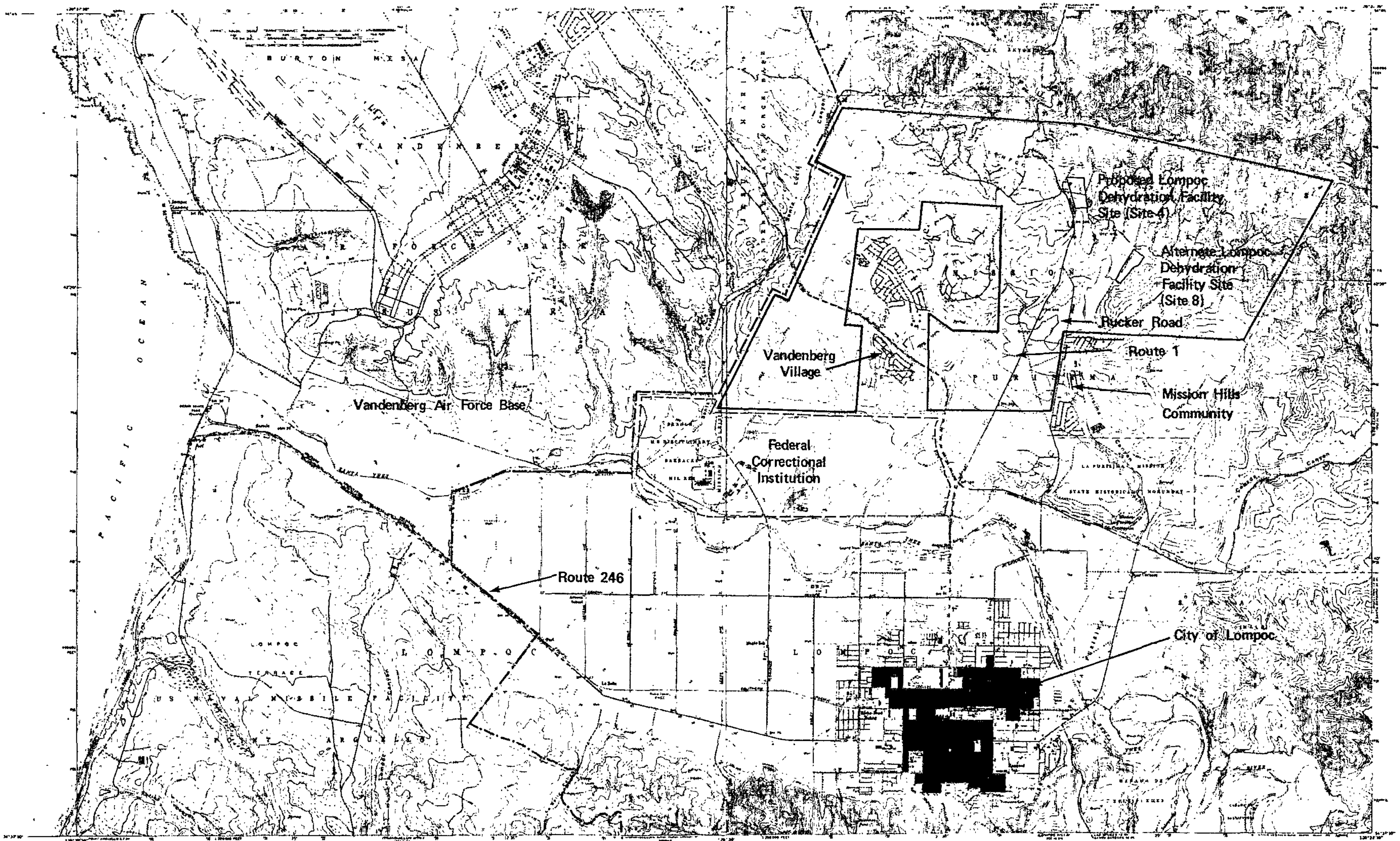
The next phase of construction will entail the installation of foundations for vessels, pumps, and the control building. These foundations will be of steel reinforced concrete and designed to conform with the Uniform Building Code seismic Zone 4. Gravel foundations for the tanks will also be installed during this period.

Once the foundations are in place, the vessels and pumps will be set. The vessels will be built offsite and trucked to the location after the foundations are ready. All storage tanks above 500 barrels will be erected onsite. Tanks which are less than 500-barrel capacity will be manufactured offsite and trucked in.

Interconnecting piping will be fabricated onsite and will be designed to conform with the ANSI Code B-31.3. All pressure piping 2 inches and above will be joined by welding. One-inch and smaller piping will be screwed. Only fresh water will be used for hydrotesting. Once hydrotesting is complete, the water will be disposed of by dumping on the ground for dust control at the site.

The dry oil surge tank is the largest (100,000 barrels) tank requiring hydrotesting. Union proposes to use the tank as a test reservoir to store and save hydrotest water for the dehydration facility, the pipelines from the platform and the pipeline to Orcutt. The water will be obtained over a few month period from wells located on Union Oil's Lompoc Oil Field property.

The control building will be constructed concurrently with the vessel and piping installation. The building will be constructed with cement block and conformed to the Uniform Building Code. Once the building is completed, with the piping, the electrical power, the control, and the alarm systems will be installed. All electrical design and construction will conform to the National Electric Code. The final phase of construction will be the painting of all the onsite facilities. The facility will be enclosed by a 6-foot high chain link fence with gates at access points.



Vandenburg AFB Boundary
Union Fee Property Boundary
Federal Prison Property Boundary

FIGURE 2.4-1

PROPOSED LOMPOC DEHYDRATION FACILITY LOCATION

Construction of the facility should take approximately six months. The labor requirements for the construction of the facility will be a maximum of 120 persons. The average labor force will be about 60 persons, working one ten-hour shift per day, six days per week.

The estimated air emissions for the construction of the dehydration facility is shown below in Table 2.4-1. Union has estimated that 500 tons of solid waste material will be generated during the construction of the facility. This material will be trucked to a local disposal site.

Table 2.4-1

ESTIMATED AIR EMISSIONS FOR CONSTRUCTION OF THE LOMPOC DEHYDRATION FACILITY

Facility Construction	Pollutants				
	NO_x	SO_2	CO	VOC	PM
1. Peak 1-hour (lbs)	15.8	0.8	40.7	4.7	1.2
2. 24-hour (lbs)	116.9	6.5	306.8	40.0	9.2
3. Total (tons)	9.5	0.5	24.8	3.0	0.7

2.4.4 Operational Activities

2.4.4.0 Oil Treating

A flow diagram showing the major equipment required for the Lompoc Dehydration Facility is shown in Figure 2.4-2. The equipment will be laid out as shown in the site plant in Figure 2.4-3.

To carry out these operations, a total staff of 11 persons plus supervision and engineering support. The foreman will normally be present one or more shifts per day. The engineer assigned to the job will not necessarily be onsite as much of his work is done in the office.

The Lompoc Dehydration Facility begins with a pig receiver which is the terminus of the oil pipeline from the platform. The fluid in the oil line will be comprised of gas, water, and oil. The gas will be in solution in the oil. The water can exist as free water and/or be emulsified in the oil. The pressures will be 100-200 psi and the temperature will be 55°-60°F.

The fluid will pass through a heat exchanger where it will be heated to 100°F. Produced water will be used in this exchanger as the heat source.

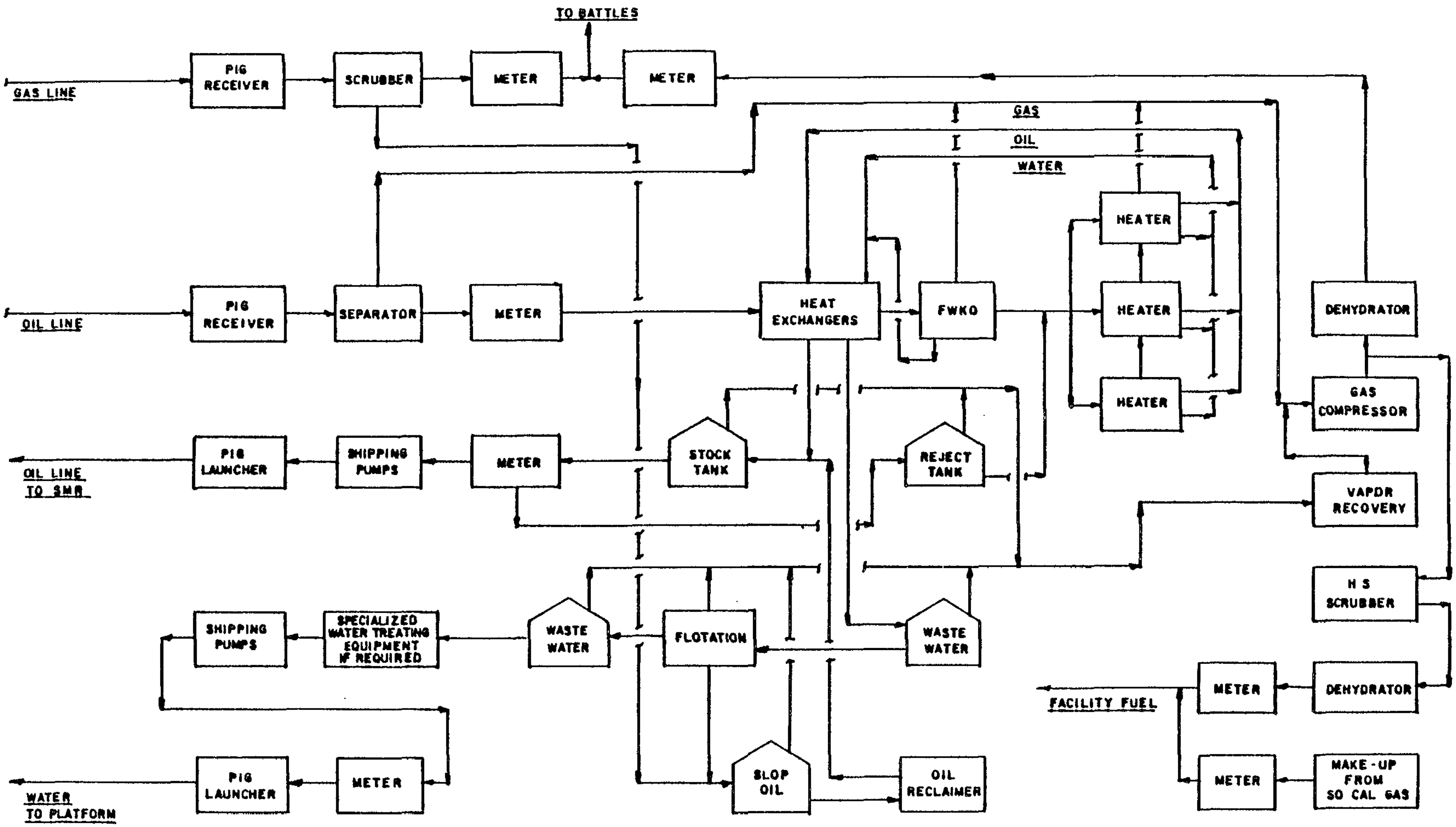


FIGURE 2. 4-2
PROPOSED LOMPOC DEHYDRATION FACILITY
BLOCK FLOW DIAGRAM

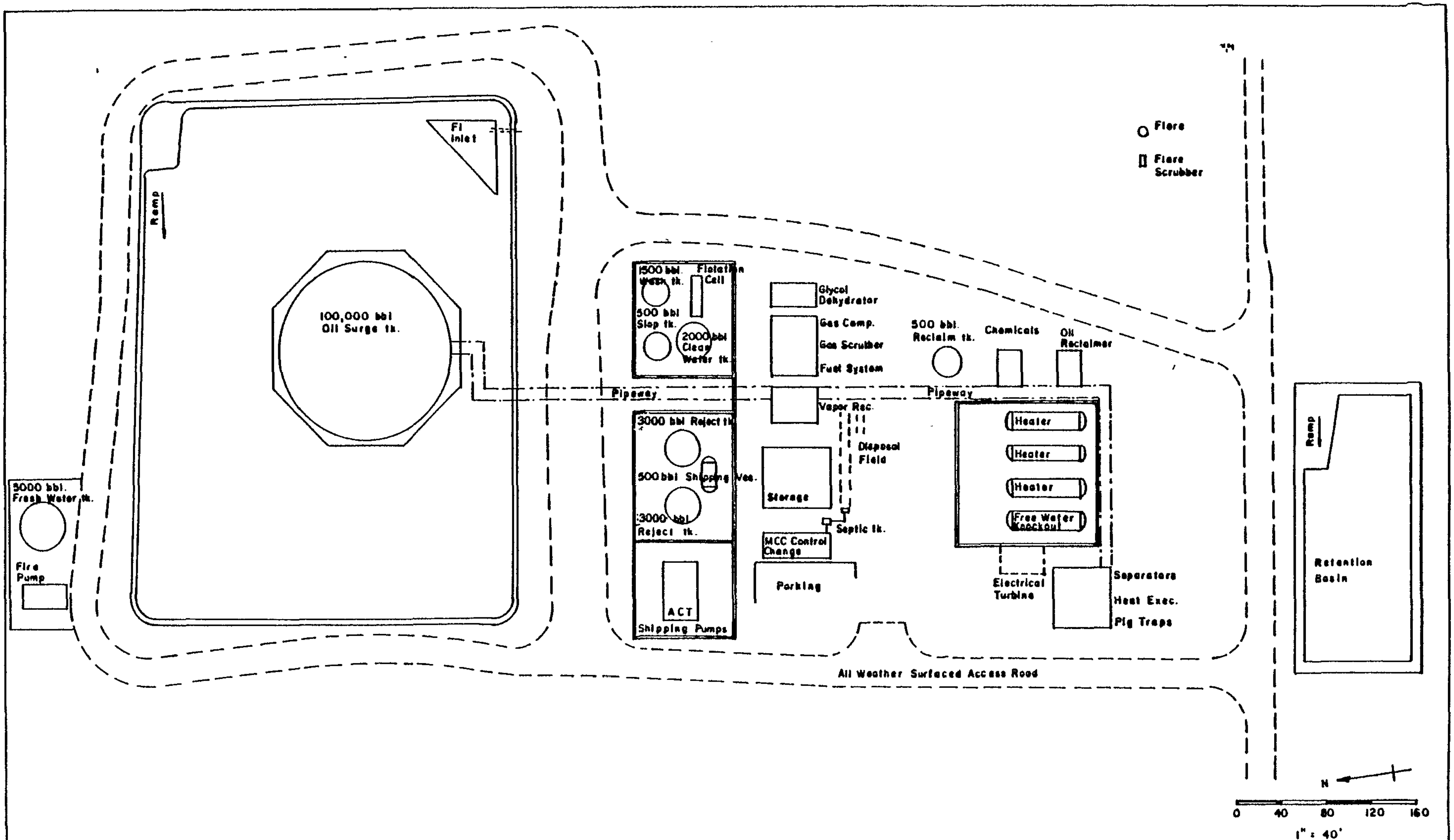


FIGURE 2. 4-3

PROPOSED LOMPOC DEHYDRATION FACILITY

SITE PLAN

R-2-69

The produced fluids will then flow through the gas-oil separator. In this vessel the pressure will be lowered to 125 psi. The heating of the fluid in the heat exchanger and the lower pressure will allow some of the gas to come out of solution. The liberated gas will be separated and sent to the gas treating system.

The fluid will pass through another heat exchanger where it will be heated to 125°F. The source for this heat will be the oil from the heater treaters.

The production will then flow to the free water knockout, where the pressure will be lowered to 85 psi. Since the pressure is lower and the temperature higher than the last vessel, more gas will evolve from solution. This gas will also be sent to the gas treating system.

Before the oil production enters the freewater knockout, emulsion breaking chemicals will be added at a rate of 30-60 ppm. The chemical will be added at this point to assure complete mixing prior to the heater treaters.

The treaters will be divided into two sections. The front section will be a direct fired heater which will increase the temperature of the emulsion to 200°F. The heat will be supplied by the combustion of natural gas at a maximum rate of 12,000,000 Btu/hour per heater treater. The back section will be equipped with baffles to aid in coalescing of the water droplets, and will provide the settling time necessary for the oil and water to separate. The water will be drawn off automatically into the produced water treating system. The heater treaters will operate at 40 psi. As a result of increasing the temperature and lowering the pressure, more gas will come out of solution. This released gas will be discharged into the gas gathering system.

The oil from the treaters will be sent back through the heat exchanger which is just prior to the free water knockout where it will be cooled by incoming production from 200°F to 180°F. The dry crude oil will then flow into a pressurized shipping vessel. From the shipping vessel, the oil will then be pumped through the automatic custody transfer (LACT) unit where the volume of oil sold is recorded. At this point, the responsibility for the oil will be transferred from the Union Oil and Gas Division to the Union 76 Division.

A 100,000-barrel dry oil surge tank will be provided to allow surge capacity so that routine maintenance can be performed on the pipeline system or the Santa Maria Refinery without shutting down production. Under normal operations, crude oil will not flow into this surge tank. The surge tank will be connected to the vapor recovery system and equipped with dual controls. Two 3,000-barrel reject oil tanks will be supplied to allow reprocessing of oil which does not meet the required specifications upon leaving the heater treater system.

It should be noted that there are three heater treaters installed at the facility, each with the capacity to treat 12,000 barrels per day of dry oil. Under normal operations, only two heater treaters will be in service.

2.4.4.1 Gas Treating

The gas system will receive gas from two sources. The majority of the gas will be separated from the oil at the platform. It will be dehydrated, compressed, and shipped to the onshore facility. No additional compression will be necessary. The remainder of the gas (1,000 Mcfd) will be released from solution in the oil treating system. This gas will have to be compressed and dehydrated prior to being shipped to the Battles Gas Plant.

The gas generated from within the onshore facility (approximately 1 MMscfd/day) will come from two sources. One source will be the vapor recovery system which will operate at 2 inches of water column positive pressure. In this system, the vapors will be collected from all of the tanks, the flotation cell, and the vents used to depressure the vessels and routed through a heat exchanger where they will be cooled to atmospheric temperature. They will then flow to an intake scrubber where any condensed liquid will be removed. The liquid will be pumped to the oil treating system just prior to the free water knockout. The gas will go to the vapor compressor where the pressure will be boosted to 35 psi.

At this point, the second gas stream will enter the system. The gas from the gas-oil separator, freewater knockout, and the heater treaters will be mixed with the compressed vapors and pass through another heat exchanger and cooled to atmospheric temperature. Downstream of the exchanger, any liquids will be removed by a scrubber and routed to the oil system. The gas will enter the booster compressors where the pressure will be increased to 300 psi. The gas will again be cooled to atmospheric temperature in a heat exchanger, and any condensate removed via a gas scrubber.

At this point, the gas will either be used as fuel for the onshore facility or be treated for shipment to the Battles Plant. The portion which will be used for fuel will be treated to lower the H_2S content to below 50 grains/100 standard cubic feet by contacting the gas with caustic soda (NaOH) in a caustic scrubber. The gas which is not used as fuel will be dehydrated in a glycol contactor and shipped to Battles Plant along with the gas from the platform, through a 6-inch pipeline.

2.4.4.2 Produced Water Treating

The produced water system will collect the water which is automatically drawn off the freewater knockout and heater treaters and transport it to the wash tank. Reverse emulsion breaking chemicals will be added at rate of 10-20 ppm to separate the trace oil which will be contained in the produced water. The oil will float to the top of the wash tank where it will be skimmed off and sent to the reclaimed oil tank for treating.

The water will flow to the flotation cell. In the flotation process, gas bubbles will be introduced into the water. These bubbles will attach to the small oil or solid particles which may be present and increase their buoyancy. The particles will float to the surface where they will be skimmed off and flow to the reclaimed oil tank.

The clean water (20-30 ppm oil/20-30 ppm solids) will be pumped through the heat exchanger located prior to the gas oil separator to the water surge tank. The tank level will control the produced water shipping pumps which will transfer the water to Platform Irene for disposal.

2.4.4.3 Oil Reclaiming Systems

The reclaimed oil system is the final component of the treating systems at the onshore facility. This system will collect the oil which will be discharged from the oil and water treating systems and salvage it. The piping from the various vessels, tanks, and drain systems will transport the oil to the reclaimed oil tank. From there it will be pumped to a 1 million Btu/hour heater treater where it will be dehydrated to less than 3 percent water. Any water removed will be sent to the water treating system. The oil will go to the oil surge tank.

2.4.5 Support Facilities

The following support facilities will be provided for the dehydration facility.

2.4.5.0 Electrical Power

Electrical power for the facility will be purchased from the Pacific Gas and Electric Company (PG&E) which currently supplies power for the adjacent properties operated by Union Oil. PG&E has indicated that their existing lines are adequate and will not require modification. The 12,000-volt distribution network owned by Union Oil in the surrounding oil fields will have to be reconducted to provide the processing load which is expected to be 860 kilowatts. A standby 110-volt engine-driven generator will be installed to provide control power in the event of a power failure.

2.4.5.1 Natural Gas Supply

As discussed above, the normal supply of natural gas will be from the gas recovered from the crude oil-water stream coming from Platform Irene. Before the gas is used at the facility, it will be treated to reduce hydrogen sulfide (H_2S) content to below 50 grains/100 standard cubic feet. For startup of the facility and for emergency use, a gas pipeline connection will be made to the Southern California Gas Company pipeline which is adjacent to the site. The gas consumption will be 475 Mcf/day.

2.4.5.2 Potable Water

Potable water will be available from both wells located on the Union Fee property and the Mission Hills Community Services system. The site will use fresh water for sanitary and washdown purposes at a rate of less than 500 gallons/day. Water for fire protection use will come from wells on or adjacent to the property.

2.4.5.3 Waste Water Systems

The water separated from the incoming crude oil will be treated as discussed above and returned to Platform Irene for disposal. A septic tank will be used for the site's sanitary needs.

2.4.5.4 Vent and Flare Systems

A vapor recovery system and a blanket gas system will be utilized on all natural gas containing equipment to prevent the atmospheric release of gas and to recover as much gas as possible for use as fuel at the facility. All low pressure storage tanks will be connected to a blanket gas system to maintain an oxygen-free atmosphere over these tanks. The vapor recovery and blanket gas systems will tie into the gas recovery system where a series of scrubbers, compressors, and treaters will be utilized to eliminate the discharge of gas to the atmosphere. Relief valves and emergency venting will tie into a flare header which goes through a scrubber and then to an elevated flare stack.

2.4.5.5 Compressed Air Systems

A utility air system and an instrument air system will be provided to supply the needs of the facility.

2.4.5.6 Site Drainage

The area surrounding the onshore facility will be graded and bermed to prevent upslope runoff water from entering the site. The berms will be reinforced with gunite or riprap at points where erosion may be a problem. This water will be diverted around the facility and returned to natural channels below this site.

Rainwater will be removed from the surge tank area and catch basins via drainlines which will dump into the drainage channel to the west of the site. The lines from these areas will be equipped with valves which will be locked in the closed position. Before any water is drained from these areas, the water will be checked for contaminants. In the event of a spill of oil or produced water, the liquids will be pumped into the slops tank for treating.

2.4.5.7 Miscellaneous Supplies and Chemicals

For the operation of the facility, chemical supplies will be required on a routine basis. The chemicals, which are used in large quantities such as caustic soda (sodium hydroxide) and treating compounds for water and oil, will be bought in bulk and delivered by tank trucks to avoid handling container disposal problems. Lubricating oil, glycol, and chemicals used in small quantities will be purchased in returnable containers which will be recycled to the vendor supplying the product.

2.4.6 Safety and Environmental Control Facilities

The dehydration facility at Lompoc will be designed to contain and recover any natural gas produced in the system. A flash gas system will collect gas liberated from the incoming water crude oil streams and recover it for use as plant fuel.

Vapor recovery systems will recover low pressure gas from all gas containing equipment and vessels in the plant for recovery and introduction into the fuel gas system after treating for removal of any residual hydrogen sulfide present. A blanket gas system will be provided to insure a positive pressure is maintained on all hydrocarbon containing vessels and hence, preclude the inadvertent introduction of air into hydrocarbon containing tanks. The blanket gas system and the vapor recovery system will work in conjunction with one another.

Pressure vessels will have control systems which will, under normal circumstances, prevent them from being over-pressured. However, if an emergency arises and the vessels are subjected to high pressure, they will be protected from this circumstance by pressure relief valves on the vessels which relieve into a relief valve header, with ultimate disposition of gas in an elevated flare. The low pressure storage tanks will have pressure controls built into them working on the blanket gas and vapor recovery system. However, in case of an emergency, emergency vents on these storage tanks will relieve the pressure to the atmosphere.

All hydrocarbon containing storage tanks will have a berm or diked area around them to equal 1 1/2 times the capacity of the tank.

2.4.6.0 Fire Protection System

The fire protection system which has been approved by the County Fire Department will include the following equipment:

- One 3,000-gpm, 150-psi fire pump which will be diesel engine-driven.
- One 3,000-gpm, 150-psi fire pump which will be electric-driven.
- Four 4-inch hose reels with loan capability.
- Three street-type fire hydrants.
- Three hydrant monitors with foam capability.
- Two 500-gpm monitors with foam capability..
- One 5,000-barrel water storage tank.
- Portable fire extinguishers, as needed.
- Foam system for 100,000 bbl tank.

Water will be supplied to the firewater tank from existing wells in the Lompoc Oil Field. The tank will be kept full by an automatic level control. A controller will monitor the pressure in the firewater main which is looped around the facility. In the event of a drop in pressure, the firepump engine will start automatically and run until it is shut down manually. In addition, connections will be made so the Lompoc Fire Department can pressure the system directly.

Union Oil has prepared spill prevention control and countermeasure (SPCC) plans for all onshore and offshore facilities. These are generic plans inspected by the EPA and the California Department of Fish and Game. It is Union Oil's intention to prepare SPCC plans for the dehydration facility which will reflect the design characteristics of the permitted facility following the basic format of those plans previously inspected by the EPA. The SPCC plan will be prepared and inspected prior to startup of the facility and will be updated as required by federal, state, or local regulations.

Union does not anticipate high hydrogen sulfide (H_2S) levels at the dehydration facility and does not at this time propose to incorporate an H_2S contingency plan. However, if high H_2S levels are encountered, a contingency plan will be incorporated into the facility operation reflecting the policy standards of the company as outlined in Union Oil Company's Standard #15.

2.4.7 Emissions and Effluents

The estimated air emissions for the operations for the Proposed Lompoc Dehydration Facility are shown in Table 2.4-2.

Table 2.4-2

ESTIMATED AIR EMISSIONS FOR OPERATIONS OF LOMPOC DEHYDRATION FACILITY

	Pollutants				
Year	NO_x	SO_2	PM	CO	VOC
1986	8.16	0.004	0.004	3.694	7.614
1987	8.16	0.004	0.004	3.694	7.614
1988	8.16	0.004	0.004	3.694	7.614
1989	8.16	0.004	0.004	3.694	7.614
1990	8.16	0.004	0.004	3.694	7.614
1991	8.16	0.004	0.004	3.694	7.614
1992	8.16	0.004	0.004	3.694	7.614
1993	8.16	0.004	0.004	3.694	7.614
1994	8.16	0.004	0.004	3.694	7.614
1995 on	8.16	0.004	0.004	3.694	7.614

The primary source of air emissions for the facility will be from the combustion of natural gas in the heater treaters, the oil reclaimer and the glycol regenerator. Fugitive emissions will also contribute to the volatile organic compounds. The heater treaters will utilize both low NO_x burner and a waste heat recovery system, thus reducing NO_x emissions by 60 percent over conventional burners.

The major liquid effluent from the facility will be the produced water removed from the crude oil water stream coming in from Platform Irene. As described above, this produced water will be treated to remove oil and pumped via pipeline back to Platform Irene for disposal. The composition of a typical Monterey formation produced water is shown in Table 2.4-3. This is from an onshore well and may not be typical of what will be discharged from Platform Irene.

If the fuel gas burned by the facility has an H_2S concentration above the maximum allowed by the APCD, a caustic scrubber will be used for removal of the hydrogen sulfide. This spent caustic stream will contain approximately 1,850 milligrams/liter of sodium sulfite and 15,000 milligrams/liter of sodium sulfide. It is expected that a maximum of one 100-barrel vacuum truck per week will be required to dispose of this waste at the approved disposal site (Casmalia).

All oil recovered from the flotation cell and drained from vessels or tanks will be reclaimed and piped to the Santa Maria Refinery. Since the Monterey Formation is a fractured shale instead of an unconsolidated sandstone, very little solids are expected to be produced with the oil. Tank cleaning will occur at five-year or longer intervals. On the average, tank bottom sediments will amount to 200 barrels per year and will be disposed of at the approved disposal site (Casmalia).

It is estimated that solid wastes equivalent to one small dumpster (160 cubic feet) per week will be produced. Any scrap metal will be held onsite and then recycled by sale to scrap dealers. Sanitary sewage will be treated onsite in a septic system.

2.4.8 Transportation of Products

From the Lompoc Dehydration Facility, pipeline quality oil will be shipped north via pipeline from Lompoc to Union's Santa Maria Refinery. There are existing pipelines the entire distance; however, the present line segment from Lompoc to Orcutt, where an intermediate pumping station is located, is too small to handle 20,000 barrels per day. The existing Lompoc to Orcutt line is a combination of 6-inch and 8-inch diameter pipe. Union Oil proposes to install 11.5 miles of 10-inch insulated pipe in the same pipeline corridor to transport OCS production from Lompoc to Orcutt. From Orcutt to Santa Maria Refinery, the existing 8-inch line will be adequate.

The new 11.5-mile, 10-inch line between Lompoc and Orcutt will be insulated and will receive oil at Lompoc at temperatures between 175 and 180°F. The oil will arrive at Orcutt at about 150°F where it will be reheated to 180°F and blended with 3,000 BOPD of lighter gravity Orcutt and/or Lompoc crude. The mixed crudes will then be pumped through an 8-inch line to the Santa Maria Refinery.

Table 2.4-3

TYPICAL PRODUCED WATER COMPOSITION

Constituent	Before Treatment mg/L	After Treatment** mg/L
Sodium	6,200	
Ammonium	59	0.59
Calcium	60	
Magnesium	40	
Barium	2.1	
Iron	0.02	
Sulfide	1.1	
Sulfate	26	
Chloride	9,100	
Iodide	19	
Borate	140	
Hydroxide	0	
Carbonate	0	
Bicarbonate	120	
Organic Acids	18	
Silica	45	
Total Solids	16,900	
Salinity as NaCl	15,000	
Hardness as Ca_2CO_3	310	
Specific Gravity	1.014	
pH	7.7	7.7
Phenols	0.41	0.004
Toxicity (tu)	6.4	0.63
Oil & Grease	200-400	0.3
Cadmium	0.02	0.0002
Total Chromium	0.05	0.0005
Copper	0.05	0.0025
Lead	0.1	0.001
Nickel	0.08	0.0008
Silver	0.005	0.0002
Arsenic	0.02	0.0033
Mercury	0.002	0.00008
COD	160	
Cyanide	0.01	0.0001
Total Chlorinated Pesticides & PCB	ND*	

* Not detected: limit of detection, 1 microgram/liter.
**Includes dilution factor of 100.
Source: Union Oil OCS-P 0441 Development Application, October 1983. Represents an onshore water sample.

The gas production from the dehydration facility at Lompoc along with the gas from Platform Irene will be shipped to the Battles Gas Plant through the existing 6-inch line. No modifications to this line are proposed. The Union Battles Gas Plant is discussed in Section 2.5.

2.5 ORCUTT PUMP STATION

The Orcutt Pumping Station is an existing facility comprising primarily an oil tank and two gas engine-driven pipeline pumps used to transport Lompoc and Orcutt crude to the Santa Maria Refinery.

In order for the Orcutt Pumping Station to handle OCS crude, several modifications will be made. The two existing gas engine-driven pumps will be removed and replaced with three 250-Hp electrically motor-driven and one 350-Hp gas engine-driven pipeline pumps. Each electric pump will be rated for 10,000 barrels per day. Normally, two will be in service with one on standby. In the event of extended power failure, the engine-driven pump will be used to transport 20,000 barrels per day to the refinery.

To enable the OCS crude to be pumped to the Santa Maria Refinery in an 8-inch line, the OCS crude will have to be blended with lighter Lompoc and Orcutt crude and heated to 180°F before entering the 8-inch pipeline to the Santa Maria Refinery.

2.5.1 Description of Site

The Orcutt Pump Station will be located on Union property of 4.69 acres bounded by the edges of Markam and Clark Streets. As noted above, the site is currently being used as a pump station, and the modifications required for it to handle OCS crude will not require any additional acreage.

2.5.2 Operational Activities

The Orcutt Pump Station will be remotely operated by microwave from Los Angeles. The station will be visited on a daily basis to check the boilers and other operating equipment.

2.5.3 Support Facilities

2.5.3.0 Electrical Systems

Electrical power for the operation of the Orcutt Pumping Station will come from PG&E via Union's existing Orcutt area master meter which serves the Orcutt office and shop and the Orcutt Hill Field. Operation of the Orcutt Pumping Station will require 484 kilowatts of electricity.

2.5.3.1 Freshwater System

Water for makeup to the boilers and landscaping will come from Union's Orcutt water system. Eighty to 400 gallons/day will be required depending on boiler characteristics. A similar amount will be rejected or blown down to prevent minerals in the water from forming scale in the boiler. A 5,000 gallon underground tank will be installed to collect blowdown water which will periodically be trucked to Orcutt Hill and put into the produced water system. Once the system is in operation and the water quality has been confirmed, an application may be made to enter the Laguna Sanitation Sewer on Clark Avenue for the boiler blowdown.

2.5.3.2 Fuel Gas System

The operation of the two boilers producing steam to heat the oil will consume 302 Mcf/day of natural gas supplied from Union's existing fuel gas supply from the Battles Gas Plant to the site. This gas is free of H_2S. If the emergency engine-driven pump is in service it will use 67 Mcf/day. An instrument air system is supplied for providing motive power for the control system.

2.5.4 Safety and Environmental Control Facilities

The OCS crude will enter the pump station and go directly to the suction manifold of the pumps, through heaters, and then out to the pipeline to the Santa Maria Refinery. Emissions will be reduced because of the change of gas engine-driven pumps to electrically-driven pumps and additional emissions because of the addition of boilers for producing steam to heat the crude oil. These changes in emissions are shown in Section 2.5.5.

Liquid effluents which are a result of a blowdown from the operation of the steam boilers, will be trucked to the Orcutt Hill Oil Field for introduction into the produced water system. A 500-gallon slop oil tank is provided to collect any oil drained from pumps, valves, pigging operations, or piping during the maintenance activities. Oil collected in a slop tank will be pumped back into the pipeline to the Santa Maria Refinery by a small electric pump controlled by a float switch.

2.5.5 Emissions and Effluents

The existing and future air emissions for the Pump Station are shown in Table 2.5-1.

2.5.6 Transportation of Products

The OCS crude from the Orcutt Pumping Station will be mixed with Lompoc and Orcutt Hills lighter crude and transported via an existing 8-inch pipeline to the Santa Maria Refinery.

Table 2.5-1

ANNUAL AIR EMISSION ESTIMATES FOR THE ORCUTT PUMP STATION

	Pollutants				
Source	NO_x	SO_2	CO	VOC	PM
Engines	0.40	0.0	0.05	0.16	0.00
Boilers	3.68	0.0	0.84	0.22	0.06
Tanks	0.00	0.0	0.00	0.50	0.00
Total Future Emissions	4.08	0.0	0.89	0.88	0.06
Total Current Emission	12.68	0.0	1.64	5.71	0.00

2.6 SANTA MARIA REFINERY

The Santa Maria Refinery is located on the Nipomo Mesa about 8 miles north of the City of Guadalupe in southwestern San Luis Obispo County. The refinery is located within a fenced area of approximately 100 acres. Immediately adjacent to the refinery is a Union Chemical Division plant which processes coke and sulfur byproducts from the refinery. The refinery is used to upgrade low gravity crude oils by coking so the oil can be further refined at Union's Rodeo Refinery which is located in the San Francisco Bay Area. The Santa Maria Refinery ships semi-refined products by pipeline to the Bay Area. Some limited semi-refined products such as gas oils are shipped to Union's Los Angeles Refinery by tanker from the Avila Marine Terminal.

In order for the Santa Maria Refinery to process 20,000 barrels per day of OCS-P 0441 crude, various modifications will have to be made. The initial assay of OCS-P 0441 crude indicates it has a higher sulfur content (5-6 weight percent) and residual oil content than the San Joaquin crude it will replace. This change in crude quality will require new facilities to process the increased sour gas, sulfur yields, and coke yields at current crude rates.

No discretionary development permit from San Luis Obispo County is required for these modifications. Therefore, CEQA review of the modifications is not required. However, the scope of the document covers the refinery because CEQA and NEPA require that both direct and indirect impacts of the complete project be evaluated.

Basic refinery operations will remain unchanged with the proposed modifications. Refinery capacity will continue to be 43,900 barrels per day. Figure 2.6-1 presents a general process flow diagram of the refinery operation after the proposed modifications have been made. Figure 2.6-2 provides a general plot plan for the refinery that includes the proposed modifications. No changes are planned for the crude and vacuum units. New coker heaters will be required to meet an increased heating demand. The amount of coker gas to be processed will increase by 50 percent requiring higher capacity compressors at the gas recovery units. Union will extend the dual-train configuration by adding a new H_2S absorption unit in parallel with the existing unit. The

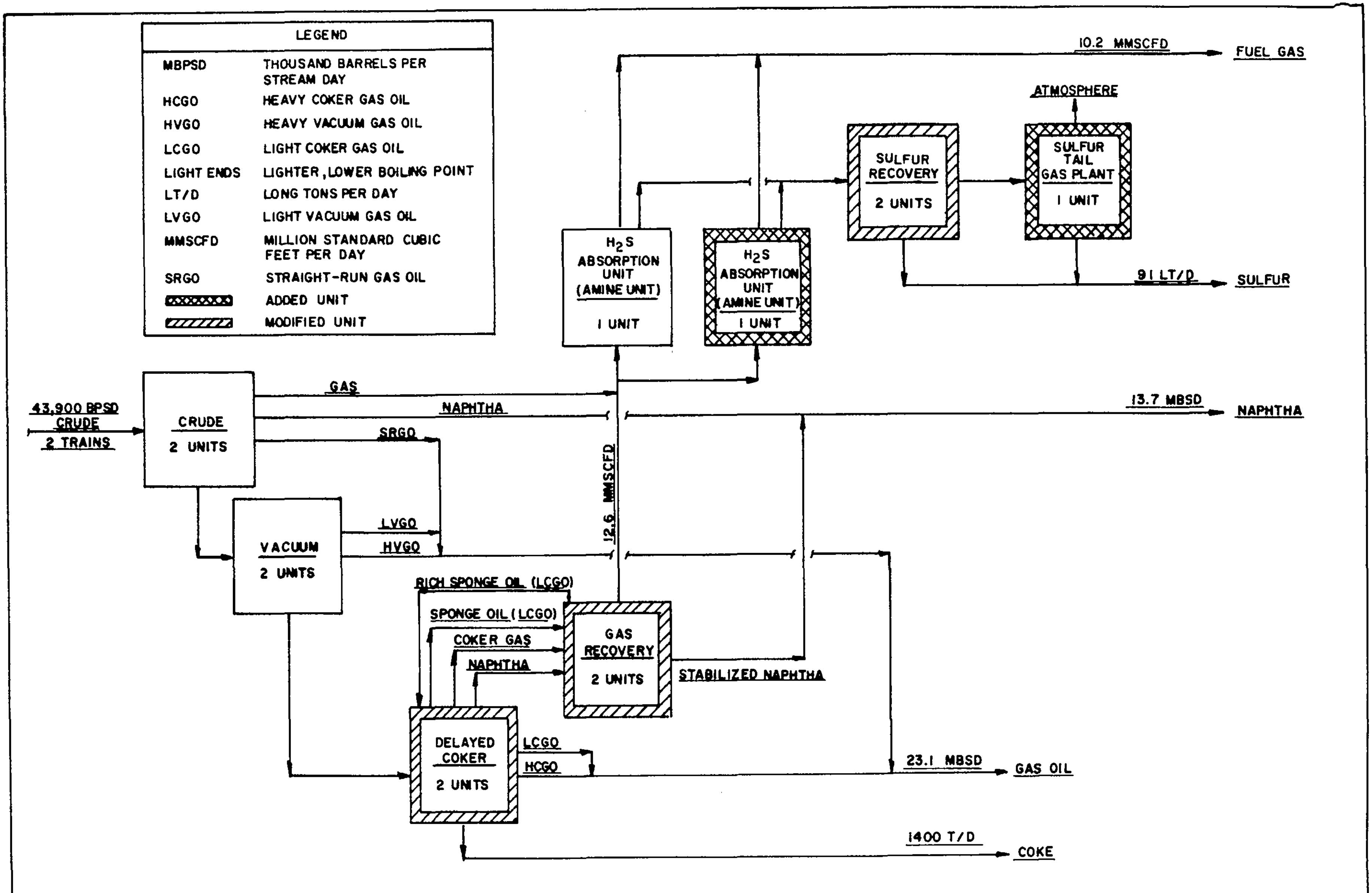


FIGURE 2.6-1
SANTA MARIA REFINERY
BLOCK FLOW DIAGRAM

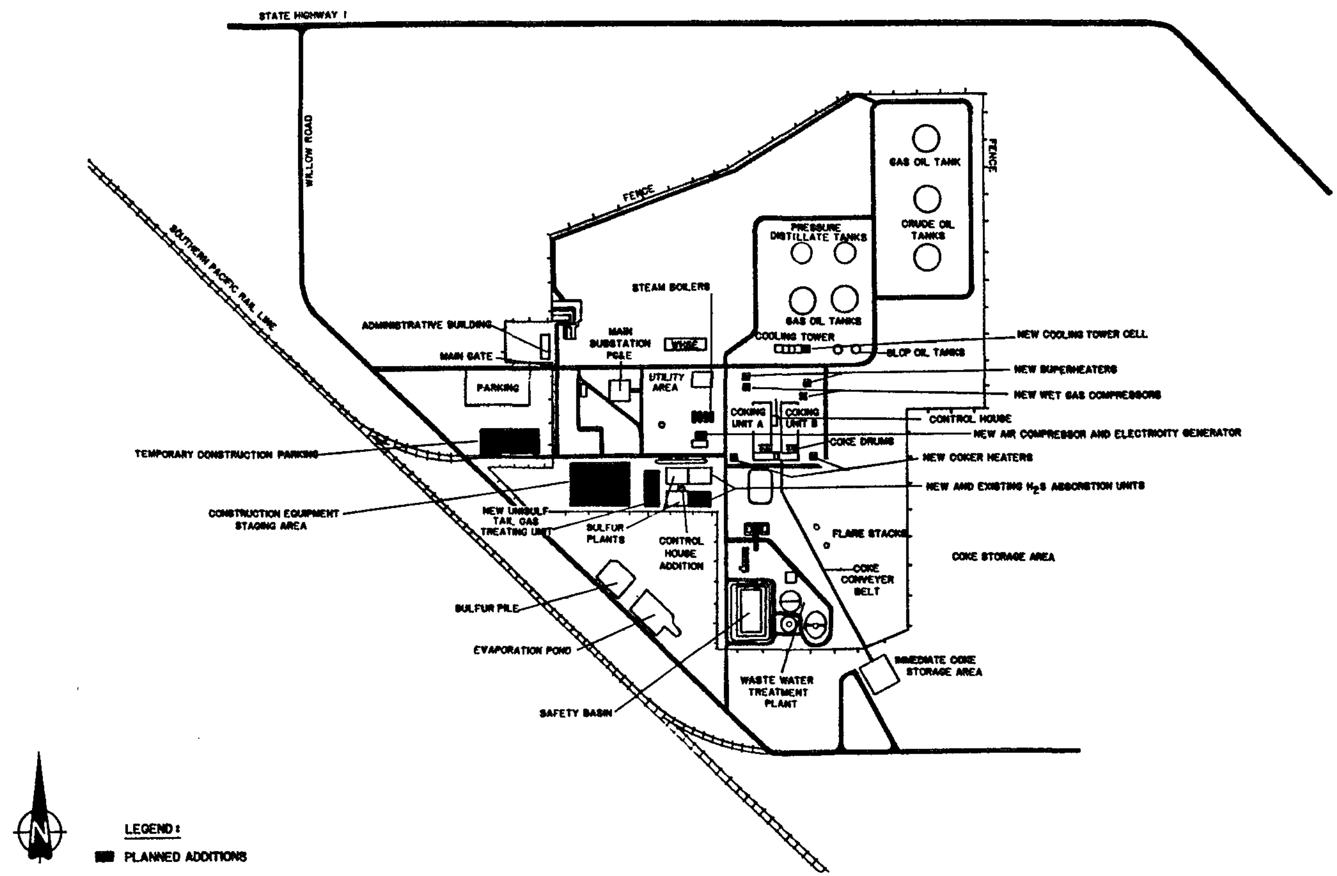


FIGURE 2.6-2

SANTA MARIA REFINERY PLOT PLAN

increased sulfur removal required will be accomplished by adding third-stage catalytic converters to the sulfur recovery units and by installing a new Unisulf Tail Gas Treating Unit to convert residual sulfur compounds in the tail gas to elemental sulfur.

Storage and transportation facilities will not be modified since throughput capacity will remain unchanged. All crude oil will enter the refinery in the existing pipelines. Liquid products will continue to be shipped from the refinery by pipeline and truck, while solid products will continue to be shipped by truck and rail. The modified refinery will consume additional water, power, and fuel gas. Additionally, the modified refinery will treat slightly more wastewater and will generate an insignificant amount of additional solid waste. Proper disposal of all wastes will be carried out in accordance with applicable permits and requirements.

The proposed modifications involve changes to the refinery's processing capabilities, not to throughput capacity. The modifications include:

- Increasing the capacity of the delayed coker units by revamping and replacing portions of existing equipment and by adding new equipment.
- Expanding the capacity of the gas recovery units by both replacing existing equipment and adding new equipment.
- Adding additional H_2S absorption capacity by adding new equipment.
- Increasing the amount of sulfur recovery by adding new equipment.
- Meeting increased needs for cooling water, plant and instrument air, fire protection, and electrical power by adding new equipment.

The air emission changes for the proposed refinery modifications are shown in Table 2.6-1. As can be seen from Table 2.6-1, there will be a slight net increase in emissions of NO_x, CO, PM, and THC. There will be a major decrease in SO_2 emissions because of the addition of state-of-the-art emission control equipment.

Construction activities are scheduled to occur over a ten-month period beginning in August 1985. All equipment additions and modifications, construction activities and use of an equipment staging area will take place within existing refinery boundaries, on already graded and/or paved areas.

Union Oil has submitted permit applications to the San Luis Obispo County APCD who will be responsible for issuing an authority to construct permit for the refinery modifications.

No modifications or operating changes will be made to the pipeline system from the Santa Maria Refinery to the Refinery. No modifications or operating changes will be made to the Rodeo Refinery as a result of the proposed project.

Table 2.6-1

NET AIR EMISSION CHANGES FOR THE SANTA MARIA REFINERY MODIFICATIONS

Item	Pollutant/Emission Rate (tons/year)[1] NO_x (as NO_2)	SO_2	CO	PM	THC
Emission Decreases					
Shutdown Existing Coker Unit Heaters, B101-A and B	-54.8	- 36.9	-13.7	-1.2	-1.2
New Tail Gas Unit	-	-3,883.7	-	-	-
Emission Increases					
New Coker Unit Heaters	+65.7	+ 47.1	+17.5	+1.5	+1.5
New Steam Superheaters	+ 1.9	+ 1.4	+ 0.5	+0.1	+0.1
New Sulfur Melter Vent	-	+ 3.9	-	-	-
New Tail Gas Unit	-	+ 21.5	-	-	-
Steam Balance	+28.7	+ 12.0	+ 2.0	+1.8	+0.4
Net Change	+41.5	-3,834.7	+ 6.4	+2.1	+0.7

[1] A dash signifies that emissions are not applicable for this pollutant.

2.7 BATTLES GAS PLANT

The Battles Gas Plant is located east of Highway 101 between Betteravia Road and Battles Road. It receives gas from all of the Santa Maria Area oil fields including Lompoc. The primary function of the plant is to remove hydrocarbon liquids and impurities from the incoming natural gas stream before the gas is returned to the oil field for fuel or sold to Pacific Lighting through its subsidiary, the Southern California Gas Company. The plant has a rated capacity of 30 MMscfd, but the current throughput is 12-18 MMscfd.

Figure 2.7-1 provides a general block flow diagram of the Battles Gas Plant operations. Figure 2.7-2 shows the existing plot plan for the Battles Gas Plant.

The incoming gas is compressed and then sent to the purification process. This process removes the hydrogen sulfide from the gas stream so the gas will be acceptable for sales or fuel. This portion of the plant is divided into two stages. In the first stage, the gas is contacted with the Ferrox solution. The iron in the Ferrox solution reacts with the hydrogen sulfide and removes the majority of it from the gas by converting it to elemental sulfur. The gas then passes through vessels which are packed with iron oxide impregnated wood chips which remove the remaining hydrogen sulfide. The purification plant reduces the hydrogen sulfide content from as much as 3,400 ppm to less than 1 ppm. The Ferrox solution is regenerated and recycled. The impurities are ultimately reduced to a sulfur slurry which is used for agricultural soil conditioning or disposed of at an approved disposal site such as the Casmalia Dump.

From the purification plant, the gas is sent to the lean oil absorption plant. In this portion of the plant, the gas is contacted with a low molecular weight oil which absorbs the hydrocarbon liquids (butane, propane, and natural gasoline) from the gas. The oil is then heated to remove the hydrocarbon liquids from solution and recycled. The liquids go through a series of distillation steps to separate it into the various components. The butane produced is sold and transported by truck. The propane is sold and transported by rail car or truck, and the natural gasoline is transported by pipeline. The residual natural gas, which is mostly methane is either returned to the oil fields to be used for fuel or sold to the gas company. Process heat is supplied by several natural gas-fired boilers.

Presently the portion of the gas which is used as fuel is 5.7 MMscfd, while 3.5 MMscfd is sold to the gas company. In addition to the sales gas, the plant produces approximately 14,000 gallons of natural gasoline, 20,000 gallons of propane, and 12,000 gallons of butane per day. This amount of byproduct production requires approximately six LPG truck trips per day. Half of these are small trucks (3,000 gallons) serving local markets; the remainder are large trucks (9,000 gallons) serving Bakersfield and Los Angeles.

The Battles Plant currently holds permits issued by the Santa Barbara County Air Pollution Control District to operate up to a rated capacity of 30 MMscfd, and therefore will need no new permits to process OCS gas production.

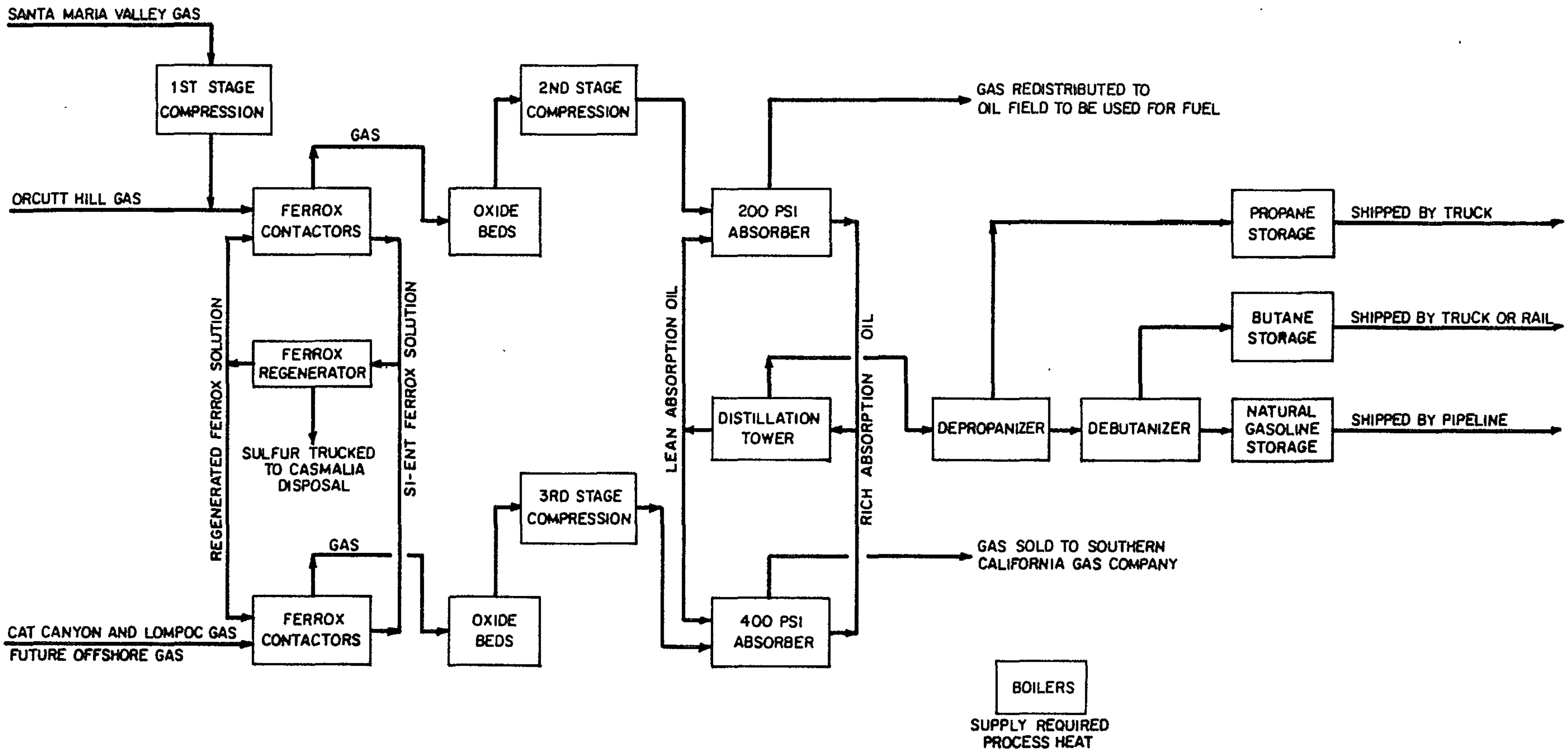
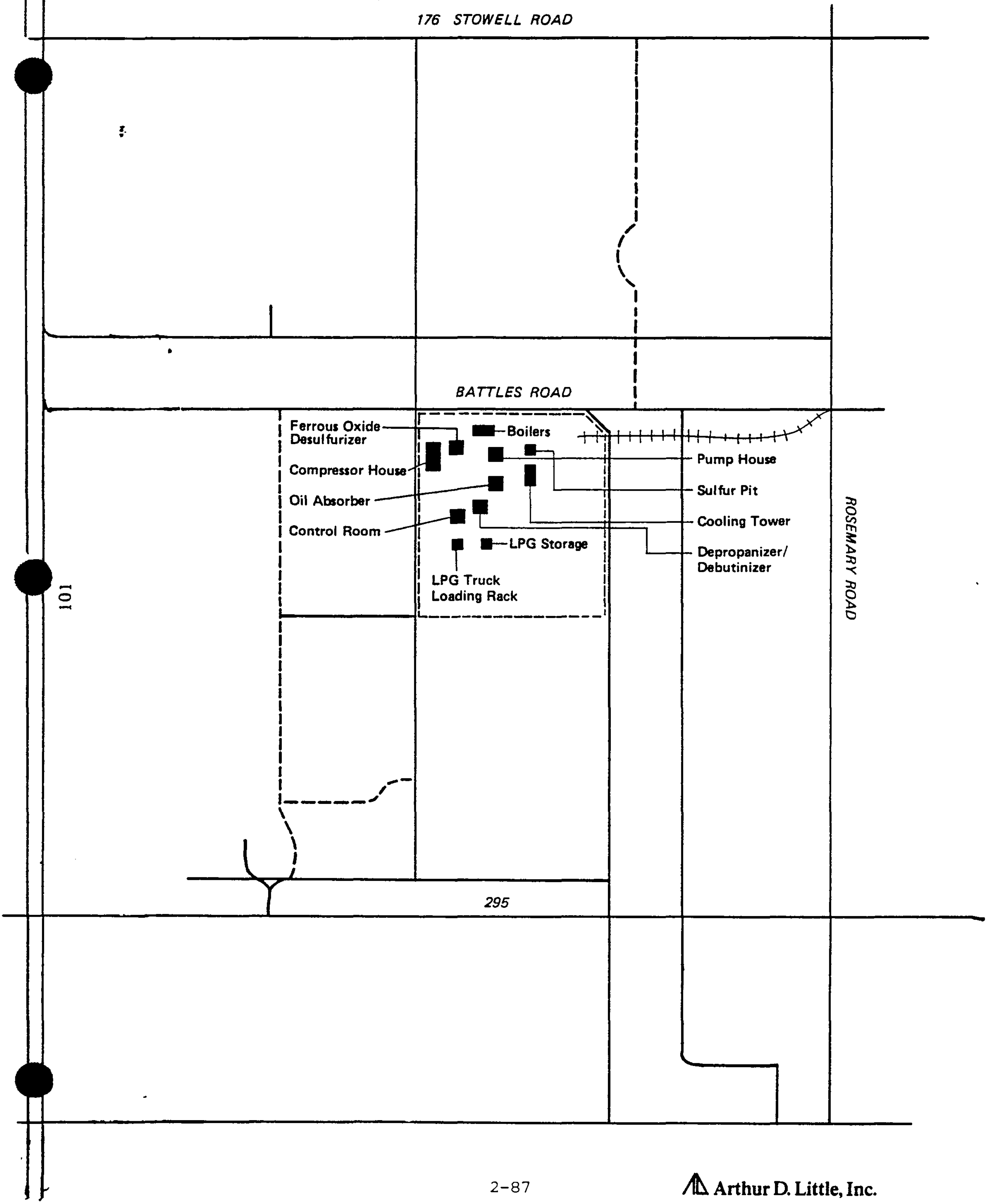


FIGURE 2.7-1 BATTLES PLANT FLOW DIAGRAM.

FIGURE 2.7-2

BATTLES GAS PLANT PLOT PLAN



No modification to the Battles Plant will be required to treat natural gas from OCS-P 0441. The 16-18 MMscfd of available capacity is more than adequate to handle the peak gas rate of 13 MMscfd from offshore. Gas rates from existing fields supplying the Battles Plant are declining by 5-8 percent/year. For example, the 1980 gas rate of 15 MMscfd declined to 12 MMscfd by 1983. By 1987, OCS-P 0441 should be producing 4 MMscfd if there are no major delays. At this time, the onshore gas rate will have declined to 9.7 MMscfd, so the addition of 4 MMscfd will create a plant load of 13.7 MMscfd which is approximately equal to the 1981 load. Throughput at the Battles Gas Plant is expected to peak at 17.2 MMscfd in 1991 and 1992. During these peak years the plant will require eight LPG tank trucks per day to handle the propane and butane production.

Due to the age of the facility and the fact that this project will prolong the life of the facility, a Fire Protection Plan will be required by the County of Santa Barbara Fire Department. No discretionary permit is required by the County of Santa Barbara for the Battles Gas Plant to process OCS-P 0441 gas.

2.8 PROPOSED PROJECT SCHEDULE

The following describes the schedule for the proposed projects. The installation and operating schedule for each component of the Union and Exxon projects is shown in Figure 2.8-1.

2.8.1 Construction Activities

The first platform to be installed will be Union Oil's Platform Irene. Installation and hookup are scheduled to begin in July 1985 and should take about 14 weeks to complete. Drilling should begin in January 1986 with production starting sometime in March.

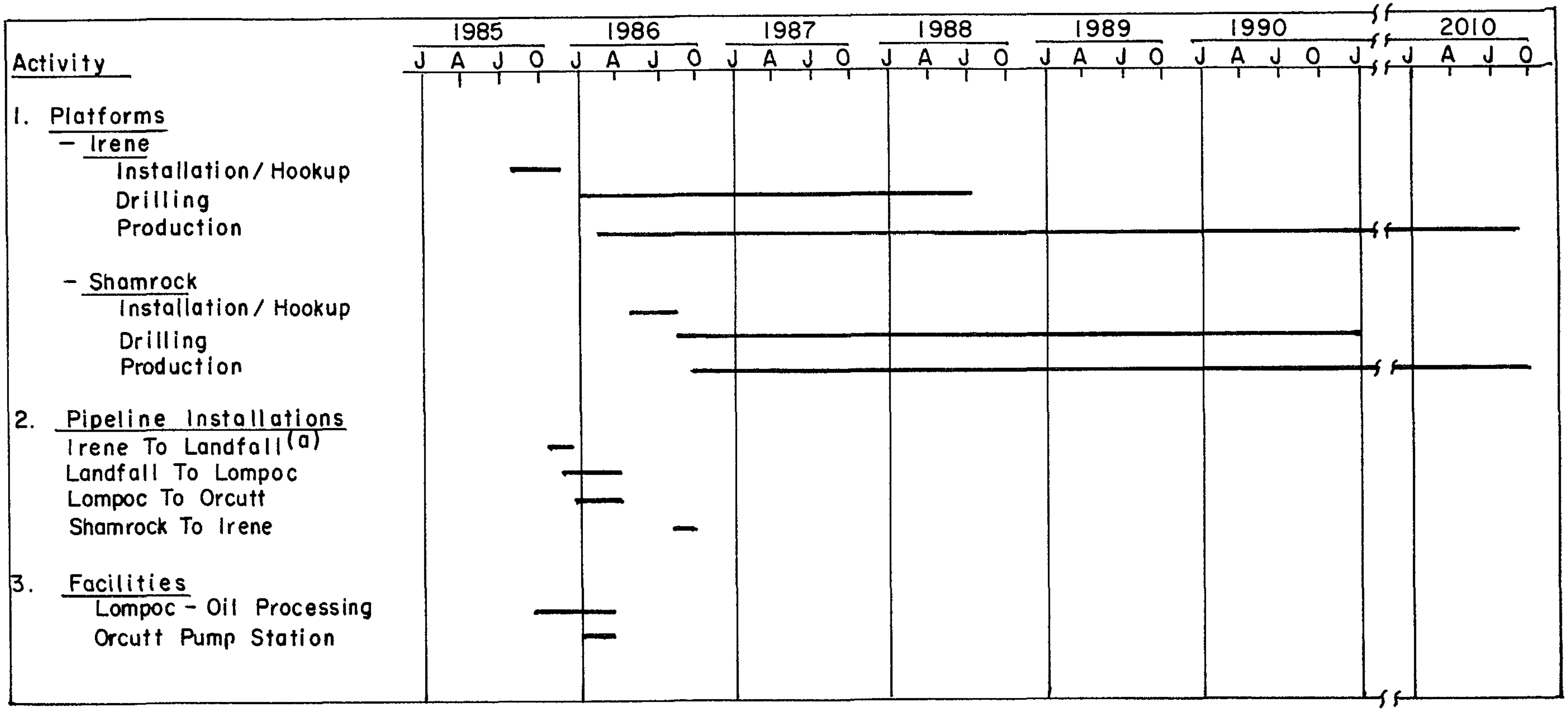
Installation of Exxon's platform will begin around April 1986 and take about 16 weeks to complete. Given this schedule, drilling could begin as soon as August 1986, with production starting one month later.

Union Oil's subsea pipelines will be installed concurrently with the onshore pipeline. The onshore portion of the pipelines will be installed along with the Lompoc Dehydration Facility.

Construction of the Lompoc Dehydration Facility could begin as early as September 1985 and will require about six months to complete. With this schedule, operation could commence in March 1986.

2.8.2 Operation and Abandonment

The operators have stated that the platforms have an estimated production life of about 20 years. Thus, oil and gas production should cease around the year 2010, although additional discoveries and/or secondary recover could extend the project life. When production has ended, wells will be plugged and abandoned in accordance with MMS OCS Pacific Order No. 3. The equipment will be dismantled and sent to shore. The decks will be transported to shore, or



(a) Includes power cable, valve station, and substation.

FIGURE 2.8-1

PRELIMINARY DEVELOPMENT SCHEDULE FOR PROPOSED PROJECTS sent to an offshore site for disposal. Jacket legs and pilings will be cut off at least 6 feet below the mud line and then be cut up into sections for transportation to shore or for disposal at an offshore site.

The subsea pipelines will be used for the life of the platforms, at which time they will either be used to transport oil and/or gas from other platforms or be filled with water and capped. The onshore portion of the pipelines will be used for the life of the Lompoc Dehydration Facility. At that time, the lines either will be used to transport oil and gas as part of some other pipeline system or will be abandoned and sealed.

The lifetime of the Lompoc facility may exceed the expected lifetime of the project platforms because of other production platforms in the Central Santa Maria Basin that may use the facility. The producing life of the Central Santa Maria Basin has been estimated by MMS to be 30 to 35 years, at which time the Lompoc facility would most likely be disassembled and transported to an appropriate disposal site. Union Oil has stated that upon dismantling, the site would be restored to its natural condition.

2.9 AREA STUDY

The concept of an offshore and onshore Area Study is used in this document to provide the public and agency planners with information on the cumulative impacts of potential development in the Central Santa Maria Basin. The onshore Area Study expores some of the options that could exist for processing the anticipated oil and gas production from the Central South Maria Basin. This document analysis to a planning level of detail one of the onshore scenarios. The cumulative impacts of the offshore and onshore Area Study scenario are discussed in the subsequent chapters.

The offshore Area Study analysis provides first, for an evaluation of impacts related to expected additional developments in the Central Santa Maria Basin. Second, it facilitates coordination among all involved permitting and planning agencies. Third, it provides a basis upon which cumulative impacts may be considered. Finally, it provides the public and agency reviewers and decisionmakers with a perspective on the developments which may occur in a given area.

It is important to recognize that many of the more significant onshore impacts will occur early in the development of the Central Santa Maria Basin. This case is especially true since consolidation of facilities is being encouraged by several of the responsible permitting agencies. All major offshore pipelines and most of the related facilities will be installed essentially at the time the first platform is installed. Subsequent platforms will be tied to the existing pipelines offshore. A number of additional platforms can be accommodated by the initial proposed pipeline. Furthermore, Union has agreed to make land available for expanded consolidated or colocated facilities to process future Central Santa Maria Basin oil and gas production.

Other than the facilities covered by Union Oil's and Exxon's proposed projects, the options for oil and gas movement and production identified and evaluated in this Area Study do not represent any specific proposed project and are therefore not being considered for permitting in this EIR/EIS. These options only represent possible scenarios to help planners and the public understand the options that may be available for future development projects. If and when these future projects are actually proposed, they will be subject to a separate NEPA/CEQA review.

2.9.1 Santa Maria Basin Developments

For planning purposes the large offshore area known as the Santa Maria Basin has been divided into three regions.

The Southern Santa Maria Basin Area Study includes 25 leases and up to eight platforms. The evaluation of this offshore Area Study was done as part of the Point Arguello Field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans EIR/EIS. In this analysis, all the production from the three proposed and five hypothetical platforms was comingled at Platform Hermosa and then shipped via pipelines to the proposed Gaviota Oil and Gas Processing Facility. The Final EIS/EIR was completed in November, 1984.

The Central Santa Maria Basin includes 31 leases which may require up to six platforms to develop. In this analysis all the production from the two proposed and four hypothetical platforms is assumed to be comingled at Platform Irene and then shipped via pipelines to processing facilities on Union fee Property near Lompoc. It is this offshore Area Study that has been evaluated as part of this document. The offshore Area Study is discussed in detail in Section 2.9-2.

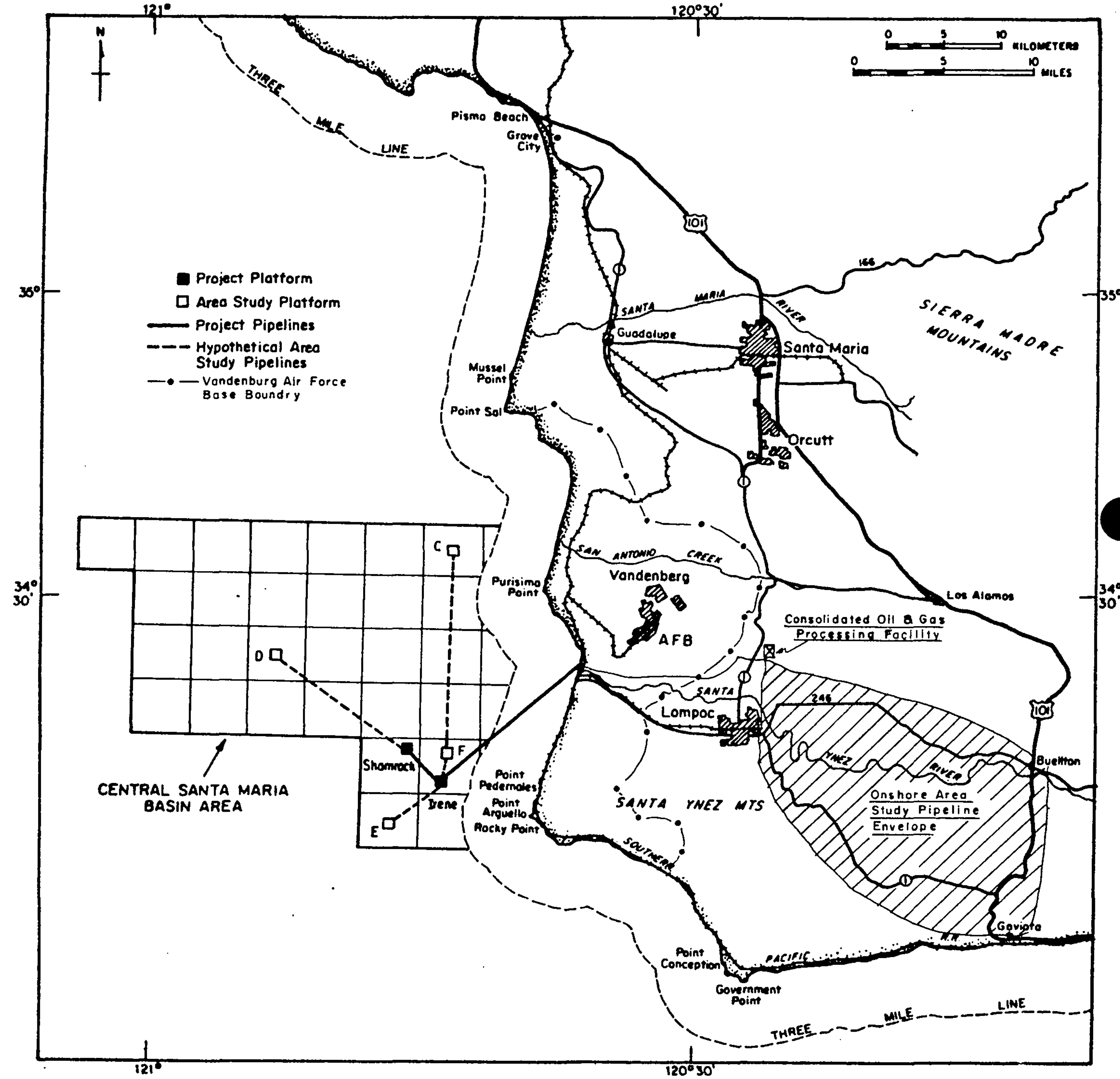
The Northern Santa Maria Basin includes leases, and MMS has estimated that up to seven platforms may be needed in order to develop the resources. In this document, the Northern Santa Maria Basin is only covered as part of the cumulative analysis. In the cumulative analysis, only four platforms are assumed to be required in order to develop the reserves of the Northern Santa Maria Basin, since the MMS had not finalized the specifics for the Northern Santa Maria Basin Area Study prior to this analysis. The impacts associated with the development of the Northern Santa Maria Basin will be evaluated with the Development and Production Plan submitted by Cities Service in an EIS/EIR to be developed by the MMS, San Luis Obispo County, and the State Lands Commission. The EIS/EIR for this Area Study will probably commence in spring 1985.

2.9.2 Offshore Area Study

The Area Study includes the four leases proposed to be developed by the Uion Oil and Exxon Projects (OCS-P 0440, -P 0441, -P 0437, and -P 0438) and 27 other leases as shown in Figure 2.9-1. The MMS has estimated that, in order to develop the oil and gas reserves in the Central Santa Maria Basin, up to six platforms could be required. The MMS has determined that the potential impacts associated with developing this frontier area are significant enough to warrant the preparation of an EIS. The location of these six platforms is shown in Figure 2.10-1. These platforms include the two proposed platforms analyzed to a permit level of detail in this document, plus four additional

FIGURE 2.9-1

CENTRAL SANTA MARIA BASIN AREA STUDY REGION



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hypothetical platforms. The location of the four hypothetical platforms is based on public OCS Order No. 4 determinations (OCS-P 0427) and on Union's DPP (OCS-P 0441). The two remaining platforms on OCS-P 0445 and OCS-P 0510 are just hypothetical sitings. Area Study platform locations are assumed to be the centers of the leases indicated, except for the second platform in Union's OCS-P 0441. It is possible that this platform may be required in order to develop the Point Pedernales field to its maximum potential. It is not possible to determine at this time if the additional platform is needed. This determination can only occur after the drilling and production results can be evaluated. This platform, and any other Area Study platforms will be subject to a separate NEPA review if and when they are actually proposed. These subsequent reports will also consider new information not available at the time of this Area Study EIS/EIR which may affect the significance of the proposed project impacts. General data on all impacts to air quality, marine biology, geology, etc. from the four hypothetical platforms will be updated at that time.

Theoretically, any of these platforms could be placed on any of the remaining leases within the Area Study boundary. However, the number of platforms per lease and general platform descriptions depend on the characteristics of the reservoirs and are assumed, for the purposes of this analysis, to remain the same regardless of actual future sitings. MMS has estimated that the total primary recoverable reserves of the Central Santa Maria Basin could be approximately 135 million barrels of oil and 135 billion standard cubic feet of gas. The MMS has estimated that one new platform may be brought on each year starting in 1987, with the final platform being brought online in 1990. Table 2.9-1 provides the development and production parameters that have been assumed for the Central Santa Maria Basin.

Exactly how these platforms will move their oil and gas to shore will depend on where they decide to process their production. However, it is assumed for this analysis that all of the new hypothetical platforms would use subsea pipelines to Union's Platform Irene in order to get their production to shore. Any one of several platforms, including Exxon's Platform Shamrock, Chevron's Platform Hidalgo or Hermosa, or one of the future Northern Santa Maria Basin Area Study platforms could be tied into in order to get their production to shore. The option of whether to tie into platforms in the Central, Southern, or Northern Santa Maria Basin will be based on the availability of treating/processing facilities either at Lompoc, Gaviota, or a future site in San Luis Obispo County. Further discussion of the possible onshore processing options is provided below under the Onshore Area Study.

2.9.2.0 Platform Design

Water depths within the Area Study leases range from 200 to 1,800 feet. Conventional, fixed-platforms similar to Platform Irene and Exxon's Platform Shamrock have been installed in water depths of 1,000 feet. Beyond that depth, development of oil and gas resources may involve new technology for deep water platforms both in design and installation. A discussion of both conventional and deep-water-type platforms is provided below. For the Area Study analysis all the platforms were assumed to be conventional platforms.

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Table 2.9-1

Development and Production Activity Parameters for Central Santa Maria Basin Study Area

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000
Platform Installations	1	1	1	1	1	1						
Development Wells												
Irene (43)		11	12	12	8	--	--	--	--	--		
Shamrock (45)		5	10	10	10	10	--	--	--	--		
Future Platforms (180)		--	5	15	25	35	40	30	20	10		
Total for area (268)		16	27	37	43	45	40	30	20	10		
Oil Production, MB/D												
Irene		3	5	12	20	20	17	15	12	10	9	4
Shamrock		1	3	10	20	20	17	15	12	10	9	4
Future Platforms		--	1	4	10	16	27	37	32	26	21	7
Total for area		4	9	26	50	56	61	67	56	46	39	15
Gas Production, MMCF/D												
Irene		1	3	3	6	8	11	12	13	13	12	7
Shamrock[1]		--	--	--	--	1	1	1	1	1	1	1
Future Platforms		--	--	3	10	20	25	30	30	30	25	20
Total for area		1	3	6	16	29	37	43	44	44	38	28

[1] Asumes Exxon reinjects gas until the year 2000.

Sources: Exxon USA
Union Oil Point Perdinales DPP.
Arthur D. Little estimates.

CONVENTIONAL PLATFORMS

Steel-template-jacket platforms are anchored to the ocean floor by pilings. These platforms are fabricated onshore and then towed to the installation site on a barge. The platforms are launched over the end of the barge and floated in the water. By means of controlled flooding, the jacket is rotated to a vertical position and then lowered to the ocean floor. These platforms, along with the concrete gravity-base platforms used in the North Sea, are regarded as fixed structures.

TENSION-LEG PLATFORMS

One advanced design platform for deep water use is the tension-leg platform (TLP). This platform has two main structural components. The first is a floating hull which is very similar to a semi-submersible drilling rig. The second is an array of highly tensioned vertical tethers that are located at the four corners of the hull. These tethers, made of steel cables or tubes, pull the floating hull down. This design allows the platform some degree of lateral motion, but prevents the vertical motion that is associated with free floating vessels, such as drilling ships. The cost of this platform design is relatively insensitive to increased water depth since only the tethers must be lengthened. Also, these platforms can be untethered and moved to other sites and reused. The installation of a TLP requires that a drilling template and the tether foundations be installed prior to the arrival of the hull.

GUYED TOWER PLATFORMS

This structure, like the TLP, is a compliant structure (i.e., free to move in the lateral direction), and is designed for deep water use. The jacket or tower is a steel structure that is held upright and to the sea floor by a radial array of anchor cables. To each cable are attached weights that keep the cables taut. Under normal weather conditions these weights rest on the ocean floor. However, when rough weather conditions are encountered, the weights lift off the ocean floor and allow the tower to tilt. This type of structure allows steel jacket platforms to be placed in depths greater than 1,000 feet and requires that piles be driven into the ocean floor as anchors for the guide wires.

2.9.2.1 Oil and Gas Processing

Depending on the location of the onshore processing facility, the platforms may require some level of oil and gas processing on the platform. If the Area Study platforms wish to use Chevron's proposed oil and gas processing facility at Gaviota, then they will have to have oil and gas processing capabilities. In order for the oil to be processed at Gaviota it cannot contain more than 20 percent water. This requirement means that the platforms need to have direct fired heaters for heating the oil in order to break the oil/water emulsion. The heaters would be fired by use of some of the natural gas production. If this gas is sour, then it must be treated on the platform prior to burning.

In most cases when there are heating requirements on the platforms, the heating is provided by waste heat recovery for gas fired turbine generators that provide the electrical requirements of the platform. The hypothetical platform on OCS-P 0510, which was issued during Lease Sale No. 73, would have to use power from the local utility grid and not gas-fired turbine generators. This stipulation was attached to Lease Sale No. 73 for platforms within 10 miles of shore.

For the Area Study analysis all the platforms except the ones in OCS-P 0495 and OCS-P 0427 were assumed to use power cables. The other two were assumed to use gas fired turbines due to the long offshore pipelines required to transport their oil and the possible requirement for heating of the oil.

2.9.2.2 Offshore Pipelines

For the analysis of the offshore Area Study, it was assumed that the subsea pipelines connecting the six Area Study platforms would be as shown in Figure 2.9-2. In this scenario, all platform oil and gas production is commingled at either Platform Irene or Platform Shamrock and then transported through a common pipeline system to another platform or an onshore processing facility. This network of pipelines would include both gas and oil lines as well as some subsea power cables.

Even though the analysis of the offshore Area Study assumes that all the Central Santa Maria Basin oil and gas production is commingled and processed at one location, some of these hypothetical platforms could opt for independent processing locations. For example, the hypothetical platform on OCS-P 0510, which is owned by Gulf, might opt to process its oil south at Gaviota. The hypothetical platform on OCS-P 0427, which would be operated by Pennzoil might send its production north to a tie-in with Cities Services proposed Platform Julius in the Northern Basin Area Study. In any event, future Area Study platforms are assumed to use existing or proposed consolidated pipelines and facilities for the transport of their production to shore.

2.9.3 Onshore Area Study

The oil and gas that will be produced from the Central Santa Maria Basin needs to be treated and processed onshore. There are currently three proposed processing sites that could be considered for handling this production.

1. Union Oil's proposed Lompoc (Oil) Dehydration Facility.

2. Chevron's Oil and Gas Processing Facility proposed for Gaviota.

3. Cities Service oil processing facility proposed for San Luis Obispo County.

Only the impacts associated with the Lompoc option are discussed to a planning level of detail in this document. The other two options are only generally discussed further on in this section. Since the Gaviota option was already analyzed as part of the Point Arguello EIS/EIR, and no information is yet available for the Cities Service site.

2.9.3.0 Lompoc Option

This option assumes that all gas and oil production from the Central Santa Maria Basin is processed at a consolidated oil and gas processing facility located near Lompoc. In this scenario, the oil and gas from the Area Study platforms would connect with Platform Irene via subsea pipelines as shown in Figure 2.9-1. At Platform Irene, the gas and oil would be commingled and then sent onto the consolidated facility via the pipelines currently proposed by Union Oil. These pipelines are capable of handling a throughput of 72,000 barrels per day of oil and 80 MMscfd of gas without any modifications to the pipelines. Once the oil is processed, it would be shipped via a new industry dry oil pipeline from the Lompoc facility to a tie-in with either the Southern California Pipeline Systems (SCPS) near Buellton or to the proposed Texaco Marine Terminal at Gaviota. This new pipeline would have to be sized to handle up to 50,000 barrels per day of dry oil. A tie-in to SCPS would allow the oil to be moved to the Los Angeles refineries or to connect with the proposed All American pipeline at Emidio. The All American pipeline would allow the oil to move to Texas. No specific pipeline routes for the onshore Area Study have been analyzed in this document. However, Exxon has recently submitted an Application to the County for a dry oil pipeline from Lompoc to the Gaviota Marine Terminal. The Area Study analysis considers the generalized impacts of pipeline corridors that could be located in the triangular-shaped area of land shown in Figure 2.9-1. This area encompasses the potential direct routes to the Buellton and Gaviota areas.

With this option, all the platforms in the Area Study could be designed like Platforms Irene and Shamrock. Power requirements could be supplied by electric cables, thus eliminating the need for gas-fired turbines on the platforms. PG&E has indicated that their current system is capable of supplying the 8-10 Mw of power that each platform would require. This option would require installing new subsea power cables.

OIL DEHYDRATION FACILITY

The oil dehydration facility that is currently proposed by Union Oil could be expanded to handle up to 100,000 barrels per day of oil with only minor modifications. These modifications would include:

- Five additional heater treaters.
- One additional freewater knockout (FWKO) vessel.

This additional equipment would not require any additional land over what is currently proposed. These modifications would increase the natural gas firing rate from 475 Mscfd to approximately 1.9 MMscfd. This increase is due primarily to the fuel requirements of the heater treaters. The amount of produced water being handled by the facility and shipped to Platform Irene for disposal would increase to about 108,000 barrels per day. For this analysis, the composition is assumed to be as given in Table 2.4-3. These modifications would require approximately one month to install with a work force of 15-20 workers.

These modifications to the Lompoc Facility are not currently being proposed by Union Oil. When and if these modifications are proposed they will be subject to a separate CEQA review.

GAS PROCESS FACILITY

The site that is currently proposed by Union Oil for the oil dehydration facility is approximately 40 acres in size. However, Union is proposing only to develop 15 acres of this for the oil dehydration facility. The remainder of the acreage could be used for a co-located gas processing facility to process the Central Santa Maria Basin gas production. This gas facility, which would need to have an estimated capacity of 80 MMscfd, would require an additional 15 acres. This hypothetical gas facility could be located adjacent to the oil dehydration facility on the east end of Site 4. Nobody is currently proposing to construct this gas facility. When and if a new colocated gas facility is proposed it will be subject to a separate CEQA review.

The primary function of the gas processing facility would be to remove the hydrogen sulfide, NGLs and LPGs from the gas so that it is acceptable for injection into a gas pipeline network. The hydrogen sulfide removed from the gas would be converted to elemental sulfur and then sold. All the LPGs and NGLs would be treated, sent to interim storage tanks, and then trucked to their final destination.

A general block diagram of the gas processing facility is shown in Figure 2.9-2 and includes:

- NGLs condensate knockout vessels for removing condensate from the gas stream.
- An amine-based scrubbing system for removing the H_2 and CO_2 from the gas.
- A glycol dehydration system.
- A low-temperature separation system for removing the NGLs and LPGs from the gas stream.
- A sulfur recovery plant for converting the H_2S to sulfur.
- A tail-gas incinerator and caustic scrubber for removing the final portion of sulfur that is not removed by the sulfur plant.
- A separation unit and treatment unit for NCLs and LPGs.

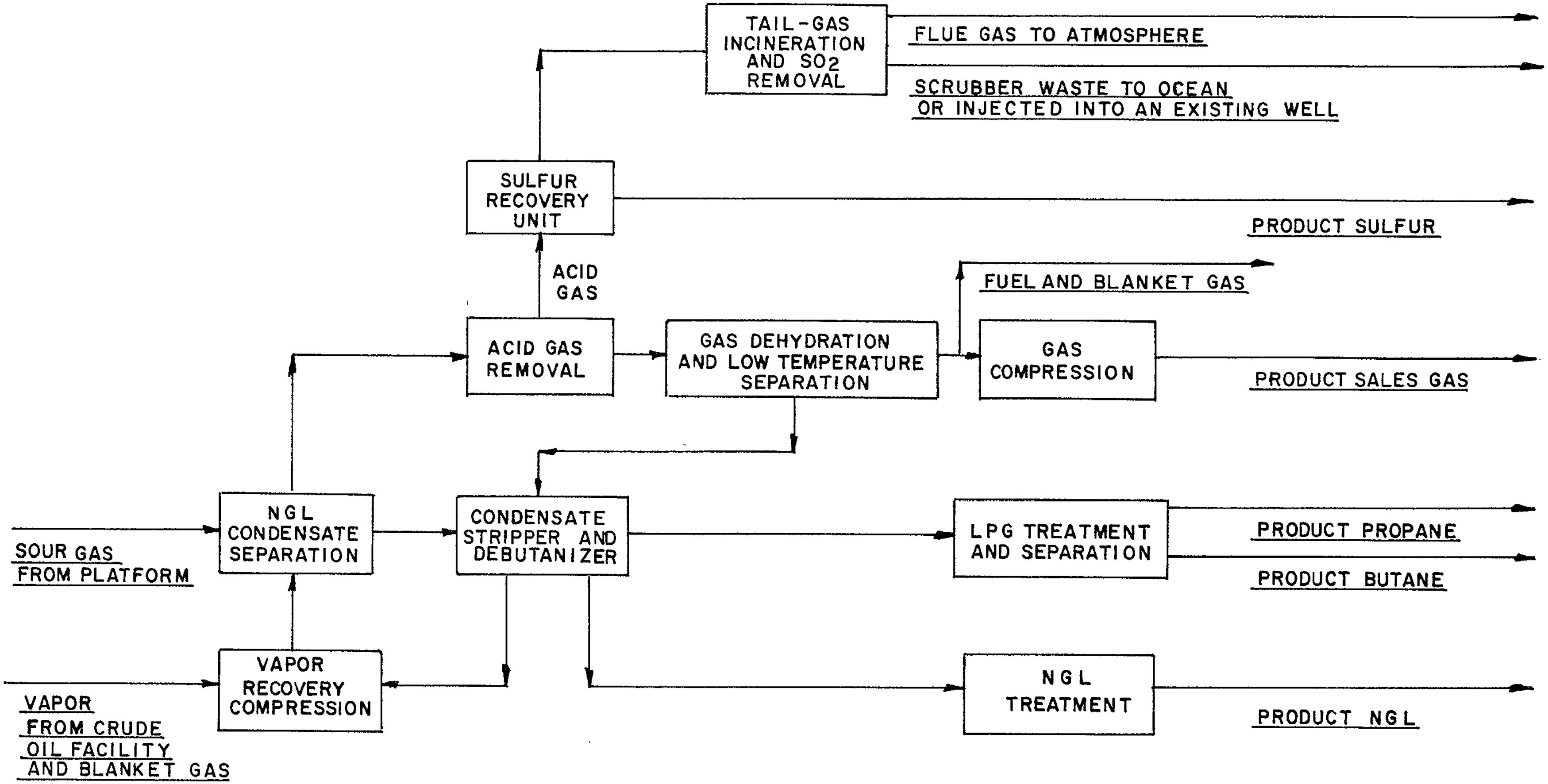


FIGURE 2.9-2

SIMPLIFIED BLOCK FLOW DIAGRAM FOR GAS PROCESSING

- Storage tanks and truck loading facilities for the NGLs and LPGs as well as a storage pit for the produced sulfur.

All tanks in the processing facility which may contain hydrocarbon or H_2S vapors would be equipped with a vapor recovery system which would substantially reduce the hydrocarbon vapor emissions from the facility. This vapor recovery system would also provide a constant vapor blanket over the vessels and thus prevent air from entering the process.

Upon entering the facility from the pipeline, the gas stream would pass through an inlet separator or "slug catcher" which removes any condensed hydrocarbons. These collected hydrocarbons would then be sent to the condensate stripper. Gas from the slug catcher would be sent to the acid-gas removal unit for sweetening.

In the acid-gas removal system, both the H_2 and CO_2 would be removed by contacting the gas in a tower with an amine solution which absorbs the CO_2 and H_2S from the gas. The amine would be regenerated and recycled, thereby liberating acid gas which would be processed further in the sulfur recovery facilities. The H_2S content of the sweet gas would be reduced to about 3-4 ppm as a result of this sweetening process.

The acid gas would be sent to a sulfur recovery unit where the H_2S would be converted to elemental sulfur. These recovery units typically remove approximately 95 percent of the inlet H_2S as sulfur. The remaining acid gas is called tail gas. It is anticipated that approximately 25 tons of sulfur would be generated daily at peak production. The recovered sulfur would be stored as liquid in a sump and then, after degassing, sent to the truck terminal for transport to area markets.

Once the gas has been sweetened, it would be sent to a low-temperature separation unit where it would be dried by direct contact with ethylene glycol, and cooled by a propane refrigeration system which would cause the heavier hydrocarbons (propane and heavier) contained in the gas to condense. The ethylene glycol would be regenerated and reused. The liquid hydrocarbons would be sent to fractionation towers where they would be separated into propane, butanes, and the heavier natural gas liquids (NGLs). The separated hydrocarbon liquids would be delivered by tank trucks to vendors.

The natural gas from the low-temperature separation unit would be compressed into the gas transmission line. A portion of this sweet gas would be used for fuel for steam generation.

The major consumers of electrical energy in the gas processing system would include:

- Propane refrigeration compressors.
- Vapor recovery and gas booster compressors.
- Fans for air coolers.

- Air blowers for the sulfur plants and waste incinerators.
- Various pumps.

The major consumers of steam in the gas-processing system include:

- Reboilers for the DEA and glycol regenerators, and
- Reboilers for the fractionation towers and condensate stripper.

Some steam would be produced in the sulfur plants and incinerators. Fuel gas is required for operation of the sulfur plant and for the incinerators.

The emissions from the gas-processing systems include:

- Sulfur plant tail-gas treating unit.
- Emissions from the glycol regenerator.
- Fugitive emissions from leaking valve stems, flanges, packing glands, mechanical seals, relief valves, etc.
- Stack gas emissions from the gas-fired heaters in the sulfur plant.

The liquid effluents from the gas-processing system would include sour water, sulfur plant tail-gas scrubber discharges, and spent caustic from the NGL and LPG treating system.

Approximate fresh water requirements for the facility would be 50,000 gallons/day with the majority of this being for SO_2 scrubber liquor makeup, steam condensate losses and potable usage. It is assumed that the SO_2 scrubber liquid (approximately 30 gpm) would be mixed with the produced waste and shipped via pipeline to Platform Irene for disposal.

This gas processing facility would require about six months to build with an average work force of 140 men. The types of laborers required would be the same as that for the proposed oil dehydration facility.

2.9.3.1 Gaviota Option

This option assumes that all the gas and oil production from the Area Study platforms is processed at Chevron's proposed Gaviota oil and gas processing facility. The Gaviota facility will include oil dehydration, gas sweetening, compression/pumping equipment, as well as liquefied petroleum gas (LPG) and natural gas liquids (NGL) recovery, treatment, and storage. A sulfur recovery system is also included to recover the sulfur removed from the gas sweetening.

The processing facility is to be installed in two phases. Phase I should be operational in the first quarter of 1986, and will be capable of handling 60 MMscfd of gas and 150,000 barrels per day of dry oil. Phase II will increase the capacity of the facility to its maximum capacity of 120 MMscfd of gas and 200,000 barrels per day of dry oil. For a further discussion of the Gaviota facility, the reader is referred to the "Point Arguello Field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans EIR/EIS."

Table 2.9-1 indicates that the Central Santa Maria Basin gas production is expected to peak in 1993 and 1994 at approximately 44 MMscfd. Chevron has estimated that in 1993 and 1994 the Gaviota facility will be processing 101 MMscfd and 90 MMscfd of gas respectively from the Southern Santa Maria Basin. Therefore, the Gaviota facility as currently designed could not handle all of the Central Santa Maria Basin gas production. Since Chevron has agreed to make Gaviota a consolidated facility, they will be required to accept gas from other offshore producers. This means that, in order to accommodate the gas production of the Central Santa Maria Basin at Gaviota, either production would have to be phased in or the facility would have to be expanded.

The oil production from the Central Santa Maria Basin is expected to peak in 1992 at 67,000 barrels per day. Again, this total production could not be accommodated at the Gaviota facility unless production was phased in or the facility expanded.

The environmental impacts associated with this processing option are covered in the Point Arguello Field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans EIR/EIS. The Point Arguello document assesses the environmental impacts associated with operating the Gaviota facility at 200,000 barrels per day of dry oil and 120 MMscfd of gas. Therefore, the analysis in the Point Arguello EIR/EIS covers the option of phased production, and not further expansion of the Gaviota facility.

The environmental impacts of an industry pipeline from a Central Santa Maria Basin platform to Chevron's Platform Hermosa in the Southern Santa Maria Basin are evaluated in this document as an alternative offshore pipeline route for Exxon's Platform Shamrock (see Chapter 3). Use of this pipeline for all the Central Santa Maria Basin production would require that the production be commingled at Platform Shamrock.

2.9.3.2 San Luis Obispo County Option

Cities Services is currently developing applications to the County of San Luis Obispo to construct and operate a 40,000 barrels per day oil dehydration facility to handle production from their proposed Platform Julius on OCS-P 0409. There are currently no plans for any gas processing facility.

This option would require that industry pipelines be built from a platform in the Central Santa Maria Basin to the proposed Platform Julius. The most reasonable candidate would be the hypothetical platform on OCS-P 0427 since it is the northern most platform. In order to accommodate the gas production of the Central Santa Maria Basin, a new gas processing facility would have to be constructed.

III. PROJECT ALTERNATIVES

3.0 INTRODUCTION

This section describes the Project Alternatives as required by the NEPA (Section 1502.14) and CEQA [Section 15126(D)] for the Union Oil and Exxon projects. Alternatives to the project and project components which are capable of eliminating significant environmental impacts or reducing them to a level of insignificance are identified and described.

Alternatives for the Area Study are not considered since it is designed to be a general study of cumulative impacts to the area and no direct mitigation or permit approvals are involved.

The environmental impacts associated with the alternatives discussed below are presented in Chapter 5 of this document. These alternatives have been evaluated to the same level of detail as the proposed project components.

3.1 NO-PROJECT ALTERNATIVE

The "no-project" alternative for this study assumes the continuation of presently permitted activities by the operators in the absence of any development by Union or Exxon in the Central Santa Maria Basin. Present activities onshore and in the Santa Maria Basin would continue but there is no assumed expansion as proposed in the various present development applications. This alternative provides a consistent basis against which to measure the environmental impacts of the other alternative development scenarios.

3.2 UNION OIL ONSHORE AND OFFSHORE PIPELINE AND POWER CABLE ALTERNATIVE ROUTES

3.2.1 Pipeline Routes

3.2.1.1 Alternative Route to Site 4

Union Oil has proposed to transport its wet oil and gas production from Platform Irene to the proposed Lompoc Dehydration Facility (Site 4). The Alternative Pipeline route to Site 4 is shown in Figure 3.2-1 as a solid line.

This route comes ashore with the power cable south of the Santa Ynez River at a landfall near Surf. The pipeline route runs south of the Santa Ynez River and parallels Route 246. The actual corridor lies between 246 and the Southern Pacific Railroad line. The route turns east near Union Sugar Avenue and follows Central Avenue, passing through mainly agricultural land. At Floradale Avenue the route proceeds north, crossing the Santa Ynez River. Once across the river, the pipeline route crosses the U.S. Disciplinary Barracks Military Reservation, and proceeds in an easterly direction, south of

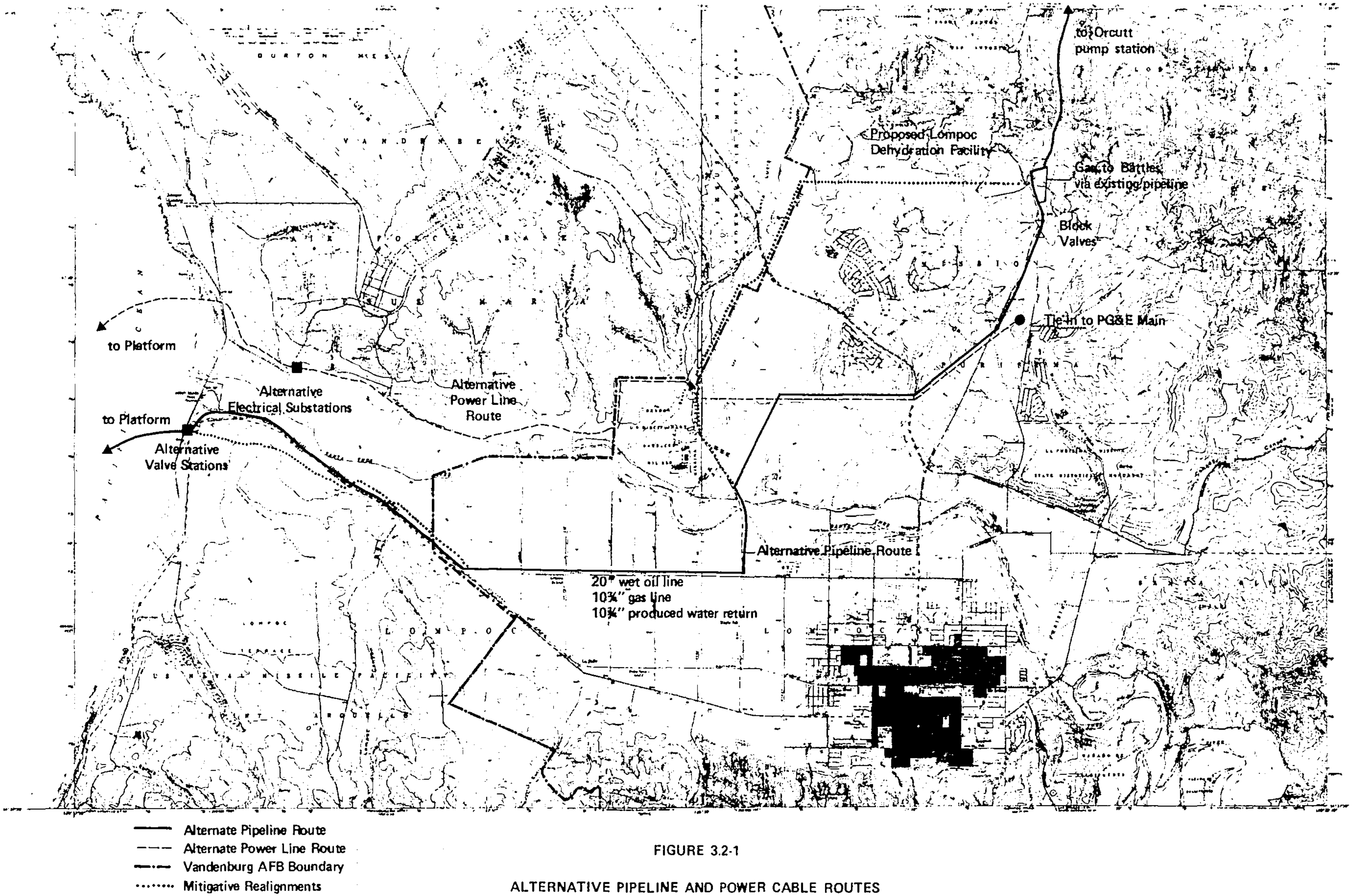


FIGURE 3.2-1

ALTERNATIVE PIPELINE AND POWER CABLE ROUTES
TO PROPOSED LOMPOC DEHYDRATION FACILITY

Vandenberg Village. At Lompoc-Casmalia Road, the route runs in a northeasterly direction until it intersects Highway 1. From here the pipeline follows Highway 1 to Site 4.

3.2.1.2 Proposed Route to Site 8

Union Oil has identified Lompoc Site 8 as an alternative location for the oil dehydration facility. This site is described further in Section 3.3. Two Alternative Pipeline routes lead to this site. The first route follows the same pathway as the proposed (northern) route to Site 4 to the Union fee Property line west of Vandenberg Village. From there it proceeds easterly, south of Vandenberg Village and then northeasterly crossing Highway 1 to Site 8. This route is shown as a solid line on Figure 3.2-2.

3.2.1.3 Alternative Route to Site 8

The alternative route to Site 8 is nearly identical to the alternative (southern) route to Site 4 except for a short segment beginning at Highway 1 and proceeding northeasterly to Site 8. This latter segment follows the same pathway as the first alternative route to Site 8. This route is shown by a dotted line on Figure 3.2-2.

3.2.1.4 Mitigated Pipeline Routes

In surveying the proposed and alternative pipeline routes certain mitigation realignments were identified that could reduce some of the impacts associated with the routes. These mitigative realignments are shown in Figure 3.2-1 as dotted lines. It should be noted here that these realignments are not alternatives per se, but have been evaluated in enough detail to determine that they should reduce the overall environmental impacts of the various pipeline routes. These mitigative realignments are discussed further in Chapter 5 of this document.

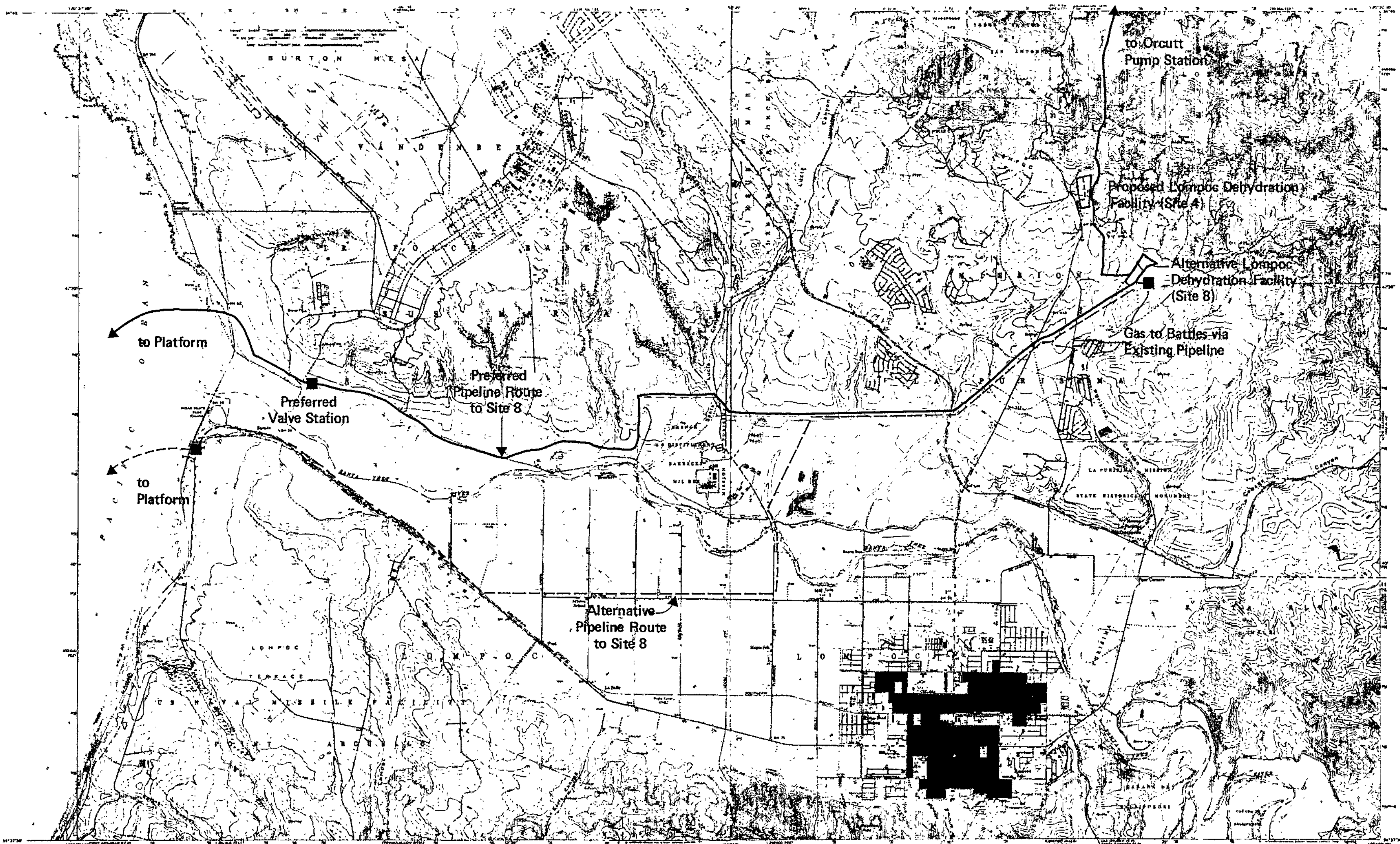
The proposed mitigative realignments can be separated into two main sections which are each discussed below.

<u>Landfall to Floradale Avenue</u>

With this realignment the pipeline would have a landfall at Surf with the power cable. The substation and valve station would be combined at one location. From Surf the pipeline would cross Route 246 and proceed up over a hill on the South side of Route 246, avoiding completely the Santa Ynez River Estuary. The pipeline would then cross Route 246 and the Southern Pacific Railroad tracks about two miles in from the landfall. The pipeline would then parallel the railroad tracks for about 1 1/2 miles where it would rejoin the alternative route.

<u>San Lucia Canyon to Site 4</u>

This realignment would have the pipeline route follow Floradale Avenue through the Federal Correctional Institute until it intersects the Union Fee Property line. At this point the pipeline route would follow an existing



——— Preferred Pipeline Route
– – – – Preferred Power Cable Route

FIGURE 3.2-2

ALTERNATIVE LOMPOC DEHYDRATION FACILITY SITE
AND ASSOCIATED PIPELINE ROUTES

firebreak on the Vandenberg AFB for approximately 2.5 miles where it would rejoin the proposed pipeline route to Site 4.

3.2.2 Power Cable Route

The alternative route for the power cable would follow the offshore pipeline to the proposed landfall north of the Santa Ynez River. The power cable would then parallel the proposed onshore pipeline route to an alternative substation located at the Proposed Pipeline valve station. The route continues along the Primary Pipeline route to the intersection with the Union fee Property line. From there it follows the preferred route to Site 8 to an intersection with the new PG&E feeder line east of Highway 1. This route is shown by the dotted line in Figure 3.2-1.

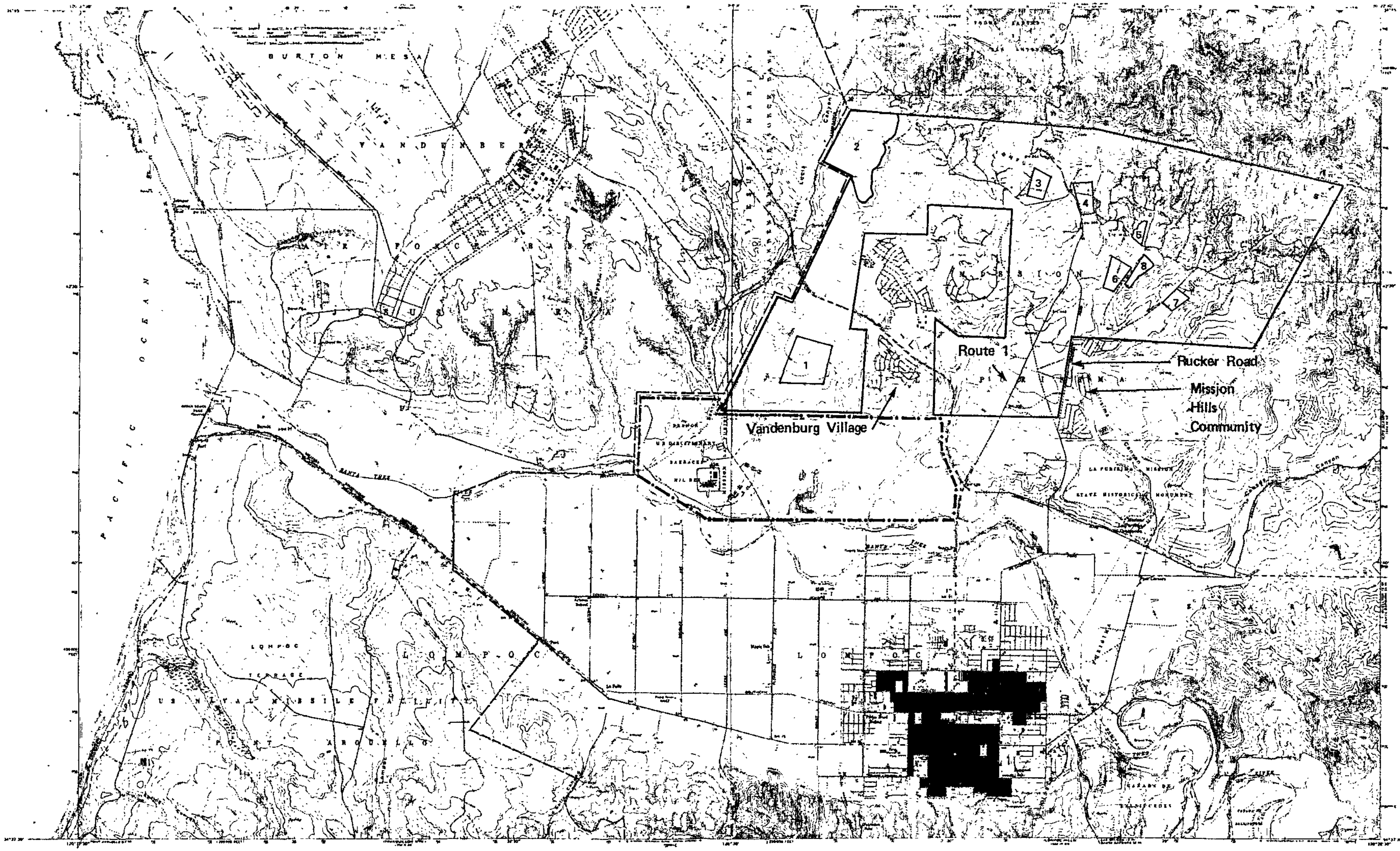
3.3 UNION OIL ONSHORE OIL DEHYDRATION ALTERNATIVE SITE LOCATION

Union Oil proposed to process its oil production at a new oil dehydration facility located north of Lompoc. As stated in the Project Description, Site 4 is the preferred site. Seven alternative sites on the Union Oil Fee Property were initially screened as potential alternatives to the proposed Site 4. The location of these sites is shown in Figure 3.3-1. These sites were evaluated with the goal of minimizing known impacts and conflicts that exist for Site 4. The main points of consideration were:

- Allow for a large buffer zone with public areas and, particularly, residences, to minimize potential noise, odor, and safety impacts to the public.
- Avoid prime agricultural land.
- Avoid potential conflicts with archaeological sites, flora, and fauna.
- Minimize visibility to the public.
- Minimize grading.
- Use previously disturbed areas
- Have water and power readily available.
- Allow easy access to public roads.
- Provide room for expansion by Union or other firms.
- Sited along a potential or existing pipeline corridor.

The major criteria used in selecting an appropriate alternative site was (1) to maintain a large buffer zone between the site and residential areas, and (2) to minimize visibility to the public. The initial screening phase for the alternative sites indicated that none of the sites had significant environmental or safety advantages over Site 4. However, one of the seven alternative sites was chosen for a detailed evaluation equivalent to that for the proposed Site 4. Detailed analysis was conducted since Site 8 was originally proposed by Union Oil. In addition an alternative site was needed in case during the field and analytical work some environmental and/or safety constraint on Site 4 was found.

Based on preliminary information collected for this project and provided by Union Oil, Sites 8 and 6 appeared to be the best candidates as alternative sites, however, Site 8 was chosen for detailed analysis since development



---- Vandenburg AFB Property Boundary
-·-·- Federal Prison Property Boundary
—— Union Fee Property Boundary

FIGURE 3.3-1

ALTERNATIVE LOMPOC DEHYDRATION FACILITY SITES there would result in less agricultural crop land loss due to oil dehydration facility installation. The remaining six candidate sites were eliminated from further detailed study as alternatives. The reasons for dropping these sites are discussed in Section 3.5 on alternatives not considered for further analysis. Table 3.3-1 provides some of the general information that was used to screen the sites.

Site 8 was chosen as the best possible alternative to Site 4 for the following reasons:

- It is a previously disturbed area.
- It has low potential of archaeology, flora, and fauna conflicts.
- It has minimal grading requirements.
- It has room for facility expansion for consolidation.
- It provides access to existing Lompoc-to-Orcutt pipeline right-of-way.
- It has access to existing public road.
- It has access to existing power and water service.

Site 8 is located on Union Oil property 1/2 mile north of the north boundary of the Mission Hills housing area and 1/2 mile east of Rucker Road. The site is only visible from a 300-foot stretch of Rucker Road.

3.4 EXXON OFFSHORE PIPELINE ALTERNATIVE ROUTE

An alternative for Exxon's offshore oil and gas pipeline route is to tie-in with Chevron's Platform Hermosa. This alternative would require construction of two pipelines from Platform Shamrock to Chevron's Platform Hermosa. One pipeline would be for wet oil and the other for gas. Production from Exxon's Platform Shamrock would be sent to Platform Hermosa and then through the industry pipelines to Gaviota. This alternative is considered since it represented Exxon's preferred option prior to the MMS request that the Point Pedernales Oil Field be operated under a unit agreement.

Figure 3.4-1 shows the Alternative Pipeline route that would be used for the subsea pipelines. This pipeline route is approximately 70,000 feet (13.2 miles) long. This alternative would require that the wet oil pipeline be an annular pipe with polyurethane insulation in order to keep the temperature of the oil high enough to be transported to Gaviota without reheating. This alternative would require that the design of Platform Shamrock be modified to include oil heating and emulsion breaking equipment to meet the Gaviota design limit of 20 percent water in the incoming oil emulsion. Therefore, in evaluating this alternative, certain assumptions about platform design changes were necessary.

3.4.1 Oil Processing

Well fluids produced at about 105 degrees Fahrenheit would be heated to approximately 200 degrees Fahrenheit by heat exchange with hot produced water and a heating oil medium. The hot emulsion would then flow to the two-phase

Table 3.3-1

PRELIMINARY ANALYSIS OF POTENTIAL PROCESSING SITE LOCATIONS ON UNION OIL FEE PROPERTY

	#1	#2	#3	#4	#5	#6	#7	#8
I. Engineering								
• Land Availability	Good	Excellent	Fair	Fair	Fair	Good	Fair	Good
• Land Terrain	Relatively Flat	Flat	Relatively Flat	Relatively Flat	Flat	Relatively Flat	Relatively Flat	Flat
• Available Water and Power	None	Fair	Good	Excellent	Good	Good	Fair	Good
• Proximity to Pipeline Corridor	Yes	Yes	Yes	Yes	Poor	Yes	Poor	Yes
II. Safety								
• Proximity to Nearest Edge of Population	0.35 mile from Federal Correctional Institution	0.4 mile from Vandenberg Village; 0.5 mile from School	0.5 mile from Vandenberg Village	1 mile from Vandenberg Village	1 mile from Mission Hills	0.5 mile from Mission Hills	0.5 mile from Mission Hills	0.5 mile from Mission Hills
III. Current Land Use	Grazing	Agriculture (crops)	None	Grazing/oil wells	Agriculture (crops)/ oil wells	Agriculture (crops)	Agriculture (crops)	Agriculture (crops)
IV. Visual Impacts	High	Moderate	High	Moderate	Low	Low	High	Low
V. Other Constraints								
• Public Road Access	Fair	Fair	Good	Good	Fair	Good	Good	Good
• Previous Disturbed Area	No	Yes	No	No	Yes	Yes	Yes	Yes
• Potential for Archaeological Flora or Fauna Conflict	High	Low	High	Moderate	Low	Low	Low	Low
• Room for Expansion	Excellent	Excellent	Poor	Good	Poor	Good	Fair	Good

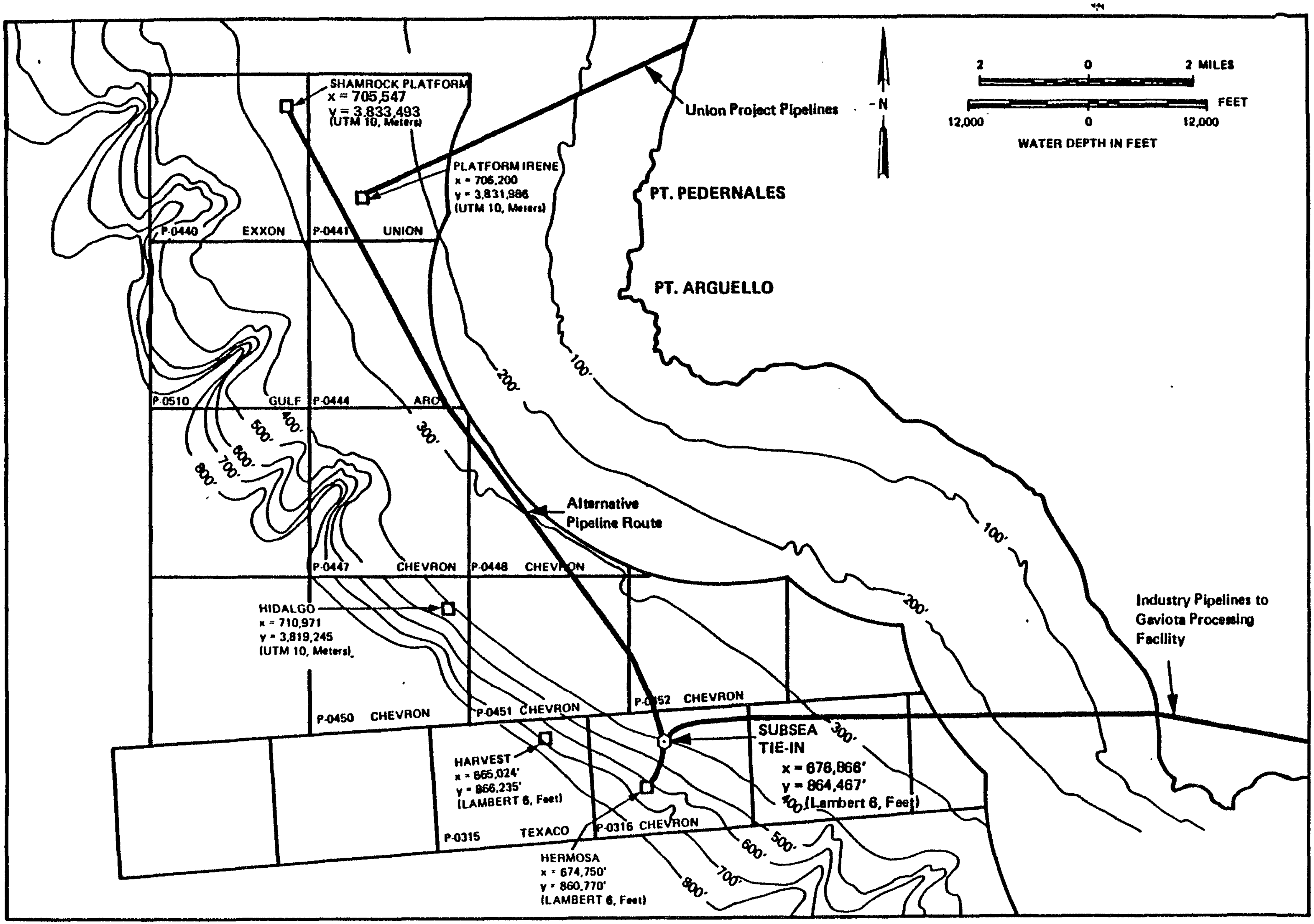


FIGURE 3.4-1 SHAMROCK PROJECT ALTERNATIVE PIPELINE CORRIDOR

Arthur D. Little, Inc.

production separators operating at about 80 psig. Gas released from the wet oil due to heating and pressure reduction would flow to the compression system and the wet oil would flow to the freewater knockout drum. The freewater knockout drums would operate at about 15 psig. Hot freewater from the freewater knockout drums would flow through the inlet well stream heat exchangers to heat the incoming well fluids. The cooled freewater would then flow to the water treating system for cleaning prior to discharge through a skim pile. Wet oil would be pumped to the shipping and metering system.

The platform wet oil metering systems would transmit volume pulses to a comparator located at the onshore oil treating facilities (i.e., Gaviota Processing Facility) where a leak detection counter would provide a continuous volumetric comparison of inputs to the line with deliveries at the treating facilities. The system would include an alarm sensitive enough to detect significant variations between input and output volume. If a variation were detected, the pipeline network would be shut down. The exact design of the leak detection system is being developed by the Point Arguello Pipeline Company (PAPCO) and is discussed in the Point Arguello Field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans EIR/EIS.

3.4.2 Gas Processing

From the well bay manifold, the gas would be compressed to a pipeline pressure of approximately 1,200 psig by two stages of compression. Each would be equipped with suction scrubbers, discharge coolers, and various controllers to allow for the handling of varying gas production rates (see Figure 3.4-3).

Fuel gas for the platform would be provided from the first-stage compressor discharge. The fuel gas would enter a high pressure fuel gas scrubber for liquefied removal and then flow through filters and a heater to the high pressure fuel gas system. High pressure fuel gas would be used both as turbine fuel and as a makeup into the low pressure gas system (flare pilots, purges, and blanket gas).

The produced gas would contain relatively low concentrations of H_2S (up to 1,200 ppm) and other sulfur species, and therefore fuel gas sweetening is not expected to be necessary. However, room for fuel gas sweetening equipment would be provided on the platform in the event the produced gas eventually became sour. If fuel sweetening is eventually initiated, H_2S removed from the fuel would be blended into the gas leaving the platform and transported to shore for processing at the Gaviota facilities. No equipment for recovery of elemental sulfur would be installed on the platform.

3.4.3 Utility Systems

Electrical power would be generated by four turbine-driven generators. The turbines would have diesel alternative fuel capability to allow for facility production startup without fuel gas. The turbines would be equipped with a waste heat recovery system. The heat from the turbine generator exhaust would be exchanged with a heating oil which would in turn be used to heat the produced wet oil as described above under oil processing.

The turbines would also be equipped with a water injection system to lower the combustion temperature and reduce the formation of NO_x. Exxon has estimated that the NO_x emissions could be reduced by 50 percent by using water injection.

Freewater separated from the emulsion and the deck drains would be treated for oil removal through gravity separation methods and, if necessary, filtration. It would then be discharged into the ocean through a skim pile. Water disposal would be in conformance with the applicable NPDES permit.

Seawater would be converted to fresh water in a distillation unit and would flow to a utility water storage tank. Water from this tank would be pumped through an ultraviolet sterilizer to the pressurized potable water system. Water from this tank would also be the source of fresh water for the deionizer associated with the gas turbine water injection system.

3.5 ALTERNATIVES NOT CONSIDERED FOR FURTHER ANALYSIS

3.5.1 Delay of the Project

Alternatives involving project postponement are not considered per se, but this option was viewed as an appropriate measure for mitigating potential impacts due to specific project components. This choice was made since delaying the proposed projects would only delay, not eliminate, the environmental impacts.

3.5.2 Union Offshore Pipelines to Santa Maria

This alternative would transport Union's wet oil production via offshore pipeline from Platform Irene to a new dehydration facility near the Santa Maria Refinery in San Luis Obispo County. Because the distance from Platform Irene to landfall at San Luis Obispo is 30 miles, the impact on sea bottom from pipeline construction would be three times greater than for the proposed project. This alternative would require that natural gas be burned on Platform Irene in order to preheat and reduce emulsion water in the oil. This would lead to increased air emissions at the platform over the proposed project. This alternative would also increase risk of an oil spill from the platform due to increased processing and storage requirements, and from the subsea pipeline due to its increased length. This alternative would shift the impacts associated with the onshore dehydration facility from the Lompoc area to an area near the Santa Maria Refinery. However, the impact would not be reduced since a new facility would still have to be constructed. This alternative would lead to increased environmental impacts over the proposed project for the offshore components, and would not reduce the overall onshore impacts compared to the proposed project. Therefore, this alternative has been dropped from further consideration.

3.5.3 Union Oil Gas Processing Alternative Site Location

No onshore gas processing alternatives in the Lompoc area are considered for Union, since any other location would require a new facility with attendant environmental impacts. The construction of a new gas processing facility, depending on its location, could lead to increased visual, cultural, and biological impacts that are not associated with the proposed project. The impacts associated with operating a new gas processing facility would be the same as those for the existing Battles Gas Plant. Therefore, by using an existing pipeline network and gas processing facility, all the environmental impacts associated with constructing a new grass roots facility are avoided. For these reasons the alternative has been dropped from further consideration. In addition, transporting gas from the Lompoc Oil Dehydration Facility to the Battles Gas Plant will utilize the existing Lompoc field gas transmission system (six-inch line) which minimizes the installation of new onshore gas pipelines and avoids potential impacts to cultural and biological resources.

3.5.4 Oil Processing on the Platforms

This alternative would necessitate that all the oil treating take place on the platform with dry oil shipped via subsea pipeline to shore. With this alternative, the proposed Lompoc Oil Dehydration Facility would not be needed.

In order to accommodate the necessary equipment for oil dehydration and waste water treatment, a third platform would have to be installed that could process both Exxon's and Union's oil production. This platform would be placed in the vicinity of the proposed platforms and would house all the processing equipment. These three platforms -- two used for drilling and production, the third for processing and shipping -- would need to be equipped with gas-fired turbine generators. These generators would provide the electrical power and the heat for heating the oil. The manpower requirements for operating the platforms would at least double, increasing the needed crew and supply support activities. The increase in both the gas-firing rate on the platform and the added crew and supply support activities would lead to substantially increased air emissions over the proposed project, even though the emissions associated with the onshore dehydration facility would be eliminated. With this alternative, the peak one-hour emissions would be more than twice that for the proposed project.

The risk of an offshore oil spill would be increased over the proposed project due to the increased storage and handling of the oil on the platforms. Under this alternative, a consolidated industry facility to serve other offshore production is lost. The pipelines from Platform Irene to shore would be used to carry dry oil rather than wet oil. Therefore, other Area Study platform operators would also be required to process their oil offshore using additional platforms to accommodate oil dehydration and waste water treatment equipment. If the other Area Study operators do not process their oil offshore, a wet oil pipeline to shore and an onshore oil dehydration facility would still be necessary.

In summary, this alternative was dropped from further consideration since it would lead to increased air emissions due to gas-fired turbines and a higher risk of an offshore oil spill than the proposed project due to more oil stored on the platform. This alternative is also not in keeping with the County of Santa Barbara's policy of consolidated industry processing locations.

3.5.5 Subsea Completions

Platform Irene is to serve as the central platform for the Central Santa Maria Basin. This platform will provide the location for receiving oil and gas production from the other platforms in the Central Santa Maria Basin and feeding the single set of pipelines to an onshore oil processing location. Therefore, this platform cannot be replaced by a subsea completion system.

To replace Platform Shamrock with subsea completion would require that Platform Irene be expanded to include the equipment necessary to handle the production from the subsea completion system. Subsea completions are basically satellite systems that still require conventional platforms to provide facilities for initial separation of gas and oil. Furthermore, subsea completions have overriding environmental disadvantages because all of the development drilling and well servicing has to be carried out by drill ships. Compared to platforms, drill ships have higher air emissions and are considered more prone to accidents.

Subsea completions could not be used in place of the platforms due to distance from shore and from a purely technical and operational standpoint. A platform would still be needed to provide for initial oil and gas separation, oil pumping to shore, and gas compression for reinjection or shipment to shore. Thus, the use of subsea completions would not eliminate the need for platforms. For these reasons the use of subsea completions is not considered a practical alternative for these projects.

3.5.6 Number of Platforms to Develop Point Pedernales Field

The MMS has reviewed and evaluated reservoir data submitted by Union Oil, Exxon, and Arco and has determined that the most efficient development of the Point Pedernales Field will occur with a minimum of two platforms. This decision is based on the results obtained from six exploratory wells drilled in the field. Only after drilling and production data from Platform Irene and Shamrock is available, can a determination of the need for additional platforms be made. The feasibility of this alternative cannot be determined in this EIS/EIR since the reservoir data is considered proprietary.

3.5.7 Electric Power Generation on the Platform

This alternative was dropped from further consideration since it would result in over three times more air emissions from the platforms than the use of grid power. By using grid power for the platforms' power needs, the gas-fired turbine generators, which are the largest emission source on self-contained platforms, can be eliminated.

3.5.8 Alternative Platform Locations

The locations for the two platforms, as proposed, are dictated by reservoir and seafloor considerations. No practical alternative locations have been identified, although other sites may be considered as mitigation if the proposed platform locations would result in significant impacts, and minor relocation would mitigate the impact.

3.5.9 Alternative Sites for an Onshore Oil Processing Facility

Additional sites outside the Union fee Property were not evaluated as alternatives for the project since the Union property (9,000 acres) is an existing oil field with ample space useable for such a facility. In addition, the property, for the most part, is disturbed. Also, since Union Oil owns the land and has no plans to sell any of it, the area would provide an adequate buffer zone between the facility and residential areas. The Union fee Property is also near existing public services (water, gas, electricity) and the pipeline corridors which can be used to transport the dry oil and gas to their ultimate destination. Use of these existing project elements would avoid the need to install additional infrastructure that would have associated environmental impacts. There are no adequate sites between the Union fee Property and the coast. Locations much further from the coast would require that the wet oil be reheated and repumped. This would require that an additional pump station be installed which would lead to increased environmental impacts.

Union Oil identified eight possible sites on its Union fee Property that could be suitable for an oil dehydration facility. None of these sites appears to have strong advantages over the others, but there are some potential safety, visual, and agricultural impacts associated with some of the sites that causes them to be less attractive as potential sites. Specific disadvantages found for each of the sites dropped from further consideration are discussed below:

- Site 1 -- This site is currently used for grazing and is undisturbed. The site is within 0.25 mile of Vandenberg Village and would have high visual impacts for 0.5 miles of Lompoc-Casmalia Road. The use of this site would also require that new water and power lines be installed to meet the utility needs of the facility.

- Site 2 -- This site is currently used for dry-farming yielding one to two crops a year. Use of this site could take up to 40 acres of land out of agricultural production. Also, a small pond located at the southern end of the site could be impacted by the use of this site.

- Site 3 -- This is an undisturbed site that is not currently used for grazing. This site would have a high visual impact for 0.25 mile on Highway 1. Use of this site could represent significant impacts to biological habitats, and is not large enough to be used for an expanded consolidated oil and gas processing facility.

- Site 5 -- The site is currently dry-farmed yielding one to two crops per year. The site does not have sufficient room for consolidated oil and gas facilities. Even for the proposed oil dehydration facility, the site would require the removal of a substantial number of oak trees.

- Site 6 -- This site is a dry-farmed agricultural field that yields up to two crops per year. The site is 0.3 mile from the Mission Hills community, but would not be visible from the community.

- Site 7 -- This site is also dry-farmed during the year and is within 0.25 miles of the Mission Hills community. Use of this site would result in the facility being visible from segments of the Mission Hills community.

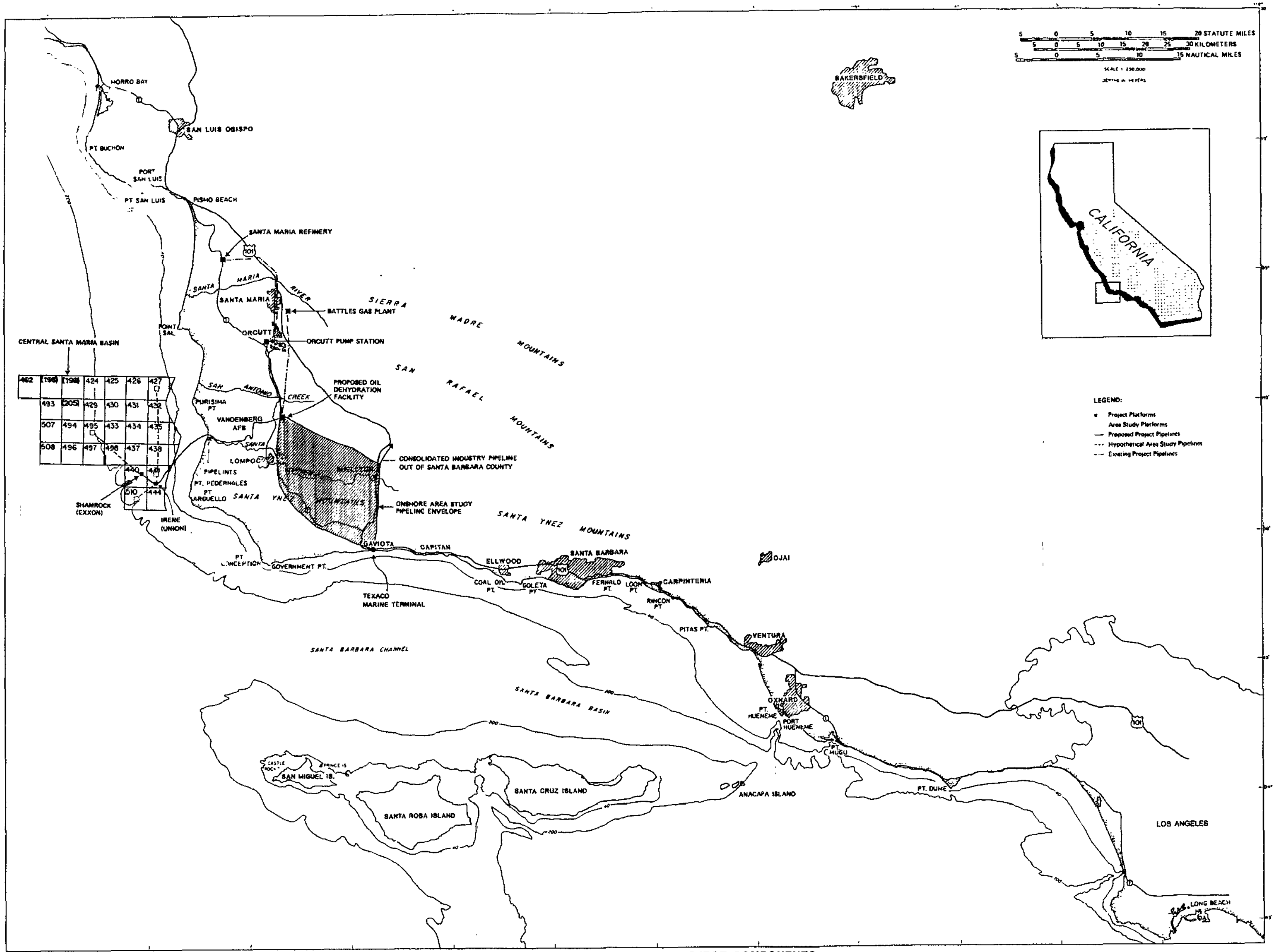


FIGURE 4.0-1 STUDY REGION AND PROJECT COMPONENTS

IV. ENVIRONMENTAL AND REGULATORY SETTING

4.0 INTRODUCTION

This chapter decribes the existing environmental and regulatory setting, or baseline, against which Proposed Project, Area Study, and Cumulative development impacts are evaluated in Chapters V and VI. Present conditions are described in this chapter. It is acknowledged that these conditions will change prior to proposed construction because of natural processes and human activities. Such changes are discussed where applicable in this chapter and in Chapters V and VI.

Figure 4.0-1 shows the general extent of the Study Region considered in the various subject areas below. Each subject area has its own subdivisions of the Region. See the text and accompanying figures in the remainder of this chapter for further definition of these areas by discipline.

4.1 GEOLOGY

4.1.1 Overview

The geologic Study Region considered in this report is shown in Figures 4.1-1 and 4.1-2, and includes the Western Transverse Ranges, the southern portion of the California Coast Ranges province, and the Central California Continental Borderland. This section describes the geologic setting, faults, seismicity, and other geologic considerations pertaining to this region, the Project Area, the leases of the Area Study offshore, and the onshore Area Study. See Figure 2-1. For more detailed discussions, the reader is referred to Appendix A. Regional characteristics (setting, faulting, and seismicity) are described first, in Sections 4.1.2 to 4.1.4. In Section 4.1.5, other geologic considerations both offshore and onshore are addressed. Offshore, this section focuses on the Area Study leases. The onshore discussion includes the onshore Area Study. In Sections 4.1.6 and 4.1.7, site-specific conditions at proposed project facilities are discussed. Paleontological resources are discussed in Section 4.1.8. Finally, Section 4.1.9 describes the regulatory setting.

4.1.2 Geologic Setting - Santa Maria Basin and Surrounding Region

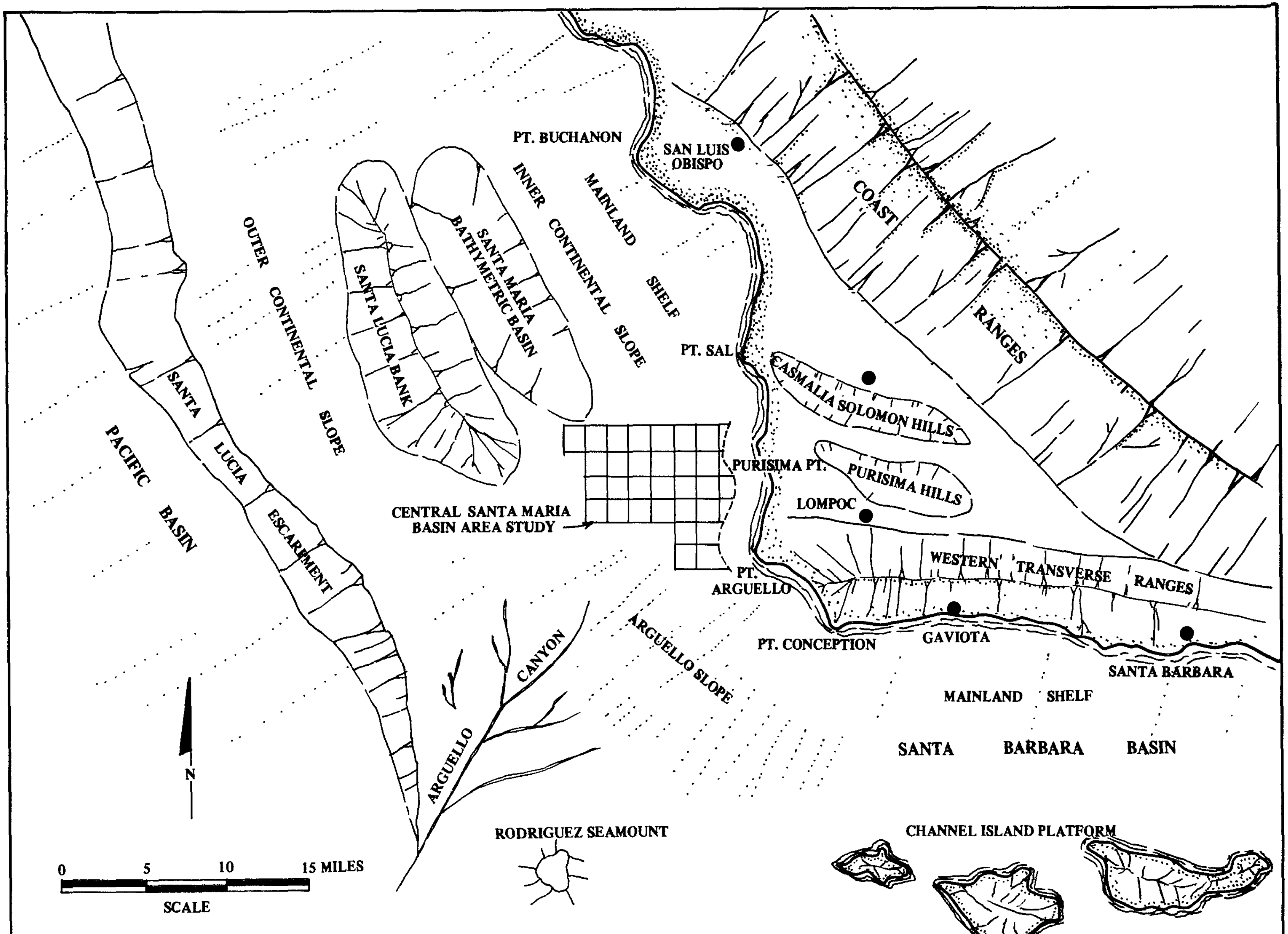
4.1.2.0 Geologic History

The geologic history of the Western Santa Barbara Basin-Santa Ynez Mountains-Santa Maria Basin region is traceable for more than 100 million years, and indicates recurrent periods of tectonic activity followed by periods of relative quiescence.

It is noteworthy that many of the structural and geomorphic features present in the Santa Barbara Channel today were slowly growing throughout much of the Pliocene Epoch to the degree that they affected sedimentation. The major north-south compressional tectonism (i.e., folding and faulting) that created the present form of the region did not take place until the middle Pleistocene [Vedder, et al., 1969]. The nature and distribution of Pleistocene deposits indicate the dominant geologic processes at work during this time were tectonism and sea level fluctuations related to periods of glaciation. Deformation since the middle Pleistocene appears to have decreased throughout the Western Transverse Ranges and Santa Maria Basin. Much of the Pleistocene and Holocene Epochs appear to have been relatively quiescent. Presently, the tectonism in this region comprises gentle uplift and continued compressional faulting along previously initiated major faults.

4.1.2.1 Physiography/Bathymetry

The Central Santa Maria Basin lies in a transition zone between the east-west trending Western Transverse Ranges and the northwest trending California Coast Ranges physiographic provinces. The basin is wedge-shaped opening towards the ocean. Its western terminus is the offshore Santa Lucia Bank located about 35 miles (56 kilometers) off the coastline.



REGIONAL PHYSIOGRAHIC MAP

FIGURE 4.1-1

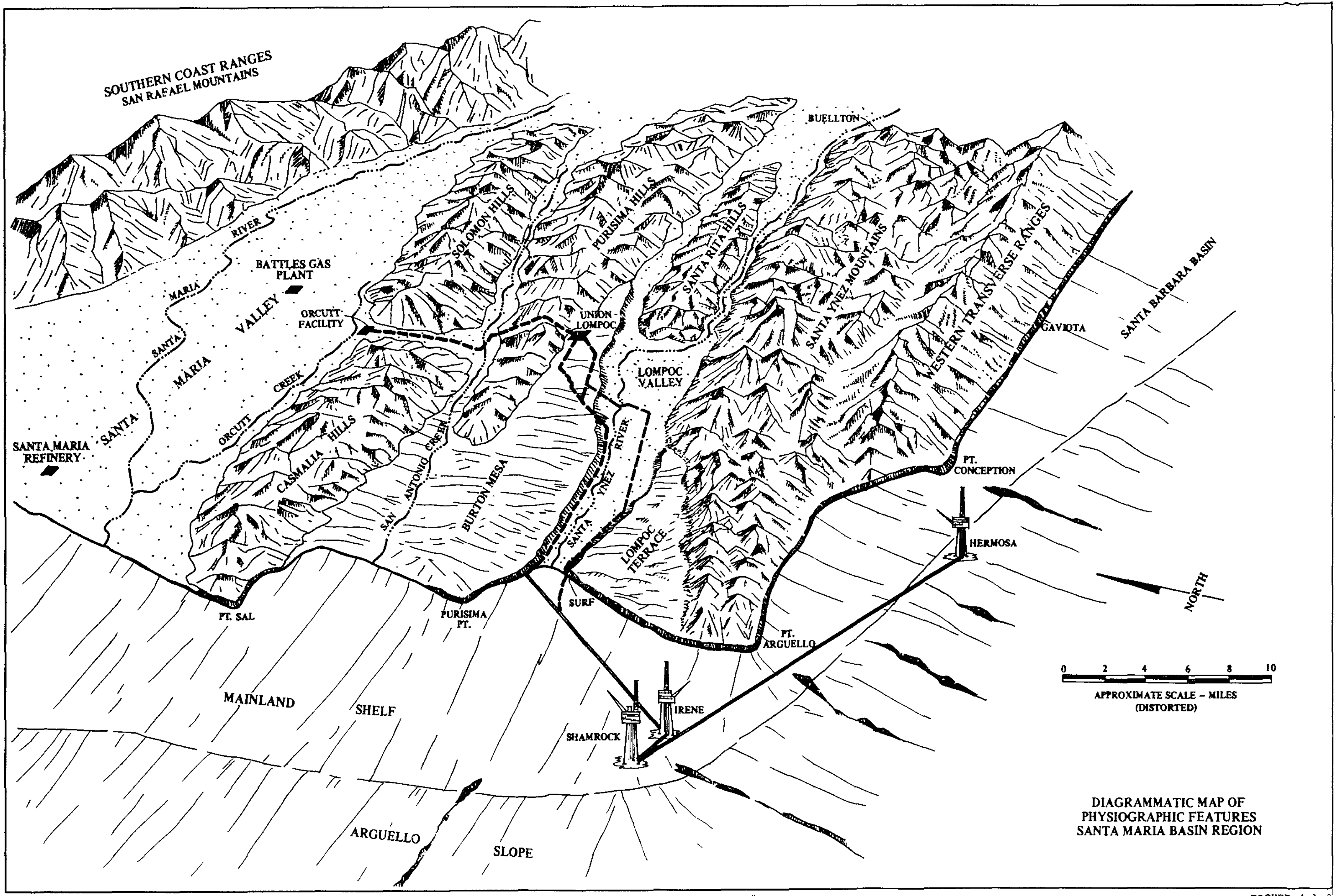

SOUTHERN COAST RANGES
SAN RAFAEL MOUNTAINS
BUELLTON
SANTA MARIA RIVER
BATTLES GAS PLANT
SANTA MARIA VALLEY
ORCUTT FACILITY
UNION LOMPOC
SOLOMON HILLS
PURISIMA HILLS
SANTA RITA HILLS
SANTA YNEZ MOUNTAINS
WESTERN TRANSVERSE RANGES
SANTA BARBARA BASIN
GAVIOTA
LOMPOC VALLEY
ORCUTT CREEK
SANTA MARIA REFINERY
CASMALIA HILLS
SAN ANTONIO CREEK
BURTON MESA
SANTA YNEZ RIVER
LOMPOC TERRACE
PT. CONCEPTION
HERMOSA
NORTH
PT. SAL
PURISIMA PT.
SURF
PT. ARGUELLO
0 2 4 6 8 10
APPROXIMATE SCALE - MILES (DISTORTED)
MAINLAND SHELF
IRENE
SHAMROCK
ARGUELLO SLOPE
DIAGRAMMATIC MAP OF
PHYSIOGRAPHIC FEATURES
SANTA MARIA BASIN REGION

FIGURE 4.1-2

The offshore landforms of the Central Santa Maria Basin are the Mainland Shelf, the Arguello Slope, and, to the northwest of the Pedernales Field, the submarine Santa Maria Basin and the Santa Lucia Bank. The shelf is a relatively flat area with slopes less than one degree from the shoreline to about 330 to 360 feet (100 to 110 meters) of water depth. The Arguello Slope starts at this depth and increases rapidly in gradient to four to seven degrees. The slope is incised by several prominent southwest-trending channels which have been eroded into the seafloor. The two platforms and associated pipelines would be located on the Mainland Shelf. Figure 4.1-3 shows the bathymetric features of the offshore area.

The onshore basin is bordered on the south by the east-west trending Santa Ynez Mountains and on the northeast by the San Rafael Mountains. Chains of west to northwest trending hills, valleys, and mesas characterize the basin. Major geomorphic features include from south to north: The Lompoc Terrace, the Lompoc Valley, Burton Mesa, Purisima Hills, San Antonio Valley, Casmalia-Solomon Hills and the Santa Maria Valley. The hills display low to moderate relief. The valleys and mesas form extensive relatively flat surfaces. Onshore facilities would be located on all these terrains.

4.1.2.2 Stratigraphy

The stratigraphy of the onshore and offshore portions of the Santa Maria Basin are somewhat similar. Figure 4.1-4 shows representative stratigraphic columns. Figure 4.1-5 shows the lateral extent of the various units onshore. The basement rock regionally consists of the Jurassic age Franciscan formation which is extensively exposed throughout the Coast Ranges of California. The bulk of the offshore sequence is comprised of Pliocene and Miocene age strata which correlate with the onshore Careaga sand, Foxen mudstone, Sisquoc sands and mudstones, and the Monterey shale. The Pleistocene and Holocene section is composed of marine unlithified muds, silts and sands. These sediments mantle, nearly continuously, a wavecut platform surface of the underlying Tertiary sequence [Payne, et al., 1979].

In the onshore Santa Maria Basin and adjacent Santa Ynez Mountains, a nearly complete middle and lower Tertiary sequence generally lies between the Monterey formation and Cretaceous Age formations. (See Figure 4.1-4.) The Plio-Pleistocene sequence onshore is composed of mostly terrestrial sediments such as the Paso Robles Sand and gravels, Orcutt Sand, and various younger terrace and alluvial units.

4.1.2.3 Structure

The geologic structure of the Central Santa Maria Basin consists of a series of east-west to northwest trending anticlines and synclines. Onshore the east-west structures are well displayed in the Santa Ynez Mountains and southern parts of the Santa Maria Basin. Towards the north, the folds and regional faults become more northwesterly aligned and reflect the transition between the Transverse and Coast Range structures. Offshore structure is predominantly to the northwest. The structure from which production is anticipated in the Point Pedernales Field is a northwest-trending anticlinal fold. The main oil and gas producing horizon is believed to be the Monterey Formation.

Major active and potentially active faults occur just outside the Point Pedernales Field area and have a potential for generating large earthquakes which may affect area facilities. These faults are the Santa Lucia Bank Fault and the Hosgri Fault. Other faults of possible significance include the Offshore Lompoc Fault, the Santa Ynez Fault (including the South Branch) and the San Andreas Fault.

4.1.2.4 Geotechnical Environment

OFFSHORE

Offshore, a shallow soil cover (less than 100 feet) overlies bedrock which in turn exhibits variable strength characteristics in the Santa Maria Basin area. At the location of Platform Irene, the bedrock is relatively incompetent and provides a good environment for pile driving installations required for offshore platforms. At other locations in the area where bedrock is exposed, the rock is more competent.

In general, the sediment thickness decreases, the particle size increases and sediment plasticity decreases towards the shore. The soil types range from sandy and clayey silts to a silty fine sand and then a fine sand as one progresses from the top of the continental shelf towards the shore. While these soils have not been characterized geotechnically, the overlying sediments do not appear to be dense and are therefore susceptible to liquefaction.

ONSHORE

From a geotechnical standpoint, this report considers zones of soil or rock (with or without groundwater) which could be affected by the proposed project or which could affect the proposed project. These zones include a narrow and shallow corridor along the pipeline alignment, and conditions at greater depths at locations of major facilities. In general, most of the proposed structures would not interact with bedrock except as a result of transmission of seismic waves.

Soils in the Project Area can be broadly divided into two categories. The first is the thin soil cover overlying various bedrock formations in the highlands. This cover is generally formed of sandy materials, is not susceptible to liquefaction, is generally erodable, susceptible to landsliding in areas, and occasionally sensitive to saturation by water which can cause expansion or collapse depending on the soil type.

The second major category of soil cover is sands in valleys and flood plains of the Santa Ynez River and other stream channels. In isolated locations these deposits can be as thick as 200 to 300 feet, though their thickness is less than 200 feet over most of the area. Occurrence of gravel and coarse sand is limited, but high silt content is frequent. While the

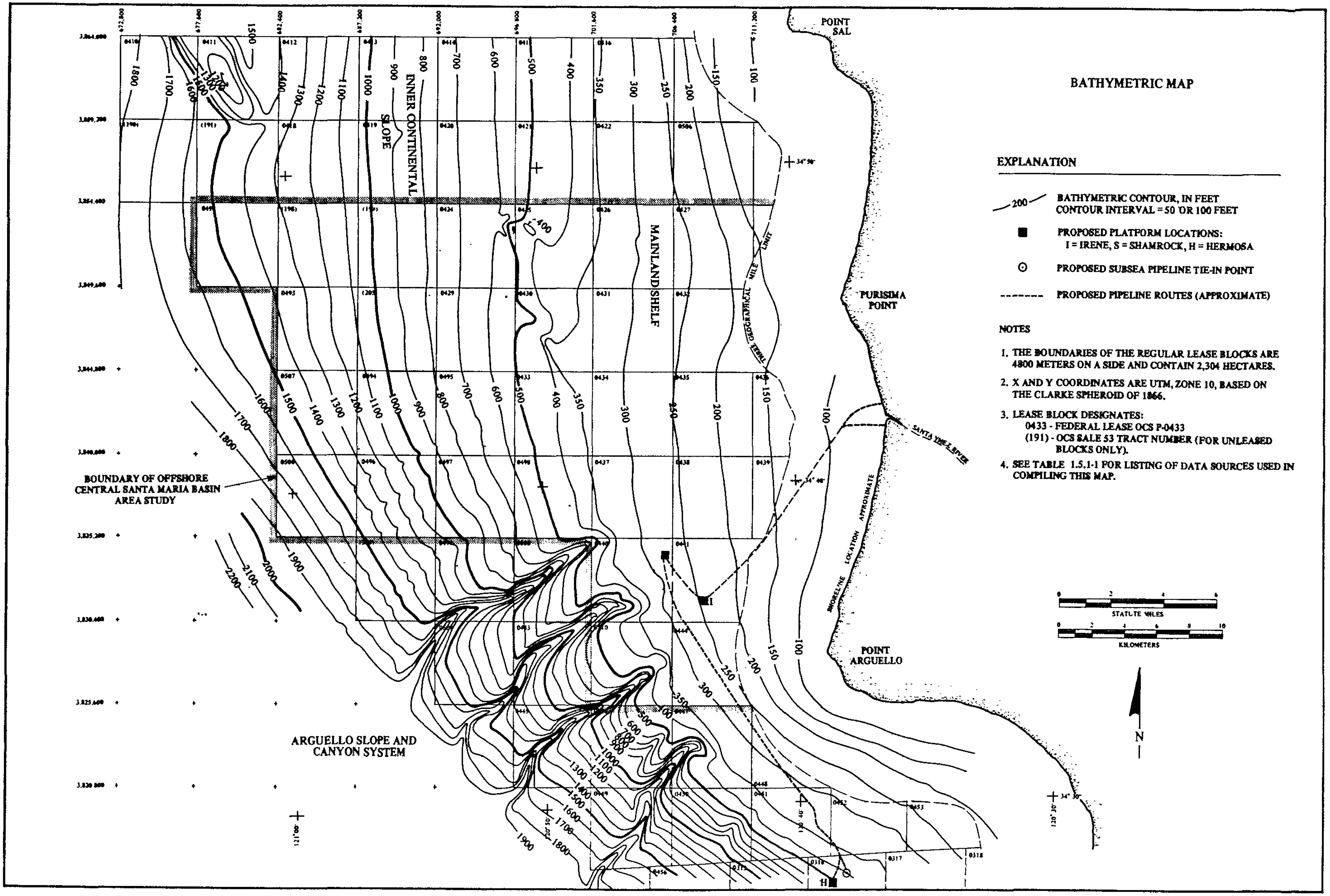
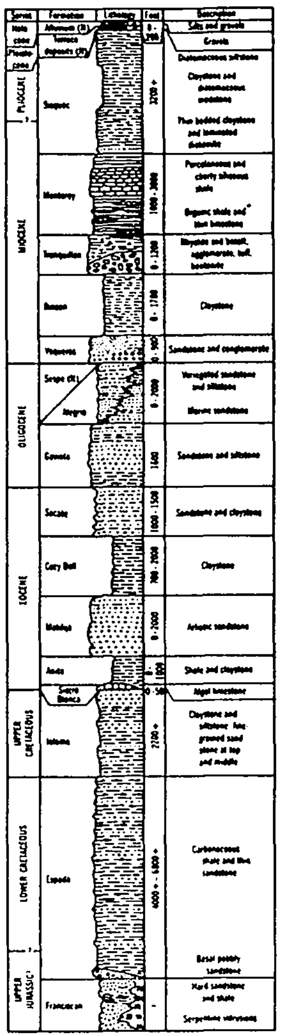

BATHYMETRIC MAP
EXPLANATION
200 BATHYMETRIC CONTOUR, IN FEET CONTOUR INTERVAL = 50 OR 100 FEET
PROPOSED PLATFORM LOCATIONS: I = IRENE, S = SHAMROCK, H = HERMOSA
PROPOSED SUBSEA PIPELINE TIE-IN POINT
PROPOSED PIPELINE ROUTES (APPROXIMATE)
NOTES
1. THE BOUNDARIES OF THE REGULAR LEASE BLOCKS ARE 4800 METERS ON A SIDE AND CONTAIN 2,304 HECTARES.
2. X AND Y COORDINATES ARE UTM, ZONE 10, BASED ON THE CLARKE SPHEROID OF 1866.
3. LEASE BLOCK DESIGNATES:
0433 - FEDERAL LEASE OCS P-0433
(191) - OCS SALE 53 TRACT NUMBER (FOR UNLEASED BLOCKS ONLY).
4. SEE TABLE 1.5.1-1 FOR LISTING OF DATA SOURCES USED IN COMPILING THIS MAP.
STATUTE MILES
KILOMETERS
N
POINT SAL
PURISIMA POINT
POINT ARGUELLO
SANTA YNEZ RIVER
SHORELINE LOCATION APPROXIMATE
THREE GEOGRAPHICAL MILE LIMIT
INNER CONTINENTAL SLOPE
MAINLAND SHELF
ARGUELLO SLOPE AND CANYON SYSTEM
BOUNDARY OF OFFSHORE CENTRAL SANTA MARIA BASIN AREA STUDY

FIGURE 4.1-3

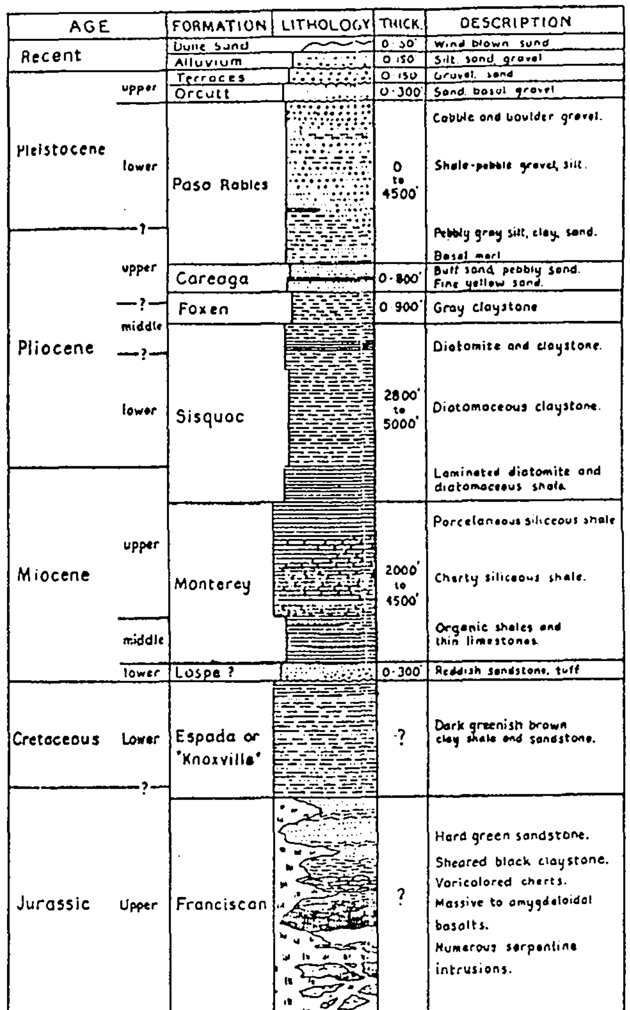
STRATIGRAPHIC COLUMNS
CENTRAL SANTA MARIA BASIN REGION

WESTERN SANTA YNEZ MOUNTAINS



FROM DIBBLEE, 1950

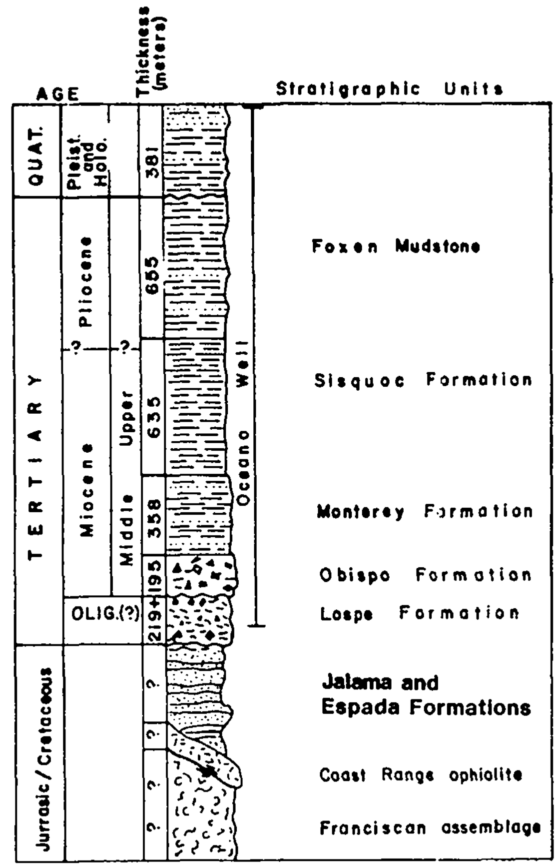
CENTRAL SANTA MARIA BASIN (ONSHORE)



FROM DIBBLEE, 1950

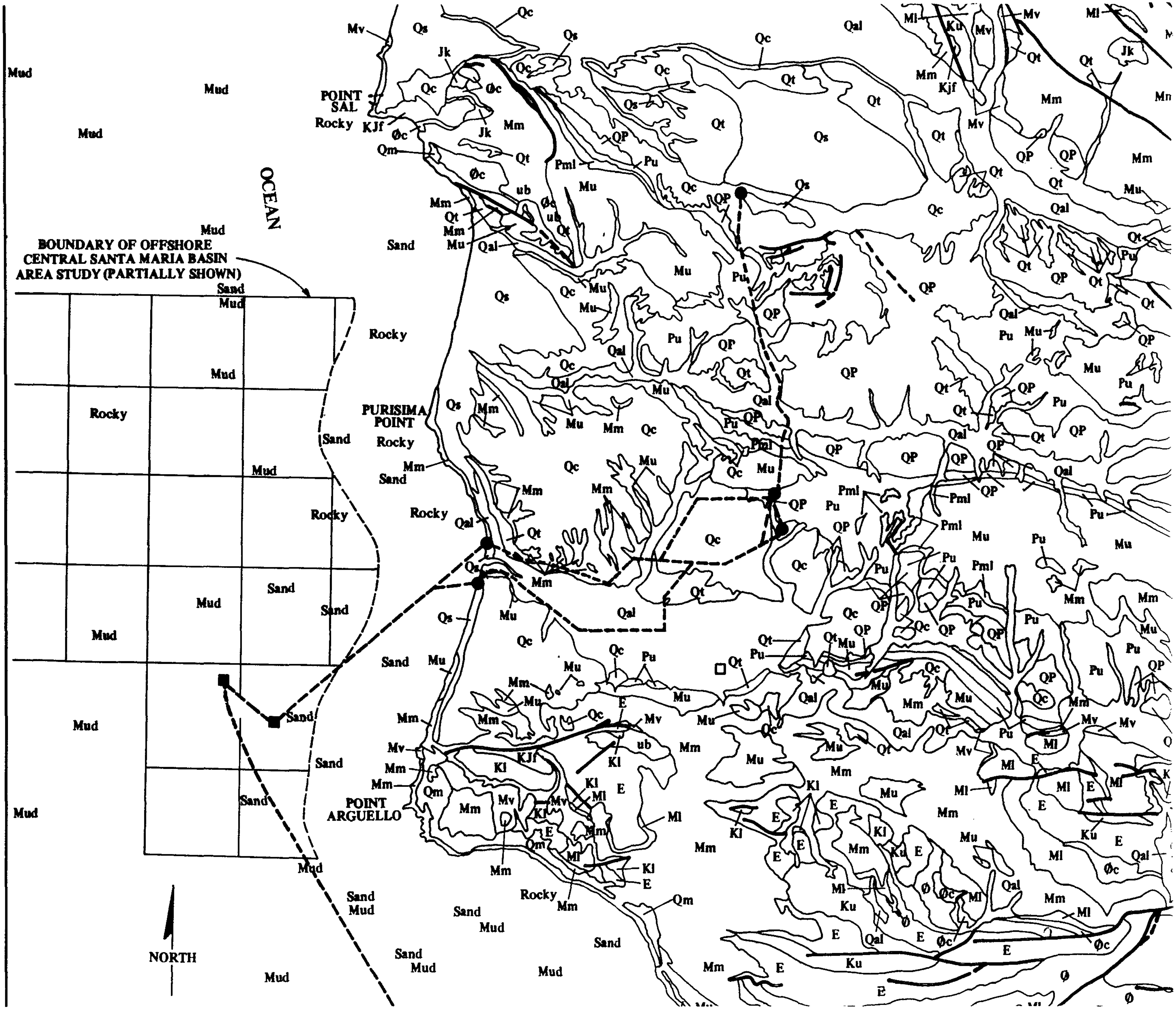
SANTA MARIA BASIN (OFFSHORE)

NOTE: OCEANO WELL LOCATED 14.3 MILES, N55°W OF POINT SAL



FROM HOWELL AND OTHERS, 1978

FIGURE 4.1-4



POINT SAL
Rocky
OCEAN
BOUNDARY OF OFFSHORE CENTRAL SANTA MARIA BASIN AREA STUDY (PARTIALLY SHOWN)
PURISIMA POINT
Rocky
POINT ARGUELLO
NORTH
Mud
Sand
Rocky
Sand Mud

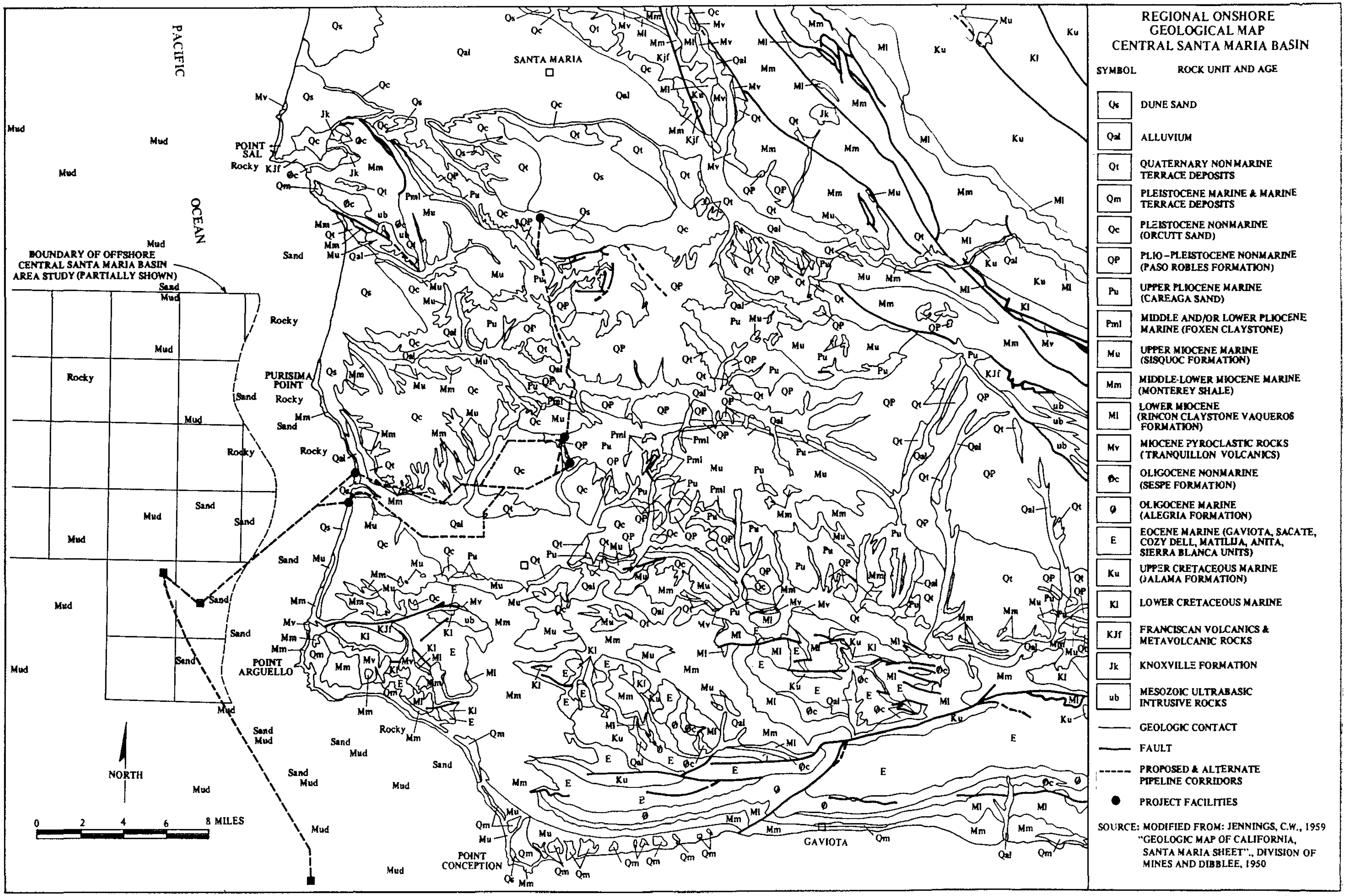

REGIONAL ONSHORE GEOLOGICAL MAP
CENTRAL SANTA MARIA BASIN
SYMBOL ROCK UNIT AND AGE
Qs DUNE SAND
Qal ALLUVIUM
Qt QUATERNARY NONMARINE TERRACE DEPOSITS
Qm PLEISTOCENE MARINE & MARINE TERRACE DEPOSITS
Qc PLEISTOCENE NONMARINE (ORCUTT SAND)
QP PLIO-PLEISTOCENE NONMARINE (PASO ROBLES FORMATION)
Pu UPPER PLIOCENE MARINE (CAREAGA SAND)
Pml MIDDLE AND/OR LOWER PLIOCENE MARINE (FOXEN CLAYSTONE)
Mu UPPER MIOCENE MARINE (SISQUOC FORMATION)
Mm MIDDLE-LOWER MIOCENE MARINE (MONTEREY SHALE)
Ml LOWER MIOCENE (RINCON CLAYSTONE VAQUEROS FORMATION)
Mv MIOCENE PYROCLASTIC ROCKS (TRANQUILLON VOLCANICS)
Øc OLIGOCENE NONMARINE (SESPE FORMATION)
Ø OLIGOCENE MARINE (ALEGRIA FORMATION)
E EOCENE MARINE (GAVIOTA, SACATE, COZY DELL, MATILIJA, ANITA, SIERRA BLANCA UNITS)
Ku UPPER CRETACEOUS MARINE (JALAMA FORMATION)
Kl LOWER CRETACEOUS MARINE
KJf FRANCISCAN VOLCANICS & METAVOLCANIC ROCKS
Jk KNOXVILLE FORMATION
ub MESOZOIC ULTRABASIC INTRUSIVE ROCKS
GEOLOGIC CONTACT
FAULT
PROPOSED & ALTERNATE PIPELINE CORRIDORS
PROJECT FACILITIES
SOURCE: MODIFIED FROM: JENNINGS, C.W., 1959 "GEOLOGIC MAP OF CALIFORNIA, SANTA MARIA SHEET"., DIVISION OF MINES AND DIBBLEE, 1950
PACIFIC
OCEAN
SANTA MARIA
POINT SAL
BOUNDARY OF OFFSHORE CENTRAL SANTA MARIA BASIN AREA STUDY (PARTIALLY SHOWN)
PURISIMA POINT
POINT ARGUELLO
POINT CONCEPTION
GAVIOTA
NORTH
0 2 4 6 8 MILES
Mud
Sand
Rocky

FIGURE 4.1-

water table is generally deep from the standpoint of geotechnical engineering (more than 50 feet), zones of shallow water do exist, creating soils susceptible to liquefaction. The alluvial materials are scoured and redeposited during periods of high flow. Scour and redeposition can occur across the full valley alluvium width during peak flow conditions. However, the depth of erosion and scour is not well documented. Limited information [Terzaghi and Peck, 1967] suggests that the depth of scour can be as much as three to four times the height of rise in river stage.

4.1.3 Faults

4.1.3.0 Introduction

The regional structural geologic setting was described in Section 4.1.2.3. This section describes faults of importance to the Central Santa Maria Basin area and related project components such as the pipeline and processing facilities. The determination of which faults are important is based on their activity, their potential for causing surface faulting at project facilities, and their potential for generating earthquakes which could cause damaging ground motion at project facilities. Specifically, important faults are either active or potentially active, and in addition have one or the other of the following characteristics: 1) the fault trace crosses the Project Area; 2) expected ground shaking as a result of earthquakes will control design of particular project components. The primary parameters in making this determination are the history of fault displacement and the faults' proximity to project facilities.

With respect to the history of faulting, this report considers faults active if they have evidence of displacement or seismicity within the last 11,000 years (Holocene Epoch). Potentially active faults are defined as faults with evidence of displacement or associated seismicity within the last 500,000 years. This upper time limit is chosen based on currently-accepted criteria used by the NRC (U.S. Nuclear Regulatory Commission, 1975) and is consistent with the history of the Western Transverse Ranges area since they formed relatively recently in geologic time and may have undergone a change in tectonic regime as recently as middle Quaternary (about 500,000 to 600,000 years before the present). In the following sections, fault descriptions are grouped according to their onshore or offshore locations. Section 4.1.3.1 describes the offshore faults within the Central Santa Maria Basin. The major onshore faults are discussed in Section 4.1.3.2. Additional discussion regarding evidence for classification of these faults and others listed in Table 4.1-1 is included in the Appendix A. Of the active and potentially active faults listed in Table 4.1-1, only those which are considered further in Section 5.1 are discussed here.

4.1.3.1 Central Santa Maria Basin and Surrounding Region

Figure 4.1-6 shows the principal faults in the Study Region. Of those which are considered active or potentially active, some may actually be inactive faults which have been exposed by erosion, and others are related to mass movements and thus are not tectonic features capable of producing earthquakes. Though there are no major active or potentially active faults

Table 4.1-1

SUMMARY OF SIGNIFICANT FAULTS AND ASSOCIATED MAXIMUM EARTHQUAKES FOR THE PROJECT AREA AND STUDY REGION

Fault or Fault Systems	Activity[1]	Fault Length miles/km	Maximum Expected Magnitude[2]	Maximum Credible Magnitude[2]
Hosgri Fault	PA-A	84/135	7.2	7.5
Santa Lucia Bank Fault	PA-A	68/114	7.1	7.5
Unnamed Faults on Santa Lucia Bank	PA-A	48/80	7.0	7.5
Offshore Lompoc Fault	A	12/20	6.3	6.5
Offshore Purisima Fault	PA	16/26	6.3	6.5
Point Conception (F-1) Fault Zone	A	12/20	6.3	6.5
Molino Fault	A	5/9	5.9	6.0
Santa Ynez Fault (with South Branch)	PA-A	80/134	7.2	7.5
Lompoc-Solvang (Santa Ynez R.) Fault	I	-	-	-
Pacifico Fault	I	-	-	-
Honda Fault	I	-	-	-
Lions Head	I	-	-	-
Pezzoni-Casmalia Fault	I-PA(?)	20/32	6.5	6.8
Los Alamos-Baseline Fault System	A-PA	24/38	6.5	7.0
Santa Maria River-Foxen Canyon -Little Pine Fault System	PA	62/100	7.0	7.4
Santa Maria/Bradley Canyon Faults	I	-	-	-
Orcutt Oil Field Faults (except north trace)	I	-	-	-
Arroyo Parida-Santa Anita Fault	PA	31/52	6.75	7.0
Big Pine Fault	A	42/70	6.9	7.25
Rinconada Fault (northern segment)	PA	111/185+	7.4	7.5
Cuyama, Ozena, Panza Faults, etc.	PA(?)	21/35	6.7	6.75
San Andreas Fault Zone	A	678/1130	8.2	8.25
White Wolf-Pleito Fault	A	57/95	7.0	7.75
Garlock Fault	A-PA	150/250	7.5	7.75

1. A-Fault shows evidence of displacement or seismicity within the last 11,000 years (Holocene Epoch); active. PA-Fault shows evidence of displacement older than 11,000 years, but younger than about 500,000 years; potentially active. I-Fault shows no evidence of displacement within the last 500,000 years; inactive.

2. Magnitude estimate from Slemmons (1977) length-magnitude relationships. Magnitudes are surface wave magnitudes, (Ms). Fault lengths used in calculation are half of mapped length, based on empirical data of Albee and Smith (1966).

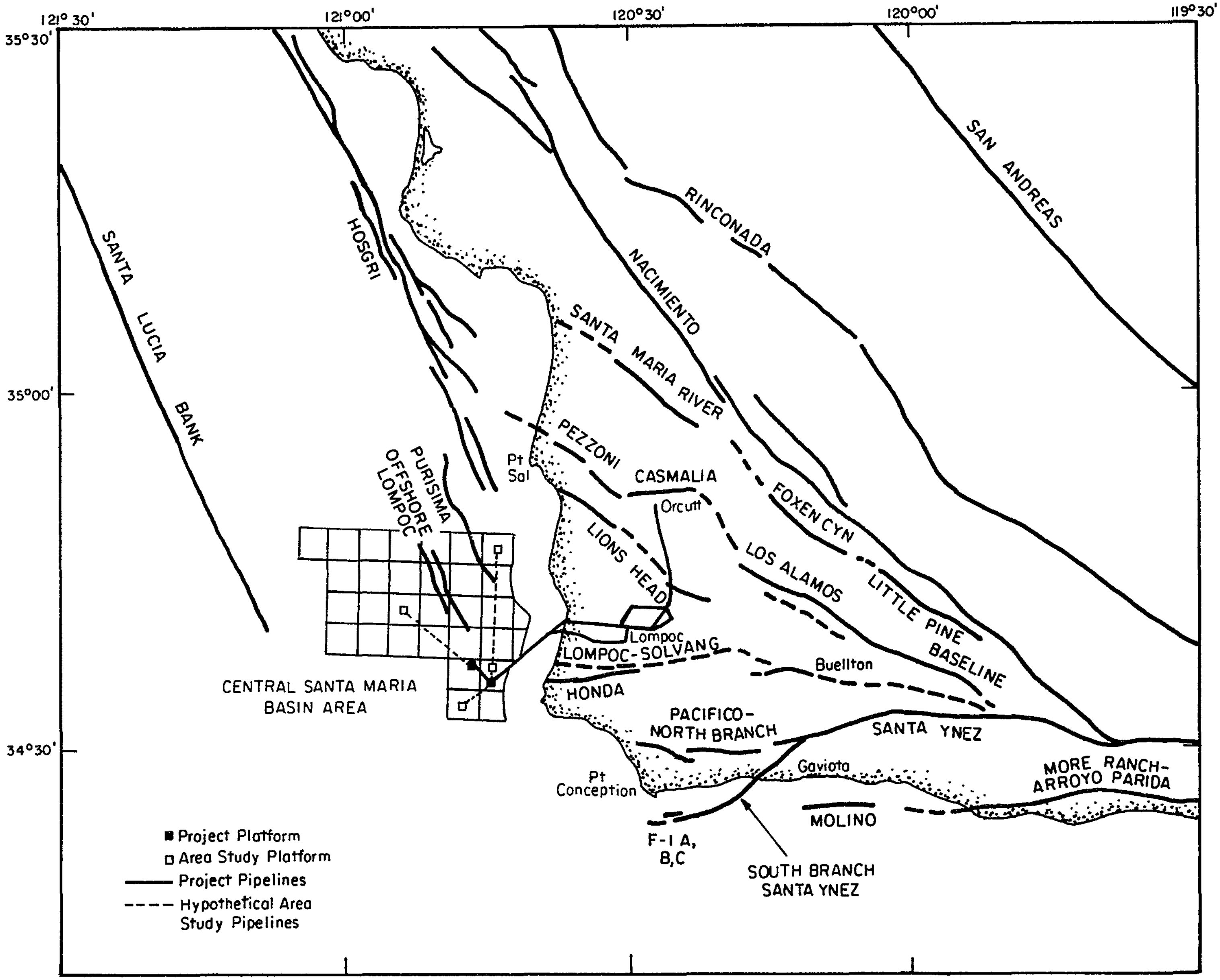


FIGURE 4.1-6 GENERALIZED REGIONAL FAULTS

within the Point Pedernales Field area, some major faults are quite close to the Point Pedernales Field area and therefore can be expected to generate strong ground motion at project facilities if they should experience large displacements during the life of the project.

HOSGRI FAULT

This fault is a zone of complex, braided and branching fault segments along the eastern edge of the offshore Santa Maria Basin. Controversy exists regarding the extent, nature, and earthquake-generating capacity of this fault zone. Most of the arguments center on whether it connects to others on the north such as the San Simeon, Sur, and San Gregario Faults, which would imply a feature of plate-tectonic proportions.

The Hosgri Fault is reported to be seismically active [McCulloch, et al., 1980], though this conclusion is not supported by the poor spatial correlation of epicenters on seismicity maps. (See also Section 4.1.4.) However, direct correlation of epicenters to the fault is not important, because geophysical studies suggest that displacement of the latest Pleistocene-Holocene (about 17,000 to 5,000 years old) sediments has occurred at several localities along the fault zone [Wagner, 1974; Payne, et al., 1979], indicating that it is at least potentially active and likely to be active.

OFFSHORE LOMPOC FAULT

This fault is a relatively small reverse fault within the Point Pedernales Field area. Although no seafloor displacement has been proven, there are numerous geomorphic features, apparent stratigraphic displacements, and gas seeps which suggest this fault is a young feature. Richmond, et al. [1981] interpret the evidence to indicate sea floor displacement. Payne, et al. [1979] noted a zone of disruption about 20 kilometers (12 miles) long in the geophysical record, and suggest that this indicates faulting dating to late Pleistocene (less than 20,000 years old) and possibly Holocene. The fault is considered potentially active.

OFFSHORE PURISIMA FAULT

This fault is located north of the Point Pedernales Field area between the Hosgri and Lompoc Faults. The fault, as mapped by Richmond, et al. [1981], extends for approximately 26 kilometers (16 miles) and is believed to offset middle to late Pleistocene deposits but not Holocene sediments, and therefore is considered to be potentially active.

SANTA LUCIA BANK FAULTS

There are several major faults in the vicinity of Santa Lucia Bank. The largest fault, and the nearest to the Point Pedernales Field, is the Santa Lucia Bank Fault, which forms the eastern boundary of the Santa Lucia Bank uplift and in places shows vertical separation on the same order as the Hosgri Fault [McCulloch, et al., 1980]. Although the upward extent of the fault is very near to the sea floor and Quaternary strata seem to be folded near the fault, the fault does not appear to displace the seafloor and therefore is considered potentially active.

West of Santa Lucia Bank Fault, there are several major unnamed faults. These faults have lengthy (30 to 40 kilometers) sea floor expressions but they are not overlain by Quaternary strata. Thus, their age of last movement cannot be proven. Earthquake activity has been abundant in the vicinity of these faults (Section 4.1.4) which, in conjunction with the prominent sea floor expression, indicates that at least some of the faults in the region are active.

MINOR FAULTS IN THE VICINITY OF THE POINT PEDERNALES FIELD AREA

Based on regional offshore geologic maps, numerous northwest-trending minor faults exist in Area Study leases. Most of these features are confined to the Mainland Shelf with only a few mapped on the Arguello Slope. Several short fault segments (one-six miles) parallel the major Lompoc, Purisima, and Hosgri fault zones.

4.1.3.2 Onshore Faults

Eleven significant onshore faults have been identified, a few of which could influence the project with respect to seismic activity. No active faults have been delineated close to the onshore components. The pipeline corridor from Lompoc to Orcutt crosses two faults: the inactive Lions Head and the potentially active Pezzoni-Casmalia Fault. The potentially active South Branch of the Santa Ynez Fault and the inactive Lompoc-Solvang Fault (Santa Ynez River Fault) lie in the onshore Area Study between Lompoc and Gaviota.

Other minor onshore mapped faults within the Project Area are considered inactive and do not constitute a seismic hazard for the proposed project. The distant San Andreas Fault is discussed because of its capability of generating a great earthquake. The faults discussed below are shown on Figure 4.1-6.

SANTA YNEZ FAULT

This fault, the longest known fault in the Western Transverse Ranges, extends from the Point Conception area to near the junction of the Pine Mountain and San Gabriel Faults, a distance of about 144 kilometers (90 miles). Separation along the fault may amount to several kilometers both vertically and horizontally. Because the separation is so great, much controversy surrounds the interpretation of direction of movement. To the west along the trace, offset appears to decrease, and the fault becomes a south-dipping thrust that dies out into an anticline overturned to the north.

Near Gaviota Pass, the Santa Ynez Fault splits into north and south branches. The north branch extends due west from the split for about 6 kilometers. The existing data suggest a late Quaternary age of last movement on the south branch, indicating that the fault is potentially active. Though proof is lacking, the association of the south branch with the main branch, which was active in Holocene time, indirectly implies that the south branch may be active.

PEZZONI-CASMALIA FAULT

This northwest-trending fault extends along the southern margin of the Santa Maria Valley adjacent to the Casmalia and Solomon Hills [Buchanan, et al., 1978]. The 20-mile-long buried fault may be continuous to the southeast with the Los Alamos Fault [Woodring and Bramlett, 1950] and may further connect with the Baseline Fault at depth near Los Olivos [Sylvester and Darrow, 1979]. There is little evidence to indicate that these faults form a single zone of deformation, though the surface alignment of the features is strikingly coincidental and suggestive of a continuous fault zone.

Northwest of the Cachuma Reservoir, the Baseline Fault has produced a 30-foot (10-meter) high scarp within Quaternary-age alluvium [Sylvester and Darrow, 1979]. This scarp and other geomorphic evidence suggest the Baseline Fault is at least potentially active. In Los Alamos Creek just northwest of the Zaca Creek confluence is a 4-mile (6.4-kilometer) long fault segment of the Los Alamos Fault. Based on evidence of a fault line scarp, this segment has been categorized as active [Buchanan, et al., 1978].

Sylvester and Darrow [1979] have postulated that a small 2-mile (3.2-kilometer) long fault segment located in the north portion of the Orcutt Oil Field may represent the Pezzoni-Casmalia Fault. Woodring and Bramlett [1950] have shown this fault segment to possibly displace the Orcutt Sand of middle Pleistocene age. The location of the Pezzoni-Casmalia segment, its degree of connection with other segments, and age of last movement are controversial. For purposes of this study, the Pezzoni-Casmalia is considered potentially active.

SANTA MARIA RIVER-FOXEN CANYON-LITTLE PINE FAULT

Trending along the southwestern margin of the Southern Coast Ranges is an interconnected fault system -- consisting of the Santa Maria River, Foxen Canyon and Little Pine Faults -- which in part has been responsible for uplift of the local mountain masses. Combined, the three faults form a nearly continuous 62-mile (100-kilometer) long zone exhibiting a northwest trend [Hall, 1977]. The segments are considered potentially active.

SANTA MARIA AND BRADLEY CANYON FAULTS

Both faults trend to the north and northwest across the eastern portion of Santa Maria Valley northeast of Orcutt. Neither fault is exposed at the surface, but each is concealed under younger alluvial valley fill units [Worts, 1951]. Both faults displace the Paso Robles formation of early Pleistocene age [Worts, 1951]. Though actual minimum ages of last movement have not been documented, indirect evidence based on subsurface information suggests the faults have not displaced the Orcutt sand. Therefore, the faults are considered inactive.

ORCUTT OIL FIELD FAULTS

Woodring and Bramlett [1950] have mapped about 19 short and closely spaced east-west to north-south trending faults in the Orcutt Oil Field. Most are inferred and concealed. Based on available data, all these faults are considered inactive with the possible exception of the northernmost fault which may be coincidental with the postulated potentially active Pezzoni-Casmalia Fault.

RINCONADA FAULT

The Rinconada is the major fault in the Coast Ranges onshore. The fault system extends from the Monterey Bay region to the Big Pine Fault, a distance of about 300 kilometers, but only the northern portion of the fault has demonstrated Quaternary activity [Jennings, 1975]. Therefore, only that portion should be considered potentially active.

SAN ANDREAS FAULT

This fault forms the boundary between major crustal plates. Such boundaries are commonly the source of great earthquakes. In spite of the great distance to the fault, it is discussed because of its potential to generate long-period vibrations which may affect tall structures such as offshore oil platforms.

The San Andreas Fault extends from the Salton Trough area in southern California to the Cape Mendocino area in northern California, a distance of about 1,130 kilometers (700 miles). Based on historic behavior, it appears that the fault can be divided into at least three segments: northern, central, and southern. The central segment, which is closest to the Point Pedernales Field Area, ruptured during a large earthquake in 1857.

4.1.4 Seismicity

4.1.4.0 Earthquake History

Earthquake epicenters in the Study Region are shown on Figure 4.1-7. Notable features of the seismicity in this region are: 1) the relatively low level of activity (both frequency and magnitude) compared to the eastern Santa Barbara Basin, 2) the general random distribution of epicenters, and 3) the occurrence of a swarm of earthquakes in the vicinity of Santa Lucia Bank in October and November of 1969. Except for perhaps the Santa Lucia Bank swarm, none of the earthquake trends is readily correlated to known faults [Schell, 1979]. This may be due to long recurrence intervals for major faults, or to the poor location accuracy of seismographic networks in the area.

The largest earthquakes in the Study Region were the 1812, 1857, and 1927 earthquakes. The 1812 shock probably occurred within the Western Transverse Ranges province [U.S. Geological Survey, 1976; Toppozada, et al., 1980]. The magnitude and epicenter of this event are poorly known, but based on reports of damage and the occurrence of tsunamis, it appears to have been a shallow-focus, large-magnitude earthquake (M greater than 7.0) which occurred offshore in the Santa Barbara Basin. Several major faults in the vicinity of the presumed location are sizeable enough to have generated such a large earthquake, and thus no correlation can be made with confidence. The 1857 earthquake of magnitude about 8.0 occurred on the San Andreas Fault. The 1927 event of magnitude 7.3 [Gutenberg and Richter, 1954] was probably associated with one of the northwesterly-trending faults of the California Continental Borderland [Gawthrop, 1978; Hanks, 1979; Schell, 1979; Yerkes, et al., 1980]. Although some degree of controversy surrounds the call as to the responsible fault for this event, the presence of long active and potentially active faults such as the Santa Lucia Bank Faults, the Hosgri Fault, and the Offshore Lompoc Fault indicates that earthquakes in the 7.5 magnitude range can be generated by more than one source in this region.

Other notable events in the Study Region were the 1902 and 1915 Los Alamos earthquakes of about magnitude 5.5. These events were probably associated with onshore faults in the Los Alamos area which show evidence of very young, probably Holocene, near-surface displacements [Guptil, et al., 1980].

A recent example of the effects of a small to moderate magnitude earthquake on nearby oil platforms and related facilities is provided by the August 13, 1978, earthquake which occurred in the Santa Barbara Basin. The magnitude of the event was about 5.4 [Lee, et al., 1979; Miller and Felszeghy, 1978]. Strong-motion instruments recorded peak ground accelerations of about 0.44 g at the University of California and about 0.21 g in downtown Santa Barbara. The earthquake caused almost no damage to the 14 offshore oil platforms in the Santa Barbara Channel. At the ARCO and the Aminoil onshore oil production and storage facilities, minor damage was reported, consisting of minor cracks in concrete, broken water lines, downed power lines, and minor landslides along the bluffs. No damage was sustained by large oil storage tanks.

4.1.4.1 Maximum Earthquakes

Table 4.1-1 lists the maximum credible earthquakes (MCEs) considered capable of occurring on faults in the Central Santa Maria Basin region, based on seismological data such as maximum historical earthquakes and on geologic data such as fault-length and fault-displacement parameters. The length of a fault used to estimate an MCE is based on Albee and Smith [1966] who showed that faults rupture along 20 to 50 percent of their total lengths. The MCEs given in this EIS/R are based on 50 percent of the faults' mapped length, resulting in larger, or more conservative, MCEs. The MCEs were calculated using empirical data of Slemmons [1977] of fault length, surface-wave magnitude relationships.

4.1.5 Other Geologic Considerations

4.1.5.0 Offshore and Area Study

The general geologic setting of the offshore Central Santa Maria Basin and the surrounding area was described in previous sections. In addition to the geologic history, bathymetry-physiography, stratigraphy, structure, and

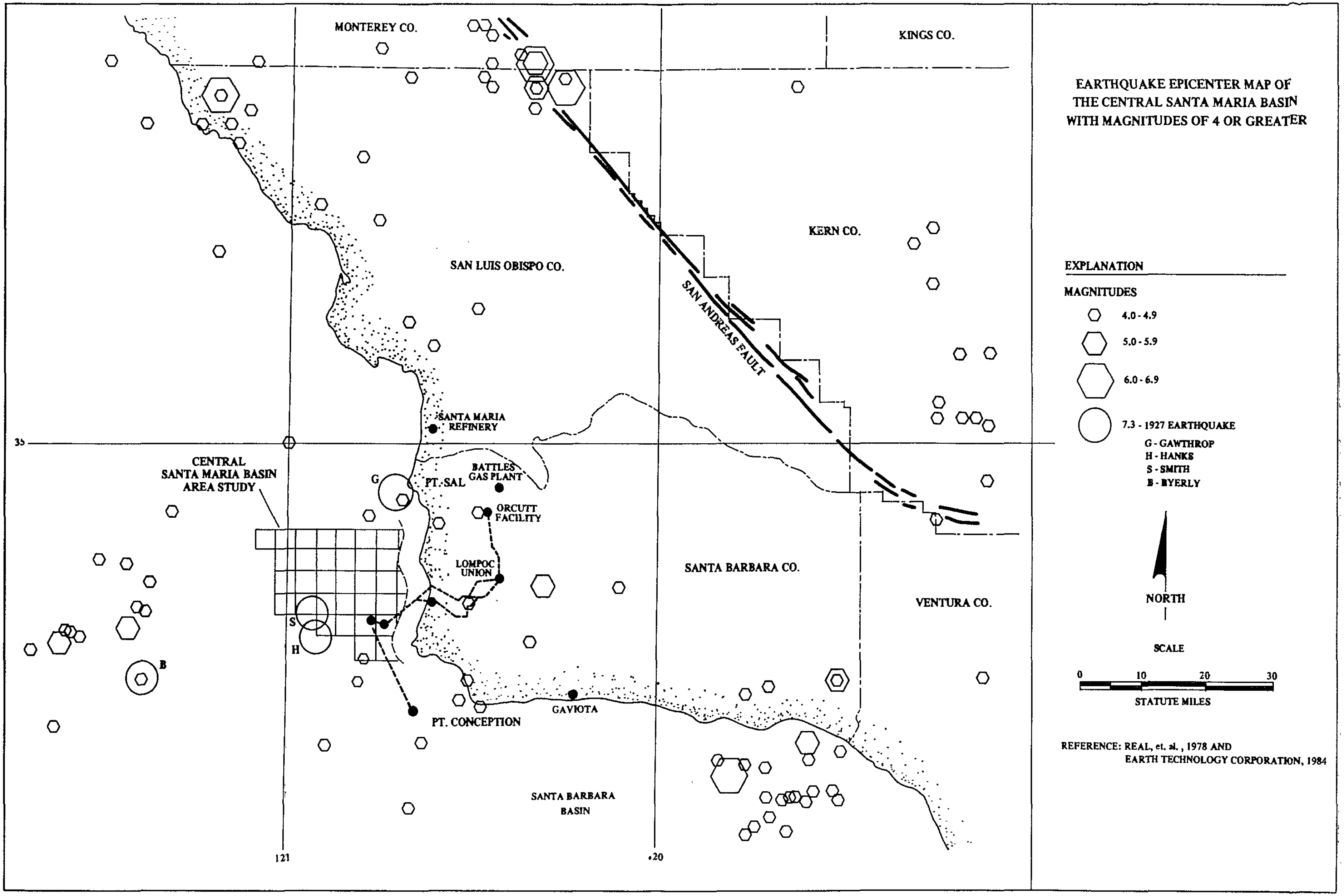

EARTHQUAKE EPICENTER MAP OF THE CENTRAL SANTA MARIA BASIN WITH MAGNITUDES OF 4 OR GREATER
MONTEREY CO.
KINGS CO.
KERN CO.
SAN LUIS OBISPO CO.
SAN ANDREAS FAULT
SANTA MARIA REFINERY
CENTRAL SANTA MARIA BASIN AREA STUDY
PT. SAL
BATTLES GAS PLANT
ORCUTT FACILITY
LOMPOC UNION
SANTA BARBARA CO.
VENTURA CO.
PT. CONCEPTION
GAVIOTA
SANTA BARBARA BASIN
G
S
H
B
35
121
120
EXPLANATION
MAGNITUDES
4.0 - 4.9
5.0 - 5.9
6.0 - 6.9
7.3 - 1927 EARTHQUAKE
G - GAWTHROP
H - HANKS
S - SMITH
B - BYERLY
NORTH
SCALE
0
10
20
30
STATUTE MILES
REFERENCE: REAL, et. al., 1978 AND EARTH TECHNOLOGY CORPORATION, 1984

FIGURE 4.1-

seismic environment of the Point Pedernales Field and Area, other geologically-related factors may provide, on a local basis, impacts or constraints on proposed future development offshore. These potentially inhibiting features or processes are commonly referred to as geologic hazards or design constraints. Non-hazardous features such as other mineral resource deposits and offshore fresh water aquifers that may also have an impact on petroleum-related development are also discussed.

Geologic hazards are defined as any geologic feature or process, existing or potential, that would inhibit the development of oil and gas resources. Hazards that have been identified in portions of the offshore Central Santa Maria Basin include seismicity, mass transport of unconsolidated to semi-consolidated sediments, active faults, steep (greater than 10 degrees) slopes and steep-walled canyons [Richmond, et al., 1981]. Geologic features whose potential impacts can feasibly be reduced through existing technology, design, or alternative siting or routing are considered to be geologic design constraints on development. These "second-order" features include buried channels, gas-charged sediments, shallow formational gas, and rock outcrops. Physical processes acting on the geological environment that are of potential concern include scour and erosion, uplift, subsidence, liquefaction, soil collapse, and the effects of tsunamis. These geologic features or processes (excluding faulting and seismicity, which were discussed previously) are discussed in general terms for the entire basin.

Potential geologic hazards and design constraints for the lease blocks and tracts in the Central Santa Maria Basin Study Area are summarized in Table 4.1-2 and shown in Figure 4.1-8. These data are taken from regional investigations [Richmond et al., 1981; Fairfield Industries, 1980; McCulloch, et al., 1982, 1980a, 1980b, 1977] and the geologic hazard reports presently on file with and under review by the Minerals Management Service.

ROCK OUTCROPS AND IRREGULAR SEAFLOOR TOPOGRAPHY

Rock outcrops and micro-relief features of the seafloor are generally not, in themselves, considered as hazards to seafloor facility development, though their existence could be an indicator of other geologic features or processes that may be hazardous such as faulting, mass movement, or gas venting. Such features may be constraints in siting or routing offshore facilities if they have considerable relief, steep slopes, or present rapid horizontal or vertical changes in the geotechnical properties of the seafloor.

In the Central Santa Maria Basin and surrounding region, rock outcrops are found in four general locations: in state waters along the rocky headlands; along the shelf-slope break and upper slope, especially in the area south and west of Point Arguello; as an elongated expression of the Lompoc Anticline in the north-central part of the area; and as a major topographic ridge just northwest of the northwest corner of the area.

Locally hummocky topography and individual craters, attributed to gas venting and/or the localized failure of gasified sediments, have been reported in lease blocks OCS-P 0433, -P 0424, -P 0496, and -P 0427. The individual craters may be several hundred feet across with vertical relief up to 20 feet.

TABLE 4.1-2
SUMMARY OF POTENTIAL GEOLOGIC DESIGN CONSTRAINTS
CENTRAL SANTA MARIA BASIN AREA STUDY (1)

Lease Sale(2) #53 Tract #	OCS Lease Block #	Hazard Survey Available	Tract Stipulated By MMS	POTENTIAL CONSTRAINTS (3)								
				Fault (*Active)	Mass Transport	Steep-walled Canyon	Rock Outcrops	Irregular Topography	Buried Channel	Shallow Gas	Gas-Charged Sediment	Seep
197	0492	No		X	X							
198	N/A	No		X	X							
199	N/A	No								X		
200	0424	Yes		*			X	X	X	X	X	X
201	0425	Yes		*			X	X	X	X		X
202	0426	Yes		*			X	X	X	X	X	X
203	0427	Yes	Yes	*							X	X
204	0493	No		X								
205	N/A	No								X		X
206	0429	No		X						X		X
207	0430	Yes		*			X	X	X	X	X	X
208	0431	Yes		*					X	X	X	X
209	0432	Yes	Yes	X						X	X	X
210	N/A	No	Yes	X			X					X
211	0507	No										
212	0494	Yes		X				X	X	X	X	
213	0495	Yes		X				X	X	X	X	X
214	0433	Yes		*			X	X	X	X	X	
215	0434	Yes		*			X		X	X		X
216	0435	Yes		X						X	X	X
217	0436	Yes	Yes	X						X	X	X
218	0508	No										
219	0496	Yes		X				X	X	X	X	
220	0497	No							X			
221	0498	No							X		X	X
222	0437	Yes		X			X		X	X	X	X
223	0438	Yes		X					X	X	X	X
224	0439	Yes		X						X	X	X
228	0440	Yes	Yes	X	X	X		X	X	X	X	X
229	0441	Yes		X					X	X	X	X
230	N/A	No		X								
233	0510	No	Yes			X		X	X	X	X	
234	0444	Yes		X					X	X	X	X

Notes:

(1) This table and maps shown in Figures 1.2.2-2, 1.2.4-2, and 1.5.1-1 are based on data from Richmond and others (1981a) modified by detailed information (where available) from Lease Block Geohazard Reports and Environmental Reports (Exploration) listed in the References.

(2) Tracts are listed in numerical order of Lease Sale 53 tract number. Only tracts within the Area Study are listed in the table although contiguous blocks are shown on the maps.

(3) Regional seismicity is considered a design constraint for all Lease Blocks in the Area Study.

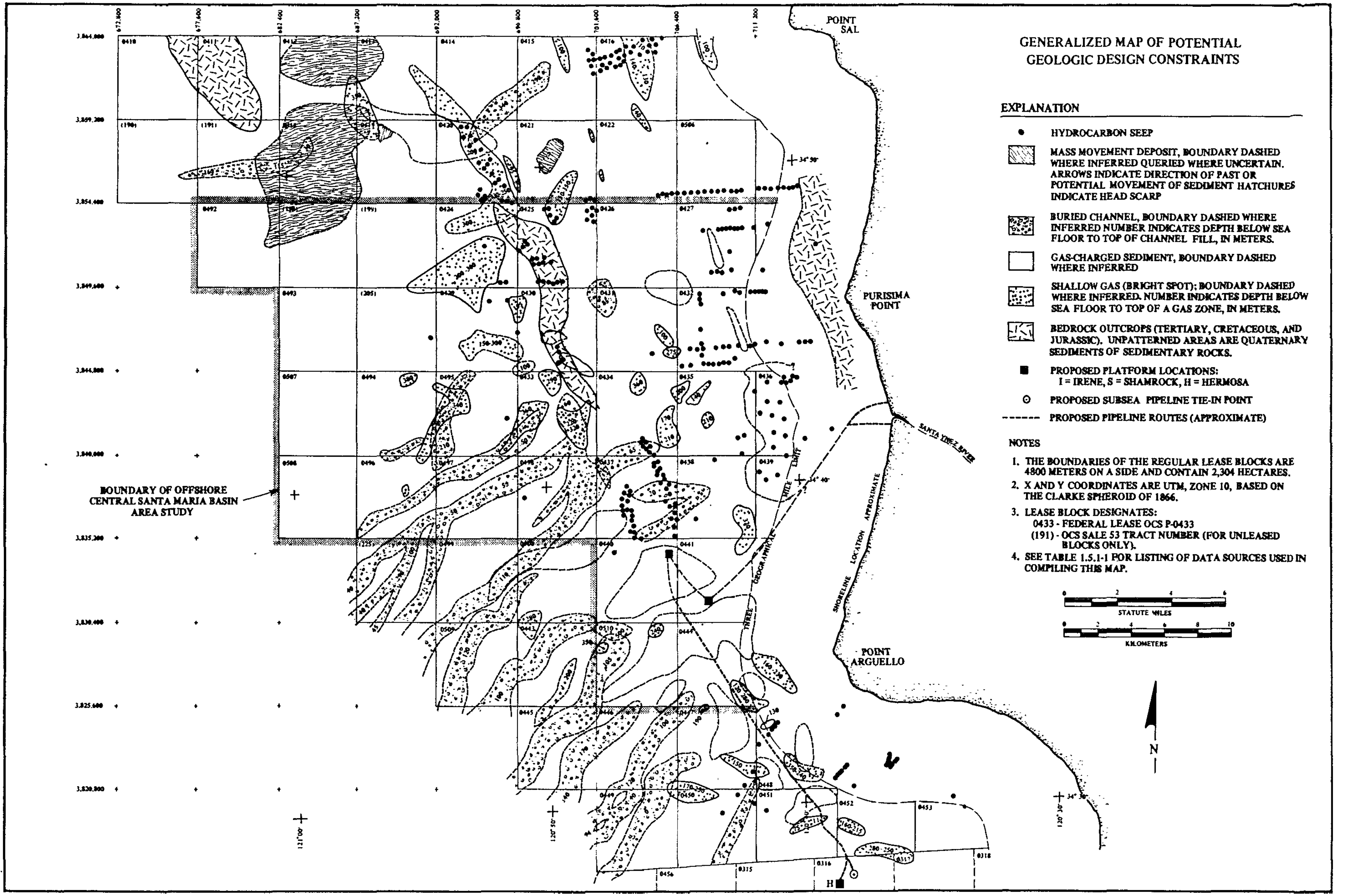

GENERALIZED MAP OF POTENTIAL GEOLOGIC DESIGN CONSTRAINTS
EXPLANATION
HYDROCARBON SEEP
MASS MOVEMENT DEPOSIT, BOUNDARY DASHED WHERE INFERRED QUERIED WHERE UNCERTAIN. ARROWS INDICATE DIRECTION OF PAST OR POTENTIAL MOVEMENT OF SEDIMENT HATCHURES INDICATE HEAD SCARP
BURIED CHANNEL, BOUNDARY DASHED WHERE INFERRED NUMBER INDICATES DEPTH BELOW SEA FLOOR TO TOP OF CHANNEL FILL, IN METERS.
GAS-CHARGED SEDIMENT, BOUNDARY DASHED WHERE INFERRED
SHALLOW GAS (BRIGHT SPOT); BOUNDARY DASHED WHERE INFERRED. NUMBER INDICATES DEPTH BELOW SEA FLOOR TO TOP OF A GAS ZONE, IN METERS.
BEDROCK OUTCROPS (TERTIARY, CRETACEOUS, AND JURASSIC). UNPATTERNED AREAS ARE QUATERNARY SEDIMENTS OF SEDIMENTARY ROCKS.
PROPOSED PLATFORM LOCATIONS: I = IRENE, S = SHAMROCK, H = HERMOSA
PROPOSED SUBSEA PIPELINE TIE-IN POINT
PROPOSED PIPELINE ROUTES (APPROXIMATE)
NOTES
1. THE BOUNDARIES OF THE REGULAR LEASE BLOCKS ARE 4800 METERS ON A SIDE AND CONTAIN 2,304 HECTARES.
2. X AND Y COORDINATES ARE UTM, ZONE 10, BASED ON THE CLARKE SPHEROID OF 1866.
3. LEASE BLOCK DESIGNATES:
0433 - FEDERAL LEASE OCS P-0433
(191) - OCS SALE 53 TRACT NUMBER (FOR UNLEASED BLOCKS ONLY).
4. SEE TABLE 1.5.1-1 FOR LISTING OF DATA SOURCES USED IN COMPILING THIS MAP.
STATUTE MILES
KILOMETERS
N
POINT SAL
PURISIMA POINT
POINT ARGUELLO
SANTA YNEZ RIVER
SHORELINE LOCATION APPROXIMATE
THREE GEOGRAPHICAL MILE LIMIT
BOUNDARY OF OFFSHORE CENTRAL SANTA MARIA BASIN AREA STUDY

FIGURE 4.1-2

SEAFLOOR CHANNELS AND BURIED CHANNELS

Slopes and submarine canyon walls are classified as either flat (horizontal), gentle (less than 5 degrees), moderate (5-10 degrees), or steep (greater than 10 degrees). Only steep-walled canyons and steep slopes, especially those with sediment cover, are considered to be hazards [Richmond, et al., 1981].

Buried channels are features that were cut during periods of lower sea level and subsequently infilled with sediments by transgressing seas or by shifting submarine canyon/fan systems. Shallow buried channels are constraints because of potential contrasts in geotechnical properties between the infilling sediments and the surrounding sediments. In addition, permeable channel fill can cause fluid loss during drilling [Richmond, et al., 1981]. Buried channels are found in about half of the Area Study leases. Many show a coincident location beneath present-day channels, are the same size and have the same northwest-southeast trend although they extend farther into the Basin than the existing features. The depth of burial beneath the seafloor ranges from 60 feet to over 600 feet and, within a single channel, increases towards the southwest.

MASS MOVEMENT

Among the most important conditions which contribute to a susceptibility for slope instabilities are thick deposits of poorly consolidated sediments on steep slopes. Sediments deposited on submarine slopes under normal conditions are at equilibrium with the depositional environment and should be stable on slopes up to the friction angle of the sediment (generally about 35 degrees). However, the frequent occurrence of downslope sediment movements on slopes of only a few degrees (less than about 10 degrees and as low as 1 or 2 degrees) indicates that external forces contribute to instability.

Areas with evidence of previous instability have a high potential for future instability and thus such areas impose a constraint on project development. Areas without evidence of previous seafloor instability may also pose a hazard if the sediment/slope angle conditions are similar to those where previous instabilities exist.

A large area of questionable mass transport has been mapped at the northwestern edge of the Area Study (Figure 4.1-8). It covers approximately 17 square miles in unleased tracts 191, 198, and leases OCS-P 0418 and -P 0492. Zones of mass movement have been mapped in the south Santa Maria Basin [ADL, 1984 and Richmond, et al., 1981]. These failures occurred along the steep slopes of the submarine canyons and in the vicinity of the shelf-slope break. However, other than the previously mentioned questionable feature in the northwest corner, no mass movement features have been reported by geologic hazard surveys of Area Study leases.

SHALLOW GAS, GASIFIED SEDIMENTS, AND SEEPS

Gas within the shallow sediment section generally occurs in three ways that require consideration during the siting, routing, and construction of offshore facilities: as pockets or zones within unconsolidated sediments (gasified sediments); as zones within the upper portions of the consolidated formations (shallow gas); and as gas seeps either in the form of gas bubbles (water column anomalies) or tar mounds on the sea floor. All three types of gas occurrences are found throughout the Area Study and are apparently concentrated in the eastern portion of the basin. This concentration may partially be a reflection of a more dense grid of seismic data than is found in the deeper water tracts in the western portion of the basin, but may also reflect the greater concentration of shallow faults and folds in the eastern portion of the basin. These near-surface structures may be acting as conduits for escape of gas from pressurized zones at depth.

GEOPRESSURE ZONES

To date about 30 exploratory wells have been drilled in the Arguello Field region in the southern Santa Maria Basin and there have been no reported cases of geopressure zones. At least five exploratory wells have been drilled in the Point Pedernales Field and apparently have not encountered any geopressured zones.

UPLIFT AND SUBSIDENCE

Uplift in the region appears to be relatively minor. The tectonics of the region is one of compression and appears to be represented by slight crustal uplift onshore in the Point Conception area of about 0.4 mm/year for the last 100,000+ years [Lajoie, 1982]. This is a slow rate of uplift.

The phenomenon of subsidence of the land surface has historically occurred in several areas of California as a result of groundwater withdrawal, hydrocarbon production activities, peat oxidation, and hydrocompaction of collapsible soils. The most common cause of subsidence in California is the withdrawal of subsurface fluids including oil, gas, and water. Probably the best documented case of oil production-related subsidence occurred in the Wilmington Oil Field where cumulative subsidence of 29 feet (8.8 m) occurred over the period from 1928 to 1970 at a maximum subsidence rate of 28 inches/year (71 cm/year) in 1951 [Mayuga and Allen, 1966].

A number of factors contribute to the potential for hydrocarbon withdrawal-related subsidence, including: predominance of unconsolidated, poorly cemented sandstone reservoir rocks; presence of unconsolidated, uncemented sediments overlying the oil reservoir; gently dipping (slightly deformed) strata; presence of normal (extensional) faulting; and large production volumes. The key factors related to the occurrence of subsidence at Wilmington were the presence of unconsolidated and uncemented sandstone reservoirs and the high rates of production which led to a significant reduction in reservoir pressures and subsequent reservoir collapse.

OFFSHORE FRESHWATER AQUIFERS

A major portion of the water supply of the coastal area of central California comes from local groundwater basins. Aquifers in the coastal plains may continue offshore, and the freshwater they contain could be an integral part of the area's water resources. Groundwater in the area of

Arroyo Grande, 20 miles north of the Area Study, and in the Oxnard Plain, appears to extend offshore. These occurrences are associated with extensive onshore fresh water aquifers that are part of a fluvial-deltaic sequence associated with larger rivers [Exxon Company, U.S.A., 1984].

The Santa Ynez River, located on the eastern edge of the central Santa Maria Basin may provide a source for offshore fresh water. The Point Pedernales Field is approximately 9 miles southwest of the Santa Ynez River mouth. Neither operator has reported encountering aquifers having the potential to supply fresh water for onshore use as a result of their exploratory drilling in leases -P 0438, -P 0440, or -P 0441 [Robert Dundas Associates, 1984; Hooks, McCloskey and Associates, 1983].

OTHER MINERAL RESOURCES

No significant non-petroleum mineral resources are known to occur within the offshore Central Santa Maria Basin. The most extensive expected offshore resources along the shelf would be sands and gravels deposited by the westward flowing rivers. Such deposits have potential use as a construction aggregate or for beach replenishment. However, the deposits are not being exploited and are apparently not presently of commercial value.

4.1.5.1 Onshore

Other geologic factors which may provide constraints or impacts on the onshore project facilities include erosion, scour, landsliding, liquefaction, expansive and collapsible soils, and other mineral resources. These are discussed in this section.

EROSION

The soils encountered in the area are very erodable; however, their erosion is generally arrested by vegetative cover. The erosional characteristics of soils encountered in the Project Area are discussed in Section 4.3.1. Windblown (aeolian) erosion is prevalent at landfall locations for the pipelines and the power cable, as evidenced by the presence of extensive dunes.

SCOUR

Scour as discussed in this section is defined as removal of soil particles along stream channels caused by concentrated flow. In addition, scour is caused in the littoral zone by wave action along the ocean front. The former type of scour is prevalent throughout the Santa Ynez River flood plain and seems to be the primary reason for the destruction of what used to be the 35th Street Bridge across the Santa Ynez River, movements in the railroad trestle at the mouth of the Santa Ynez River, and maintenance problems with the 13th Street Bridge. Scour along stream beds occurs during floods, at which time the stream bottom soils apparently become fluid to some depth. For practical purposes, estimates of scour depth have been related to rise in river stage during flooding. These reports [Terzaghi and Peck, 1967] indicate that the depth of scour can be as great as three to four times the rise in river stage.

LANDSLIDES

The occurrence of landslides is related to a variety of factors. Instability may be initiated by such factors as increases in hydrostatic head (due to excess precipitation or changes in drainage characteristics), excess load, removal of lateral or underlying support at the toe of a slope, oversteepening of a slope, exposure of bedding planes that dip out of slope, removal of vegetation, seismic activity, or combinations of these factors.

Landslides can be classified into four general types: falls, rotational slides, translational slides, and flows.

Rotational landslides predominate in the Rincon Formation and associated soils where weathered material exhibits large dessication cracks during dry periods. Such cracks facilitate infiltration of precipitation following dry periods, which in turn can lead to temporary saturated conditions along the contact between weathered and unweathered material, increased hydraulic head, decreased shear strength of the weathered material, and increased likelihood of failure. Translational landslides typically occur along bedding planes in the Monterey Formation. The Monterey contains frequent interbeds of bentonite which, when saturated with water, expand and form lubricated surfaces which act as sliding planes for landslides.

Review of aerial photographs as part of this project indicated that a number of small to large (approximately 30,000 to 1,600,000 square feet or 2,700 to 144,000 square meters) landslides exist in the Project Area. The slides are found in three general locales: on the north-facing slopes of The Lompoc Terrace, near major drainage channels, and in the Purisima Hills.

LIQUEFACTION

Liquefaction, as discussed here, is the almost complete loss of strength of saturated sandy (or silty) soil accompanying ground shaking during an earthquake, and which may cause water to rise to the ground surface, usually carrying sand with it and forming sand "boils." On sloping ground, liquefaction will usually result in slope failure. Although there is no historic evidence of liquefaction in the onshore Project Area, most of the low coastal plain and valley bottom underlain by alluvium has a moderate potential for liquefaction. Since depth to groundwater is one of the key factors in determining liquefaction potential, liquefaction is not considered to be a problem where the depth to water exceeds 50 feet. See Figures 2.3-2 and 2.3-3 in Technical Appendix C for areas where depth to groundwater is less than 50 feet.

EXPANSIVE AND COLLAPSIBLE SOILS

Certain soils, when exposed to wetting as a result of natural phenomena or construction activities, undergo volume change. Such volume change is generally limited to the uppermost few feet (less than 10 feet) and is of interest in the engineering design of structures. In general, clays are expansive, and loose deposits of sand or silt are collapsible. The limited occurrences of expansive and collapsible soils are discussed in site-specific sections of this report.

OTHER MINERAL RESOURCES

Onshore, several economic resources have been identified close to proposed facilities. The pipeline from the Lompoc facility to the Orcutt Pump Station would traverse the active Lompoc Oil Fields located at the western edge of the Purisima Hills, and would skirt the western edge of the Orcutt Oil Field about 1 mile (1.6 kilometers) south of Orcutt. Diatomite is found extensively within the Sisquoc formation which is exposed throughout the Santa Maria Basin and Western Transverse Ranges. Diatomite is quarried in the hills about 2 miles (3.2 kilometers) south of Lompoc and just west of Highway 1 in Salsipuedes Creek.

Other recognized or potential mineral resources in the Study Region include impure diatomite, tar sands (which have not been quarried in the area), limestone for use as road grade, sand and gravel, and bentonite. For the most part, these resources are not currently being exploited, and in any event, are not in the Project Area.

4.1.6 Site Geology - Offshore Facilities

4.1.6.0 Introduction

The general geologic setting of the Central Santa Maria Basin and the Point Pedernales Field was presented in Sections 4.1.1. to 4.1.5 of this EIS/EIR. The proposed facilities are approximately located on the figures presented in those sections. This portion of the report considers in greater detail the site-specific geology of the seafloor tracts in the immediate vicinity of the proposed facilities.

4.1.6.1 Subsurface Geologic Setting of the Point Pedernales Field

The Point Pedernales Field will be developed from a northwest-trending, doubly-plunging, anticlinal structure. Several faults mapped in apparent association with this anticline are considered as second-order structures related to the formation of the fold. All of the faults in the area are overlain by unfaulted Holocene sediments. Because these faults displace Pleistocene, but not Holocene sediments, they are considered potentially active, but not active [Dames and Moore, 1984].

A representative stratigraphic column for the Point Pedernales Field area is shown in Figure 4.1-4. Two potentially productive hydrocarbon-bearing intervals are present in the area: a pre-Miocene sequence of three rock units ranging in age from pre-Cretaceous to upper Cretaceous, and the Miocene Monterey Formation. Minor heavy hydrocarbon shows have been encountered in the Pliocene Foxen sandstone; however, this interval is not currently of economic interest [Exxon, 1984]. The Miocene Monterey Formation is the principal hydrocarbon objective in the Point Pedernales Field.

4.1.6.2 Seismicity Considerations

Earthquakes in proximity to proposed facilities are small-magnitude events (less than 5.0). The earthquakes are randomly scattered through the region, are not associated with known active faults, and do not indicate any zones of intense seismicity or any seismically active faults. They do not produce surface rupture and generally have magnitudes in the 3.0-4.0 range. These characteristics suggest they are typical of background seismicity as seen in other parts of California. The earthquakes of most concern to the platform sites are the 1927 event of magnitude 7.3 and the 1812 event estimated to have been magnitude of 7.1.

As an example of the anticipated degree of ground motions within OCS-P 0441 (Platform Irene location), a probabilistic seismic hazard analysis was performed by The Earth Technology Corporation [1984] in response to required submittals of the Platform Verification Program administered by the Minerals Management Service. Results indicate that 0.15 g, 0.20 g and 0.25 g ground motions were possible with return periods of 200, 400 and 600 years, respectively. Earth Technology [1984] pointed out that future seismic activity may be greater than that recorded in the last 50 years. For example, a maximum or rare event of magnitude 7.5 on the Hosgri fault (10.8 miles or 18 kilometers distance) could substantially affect the proposed Platform Irene to higher degrees than the probabilistic analysis suggests. Using a deterministic analysis, they indicate that medium level ground motion for a magnitude 7.5 event would increase the expected acceleration to 0.30 g for the 200, 400, and 600 year ground motions.

No other such probabilistic studies have been performed for the other offshore components. This analysis [Earth Technology, 1984] may be considered fairly typical for all the proposed facilities offshore. Deterministic values were calculated using regression analyses [Campbell, 1981] and are shown in Table 5.1-2 of Section 5.1 for each project component.

4.1.6.3 Platform Irene and Associated Pipelines

LEASE OCS-P 0441

Water depths at the proposed platform site are about 243 feet, and range from 170 feet to 292 feet (52 meters to 89 meters) in the tract. The seafloor dips west-southwest at less than 0.5 percent. It is generally smooth with the exception of a few isolated depressions with relief up to 15 feet [Nekton, 1981].

Horizontally stratified late Quaternary (Holocene-late Pleistocene) unconsolidated sediments unconformably overlie eroded and folded older sediments. Late Quaternary sediments range from approximately 50 feet to 150 feet (15 meters to 50 meters) in thickness and consist of sand and silt. They are undisturbed except for a few small, isolated collapse features. This unit is about 83 feet (25 meters) thick at the proposed platform site.

The primary subsurface structure in OCS-P 0441 is the northwest- trending anticline that serves as the hydrocarbon trap. Faults have been inferred on both flanks of the anticline but are not major through-going structures and do not disturb the late Quaternary sediments. They are considered potentially active.

Potential geologic hazards and design constraints for Lease OCS-P 0441 are shown in Figure 4.1-9. These include the aforementioned faults, shallow gas deposits, gas charged sediments, and seeps. Shallow gas is abundant near the proposed platform site, generally at depths of 25 feet (7.5 meters) or less. Gas is also present in the older rocks at several locations. No other geological features or conditions that would present possible hazards or constraints to the platform are known to exist at present [RDA, 1984].

GEOTECHNICAL CONSIDERATIONS FOR PLATFORM IRENE

The primary reference for geotechnical conditions at the site of Platform Irene is a project-specific report by McClelland Engineers Inc. [February, 1984]. In addition, the geohazard surveys and geophysical profiles were reviewed.

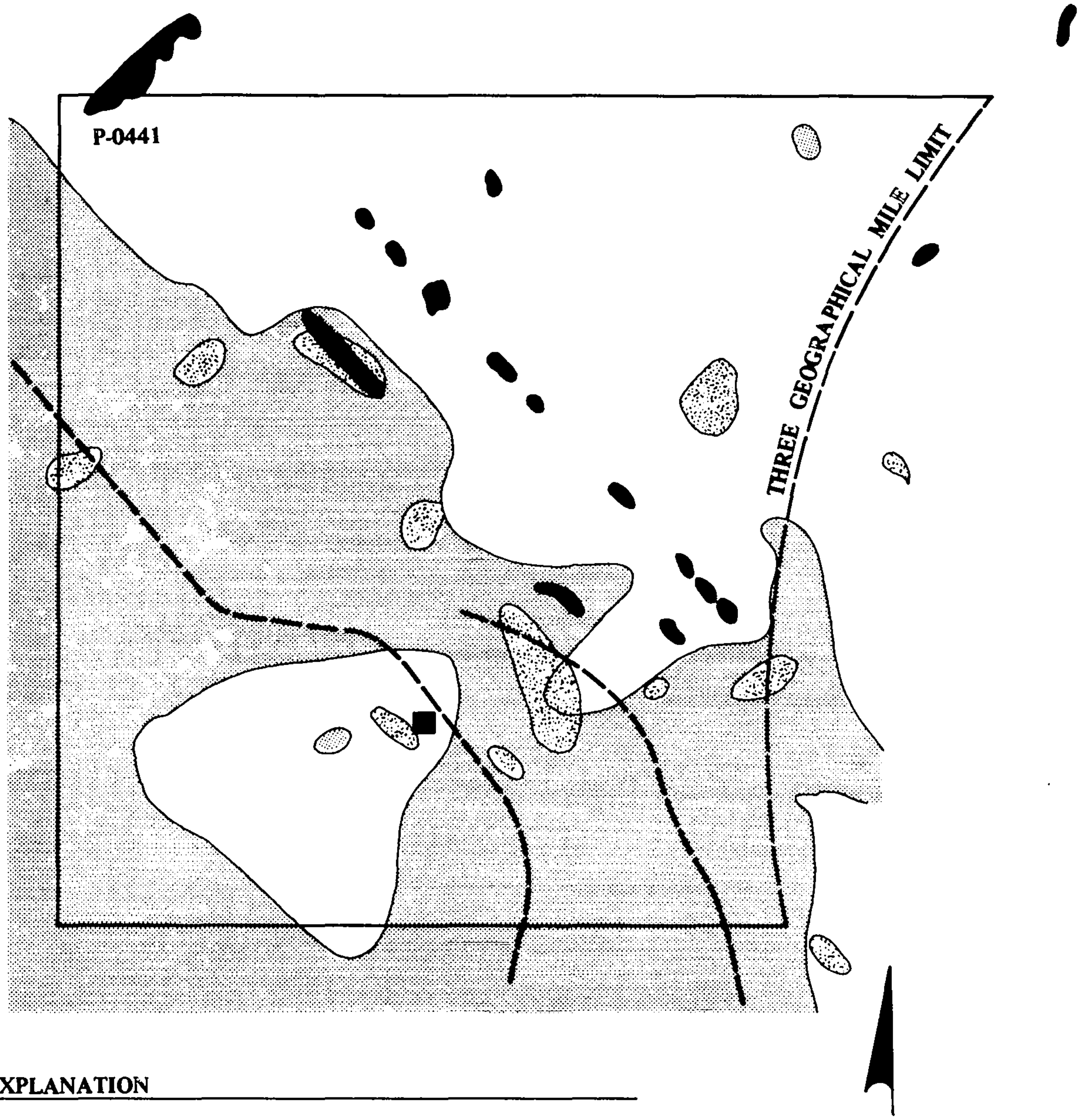
Three layers of geotechnical significance exist at the site: 0 to 58 feet, 58 to 83 feet, and 83 to 286 feet. The first layer can be classified as a clayey silt with varying content of sand. In general, the strength and foundation characteristics of the materials are moderate in the uppermost layers and increase with depth while permeability is low in all layers and decreases with depth. Liquefaction potential is estimated to be low under seismic shaking conditions.

PROPOSED PIPELINE ROUTE TO SHORE

Information on the proposed pipeline route to shore comes primarily from the McClelland [1983] hazard survey. The route extends northeastward from the platform site for approximately 10 miles (Figure 4.1-10). At a water depth of about 60 feet, the route bends to the east and comes ashore just north of the Santa Ynez River mouth. Water depths along the pipeline route decrease from 243 feet at the platform site. The apparent seafloor slope measured along the route is toward the southwest with slopes varying from about 0.3 percent (15 feet/mile) to 0.8 percent (40 feet/mile).

The seafloor sediment unit is a clayey silt with varying sand content at the platform site and becomes progressively sandier toward shore. The thickness of the upper (Holocene-late Pleistocene) sediment unit varies from 83 feet at the platform site to a maximum of 130 feet and then thins to 0 feet at a water depth of approximately 30 feet. Older rocks crop out on the seafloor along the route approximately 3,000 feet to 4,000 feet offshore.

Shallow gas and gasified sediments along the route are illustrated in Figure 4.1-10. Gasified sediments are abundant in the vicinity of the platform. Shallow gas deposits are locally present in the older rocks along the southwestern portion of the route. Although seismic records do not indicate shallow gas or gasified sediments in the northeastern part of the



EXPLANATION

GAS CHARGED SEDIMENTS AT DEPTH. (BELOW THE QUATERNARY INTERVAL)

MINOR WATER COLUMN ANOMALIES AND ANOMALY ZONES

GAS CHARGED SEDIMENTS

INFERRED FAULT

APPROXIMATE LOCATION OF PROPOSED PLATFORM IRENE
SEE FIGURE 1.6.4-7 FOR DETAIL OF PLATFORM SITE AND PIPELINE ROUTE

SOURCE: NEKTON 1981 .

POTENTIAL GEOLOGICAL CONSTRAINTS
LEASE OCS P-0441

FIGURE 4.1-9

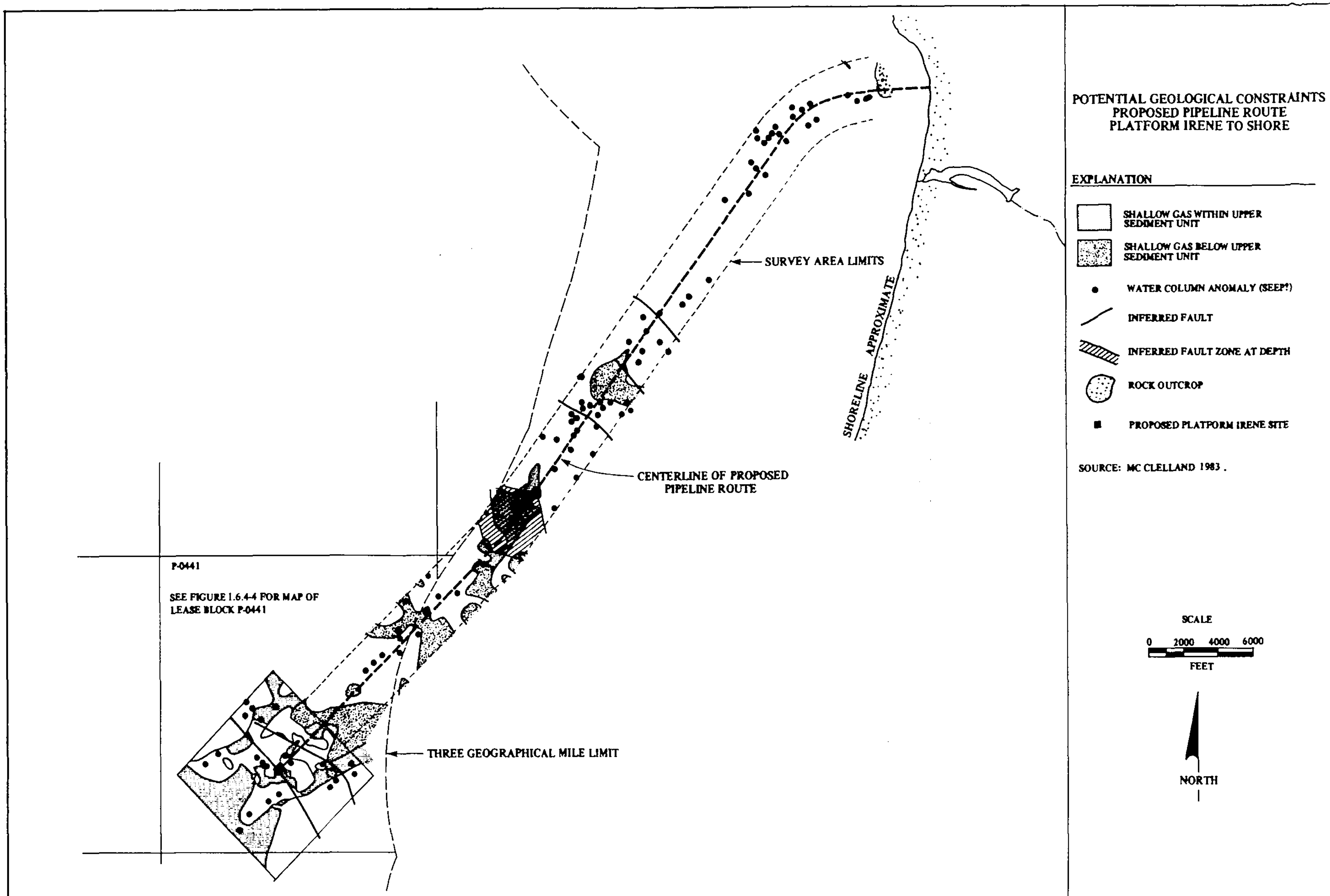

POTENTIAL GEOLOGICAL CONSTRAINTS
PROPOSED PIPELINE ROUTE
PLATFORM IRENE TO SHORE
EXPLANATION
SHALLOW GAS WITHIN UPPER SEDIMENT UNIT
SHALLOW GAS BELOW UPPER SEDIMENT UNIT
WATER COLUMN ANOMALY (SEEP?)
INFERRED FAULT
INFERRED FAULT ZONE AT DEPTH
ROCK OUTCROP
PROPOSED PLATFORM IRENE SITE
SOURCE: MC CLELLAND 1983 .
SCALE
0 2000 4000 6000
FEET
NORTH
SURVEY AREA LIMITS
SHORELINE APPROXIMATE
CENTERLINE OF PROPOSED PIPELINE ROUTE
P-0441
SEE FIGURE 1.6.4-4 FOR MAP OF LEASE BLOCK P-0441
THREE GEOGRAPHICAL MILE LIMIT

FIGURE 4.1-10

route, numerous water column anomalies were mapped -- possibly indicating gas bubbles escaping from the sea floor. Other possible explanations for the anomalies include fish, other marine life, or instrument noise [McClelland, 1983]. The littoral regime at landfall is discussed in Technical Appendix D, Section 2.1.2, and Section 4.4 of the EIS/EIR.

4.1.6.4 Shamrock Project and Associated Pipelines

LEASE OCS-P 0440

The proposed Shamrock Project platform would be located in the northeast quarter of OCS-P 0440 where the water depth is about 277 feet (Figure 4.1-11). Water depths in the block range from 250 feet in the northeast to over 1,000 feet in the southwest corner. Bottom slopes in the eastern portion of the block are about 1 percent (50 feet/mile). In the southwest and northwest corners of the block the seafloor has been incised by two canyons. Slopes on the canyon walls reach 45 degrees. Slump blocks and slope failure have been noted in this area. The distance from the nearest canyon to the proposed platform site is approximately 6,000 feet. In the eastern half of the lease there is an extensive area of shallow gasified sediments as well as numerous gas vents or seeps. Structurally, the major feature is the doubly-plunging structure discussed in Section 4.1.6.1. Faults are located along the flanks of the anticlinal structure, but are at least 4,600 feet from the platform site and do not appear to disrupt the Holocene.

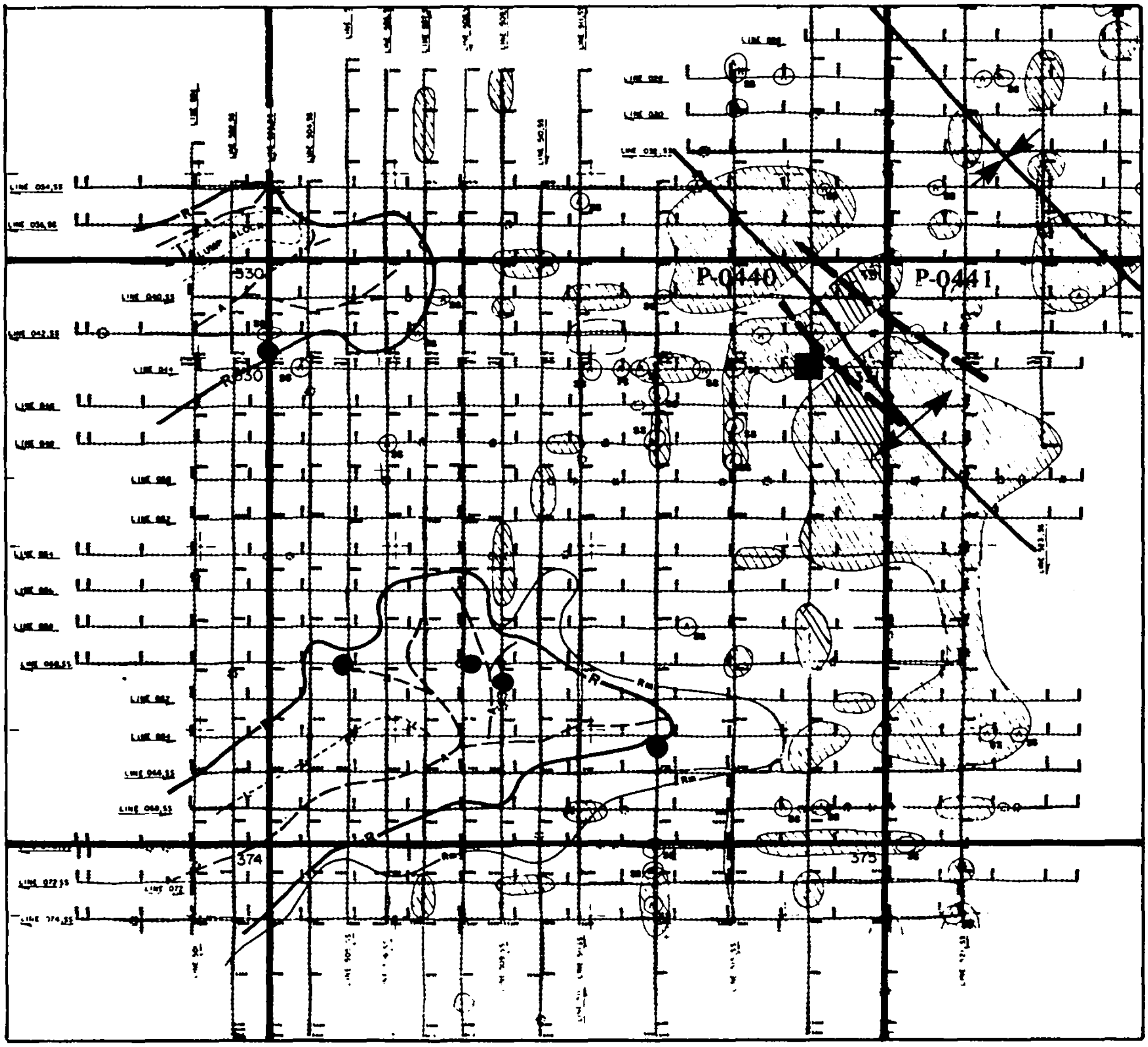
GEOTECHNICAL CONSIDERATIONS FOR SHAMROCK PROJECT PLATFORM

Six layers of geotechnical significance exist at the site of the Shamrock Project platform: 0 to 47 feet (0 to 14 meters), 47 to 82 feet (14 to 25 meters), 82 to 101 feet (25 to 30 meters), 101 to 182 feet (30 to 55 meters), 182 to 265 feet (55 to 80 meters), and 265 to 355 feet (80 to 107 meters) [McClelland Engineers, Inc., 1984]. The borings indicate that the surficial seafloor sediments at the Shamrock Project platform site consist of a thin layer of very soft clayey silt a foot (0.3 meter) or less thick. This surficial layer grades into a slightly clayey silt that extends 47 to 51 feet (14 to 15 meters). These soils are interpreted to be of recent origin and are in a relatively low state of consolidation.

Underlying layers are, in order, non-plastic sandy silt, a slightly clayey silt of moderate plasticity, a low-plasticity sandy silt with interspersed cemented layers, a silt of low to moderate plasticity and zones of cementation, and a dense to very dense sandy silt with low or no plasticity. Layers are increasingly consolidated with depth.

PIPELINE TO PLATFORM IRENE FROM PROJECT SHAMROCK

A proposed pipeline would extend southwest from the Project Shamrock platform to Platform Irene, a distance of approximately 10,000 feet (3100 meters). This pipeline would begin at a water depth of 283 feet (88 meters) at the Project Shamrock platform and head upslope to Platform Irene at a water depth of 235 feet (72 meters). The average slope along this route is 0.5 percent.



SOURCE: SEA TALES, 1982

EXPLANATION

SHALLOW GAS
CHAOTIC REFLECTORS
PINNACLE
WATER COLUMN ANOMALY (SEEP?)
CANYON RIM
CANYON AXIS
PROPOSED PLATFORM FOR SHAMROCK PROJECT
ANTICLINE
SYNCLINE
INFERRED FAULT AT DEPTH

NORTH

0 4 8
KILO FEET

POTENTIAL GEOLOGICAL CONSTRAINTS
LEASE OCS P-0440

FIGURE 4.1-11

The surficial sediments are sandy and clayey silts, and thicken from approximately 5 feet (15 meters) at the Shamrock site to 90 feet (27 meters) at Irene. No faults have been mapped as extending into or disrupting the surficial sediment (Holocene age) section along the pipeline route. (Figure 4.1-12).

The entire pipeline route, except for the last few hundred feet, crosses an area of gasified sediments. There is no evidence, in this area, that the gas has lead to failure or disruption of the near surface sediment or seafloor. No evidence of subsurface sags or gas vents was noted. No other geological design constraints have been mapped along this route.

4.1.6.5 Alternative Pipeline Route to Hermosa or Subsea Tie-in Location

The Shamrock to Hermosa route would extend southeastward along the shelf and terminate at the proposed Platform Hermosa or at a subsea tie-in to the proposed PAOS/PAGS pipeline extending from Hermosa (Figures 4.1-12 and 4.1-13). The route generally parallels the shelf between the 260- and 280-foot contours. Slopes along this portion of the route are less than 1 percent. In Lease -P 0451, the route heads downslope terminating at a water depth of 620 feet at Hermosa or 400 feet at the tie-in. Slopes along this portion of the route may approach 6 to 8 percent.

The surficial sediments along the route are sandy or clayey silts. In the southern portion of the route, a series of rock outcrops occurs along the shelf-slope break. These outcrops have a local relief of 1-18 feet, and vary in size from a few feet up to dimensions of 3,000 feet by 2,000 feet. Surficial sediments adjacent to the larger outcrops show evidence of current scouring as far as 200 feet from the outcrops. The sinusoidal route of the proposed pipeline in the southern area avoids the outcrops. The northern portion of the route crosses the previously discussed area of gasified sediments but the southern portion is free of near surface gas features. This route crosses several faults that do not affect surficial Holocene-late Pleistocene sediments and are inferred to be inactive [EPRCo, 1984].

4.1.7 Site Geology -- Onshore Facilities

4.1.7.0 Seismic Considerations for Onshore Facilities

Earthquakes near the onshore facilities are generally small events of a magnitude less than 4.0. Exceptions are noted in site-specific discussions. There are other more distant events in the 4.0 to 5.0 range. Earthquakes within 10 miles (16 kilometers) of the proposed facilities are randomly scattered and do not indicate any zones of intense seismicity or any known seismically active faults. Their random distribution suggests they are typical of background seismicity. Earthquakes of most concern are likely to occur west of the site offshore on one of the major faults such as the Hosgri or Santa Lucia Bank Faults.

4.1.7.1 Lompoc Dehydration Facility (Site 4)

Site 4, the preferred site for the Lompoc Dehydration Facility, is located at the northern extent of Burton Mesa immediately south of the Purisima Hills, on a broad planar alluvial surface that grades gently to the south at about 5 degrees (see Figure 4.1-14). This very low relief, nearly featureless surface is about 1,000 feet (310 meters) wide east to west and 2,800 feet (558 meters) long north to south. Irregular smooth, rolling hills of low relief surround this property to the east, south and west. About 500 feet (155 meters) to the north of the site, the Purisima Hills rise abruptly about 250 feet (78 meters) above the mesa surface. The slopes of the Purisima Hills are deeply incised, with one prominent valley lying immediately to the north of the site.

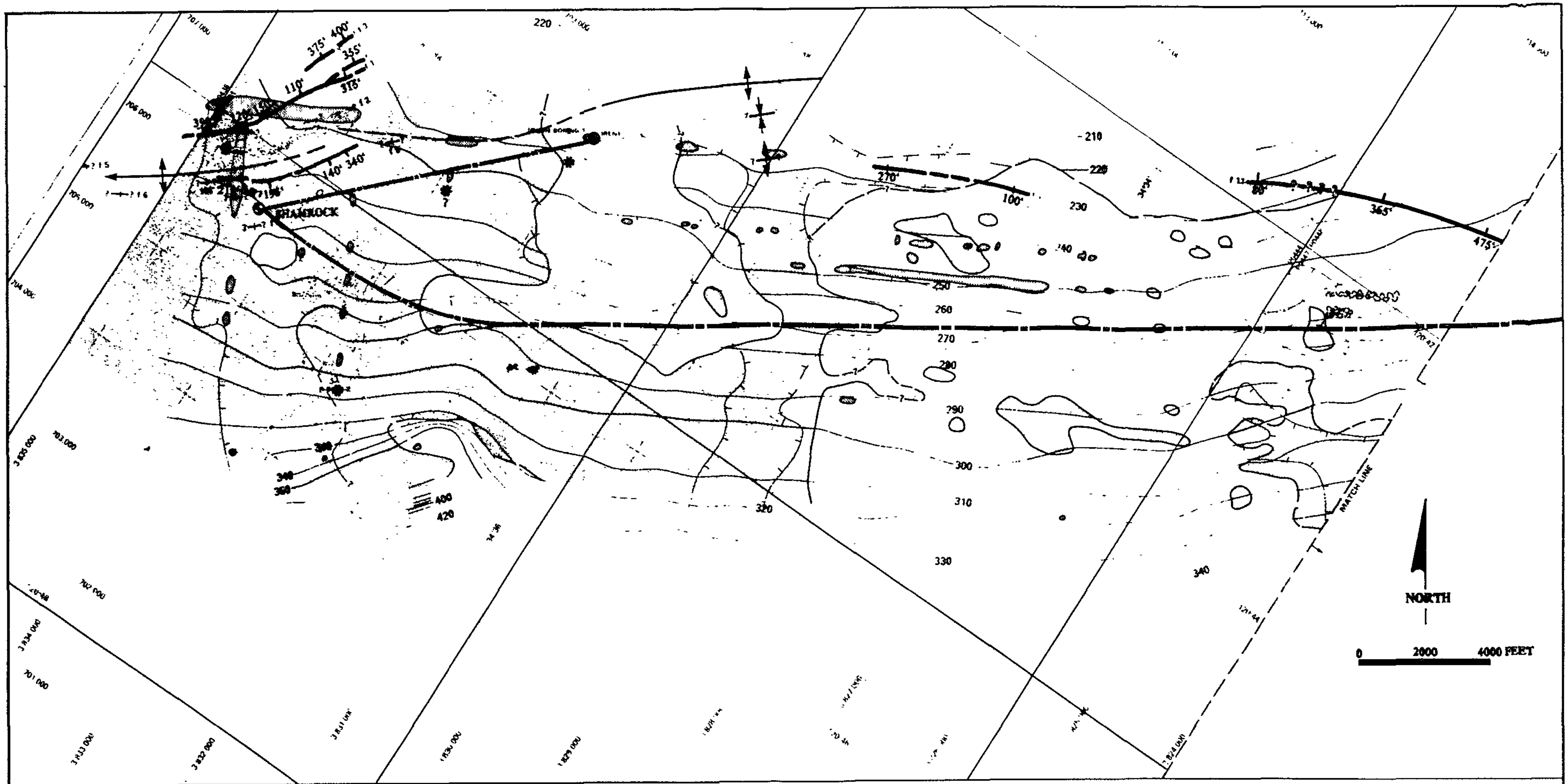
The sandy alluvium is underlain by the Plio-Pleistocene age Paso Robles Formation. A small exposure of upper Pliocene Age Careaga Sand underlies the northern quarter of the site. Below these formations, the normal succession of Tertiary Age sedimentary rocks extend down to the Franciscan basement, estimated to be at a depth of about 4,000 feet (1,240 meters) below the surface.

The east-west trending Purisima anticline axis is located less than 1,000 feet (330 meters) north of Site 4, and has been faulted by a feature postulated to be a major structure associated with the inactive Lion's Head fault [Sylvester and Darrow, 1979], though this interpretation is a point of controversy. A 4.1-magnitude earthquake occurred on November 30, 1941, close to the site.

Soils at the site generally range from sandy clays to clayey sands with the sand portion extending all the way from coarse to fine with limited portions of fine gravel. Because of the high clay content, these soils are not susceptible to liquefaction. Earthquake-induced subsidence or collapse is also not a problem. Settlement considerations will probably govern the design of foundations. The soils are easily excavatable and able to withstand moderate slopes as long as they are protected against erosion.

4.1.7.2 Orcutt Pump Station

The Orcutt Pump Station site is located at the southwest margin of the Santa Maria Valley (see Figure 4.1-15). The graded property lies on top of an elevated surface which represents the valley floor prior to incision of two main drainages located close to the site. The confluence of the north-flowing Graciosa Creek and the west-flowing Orcutt Creek lies about 1,500 feet (465 meters) to the northwest of the site. The Casmalia and Solomon uplands commence rising about 2,000 feet (620 meters) to the southwest and southeast, respectively, and are separated by Graciosa Canyon, a very linear prominent north-flowing drainage. The surface underlying the site has been mapped as a thin veneer of older sand dune deposits, overlying a flat erosional surface of Orcutt Sand. There are no mapped or known faults that project through or towards the facility. The closest mapped fault (Pezzoni-Casmalia) lies about 7,000 feet (2,170 meters) to the south. Earthquakes in proximity to the site are small events of a magnitude less than 4.0, with the exception of the 4.1-magnitude earthquake which occurred close to the site on June 21, 1966.



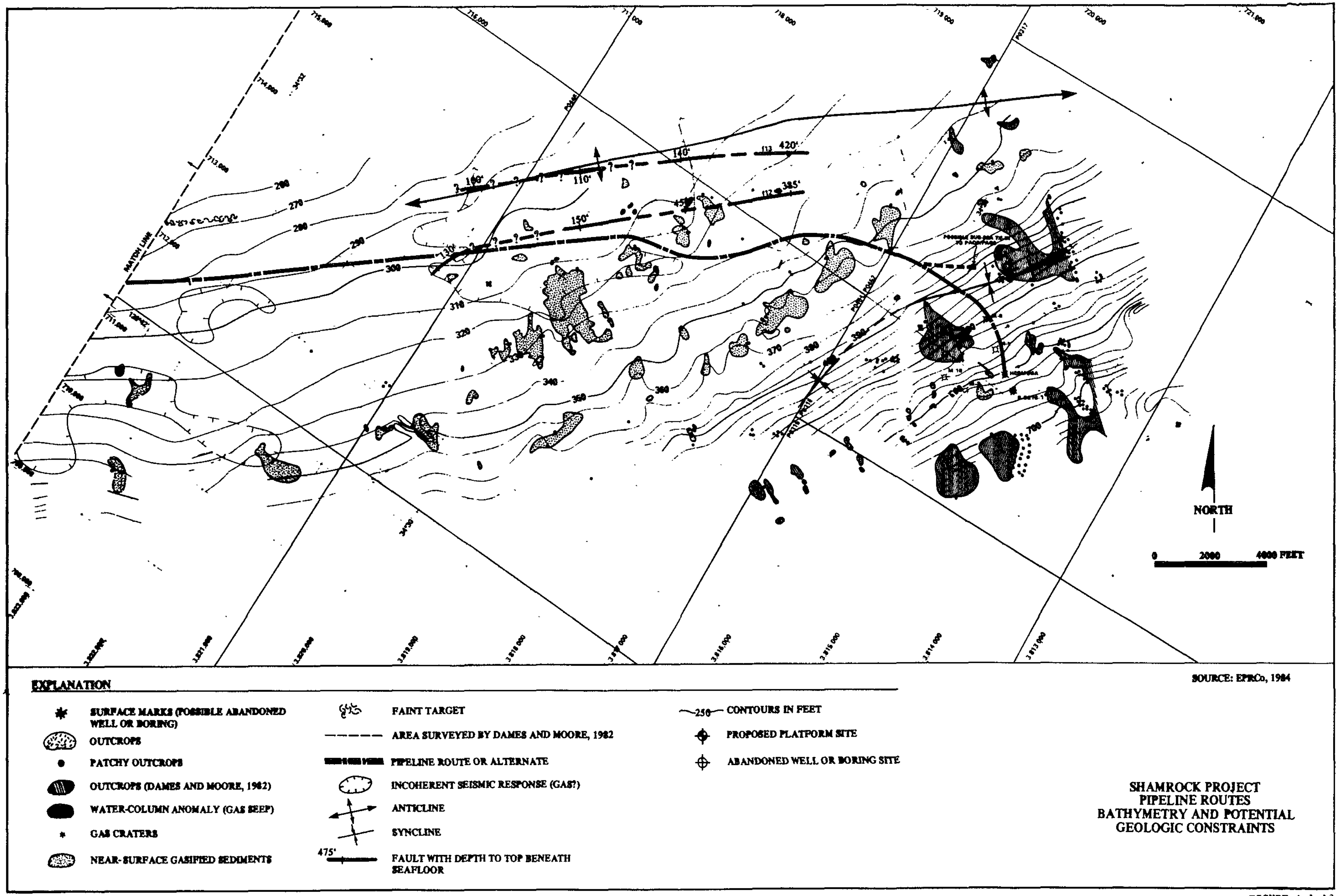
EXPLANATION

- SURFACE MARKS (POSSIBLE ABANDONED WELL OR BORING)
- OUTCROPS
- PATCHY OUTCROPS
- OUTCROPS (DAMES AND MOORE, 1982)
- WATER-COLUMN ANOMALY (GAS SEEP)
- GAS CRATERS
- NEAR-SURFACE GASIFIED SEDIMENTS
- FAIN TARGET
- AREA SURVEYED BY DAMES AND MOORE, 1982
- PIPELINE ROUTE OR ALTERNATE
- INCOHERENT SEISMIC RESPONSE (GAS?)
- ANTICLINE
- SYNCLINE
- 475' FAULT WITH DEPTH TO TOP BENEATH SEAFLOOR
- 250 CONTOURS IN FEET
- PROPOSED PLATFORM SITE
- ABANDONED WELL OR BORING SITE

SOURCE: EPRCo, 1984
PELAGOS, 1984

SHAMROCK PROJECT
PIPELINE ROUTES
BATHYMETRY AND POTENTIAL
GEOLOGIC CONSTRAINTS

FIGURE 4.1-12



SHAMROCK PROJECT
PIPELINE ROUTES
BATHYMETRY AND POTENTIAL
GEOLOGIC CONSTRAINTS

FIGURE 4.1-13

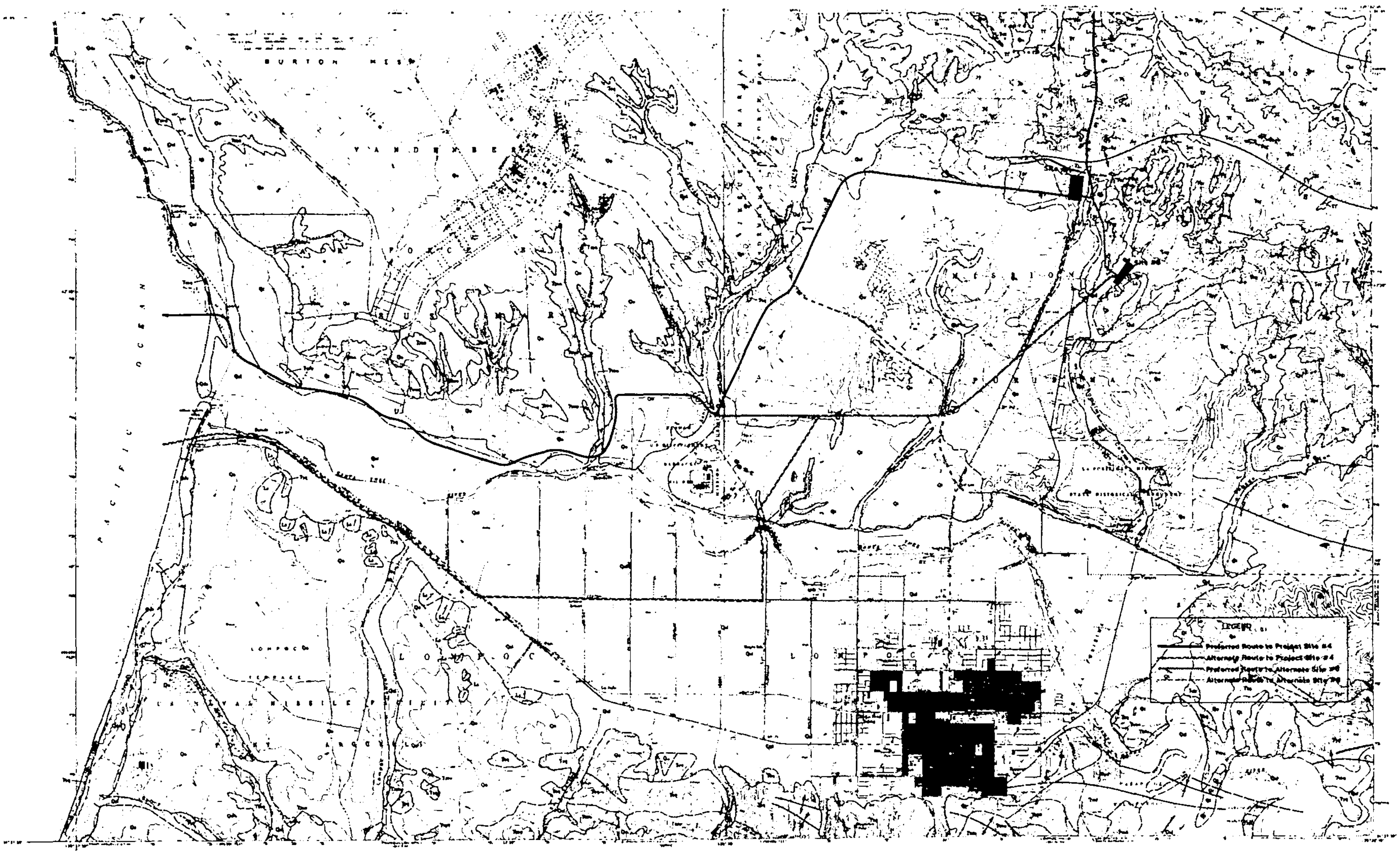


FIGURE 4.1-14 GEOLOGIC MAP OF THE PROJECT AREA FROM LANDFALL TO LOMPOC

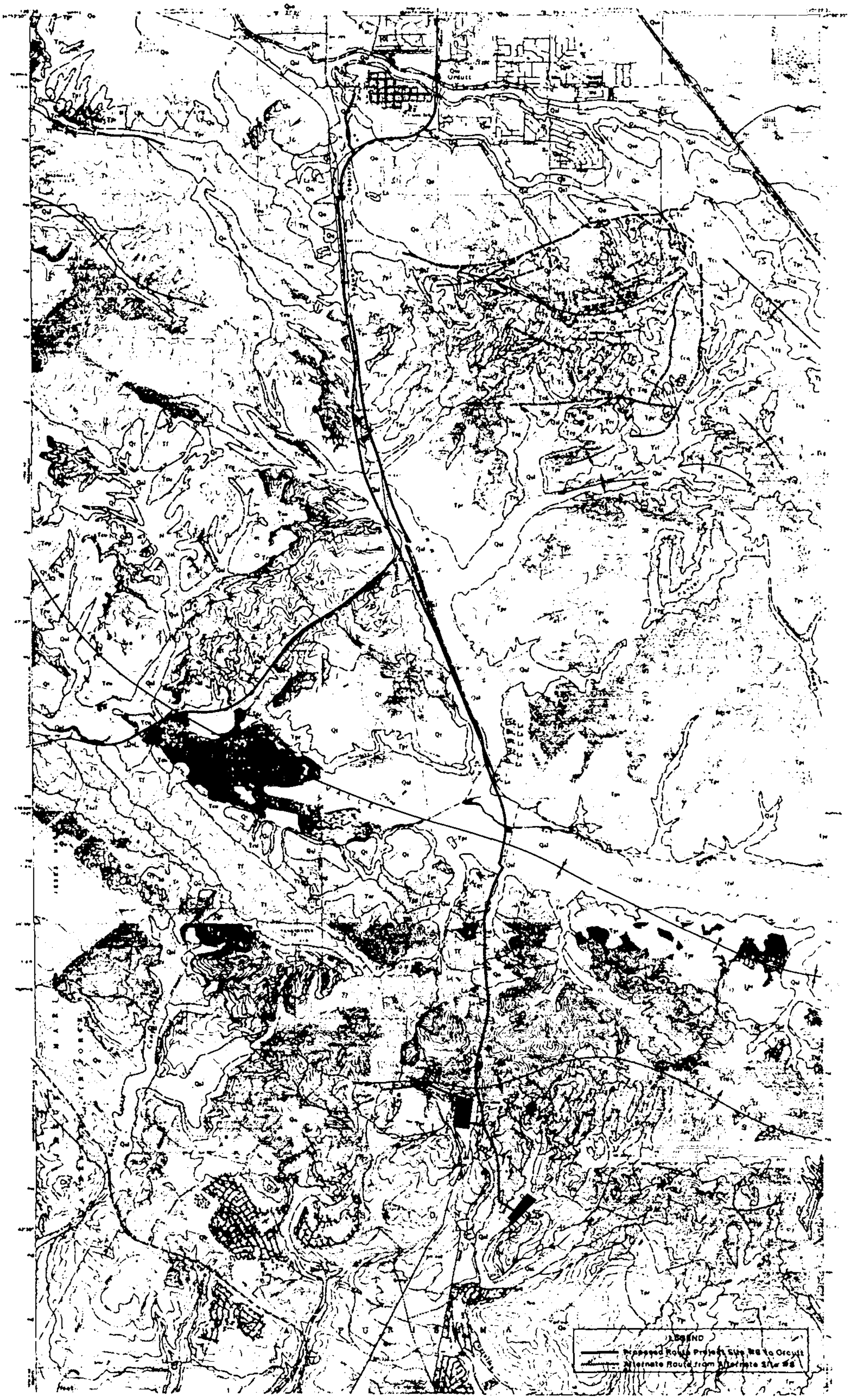


FIGURE 4 1-15 GEOLOGIC MAP OF THE PROJECT AREA FROM LOMPOC TO ORCUTT

EXPLANATION

AGE		SYMBOL	UNIT	DESCRIPTION
HOLOCENE		Qal	ALLUVIUM	GRAVEL, SAND, SILT
		Ls	LANDSLIDE	UNDIFFERENTIATED
PLEISTOCENE		Qso	OLD DUNE SAND	SAND
		Qt	TERRACE DEPOSITS	SAND, GRAVEL
UPPER PLIOCENE		Qo	ORCUTT SAND	SAND, GRAVEL
		Tpr	PASA ROBLES FORMATION	SAND, GRAVEL, CLAY, MINOR LIMESTONE
	CAREAGA FORMATION	Tcg	GRACIOSA MEMBER	COARSE SAND, SANDSTONE, CONGLOMERATE
		Tcc	CEBADA MEMBER	FINE SAND, SAND, LIMY SANDSTONE
		Tcu	CAREAGA SANSTONE	UNDIFFERENTIATED
EARLY-MID PLIOCENE		Tf	FOXEN MUDSTONE	MUDSTONE, SILTSTONE, FINE SANDSTONE
		Ts/Tsq	SISQUOC FORMATION	DIATOMACEOUS MUDSTONE, CLAYEY MUDSTONE
UPPER MIOCENE		Tmu	MONTEREY SHALE (UPPER)	PORCELANEOUS SHALE, DIATOMITE, DIATOMACEOUS SHALE
		Tml	MONTEREY SHALE (LOWER)	PHOSPHATIC SHALE, PORCELANEOUS SHALE, LIMESTONE

GEOLOGIC CONTACT

FAULT (DASHED WHERE APPROXIMATE OR INFERRED)

ANTICLINE

SYNCLINE

REFERENCE: MODIFIED FROM WOODRING AND BRAMLETT, 1950, AND DIBBLEE, 1950.

Four borings done by Pacific Geoscience [1983] indicate moist sands and silty sands to depths of 13 to 20+ feet at the site. These sands are older sand dune deposits, are susceptible to erosion, but should provide adequate bearing capacity and settlement characteristics for light to medium construction. Liquefaction potential is considered to be nil. In addition, earthquake-induced subsidence and collapse, and expansion potential because of wetting are not considered to be problems at this site. The hard pan encountered at depths of 13 to 15 feet in three of the four borings is likely composed of Orcutt Sand and is considered to be competent foundation material.

4.1.7.3 Surf Substation Facility

The proposed Surf Substation site is located about 0.7 miles (1.1 kilometers) south of the Santa Ynez River mouth and adjacent to the coastal beach at an elevation of about 40 feet (12 meters). The area consists of rolling hills of generally very low relief rising to the broad Lompoc Terrace. The terrain to the south is typified by northwest trending elongate sand dunes.

Orcutt Sand covers most of the Lompoc Terrace and may underlie the site at depth. The Monterey Formation is exposed in the river bluff-roadcut on Highway 246 just to the northeast of Surf and presumably underlies the site near or slightly below sea level and may form a wave cut platform now buried by nearshore sediments. Franciscan basement rock underlies the Monterey at about 3,000 feet (930 meters) [Dibblee, 1950].

There are no known faults that trend toward or through the site area. The closest faults are an inferred buried fault based on a postulated groundwater barrier located about 1.6 miles (2.7 kilometers) to the southeast, a set of east-west trending faults which Sylvester and Darrow [1979] have hypothesized to be associated with the Lompoc-Solvang Fault zone, and the Canada Honda Fault mapped by Dibblee [1950]. These faults are discussed in more detail in Technical Appendix A.

Soils of geotechnical engineering significance are the dune sands. Their grain size characteristics and proximity to groundwater make them susceptible to liquefaction within the general range of acceleration expected in the area. They are not highly susceptible to collapse or expansion upon wetting and can provide good foundation support for most structures as long as the continuous eastward shift of the dunes is arrested at the site.

4.1.7.4 Proposed Pipeline Route: Landfall to Lompoc (Site 4)

The Proposed Pipeline route from landfall to the Lompoc facility (Site 4) (Figure 4.1-14) (Site 4) runs easterly roughly paralleling the north margin of the Lompoc Valley, traverses northeastward and then eastward through a portion of Burton Mesa, a mildly dissected planar surface that is tilted slightly to the south and stretches from the Purisima Hills on the north to the Lompoc Valley on the south. The landfall is located about 1.4 miles (4.3 kilometers) north of Surf on a 400-foot (124-meters) wide gently dipping sandy beach. Just to the south are several extensive longitudinal sand dunes reaching heights of 40 feet (12 meters). Just north of the landfall, a low vertical sea cliff is actively being degraded by wave action. Tertiary age bedrock, terrace and alluvial deposits are well exposed there. The corridor from the beach area skirts east and then south around the dunes and then crosses an abandoned portion of the alluviated Lompoc Valley estuary. Where the alignment crosses the railroad tracks, about 1700 feet (530 meters) east of the coast line, the corridor slowly rises in elevation above the flat valley floor onto an older poorly-defined marine terrace perched along the lower south-facing slopes of Burton Mesa. The terrace extends eastward to the first major south-flowing drainage incised into the mesa slope, about 2,500 feet (775 meters) east of the proposed valve facility. For about 3,400 feet (1100 meters) east of this drainage the alignment trends above the valley floor at about 40 feet (12 meters) elevation on the slopes of the mesa. At a point just south of the Vandenberg AFB sewage treatment facility, the alignment drops down onto the valley floor for about 1.4 miles (2.4 kilometers). At Santa Lucia Canyon, a major south-flowing drainage within Burton Mesa, the corridor projects to the northeast for 3 miles (4.8 kilometers) then turns due east for another 2.3 miles (3.7 kilometers) to Site 4. This section of the alignment is confined to the Burton Mesa surface and associated slopes.

Only three main stratigraphic units are crossed along the entire pipeline corridor from the landfall to Site 4 (Figure 4.1-14). Between landfall and the location where the alignment finally climbs out of the Lompoc Valley, the alignment weaves in and out of poorly defined contacts between recent stream alluvium, marine terrace deposits, and Orcutt Sands. The alignment across the Burton Mesa slopes and surface is underlain by the Orcutt Formation except in channel crossings where alluvium of unknown thickness may be encountered. East of Santa Lucia Canyon, the Orcutt Sand overlies the Paso Robles Formation at depths of 50 feet (15.5 meters) or more. The entire pipeline route is underlain by bedrock that dips to the south at low angles of less than ten degrees.

There are no mapped faults that trend toward or through the pipeline corridor. The east-west trending inactive Lion's Head Fault runs 1,100 feet north of and parallel to the corridor.

From a geotechnical standpoint, the pipeline would traverse cohesionless deposits formed of sands, silty sands, and sandy silts over most of its length. Some limited amounts of clays and silts are expected. In general, the bearing capacity and settlement characteristics of soils encountered along the pipeline alignment are quite good. The soils are not subject to collapse or expansion upon wetting. Only in clay zones (of very limited extent) would there be some expansive soils. Soil liquefaction during earthquakes can occur in the flood plain in regions where the depth of water is less than 50 feet. However, there are no records of sand boils in the general vicinity. Only one landslide, an old feature west of Santa Lucia Canyon, has been mapped on this route.

The pipeline crosses the Santa Ynez River flood plain in certain locations. These locations are susceptible to scour during flood conditions. In addition, scour is expected at areas of concentrated flow where stream channels enter the flood plain.

4.1.7.5 Proposed Pipeline Route: Lompoc to Orcutt

The proposed Lompoc to Orcutt pipeline would parallel an existing pipeline corridor and stay within the present right-of-way (Figure 4.1-15). From Site 4 the corridor enters a steep-sided narrow canyon cut into the Purisima Hills. At the head of the canyon, it trends up a steep ridge to the hillcrest, follows an irregular north-trending ridge top for about 3,500 feet (1,085 meters), and extends down the nose of a steep (20-30°) ridge into a wide alluviated valley floor about one mile (1.6 kilometers) south of the San Antonio Valley. Landslides exist on some of the steep slopes of this portion of the corridor.

The corridor intersects the southern margin of San Antonio Canyon near Highway 1, and trends slightly west of north across the very flat valley floor. Upon leaving San Antonio Canyon, the corridor extends northward up south-flowing Harris Canyon for 4.7 miles (7.5 kilometers) to its stream divide. At this point and along the same trend, the route will follow Graciosa Canyon for 2.2 miles (3.5 kilometers) to the Orcutt facility. Together these two canyons separate the Casmalia Hills to the west from the Solomon Hills to the east. The valley floors are relatively flat (slopes less than 20°) and featureless, and average about 1800 feet (558 meters) wide over most of their extent. Most of the Harris Canyon valley floor and west-facing slopes have been cultivated with the natural drainage obliterated by farming activities. Drainage is presently controlled by a man-made earthen channel which closely parallels old Highway 1. Both channels have been deeply incised (as much as 20 feet [6 meters]) with near vertical channel walls, excessive erosion, and channel enlargement. Little has been done to control this entrenchment or broadening.

Evidence of the pre-existing pipelines includes the lack of shrubbery along heavily vegetated sections of the pipeline, service roads along ridges, possible erosion just south of Orcutt, and exposure of the lines at several locations, including stream channel crossings and in the Purisima Hills.

The pipeline corridor from Lompoc to Orcutt crosses Holocene, Quaternary and Tertiary Age units. From Site 4, the pipelines would cross a portion of Burton Mesa, which is overlain by the Orcutt Sand, the Paso Robles Formation, and the Careaga Formation. From the base of the Purisima Hills, the route would cross a thick section of the Sisquoc Formation for about 1.1 miles (1.8 kilometers). Before descending into the San Antonio Valley, the alignment traverses an isolated outcrop of Orcutt Sand. The entire steep slope into the tributary valley north of the outcrop is underlain by Foxen mudstones. From here to the Orcutt facility, the pipeline corridor is confined to young stream alluvium and poorly developed soils. The alluvium is unconsolidated sandy to clayey or silty sands 10 or more feet (3 meters) in thickness which, if exposed to concentrated running water, will erode quickly and deeply. Bedrock underlying all of the alluvium from San Antonio Canyon to the Orcutt facility consists of the Orcutt Sand, Paso Robles Formation, or the Careaga Sand.

The Pezzoni-Casmalia Fault located about 7,000 feet (2,170 meters) south of the Orcutt facility would be crossed by the pipeline, as would several other minor and inactive faults in the Harris-Graciosa Canyon areas.

From a geotechnical perspective, the route starts in clay sands and sandy clays at Site 4 to the head of a canyon where it crosses the stream channel and goes up a steep slope in apparently stable bedrock. Over the next mile, it traverses along highlands and ridges which are diatomaceous and formed of competent rock. Limited extents of expansive soils in the Purisima Hills may have caused disruptions to the existing pipelines. Along the valley floor which descends into San Antonio Valley are silty sands, sandy silts and clayey sands. Occasional layers of clay and silt may be encountered. There are no apparent geotechnical engineering problems. In the San Antonio Creek flood plain, the corridor traverses silts, sandy silts and silty sands. Recent well data provided by the County water agency show a depth of about 20 feet to groundwater, indicating potential for liquefaction. Stream scour during high flow periods may be a consideration, though flood plain development and the recent records do not indicate problems with stream flow erosion and scour in recent historical past. North of San Antonio Creek, fine grain deposits are not highly susceptible to liquefaction or scour, but may undergo volume change because of wetting. North of the intersection of San Antonio Road with Highway 1, soils are mainly silty sands, and while highly erodable, appear to sustain vertical cuts better than inclined slopes. The soils are slightly expansive. Liquefaction potential is not considered to be a problem because of the great depth to groundwater. In general, this stretch has limited geotechnical problems. The only areas of possible concern are erosion along slopes that the pipeline must traverse about one half mile south of Orcutt.

4.1.7.6 Power Corridors

The power corridor is virtually coincident with alternative pipeline route 2 from Surf to Floradale Ave. See discussion of this alternative below.

4.1.7.7 Battles Gas Plant

The existing Battles Gas Plant is located within the central portion of the Santa Maria Valley approximately 2.5 miles (3.3 kilometers) southwest of the San Rafael Mountains and 4.5 miles (7.4 kilometers) north of the Solomon Hills. The valley floor is of very low relief. A linear east-west trending 25-foot (8-meter) high river bluff representing the southern margin of the older, now abandoned, Santa Maria River flood plain extends along the valley floor about 1000 feet (310 meters) south of the facility.

Older river alluvium composed of sand and gravel underlies the site to an estimated depth of about 200 to 300 feet (62 to 93 meters). Underlying the alluvium is a 400 foot section of the Pleistocene age Orcutt Sand which is locally exposed in the river bluff 1000 feet (310 meters) south of the plant site. The Tertiary age stratigraphic sequence above the Franciscan basement at about 2,800 feet (870 meters) below ground surface consists of Paso Robles Formation, Careaga Sand, Fox Mudstone and the Sisquoc Formation.

The Santa Maria Fault trends near the site immediately to the west. The fault has a 3-mile (4.8-kilometer) trace, trends to the northwest, and is considered inactive since there is no evidence to suggest the middle Pleistocene age Orcutt Sand has been displaced by faulting. No other known or mapped faults trend toward or through the site.

4.1.7.8 Santa Maria Refinery

The existing Santa Maria Refinery is located in the west-central Santa Maria Basin about 2 miles (3.2 kilometers) east of the coastline. The property lies at about 100 feet (31 meters) above sea level within a low relief hilly area locally referred to as the Nipomo Mesa. The shallow sloped hills are older inactive sand dunes elongated in a west-northwest direction. Drainage on the site is mostly by direct infiltration into the underlying highly permeable sandy deposits. The closest drainages are the Black Lake Canyon drainage located 1 mile (1.6 kilometers) to the north and Oso Flaco Creek located 0.6 mile (1 kilometer) to the south. Surficial geologic units are sand dune deposits estimated to be a few hundred years in age, and roughly 40 feet (12 meters) thick, underlain by Orcutt Sand. The underlying Tertiary sequence is relatively thin and consists of: Paso Robles Formation, Careaga Sand and other undifferentiated sedimentary formations with a total thickness of about 1,050 feet (326 meters) [Worts, 1951] above the Franciscan basement. There are no known or mapped faults that trend toward or through the site.

Soils of geotechnical engineering significance are the deposits of older dune sands which are typically loose to medium dense sands with high permeability, moderate compressibility and a high angle of internal friction. Their grain size characteristics and proximity to ground water may cause them to be susceptible to liquefaction. They should not be susceptible to collapse or expansion upon wetting and can provide good foundation support for most structures. If they are in a loose condition, they may be susceptible to subsidence induced by heavy vibratory machinery or earthquakes.

4.1.7.9 Alternatives

LOMPOC DEHYDRATION FACILITY (SITE 8)

The alternative site for the proposed Lompoc Dehydration Facility (Site 8) is located in the upper reaches of Purisima Canyon, a major south-flowing drainage on the south side of the Purisima Hills. The property is situated on the east side of a relatively flat 1,000-foot (310-meter) wide canyon floor incised into Burton Mesa. Smooth rounded slopes extend along the canyon margins. Two possible minor slides were observed on the east side of the site. The site presently is undeveloped though the surface has been cultivated.

The facility would be constructed entirely on the alluvial surface of the canyon floor. Test borings drilled on the site indicate the alluvium consists of interbedded sands and silty sands [Pacific Geoscience, 1983] overlying bedrock at 18-24 feet. Bedrock underlying the alluvium at the site consists of Careaga Sand and Paso Robles Formation, both of which are moderately well-bedded, poorly-indurated fine to coarse grained sand.

The overburden material can be considered suitable foundation material only for light and non-critical structures subject to known machine vibrations, as it is susceptible to seismically-induced subsidence.

Liquefaction potential is considered to be minimal because bedrock occurs at shallow depths. Settlement considerations will override design of any structures on these soils. The bedrock at a depth of 18 to 24 feet (deeper in some locations) is capable of providing excellent foundation support. Seismicity and faulting characteristics for Site 4 are also applicable here.

ALTERNATIVE PIPELINE ROUTE: SURF TO LOMPOC FACILITY SITE 4 (ROUTE 2)

This entire pipeline route would be confined to recent stream alluvial materials which are mostly interbedded silts, sands and gravels. Only the last 2 miles (3.2 kilometers) of the route along Highway 1 would traverse a section of river terrace sands and Orcutt Sands.

The alignment does not cross any mapped or known faults, nor do any faults trend towards the corridor. The closest mapped fault is the inferred Lompoc-Solvang Fault that trends east-west about 2 miles (3.2 kilometers) south of the alignment.

Regarding geologic constraints, a large number of landslides exist on the north-facing slopes of the Lompoc Terrace just south of the corridor along Highway 246. In addition, a slide exists just east of the Lompoc Casmalia Road, near Davis Creek. The terrace slides are probably translational slides originating in the underlying Monterey Formation.

From the geotechnical standpoint, two major problems exist with this alignment. First, the pipeline traverses the flood plain of the Santa Ynez River for a very long distance. This flood plain is not stable during flood conditions. Studies conducted on the 13th Street Bridge [Fugro, 1978], indicate that scour of the river bed could be deep and create fluid conditions in the underlying soils during floods. These fluid soils redeposit themselves and are not detected after the flood. However, their impact is exhibited by destruction of the 35th Street Bridge on Vandenberg AFB, constant realignment of the railroad trestle crossing of the Santa Ynez River mouth, and difficulties with the 13th Street Bridge that exist at present. A 30-foot-high pier of the 13th Street Bridge was swept away during flood conditions while the bridge was under construction. The pier was not found downstream and is believed to be buried in the temporarily flood-scoured bottom.

Second, the pipeline would have to cross the Santa Ynez River at the location of one of two existing bridges. Any bridge is susceptible to damage during flood conditions. The Floradale Avenue bridge was in fact destroyed during the January 1969 flood [Corps of Engineers, 1970].

ALTERNATIVE PIPELINE ROUTE: LANDFALL TO SITE 8 (ROUTE 3)

Seismicity, faulting, and geotechnical conditions for this alternative are generally similar to the section of the preferred alignment which traverses Burton Mesa from Santa Lucia Canyon to Site 4. Old landslides within the right-of-way occur west of Santa Lucia Canyon and near Davis Creek. Another slide occurs about 500 feet north of the route where it enters Purisima Canyon.

ALTERNATIVE PIPELINE ROUTE: SURF TO SITE 8 (ROUTE 4)

This alternative is coincident with Route 2 as far as Davis Creek and then with Route 3 to Site 8. Slides exist along Highway 246, near Davis Creek, and north of where the route enters Purisima Canyon.

4.1.7.10 Onshore Area Study

The Santa Ynez Fault and its branches lie in the southern portion of the Area Study triangle. This fault is capable of large magnitude earthquakes and surface rupture. Historic seismicity is generally as discussed in Section 4.1.7.0. Earthquakes of most concern in southern and eastern portions of the Area Study would be those generated on the Santa Ynez Fault.

Onshore, many landslides have been mapped on the Santa Ynez Mountains, particularly on the steeper slopes along major drainages. In general, this is an area of potential landsliding and other forms of slope instability. Potentially unstable conditions relative to landsliding, slumping, mud and debris flows, and rock falls are directly related to slope terrain, geologic structure and shear strength of rock and soil materials. Formations of special concern include the Rincon, Monterey, and Sisquoc (Figure 4.1-5). See Section 4.1.5.1 and Technical Appendix A, Section 1.5.2.4 for additional discussion. There is also ample evidence of gullying in the onshore Area Study triangle, especially in the Santa Ynez Mountains and foothills south of the Santa Ynez River. Scour could also be more significant in these areas of consolidated rock, more rugged topography, lower infiltration rates, and more rapid runoff.

4.1.8 Paleontological Resources

4.1.8.0 Regional Setting

In the Study Region, it is possible to find fossil remains of both vertebrate and invertebrate animals. The occurrence and relative abundance of fossil material is very closely associated with particular geologic formations and their associated depositional environments. A map of geologic formations in the Study Region is presented as Figure 4.1-5, and in the Project Area as Figures 4.1-14 and 4.1-15.

In this region, the bulk of vertebrate fossils are found in two types of deposits. The first is Quaternary terrace deposits of nonmarine or continental origin. Exposure of fossils occurs either along the beach terraces or along incised river terraces at or near the beach shoreline. Vertebrate fossils are randomly scattered throughout, and most bone material has been discovered by a chance exposure.

Known localities of fossil material in Quaternary deposits in the vicinity of the Project Area are all close to the ocean on Vandenberg Air Force Base. At one site near Point Sal State Park, fossil remains of ground sloth, mammoth, and possibly horse and camel have been found in deposits dating back about 45,000 years. The other known site, about two miles north of Jalama State Beach, has yielded mammoth and horse material from slightly older deposits.

In the larger study region, occasional finds have been discovered where a site has been excavated for a home or building or a small hill has been cut for a new road or highway. The Goleta mastodon was discovered in a new roadcut into Quaternary continental terrace deposits.

The second type of rock units are the Pliocene Sisquoc Formation and the Miocene Monterey Formation. These highly-rich diatomaceous beds are a good source for marine birds and marine mammals. Classic localities are known from three quarries in this area: the Mansville quarry just south of Lompoc, the Grefco quarry about seven miles southwest of Lompoc (both in the Area Study), and the Antolini Bros. quarry east of Santa Maria up Tepesquet Canyon. Although each of these quarries has yielded outstanding vertebrate fossils such as toothed whales, baleen whales, porpoises, sea lions, birds, and countless fossil fish, no effort is directed to locating fossil material for preservation. Reasons given are 1) automation of the diatomaceous shale operations, 2) randomness of the marine fossil bone material, and 3) the abundance of like fossil material, especially fossil fishes, in similar beds throughout Southern California. Occasionally a chance discovery of marine vertebrate fossil material at the right place in the quarry might allow for salvage excavation.

Other major rock units near Lompoc have not yielded any significant vertebrate fossil material. In fact, some of these units present low possibilities for any vertebrate fossil material. The Orcutt Sand, for example, is suggested by some geologists [Dibblee, 1950] to be an ancient dune sand deposit. Dune sand deposits are poor sites for preservation of bone material. Thus, the Orcutt Sand has low potential for vertebrate fossil material. The paleontological potential of the rock units in the Lompoc-Santa Maria area is listed in Table 4.1-3.

4.1.8.1 Project Areas

Of the formations crossed in the Project Area, the Sisquoc, in the Purisima Hills, has the greatest potential for fossils. The Orcutt Sand and stream alluvial materials are not known to contain any fossil material. The Paso Robles and Foxen Formations are also poor in this regard. The Careaga Formation has low to moderate potential and has yielded some material.

4.1.8.2 Alternatives

The alternative pipeline corridor (Route 2) follows the floodplain of the Santa Ynez River almost entirely until it crosses the river at Floradale Avenue, and then crosses primarily Orcutt and alluvial deposits associated with streams, all with low potential for yielding fossil material. Most of this route is cultivated agricultural land which has been disturbed a number of times. The possibility of finding vertebrate fossil material is low. Similarly, fossil potential associated with the other alternatives is low, as described for the proposed route and Route 2.

Table 4.1-3

PALEONTOLOGICAL POTENTIAL OF ROCK UNITS IN LOMPOC-SANTA MARIA AREA

GEOLOGIC AGE	FORMATION	MAP SYMBOL	DESCRIPTION OF ROCK UNIT	VERTEBRATE FOSSIL MATERIAL	POTENTIAL FOR VERTEBRATE FOSSILS
Holocene	Alluvium	Qal	Undissected, unconsolidated, uncemented gravel, sand and silt and rock fragments of recent flood plains	See archaeological survey	Low; vertebrate fossils considered in rock units older than Holocene
(Recent) (±11,000 years)	Beach Sand	Qbs	Unconsolidated uncemented sands	None	Low; rock unit too young for vertebrate fossils
Upper Pleistocene	Alluvial Terrace Deposits	Qm	Semi-consolidated, clean to clayey, well sorted sands on beveled bedrock surface of wavecut platform (marine terrace--120,000 yrs/85,000 yrs; marine)	Some bone material of marine origin (?)	Low; most deposits contain invertebrate marine fossils
		Qt_2 (continental)	Semi-consolidated, silty to clayey sands, clayey silts, gravels in silty sand matrix on a wavecut platform and its mantle of marine terrace deposits (85,000 yrs/45,000 yrs); nonmarine	Mastodon, mammoth, camel, horse, ground sloth, microvertebrate	Moderate to high where dissected and exposed; low when covered and buried
		Qt_3 (stream)	Semi-consolidated rock material similar to Qt_2; deposited in abandoned flood plains and on alluviated surfaces (85,000 yrs/45,000 yrs); nonmarine	Mastodon, mammoth, camel, horse, ground sloth, rodents, rabbits	Moderate to high where dissected and exposed; low when covered and buried
	Orcutt Sand	Qo	Semi-consol. wind-blown ? sands and clayey sands; pebble conglomerate at base; inclined terrace deposits; nonmarine	None; questionable bone chips	Low; ancient dune sand (Dibblee, 1950)
Lower Pleistocene Upper Pliocene	Paso Robles Formation	Tpr	Poorly consol. gravels, sands, and pebbley clays or silts; porcelanous debris common; tilted; nonmarine	Questionable horse and mastodon remains	Low to moderate; essentially no bone material reported from unit
Upper-Middle Pliocene	Careaga Formation	Tca	Semi-consol. yellow-buff sandstone, littoral, beach and dune sand deposits; marine	Some seal bones; questionable whale bone fragments	Low to moderate; essentially a rich marine invertebrate nearshore fauna
	Foxen Mudstone	Tf	Consol. mudstone and clayey siltstone; diatomaceous muds; marine	None reported	Low; considered a marine embayment with little potential for marine ve?????
Lower Pliocene	Sisquoc Formation	Tsq	Laminated diatomite and diatomaceous mudstone with porcelaneous shales; marine	Numerous fish fossil material; some whale and porpoise	Low to moderate; little bone material of marine mammals has been found at Mansville and Grefco Quarries
Upper Miocene	Monterey Formation	Tm	Consol. diatomaceous mudstone, porcelaneous shales, chert lenses, siltstone, some limestones; marine	Numerous fish fossil material; whale, porpoise	Mod.; good marine mammal bones; found in limestone unit; considerable fish material, whole fish fossils located along bedding planes widespread in southern California

4.1.9 Applicable Rules, Regulations, and Standards

This project is proceeding under the overall guidelines of the NEPA and CEQA process. Several other pieces of Federal legislation involve consideration of activities proposed on the continental shelf and in the coastal zone: the Coastal Zone Management Act (15 CFR 930), the OCS Land Acts (30 CFR 250), and the Department of Interior OCS Orders 1-12, in particular Orders 2, 8 and 9. Department of Transportation regulations (e.g., 49 CFR 192, 49 CFR 195) govern aspects of construction and design of oil and gas pipelines. The OCS Lands Act (30 CFR 250) requires characterization of the geologic environment for both exploration and production activities to ensure safe operation and minimization of environmental damage. These regulations have been implemented through the OCS Orders, a series of Notices to Lessees (NTLs) and stipulations attached to individual lease sales. OCS Order 2 specifies the regulation for drilling wells, including blowout prevention equipment, types of mud, and casing and cement programs; requires plans for exploration, development/production, and an application for permit to drill; provides for inspection of drilling platforms by MMS: requires the geologic hazard surveys, and directional surveys to ensure well holes stay within their associated leases of origin; provides for supervision of drilling operations at all times to ensure compliance with regulations, orders and NTLs; and requires approval of plans for abandonment. OCS Order 3 establishes requirements for plugging and abandonment procedures for all oil and gas wells.

OCS Order 8 requires the Platform Verification Program, an integral part of the review and approval process for Development and Production Plans, and is administered by MMS. This program ensures that new fixed platforms can function safely in unusual or extreme environmental conditions and is considered to result in fully-mitigated state-of-the-art platform designs and installations. OCS Order 9 describes pipeline design requirements and associated procedures.

MMS, acting under the authority of 30 CFR 250, requires geological hazards, surveys for both exploration and production permitting, demonstration that mass movement of sediments in the vicinity of structures is either unlikely or can be accommodated in design of structures, mapping of all unstable areas, and soil testing to determine whether soil can support platforms [MMS, 1983].

Periodically, MMS has issued Notices to Lessees (NTLs) to clarify, correct, or add to the orders and regulations [MMS, 1983b]. Of particular interest are NTLs 83-1, 82-2, 82-3. NTL 83-1 details requirements of geologic hazard surveys for OCS exploratory activity regarding types of equipment required, data parameters, data to be submitted and report formate. NTL 82-2 addresses minimum requirements for OCS pipeline routes hazard surveys for topics similar to those described for 83-1. NTL 82-3 summarizes the requirements and procedures for approval of Exploration Plans and Applications for Permits to Drill, as required by OCS Order 2.

State legislation includes the California Coastal Act, and the regulations of the California Division of Oil and Gas (CDOG) regarding underground injection. California Division of Mines and Geology (CDMG) has published notes which provide report preparation guidelines. Locally, the Santa Barbara County Local Coastal Plan addresses interactions of development and the geologic environment.

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4.2 ATMOSPHERE

4.2.1 Air Quality

4.2.1.0 Overview

The South Central Coast Air Basin that may be impacted by air emissions from the projects include the interior and coastal portions of San Luis Obispo, Santa Barbara, and Ventura Counties. This same region would also be impacted by emissions from the Area Study facilities. The ambient-air quality within this region depends on the extent and orientation of emission sources, and the characteristics of the receptors as well as the time of exposure to a given pollutant. The state and federal standards define the maximum allowed limits of ambient-air pollutants, and rules and regulations have been set up to ensure that the standards are not exceeded by setting emission limits for sources in the area.

In this context, the ambient-air quality of specific pollutants has been monitored at a number of locations in the region. The results of the monitor data for the recent years indicate that the air quality is generally good with the exception of ozone, in which both the state and federal one-hour standards have occasionally been exceeded. The federal standard has been exceeded only in the coastal areas of Goleta, Santa Barbara, Ventura, and the areas near Ojai. Southern portions of Santa Barbara and Ventura Counties have thus been declared nonattainment for ozone, and new pollution sources, such as those defined in the proposed project, are subject to federal, state, and local regulations to restrict net increased emissions of the major pollutants that contribute to the formation of ozone (reactive hydrocarbons and nitrogen oxides). Exceedance of the federal standard occurred in San Luis Obispo for the first time in several years on September 9, 1984. However, the high levels on this day may have been due to unusual meteorological conditions.

Because the proposed projects will result in the release of air pollutants from facilities that are located on land and those that are located offshore within the 3-mile limit as well as from facilities at offshore locations beyond the 3-mile limit, compliance with a number of local, state, and/or federal regulations is required.

All proposed facilities that are onshore and those offshore within the 3-mile limit are regulated by the New Source Review (NSR) Regulations, of Santa Barbara County Air Pollution Control District (APCD) and the San Luis Obispo County APCD, the SBAPCD Prevention of Significant Deterioration Regulations (PSD), and the US Environmental Protection Agency (EPA) PSD Regulations. The proposed facilities located beyond the 3-mile limit are subject to the Department of Interior (DOI) Outer Continental Shelf (OCS) air regulations (30 CFR 250). The specific regulations that are applicable to the proposed projects are described below.

4.2.1.1 Applicable Regulations, Rules, and Standards

AMBIENT-AIR QUALITY STANDARDS

The National Ambient Air Quality Standards (NAAQS), as established by the Clean Air Act, are defined as maximum concentrations which may be equaled but not exceeded for the annual average standards and, in the case of short-term standards, may not be exceeded more than once per year. In addition, the State of California has established ambient-air quality standards that specify pollutant concentration limits that are never to be exceeded. Table 4.2-1 summarizes the current federal and state standards.

DEPARTMENT OF INTERIOR (DOI) AIR QUALITY REGULATIONS

The Outer Continental Shelf Lands Act Amendments of 1978 give the DOI responsibility for regulating OCS air pollutant emissions. Pursuant to these Amendments the DOI promulgated OCS air quality regulations in 1980 (30 CFR 250.57). The Minerals Management Service (MMS) has been designated to enforce the DOI regulations in the Pacific OCS.

The DOI regulations are applicable to all offshore facilities beyond the 3-mile limit that are used in the exploration, development, and production of oil and gas. Additional stipulations regarding air quality have been designated for specific lease sales. Of particular interest is the stipulation for lease sale 73 tracts. Any lease sale 73 tract within ten miles of shore would be required to minimize emissions of nitrogen dioxide by using electric power supplied from shore instead of generating their own power at the platform.

A single facility is assumed not to significantly affect onshore air quality if its emissions are below the following emissions exemption levels:

Pollutant	Exemption Level (tons per year)
Particulate matter (PM), nitrogen oxides (NO_x), volatile organic compounds (VOC), and sulfur dioxide (SO_2)	33.3 D
Carbon monoxide (CO)	3,400 $D^{2/3}$

where D = the distance from the proposed facility to the closest onshore location (statute miles).

If a facility's SO_2, NO_x, PM, or CO emissions exceed DOI exemption levels, further analysis is required. This additional analysis involves the estimation of onshore air quality concentrations resulting from the facility operations and meteorological conditions and comparing them to DOI air quality significance levels (Table 4.2-2). This calculation must be completed using a DOI-approved air quality dispersion model. If the calculated concentrations are greater than the significance levels, the project is considered to significantly affect onshore air quality and mitigation of emissions is required.

Table 4.2-1

AMBIENT AIR QUALITY STANDARDS[A]

Pollutant	Averaging Time	California Standards[C,D]	National Standards[B] Primary[D,E]	National Standards[B] Secondary[D,F]
Oxidant (Ozone)	1-hour	0.10 ppm (200 ug/m^3)	240 ug/m^3 (0.12 ppm)	Same as primary standard
Carbon monoxide	8-hour	9 ppm (10 mmg/m^3)	10 mg/m^3 (9 ppm)	Same as primary standard
	1 hour	20 ppm (23 mg/m^3)	40 mg/m^3 (35 ppm)	Same as primary standard
Nitrogen dioxide	Annual average	no corresponding State standard	100 ug/m^3 (0.05 ppm)	Same as primary standard
	1-hour	0.25 ppm (470 ug/m^3)	no corresponding Federal standard	no corresponding Federal standard
Sulfur dioxide	Annual average	no corresponding State standard	80 ug/m^3 (0.03 ppm)	secondary standard for 3-hour period only
	24-hour	0.05 ppm[G] (131 ug/m^3)	365 ug/m^3 (0.14 ppm)	secondary standard for 3-hour period only
	3-hour	no corresponding State standard	no 3-hour primary standard	1300 ug/m^3 (0.5 ppm)
	1-hour	0.25 ppm (655 ug/m^3)[J]	no 1-hour primary standard	no 1-hour secondary standard
Suspended particulate matter	Annual geometric mean	no corresponding State standard	75 ug/m^3	60 ug/m^3
	24-hour	100 ug/m^3 [H]	260 ug/m^3	150 ug/m^3
Suspended particulate matter (continued)				
Sulfates	24-hour	25 ug/m^3	no corresponding Federal standard	no corresponding Federal standard
Lead	30-day	1.5 ug/m^3	no corresponding Federal standard	no corresponding Federal standard
	Calendar quarter	no corresponding State standard	1.5 ug/m^3	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 ug/m^3)	no corresponding Federal standard	no corresponding Federal standard

Table 4.2-1
continued

AMBIENT AIR QUALITY STANDARDS[A]

Pollutant	Averaging Time	California Standards[C,D]	National Standards[B] Primary[D,E]	Secondary[D,F]
Vinyl Chloride	24-hour	0.010 ppm (26 ug/m^3)	no corresponding Federal standard	no corresponding Federal standard
Ethylene	8-hour	0.1 ppm	no corresponding Federal standard	no corresponding Federal standard
	1-hour	0.5 ppm	no corresponding Federal standard	no corresponding Federal standard
Visibility	1 observation	Insufficient amount to reduce the prevailing visibility to less than 10 miles when the relative humidity is less than 70 percent[H]	no corresponding Federal standard	no corresponding Federal standard

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[A] Standards from California Air Resources Board.

[B] National standards, other than those based on annual averages or annual geometric means, are not to be exceeded more than once per year.

[C] California standards are values that are not to be equaled or exceeded.

[D] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of Hg (1,013.2 millibars); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[E] National Primary Standards: The level of air quality necessary, with an adequate margin of safety, to protect public health.

[F] National Secondary Standards: The level of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[G] 0.05 ppm (131 ug/m^3) (CONDUCTIMETRIC) IN PRESENCE OF OXIDANT IN EXCESS OF STATE 1-HOUR STANDARD OR IN PRESENCE OF PARTICULATES IN EXCESS OF STATE 24-HOUR STANDARD.

[H] 24-hour TSP standard is only applicable to California 24-hour SO_2 combination standard (see footnote g). CARB recently adopted fine particulate matter (less than 10 microns) standards of 30 ug/m^3 (annual geometric mean) and 60 ug/m^3 (24-hour average).

[I] Prevailing visibility is defined as the greatest visibility which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.

[J] The pro[illegible] new California 1-hour SO_2 standards became effective October [illegible]984).

Table 4.2-2

DOI AIR-QUALITY IMPACT SIGNIFICANCE LEVELS

Averaging Time	Concentration (ug/m^3)			
	NO_2	SO_2	CO	PM
1-hour	-[a]	-	2,000	-
3-hour	-	25	-	-
8-hour	-	-	500	-
24-hour	-	5	-	5
Annual	1	1	-	1

[a]Dash indicates no significance level has been defined.

Source: 30 CFR 250.57

VOC emissions are reviewed differently. Since emitted VOCs can react photochemically in the atmosphere to contribute to the formation of ozone, the presently approved DOI air quality models cannot be used to calculate VOC effects on ambient ozone levels. For this reason, VOC emissions from a facility which are not exempt based on DOI exemption levels are automatically considered to significantly affect onshore air quality.

Facility emissions which significantly affect onshore air quality require the following mitigation:

(1) Attainment or Unclassified Pollutants

- Emissions control must reflect Best Available Control Technology (BACT).

- Calculated onshore concentrations from sources permitted after an EPA-specified baseline date cannot exceed the maximum allowable increases shown in Table 4.2-3.

- Onshore concentrations cannot exceed the NAAQS shown in Table 4.2-1.

(2) Nonattainment Pollutants

- Pollutant emissions must be fully reduced using emission controls and/or emission offsets.

If emissions from a temporary facility exceed the exemption levels and the air quality significance levels, these emissions must be controlled using BACT.* "Temporary facility" is defined by the DOI as "activities associated with construction of platforms on the OCS or with facilities related to exploration for or development of OCS oil and gas resources which are conducted in one location for less than three years" (30 CFR 250.2[fff]). In addition to these requirements, the Director of the MMS can require that the cumulative air quality effects of all OCS facilities located in and near the project area be addressed.

The Santa Barbara County APCD and the Air Resources Board disagree with the DOI Exemption Level/Significance Level approach for regulating OCS air emissions. With respect to the DOI exemption levels, APCD and ARB contend that the use of only annual average emissions would ignore the impacts on

---

*Under the DOI regulations, BACT is defined as follows (30 CFR 250.0): Best available control technology is an emissions limitation based on the maximum degree of reduction for each pollutant that is subject to regulation which would be emitted from any proposed major stationary source or major modification which the Administrator, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques.

short-term average standards. They also disagree with the DOI-approved modeling approach for comparing impacts to significance levels. This disagreement pertains to the choice of models and the choice of pollution sources to be included in the impact analyses. Consequently, two separate air quality analyses are required, one to satisfy the DOI regulations and another to satisfy the requirements of APCD and ARB. Further details on the two modeling approaches are described in Section 5.2.

FEDERAL PREVENTION OF SIGNIFICANT DETERIORATION REGULATIONS

The Environmental Protection Agency's (EPA) Prevention of Significant Deterioration (PSD) regulations apply to certain facilities located onshore and within the 3-mile limit. This includes the proposed onshore facilities but excludes the offshore platforms. PSD regulations apply to attainment pollutants only. EPA's Region IX office is responsible for enforcing the PSD regulations.

The PSD review applies to major modifications to existing major stationary sources or new major stationary sources. A source is considered a major stationary source if emissions of any attainment pollutant exceed either 100 tons per year for 28 listed source types or 250 tons per year for any other source types.

If a new source is considered major because of the emissions of any one attainment pollutant, PSD review is required for all other pollutants (except nonattainment pollutants) that exceed the following emission significance levels:

Pollutant	Significance Level (Tons Per Year)
Sulfur dioxide	40
Nitrogen oxides	40
Carbon monoxide	100
Ozone	40 of VOC
Particulate matter	25
Lead	0.6
Asbestos	0.007
Beryllium	0.0004
Mercury	0.1
Vinyl chloride	1
Fluorides	3
Sulfuric acid mist	7
Hydrogen sulfide	10
Total reduced sulfur	10
Reduced sulfur	10

If a major stationary source is modified, the PSD regulations would apply to those pollutants listed above with net emission increases exceeding these significance levels.

If a source is subject to PSD review, the following requirements may apply on a pollutant-by-pollutant basis:

(1) The emissions must be controlled using BACT.

(2) The air quality impacts in combination with other PSD sources must not exceed the maximum allowable increases for SO_2 and particulate matter (PM) shown in Table 4.2-3.

(3) The air quality impacts of all sources in the area cannot exceed the NAAQS (Table 4.2-1).

(4) Pre- and/or post-construction air quality monitoring may be required.

(5) The air quality impact on soils, vegetation, and nearby PSD Class I (pristine) areas must be addressed.

Pollutant emissions that occur during construction are generally exempt from EPA review, because the PSD regulations specifically exempt temporary increases of SO_2 and PM emissions (40 CFR 52.21 f[v]). Temporary is defined by EPA as two years, although this period can be increased at the discretion of the EPA Administrator (40 CFR 52.21f[4]). In addition, mobile emissions are exempt from EPA review (42 USC 7401, Section 110(a)[5]). Since mobile sources are the primary source of pollutants during construction, and construction activities generally require less than two years, EPA does not normally review construction emissions.

The pre- and post-construction air quality monitoring requirements may be satisfied using existing air quality and meteorological data gathered at a location near the project area. In addition, these monitoring data requirements can be waived if the calculated air quality impacts are less than the values shown in Table 4.2-4. Monitoring is also not required if ambient pollutant concentrations in the project area are less than those shown in Table 4.2-4.

COUNTY APCD RULES AND REGULATIONS

Local air pollution control districts in California are responsible for regulating stationary sources of air emissions that are located in their jurisdictions. The onshore facilities are thus reviewed by the Santa Barbara County APCD and the San Luis Obispo County APCD. The Santa Barbara APCD also regulates offshore emission sources that are within 3 miles of shore. The stationary source definition in District Rule 205.C allows the District to include the emissions from offshore operations as part of the permit review for the related onshore facilities.

Table 4.2-3

MAXIMUM ALLOWABLE INCREASES[a]

Class I Areas	Maximum Allowable Increase (ug/m^3)
Particulate Matter	
Annual geometric mean	5
24-hour maximum	10
Sulfur Dioxide	
Annual arithmetic mean	2
24-hour maximum	5
3-hour maximum	25
Class II Areas	
Particulate Matter	
Annual geometric mean	19
24-hour maximum	37
Sulfur Dioxide	
Annual arithmetic mean	20
24-hour maximum	91
3-hour maximum	512
Class III Areas	
Particulate Matter	
Annual geometric mean	37
24-hour maximum	75
Sulfur Dioxide	
Annual arithmetic mean	40
24-hour maximum	182
3-hour maximum	700

[a]DOI increments and EPA-PSD increments are identical.

Source: 40 CFR 52.21

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Table 4.2-4

EPA MONITORING EXEMPTION LEVELS

Pollutant	Averaging Period	Concentration (ug/m^3)
Sulfur Dioxide	24-hour	13
Nitrogen Dioxide	Annual	14
Particulate Matter	24-hour	10
Carbon Monoxide	8-hour	575
Ozone	--	[a]
Lead	24-hour	0.1
Asbestos	--	[b]
Beryllium	24-hour	0.0005
Mercury	24-hour	0.25
Vinyl Chloride	24-hour	15
Fluorides	24-hour	0.25
Sulfuric Acid Mist	--	[b]
Hydrogen Sulfide	one-hour	0.04
Total Reduced Sulfur	one-hour	10
Reduced Sulfur	one-hour	10

[a] Increase in VOC emissions of 100 tons per year.
[b] No exemption level specified.

Source: 40 CFR 52.21

Santa Barbara County recently adopted the revised New Source Review (NSR)/Prevention of Significant Deterioration (PSD) regulations on March 5, 1984 (Rule 205.C). The new rules include PSD increments in addition to the federal PSD regulations. The additional increments are summarized in Table 4.2-5.

Under Rule 205.C, any source subject to New Source Review is subject to the following requirements:

(1) For new or modified stationary sources, net emission increases of 2.5 pounds per hour, or more, of any non-attainment pollutant, except carbon monoxide require BACT. BACT review levels for carbon monoxide are 20 pounds per hour or 150 pounds per day;

(2) A new or modified stationary source with a net emission increase of 5 pounds per hour, but less than 10 pounds per hour, 240 pounds per day or 25 tons per year of any non-attainment pollutant, except carbon monoxide, must submit an application containing information that demonstrates, by air quality impact analysis (AQIA) to the satisfaction of the Control Officer that the emissions will not cause an exceedance or interfere with the attainment or maintenance of any national primary ambient-air quality standard; or prevent reasonable progress toward the achievement or maintenance of any national ambient-air quality standard.

The requirements for BACT are specified as the more stringent of the following:

- The most effective emissions control technique which has been achieved in practice for such category or class of source; or

- Any other emissions control technique found, after public hearing by the Control Officer or the Air Resources Board, to be technologically feasible and cost effective for such class or category of sources or for a specific source.

BACT can be no less stringent than the emission control required by any applicable provision of district, state, federal, or Air Resource Board laws or regulations unless the applicant demonstrates to the satisfaction of the Air Pollution Control office that such limitations are not achievable.

Under the PSD portion of new rule 205.C, BACT is required for any source with net emissions increases for attainment pollutants of 5 pounds per hour or more, except for carbon monoxide for which the review level is 50 pounds per hour or 550 pounds per day, or more. The following offset requirement also applies under this rule:

Table 4.2-5

SANTA BARBARA COUNTY APCD AIR QUALITY INCREMENTS
(IN ADDITION TO INCREMENTS ESTABLISHED BY CLEAN AIR ACT)
ug/m³

Pollutant	Maximum Allowable Increase Class I	Maximum Allowable Increase Class II	Baseline Date	Air Quality Standard
Carbon Monoxide:				
8-hr Maximum	200	2500	1/1/84	10000
1-hr Maximum	800	10000		40000
Nitrogen Dioxide:				
Annual Arithmetic Mean	2	25-100*	1/1/84	100
1-hr Maximum	10	100-470*		470
Reactive Organic Compounds:				
3-hr Maximum	3	40-160*	1/1/84	160
Particulate Matter 10:				
24-hr Maximum	2	12-50*	1/1/84	50

* The Applicant may consume the full increment range if the Applicant enters into a Memorandum of Agreement with the APCD providing for alternative mitigation. The cost of such mitigation shall not exceed $333 per year per microgram/m³ over the lower level of the increment range for this pollutant based on the maximum modeled concentration of the first year of operation of the stationary source, and thereafter based on the single actual worst case contribution by the stationary source to monitored concentrations during the previous year. If post-construction monitoring shows no consumption beyond the lower level of the increment range for any period of three consecutive years after the year of peak projected emissions, then no further monitoring or mitigation shall be required for the purposes of this sub-section (1.a.4). If, subsequent to the termination of monitoring or mitigation, the APCD determines that consumption has increased beyond the lower level of the increment range, APCD may require reinstatement of post-construction monitoring or mitigation. As an alternative to monitoring-based mitigation costs, the Applicant, with consent of the APCD, may choose to base the maximum cost of mitigation for the first year on the maximum modeled concentration of the projected peak-emissions year, thereafter depreciating this amount by 10 percent per year over ten years or the life of the project, whichever is less. APCD's consent shall not be unreasonably withheld provided that the ten-year depreciation schedule results in an equitable, realistic approximation of the Applicant's projected annual emission rate. Cost of mitigation during the final year of the project shall be prorated to reflect the portion of the year during which the facility is in operation. This increment and mitigation requirement shall be reviewed if CARB or EPA develop an increment or other alternative with supporting technical rationale.

Source: Rule 205.C, County of Santa Barbara

- If the net emission increases exceed 10 pounds per hour for reactive organic compounds, nitrogen oxides, sulfur oxides or particulate matter, emission trade-offs are required by reducing emissions from existing sources to offset emission increases from the new source.

Under Rule 205.C if a new or modified source would have a net emission increase of more than 5 pounds per hour for particulate matter or 10 pounds per hour of any other attainment pollutant an ambient-air quality monitoring program must be conducted by the applicant with preconstruction monitoring being not less than one year in duration. This monitoring program is required if the Air Pollution Control Officer finds that insufficient data will be available to determine the effects that the emissions from the new and modified source may have on the area. Post-construction monitoring is required until the Air Pollution Control Officer determines that the air quality impacts have been adequately characterized. In this case, Union has been setting up a preconstruction monitoring network near the locations of the proposed onshore sources.

4.2.1.2 Existing Air Quality

Portions of the South Central Coast Air Basin may be impacted by air emissions from the proposed projects as well as from additional future projects. These include the coastal and near coastal regions of San Luis Obispo County, Santa Barbara County, and Ventura County.

The Santa Maria Refinery is located on the Nipomo Mesa about 8 miles north of the City of Guadalupe in southwestern San Luis Obispo County. Changes at the refinery are therefore subject to San Luis Obispo County APCD rules and regulations. Specifically, changes to the refinery would be subject to Rule 204 B.4 "New Source Review, Modifications to Existing Stationary Sources." For net emission changes greater than 5 pounds per hour, the applicant must include information showing that emissions are controlled by BACT. Emission increases greater than 10 pounds per hour require demonstration that BACT is used and that the changes will not cause a violation or interfere with the attainment or maintenance of a National Primary Ambient Air Quality Standard.

A summary of the federal attainment status for the five criteria air pollutants in the South Central Coast Air Basin is given in Table 4.2-6. According to 40 CFR 81.305, all of Santa Barbara County is classified nonattainment for ozone. However, the North Coast area of Santa Barbara County, Region 2 (Figure 4.2-1), is being considered by EPA for reclassification to attainment for ozone, although no official action has been taken. The Santa Maria area of Region 2 (Figure 4.2-1) is nonattainment for total suspended particulates (TSP).

All of San Luis Obispo County and the northern area of Ventura County are designated attainment for the federal ambient standard for ozone (12 ppm). The western portion of Santa Barbara County, the land area closest to the projects, has been accepted for reclassification to attainment for the federal standard for ozone.

Table 4.2-6

CURRENT ATTAINMENT STATUS FOR THE CRITERIA AIR POLLUTANTS IN THE SOUTH CENTRAL COAST AIR BASIN

Area	Pollutant O_3	TSP	NO_2	SO_2	CO
San Luis Obispo County					
Salinas Valley Area	A	A	A	U	A
Other	A	A	A	U	A
Santa Barbara County					
(South Coast Area, Region 1)*	N	A	A	U	A
(North Coast Area, Region 2)*	N	N**	U	U	U
(North Inland Area, Region 3)*	N	U	U	U	U
Ventura County					
Northern (Inland Area)	A	U	A	A	A
Southern (Coastal Area)	N	A	U	U	U

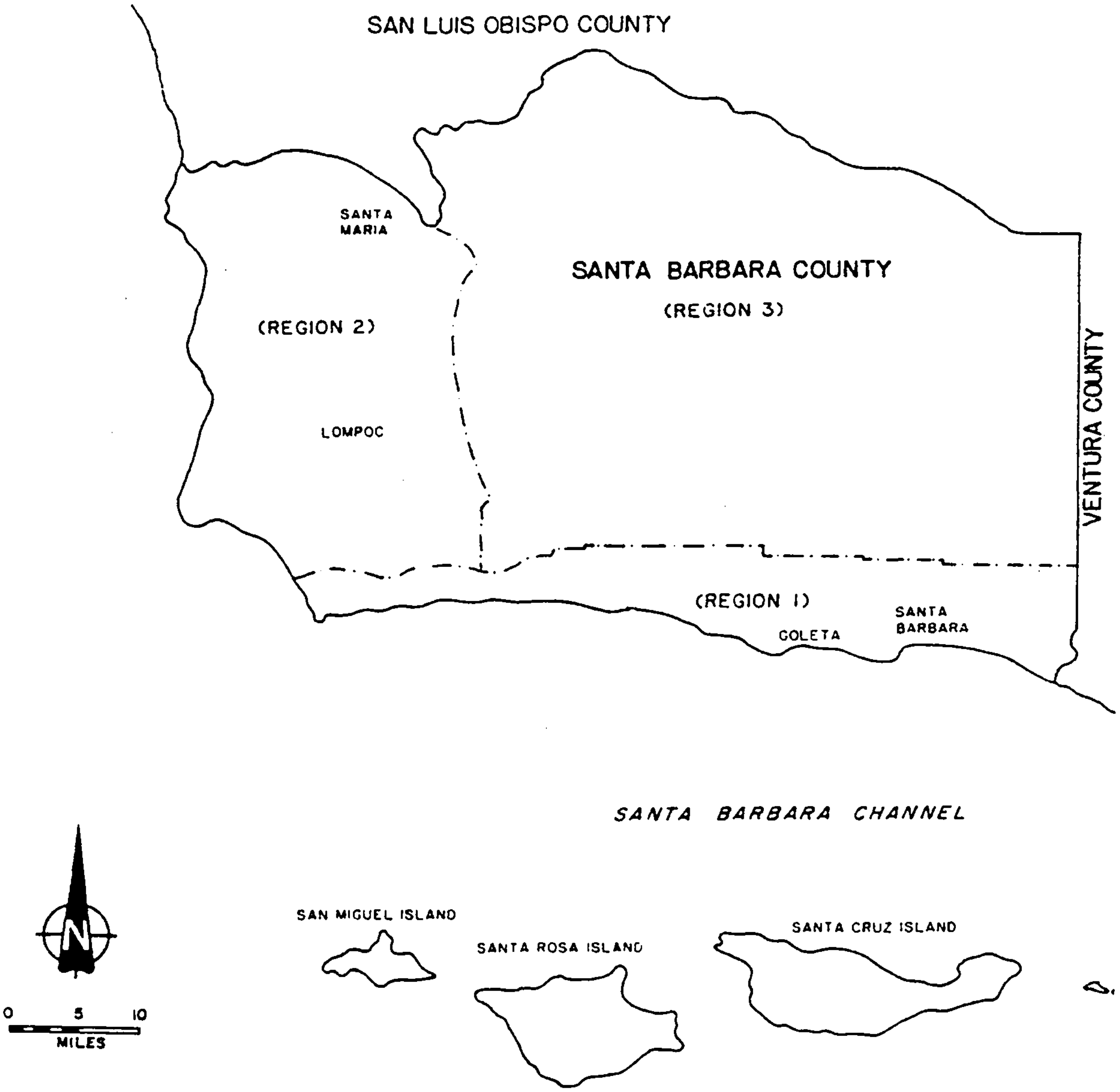
A - Attainment, better than federal air quality standards
N - Nonattainment, exceeds primary standards
S - Nonattainment, exceeds secondary standards
U - Unclassifiable, insufficient data to make a determination
AQMA - Air Quality Maintenance Area

* See Figure 4.2-1 for designation of regions.
** Portions of Santa Maria are nonattainment.

Source: 40 CFR 81.305, 1983.

FIGURE 4.2-1

AIR QUALITY REGIONS IN SANTA BARBARA COUNTY



The emissions inventory for Santa Barbara County is summarized in Table 4.2-7. The major sources of most of the pollutants are motor vehicles and petroleum production. Agricultural operations that generate fugitive dust are major sources of particulate matter in the County.

Air above the federal waters of the OCS in the Central Santa Maria Basin is unclassified as to the attainment of the standards. There are no air quality data for this region. However, for most pollutants, the air quality may be considered as good because of the lack of nearby emission sources except for occasional petroleum exploration activities, marine traffic and natural emissions of hydrocarbons from oil and gas seeps. Another contributor to pollutant levels in the offshore area would be due to the transport of pollutant-laden air from the Los Angeles Basin that is swept into the Channel on Santa Ana winds. Hydrocarbon samples were collected at a number of coastal sites, including Point Conception by the California Air Resources Board (CARB) in 1980. The observations indicate that the reactive hydrocarbon levels ranged from 0.07 to 0.24 ppm. There has been no quantification of emissions of hydrocarbons from natural seeps. However, the measured ambient levels that are reported above would presumably include contributions from seeps and are included as part of the initial conditions in the photochemical model calibrations.

4.2.1.3 Site-Specific Data

Ambient air pollutant concentrations have generally been monitored by the CARB and the County APCDs. Figure 4.2-2 shows the locations of monitoring stations in San Luis Obispo, Ventura and Santa Barbara Counties during 1982. Several additional stations have been operated but for relatively short periods and not recently.

The air quality for each specific pollutant that would be affected by emissions from the projects is described below.

OZONE

Ozone (O_3) is the principal compound of a group of secondary pollutants (photochemical oxidants) that are formed in the atmosphere as a result of a series of chemical reactions. These reactions involve sunlight, nitrogen oxides (NO_x) and reactive hydrocarbons and occur over several hours during atmospheric transport. The basic chemical reactions and other influencing factors that lead to ozone formation are described in Appendix B. The distribution of O_3 is more regional compared with primary inert pollutants. Table 4.2-8 presents a summary of four years of maximum ozone concentrations for a number of stations in the Study Area. The table shows that relatively high ozone concentrations have been observed along the coastal regions for each of the years in Santa Barbara and Ventura Counties. Peak levels in Southern San Luis Obispo County are lower than those reported for Santa Barbara and Ventura Counties. Although there were no levels that exceeded the federal standard in San Luis Obispo County for the years 1980-1983, recent data indicate that on September 9, 1984 a maximum value of 0.14 ppm was observed and a peak of 0.16 ppm was observed farther north at Paso Robles.

Table 4.2-7

SANTA BARBARA COUNTY EMISSIONS INVENTORY
(tons/day)

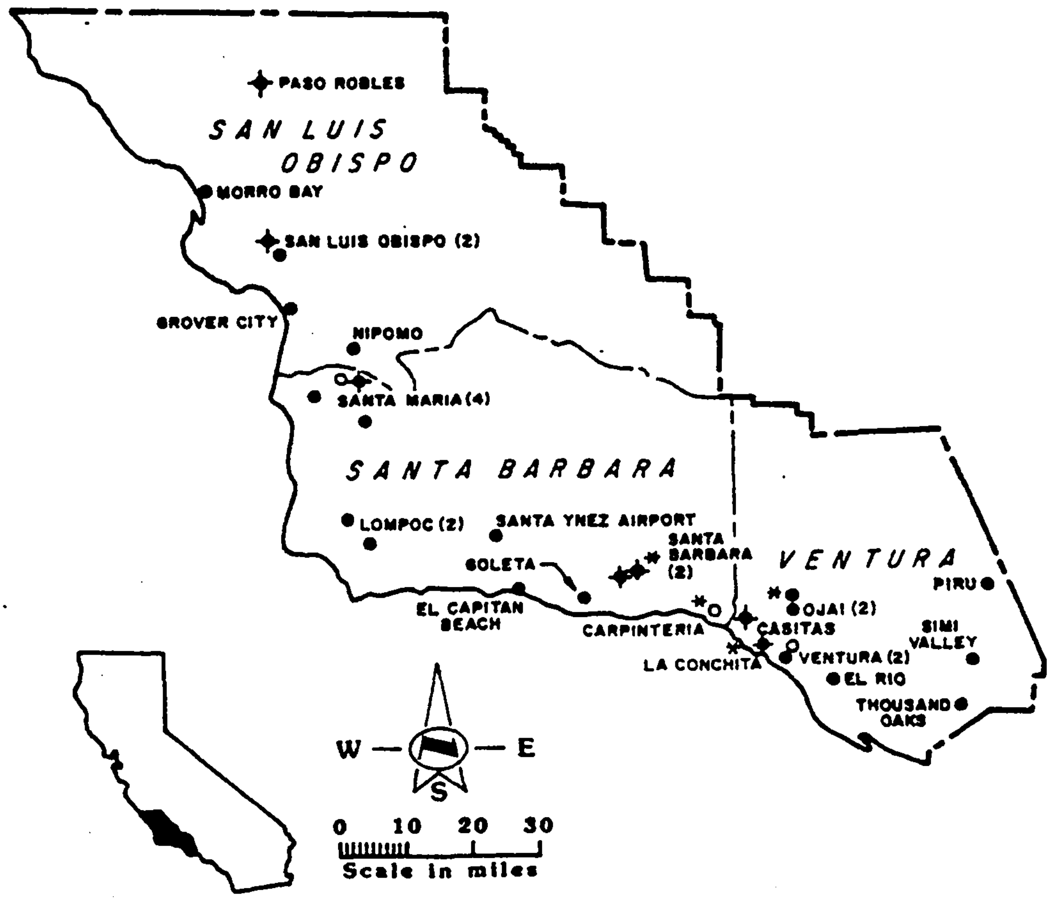
	RHC[1]		NO_x[1]		CO	
	1979	1982	1979	1982	1979	1982
Petroleum Production Emissions						
Santa Maria Area (onshore)	4.41	4.40	5.03	5.03	0.84	0.84
Lompoc/Santa Ynez	0.12	0.11	N.D.	N.D.	N.D.	N.D.
South Coast Area (onshore)	1.13	1.20	2.67	2.67	0.33	0.33
Automotive Emissions						
Santa Maria Area	6.62	5.26	8.56	8.14	47.0	42.77
Lompoc/Santa Ynez	5.72	4.70	7.11	6.42	38.7	34.69
South Coast Area	14.35	11.13	17.36	16.35	102.2	91.79
Other Stationary Sources						
Santa Maria Area	4.89	4.76	2.19	2.24	5.05	5.36
Lompoc/Santa Ynez	3.34	3.21	0.50	0.52	4.09	4.33
Vandenberg AFB	0.64	0.73	1.27	1.51	0.27	0.33
South Coast Area (onshore)	8.00	7.26	2.70	2.79	9.34	9.59
TOTAL:	49.22	42.73	47.39	45.67	206.92	190.03

[1]Does not account for reductions due to Mobile Source Control Measures.

Source: 1982 AQMP Update.

FIGURE 4.2-2

SOUTH CENTRAL COAST AIR BASIN
MONITORING STATIONS



LEGEND

- ● Gaseous pollutant or multipollutant monitoring site
- ○ High volume particulate sampling only
- ✧ ARB operated site
- * Discontinued during year
- † Site relocated

Source: California Air Resources Board

Table 4.2-8

MAXIMUM ONE-HOUR AVERAGE OZONE CONCENTRATIONS[a] (ppm)

Location	1980	1981	1982	1983
Ventura	0.13	0.15	0.16	0.17
Ojai	0.18	0.20	0.19	0.17
Santa Barbara-State Street	0.16	0.24	0.11	0.16[d]
Santa Barbara-Cathedral Oaks Rd.	0.19	0.17	0.11[e]	
Goleta - N. Fairview	0.19	0.18	0.14	0.15
El Capitan Beach	0.12	0.11	0.15	0.14
Lompoc - G St.			0.10	0.08[b]
Santa Ynez Airport	0.09[c]	0.11	0.11	0.12
Santa Maria - E. Main	0.09	0.10	0.10	0.11
Nipomo	0.10	0.10	0.10	0.10
Grover City			0.10[f]	0.11
San Luis Obispo	0.10	0.09	0.08	0.08

a Federal Standard 0.12 ppm, California Standard 0.10 ppm.
b Data for 1/83 through 4/83.
c Data for 9/80 through 12/80.
d Moved to Cannon in January 1983
e Discontinued in September 1982
f Monitoring begun April 1982

Source: California Air Quality Data; Annual Summaries published by the California Air Resources Board, Technical Services Division.

Meteorological data specific to the September 9 day were utilized in the calibration of a trajectory to San Luis Obispo County and are described in detail in Technical Appendix B.

The frequency of occurrence of elevated levels may be a more significant indicator of air quality than the actual magnitudes of the maximum levels. The number of occurrences that exceed the state and federal standards at each of the monitors is summarized in Tables 4.2-9 and 4.2-10. Exceedences of the federal ozone standard have occurred infrequently, less than 3 percent of the days at all monitors except at Ojai Valley. Exceedences of the more restrictive California state standard have occurred on up to 8 percent of the days in the urban areas of Santa Barbara and Ventura Counties. The frequent occurrence of ozone levels in excess of the standards in Ojai, even though a sparsely settled area, is apparently due to pollutant transport along the Ventura River Valley and over Casitas Pass. Pollutant buildup can occur because of diminishing winds and frequently occurring inversions in the valley. The ozone levels at specific locations and under specified atmospheric conditions will be summarized in the photochemical model calibration portion of the impacts section.

INERT POLLUTANTS

The maximum short-term and annual average concentrations in the Study Area of the inert (primary) pollutants -- CO, NO_2, SO_2, TSP, and lead -- are summarized in Table 4.2-11. Sulfate levels are also summarized. This table includes data for four years (1979-1983). Annual average data reported for Refugio Beach and Corral Canyon do not include an entire year of data. The reported levels at the latter two monitors thus may not reflect actual annual average levels. Elevated levels of the primary pollutants are generally found only in the vicinity of major sources. Because of the non-uniform distribution of sources in the Study Area, it can be assumed that the ambient-air quality levels of the primary pollutants would be distributed non-uniformly. This assumption is noted in Table 4.2-11, in which a wide range of values is reported. The magnitude of each value is dependent on the proximity of the monitor location to the major pollutant sources.

Motor vehicles are the primary sources of CO emissions in the area. Thus, monitor values in urban areas and in the vicinity of Highway 101 in downtown Santa Barbara show the highest values in Table 4.2-10. The maximum one-hour average concentrations did not exceed the federal (35 ppm) or state (20 ppm) standards. However, the eight-hour standards were exceeded a few days in Santa Barbara. The Santa Barbara County Air Quality Attainment Plan projects attainment of the CO eight-hour standard by 1984-1985 with the progressive reduction in auto emissions. The CO levels in San Luis Obispo were lower than those observed in Santa Barbara. Very low SO_2 concentrations were reported at all monitor stations in the area, thus reflecting the lack of major SO_2 sources in the region. The table shows that the maximum one-hour levels of NO_2 have approached the California state standard. However, the annual average levels are well below the federal standard.

Table 4.2-9

DAYS/HOURS ABOVE 0.12 ppm FEDERAL ONE-HOUR OZONE STANDARD

Location	1980	1981	1982	1983
Ventura	3/6	3/4	3/5	7/17
Ojai	33/119	27/83	25/82	10/30
Santa Barbara-State Street	2/4	1/5	0/0	3/7[c]
Santa Barbara-Cathedral Oaks Rd.	1/3	2/6	0/0[d]	
Goleta - N. Fairview	1/3	3/9	1/1	2/5
El Capitan Beach	0/0	0/0	1/5	4/8
Santa Ynez Airport	0/0[a]	0/0	0/0	0/0
Lompoc - G St.			0/0	0/0[b]
Santa Maria - E. Main	0/0	0/0	0/0	0/0
Nipomo	0/0	0/0	0/0	0/0
Grover City			0/0[e]	0/0
San Luis Obispo	0/0	0/0	0/0	0/0

a Data for 9/80 through 12/80
b Data for 1/83 through 4/83.
c Moved to Cannon in January 1983
d Discontinued in September 1982
e Monitoring begun April 1982

Source: California Air Quality Data; Annual Summaries, Published by California Air Resources Board.

Table 4.2-10

DAYS/HOURS EQUAL TO OR GREATER THAN 0.10 ppm
CALIFORNIA ONE-HOUR OZONE STANDARD

Location	1980	1981	1982	1983
Ventura	18/70	19/51	13/55	28/77
Ojai	75/366	101/459	80/359	77/278
Santa Barbara-State Street	5/11	3/7	2/4	9/27[c]
Santa Barbara-Cathedral Oaks Rd.	9/21	5/18	3/5[d]	0/0
Goleta - N. Fairview	21/54	11/36	7/20	13/42
El Capitan Beach	11/43	12/22	6/18	9/30
Santa Ynez Airport	0/0[a]	2/6	9/19	4/11
Lompoc - G St.			2/3	0/0[b]
Santa Maria - E. Main	0/0	1/1	1/1	0/0
Nipomo	3/4	0/0	1/3	3/7
Grover City			1/3[e]	3/6
San Luis Obispo	1/1	0/0	0/0	0/0

a Data for 9/80 through 12/80
b Data for 1/83 through 4/83.
c Moved to Cannon in January 1983
d Discontinued in September 1982
e Monitoring begun April 1982

Source: California Air Quality Data; Annual Summaries, Published by California Air Resources Board.

Table 4.2-11

MAXIMUM POLLUTANT CONCENTRATIONS MONITORED IN THE STUDY AREA
(Includes Data From 1980-1983)

Pollutant/Monitoring Station	1-Hour	8-Hour	24-Hour	Annual	1-Mo. Average	3-Mo. Average
Carbon Monoxide (CO)						
Santa Barbara (State Street)	18 ppm	13 ppm				
San Luis Obispo	13 ppm	4.8 ppm				
Nitrogen Dioxide (NO_2)						
Ventura	338 ug/m^3			56 ug/m^3		
Santa Barbara (State Street)	300 ug/m^3			51 ug/m^3		
Goleta	207 ug/m^3			36 ug/m^3		
Santa Maria	94 ug/m^3			18 ug/m^3		
Refugio Beach[1]	207 ug/m^3			19 ug/m^3		
Corral Canyon[2]	207 ug/m^3			8 ug/m^3		
Nipomo	188 ug/m^3			23 ug/m^3		
Grover City	113 ug/m^3			17 ug/m^3		
San Luis Obispo	207 ug/m^3			30 ug/m^3		
Sulfur Dioxide (SO_2)						
Ventura	104 ug/m^3		31 ug/m^3	8 ug/m^3		
Santa Barbara (State Street)	104 ug/m^3		31 ug/m^3	8 ug/m^3		
Goleta	52 ug/m^3		21 ug/m^3	3 ug/m^3		
El Capitan	52 ug/m^3		16 ug/m^3	3 ug/m^3		
Lompoc (Jalama Road)	104 ug/m^3		26 ug/m^3	3 ug/m^3		
Santa Maria	234 ug/m^3		42 ug/m^3	3 ug/m^3		
Corral Canyon[2]	45 ug/m^3		42 ug/m^3	5 ug/m^3		
Nipomo	707 ug/m^3		101 ug/m^3	10 ug/m^3		
Grover City	419 ug/m^3		53 ug/m^3	5 ug/m^3		
San Luis Obispo	262 ug/m^3		47 ug/m^3	6 ug/m^3		
Total Suspended Particulate (TSP)						
Ventura			158 ug/m^3	61 ug/m^3		
Santa Barbara (State Street)			161 ug/m^3	68 ug/m^3		
Goleta			107 ug/m^3	56 ug/m^3		
El Capitan			302 ug/m^3	103 ug/m^3		
Lompoc (G Street)			175 ug/m^3	68 ug/m^3		
Santa Maria			260 ug/m^3	65 ug/m^3		
Corral Canyon[2]			60 ug/m^3	33 ug/m^3		
Nipomo			85 ug/m^3	38 ug/m^3		
San Luis Obispo			96 ug/m^3	50 ug/m^3		
Lead (Pb)						
Ventura					0.6 ug/m^3	0.5 ug/m^3
Santa Barbara (State Street)					2.2 ug/m^3	1.8 ug/m^3
Lompoc (G-Street)					0.9 ug/m^3	0.6 ug/m^3
Santa Maria (Library)					1.0 ug/m^3	0.8 ug/m^3

Table 4.2-11
(continued)

MAXIMUM POLLUTANT CONCENTRATIONS MONITORED IN THE STUDY AREA
(Includes Data From 1980-1983)

Pollutant/Monitoring Station	1-Hour	8-Hour	24-Hour	Annual
Sulfates (SO_4)				
Ventura			21 ug/m^3	
Santa Barbara (State Street)			29 ug/m^3	
El capitan			23 ug/m^3	
Lompoc (G-Street)			12 ug/m^3	
Santa Maria (Library)			28 ug/m^3	

Refer to Table 4.2-1 for Standards.

[1] Refugio Beach period of record 11/21/74 to 1/14/75.
[2] Corral Canyon period of record 3/31/75 to 8/4/75 and 10/21/75 to 1/1/76 (NAWC, 1976).

Source: Summaries of Air Quality Data, California Air Resources Board.

Table 4.1-12

MAXIMUM BACKGROUND LEVELS NEAR PROJECTS

	POLLUTANTS								
(ppm)	SO_2 (ug/m^3)			NO_2 (ppm)		TSP (ug/m^3)		CO*	
	1-hr	24-hr	Ann	1-hr	Ann	24-hr	Ann	1-hr	8-hr
Lompoc monitors for Lompoc facility and platforms	104	26	3	10/2	.004	165	64	13	4.8
Santa Maria for Battles Gas Plant	234	42	5	10/2	.004	260	65	13	4.8
Santa Maria Refinery (Nipomo Monitor)	--	--	--	10/2	.004	90	43		

* Only CO monitor in the area is in San Luis Obispo County.

Atmospheric particulates, measured as TSP, are made up of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Levels of TSP monitored at sites in the region, as reported in Table 4.2-11, show exceedances of both the 24-hour and annual geometric mean standards at the El Capitan station. Levels approaching the standards have also been observed at the Goleta and Santa Barbara stations. High levels at these stations can generally be the result of localized fugitive dust sources and are generally not indicative of levels in other areas throughout the region.

Motor vehicles are the primary source of lead particles. High ambient levels generally occur in urban areas near major traffic lanes. The lead concentrations, as reported in Table 4.2-11, indicate exceedances of both the state and federal standards at the Santa Barbara State Street monitor. There are no formal designations of attainment for any regions of the country for lead. Suspended particulates may also contain sulfate (SO_4) ions which can form as a result of combustion of sulfur-containing fuels or can be of natural origin from soils and sea salt aerosols. Sulfate concentrations summarized in Table 4.2-11 indicate occasional exceedances of the state standards at the Santa Barbara State Street and the Santa Maria monitors. There is no federal standard for sulfates.

Because the air-quality baseline levels in the region are nonuniform, as discussed previously, baseline concentrations at specific receptors should be assigned by using monitor data that most appropriately reflect values unique to given locations. These levels form the site-specific baseline levels to which modeled increases will be added in order to determine the total impacts of the projects. The site-specific levels will be reported in the project impacts section.

In order to be consistent with NEPA and CEQA in evaluating potential worst case impacts, the maximum pollutant levels that have been observed at monitors nearest the sites have been used as background. For the region that will be affected by emission from the Lompoc Dehydration Facility and the offshore platforms, data in Lompoc were used. Data in Santa Maria were used to characterize the background near the Battles Gas Plant and, except for SO_2, data at the Nipomo monitor were used for the maximum background levels near the refinery. Monitor data in San Luis Obispo was used for background CO levels, because it is the only station in the regon. The background data corresponding to these sites are summarized in Table 4.2-12. For SO_2, the region around the refinery is unique in that only two major sources have contributed to ambient levels in the Nipomo region: the existing refinery and the neighboring coke plant. Two stations in the region monitor SO_2, one at Nipomo and another at Grover City. However, data reported at these stations may not reflect the highest levels from the combined plants. Also, the contribution of the coke plant cannot be a part of the future background. Thus, a different approach was used for the future background of SO_2. The SO_2 emissions of only the coke plant were modeled to determine the maximum background in the region. The emissions from the modified refinery were then modeled and added to the model results for the coke plant. The results of this approach are reported in Section 5.2.

4.2.2 Meteorology

4.2.2.0 General Weather and Climate Summary

The climatological records of weather conditions for the region were reviewed to obtain information related to the transport of air pollutants and to determine the effects of climate and weather on pollution build-up.

The climate of the coastal region is classified as Mediterranean. It is characterized by partly cloudy, cool summers without significant precipitation and mostly clear, mild winters during which precipitation falls with passing storms. This climate is controlled primarily by a combination of a Pacific High Pressure System over the ocean to the west, thermal contrasts between land and the adjacent ocean, and topographic factors. This last factor includes the change in orientation of the coastline near Point Pedernales and Point Conception and the orientation of the mountains along the coast. The abrupt eastward turn in the coastline, including the low mountain range that cuts across the prevailing northwesterly air flow, results in marked differences in climate between the immediate coastal zone north of Point Conception and the region east of Point Conception. The coastline mountain range causes a decrease in the occurrence of northwest winds in the channel as compared with the area north of Point Conception. The strength of the northwest flow on the coastline along the channel depends on the wind velocity across the top of the mountain barrier and the pressure differences on either side.

During the summer, fog and low clouds often form in the layer of marine air over the ocean. This fog also typically forms on the coast and moves inland during the evening. Fog usually lifts and low clouds evaporate as land areas are warmed in the morning. Afternoons are characterized by fair skies, cool temperatures, and a sea breeze. Extratropical storms are diverted to the north, and precipitation occurs infrequently when tropical moisture is transported into the region.

The Pacific High Pressure System weakens and migrates southward during winter. During this season, three weather regimes generally prevail: periods of low clouds/fog associated with dominance of the Pacific High; periods of clear skies, cool nights, and warm days associated with continental flow; and periods of variable cloudiness, shifting and gusty winds, and precipitation associated with extratropical storms. At times the weakened high over the Pacific combined with the build-up of high pressure in the interior of the southwest results in strong flow from the east and leads to the "Santa Ana" conditions. During this condition pollutant emissions from urban residential areas are transported offshore. The polluted air can recirculate onshore under what is termed post-Santa Ana conditions. This is usually the situation in which offshore sources combined with higher background levels can cause higher pollutant levels in the region.

Of equal importance in providing air flow up the channel from Los Angeles is the eddy low which is often present in the Southern California Bight. Under certain conditions this eddy, sometimes called the Catalina Eddy, will expand and/or shift northward producing a southeasterly gradient in the Santa Barbara Channel. It is not uncommon for the sea breeze to appear for a short time during the afternoon. However, with a well developed eddy low, surface winds will remain from the southeast all day.

4.2.2.1 Statistical and Climatological Records

Annual average wind directions at a number of meteorological stations within the area are shown in Figure 4.2-3. Data from all the stations indicate a general northwesterly flow with higher wind speeds occurring offshore and at Point Conception and Point Arguello. The data in the Channel generally show a greater westerly component than do winds at Point Arguello and north, because of the effects of the east-west Santa Ynez Mountains. Wind data measured at Point Conception, Point Arguello and Vandenberg AFB all show generally similar directional distributions. They generally reflect conditions at the proposed platform locations. However, the average speeds at Vandenberg AFB are somewhat lower.

TEMPERATURE

In the coastal zone, temperature fluctuations are moderate because of the influence of the marine climate. In general, conditions are mild near the coast and the daily annual range is slight. On certain occasions, offshore continental air flow can bring extremes in temperature changes. Freezing or near freezing temperatures have been recorded at all of the coastal and offshore locations along the central coast. The synoptic weather patterns associated with these cold temperatures showed a low pressure system over the southwestern United States pushing cold Arctic air directly into the area.

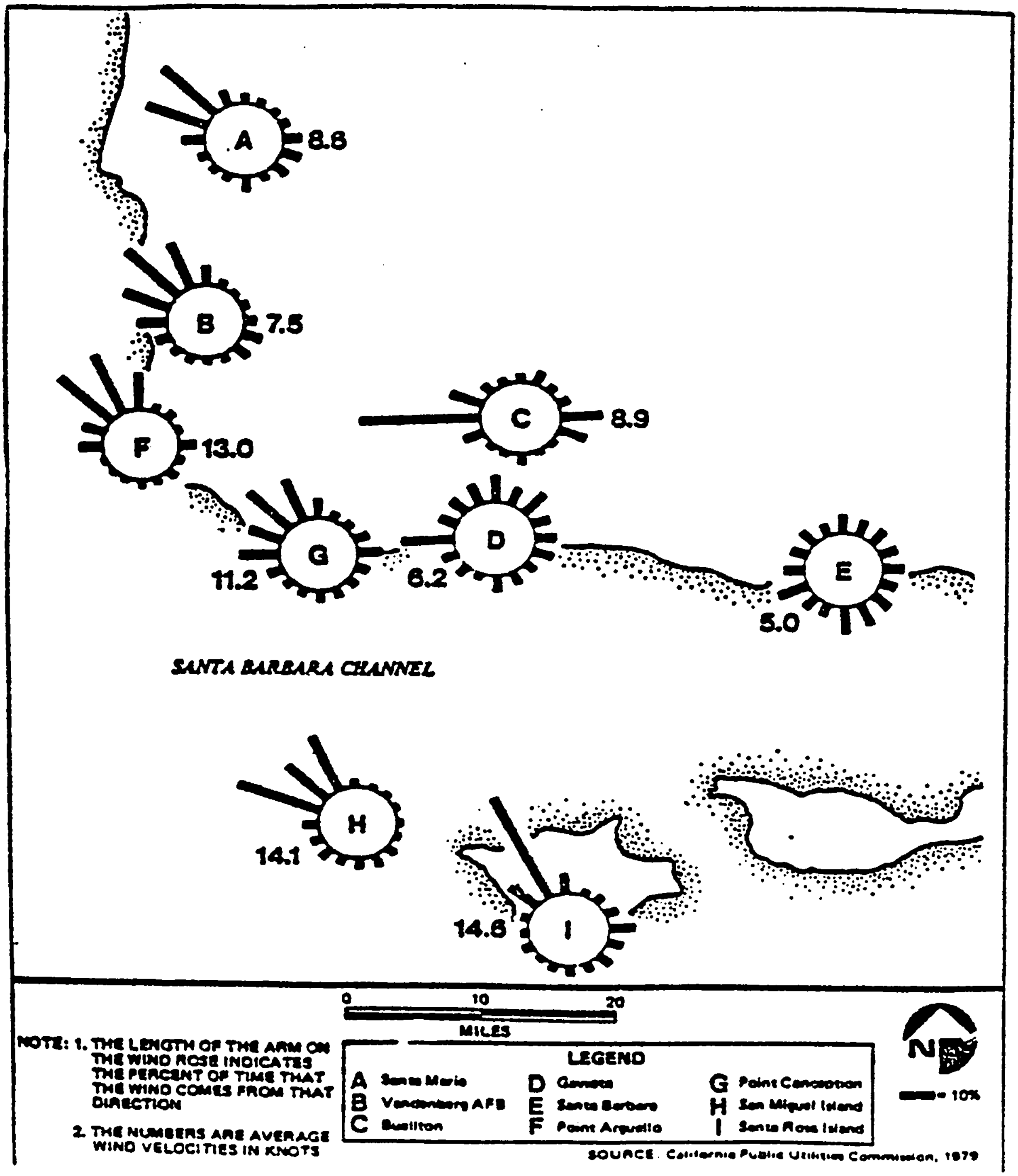
The Southern Santa Maria Basin is more subject to marine airmass control than the onshore facility and thus experiences smaller diurnal and annual variations in temperature. Local offshore temperatures are primarily moderated by the temperature of the sea surface and thus range from 50°F to 65°F year-round. Maximum temperatures in July average in the upper 60s°F or low 70s°F along much of the coast and in the coastal valleys. In the mountain valleys, temperatures range in the low 90s°F. Nighttime temperatures in July drop to near the low 50s°F over most of the area.

Low temperatures in January average in the low 40s°F along the coast and approximately 32°F in most inland valleys. Cold spots in the interior have dropped to 10°F or colder. However, day temperatures typically are comfortable in January with the average maximum reaching the high 50s°F or low 60s°F. Details of temperature means and extremes for the region are given in Appendix B.

SKY COVER AND VISIBILITY

The predominant cloud cover over the immediate coastline and in the coastal valleys is low level (stratus). During the late spring and summer months a thermal low pressure area forms over the inland deserts causing a flow of moist air from the Pacific across the coast. The subsiding air of the Pacific high pressure center regularly traps a cool layer of moist maritime

Figure 4.2-3
Annual Average Wind Frequencies in the Region



air near the surface. At night the moist air cools and fog or low stratus clouds are formed. Foggy conditions are most prevalent during the early morning hours. However, because of the heating of the air and sea breezes, this condition usually gives way to afternoon sunshine. In the Point Conception LNG Terminal EIR [California Public Utilities Commission, 1978], the authors estimate visibility may be restricted to approximately 1 mile on 6.7 percent of all days. It has also been estimated that the maximum duration of restricted visibility is about 14 hours. Thus, delays in shipping access would be less than one-half day. Light to dense fog is reported along the immediate coast about 20 percent of the time during the summer. Restricted ceilings or visibility vary seasonally and by time of day. Generally, the visibility range is lower between the months of July and November, with October experiencing the worst cases of visibility [California Public Utilities Commission, 1978].

While fog and low clouds may at times limit platform activities, they burn off almost daily between 1200 and 1400 (Pacific Standard Time) so that there is almost never a day when the proposed platforms could not be reached. Early morning hours, especially in late summer and early fall, have the highest frequency of poor visibility and/or low clouds but no significant access restrictions are predicted over any extended period of time. Figure 4.2-4 shows the frequency or occurrence of weather events considered to affect visibility including fog, smoke-haze and precipitation. Assuming that these events are mutually exclusive, their individual probabilities of occurrence may be added together. It can therefore be inferred that during the period of July through October there is an approximately 40 percent chance that visibility will be affected by one of these events [California Public Utilities Commission, 1978]. Sky cover and visibility at Santa Maria are summarized in Appendix B.

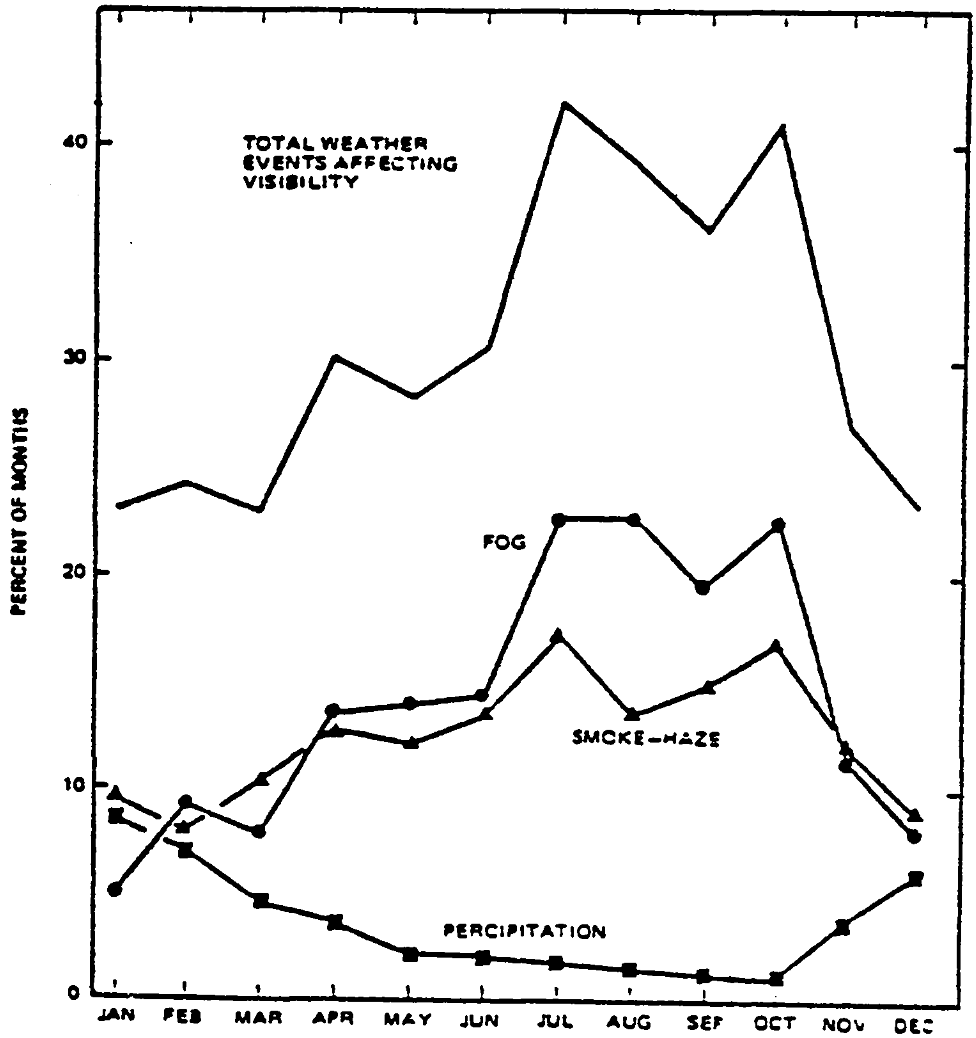
PRECIPITATION

Nearly 90 percent of central and southern California's annual rainfall occurs between November and April which are relatively cool months. Annual precipitation averages nearly 6 inches at some inland areas and almost 30 inches in the higher mountain areas. Storms approaching the basin from the southwest carry significant amounts of subtropical moisture and can produce heavy rainfall and occasional flooding. Storms from the northwest are cooler and generally result in lighter rainfall. Near the coast, there are about 45 days a year of measurable precipitation [DOI, 1980]. Monthly average precipitation rates for several stations in the area are summarized in Appendix B.

SEVERE WEATHER

Severe weather conditions likely to impact the coastal areas of south central California include frontal thunderstorms, funnel clouds and tropical cyclones. The Pacific Coast has the smallest number of thunderstorms per year in the entire United states. Although storms can occur at any time of the year, thunderstorms occur most frequently in central California during late summer and early fall. Frontal storms typically approach the coast from a west or southwesterly direction and develop strong winds. Waves and wind

Figure 4.2-4
MONTHLY FREQUENCY OF WEATHER EVENTS
AFFECTING VISIBILITY



associated with these storms can cause some damage to unprotected coastal facilities.

Funnel clouds and tropical cyclones are not common in California central coastal regions. Only one or two tornados (funnel clouds reaching the ground) are reported throughout California each year [DOI, 1979]. Tornados occurring in California are smaller and weaker than those in the Midwest and do little damage.

Tropical storms rarely reach as far north as the central California coast. These cyclones usually develop off the west coast of Central America or Mexico (typically between the latitudes of 10° and 15° N), turn westward, then veer northeastward across Mexico, or dissipate offshore. While there are no records of tropical storms with extreme winds having reached California, high tides and heavy precipitation have resulted from the few storms that have approached the coast.

During 1982-1983 a global weather system precipitated one of history's most severe climatic events. Drought and flooding became widespread throughout the world. The cause is attributed to abnormal heating of the Equatorial Pacific Ocean, referred to as El Nino. El Ninos occur frequently, although in milder form. There have been eight perceptible El Ninos since 1946; approximately one every five to ten years. They do not occur regularly, and can be from five to ten years apart. The El Nino preceding the 1982-1983 episode occurred during 1976-1977.

The 1982-1983 El Nino caused a faltering of the trade winds, the reversal of the equatorial current and a rise in sea surface temperatures of as much as 14°F. In the deep south of the United states a large persistent low pressure system developed, bringing with it torrential rains and severe flooding. In California, warm water from the western Pacific raised the local sea level about eight inches and the mass of warm water moved up the coast toward Canada. California was subjected to high tides and violent storms causing much damage to oceanfront property. Inland, heavier than normal rainfall damaged crops and caused landslides. The storm moved eastwardly causing the eventual flooding of Salt Lake City and record cold in the East.

The effects of the 1976-1977 El Nino differed regionally. It brought drought to California. There apparently is no set pattern to the effect an El Nino would have on the western United states. Other areas of the world, however, historically have consistent weather changes during El Ninos.

El Nino's weather patterns seem to start when the Pacific atmospheric low, normally centered over Indonesia and the cause of the trade winds, drifts eastwardly. The reason for this drifting is unknown. Resulting winds reverse the surface ocean currents. To date, El Nino conditions cannot be forecasted.

4.2.2.2 Local Wind Data

DeMarrais, et al. [1965] have conducted streamline analyses that provide a characterization of the prevalent horizontal transport of air over the region during the daytime and nighttime hours in the summer and winter seasons. The analyses included the most common wind direction, percent frequency of wind from the most common and two adjacent directions, mean wind speed, and percent frequency of calms at selected stations, including Santa Barbara Airport. These were based on available data and included inferences, interpolations, and extrapolations in some areas, especially over the ocean, because of data limitations.

Figure 4.2-5 and 4.2-6 depict plots of daytime and nighttime streamline analyses (winter and summer seasons) for the region. The plots show that the generally northwesterly air flow associated with the Pacific High is significantly modified by interaction with the terrain. It also becomes modified at particular times of the day because of temperature contrasts between the land and the ocean. A sea breeze develops during the days of the summer as a result. This flow is assisted by rising air over the elevated terrain and by valley winds. During the night, a land breeze may develop as a result of land-sea temperature differences and descending air because of radiative cooling.

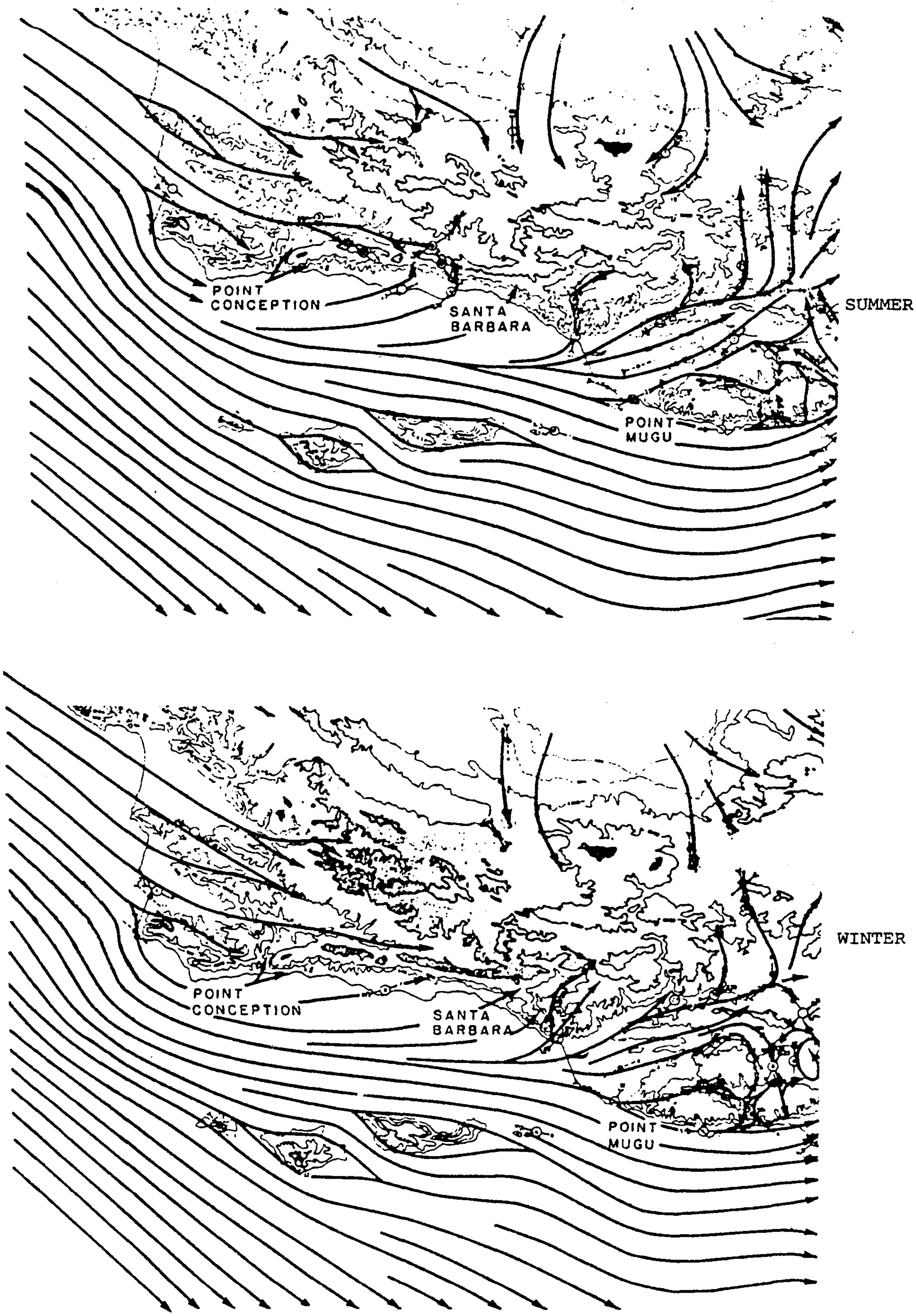


FIGURE 4.2-5
TYPICAL DAYTIME REGIONAL WIND FLOW
Source: DeMarrais, et.al. (1965), de Violini (1974), Strange (1981)

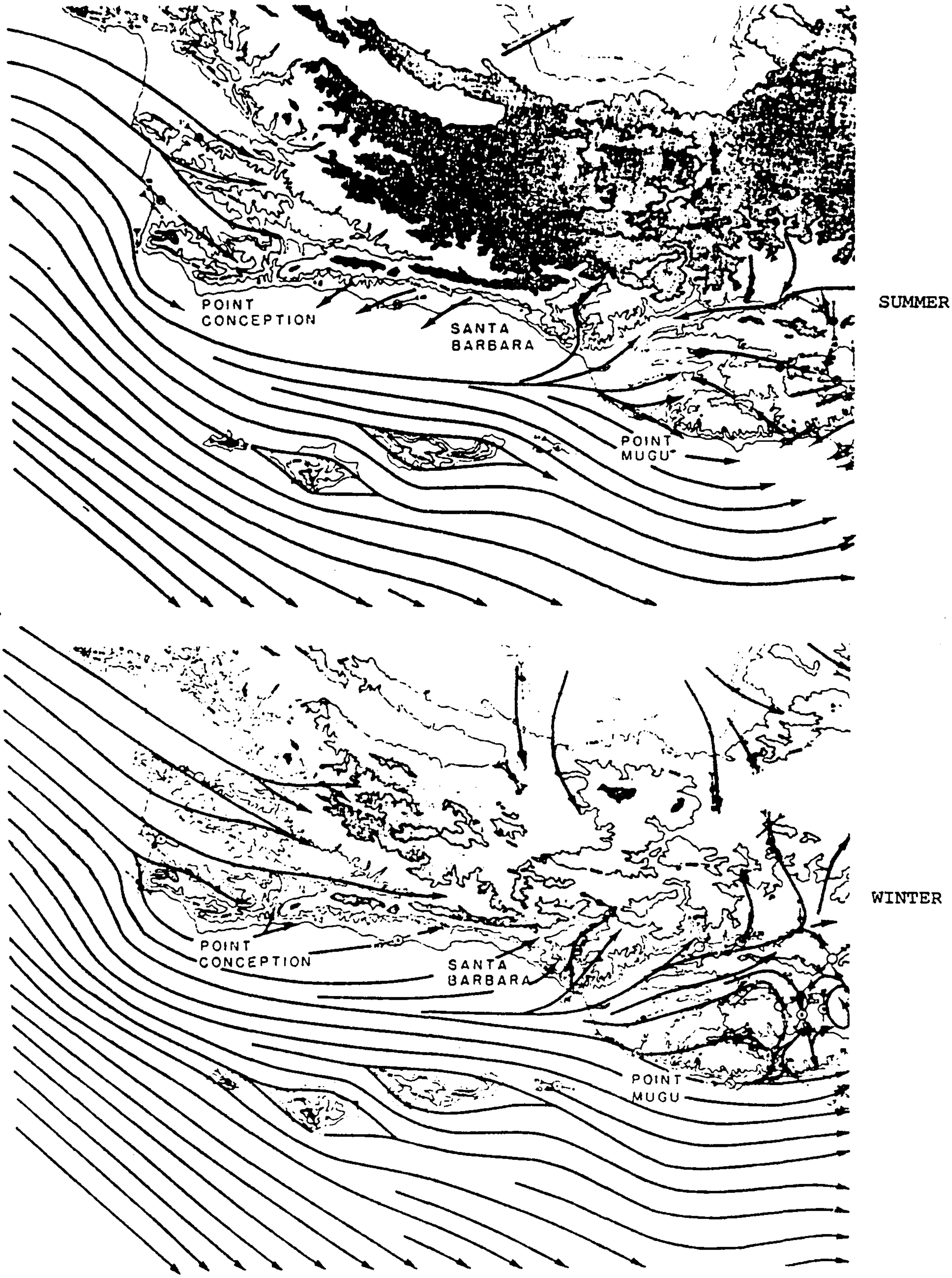


FIGURE 4.2-6
TYPICAL NIGHTTIME REGIONAL WIND FLOW

Source: DeMarrais, et al. (1965), de Violini (1974), Strange (1981)

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4.3 ONSHORE WATER RESOURCES

4.3.1 Surface Water

4.3.1.0 Overview and Regional Setting

REGIONAL SETTING

The surface water setting of the Study Region is dominated by east-west trending mountains and hills forming river valleys which have sources to the east of the Project Area. These river valleys, from south to north, are the Santa Ynez River, San Antonio Creek, and Santa Maria River drainage basins. See Figure 4.1-1 for the general locations of these basins and related physiography. Each drainage has numerous smaller tributary drainages which have quite varied characteristics related to the associated geology, soils, and topography. Drainages in the project area are shown on Figures 4.3-1 and 4.3-2. Characteristics are summarized in Table 4.3-1.

In the region, the rainy season generally lasts from November through April. Average precipitation at Lompoc during the period 1952-1972 was 13 inches [Miller, 1976], and was 14.6 inches in the San Antonio Valley in the period 1958-1977 [Hutchinson, 1980]. Rainfall is highly variable, ranging at Lompoc from 6.42 inches (in 1956) to 29.9 inches (in 1952). Most stream flow occurs in response to rainfall, and is also highly variable.

The portions of the Santa Ynez River in the Project Area lie in a nearly flat alluvial plain which dissects the Lompoc Valley. The river course extends 60 miles from its source in the Santa Ynez Mountains to its mouth just west of the City of Lompoc and drains about 800 square miles. The river has three dams on its upper reaches for water supply of the South Coast of Santa Barbara County. Normally seasonally dry throughout most of its length, the river has large flows in the Lompoc Valley only in response to floods and spilling of the most downstream of its dams -- Bradbury Dam at Lake Cachuma. Perennial flow does occur in some reaches as a result of groundwater discharge, irrigation return flow and effluent from the Lompoc Regional Waste water Treatment Plant [Miller, 1976]. Volumes of flow and water quality characteristics in these reaches are highly complex and variable, being affected by a number of factors, including seasonal variations in precipitation and irrigation, the state of the barrier dune at the mouth of the river, and treatment plant volumes. The river has many tributaries of a wide variety of sizes draining the bordering Lompoc Hills to the south and Purisima Hills to the north (Figure 4.3-1). Depending on local conditions, these creeks are ephemeral, intermittent, or perennial. Most are small in size, and ephemeral in nature. Major tributaries from the south are Lompoc Canyon, La Salle Canyon, Sloans Canyon, San Miguelito Creek, and Salsipuedes Creek. Major tributaries from the north include Oak Canyon, Santa Lucia Canyon, Davis Creek, Purisima Canyon, and Cebada Canyon.

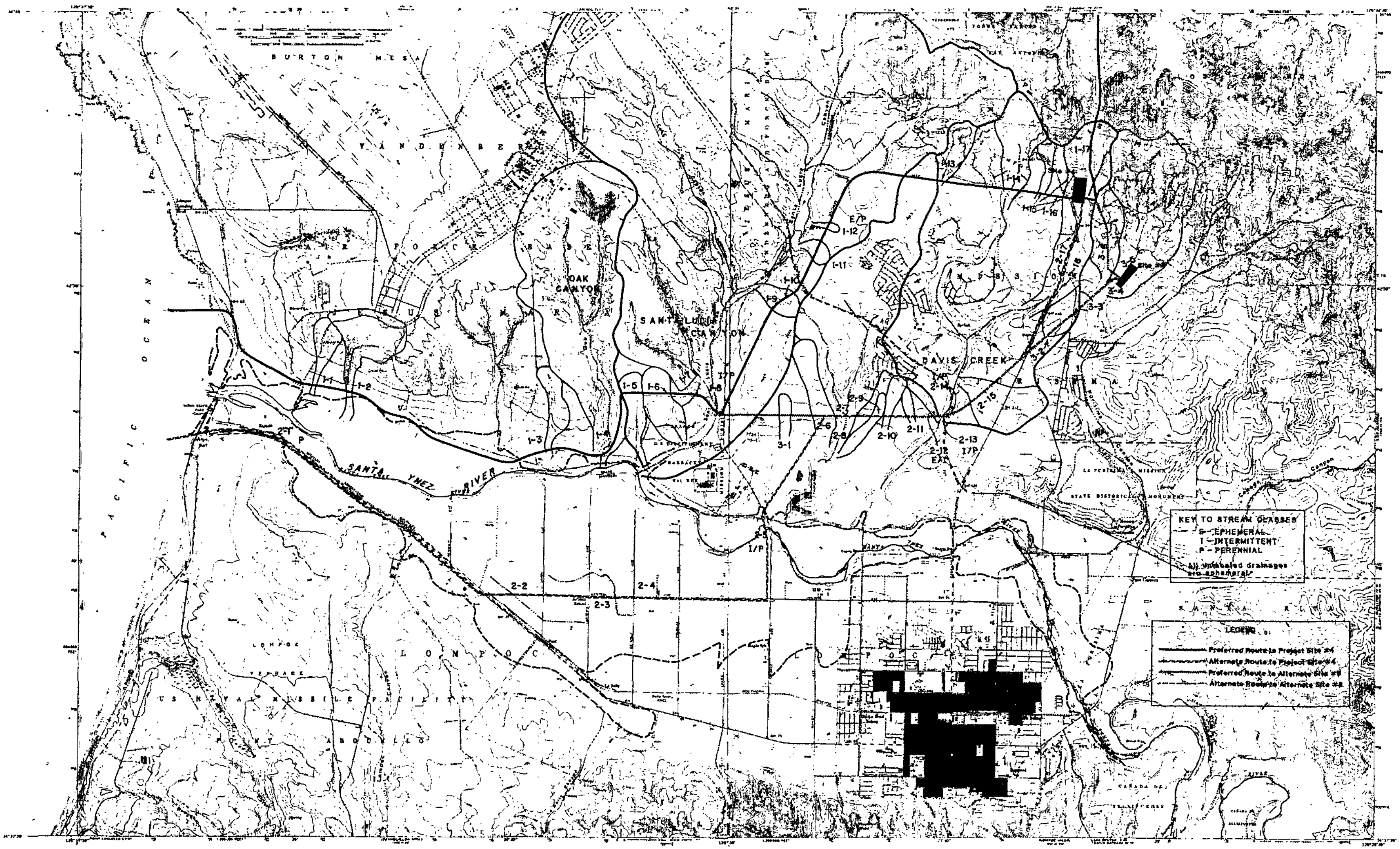

FIGURE 4 3-1 SURFACE WATER DRAINAGES AND DRAINAGE BOUNDARIES IN THE PROJECT AREA FROM LANDFALL TO LOMPOC

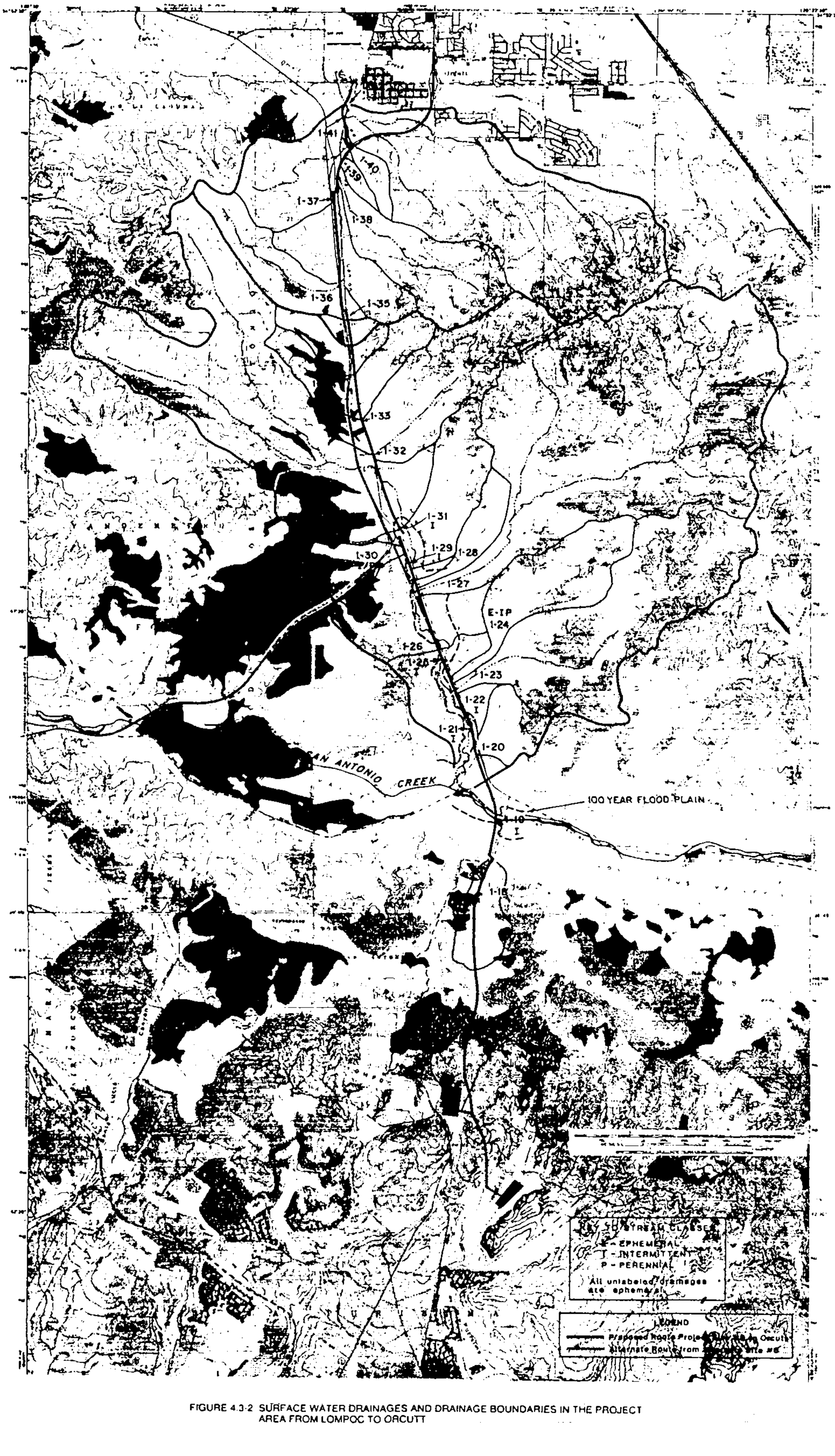

FIGURE 4.3-2 SURFACE WATER DRAINAGES AND DRAINAGE BOUNDARIES IN THE PROJECT AREA FROM LOMPOC TO ORCUTT

TABLE 4.3-1

CHARACTERISTICS OF DRAINAGES IN THE PROJECT AREA

Drainage Crossing	Location	Union No.	Name	Class	Average Flow (AFY)	Area (acres)	Soil Types
1-1	82+00	-	(at valve station)	E	7.2	100	MaE
1-2	106+00	1	-	E	15.4	214	MaE,GuE
1-3	232+00	2	-	E	7.9	109	MaC,GuE
1-4	264+00	3	Oak Canyon	E	69.9	1774	TdF,EdG2
1-5	330+00	4	-	E	1.4	33	TdF
1-6	336+00	5	-	E	1.4	18	TdF
1-7	343+00	6	-	E	2.4	32	TdF
1-8	360+00	7	Santa Lucia Canyon	I/P	373.6	9113	TsF,BtD2,MaE
1-9	440+00	A2	-	E	2.0	24	TnE2
1-10	446+00	A2	-	E	2.0	24	TnE2,TnC
1-11	477+00	A3	-	I	1.2	16	MaE
1-12	492+00	A4	-	P/E	0.8	11	MaC
1-13	577+00	A5	trib to Davis Creek	E	6.8	95	EdC2
1-14	617+00	A6	trib to Davis Creek	E	16.1	223	BtA2
1-15	632+00	A7	trib to Davis Creek	E	2.6	36	EnA2,EmC
1-16	638+00	A7	trib to Davis Creek	E	3.2	44	EnA2,EmC
1-17	85+84	21	-	E	7.5	104	BtD2
1-18	173+23	22	-	E	2.5	35	ArF,EnC2
1-19	214+96	23	San Antonio Creek	I	--	700,000	EdA2,GuE
1-20	246+80	24	-	E	15.0	209	CtA
1-21	260+00	-	Harris Canyon	I	505.2	10,983	Rs
1-22	271+00	25	Harris Canyon	I	500.0	10,500	Rs,CtA
1-23	286+49	26	Long Canyon	E	97.0	1447	Sh
1-24	293+32	27	-	E to I/P	41.5	593	CtD
1-25	301+19	28	Harris Canyon	I	428.5	8569	Rs
1-26	310+28	29	Harris Canyon	I	428.5	8569	Rs
1-27	335+75	30	-	E	208.7	3339	CuA
1-28	340+00	31,31a	-	E	13.0	180	Rs
1-29	350+72	32	Harris Canyon	I	270.2	4503	CuC
1-30	360+65	33	-	E to I/P	14.8	205	CuC,CtD
1-31	365+51	34	Harris Canyon	I	233.5	3828	CuA
1-32	408+50	35	-	E	98.4	1458	BnB2
1-33	426+30	36	-	E	51.2	731	BnB2
1-34	440+84	37	-	E	14.6	200	CuD
1-35	486+22	-	Graciosa Canyon	E	4.4	60	CuD
1-36	502+26	37a	Graciosa Canyon	E	26.6	375	CuD
1-37	544+99	38	Graciosa Canyon	E	56.9	813	BoD2
1-38	554+09	39	-	E	45.5	648	BoD2
1-39	565+50	40	-	E	3.2	44	BoA
1-40	571+02	41	-	E	5.6	78	BoD2,BoA2
1-41	587+33	42	Graciosa Canyon	E	132.1	2032	BoA2
1-42	595+19	43	Graciosa Canyon	E	244.0	4067	BoD2,Sh
Route 2							
2-1		-		P	--	-	Mh,Rs
2-2	east of 210+00	-	(irrigation ditch)	E	--	-	Mw
2-3	345+00	-	(may be filled)	E	--	-	Mx
2-4	-	-	(irrigation ditch)	E	--	-	Mx
2-5	-	-	Santa Ynez River	I	--	-	Rs
2-6	430+00	-		E	14.6	200	MaC
2-7	439+00	9	-	E	69.2	1003	CtD2
2-8	440+00	9	-	E	69.2	1003	CtD2
2-9	457+00	10	-	E	1.4	20	ArD
2-10	463+00	11	-	E	3.2	45	ArD
2-11	478+00	12	-	E	1.9	26	TnC,TrD
2-12	491+00	13	-	E/I	2.4	34	MaE3
2-13	497+00	14	Davis Creek	I/P	223.3	3660	MaE,EdC2
2-14	500+06	14	Davis Creek	I/P	223.3	3660	MaE,EdC2
2-15	522+00	15	-	E	9.9	138	MaE
2-16	-	-	e. trib. Davis Creek	E	28.0	400	MaC,EnC2
2-17	-	-	-	E	28.0	400	MaC,EnC2
Route 3							
1-1 to 1-8	See Above						
3-1	404+00	8	-	E	2.1	28	NvA,MaC
2-6 to 2-15	See Above						
3-2	573+00	16	-	E	7.2	100	MaC
3-3	605+00	17	-	E	1.4	19	MaE
3-4	624+00	18	-	E	50.0	695	EdC2,EnC2,CuC
3-5	01+00	19	-	E	50.0	695	CuC
3-6	10+00	20	-	E	13.0	179	EdC2

Total Crossings

Route Segment	Crossings	Major
1 to site 4	16	2
2 to site 4	17	3
3 to site 8	24	4
4 to site 8	18	3
Site 4 to Orcutt	26	7
Site 8 to Orcutt	28	7
1 to Orcutt	42	9

Key:

x-nn

x = Pipeline Route
1: Preferred route to site #4 (and Orcutt)
2: Alternative route to site #4
3: Preferred route to site #8
4: Alternative route to site #8

nn = number of stream crossings on that route

Notes:

- Route 1 is numbered consecutively from landfall to Orcutt, via site 4.
- Route 2 is numbered consecutively from Surf to site #4.
- Route 3 is numbered on the section from Santa Lucia Canyon east to coincide with Route 2, and from Highway 1 to site #8 and further to site #4. Crossings which are coincident with Routes 1 and 2 are 1-1 to 1-8 and 2-6 to 2-15.
- Route 4 drainage crossings are 2-1 to 2-15 and 3-2 to 3-4.
- Route Station Nos. reference Union maps as follows:

Crossings	Union Maps
1-1 to 1-17	14C
1-18 to 1-42	17C
2-1 to 2-4	15C (powerline maps)
2-5	no reference
2-6 to 2-15	14C
2-16 to 2-17	no reference
3-1 to 3-4	14C
3-5 to 3-6	17C

- Stream classes are:

  P = Perennial

  I = Intermittent

  E = Ephemeral
- See Table 4.3-2 for full names and definitions of soil types.
- See Figures 4.3-1 and 4.3-2 for locations of drainages.
- Sources: USDA, 1972; HDR, June 1984; HDR, July 1984; USGS 7.5° quadrangles (Surf, Lompoc, Orcutt)

San Antonio Creek drains about 154 square miles and is flanked by the Purisima Hills to the south and the Casmalia and Solomon Hills to the north. The creek is entrenched along most of its course. San Antonio Creek and all streams tributary to it are ephemeral or intermittent except San Antonio Creek at Barka Slough (Figure 4.3-2) where groundwater is forced to the surface by underlying consolidated material [Hutchinson, 1980]. Irrigation return water contributes to streamflow in the Project Area, especially along the east side of Harris Canyon, and has probably resulted in some otherwise ephemeral streams being intermittent in nature.

The Santa Maria Valley is one of the larger coastal valleys in California, draining about 1,600 square miles. In the Orcutt area, along the southern edge of the valley, two drainages of size are present: Orcutt Creek and Graciosa Canyon, which are both ephemeral to intermittent in nature (Figure 4.3-2).

STREAMFLOW

Most streamflow in the Project Area is in response to precipitation events. Extreme events can cause severe flooding. There is considerable data published on floods of the Santa Ynez River in Lompoc Valley. These records show a 100-year flood plain as indicated in Figure 4.3-1. Flooding in the San Antonio Creek Valley has been much less frequent although a 100-year event occurred in 1983. The 100-year flood plain in the Project Area is shown in Figure 4.3-2. These floods caused much erosion and scouring of large amounts of material as well as inundation of large surface areas. Summaries of floods of the Santa Ynez River and San Antonio Creek, as well as estimates of storm flow and average annual flow in all drainages in the Project Area, are presented in Technical Appendix C, Section 1.1.1.

SEDIMENT LOADING

Soils along the proposed, existing and alternative pipeline routes are listed in Table 4.3-2 and consist mostly of sands with a few clays and loams. Table 4.3-2 also shows the erosion coefficient K and erosion hazard as described by the Soil Conservation Service [USDA, 1972] and addresses such factors as soil type and slope for each soil.

There have been no measurements of sediment load, either bed or suspended, done on streams in the Project Area. Examination of data on long-term sedimentation rates in debris basins in watersheds in similar areas of Southern California indicates that average annual sediment yields over a 25 to 50 year period are in the vicinity of 1,000 cubic yards/square mile or about 3.5 tons/acre/year [USGS, 1974]. This relationship generally holds for watersheds that are 600 to 3,000 acres in size. Many watersheds in the Project Area are smaller than 600 acres and some are larger than 3,000. Therefore, watersheds in the project area may deviate slightly from these sediment yield rates, with smaller drainages tending to yield more, and larger drainages less, on a unit basis. Calculations of estimated erosive losses, which are higher than the sediment yields noted above, are summarized in Technical Appendix C, Section 1.1.1.

Table 4.3-2

Soils Table

Soil	Map Symbol	Slope	Erosion Hazard	K value
Arnold Sand	ArD	5-15%	moderate	0.15
Arnold Sand	ArF	15-45%	high	0.15
Arnold Sand	ArF3	9-25%	high	0.15
Betteravia Loamy Sand	BnB2	0-5%	none to slight	0.24
Botella Loam	BoA	0-2%	none to slight	0.37
Botella Loam	BoA2	0-2%	moderate	0.37
Botella Loam	BoC	2-9%	slight to moderate	0.37
Botella Loam	BoD2	2-15%	slight to moderate	0.37
Botella Clay Loam	BtA2	0-2%	moderate	0.37
Botella Clay Loam	BtD2	2-15%	slight to moderate	0.37
Camarillo Sandy Loam	Ca	-	none	-
Camarillo Very Fine Sandy Loam	Cc	-	none to slight	-
Camarillo Silty Clay Loam	Cd	-	none	-
Coastal Beaches	CnB	5%	very high	-
Corralitos Sand	CtA	0-2%	high	0.17
Corralitos Sand	CtD	2-15%	high	0.17
Corralitos Loamy Sand	CuA	0-2%	high	0.28
Corralitos Loamy Sand	CuC	2-9%	high	0.28
Corralitos Loamy Sand	CuD	9-15%	high	0.28
Dune Land	DuE	variable	very high	-
Elder Sandy Loam	EdA2	0-2%	none to slight	0.32
Elder Sandy Loam	EdC2	2-9%	moderate	0.32
Elder Loam	EmA	0-2%	none to slight	-
Elder Loam	EmC	2-9%	slight to moderate	-
Elder Shaly Loam	EnA2	0-2%	slight	0.24
Elder Shaly Loam	EnC2	2-9%	slight to moderate	0.24
Elder Shaly Loam	EnD2	9-15%	moderate	0.24
Gullied Land	GuE	variable	very high	-
Linne Clay Loam	LcF	30-45%	high	0.28
Lopez Shaly Clay Loam	LmG	15-75%	high to very high	-
Marina Sand	MaC	2-9%	high	0.20
Marina Sand	MaE	9-30%	high	0.20
Marina Sand	MaE3	9-30%	high	0.20
March	Mh	0-2%	-	-
Metz Loamy Sand	MnA	0-2%	none to slight	-
Mocho Fine Sandy Loam	Mu	-	none to slight	-
Mocho Loam	Mv	-	none to slight	-
Mocho Loam, Overflow	Mw	-	slight	-
Mocho Silty Clay Loam	Mx	-	none to slight	-
Narlon Loamy Sand	NsC	2-9%	moderate	-
Narlon Sand, Hardpan Varient	NvA	0-2%	high	0.17
Narlon Sand	NvC	2-9%	high	0.17

Table 4.3-2
(continued)

Soils Table

Soil	Map Symbol	Slope	Erosion Hazard	K value
Oceano Sand	OcD	2-5%	very high	-
Riverwash	Rs	variable	severe	-
Rough Broken Land	RuG	variable	severe	-
San Andeas-Tierra Complex	SfF3	9-45%	high	-
San Andeas-Tierra Complex	SfG	30-45%	very high	-
Sandy Alluvial Land	Sh	variable	very high	-
Santa Lucia Shaly Clay Loam	SmG	45-75%	very high	-
Sedimentary Rock Land	SpG	45-75%	severe	-
Sorrinto Clay Loam	SwB2	0-5%	slight	-
Tangair Sand	TaC	2-9%	slight to moderate	-
Terrace Escarpments	TdF	variable	very high	0.00
Tierra Sandy Loam	TaE2	15-30%	moderate to high	0.17
Tierra Sandy Loam	TnC	2-9%	slight to moderate	0.17
Tierra Sandy Loam	TnD2	9-15%	moderate	0.17
Tierra Sandy Loam	TnE2	15-30%	moderate to high	0.17
Tierra Loam	TrC	2-9%	slight to moderate	-
Tierra Loam	TrD	9-15%	moderate	-
Tierra Loam	TrE2	5-30%	high	-
Tierra Clay Loam	TsF	15-45%	high	0.37

Source: USDA, 1972.

WATER QUALITY

Surface water in the project area is typical of surface waters in the larger Study Region. Major ions include sodium, chloride, bicarbonate, sulfate and, in the San Antonio Valley, calcium. All waters are suitable for most irrigation and agricultural uses but only marginally suitable for domestic uses because of high levels of total dissolved solids (TDS). Use of surface water is extremely limited because of the dearth of flow. Quality levels can vary dramatically depending on whether a flood, discharging groundwater or irrigation return water is the source of flow. Measurements of surface water quality in both the Santa Ynez Valley and in San Antonio Creek are presented in Technical Appendix C, Section 1.1.1.

4.3.1.1 Lompoc Dehydration Facility (Site 4)

Site 4 is located at the northern edge of Burton Mesa immediately south of the Purisima Hills. The site is situated on a broad planar alluvial surface that grades gently to the south at about 5 degrees.

The slopes of the adjacent Purisima Hills are deeply incised, with one prominent valley lying immediately to the north of the site. Water issuing from this valley and two minor ones drains through the site and has been responsible for forming the broad alluvial surface at the site. At the present time, the drainage in the canyon to the north and the fan surface appear to be at grade; that is, very little net erosion or deposition is taking place. Drainage across the site is primarily by sheet wash and direct infiltration into the sandy surface soils, which are Botella clay loams and Elder shaly loams, with moderate permeability, slight to moderate erosion hazard, and slow to medium runoff [USDA, 1972].

4.3.1.2 Orcutt Pump Station

The Orcutt Pump Station site is located at the southwest margin of the Santa Maria Valley adjacent to the Casmalia-Solomon hills, on an elevated surface which represents the valley floor prior to incision of two main drainages located close to the site. The confluence of the north-flowing Graciosa Creek and the west-flowing Orcutt Creek lies about 1,500 feet (465 meters) to the northwest of the site. The main drainage channel to Graciosa Creek trends within about 600 feet (186 meters) of the property to the west and south, while the Orcutt Channel is about 1,900 feet (589 meters) to the north. Soils are Garey sandy loams, with moderate to high hazard of erosion and medium surface runoff [USDA, 1972].

4.3.1.3 Surf Substation

There are no well-defined drainages at the Surf substation site. Drainage of surface water is mostly by infiltration. Soils are dune sands and Oceano series sands, which developed from dune sands. Runoff is low, infiltration rates are high, and erosion hazard is slight.

4.3.1.4 Proposed Pipeline Route - Landfall to Lompoc (Site 4)

The preferred route runs north of, and generally parallel to, the Santa Ynez River from landfall until turning northeast at Santa Lucia Canyon and then east across Burton Mesa to reach the processing facility site. From landfall to Route 1, this route crosses 16 channels in drainages ranging in size from 18 to 9,100 acres. Except for Oak Canyon and Santa Lucia Canyon, all of these drain less than 250 acres. Oak Canyon is a wide flat-bottomed valley with steep brushy sides and sandy soils. This drainage is classed as ephemeral and drains about 1,800 acres. The natural stream channel has been diverted into a diked channel 20-30 feet wide which runs along the eastern side of the valley. Santa Lucia Canyon has a wide flat floor and gently sloping sides with clay and sandy soils. This drainage is classed as intermittent/perennial and drains about 9,100 acres. In its lower reaches, the stream has been channelized.

4.3.1.5 Proposed Pipeline Route - Lompoc to Orcutt

From Site 4, the existing pipeline corridor traverses the Purisima Hills, crosses San Antonio Creek, and parallels Harris and Graciosa Canyons en route to Orcutt, crossing drainages a total of 26 times. (See Figure 4.3-2 and Table 4.3-1.) All drainages are ephemeral except for San Antonio Creek and the lower portions of Harris Canyon, which are classed as intermittent. Two ephemeral drainages are crossed in the Purisima Hills. These drainages do not show significant evidence of erosion on the slopes trenched for installation of existing lines. From these hills, the corridor traverses the flat San Antonio alluvial plain and San Antonio Creek which is about 60 feet wide with a sandy flat bottom incised 10 to 15 feet deep. As it leaves the valley floor heading north, the pipeline route follow Harris Canyon which, in places, is a man-made ditch which collects agricultural and storm runoff and is incised as much as 20 feet. In upper Graciosa Canyon, the channel is also deeply incised. Erosion is also evident on gentler slopes near the Orcutt site.

Soil types include Botella loams and clay loams with slight to moderate erosion hazard, Corralitos loamy sands with high erosion hazard, Elder series loams with slight to moderate erosion hazard, and riverwash and alluvial lands with very high to severe erosion hazard.

4.3.1.6 Transmission Line Route

The power line corridor coincides with Alternative Route 2 as far as the intersection of Central and Floradale Avenues and proceeds east from there into Lompoc. See the discussions of Route 2 in Section 4.3.1.8 below.

4.3.1.7 Alternatives

<u>LOMPOC DEHYDRATION FACILITY (SITE 8)</u>

This level site is undeveloped but has been cultivated. Drainage of the site occurs by sheet wash, drilling and infiltration. A small active erosion channel across the site is filled annually by farming activities [Union Oil, 1983]. A minor stream channel parallels the road west of the property.

Excessive erosion on the proposed building area or adjacent slopes is not evident. Soils are Elder shaly loams and Corralitos loamy sands with moderate to high permeability, low runoff, and slight hazard of erosion.

ALTERNATIVE PIPELINE ROUTE - LANDFALL AT SURF TO SITE 4 (ROUTE 2)

This alignment crosses 17 drainages enroute to Site 4, including the Santa Ynez River, Davis Creek, and an unnamed drainage between Santa Lucia Canyon and Davis Creek. The salient unique feature of the alignment is its traverse of the flood plain of the Santa Ynez River. The implications of this are discussed further in Section 4.1.7.9. Both Davis Creek and the unnamed drainage have deeply incised the mesa surface. Davis Creek has heavily wooded slopes and sandy soil. Relatively sustained flow of water can occur as a result of irrigation of the Village Country Club golf course at Vandenburg Village. The drainage is classed intermittent/perennial and drains about 3,700 acres. The unnamed canyon located at station 439+00 actually consists of two tributaries both with stream channels incised into the valley floor with actively eroding banks approximately 10 feet high. The drainage has slopes from 20 percent to vertical in some places, is classed as ephemeral, and drains about 1,000 acres.

ALTERNATIVE PIPELINE ROUTE - NORTH LANDFALL TO SITE 8 (ROUTE 3)

This alignment coincides with the preferred route as far as Santa Lucia Canyon, from where it continues eastward along the south-facing slopes of Burton Mesa, turning northeast after crossing Davis Creek to reach Site 8. Portions of the route east of Santa Lucia Canyon are also coincident with Route 2. A total of 24 drainages are crossed; including four with areas in excess of 1,000 acres: Oak Canyon, Santa Lucia Canyon, Davis Creek, and the unnamed channel between Santa Lucia Canyon and Davis Creek.

ALTERNATIVE PIPELINE ROUTE - LANDFALL AT SURF TO SITE 8 (ROUTE 4)

This route coincides with Route 2 as far as Highway 1, where it diverges to reach Site 8. A total of 18 drainage crossings are made, including the Santa Ynez River, Davis Creek, and the large unnamed drainage to the west of Davis Creek.

4.3.1.8 Area Study

With respect to surface water resources, the triangular Onshore Area Study region defined by Lompoc, Buellton, and Gaviota can be divided at the Santa Ynez River into two broad areas. North of the Santa Ynez River, drainages of the Purisima and Santa Rita Hills are mostly ephemeral, with none permanent. Soils are generally sandy with high infiltration capacity and low erosion hazard. South of the river, drainages of the Santa Ynez Mountains are better developed and include a number of intermittent streams as well as several streams which are permanent along all or part of their lengths. Springs are more frequent in these drainages and watersheds are generally less developed.

4.3.1.9 Applicable Regulations, Rules and Standards

Discharges to surface water must be approved by the California Regional Water Quality Control Board (RWQCB). The California Coastal Act of 1976 addresses several issues which relate to surface water. Section 30253 requires that new development shall minimize flood hazards and disturbances which would contribute to erosion. Maintenance of biological productivity is required by Section 30231 of the Act, using methods such as runoff control and minimization of alterations of streams. County Coastal Plan policies which implement the Act include 3-13 (cut and fill operations), 3-14 (consistency with existing conditions), 3-15 (grading operations), 3-16 (sediment control), and 3-18 (runoff control).

4.3.2 Groundwater

4.3.2.0 Overview

The proposed Union project would have components in the Santa Ynez River, San Antonio Creek, and Santa Maria River Basins (Figure 4.1-2). These basins contain similar groundwater systems separated from each other by intervening consolidated rock hills [Miller, 1976; Hutchinson, 1980; Worts, 1951]. The groundwater resources of all these basins are heavily developed [Ahlroth et al., 1977]. Existing groundwater conditions for these basins are described below. Technical Appendix C describes groundwater conditions in greater detail. For details of geologic conditions in the Study Region and Project Area, see Section 4.1. Surface water resources are described in Section 4.3.1.

The Santa Ynez Basin consists of five hydrologically separated areas [Evenson, 1965]. From east to west, these are designated the Headwater, Santa Ynez, Buellton, Santa Rita, and Lompoc areas. Project facilities would be limited to the Lompoc Area, westernmost of the five. The Lompoc Area extends from the Robinson Bridge on State Highway 246 westward to the Pacific Ocean and is bounded on the north by the Purisima Hills and on the south by the Santa Ynez Mountains. It is composed of three hydrogeologically distinct subareas, the Lompoc Plain, the Lompoc Terrace, and the Lompoc Upland [Miller, 1976] (Figure 4.3-3.)

4.3.2.1 Physical Framework and Parameters

GEOLOGIC UNITS

Section 4.1 describes the geologic units in detail. The geologic units are discussed here with regard to their ability to supply water. All three river basins contain essentially the same geologic units, with local variations in thickness and relative significance as aquifers. The geologic units in these basins may be divided generally into two groups, the underlying low permeability consolidated rocks and the overlying, higher permeability unconsolidated deposits. The underlying consolidated rocks form an effective lower boundary on currently utilized aquifers. Table 4.3-3 summarizes the lithology, water-bearing characteristics, and hydro logic classification of

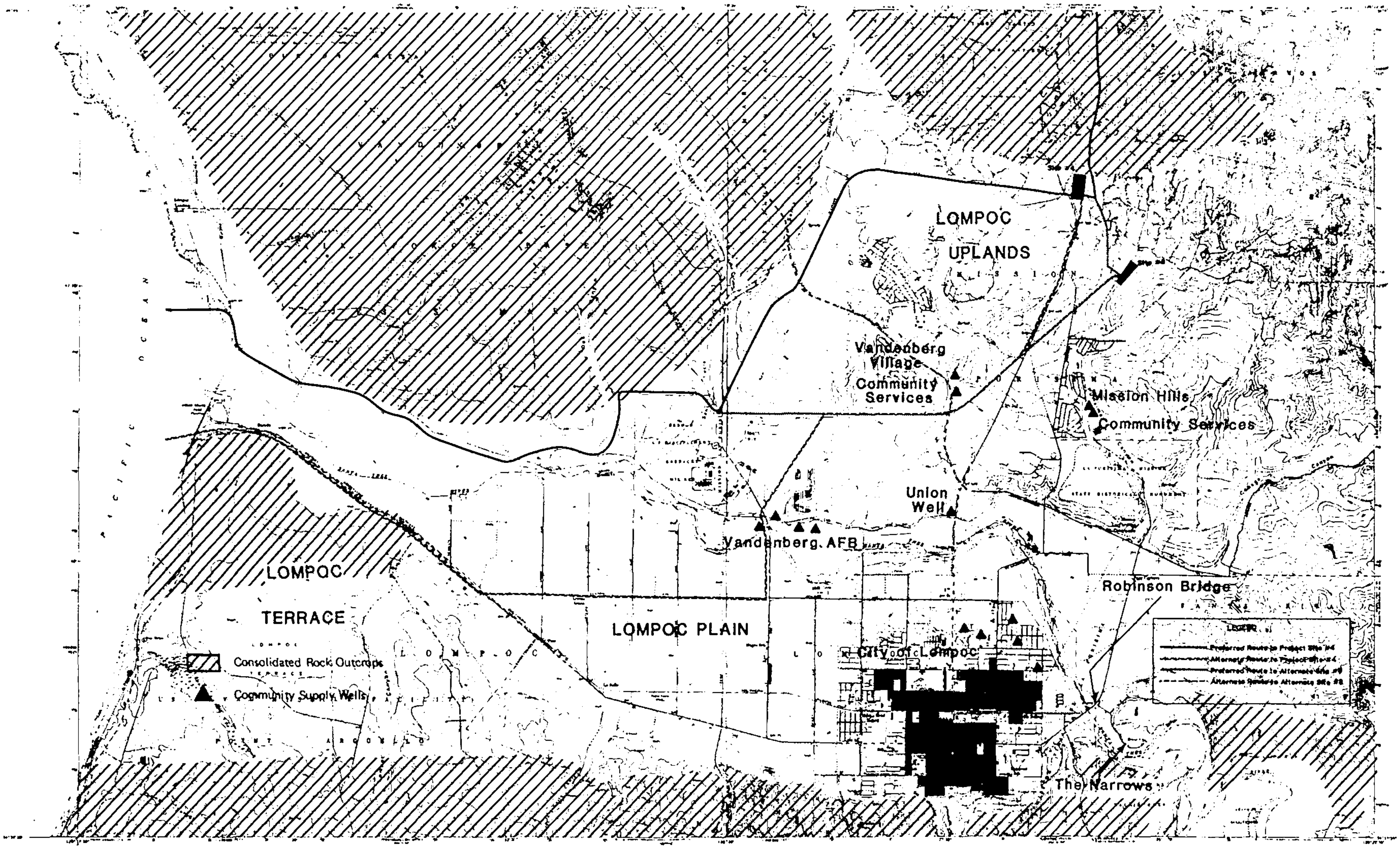

FIGURE 4.3-3

GEOHYDROLOGIC FEATURES OF THE LOMPOC GROUNDWATER BASIN

Table 4.3-3

BORING LOG FOR WELL IN MOUTH OF PURISIMA CANYON,
WELL NUMBER 7/34-24N1
(Source: Upson and Thomasson, 1951)

Material	Thickness (feet)	Depth (feet)
Younger alluvium:		
Adobe	6	6
Clay, sandy	43	49
Sand	4	53
Clay	2	55
Sand and clay	13	68
Sand, fine	17	85
Paso Robles formation:		
Clay, yellow	23	108
Clay, blue	7	115
Sand	9	124
Shale, hard	1	125
Clay, yellow	5	130
Gravel, water-bearing	13	143
Clay and gravel	16	159
Clay and sand	10	169
Sand, fine, hard	14	183

the principal geologic units in the three river basins. The younger alluvium (especially the lower member), Orcutt Sand, and Paso Robles Formation are generally the most important aquifer materials. The terrace deposits are generally above the zone of saturation. They are, however, moderately permeable and readily allow percolation to underlying formations.

In the Lompoc Upland, the younger alluvium is absent, and the Orcutt Sand is the uppermost formation. Most of the Orcutt Sand in the Lompoc Upland is above the water table. However, lenses of relatively impermeable material create local perched water bodies in the Orcutt Sand. The most heavily used formations in the Upland are the Paso Robles Formation and the Careaga Sand.

HYDRAULIC PARAMETERS

The two fundamental material properties of an aquifer are the ability to transmit water (hydraulic conductivity) and the ability to release stored water (specific yield). Flow patterns and well yields are also affected by aquifer geometry (especially saturated thickness) and boundary conditions. The product of hydraulic conductivity and saturated thickness is called transmissivity and may be computed as the stated product or measured directly from well tests.

Reported hydraulic conductivities range from 3 to 12 feet/day for the Careaga sand and 135 to 600 feet/day for the younger alluvium [Upson and Thomasson, 1951]. These values are within the typical range for productive aquifers [Freeze and Cherry, 1979]. Estimated aquifer transmissivities range from 2,000 to 27,000 ft^2/day in the Lompoc basin and from 2,600 to 34,000 ft^2/day in the San Antonio Basin. Specific yield in the region of the water table for the Lompoc Plain was estimated as 14 percent by Upson and Thomasson [1951] and 16 percent by Miller [1976].

FLOW SYSTEM

The aquifers are bounded below and laterally to the north, south, and east by low-permeability consolidated formations, and bounded on the west by the ocean [Miller, 1976; Hutchinson, 1980; Worts, 1951]. These conditions create a general flow pattern from east to west, with unconsumed groundwater discharging to the ocean. Prior to reaching the ocean, the aquifers discharge to streams (where the water level in the stream is lower than the adjacent water table), pumpage, springs, and evapotranspiration. Aquifer recharge comes from infiltrated rainfall, seepage from streams (where the water level in the stream is higher than the adjacent water table), and return flows of irrigation and waste water.

The general groundwater gradients in the three river basins range from 1 to 20 feet/mile in the Santa Ynez Basin, from 10 to over 30 feet/mile in the San Antonio Valley, and from less than 10 to over 100 feet/mile in the Santa Maria Valley. Local gradients are strongly influenced by pumping and are highly variable.

The aquifers in these three valleys are largely unconfined, though localized stratigraphy and pumping patterns can create locally confined or perched conditions and consequent vertical head gradients. In the Lompoc Plain, the generally lower permeability of the upper member of the younger alluvium, as evidenced in part by the presence of included lenses of relatively impermeable materials, creates a separate shallow groundwater body in a semi-perched condition above the main water body. In addition, the head is generally lower in the lower member of the younger alluvium than in the underlying formations. These conditions create a flow system in which water flows to the heavily pumped lower member of the younger alluvium from both overlying and underlying formations. In the Lompoc Upland, several of the perched water bodies created by the low permeability lenses discharge through seeps and springs. In the San Antonio Valley (Figure 4.3-2), the aquifer directly beneath the Barka Slough is confined.

In the Lompoc Plain, seepage from the Santa Ynez River to groundwater occurs consistently in the 2 miles downstream of the Robinson Bridge and intermittently in the rest of the river. Below Bradbury Dam, groundwater recharge as a result of seepage is also induced by controlled releases to the river from Lake Cachuma. Recharge from the river to the plain is estimated to be in the range of 2,500 to 3,000 acre-feet/year (AFY). San Antonio Creek is generally above the adjacent water table, and thus provides recharge to groundwater, except in the Barka Slough. The Barka Slough is an impoundment of groundwater behind a consolidated rock barrier. Water is discharged from the Barka Slough as downstream surface flow and evapotranspiration. In the Santa Maria Valley, water seeps from streams to groundwater over much of the valley. The principal exception is in the western part of the valley where aquitards underlie the river.

For the Lompoc Area of the Santa Ynez Basin, Wasserman [1978] estimated recharge and discharge for 1977-1978 to be 18,700 acre-feet (AF) and 21,150 AF respectively, an overdraft of 2,450 AF, occurring largely in the Lompoc Upland. Overdrafts in the Lompoc Area have caused long-term declines in groundwater levels over the past 40 years. Between 1941 and 1976, groundwater level declined on the order of 10 to 20 feet in the Lompoc Plain, though much of the Plain recovered on the order of 5 to 10 feet between the spring of 1976 and the spring of 1978 because of high rainfall in 1978 [Wasserman, 1978]. Santa Barbara County [1983] listed overdrafts of 6,700 AFY in the San Antonio Basin and 20,000 AFY in the Santa Maria Basin.

Salt water intrusion has not been a problem in the Lompoc Area. The USGS monitors three wells on Vandenberg AFB in the westernmost portions of the Santa Ynez River flood plain. To date these wells have not shown any change in water quality which would indicate the existence of a salt water intrusion problem [Ahlroth, personal communication].

Groundwater in all three areas is pumped heavily for agricultural, military, and industrial uses. The Santa Barbara County Water Agency [1978] estimated 1977-1978 pumpage in the Lompoc Area as 27,500 AFY, of which 15,600 AFY was consumed. The remainder was returned to the groundwater. The 1977 consumptive use of groundwater in the San Antonio Valley was approximately 11,000 AFY [Hutchinson, 1980].

4.3.2.2. Groundwater Quality

The groundwater in all three areas is generally hard and high in dissolved solids. Hardness, as milligrams/liter (mg/L) of $CaCO_3$, is rarely less than 200, frequently greater than 500, and occasionally greater than 1,000. Total dissolved solids (TDS) concentrations are generally between 500 and 1,500 mg/L, but range above 2,500 mg/L in some areas.

Groundwater of the Lompoc Terrace, Lompoc Upland and the eastern part of the Lompoc Plain generally meets USEPA [1972] drinking water criteria, except for high dissolved solids and sulfate concentrations in the eastern part of the Plain, while groundwater in the western part of the Plain frequently violates the criteria for dissolved solids, sulfate, chloride, and iron [Miller, 1976].

Suitability for irrigation is generally judged by the combination of soil type, crop type, dissolved solids concentration, boron concentration, percent sodium, and sodium-adsorption ratio. While some of the groundwater in the Lompoc area is unsuitable for irrigation, the extensive use of groundwater for irrigation indicates its general suitability. Much of the groundwater from Lompoc area would require treatment to meet many industrial use requirements primarily because of hardness and TDS characteristics [Miller, 1976]. Concentrations of trace constituents are generally below suggested limits. However, some lead concentrations equal to the USEPA [1972] criteria have been found. Data indicate that dissolved constituent concentrations in shallow groundwater in irrigated areas are commonly twice, or more, as high as those in deeper groundwater.

4.3.2.3 Lompoc Dehydration Facility Site (Site 4)

Very few wells exist in the vicinity of the proposed site [Miller, 1976]. Consequently, very little data on local aquifer conditions are available. Water levels at the preferred site are estimated to be about 50 feet above MSL [Wasserman, 1978]. Existing users include Vandenburg Village to the southeast and Mission Hills to the south, both of which are served by wells or community service suppliers. Water for the site would be drawn from the Mission Hills wells and the existing Union well approximately three miles south of the site.

4.3.2.4 Alternative Facility Site (Site 8)

Both the preferred and alternative sites for the dehydration facility are both in the Lompoc Upland. Water levels at the alternative site are likely lower than at Site 4, while the thickness of aquifer materials is greater, given that Site 8 is farther from the base of the Purisima Hills. Site 8 lies closer to the existing Mission Hills wells. Water would be drawn from the same sources as for the proposed site.

4.3.2.5 Applicable Rules, Regulations and Standards

Water-well drillers must file a drilling and well construction log with the California Department of Water Resources for each well drilled. Owners of groundwater wells which are used as a public water supply must file an application with and receive permission from the Santa Barbara County Department of Environmental Health in order to use the well. On-site waste disposal systems, such as septic tanks, must comply with regulations established by the Santa Barbara County Department of Environmental Health. Underground injection must comply with requirements of the California Division of Oil and Gas (CDOG). The California Coastal Act (Section 30231) requires that groundwater withdrawals not interfere with surface water flow or biological productivity.

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4.4 MARINE WATER RESOURCES

4.4.1 Overview

Much of the text in this section on Marine Water Resources is based on the baseline data and more extensive discussion provided in Technical Appendix D. Unless otherwise referenced, all data given here are from that Appendix.

The Study Region for marine water resource issues includes the area between Long Beach and Morro Bay (Figure 4.4-1). The Central Santa Maria Basin Area Study focuses on the 31 least tracts (and the marine waters between these tracks and the shore) that are offshore Point Arguello to Purisima Point.

Relative to the high energy environment (i.e., strong winds/waves/ currents) of Northern California, the physical oceanography in the Study Region (i.e., the waters off Point Conception/Point Arguello) is characterized by an area of moderate energy. The physical oceanography is also characterized by high variability. The variability is seen especially with current directions (as well as velocities) which differ significantly with location, season, and depth. This current variability characterizes the platform sites because of reversing regional current systems that are affected by important episodic events (e.g., eddies, gyres, upwelling) as well as periodic events (e.g., tides).

The chemical oceanography in the study basin is controlled in large part by the physical oceanography. The variable current patterns are reflected by variations in water chemistry. Parameters such as salinity, dissolved oxygen, temperature, nutrient concentrations, turbidity, and the concentrations of several heavy metals are all significantly affected, if not controlled, by the regional and local water movement.

Anthropogenic (man-caused) sources of pollutants in this marine region are limited. Unlike the Los Angeles area, there are no very large municipal outfalls, and only two river outfalls affect the region (Santa Ynez and Santa Maria Rivers). Several oil production platforms are located to the south in the Santa Barbara Channel; their effect on water quality near the project sites is unknown but probably negligible because of the prevailing current patterns. Data on the concentrations of heavy metals and organics in both the water column and sediments indicate a relatively low degree of pollution compared, for example, to the Southern California Bight.

Areas of special concern with regard to chemical oceanography include: 1) low values of dissolved oxygen in the deeper waters; 2) the presence of natural oil seeps in the area which release a variety of hydrocarbons into the water column; and 3) the potential build-up of heavy metal pollutants in the sediments.

4.4.2 Physical Oceanography

4.4.2.0 Characteristics of Study Region

The Study Region is in the boundary region between the Southern California Bight to the south and the Northern and Central California Coastal Province to the north. The oceanography on either side of the boundary is different, and thus a variable mixture of properties prevails in the Study Region. Geologic trends cause offsets in the coastline and seafloor in the area (i.e., the Point Arguello-Point Conception headlands, Point Sal and others); the irregular solid boundary will affect the local oceanography.

PERSISTENT MAJOR CURRENTS

Three major ocean surface currents are known to affect water movement in the Study Region. The southeastward-flowing California Current (mean speed about 15 centimeters/second) is quite broad and reaches to within a few kilometers of the shore at Point Conception. The Davidson Current (speeds up to 15-30 centimeters/second) flows northward closer to shore; all or part of its 80-kilometer width may, at times, lie under the California Current and be a part of the California Undercurrent. South of Point Dume, the major cyclonic gyre is called the Southern California Counter Current (speeds up to 30-40 centimeters/second). The locations and speeds of these currents are highly variable, especially near the Study Region; furthermore, currents within the Study Region are affected by episodic events as described below.

EPISODIC CURRENTS

In this area, episodic currents are associated with: 1) turbulent eddies and gyres within the main currents, 2) winds, 3) upwelling (i.e., the movement of water from the depths [above 200 meters] to the near-surface area), and 4) current/density stratification interceptions leading to vertical currents (producing an "over-turning" of the water). All of these factors contribute to the variability in current directions and velocities in the Study Region.

All currents, especially the wind-driven ones, are strongest near the ocean surface. Below a depth of 50-100 meters, current strengths may weaken considerably. For example, mean current speeds are reported to be around 10 centimeters/second at depths below 200 meters in the western Santa Barbara Channel. This compares with mean current speeds at the 30-meter depth of 20-30 centimeters/second (Appendix D). Tidal effects also persist near the bottom.

LITTORAL REGIME

The long-shore transport of sediments in the Study Region is generally in a southward direction north of Point Arguello, and in an eastward direction between Point Conception and Gaviota. The long-shore (southward) littoral transport of sand in the area just south of the Santa Ynez River mouth is about 50,000 cubic yards/year. Estimates of the net transport southward around the Point Conception headlands range from zero to 180,000 cubic yards/year.

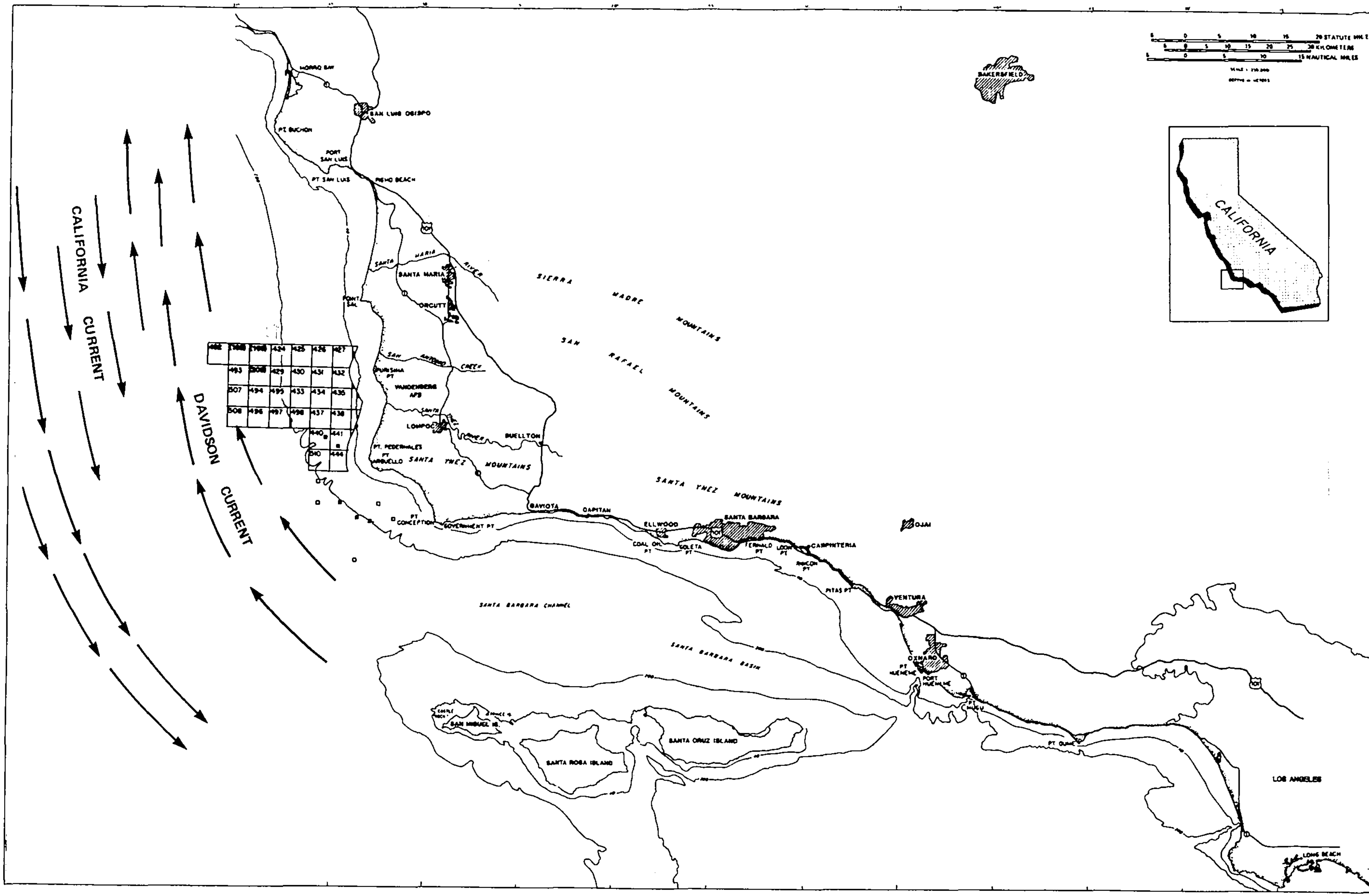

FIGURE 4.4-1

STUDY REGION FOR MARINE WATER RESOURCES

TIDES

The tides in the Study Region have a mean high water of about 4.5 feet (above Mean Lower Low Water); the highest recorded tides are about 8 feet. Tide-induced currents, with speeds up to 25 centimeters/second, contribute an oscillatory component to the local currents at depths less than a few hundred feet and at the bottom.

WAVES

Waves approaching the Study Region are either locally generated windwaves or dispersed sea and swell from distant Pacific storms. The predominant direction of approach is from the northwest. The local wind waves have periods from 5 to 10 seconds, while swells from distant (700 to 1,000 nautical miles) storms have periods from 8 to 20+ seconds. The usual duration of severe waves during a storm is approximately four days for waves exceeding 1 meter in height, 1.4 days for waves exceeding 3 meters, and one day for waves exceeding 6 meters. The significant height of the largest waves expected with a 100-year return period is about 24 feet (7.3 meters).

TSUNAMI

Tsunami (seismic sea waves) are of concern in nearshore and littoral regions where the wave's destructive force would be felt. Although the discussion of the sources and probability of recurrence in Appendix D indicates that 100-year and 500-year tsunami runups are about 3 meters and 7 meters, respectively, runup from severe storm waves is usually higher. The higher figures need to be used for design purposes. Runup from tsunamis is an important factor in the design of shore features.

BATHYMETRIC EFFECT ON WAVES

The shape of the seafloor and coastline in the Study Region will modify the approaching waves to redirect their direction of travel and lateral distribution of wave energy. The predominant waves approach from the west to northwest and are prone mainly to refraction.

HYDROGRAPHY

Hydrography data (on temperature, salinity, and density) help evaluate potential or actual water movements. Values of these parameters go through seasonal cycles. Two seasons are evident: winter-spring with low temperatures (12°C at surface) and low salinity (33.2 parts per thousand, at surface), and summer-fall with higher temperature (17°C at surface) and higher salinities (33.4 ppt at surface). At 500 to 1,000 feet, the water temperature remains close to the mean of 13°C throughout the year. In contrast, salinity variations are more pronounced at depth (approximately 0.5 ppt variation) because of upwelling.

Hydrographic data are particularly useful in monitoring the periodic upwellings of the colder, more-saline deep waters. This upwelling brings nutrient-laden, oxygen-poor water into the littoral zone and can significantly alter the water chemistry.

The cooler, more saline deep waters and the less dense surface waters produce a density gradient. This gradient can act as a barrier to the vertical dispersion of substances in the water column. This stratification intensifies during the period from April to December each year as a result of the heating of the surface waters. The result is a thin layer of strong density gradients near the surface which approximate a classical thermocline [Exxon 1983, pII-8ff]. During the winter, under the influence of strong and persistent NW winds, there is a deepening of the thermocline and a thickening of the (surface) mixed layer to about 100 meters.

4.4.2.1 Characteristics of Area Study Tracts

The physical oceanography of the Area Study (encompassing the 31 lease tracts plus the nearshore waters) is generally characterized by the description given above for the Study Region.

4.4.2.2 Characteristics of Project Sites

PLATFORM SITES

Union's Platform Irene will be located about 4.9 miles WNW of Point Arguello in 242 feet of water. Exxon's platform will be about 6.9 miles WNW of Point Arguello in 272 feet of water. The two platforms are within 2 miles of each other and about 13 miles NW of Chevron's proposed Platform Hermosa. The two newly-proposed platforms (Union, Exxon) are just within the southern edge of the Central Santa Maria Basin; they are also the first platforms proposed to lie within this Basin.

Ocean currents in this specific area are poorly defined, but are known to vary with both season and depth as well as location. Near-surface currents at the platform sites will mostly be in a southerly direction during the July-October period, northerly during the November-February period, and mostly in an offshore (westerly) direction during upwelling (March-June) [Union, 1982]. At some times, as during upwelling, bottom currents may flow in opposite directions to surface currents. Tides, wind-driven surface currents, and gyres also add to temporal viability in current direction and speed. Mean current speeds are typically in the range of 10-30 centimeters/second; maximum values are roughly a factor of three greater. Current speeds typically decrease with depth. The expected maximum current (100-year return interval) is about 1.3 meters/second at the surface and 0.27 meter/second at the seafloor (Appendix D). Higher maximum current speeds at the seafloor (some over 1.5 meters/second) have been reported based upon visual observations from submersibles.

Additional data are expected from ongoing studies including the SUPERCODE program, an MMS-sponsored Central California Coastal Circulation Study, and the Santa Barbara Channel Circulation Modeling program being conducted for MMS.

Data provided or referenced above for waves and hydrography should be pertinent for the platform sites.

PIPELINE ROUTES

The physical oceanography in the area of the proposed subsea pipelines is essentially as was described above for the platform sites; some data ontthe bottom sediments are provided in Section 4.4.3.0 under the heading 'Sediments'. It is more important for these pipelines to have detailed information on the currents, waves, and littoral regime near the shore landing points near the Santa Ynez River mouth. Such data, except for some on waves and littoral transport described in Appendix D, are generally not available. However, the data gaps in this area are not critical, and reasonable extrapolations may be made from regional information.

AREA OFF SANTA MARIA REFINERY OCEAN OUTFALL

Union's Santa Maria Refinery has an existing ocean outfall for its treated waste waters that extends 1,700 feet (515 meters) offshore, terminating in 25 feet (7.5 meters) of water. The discharge is regulated by a NPDES permit. (The permit is described in some detail in Appendix D.) Presently, this facility discharges an average of 0.29 MGD of treated waste waters through a diffuser at the end of the outfall. The discharge plume is expected to be diluted by about a factor of 700 before it rises 1.4 meters which is the estimated edge of the zone of initial dilution. (See Section 5.4.2.2 of this document and Appendix D for details of model runs which yielded dilution estimates.) Based on Union's self-monitoring data on the undiluted waste waters (Appendix D, Table 5.4-49) and the calculated dilution factor of 700, no water quality standards violations would be expected for the receiving waters around this outfall. However, data from actual ambient water and sediments in the area of the outfall are not available for review.

4.4.3 Chemical Oceanography

4.4.3.0 Characteristics of Study Region

The following topics are covered in the discussion below:

- Salinity
- Temperature
- Dissolved oxygen
- Nutrients
- Turbidity
- pH/Alkalinity
- Metals
- Other inorganics
- Organics
- Sediments

SALINITY

As mentioned above, a change in ocean salinity, typically 33.2-33.4 ppt, is more an indicator of water mass movement than of water quality. Average baseline salinity values have been fairly well established (see Appendix D); however, the variability of the salinity within the Study Region is not well documented.

TEMPERATURE

Temperature, like salinity, is subject to the influence of nearshore upwelling in the Study Region. Nearshore surface temperatures reach their normal minimum of 12-13°C in April and their normal maximum of 15-19°C in July-October. The proposed platforms will be placed in waters about 80 meters deep. Temperatures at this depth remain fairly consistent near 10°C in the Study Region.

DISSOLVED OXYGEN

It should be noted here that dissolved oxygen is a key water quality parameter since certain minimum levels are necessary to sustain aquatic life. The main feature of water-column dissolved oxygen in the area off Point Conception is that it is usually at a maximum (5-6 milliliters/liter [for dissolved oxygen, 1 milliliter/ liter = 1.43 milligrams/liter]) at the surface and decreases with depth (Figure 4.4-2). Reported nearshore values of dissolved oxygen at the 200-meter depth are about 2-3 milliliters/liter (Appendix D). Further offshore, at depths below 250 meters, dissolved oxygen values can be as low as 1 milliliter/liter; upwelling can bring more of this oxygen-poor water to nearshore Study Region areas, especially in the May-July period. However, the dissolved oxygen concentration at depths of 30 to 70 meters does not begin to fall until July or August. Therefore, a minimum is found around 50 meters from late spring to winter [Exxon, 1984]. Existing anthropogenic and natural (e.g., oil seep) discharges contribute an oxygen demand to the local waters. Many oxygen-demanding materials are particulates which settle to the bottom; thus bottom sediments are often oxygen-poor compared to the overlying water. Additional data on oxygen consumption rates for both waters and sediments in the Study Region would be desirable, in order to better describe the baseline against which the impacts of the oxygen demand of project discharges can be assessed.

NUTRIENTS

The major nutrients which may be limiting for phytoplankton growth in the water column include nitrogen, phosphorus, and silicon. Other required micronutrients include Fe (iron), Mn (manganese), Zn (zinc), Cu (copper), Co (cobalt), Mo (molybdenum), V (vanadium), vitamin B12, thiamine, and biotin. Of the major nutrients, nitrogen is more likely than phosphorus to be limiting to phytoplankton productivity in the sea. Since the proposed project would include discharges containing a significant amount of ammonia, this issue becomes an area where impacts will be analyzed. Vertical profiles of nutrient concentrations in the water column are the opposite of those for dissolved oxygen; that is, concentrations are generally depleted near the ocean surface and increase with depth.

No major rivers or anthropogenic sources currently discharge high nutrient loads to the Study Region. Most of the nutrients are presumably brought in by ocean currents, land runoff, and upwelling. Some contributions will be associated with the existing platforms in the Santa Barbara Channel.

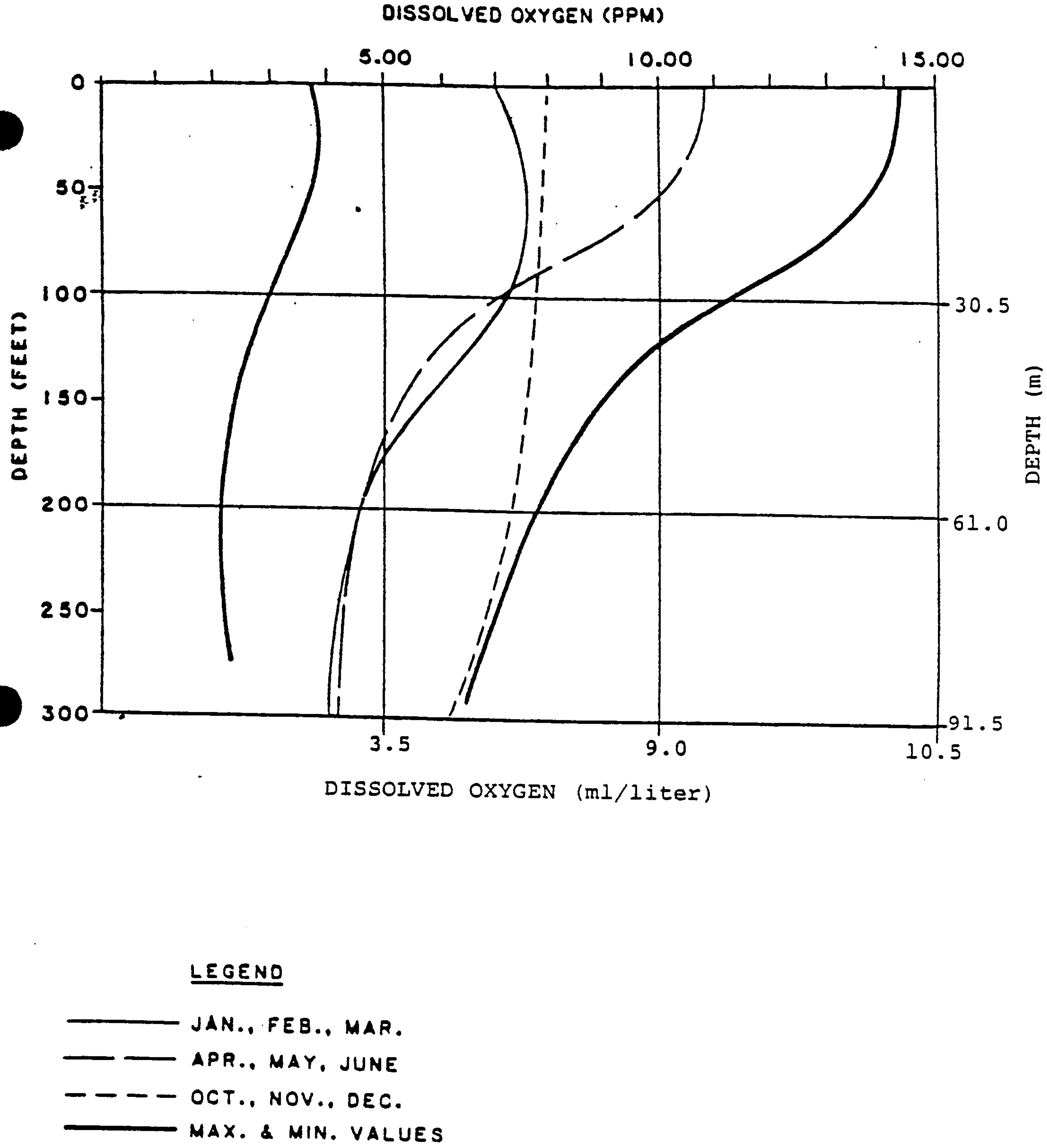

FIGURE 4.4-2 Vertical oxygen profiles showing typical lower dissolved oxygen values in the April - June period compared to the October - December period at greater than 30 meters of depth, caused by the upwelling of deep, oxygen-depleted water. However, in this instance this phenomena is reversed at less than 30 meters, presumably due to oxygen generated by photosynthesis. (From Dames and Moore, 1983a.)

The observed surface depletion of nutrients may be due, in part, to rapid sinking of nutrient-rich organic matter as well as to uptake by microorganisms in euphotic (photosynthetically active) zones.

TURBIDITY

Turbidity is a measurement of the clarity of water as indicated by light transmission or concentration of suspended particulates. The degree of turbidity controls the depth of the euphotic zone, has implications for (absorbed) pollutant transport, and is of aesthetic concern. Since the proposed platforms would discharge waste water with fine particulates (e.g., drilling muds and cuttings) which will increase turbidity near the discharge, turbidity is also an area where potential impacts will be assessed. Within the Study Region, the periods of highest turbidity correspond to the periods of highest upwelling and highest primary phytoplankton production. River runoff can also have a significant, more local impact. Within this region, Secchi depths range from 10 to 20 meters. (Secchi depths, a measure of turbidity, are the depths at which a standard [Secchi] disc can be seen from the surface.)

pH/ALKALINITY

Ocean pH values in the Study Region off Point Conception range from 7.0 to 8.3 [Exxon, 1984]. Changes in pH are indicative of water movement or other factors resulting in changes in salinity, photosynthetic activity, and CO^2, and with increasing salinity; pH usually decreases slightly with increasing depth and temperature because these favor disassociation of carbonic and boric acids.

METALS

A number of heavy metals are of concern in the Study Region because of proposed project discharges containing these metals and the role of some metals (in low concentrations) as essential nutrients and/or (at high concentrations) as toxic agents. The metals of potential concern include barium (Ba), chromium (Cr), cadmium (Cd), copper (Cu), zinc (Zn), mercury (Hg), lead (Pb), silver (Ag), iron (Fe), and nickel (Ni). A number of studies (described in Appendix D) provide data on the concentrations of these metals in the water column, sediments, and biota, and explain the sources, fate, and transport in the marine environment.

Our current understanding of the sources, speciation, concentrations, and fate of the heavy metals is limited. It does appear that a number of metals (e.g., Ba, Cd, Cr, Cu, Ni, Zn) are related to nutrients. That is, their concentrations have a positive correlation. The upwelling period may thus bring higher concentrations to the deeper waters near the proposed platforms. The Davidson Current, which dominates in this region during winter months, may be a source of metal-rich particulates from the highly urbanized/ industrialized Southern California Bight. A significant fraction of most of the trace metals may be complexed by organic material or be absorbed into particulates; the bioavailability of this metal fraction is in question. The data also show that, for sediments, trace metal concentrations strongly correlate with ocean depth (because of the association with nutrients as described above), with distance offshore (the metal-rich, fine particles are carried farther out), sediment depth (the deep, buried sediments reflecting times before significant sources of anthropogenic pollutants were introduced), smaller grain size, volatile solids, and sediment moisture content.

The available data (summarized in Appendix D) do show that metal concentrations in the Study Region water and sediments are substantially less than in the Southern California Bight areas affected by the major waste water discharges around Los Angeles. Within most regions, concentrations of metals in the sediments are higher in the benthic sediments than in the intertidal sediments. This situation is presumably due to particle size difference (i.e., a preference for the metals to associate with smaller particles). In contrast, very-nearshore water column concentrations tend to be higher than in coastal or oceanic waters.

A recent increase in the Ba content of the sediments of the Santa Barbara Basin from 500 to 800 ppm "... may reflect dispersal of barium-rich drilling muds from local operations..." [Ng and Patterson, 1982]. Many other heavy metals, notably Cu, Cr, Pb, Zn in the Southern California Bight, have also increased in sediment concentrations over the last 60-80 years because of anthropogenic inputs.

OTHER INORGANICS

Baseline data on ammonia and sulfur are desired but not currently available for the Study Region.

ORGANICS

Within the Study Region, organics may enter the water column from municipal and industrial waste water discharges, runoff, natural oil seeps, and offshore oil and gas operations. The latter include the discharge of formation water ("produced water") which may contain over 100 milligrams/liter of total organic carbon. The most water-soluble petroleum-derived organics are the light aromatics such as benzene, toluene, and xylene. A variety of other aromatic and aliphatic compounds will also be present. When such chemicals reach the well-mixed near-surface waters, losses from volatilization to the atmosphere, photodegradation, and biodegradation will diminish their concentrations fairly rapidly. If the chemicals remain in the deeper water, they may persist for some time before transport to the sediments or out of the region (by currents). Besides hydrocarbons, other chemical classes of petroleum-derived organics that may be present include phenolics, carboxylic acids, and heterocyclic compounds containing oxygen, nitrogen, and/or sulfur [Menzie, 1982].

The available data on the baseline conditions in the Study Region show highly variable concentrations and provide little or no data on the presence of specific chemicals in the water column. One study cited in Appendix D [DeLappe et al., 1979] indicates total dissolved hydrocarbon concentrations are in the range of 0.05-0.2 ug/liter; particulate hydrocarbons went up to 1.7 ug/liter. Another source cited in Appendix D [Chambers Consultants and Planners, 1982] indicated levels of oil and grease(*) up to 60 milligrams/liter in the nearshore waters off Point Arguello. These results indicate that the Study Region waters (at least nearshore) are influenced by natural oil seeps. Currents could transport some of this oil to the proposed platform site areas during periods when surface currents tend to be offshore (e.g., during upwelling).

Organics of low water solubility will tend to absorb on suspended and bottom sediments. Thus, sediment concentrations of such organics (e.g., naphthalene) are of interest. The available data for the Study Region (see Appendix D) again show high variability with, for example, total hydrocarbon concentrations in surface sediments ranging over five orders of magnitude (1-40,000 milligrams/kilogram, dry weight). One value for sediments off Point Conception, which does have natural oil seeps in the area, showed 770 milligrams/dry kilogram of petroleum hydrocarbons in the surficial (0-5 centimeters) sediments (Appendix D, Table 8-1).

SEDIMENTS

Suspended sediment concentrations in the Study Region are typically 1 milligram/liter in the nearshore, surface waters. Higher levels are found near the bottom sediments and after storms while lower levels (0.5 milligram/liter) are found in the offshore regions. The composition of the suspended sediments has not been reported; a significant fraction is presumably organic.

The bottom sediments in the Study Region contain varying mixtures of sand, silt, and clay material. In general, the proportion of finer material increases with increasing distance from shore. For example, data for two sediment sampling stations off Point Conception had 80.5 and 86.8 percent sand along the 60 meters isobath. At a different station in the area, sediments from a depth of 120 meters had a mean composition of 1 percent gravel, 29 percent sand, 19 percent silt, and 51 percent clay. The pollutant load of the sediments (suspended or settled) has not been adequately investigated; some data on heavy metal and organic concentrations were provided above. In one study, three sediment sampling stations near Point Conception yielded sediments with visible tar-like particles and elevated levels of hexane-extractable material.

Sediment accumulation on the Santa Maria Basin shelf at depths of 10-100 meters has apparently been negligible during the last 10,000-15,000 years. Sediment depths (thickness) are typically 10-20 meters, but thin to 0 meters along the eastern flank of the Santa Lucia bank. This pattern indicates considerable sediment transport in the area.

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* Oil and grease are measured by extracting a water sample with a strong organic solvent (e.g., methylene chloride) and weighing the extracted material after evaporation of the solvent. This measurement thus gives a gross total for the organics in water (excluding highly water soluble chemicals) and is not limited to hydrocarbons.

4.4.3.1 Characteristics for the Area Study Tracts

The characteristics of the chemical oceanography for the Area Study tracts are considered to be the same as described above.

4.4.3.2 Characteristics of Project Sites

The characteristics of the chemical oceanography near the project sites (platforms, pipelines, refinery waste water discharge site) are basically the same as described above. While there are few available data pertaining to water quality and sediment quality at the specific locations of the proposed platform sites, the regional data described above are reasonably pertinent. Additional sediment data for these sites are desirable (see Appendix D).

4.4.3.3 Applicable Regulations and Standards

Discharges associated with Outer Continental Shelf (OCS) oil and gas operations off Southern California are governed by a general NPDES permit (CA0110516) [EPA 1983] and the Minerals Management Service (MMS) OCS Order No. 7 [Department of Interior, 1980]. Discharge limitations and monitoring requirements required by the general permit are given in the final part of Appendix D.

Since the Santa Maria Refinery has an ocean outfall (i.e., a submerged, offshore discharge), discharge limitations on this effluent are imposed under the authority of: 1) the Federal Clean Water Act which has effluent limitations for the "Onshore" subcategory of the Oil and Gas Extraction point source category [Code of Fed. Reg.] and separate limitations for the Petroleum Refining point source category; 2) the California "Ocean Plan" [State of California, 1983], and/or 3) Section 30262 (f) of the California Coastal Act [California Coastal Commission, 1982]. Details on the existing refinery outfall location, discharge parameters, and permit status are provided in Appendix D. Details on effluent limitations associated with the California Ocean Plan are also provided at the end of Appendix D.

Other federal, state, and local agencies also will have some permitting authority over various aspects of the construction and operation of the project that are in the ocean waters. Activities such as platform and pipeline installation, well drilling, and preparation of oil spill contingency plans are covered by these permits.

The U.S. EPA has published water quality criteria for the protection of marine aquatic life. These criteria are given in Table 4.4-1.

Table 4.4-1

EPA WATER QUALITY CRITERIA, AND TOXIC LEVELS, RELATING TO THE PROTECTION OF SALTWATER AQUATIC LIFE

	Concentration in ug/L				
	EPA Criteria		Toxic Levels[a]		
Chemical/Element	24-hr avg.	Max.	Acute	Chronic	Reference
Inorganics					
Arsenic (trivalent)	63	120		--	1
Arsenic (pentavalent)	--	--	2300[c] 5-50	--	1
Cadmium	12	38	--	--	1
Chromium, hexavalent	54	1,200	--	--	1
Chromium, trivalent	--	--	10,300	--	1
Copper (active)	2	3.2	--	--	1
Cyanide (free available)	0.57	1.0	--	--	1
Lead (active)	8.6	220	--	--	1
Mercury (active)	0.1	1.9	--	--	1
Nickel	7.1[d]	140	--	--	2
Selenium	5.4[d]	410	--	--	2
Silver	--	2.5	--	--	2
Thallium	--	--	2,130	--	2
Organics (Selected Hydrocarbons)					
Ancenaphthene	--	--	970	500-710	2
Benzene	--	--	5,100	700	2
Ethylbenzene	--	--	430	--	2
Fluoranthene	--	--	40	16	2
Naphthalene	--	--	2,350	--	2
Phenol	--	--	5,800	--	2
Polynuclear Aromatic Hydrocarbons	--	--	300	--	2
Toluene	--	--	17,500	--	2

a. Toxic levels listed are prefixed with the phrase "as low as." Lower toxic concentrations may be associated with species more sensitive than those which were tested.
b. For animals.
c. For plants.
d. 24-hour average.

Sources: (1) Federal Register, 49 (26):4551 (February 7, 1984).
(2) Federal Register, 45 (231):79318 (November 28, 1980).

REFERENCES

1. California Coastal Commission, "California Coastal Act of 1976, as Amended February, 1982," California Coastal Commission, Sacramento, CA.

2. Code of Federal Regulations, Volume 40, Part 425, Subpart C.

3. Department of the Interior, "Pacific Outer Continental Shelf Orders Governing Oil and Gas Leasing Operations," U.S. Department of the Interior, Geological Survey, Conservation Division, Reston, VA (January 1980).

4. U.S. Environmental Protection Agency, "Modification of General NPDES Permit for Oil and Gas Operations on the Outer Continental Shelf (OCS) off southern California," Federal Register, 48 (237):55029- 43 (December 8, 1983).

5. Exxon Company, U.S.A., Draft Environmental Impact Statement Report, Technical Appendix 11, 12 (Physical Oceanography, Marine Water Quality, for Santa Ynez Unit/Las Flores Canyon Development and Production Plan, November 1983.

6. Exxon Company, U.S.A., Environmental Report (Production), Shamrock Project, Pacific OCS Region, Point Pedernales Field, Offshore Santa Barbara County, California, Leases OCS P-0438 and P-0440, July 1984.

7. Lynn, R.J., K.A. Bliss and L.E. Eber, "Vertical and Horizontal Distribution of Seasonal Mean Temperature, Salinity, Sigma-T, Stability, Dynamic Height and Oxygen Saturation in the California Current, 1950-1978". In: Calcofi Atlas No. 30, A. Fleminger (ed.), Scripps Institution of Oceanography, La Jolla, CA.

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9. Ng, A. and C. Patterson, "Changes of Lead and Barium with Time in California Offshore Basin Sediments," Geochem. Cosmochim. Acta, 46:2307-2321, (1982).

10. State of California, "Water Quality Control Plan: Ocean Waters of California," State Water Resources Board, Sacramento, CA (November 1983).

11. Union Oil Company of California, Environmental Report (Exploration), for Exploratory Wells on Lease OCS -P 0441 in the Santa Maria Basin Offshore California, prepared by Hooks, McCloskey and Associates, Rosemont, PA, June 1982.

4.5 MARINE BIOLOGY

4.5.1 Overview

The Study Region for Marine Biology extends along the coast from Port Hueneme to Morro Bay and offshore to include the Northern Channel Islands. The boundaries of this region are determined by the locations of proposed project and support facilities, the Area Study, and potential oil spill movements. Figure 4.5-1 and the accompanying Table 4.5-1 illustrate important features of the marine biology of the Region. Within the Region, geographic areas of emphasis in this discussion are as follows:

- The water column and seabed at the several platform and pipeline locations for the proposed projects and the hypothetical Area Study sites.
- The nearshore area off Oceano where the modified effluent from the Union Santa Maria Refinery would be discharged.
- Nearshore and coastal areas between Point Arguello and Purisima Point, which include the closest mainland coast to the proposed platforms, and the proposed landfall point of the project wet oil and gas pipelines.
- San Miguel Island, the nearest of the Channel Islands to the proposed facilities.
- The nearshore areas off Port Hueneme and Ellwood, where proposed supply and crew vessel traffic would originate.

The offshore area within which the proposed platforms and pipelines would be located is part of a unique transition zone between southern and northern marine biota, and the Region supports a number of species whose range is restricted to the transition zone [Newman, 1979]. See Appendix E for further discussion of this phenomenon.

Overall, based on the review of data reflected in Technical Appendix E, and the assumption that biological monitoring activities will be conducted at the same levels in the future as they are at present, the available marine biological data are considered adequate for the purposes of this document. Three factors which limit the interpretation of these data are discussed below to assist the reader in assigning importance to the various sampling results presented here and in the appendix. Each of these factors, while important, is routinely encountered in marine biological sampling.

Many undescribed species occur in benthic samples obtained from the deeper waters in the Region (see Technical Appendix E). While this phenomenon is routinely expected, one or more of these species may eventually be judged scientifically significant should it prove to be restricted to this biological transition zone.

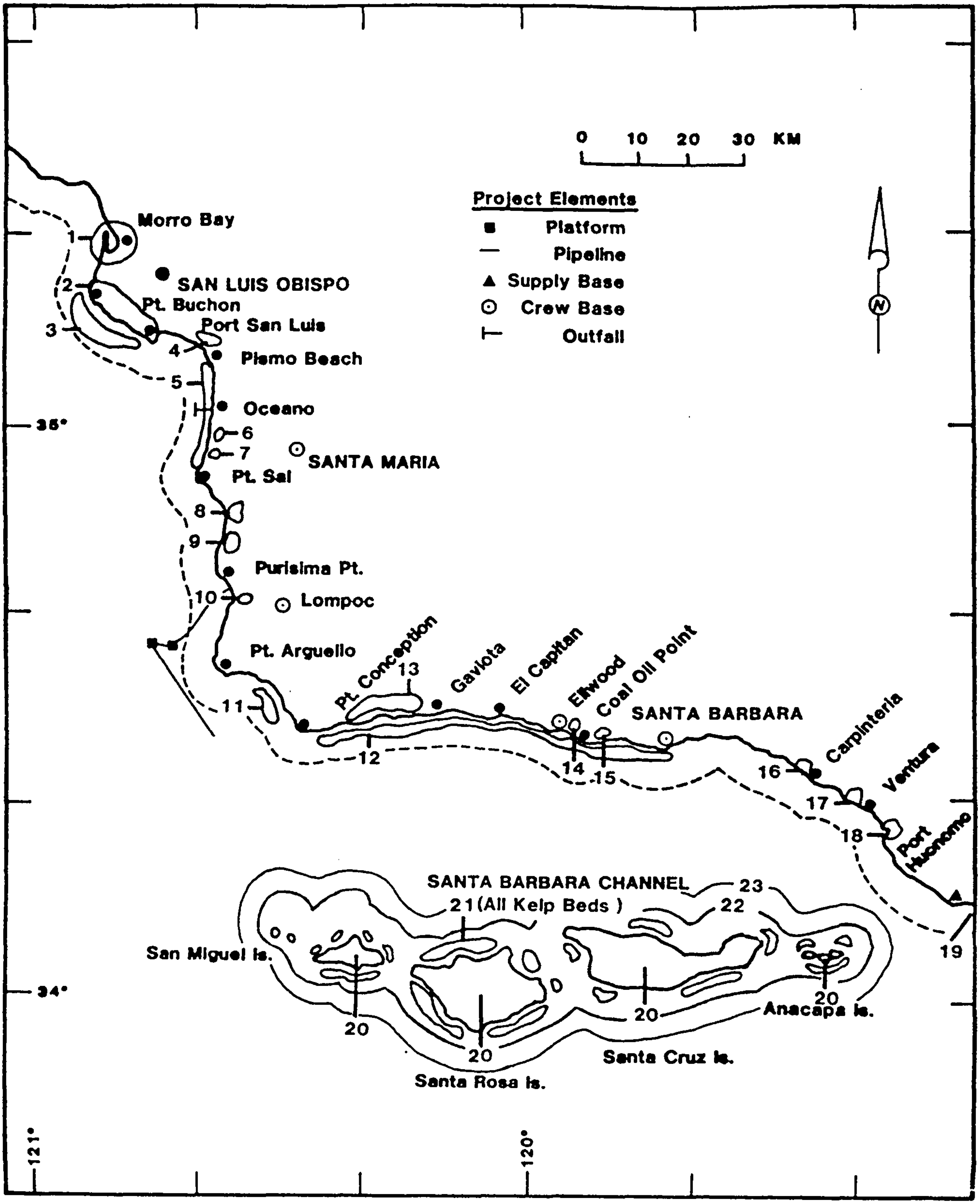

Figure 4.5-1 Location of selected sensitive habitats. (See Table 4.5.11-1)

Table 4.5-1. Biological sensitive areas. (See Figure 4.5.11-1)

Areas	Andromous Fish Stream	Area of Special Biological Significance	Dune Habitat	Ecological Reserve/Preserve	Endangered Species Habitat	Kelp Bed	Marine Life Refuge	Marine Sanctuary	National Park	Wetlands
1. Morro Bay/Morro Rock	●			●	●		●			●
2. Pt. Buchon - Pt. San Luis, onshore	●									
3. Pt. Buchon - Pt. San Luis, offshore					●	●				
4. San Luis Obispo Creek	●									●
5. Pismo Beach	●		●	●	●		●			
6. Oso Flaco Lake/Nipomo Dunes			●		●					●
7. Santa Maria River					●					●
8. Guadalupe Dune			●		●					
9. San Antonio Creek Wetlands					●					●
10. Santa Ynez River	●				●					●
11. Pt. Arguello - Pt. Conception	●				●	●				
12. Pt. Conception - Santa Barbara					●	●				
13. Cojo - Gaviota	●									●
14. Devereaux Slough										●
15. Goleta Slough					●					●
16. Carpinteria Slough					●					●
17. Ventura River Mouth										●
18. Santa Clara River Mouth					●					●
19. Mugu Lagoon		●			●					●
20. Channel Islands		●			●	●		●	●	

Sources: State of California 1976; Lindsted-Siva 1976; Sowls et al. 1980; Briggs et al. 1981, 1983; Woodward-Clyde 1982; MMS 1983b; Union 1984; MBC 1984; MMS 1984c; USFWS 1984b.

Secondly, one should not expect repetition of comparable sampling effort in the future to produce similar results for those biota whose distribution and/or abundance fluctuate over wide ranges. Further, a combination of storms and warm waters related to the El Nino phenomenon during survey periods in early 1983 biased the distribution of such biotic features as kelp beds, pelagic fish, marine mammals, and possibly others, such as intertidal biota in the Union Biological Survey. The Exxon survey, conducted in spring 1984, was likely less affected by these events [Dames & Moore, 1984].

Thirdly, the distribution and abundance of some organisms are not fully documented because of the inability to detect them with the equipment routinely used. For example, most of the larger fish species readily avoid the types of trawl gear used in the surveys referenced below. Thus, one should generally assume that the Region's characteristic species are present at the project sites, even if not reported in sample collections to date.

With one exception, regulatory setting considerations are interwoven below, primarily in the sections on locations and species of special importance. The exception is the Biological Stipulation of the Minerals Management Service (MMS), which historically has been applied to the impacts of lease operations on benthic communities: The applicable Stipulations include Numbers 1 and 8 from Lease Sale 53. Key provisions of the Stipulations are as follows:

STIPULATION NO. 1

Site specific biological surveys may be required to determine the existence of special biological resources, including but not limited to very unusual, rare or uncommon ecosystems or ecotones, and species of limited regional distribution that may be adversely affected by lease operations. Lessees must establish to the satisfaction of the MMS that special biological resources will not be significantly adversely affected by their operations. In practice, this stipulation has largely focused to date on the identification of raised-profile hard-bottom features (rocky reefs).

STIPULATION NO. 8

This stipulation requires participation by the oil and gas vessel and facility operators and supervisors in a training program to make them aware of sensitive marine mammal and seabird sites that may be affected by their operations.

4.5.2 Marine Communities and Species Groups

4.5.2.0 Intertidal Communities

The principal types of intertidal habitat in the Study Region are rock headlands/benches, boulder fields and sandy beach areas. The resident communities reflect adaptation to various disturbances and, compared to other sessile invertebrate communities, are extremely resilient by virtue of resistance to stress, rapid recolonization, or both (see Section 4.5.2 of Appendix E). As shown in Figure 4.5-2, the intertidal zone of the mainland in the Study Region is comprised mainly of sandy beach areas, while much of the

Channel Islands' shoreline is dominated by rocky benches, cobble benches and small bays. Because of their relative rarity and scientific and educational value, rocky intertidal areas are designated as Environmentally Sensitive Habitat Areas [ESHA] by the Santa Barbara County Local Coastal Plan. LCP policy 9-32 indicates that shoreline structures, including pipelines, should be sited or routed to avoid significant rocky points and intertidal areas. The Area Study includes no new facilities in the intertidal zones of the coastline. Project Area intertidal habitats are described below.

UNION PIPELINE LANDFALL

As described in more detail in Appendix E, most of the intertidal area from Point Pedernales to the Santa Ynez River is composed of a sandy beach [Woodward-Clyde Consultants, 1984]. The pipeline site is located on an exposed shore that is subject to heavy surf and deposition of sediments from the river, particularly during winter storms [Union, 1984].

Surveys of nearby sandy intertidal areas at Port San Luis, Ocean Beach, and between Point Arguello and Point Conception during 1974 and 1975 indicate a generally depauperate biota for this area [Coulombe and Cooper, 1976] perhaps because of the unstable nature of the substrate. See Section 4.5.2 of Appendix E for more detail.

REFINERY OUTFALL SITE

The refinery outfall site is located off a sandy beach about 2 miles southwest of Callender. Review of aerial photographs suggest this area is exposed to the typical wave action leading to the formation of coarse, sandy beaches. The characteristics of the Union platform pipeline landfall site are considered applicable to the refinery outfall site as well.

SUPPORT BASE SITES

Crew Base

The proposed crew base area at Ellwood is a sandy beach with seasonally varying amounts of exposed cobble substrate. The rocky intertidal biota at Ellwood is typical of small, unstable boulder substrates exposed to both sand burial and high wave action. The absence of mussels has been attributed to seasonal predation [Sousa, 1979] or possibly the unstable nature of the substrate. Studies on the sandy beach by Straughan [1982] indicated a moderate number of species including crustaceans and polychaetes but no molluscs (see Appendix E).

Supply Base

The use of the existing supply base at Port Hueneme is proposed. The base is located in a harbor composed of cement bulkheads, two jetties composed of boulders at the entrance, and sandy beaches north and south of the jetties. Sand is pumped from an area north to south of the harbor to prevent sand buildup at the harbor entrance. Two areas studied by Dawson [1965], who was primarily interested in the algae, were exposed to a sewage outfall at the

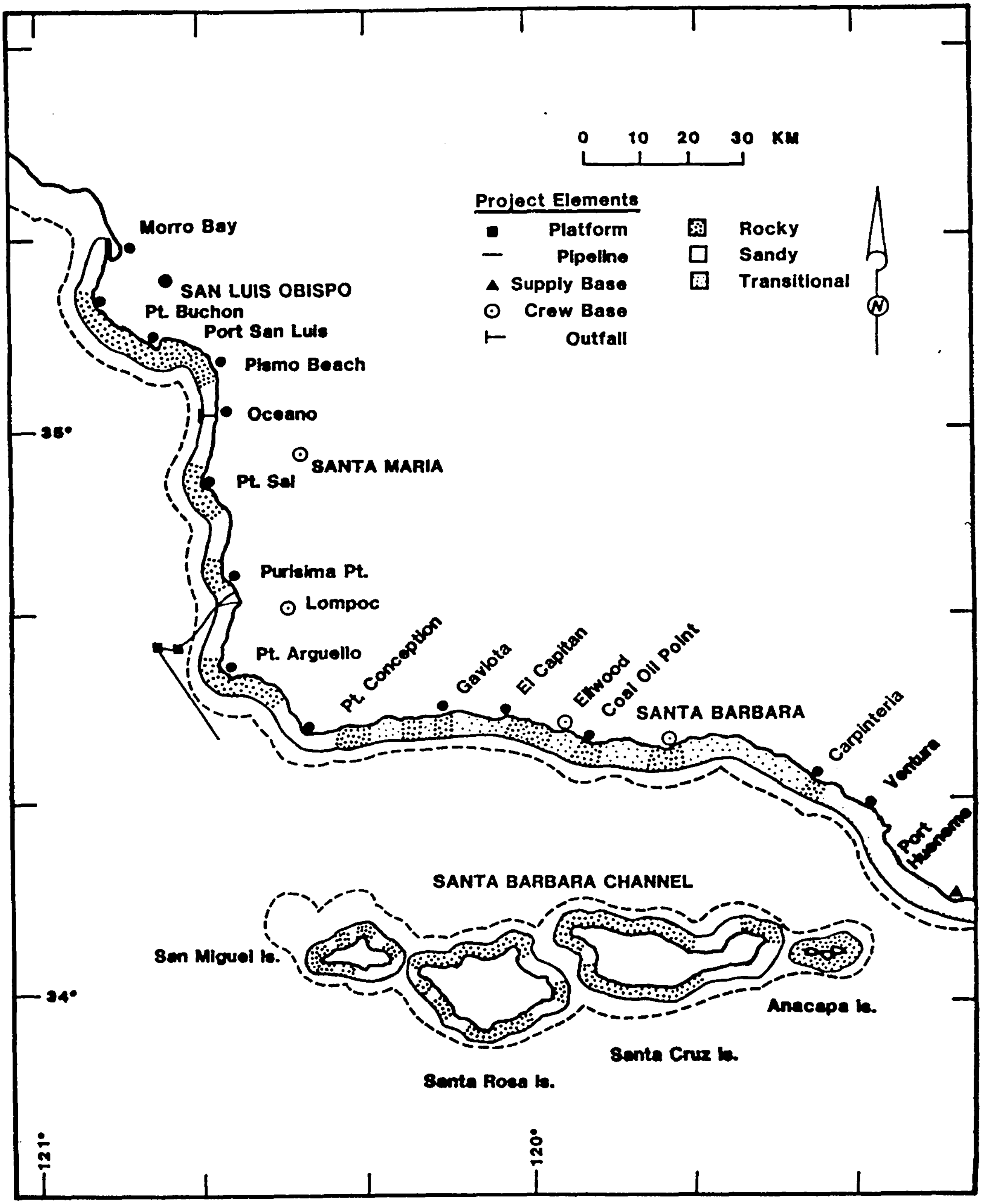

Figure 4.5-2. Distribution of intertidal substrates.
(Sources: Woodward-Clyde Consultants 1984, Littler 1978)

time. He noted a low diversity of species at that time, which he attributed to sewage exposure. He also noted that several species were tolerant of the sewage, based on their proximity to the outfall. The low abundance of animals at the sites studied by Dawson can be partially attributed to Dawson's interest in the algae, the protected nature of the habitat, and exposure to the sewage. Studies along the sand beach outside the harbor [Straughan, 1982] indicate a species rich biota composed of crustaceans, insects, polychaetes, and molluscs.

4.5.2.1 Benthic Communities

BASIC HABITAT TYPES

Three basic types of subtidal benthic habitats and associated communities prevail in the Study Region. Soft-bottoms, and hard-bottom areas covered by sediment, occupy most of the ocean floor; raised-profile hard-bottom features, also known as rocky reefs, are distributed unevenly throughout the Region (see Figure 4.5-3). These latter features support numerous species of invertebrates (e.g., anemones, corals) and associated fishes not found on soft-bottoms or lower-profile hard bottoms subject to sediment burial.

Because of their relative rarity and special value as habitat for species of scientific, recreational, commercial, and educational interest, nearshore rocky reefs are given special protection by the Santa Barbara County Local Coastal Plan (LCP). Two important subtidal reefs identified in the LCP are located off Naples and Carpinteria, respectively.

The biota of rocky reefs in deeper waters are still in the relatively early stages of study. These reefs share the ecological values of shallow reefs, and are additionally sensitive to impacts because of the relative stability and slow recovery rates of deep ocean locations and biota (See Section 4.5.3 of Appendix E). Although the deep reef features lack official protected status, they are emphasized in administrative reviews of prospective development [MMS, 1983b].

AREA STUDY TRACTS

Benthic communities in the area of the proposed projects and Area Study development have been investigated in the ongoing long-term regional monitoring program for the Santa Maria Basin sponsored by the Minerals Management Service and site-specific surveys around proposed Platform Irene and related pipelines [McClelland Engineers, 1984] and the Shamrock project platform and pipelines [Dames & Moore, 1984]. Figure 4.5-3 summarizes the locations of known hard-bottom features near the proposed and hypothetical platforms and pipeline routes. Figure 4.5-4 shows the locations of the infaunal stations from the site-specific surveys for the proposed projects. See Appendix E, Section 4.5.3 for detailed discussion.

PROPOSED PLATFORM SITES

The two proposed platform sites are nearly at the same depths and are separated by less than 4 kilometers. Remotely operated vehicle (ROV) records around the proposed sites for the Union and Exxon platforms confirmed

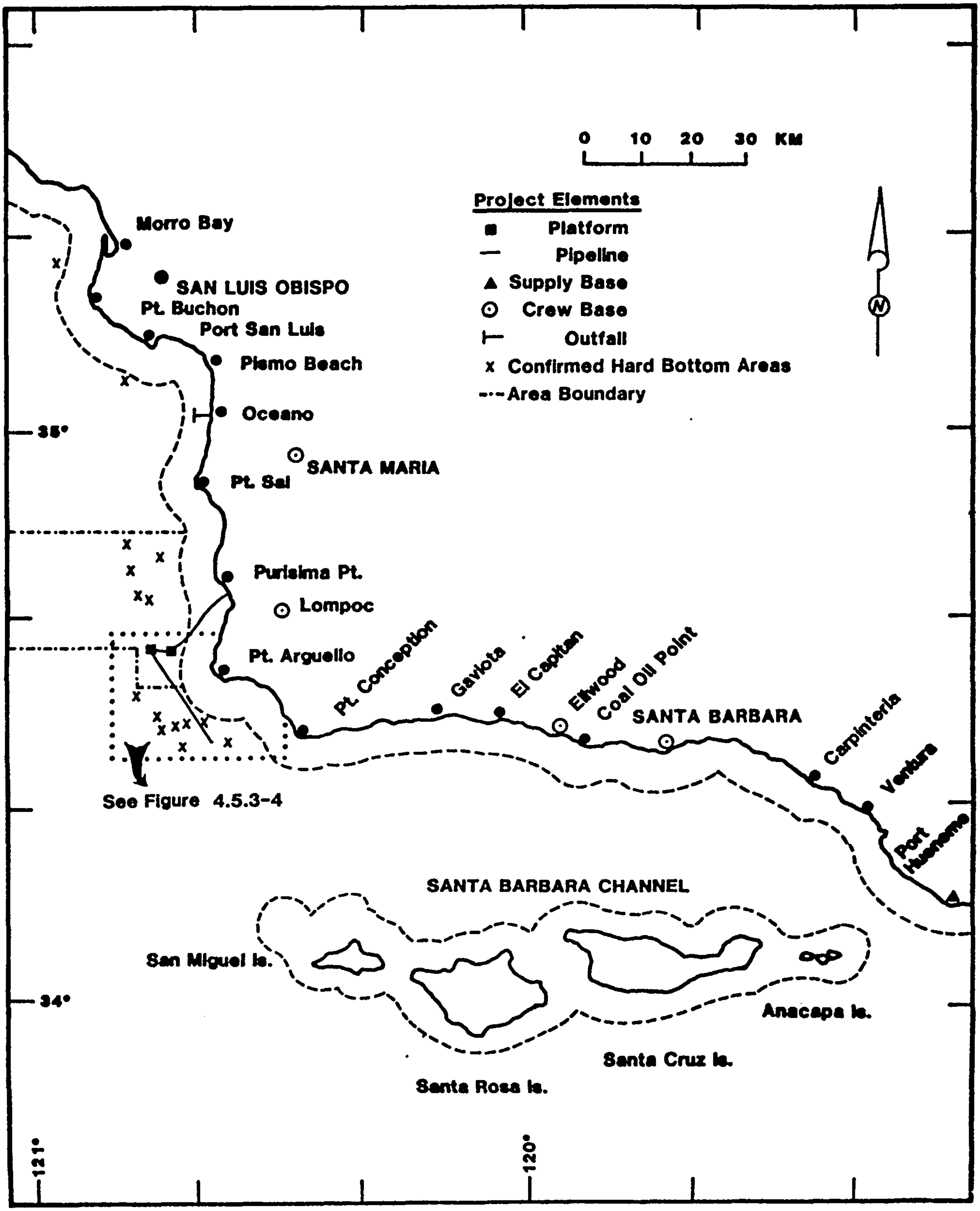

Figure 4.5-3. Hard bottom features near the platform.

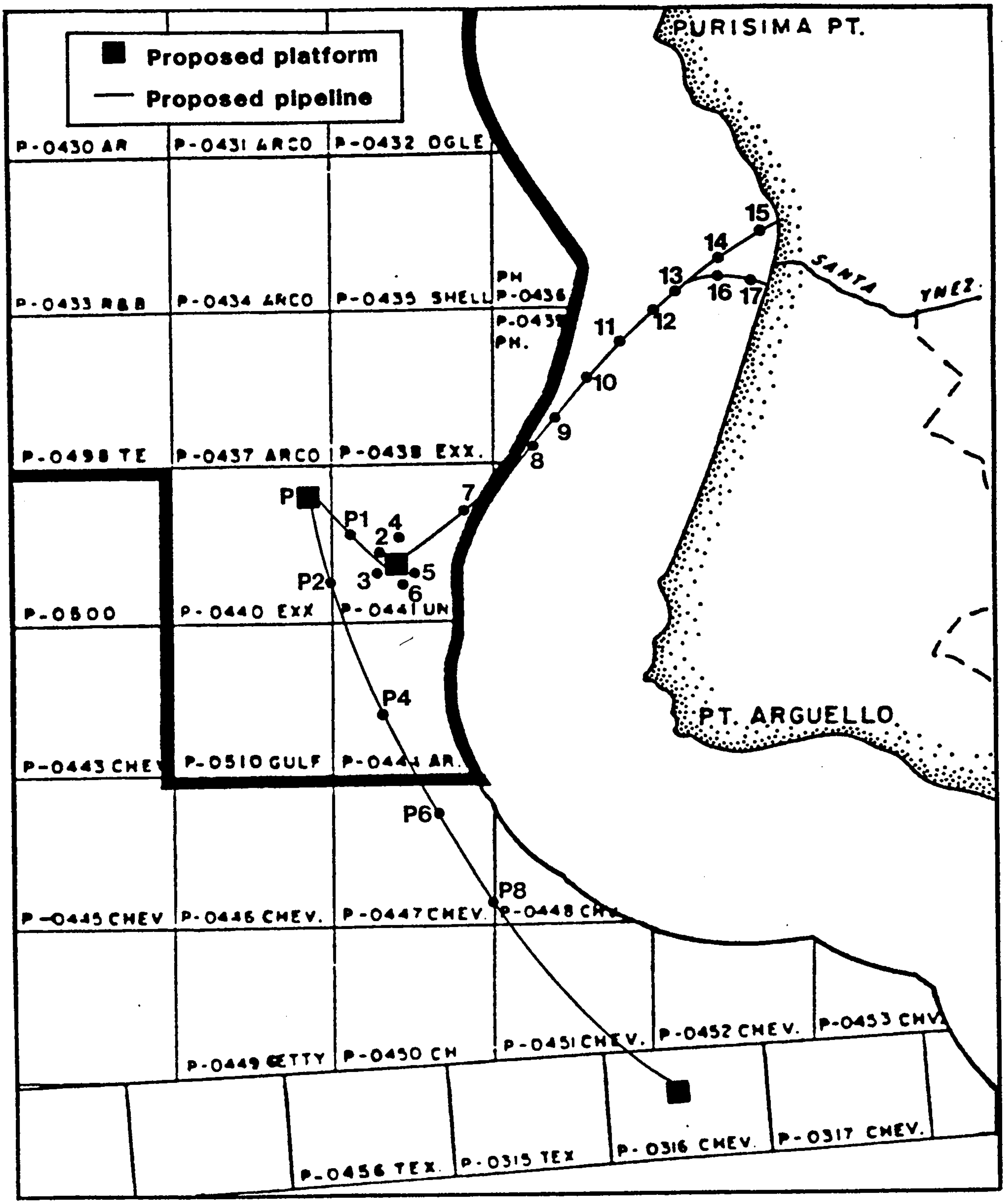

Figure 4.5-4 Biologic samples station locations.
(see Tables 4.5.3-15, 16 and 17).

geohazard side-scan sonar survey findings of no hard bottom substrate within approximately a 5,000-foot radius of the proposed facility sites. [Dames & Moore, 1984; McClelland Engineers, 1984]. With the relocation of the Shamrock Platform site by about 2,500 feet with the decision to unitize the Point Pedernales Field, site-specific infaunal sampling data are only available for the Platform Irene site. MMS decided that the biological survey of the original Shamrock site would suffice for the revised location.

PLATFORM IRENE

Biomass data from the six stations around Platform Irene [McClelland Engineers, 1984] indicate an average infaunal standing crop of 114.6 ± 33 gm/m². This value is less than the 134 gm/m² recorded in the area of the proposed Platform Hidalgo southeast of Point Arguello [Engineering Science, 1983] and the 151 gm/m² recorded at Point Conception [Fauchald and Jones, 1979b]. Differences observed generally correlate with depth, although geographic and temporal trends may also be involved. Preliminary data from sites examined near the proposed platforms during the Minerals Management Service (MMS) Santa Maria Basin Benthic Reconnaissance study indicate slightly higher standing crops than reported by McClelland Engineers for Platform Irene sites. A reconnaissance site slightly to the north and one offshore in deeper water (720 feet) both suggested standing crops similar to those reported from the proposed Platform Hidalgo site [Engineering Science, 1983]. Present data are not sufficient to define depth or geographic gradients in standing crops and consequently the slightly low values reported in the project vicinity may not be significant. Information being developed in the MMS program will help in future analyses of the data. See Section 4.5.3 of Appendix E for more details.

CANYONS

The heads of two submarine canyon tributaries are located about 8,000 to 10,000 feet from the Shamrock site in the southwest corner of lease block OCS-P 0440. These canyons probably lead into the Arguello Canyon system [Richmond et al., 1981], although some tributaries may not enter the main canyon [Shepard and Emery, 1941].

One infaunal station was located at the head of the southernmost canyon on OCS-P 0440. This site, in 392 feet of water, had finer sediments and higher organic carbon levels than sites closer to the platforms. A total of 85 species were collected in the three grab samples taken with community densities averaging 1,650 organisms/m², 62 percent less than at any other station in either Block OCS-P 0440 or OCS-P 0441. The two trawl samples collected at the canyon head indicated that the soft bottom megafauna was dominated by the same species of shrimp and starfish which characterized platform depth sites near Shamrock and Platform Irene [Dames & Moore, 1984]. The canyon trawls however, were more diverse and yielded greater numbers of organisms than those near the platform sites. The soft bottom megafauna and rock epifauna of the northern canyon head appeared typical of the low relief rock rubble habitat [Dames & Moore, 1984]. The ROV records showed large local populations of spot prawn (*Pandalus platyceros*) and pink shrimp (*Pandalus jordani*) in the southern canyon, species which were not collected in trawls.

PIPELINE ROUTE FROM IRENE TO SHORE

Section 4.5-3 of Appendix E presents sediment and infauna data for the proposed Irene to shore pipeline route. Each station along the pipeline corridor differed from those nearest it in depth. Mean grain size increased closer to shore while organic carbon levels decreased as sampling depth shoaled. Sediment oil and grease levels did not follow a uniform trend relative to depth.

The infaunal community was both less dense and less diverse along the corridors than at the proposed platform site. Community density generally declined with approach to shore. Richness declined uniformly with depth. Standing crop also tended to decline with depth and, with the exception of an anomalously low value at Station 11, did so uniformly between depths of 150 and 20 feet. Community dominance changed gradually along the corridor with an abrupt change between 105 and 130 feet.

Many infaunal species populations were centered at greater depths along the pipeline corridor than is normal for the species [McClelland Engineers, 1984]. This seaward displacement of biota indicates heavy wave action in the Project Area combined with abundant supplies of sand from the Santa Ynez River. Together these two factors allow penetration of a clean sand community into depths where a silty sand or sandy silt community would normally exist elsewhere in the region. In more protected waters in southern California the transition from clean sand to silty sand community takes Place between 25 and 40 feet [MBC, 1979] rather than the 100-200 feet observed here.

During the baseline studies, only two hard bottom areas were noted along the pipeline corridor, at depths of 30 and 55 feet near Station 15 as shown on Figure 4.5-4. Both outcrops consisted of 2-5 foot relief reefs supporting biota typical of the depth in the region. (See Appendix E for detail.) The reef at 30 feet appears to be at least 20 acres in surface area.

PIPELINE ROUTE BETWEEN SHAMROCK PLATFORM AND PLATFORM IRENE

Since the aforementioned relocation of the Shamrock site, no site-specific biological sampling data are available for the corridor between the new site and Platform Irene. In the absence of such data, the biota are assumed to be similar to those described for the nearest stations sampled [McClelland, 1984 and Dames & Moore, 1984]. See Section 4.5.3 of Appendix E for discussion of the characteristics of benthos at those sites.

ALTERNATE PIPELINE ROUTE BETWEEN SHAMROCK PLATFORM AND PLATFORM HERMOSA

The sediment characteristics and infaunal community of the approximate Alternate Pipeline corridor is summarized in Section 4.5-3 of Appendix E. Infauna averaged 91 species per station. Community density averaged 2803/m^2 at the four corridor stations. The composition of the community was also similar to that of Shamrock/Irene platform depths with six dominants in common between the two. Samples from the pipeline corridor, Platform Hermosa, and the station between Shamrock and Platform Irene all group together as having a similar biota.

Trawl samples taken at Station P-2 and P-6 (see Figure 4.5-4) characterize the soft bottom megafauna in the pipeline corridor. These samples corresponded well with catches near Shamrock and in the head of the more southern submarine canyon on OCS-P 0440. The catch was dominated by the commercially valued ridgeback prawn (Sicyonia ingentis), with the shrimp (Crangon alaskensis), the pelagic red crab (Pleuroncodes planipes), and market squid (Loligo opalescens) common. Presence of the red crab reflects lingering effects of the El Nino episode of 1982-83.

As shown in Figure 4.5-5, there are numerous hard bottom outcrop towards the southernmost end of the pipeline corridor. Those areas which have been investigated by either RCV or manned submersible support a Florometra-Ophiacantha community on low relief outcrops and rubble fields. (See Section 4.5.3 of Technical Appendix E for additional details.

4.5.2.2 Kelp Communities

Figure 4.5-6 shows the regional distribution of principal kelp beds.

No extensive kelp beds are present either at the proposed platform sites, in the Area Study lease tracts, along the proposed pipeline corridors, or at the potential supply base site at Port Hueneme. The closest giant kelp beds to the pipeline landfall are found on the reefs approximately 2 miles north [Woodward-Clyde Consultants, 1982]. The absence of beds, of either giant or bull kelp, is attributed to a combination of the wave-exposed habitat and lack of a rocky substrate for plant attachment. About 1/2 mile to the north of the Proposed Pipeline landfall, Macrocystis appears irregularly in patches off the coast where rocky substrate is present, in water depths of 6 to 15 meters.

The Ellwood kelp bed (No. 28) has been unusually important in recent years because of decreased harvest in other beds (e.g., No. 31). McPeak et al. [1983] have documented canopy loss in this bed that is due to historical vessel traffic. This bed is illustrated in Figure 4.5-7.

4.5.2.3 Plankton Communities

The variability of phytoplankton biomass within the Southern California Bight was described by Allen [1940]. After reviewing 20 years of data, he indicated that no two years, two months or two weeks were alike. Allen further indicated that there was no recognizable localization of species within the eastern Pacific and even regional limitations of species occurrence were not strong. Similar findings were reported by Resig [1965] for the Southern California Bight and are generally applicable to the entire Study Region and for zooplankton as well as phytoplankton.

A densely populated 20-meter-thick band of copepods has recently been discovered at a water depth of about 450 meters across the Santa Barbara Basin [Alldredge in SAI, 1983]. Direct observation and sampling indicate that the copepod aggregation occurs in the zone of lowest oxygen concentration in the Basin, is composed of nonmigrating, resting-stage individuals, and has densities exceeding three million copepods per cubic meter (reportedly the highest densities ever recorded in the deep sea). This type of apparently

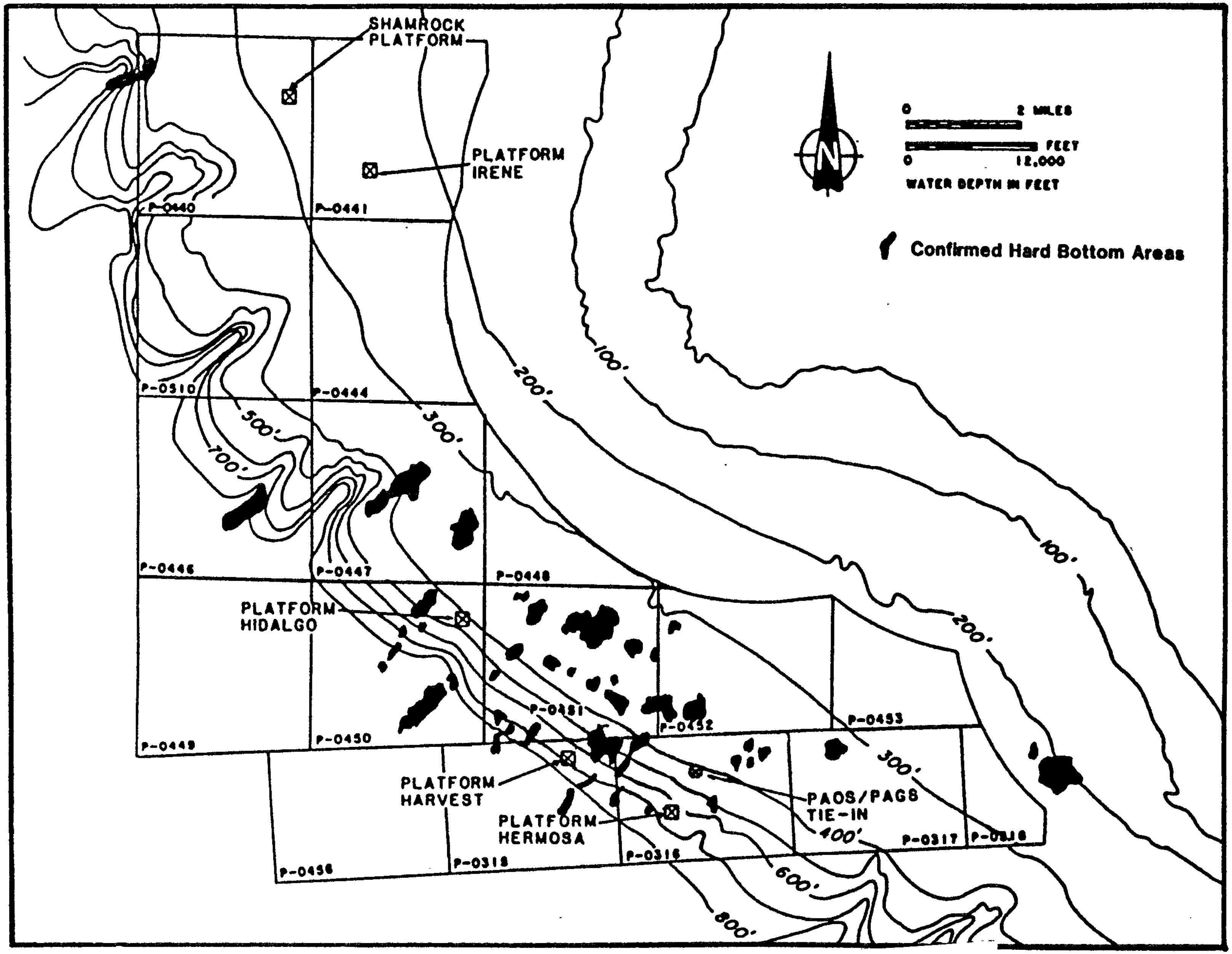

Figure 4.5-5 Hard botom feature Shamrock Platform to Hermosa.
(Sources: Dames and Moore 1982, SAI 1984)

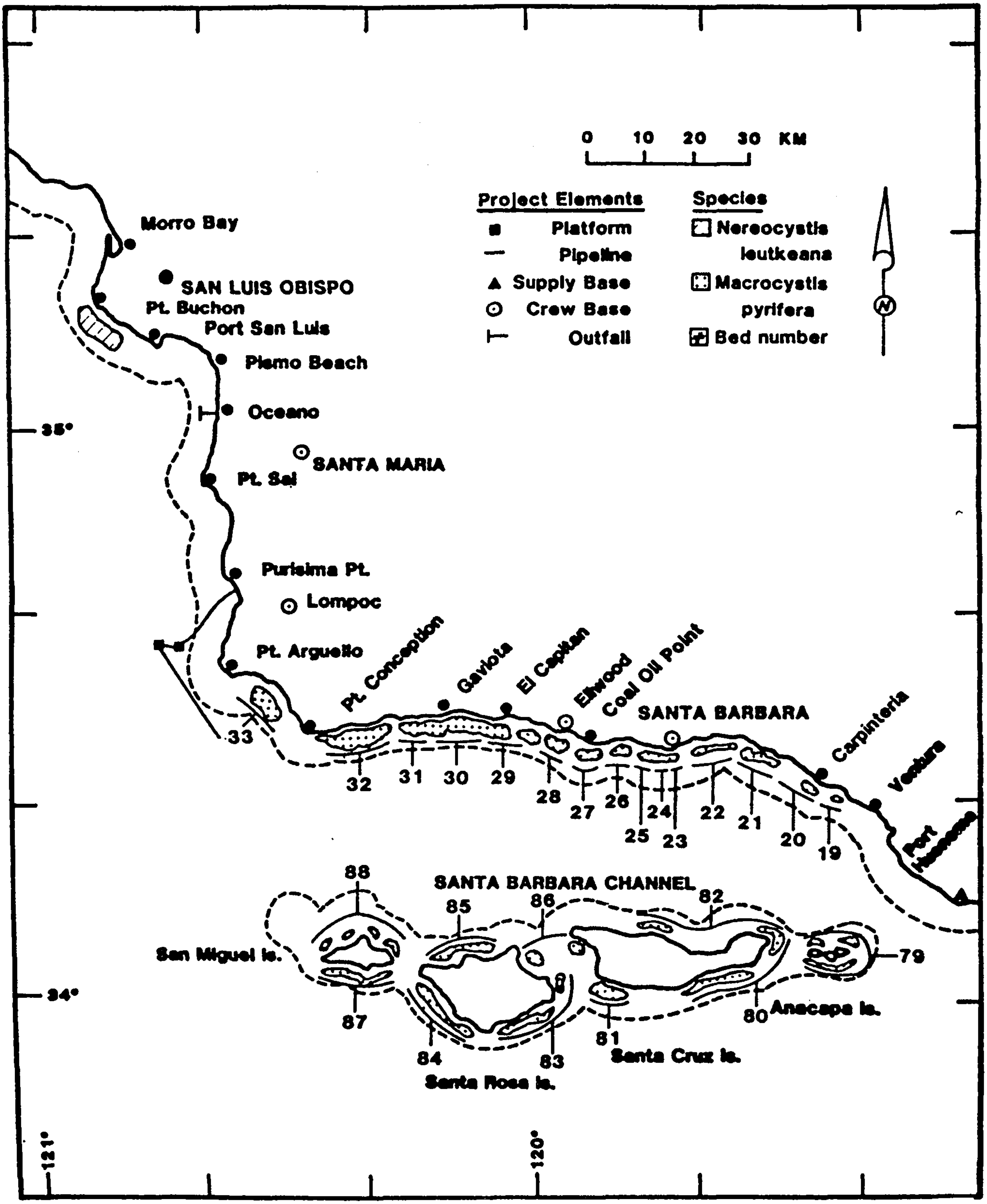

Figure 4.5-6. Regional distrubution of kelp beds.
(Sources: Hodder and Mel 1978, McPeak 1984)

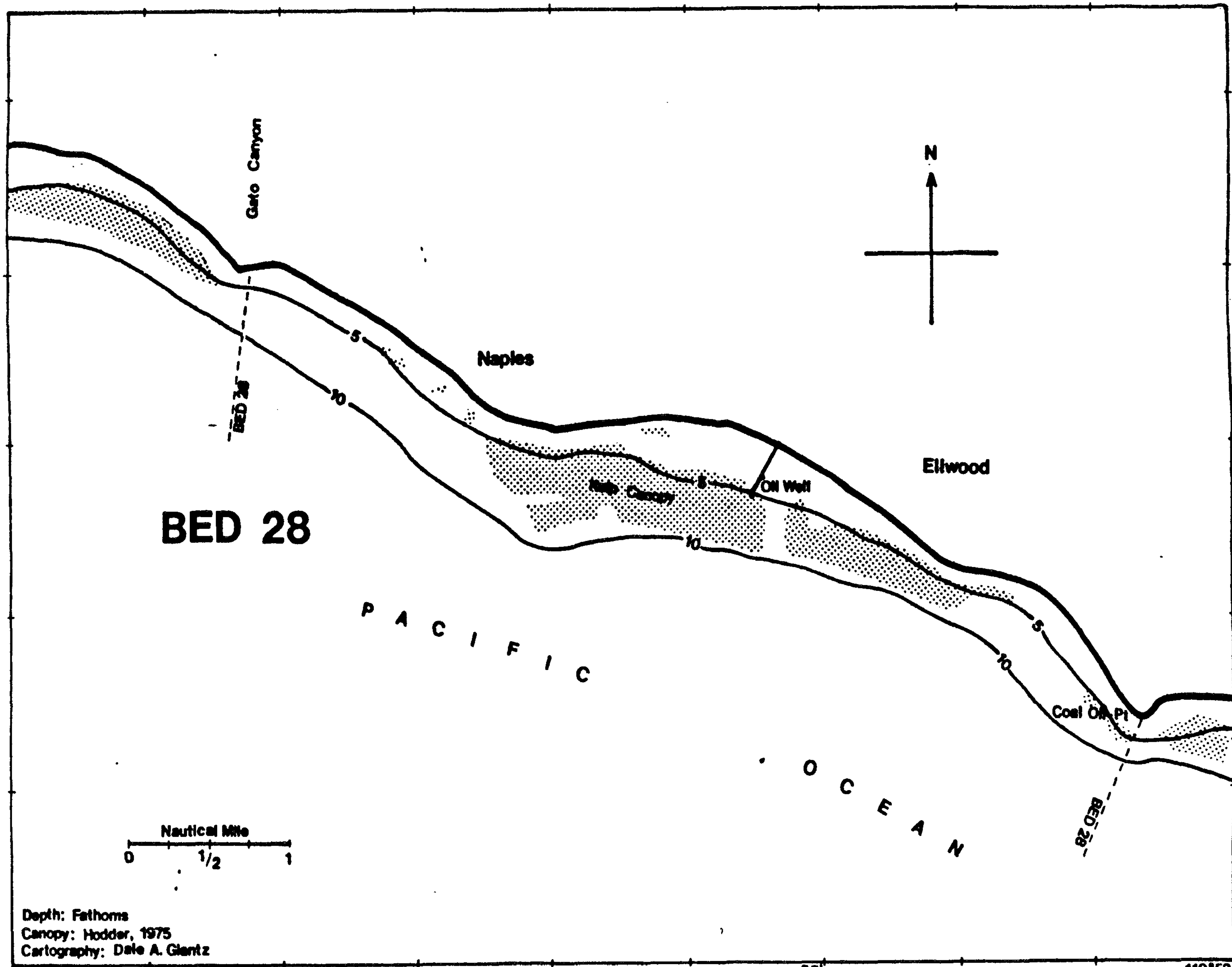

Figure 4.5-7 ELLWOOD KELP BED

widespread, dense bank of copepods may represent a significant food resource for pelagic predators in the Santa Barbara Basin and any other areas where it may occur. Videotapes at proposed platform sites off Point Conception (130 to 200-meter depths) by Nekton [1981] revealed an appreciable zooplankton community near the bottom, with mysids the only group readily identifiable from the tapes.

The existence and distribution of larval stages of commercial invertebrates in the Southern California Bight are not well documented, but Johnson [1960] reported that the early larval stages of the spiny lobster occur near shore and near the Channel Islands, while the older stages occur offshore through the Bight. The larvae of the commercial crabs, Cancer spp., occur throughout the year in the plankton in the waters south of Point Conception [MBC/CDF&G, 1982]. Larval densities decreased with increased distance from shore in the referenced study. Abalone and sea urchin larvae are also expected in the nearshore zooplankton throughout the Study Region, but have not been investigated.

A variety of studies done between Point San Luis and Point Conception within the Study Region [Chambers Consultants and Planners, 1980, Icanberry and Warrick, 1978b, MBC/CDF&G, 1982] have reported numerical dominance of the commercially important northern anchovy larvae in the ichthyoplankton. The larvae of other commercially valuable species (California halibut and English sole) were among the 20 most abundant species out of the approximately 100 species captured in the surveys.

The above description applies to the Area Study and project sites, because of the patchiness of these communities.

4.5.2.4 Nekton Communities

PELAGIC (WATER-COLUMN) SPECIES

Several of the pelagic fish species and squid in the Study Region are of special interest because of their importance in the commercial catch. These include albacore, chinook and silver salmon, northern anchovy, Pacific bonito and jack mackerel [MMS, 1983a,b], as well as white seabass, yellowtail, barracuda and various sharks. Several of these species have been reported in abundance in the Santa Barbara Channel in recent years in the shallow waters (less than 300 feet) near the mainland and the northern Channel Islands. (See Appendix E, Section 4.5.5.) None of these species has been historically recorded in consistently high concentrations near the locations of proposed project facilities. Most of the reports between 1974 and 1978 were of schools concentrated in the nearshore waters between Point Conception and Gaviota. The nearest location of reported concentrations of any of these species to the proposed project sites were of schools of white seabass just north of Point Sal and in the nearshore between Point Conception and Point Arguello [Squire, 1983]. Catch data from Block 644, containing the proposed platform sites, indicate that albacore, Pacific mackerel, and jack mackerel may occur there in harvestable quantities in any given year (see Section 4.10.1).

Of the resources discussed above, market squid represents a potentially important species. The Santa Barbara Channel area supports moderate squid concentrations; however, commercial quantities are obtained only on spawning grounds. Mais [personal communication to MBC, 1984] indicates that Mugu Canyon, the north side of Santa Cruz Island, and the gap between Santa Rosa and Santa Cruz Islands are the primary sites of existing concentrations (based on commercial fishing activity) of squid. Market squid were observed near the proposed platform sites by videotapes, and travel collections.

Although there are areas of recurring high concentrations (see Section 4.5.5 of Appendix E), the Region's pelagic species can be assumed to be present at any offshore location of suitable depth, including the Area Study and Project Area locations.

DEMERSAL (BOTTOM-ASSOCIATED) SPECIES

Region and Area Study

The rocky intertidal zone north of Point Conception supports an extremely diverse intertidal fish fauna. In one study [Burge and Schultz, 1973], 54 species were found to occur in the intertidal zone at Diablo Cove. Compared with areas north of Point Conception, the intertidal fish fauna south of Point Conception is depauperate. The difference in diversity between the areas north and south of Point Conception is generally attributed to the relative lack of micro-habitat to the south.

Data are less complete for shallow-water species north (versus south) of Point Conception, but a list of the most common species [Blunt, 1980] corresponds for the most part with the list for the Channel in general. Chambers [1980] and Dames & Moore [1977] reported on nearshore fish communities off the Point Arguello boathouse and just south of Point Conception at Little Cojo Bay.

Data from previous studies indicate that the demersal fish assemblage in the deeper waters (more than 100 feet) of the western Santa Barbara Channel is relatively homogeneous to a depth of about 270-280 feet (90 meters) (see Appendix E). A transition assemblage apparently occurs over the next 300 feet, with a deep-water group predominating below about 600 feet [Dames & Moore, 1982]. Fewer data are available for characterization of the deep demersal communities in the Santa Maria Basin. See Section 4.5 of Appendix E for additional details on demersal species, including those of commercial importance.

Platform Irene Site

An examination of the Platform Irene site using RCV revealed that the dominant fish in this area was the pink surfperch, with flatfish, including sanddabs and English sole, less frequently observed. The dominant fish collected between 63 meters and 41 meters by otter trawl included the speckled sanddab; the speckledfin midshipman was abundant from 200 feet to 128 feet. At the 33-meter station, the prominent species collected was the spotfin surfperch. The dominant taxa observed at the shallower depths (<22 meters) by the divers were the spotfin surfperch and shiner surfperch [McClelland, 1984].

Shamrock Project Site

An RCV reconnaissance survey near the Shamrock project site and along the approximate Proposed and Alternate Pipeline corridors identified a total of 26 taxa of demersal fish occurring in water depths of 88 to 133 meters. Twenty-three taxa were reported from the southern canyon, 12 from the northern canyon and six from the brief dive near the original platform site. Common species observed during the RCV surveys included sanddabs, stripetail rockfish, and two species of eelpouts. Other species observed during the dives, but not the trawls, included hagfish, ratfish, ling cod, and rockfish.

A total of 20 taxa of demersal fish were collected in otter trawl samples between 91 and 133 meters. Two species, the Pacific sanddab and the plainfin midshipman, accounted for over 70 percent of the fish collected. These species together with the yellowchin sculpin, slender sole, Dover sole, and stripetail rockfish, were present in each trawl.

Support Base Sites

The ichthyofauna at the proposed crew base site at Ellwood is as described for other shallow water regions with kelp beds along the south coast. The dominant taxa of fish expected in the area include striped surfperch (*Embiotoca lateralis*), convict fish (*Oxylebius pictus*), pile perch (*Rhacochilus vacca*), and kelp bass (*Paralabrax clathratus*) [Chambers, 1982].

There is no site-specific information on the fish fauna occurring at the existing support base site at Port Hueneme. Trawl studies conducted adjacent to the area of Ormond Beach [MBC, 1976] indicated that the dominant taxa in the area included spotfin surfperch, speckled sanddabs, northern anchovy, white croaker, shiner surfperch, and queenfish.

4.5.2.5 Marine-dependent Birds

Seabird nesting and roosting sites (see Figure 4.5-8 and Table 4.5-2) are designated Environmentally Sensitive Habitat Areas (ESHA) to be protected from disturbance by the Santa Barbara County Local Coastal Plan (LCP).

Much rocky shore habitat occurs sporadically along the coastline between Mussel Rock and Point Conception. The most extensive rocky areas are: North Vandenberg AFB from Mussel Rock and Point Sal south to Shuman Creek; at Purisima Point; along south Vandenberg AFB from just north of Point Pedernales to several miles south of Point Arguello; and in the Point Conception area. These areas support such characteristic rocky coast species as: resident and breeding black oystercatcher; nesting pelagic cormorant; pigeon guillemot; possibly rhinoceros auklet (local); and significant wintering populations of wandering tattler, black turnstone, and surfbird. Large numbers of Brandt's cormorant are present throughout the year, but do not breed along the mainland coast of Santa Barbara County [Lehman, 1982]. Many of these birds are restricted to the rocky intertidal or cliff habitats for roosting or nesting, and depend on the rocky intertidal zone (black oystercatcher, wandering tattler, black turnstone, and surfbird) or the nearshore waters (pelagic cormorant, pigeon guillemot, and rhinoceros auklet) for feeding.

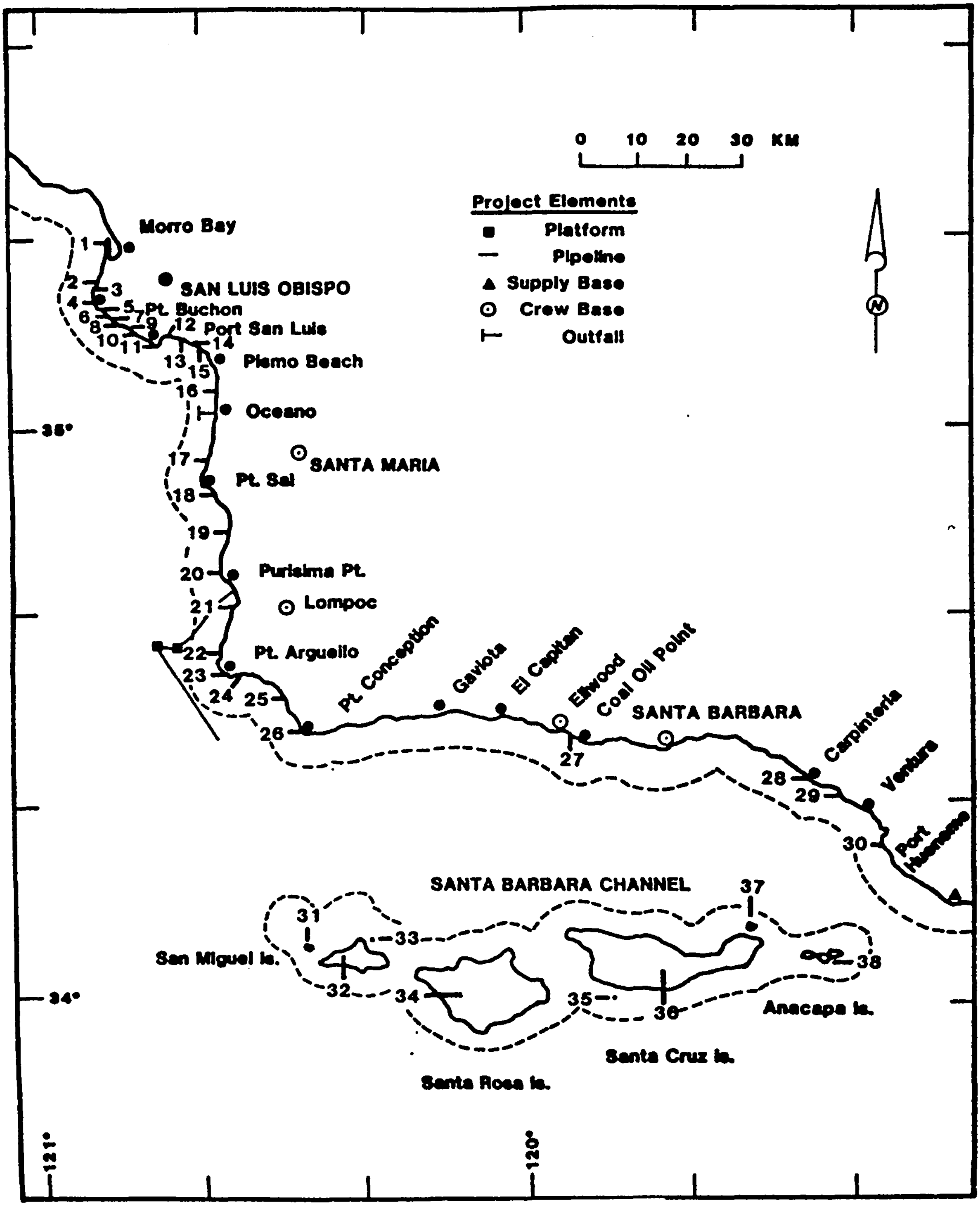

Figure 4.5-8. Sea bird nesting and roosting sites. ~~(see Table 4.5.8-1)~~.

Table 4.5-2 . Sea bird nesting and roosting sites. (see Figure 4.5.8-1).

Sites / Species	Tubenoses	Leach's storm-petrel	Ashy storm-petrel	Cormorants/Pelicans	Brandt's cormorant	double-crested cormorant	pelagic cormorant	brown pelican	Falcons	peregrine falcon	Rails	light-footed clapper rail	black rail	California clapper rail	Shorebirds	black oystercatcher	snowy plover	Gulls/Terns	western gull	Heermann's gull	least tern	Alcids	pigeon guillemot	Xantus' murrelet	Cassin's auklet	Rhinoceros auklet	Sparrow	Belding's savannah sparrow
1. Morro Rock/Pillar Rock							●			●			●	●		●	●		●				●					
2. Spooner's Cove																			●				●					
3. Point Buchon							●									●							●					
4. Unnamed Rocks							●									●			●				●					
5. Lion Rock					●											●			●				●					
6. Pup Rock																●			●									
7. Diablo Rock/Mainland					●		●												●				●					
8. Diablo Canyon					●		●									●			●				●					
9. Double Rock							●																					
10. Pecho Rock					●														●									
11. Smith/Whaler Islands																●			●				●					
12. Fossil Point							●									●			●				●					
13. Shell Beach Rocks							●									●			●	●			●					
14. North Pismo Beach Rocks							●									●			●				●					
15. Oso Flaco Lake																					●							
16. Santa Maria River/ Guadalupe Dunes																					●							
17. Lion Rock					▲																							
18. Point Sal					▲																							
19. San Antonio Creek																	●				●							
20. Purisima Point																					●							
21. Santa Ynez River to 7 miles north of river																	●				●							
22. Destroyer Rock																							●					
23. Mainland and rocks east of Destroyer Rock																							●					
24. Point Arguello							●									●			●				●		●			
25. Rocky Point																●							●					
26. Point Conception							●			●													●					
27. Goleta Slough													●															●
28. Carpinteria Slough												●																●
29. Santa Clara River Mouth																					●							●
30. Mugu Lagoon												●	●				●				●							●
31. Richardson Rock			●		●		●									●			●				●	●	●			
32. San Miguel Island			●		●		●									●			●				●	●	●			
33. Prince Island		●	●		●	●	●	●								●			●				●	●	●			
34. Santa Rosa Island			●		●		●	●								●			●				●	●				
35. Gull Island			●		●		●									●			●				●	●	●			
36. Santa Cruz Island			●		●		●									●			●				●		●			
37. Scorpion Rock			●			●		●								●			●				●	●	●			
38. Anacapa Island					●	●	●	●								●			●				●	●	●			

Sources: Sowls et al. 1980; Briggs et al. 1981; Collins et al. 1983. MMS 1984c; Lannoy, personal communication 1984

● Breeding and roosting

▲ Roosting only

Sandy beaches within the Point Conception to Point Arguello region are extensive and relatively undisturbed [Lehman, 1982]. Dunes are present along the North Coast, in the Santa Maria River mouth area (Guadalupe Dunes), along much of north Vandenberg AFB, from Shuman Creek south to the Santa Ynez River mouth, and are particularly extensive in the Guadalupe Dunes and Purisima Point areas. Heavy human recreational impacts in the Guadalupe Dunes area and further south, between Gaviota and Carpinteria, have resulted in a decrease in local breeding populations of the snowy plover and least tern, both extirpated in the last 25 years as nesters from the South Coast and now quite local along the North Coast. Active breeding colonies of the least tern were observed in 1983 at the mouth of San Antonio Creek (14 pairs, ten fledglings), Santa Maria River (seven pairs, three fledglings), and Purisima Point (14 pairs, nine fledglings). Least terns actively bred further south near the Santa Ynez River mouth (see below) [Marty Pletcher, CDF&G, and Steve Lannoy, personal communication]. Snowy plovers breed just north of Point Arguello, between Point Pedernales and just south of Ocean Beach Park [Steve Lannoy, personal communication], and breed north of the Santa Maria River mouth [Lehman, personal communication].

The passages and waters of the coast immediately adjacent to and including Point Conception and the northern Channel Islands are particularly important for migrating seabird and waterfowl species in the spring, with most of the individual birds that winter south of Santa Barbara passing these points between mid-March and late May. This migration represents in excess of 100,000 birds [Lehman, personal communication to C. Cooper, Arthur D. Little, Inc., 1984].

San Miguel Island, the closest of the Channel Islands to the proposed project sites, supports the largest and most diverse seabird colonies in southern California, although relative to northern California, the breeding population is quite small [Sowls et al., 1980]. Most breeding occurs on two small, predator-free islets off San Miguel Island--Prince Island and Castle Rock.

AREA STUDY TRACTS

Seabirds, from Point Conception to Point Sur, identified during the U.C. Santa Cruz MMS surveys [CCMS, 1982] are listed in Section 4.5.8 of Appendix E. These species can be expected to occur offshore in the platform and pipeline corridors.

PROJECT SITES

Among other species in the Santa Ynez River marsh, the endangered brown pelican and least tern are regularly present. A form of darkly-colored salt marsh savannah sparrow is regularly sighted there, but it has not been determined whether the birds are the endangered Belding's savannah sparrow. the Belding's race has thus far been recorded further south [Lehman, 1982]. The area about one-half mile upstream from the mouth of the river has recently (1983) been a significant breeding area for least tern. During 1983, eight pairs and three fledglings were sighted [Marty Pletcher, personal communication to MBC, 1984].

Protected sandy beaches and dune areas are found near the pipeline landfall on Vandenberg AFB. Several regionally declining species breed in these areas, including the snowy plover and least tern. Least tern breeding in recent years has occurred on the unnamed point about 2 miles north of the proposed landfall [Larry Spanne, personal communication to C. Cooper, Arthur D. Little, September 1984].

4.5.2.6 Marine Mammals

Table 4.5-3 summarizes recent marine mammal siting data for the portions of the Study Region closest to the proposed project sites.

CETACEANS

The entire Study Region including the Area Study tracts and project sites, is utilized by cetaceans in all seasons. Resident gray whales are now found year-round in small numbers in the Region. All of the large whales are endangered or threatened species, and migrate through the Study Region. The main body of gray whales migrating south occurs in late December off the central coast, and comes extremely close to shore at Point Conception (well within 2 kilometers) and other headlands (see Figure 4.5-9). Returning northward, migrants pass through the nearshore area in major pulses in late February through early March, and again later in the spring [C. Woodhouse, personal communication to Arthur D. Little, 1984]. Other smaller cetaceans are resident most of the year, including grampus and common dolphins, and are fully protected by the Marine Mammal Protection Act with its prohibition against taking, except incidental taking, permitted scientific research and public display (by permit), by Natives for subsistence purposes, during commercial fishing activities, and as otherwise specifically authorized on a case-by-case basis.

SOUTHERN SEA OTTER

Study Region and Area Study

As shown in Figure 4.5-10, this federally-listed threatened species occurs in the northern part of the present Study Region. While transient sea otters have been observed as far south as Point Mugu and the Channel Islands, the Port San Luis area falls within the southernmost part of the California sea otter population [CCMS, 1982]. Recent studies indicate the region between Point Buchon and Point San Luis is important to sea otters since it is now an established part of the sea otter range for the southernmost population of breeding females and males from which further southward expansion will occur [Estes and Jameson, 1983; Benech, 1981; Benech, 1982].

During CCMS spring 1980/1981 aerial sea otter surveys, the population between Arroyo Grande and Point Buchon consisted of 6 to 11 percent of the total estimated sea otter population in California. Population shifts observed during the study suggested significant changes in the southern population to more northerly areas between Point Sur and Monterey. This shift has been attributed to exploitation of food resources and the movement of young towards the center of the breeding population. The population between

Table 4.5-3

POINT CONCEPTION/PURISIMA POINT PROJECT AREA MARINE MAMMAL DATA

Species	Sightings on Land	Sightings at Sea	Season
Southern sea otter	Being Revised		
Pinnipeds		31; inshore, Little Cojo Bay, 1980-1981[5]	Autumn, winter, spring, summer
California sea lion	Present Jan 81-Sept 82 2 on Naples Rocks 7 July 1981[7]	0.4-1.59/km^2; CCMS (1982) 13 individuals; Dames & Moore Platform Hermosa Survey[3]	
		73 individuals; Platform Hidalgo Survey[4]	Autumn
		2 sightings 1 individual each; Shamrock Project survey[10]	Summer, winter Late spring
		Sighted during each day of Platform	Summer
		Irene survey[9]	Late summer
Harbor seal	16 on rocks near Point Arguello Boathouse breakwater, 1978[1]		Summer, autumn
	31; Jan 1981[2]	Present <100 fms @ Point Arguello[2]	
		4 individuals; Point Arguello Boathouse breakwater[1]	Spring
	Hauled out on Drake's Beach Spring 1976[6]	Common inshore, Little Cojo Bay[5] 1-5 individuals/km^2 South of Point Conception	Autumn, winter,
Northern elephant seal	Data not available[2]	Present; 1000 fms[2]PA-PC	
		Present, inshore near Little Cojo Bay[2]	
Northern fur seal		0.4-1.59/km^2; >3000 fm[2]PA-PC	
Total pinnipeds	261 individuals; Jan 81-Sept. 81[2]	0.4-1.59/km^2[2] PA-PC	
Cetaceans			
Pacific white sided dolphin	1-1000 individuals;	>1000 fms[2] PA-PC	Summer-autumn
		2 sightings of a pod of >10 individuals; 1 sighting of a pod of <10 individuals Platform Irene[9]	Late summer
		1 sighting of >100 individuals Shamrock Project survey[10]	Late spring
Common dolphin		135 individuals; Platform Hidalgo survey;[4]	
		1 sighting, no estimate of numbers, Platform Irene[9]	Late summer
		1 individual, inshore Little Cojo Bay[5]	
Northern right whale dolphin		100-999 individuals, 100-1000 fms[2] PA-PC	Winter, spring, summer
Grampus (Risso's dolphin)		1-999 individuals; 100-1000 fms[2] PA-PC	Winter, spring, summer, autumn
Dall's porpoise		5-78 individuals; 100-1000+ fms[2] PA-PC 2 sightings Platform Hermosa survey[3]	Summer
Harbor porpoise		9 individuals; <100 fms[2] PA-PC	
Pilot whale		20 individuals; 19 nm off Point Conception[2]	Spring
Beaked whales (Baird's, Cuvier's, *Mesoplodon* sp.		Present 100-1000 fms[2] PA-PC	Summer
Pacific rightwhale		1 individual eastern Santa Barbara Channel	Spring 1981[8]
Gray whale		Present, migrating downcoast inshore near Point Conception[2]	Winter
		69; inshore, Little Cojo Bay, 1980-1981[4]	Winter-Spring
		Present, SYU[6]	Winter
Humpback		6-10 individuals; (Purisima Pt) 100 fms[2]	Autumn
Blue whale		2-5 individuals; (Purisima Pt) 100 fms[2]	Summer
Finback		2 individuals; Platform Hidalgo survey[4] 2 confirmed sightings, 1 unconfirmed sighting[9]	Autumn Late summer

*PA-PC = Point Arguello to Point Conception

1 Chambers Consultants and Planners
2 CCMS 1982
3 Dames & Moore 1983
4 Engineering Sciences, Inc. 1983
5 MEC F[illegible]sh & Game 1932
6 SAI [illegible]
7 Dames and Moore 1977
8 Woodhouse and Strickley 1982
9 McClelland Engineers 1983
10 Dames and Moore 1984

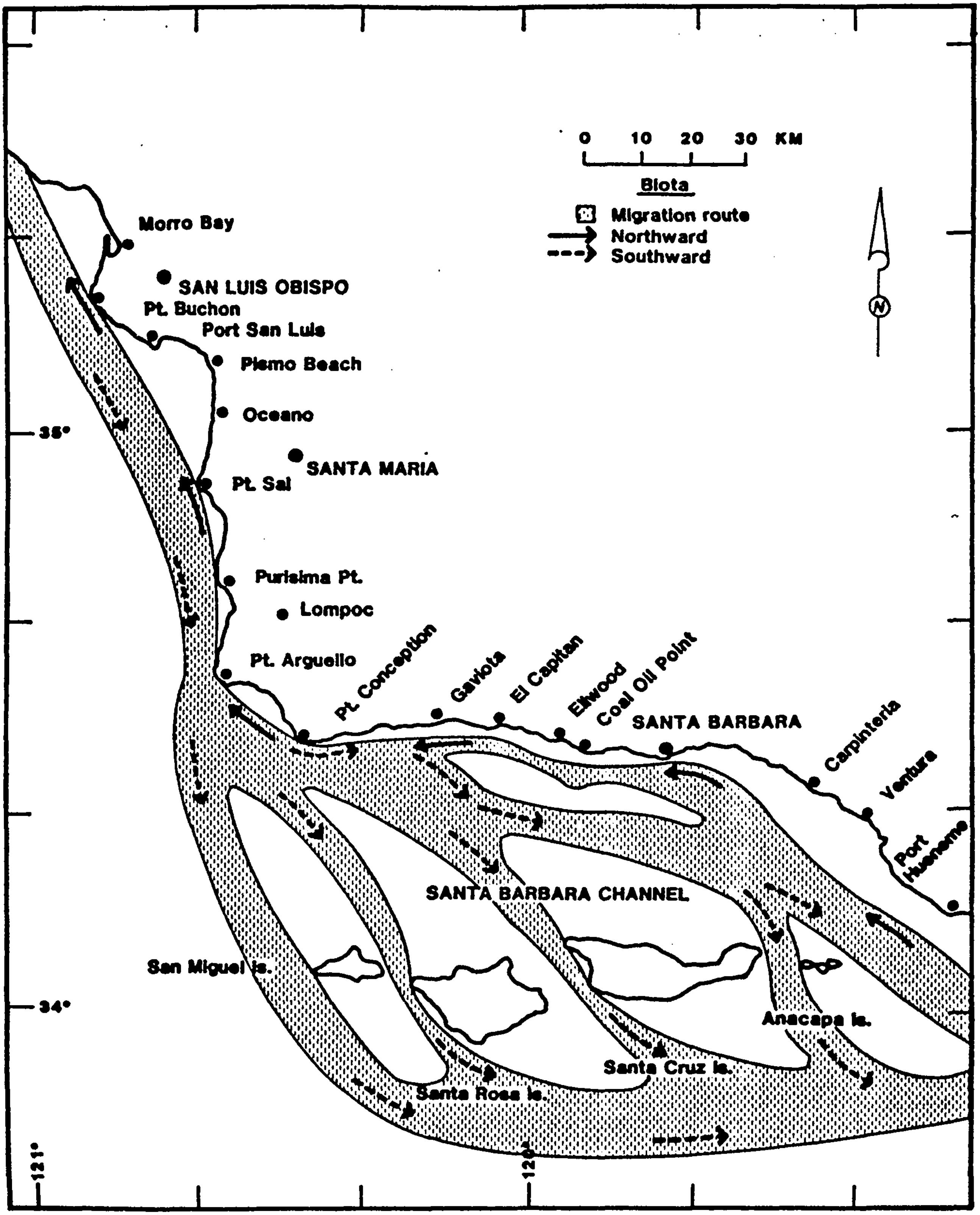

Figure 4.5-9. Whale migration routes. Sources: Dohl et al. 1983; Woodhouse, personal communication 1984)

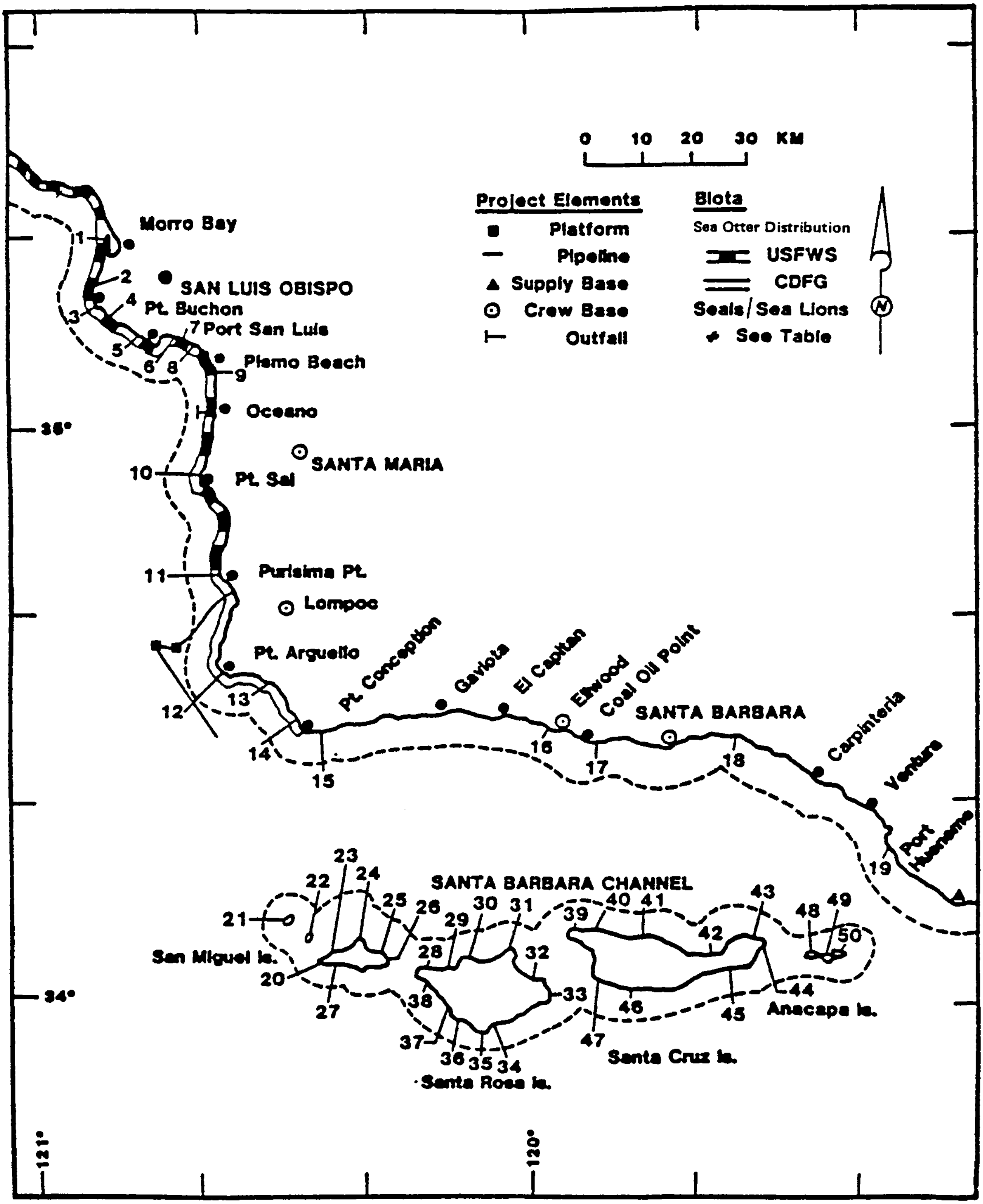

Figure 4.5-10 DISTRIBUTION OF PINNIPEDS AND SOUTHERN SEA OTTER
(Sources: Miller et al. 1983, Bonnel et al. 1983)

Point Buchon and Point San Luis consisted of 0.8 to 3.5 percent of the total California population. These locations, however, may be of special importance because they include a growing subgroup of mature females [M. Bonnell data in Estes and James, 1983]. Fish and Wildlife aerial surveys, conducted from November 1981 to February 1982, indicated that the population (one to ten individuals) between Point Buchon and Point San Luis varied from 0.22 to 1.93 percent of the total California population [Estes, 1982].

The most recent sea otter surveys were conducted by U.S. Fish and Wildlife Service in June 1984 as part of its ongoing aerial surveys. Forty-eight individuals, including two pups, were sighted between Point Buchon and Point San Luis; ten were sighted between Point San Luis and Pismo Beach [Ron Jameson, USFWS, personal communication to MBC, 1984].

Southern sea otters have recently been discovered several miles offshore feeding on pelagic red crabs [Dan Costa, UC Santa Cruz, personal communication to R. Cimberg, MBC, 1984]. This type of offshore occurrence appears to be an unusual event associated with the El Nino phenomenon.

Project Sites

Several studies conducted between 1981 and 1984 have documented the presence of sea otters in the area of the pipeline landfall. Nekton [1981] reported sea otters were commonly seen between Purisima Point and Point Arguello; Chambers [1980] observed animals near the Boathouse region of Point Arguello. CCMS [1982] reported between three and seven individuals during aerial surveys in May 1980 and May 1981 in the Santa Ynez River area. During fall 1982, 11 individuals were sighted from Pismo Creek to Point Conception [MMS, 1984].

PINNIPEDS

Region and Area Study

Pinniped rookeries and hauling grounds are designated Environmentally Sensitive Habitat (ESH) by the Santa Barbara County Local Coastal Plan (LCP). Policy 9-25 of the LCP states that marine mammal rookeries shall not be altered or disturbed by other uses during periods of use for reproductive and pup care activities. Figure 4.5-10 and Table 4.5-4 show the distribution and type of use of pinniped rookeries and hauling grounds in the Study Region.

San Miguel Island, the closest of the Channel Islands to the proposed platform sites, is the only location in the United States and one of the very few places in the world where five species of pinnipeds breed virtually side by side. A few individuals of the transient Guadalupe fur seal, a candidate for federal listing, also utilizes the island as its present northerly range extreme. Figures in Appendix E depict the usage of San Miguel Island for breeding by pinnipeds.

Section 4.5.9 of Appendix E contains additional data on marine mammal distribution and abundance in the Study Region.

Table 4.5-4. Distribution of pinniped rookeries and hauling grounds in the study area.

Sites	Guadalupe Fur Seal		Northern Fur Seal		California Sea Lion		Steller Sea Lion		Harbor Seal		Northern Elephant Seal	
	R	H	R	H	R	H	R	H	R	H	R	H
1. Morro Bay (inside harbor)									●	●		
2. 0.5 km So. Hazard Canyon										●		
3. Lion Rock						●			●	●		
4. Deer Canyon										●		
5. Pecho Rock						●				●		
6. San Luis Obispo Creek										●		
7. Fossil Point										●		
8. Mallagh Landing									●			
9. Shell Beach									●	●		
10. Point Sal						●			●	●		
11. Purisima Point									●	●		
12. Point Arguello										●		
13. Rocky Point										●		
14. Point Conception									●	●		
15. Coho									●	●		
16. Ellwood									●	●		
17. Goleta Pier										●		
18 E. Carpinteria										●		
19. Mugu Lagoon									●	●		
20. Richardson Rock						●		●				
21. Point Bennett		●	●	●		●		●			●	●
22. Castle Rock				●	●	●		●				
23. NE San Miguel Island						●			●	●	●	
24. Harris Point									●	●		
25. Bay Point Area									●	●		
26. Cardwell Point									●	●	●	●
27. Judith Rock Area				●	●	●				●	●	
28. Santa Rosa Island-north									●	●		
29. Santa Rosa Island-north									●	●		
30. Santa Rosa Island-north						●				●		
31. Santa Rosa Island-north										●		
32. Santa Rosa Island-north										●		
33. Santa Rosa Island-north						●			●	●		
34. Santa Rosa Island-south										●		
35. Santa Rosa Island-south										●		
36. Santa Rosa Island-south										●		
37. Santa Rosa Island-south										●		
38. Santa Rosa Island-south									●	●		
39. Kinton Point						●			●	●		
40. W. Kinton Point										●		
41. "Spit Rock"						●				●		
42. Coche Point						●				●		
43. Scorpion rock										●		
44. Smugglers Cove										●		
45. Santa Cruz						●			●	●		
46. Punta Arena										●		
47. Santa Cruz										●		
48. Anacapa Island-west						●				●		
49. Anacapa Island-middle										●		
50. Anacapa Island-east						●			●	●		

Source: Bonnell et al. 1981, 1983
Miller et al. 1983

R = Rookery; H = Hauling grounds

Pipeline Landfall

In the vicinity of the Proposed Pipeline landfall north of the Santa Ynez River, Woodward-Clyde [1982] noted the occurrence of harbor seal haulout areas just north of the Lompoc Landing. Harbor seals maintain a major haulout at Purisima Point [Miller et al., 1983]. Harbor seal haulouts are also listed by Woodward-Clyde [1982] for areas near San Antonio Creek.

Several harbor seal haulout sites were reported between Pismo Beach Pier and Port San Luis and between Point San Luis to Point Buchon. Haulout sites included: areas between Pismo Beach Pier and Shell Beach; Pirates' Cove; Fossil Point; and the San Luis River mouth. North of Point San Luis, Pecho Rock, the Deer Canyon area, the entrance to Diablo Canyon Harbor and particularly the Lion Rock area were reported to be active haulout sites in 1981-82 [Miller et al., 1983]. Stellar sea lions are also reported from the Lion Rock area [Woodward-Clyde, 1982]. Several of the sites between Pismo Beach and Lion Rock included pups. None of the areas was considered a large rookery.

Support Base Sites

No pinniped rookeries or regular haulout sites occur at Port Hueneme itself. Further east at Mugu Lagoon is a major haulout and rookery [Miller et al., 1983]. A harbor seal hauling ground and rookery are located near the Aminoil facility, approximately one mile west of the Ellwood Pier.

4.5.3 Important Locations for Marine Biota

Figure 4.5-1 at the beginning of this section shows important locations for marine biota in the Study Region, Area Study and Project Area. In addition to the Santa Barbara County ESH Areas discussed above, four types of state designated area of special concern are of marine biological importance: (1) ecological reserves; (2) marine life refuges; (3) reserves; and (4) area(s) of special biological significance (ASBS). These are legally defined and controlled by the State of California. Ecological reserves and marine life refuges are very similar; however, there are more restrictions and controls in an ecological reserve. The purpose of the refuges and reserves is to reduce the abuse and waste of the state's intertidal resources by restricting general collecting of all animals living in tidepools and other areas between the high tide mark and 1,000 feet below the low tide mark. Other areas of special concern under federal protection include Marine Sanctuaries and National Park areas.

ASBSs are also designed to protect intertidal and shallow subtidal areas. They are areas containing biological communities of such recognized value that certain types of change in their environments as a result of man's activities are deemed unacceptable (BLM, 1980).

Other categories of important biological environments, although they do not have legal status, warrant consideration because of comparably unique and/or important biological attributes. Some of these were identified as unique biological environments (UBA) and biologically sensitive areas (BSA) by BLM [1979].

A full listing of the above types of areas in the Region is presented in Section 4.5.11 of Appendix E. Seven ecological reserves occur from Tomales Bay to Point Conception along with three marine life refuges. They include 11 areas of special biological significance, a federal estuarine sanctuary, and a marine sanctuary [MMS, 1984b]. Several important state-designated areas of special concern, from Morro Bay to Point Conception, are Pismo Beach and Morro Rock Ecological Reserves; other areas are in either UBA or BSA status.

The Channel Island National Marine Sanctuary contains some highly productive waters, mammal and seabird habitat and bottom communities including an area of purple coral. Appendix E summarizes areas of significance to marine biota in the Channel Islands. The marine waters surrounding Anacapa, Santa Cruz, Santa Rosa, and San Miguel Islands have ASBS status, ecological reserve status, or both. The land portions of these islands are protected as a U.S. National Park. Offshore waters to a distance of six miles are afforded protection as a National Marine Sanctuary.

4.5.4 Species of Special Interest

Rare, endangered, or threatened marine-associated species that have been listed by federal or state agencies as potentially present in the Study Region are presented in Table 4.5-5. Federal listing as endangered or threatened is governed by the Endangered Species Act of 1973. In addition, all seabirds are federally protected under the Migratory Bird Treaty Act of 1972. State Endangered and Rare species are listed by the California Fish and Game Commission under the California Administrative Code, Title 14, Section 670.5.

Peregrine falcons are known from the coastal area from the Morro Bay region (breeding at Morro Rock) through Ventura County, with one pair released from Gaviota Peak [Steve Lannoy, CDF&G personal communication to MBC, 1984]. Southern bald eagles are rare in the region, mostly occurring farther south and inland. They do not breed locally.

Least terns breed at the Santa Maria River mouth, Purisima Point and Santa Ynez River marsh, sand beach/dune habitats and at several locations near Port Hueneme. They forage widely in the nearshore coastal and estuarine areas and have been recorded at Point Conception and along Hollister Ranch [Dames & Moore, 1977 and Sowls, 1981; Marty Pletcher, CDF&G personal communication to MBC, 1984; MMS, 1983]. Least terns have successfully nested within the Study Region at Pismo Beach, Oso Flaco Lake, Santa Maria River (Guadalupe Dunes), San Antonio Creek (north/south), Purisima Point, Santa Ynez River, Santa Clara River, Mugu Lagoon and Ormond Beach. Least terns utilized the Santa Ynez River mouth as a breeding habitat in 1983, which was the only time since 1969 when a colony, comprising at least three nests, was located [Least Tern Recovery Program, 1977; John Gustafson, personal communication to MMS, 1984c]. This colony represented 0.7 percent of the nests in California and 11 percent of the nests in Ventura, Santa Barbara, and San Luis Obispo counties. (See Table 4.5.12-2 in Appendix E.) Twenty to 25 terns were reported on the beach north of the river mouth in late May and early June; seven nests were located about one-half mile upstream from the mouth on June 20, 1983. Sixteen adults were present on June 25 and 29; 17 adults and three well-grown chicks on July 9. The Santa Ynez River area may be an

Table 4.5-5 Federally or state listed rare, endangered or threatened species occurring in the project region.

Species	California Distribution	Status[1]
BIRDS		
American Peregrine falcon *Falco peregrinus*	13 territories along coastal California between Oregon and Mexico	SE,SP,FE
southern bald eagle *Haliaeetus l. leucocephalus*	Mainly in interior California, some found along the coast	SE,SP,FE
California brown pelican *Pelecanus occidentalis*	Statewide along coast; breeding only on Anacapa Santa Barbara Islands and Scorpion Rock Region	SE,SP,FE
California least tern *Sterna albifrons browni*	San Francisco Bay to Mexico (breeding)	SE,SP,FE
light-footed clapper rail *Rallus longirostris levipes*	Salt marshes of Santa Barbara, Ventura, Orange, and San Diego Counties	SE,SP,FE
California black rail *Laterallus jamaicensis*	Santa Barbara, Ventura, Orange and San Diego County coastal marshes	SR,
California clapper rail *Rallus longinostris obsoletus*	Central California, San Luis Obispo, San Mateo, Santa Clara, and Alameda counties	FE,SE
California condor *Gymnogyps californianus*	San Luis Obispo County; Santa Barbara County; Sespe-Piru area of Ventura and Los Angeles County	SE,SP,FE
Belding's savannah sparrow *Passerculus sandwichensis beldingi*	Santa Barbara, Ventura, Orange and San Diego County coastal marshes	SE
MAMMALS		
blue whale *Balaenoptera musculus*	Offshore	FE
fin whale *Balaenoptera physalus*	Offshore	FE
gray whale *Eschrichtius robustus*	Offshore and normally within 15 km of the mainland shore	FE
humpback whale *Megaptera novaeangliae*	Offshore	FE
Pacific right whale* *Eubalaena glacialis*	Offshore	FE
sei whale *Balaenoptera borealis*	Offshore	FE
sperm whale *Physeter catodon*	Offshore	FE
Guadalupe fur seal *Arctocephalus townsendi*	Offshore, Channel and San Nicolas Islands**	SP,SR,FC
southern sea otter *Enhydra futris neries*	Ano Nuevo to Santa Maria River	SP,FT
FISH		
tidewater goby *Eucyclogobius newberryi*	Coastal lagoons of California	FC
REPTILES		
leather-backed turtle *Dermochelys coriacea*	Tropical and subtropical seas of west coast; some stray as far north as Vancouver Island, British Columbia	FE
loggerhead sea turtle *Caretta caretta*	Offshore	FT
green sea turtle *Chelonia mydas*	Offshore	FE
Pacific Ridley sea turtle *Lepidochelys olivacea*	Rare visitors offshore	FE
PLANTS		
Santa Barbara Island Liveforever *Dudleya traskiae*	Santa Barbara Island	FE
salt marsh bird's beak *Cordylanthus maritimus* ssp. *maritimus*	Coastal marshes of Santa Barbara, Ventura, Orange and San Diego Counties	FE

Source: BLM 1980; MMS 1983b, 1984c; CDF&G 1984

Key: SE=State of California endangered species; SP=State of California fully protected species
SR=State of California rare species; FE=Federally listed endangered species
FT=Federally listed threatened species; FC= Candidate for Federal listing

* considered to be extinct
** considered for federal listing as endangered or threatened.

important area for the least tern throughout southern and central California based on the large gathering of flocks in 1982 and 1983 [CDF&G surveys for 1982 and 1983]. The disappearance of large flocks of post-breeding birds from Purisima Point was coincident with the appearance of flocks at the Santa Ynez River [CDF&G]. Banding studies suggest movement north to the Santa Ynez River from Venice Beach [Louis Bevier, personal communication to D. Brewer, MMS, 1984].

California brown pelicans occur throughout the central coastal areas, breeding only on Anacapa and Santa Barbara Islands and Scorpion Rock. Their numbers in the region were greatly reduced in the recent past by the lack of food associated with 1982-83 El Nino episode. California black rails nest in Morro Bay coastal saltmarsh/estuarine habitat [MMS, 1983]. These marshes are the last known regional breeding site of the rail [Lehman, 1982].

Light-footed clapper rails, and Belding's Savannah sparrow have been found in Goleta Slough and Carpinteria's Sandyland Slough, with the rail now reportedly restricted to Sandyland [Lehman, 1982].

Several endangered marine mammals occur between Morro Bay and Port Hueneme, including blue, fin, gray, humpback, Pacific right, sei and sperm whales. The most abundant species, the California gray whale, migrates nearshore during its annual migration to Baja, California. A candidate species for federal listing, the Guadalupe fur seal occurs as a wanderer on San Miguel Island. See the marine mammals discussion above and in Section 4.5.9 of Appendix E.

The migrant front of about 60 immature males and a growing subgroup of mature female southern sea otters presently occur regularly within their southernmost population ranges between Point Buchon and Point San Luis. (See Marine Mammals above.) While it is generally reported that the southern sea otter population is not growing, monitoring in the aftermath of the 1985 emergency ban on entangling nets, 1983's severe storms and El Nino may provide basis for a better judgment about this issue.

The various sea turtles are infrequent visitors from the south and are not commonly observed in the central California area [CCMS, 1982].

The endangered plant, saltmarsh bird's beak, is at the northern limit of its range in coastal marshes of Santa Barbara County. This species has been reported from Goleta Slough, Santa Clara River, Oxnard, and the Point Hueneme to Point Mugu coastal saltmarsh habitat [MMS, 1983], and may occur, although not yet documented, at the Santa Ynez River mouth.

See Section 4.6 and Appendix F for a discussion of the tidewater goby, a candidate for federal listing.

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4.6 TERRESTRIAL AND FRESHWATER BIOLOGY

4.6.1 Overview

The Study Region (shown in Figure 4.6-1) includes western Santa Barbara County and part of southwestern San Luis Obispo County. Some of the last large undeveloped open areas in coastal southern California are found here (e.g., at Vandenberg AFB). Within this region, a major shift in orientation of the coastline, from north-to-south north of Point Conception, to west-to-east south of Point Conception, occurs. Climatic conditions along the unprotected coast north of Point Conception are significantly cooler, moister and windier than to the south. Thus, the area encompasses a major climatic transition zone. The region also is topographically diverse, with coastal dune-wetland complexes, terraces and bluffs and interior valleys making up the lowlands, and uplands that include coastal and interior hills and mountains. The resulting habitat diversity, species diversity and high rate of endemism make this region biologically unique within the state [Smith, 1976; Conservation Element, 1969]. Important biological resources include dunes and wetlands, stream habitats, riparian (streamside) woodlands, relictual (remnant) evergreen forests, vernal pools, Burton Mesa chaparral, oak woodlands and remnant patches of native grassland. These resources and their biotas are discussed in detail in Technical Appendix F, Sections 2.1, 2.2, 2.4, and 2.5.

The onshore Area Study development would occur in a roughly triangular area from Gaviota and Buellton west to Lompoc, located completely within the Study Region. (See Figure 4.6-1.) The eastern boundary is just east of Highway 101. The northern boundary runs through the south-facing slopes of the Purisima Hills, and the southwestern boundary is just west and south of Highway 1. Within the geographic limits of the onshore Area Study, the Purisima Hills, Santa Rita Hills, Santa Rosa Hills and Santa Ynez Mountains support mainly natural communities, with some areas used as grazing lands. Within the Santa Rita Valley (along Highway 246) and the Santa Ynez River Valley (along Santa Rosa Road) there are extensive agricultural lands. Highway 1 follows the narrow valley of the El Jaro and Salsipuedes creeks (tributaries of the Santa Ynez River), which contains some grazing land and small areas of agricultural land. Significant biological features for the geographic limits of the onshore Area Study are discussed in Section 4.6.3 and in Technical Appendix F, Section 3.0.

The Project Area encompasses Proposed and Alternate Pipeline Route corridors and facility sites and areas in the immediate vicinity of these. (See Figure 4.6-1 for project layout.) Significant biological features of the Project Area include:

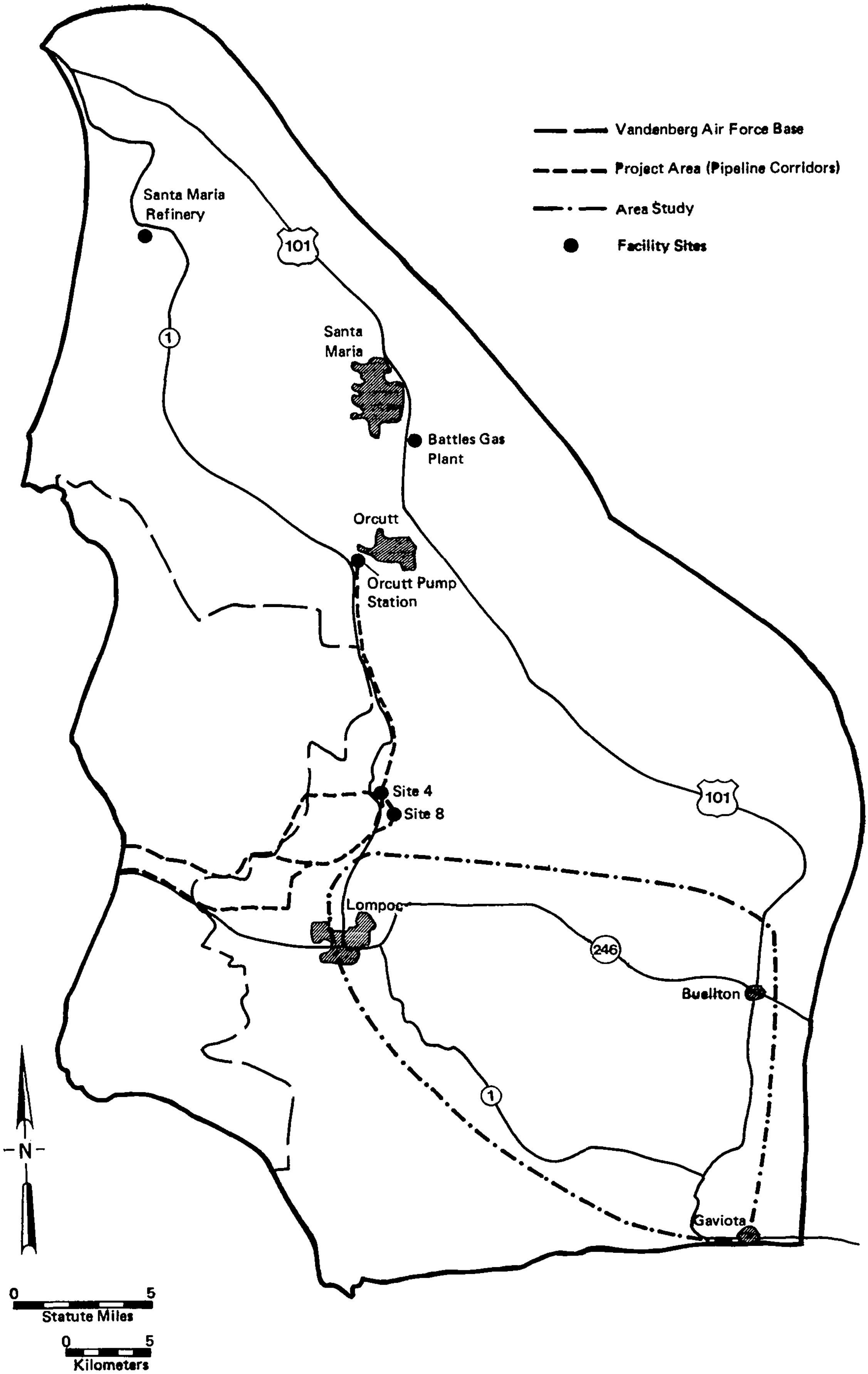

FIGURE 4.6–1 GEOGRAPHIC LIMITS OF THE STUDY REGION, ONSHORE AREA STUDY AND PROJECT AREA.

- Coastal beach and dune habitat near the Santa Ynez River mouth that supports rare plants (see Section 4.6.2.1 for meaning of "rare plant" as used in this report) and is used seasonally by the federally- and state-listed California Least Tern (roosting), California Brown Pelican (roosting), and American Peregrine Falcon (feeding), and by the regionally rare Snowy Plover (breeding, feeding), is found within the Proposed and Alternate Pipeline Route corridors near landfall.

- Coastal wetlands and riparian woodlands near the Santa Ynez River mouth that include a nesting site and feeding area for the federally- and state-endangered California Least Tern and harbor about 18 additional species of rare plants, amphibians, birds and fish, and are protected by Santa Barbara County policy [Local Coastal Plan, 1982], are within and in the vicinity of the Proposed and Alternate Pipeline Route corridors near landfall.

- San Antonio Creek, a perennial stream listed in the Santa Barbara County Conservation Element [Comprehensive Plan, 1979] and habitat of the unarmored threespine stickleback (<u>Gasterosteus aculeatus williamsoni</u>), federally-listed as endangered, and the tidewater goby (<u>Eucyclogobius newberryi</u>), a candidate for federal listing, is crossed by the proposed pipeline route north of the proposed site of the Lompoc Dehydration Facility. The crossing location is about 1 mile upstream from Barka Slough, the largest and most biologically important riparian-marsh complex remaining in Santa Barbara County.

- The Santa Ynez River, a perennial stream listed in the Santa Barbara County Conservation Element [Comprehensive Plan, 1979] and habitat of the tidewater goby (a candidate for federal listing) is crossed by the Alternate Pipeline Route at the Floradale Avenue bridge.

- Vernal pools (seasonal wetlands) and Monarch Butterfly trees, both protected by Santa Barbara County policy [Comprehensive Plan, 1982], are located near the Proposed and Alternate Pipeline Route corridors.

- Coast Live Oak Woodland, Bishop Pine Forest and Burton Mesa Chaparral, plant communities protected by Santa Barbara County policy [Comprehensive Plan, 1982], the latter two with relatively large numbers of regionally endemic and rare plant species, are transected by the Proposed and Alternate Pipeline Route corridors, especially in the vicinity of Vandenberg Village and through the Purisima Hills.

- Coastal dune habitat that supports about ten species of endemic and rare plants, (including six federal candidate species) regionally rare birds and amphibians, dune ponds and lakes and extensive planted eucalyptus groves suspected to contain a Monarch butterfly overwintering site occur in the vicinity of the Santa Maria Refinery, near Oceano in southwestern San Luis Obispo County.

4.6.2 Characteristics of the Study Region

4.6.2.0 Terrestrial Communities

VEGETATION

The native vegetation of the Study Region is composed mainly of shrub, oak woodland and modified grassland communities, distributed in a mosaic pattern over coastal terraces, dunes and bluffs and through the interior hills. Coastal and interior wetlands, and riparian woodlands, are limited in extent and are usually associated with streams or coastal dunes. Evergreen forest communities are restricted to the moister and cooler mountain environments, such as crests, ravines and north-facing slopes. Forest, dune, oak and riparian woodland, native grassland and wetland communities have decreased in area within the Study Region over time as a result of a combination of factors: 1) a trend toward a warmer, more arid climate over geologic time, 2) changes in the frequency and distribution of wildfire since the advent of man, 3) grazing by non-native herbivores, and 4) agricultural and other development practices, including land clearing and grading.

Over 40 plant species are restricted in distribution (endemic) to the Study Region and about 65 plant species reach their southern or northern mainland distribution limits in this area. Thirty-eight species, most of which are endemic to the Study Region, have been listed by one or more of the U.S. Fish and Wildlife Service's Endangered Species Office, the California Fish and Game's Endangered Plant Program or the California Native Plant Society as rare, endangered or threatened. The term "rare plant," as used in this report, refers to plants listed by one or more of these groups. The listed status and other information are given for all 38 species in Technical Appendix F, Sections 2.4 and 2.5.

PLANT COMMUNITIES

The basic plant community types of the Study Region are described below, and areas within the Study Region that support regionally rare botanical resources are shown in Figure 4.6-2. (Detailed information on these communities and resources can be found in Technical Appendix F, Section 2.1.)

Coastal Strand

This community occupies coastal sandy beaches and foredunes above the high-water mark. It is especially well-represented along the North Coast of Santa Barbara County and into southern San Luis Obispo County, from Point Conception to Pismo Beach. Some of the best-developed and most pristine

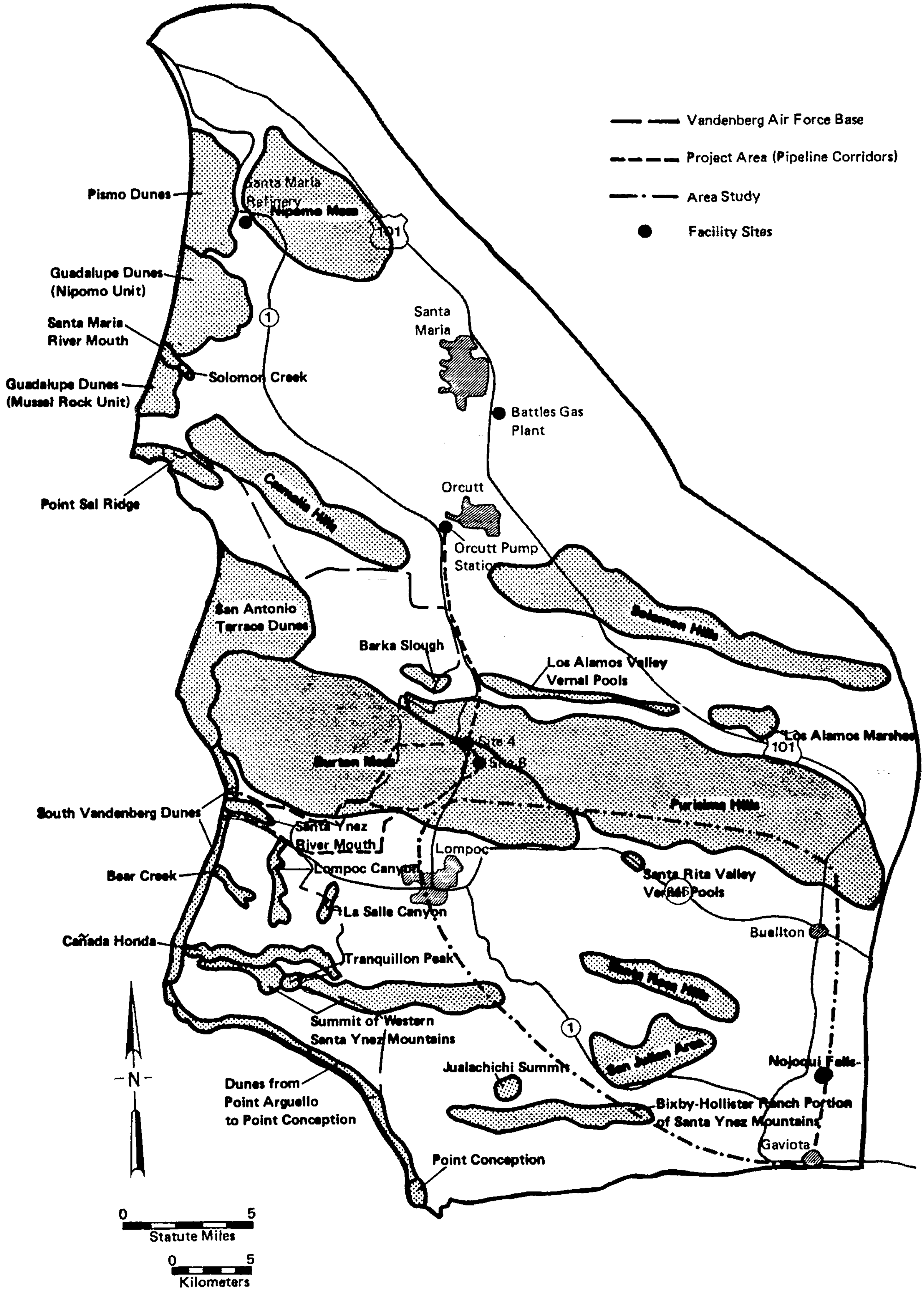

FIGURE 4.6–2 AREAS WITHIN THE STUDY REGION THAT SUPPORT REGIONALLY RARE BOTANICAL RESOURCES

examples in southern California are found at Vandenberg AFB. Dunes are poorly represented along the South Coast. Representative species are low, succulent herbs, including some that form spreading mats. These plants are sensitive to crushing by people and off-road vehicles (ORVs). Disturbance of these communities has resulted in the displacement of native species by exotics such as Ice Plant (Carpobrotus edulis) and Beach Grass (Ammophila arenaria). Surf Thistle (Cirsium rhothophilum) and Beach Spectacle Pod (Dithyrea maritima) are rare plants that are restricted to foredune habitats. Several other rare plant species found here are found within coastal dune scrub of the stabilized backdunes as well.

Coastal Scrub

Three distinctive forms of this community are discussed below. All have a few dominant species in common, but differ markedly in site characteristics and associated species.

- Coastal Bluff Scrub is confined to the immediate coast and occupies sea bluffs and coastal canyon walls. The lack of soil and the exposure to high, salt-laden winds result in a discontinuous vegetative cover and favor succulent species. This community type is well-represented on the South Coast and in rocky areas on the North Coast. It has a few endemic species.

- Coastal Dune Scrub is the dominant vegetation of stabilized backdunes. Shrubs, half-shrubs and herbs make up this community. It has a high proportion of endemics, including rare species such as Crisp Monardella (Monardella crispa), Soft-leaved Indian Paintbrush (Castilleja mollis), Blochman's Leafy Daisy (Erigeron foliosus blochmaniae) and Short-lobed Broomrape (Orobanche parishii brachyloba). It is well-represented north of Point Conception and absent from the South Coast. The best-developed examples are found from San Antonio Terrace at Vandenberg AFB north to the Callender Dunes near Oceano.

- Coastal Sage Scrub is dominated by shrubs such as Coyote Brush (Baccharis pilularis), Coastal Sagebrush (Artemisia californica), and Black, White and Purple sages (Salvia mellifera, S. apiana and S. leucophylla). It occurs on terraces, on canyon sides, and in foothills and extends in some places well inland from the coast. Several locally endemic species are associated with this type. A few of the species have pioneer characteristics and invade disturbed areas such as roadsides and old fields. Some of the grassland along the South Coast probably was Coastal Sage Scrub originally. Grazing is a major ongoing stress.

Grasslands

Grasslands are widespread on coastal plains and terraces and cover lower foothill slopes, and were formerly common in valley bottoms. Native bunch grasses, which dominated these grasslands before the advent of grazing by non-native herbivores, are now restricted to remnant patches. Native grasslands are protected by Santa Barbara County policy [Comprehensive Plan, 1982]. Most grasslands of the Study Region are dominated now by introduced annual grasses, with native wildflowers as associates. Some grasslands were originally shrub vegetation, now maintained as grassland by grazing and frequent fires. Grasslands of the Study Region have few endemic or rare species.

Chaparral

Chaparral is distributed widely within the Study Region. It covers large expanses of rocky, dry mountain habitat, and extends over sandy and shaley lowland terraces and mesas. The dominant plants are fire-adapted woody shrubs, many with restricted distributions. Lompoc Yerba Santa (Eriodictyon capitatum) and Santa Ynez False Lupine (Thermopsis macrophylla agnina), both state-listed as rare, are associated with chaparral. Burton Mesa chaparral, a form characteristic of sandy Burton Mesa and the nearby Purisima Hills, is noteworthy for the high rate of endemism in its flora; more than 20 plant species found in this community have restricted geographic distributions, including rare plants such as Shagbark Manzanita (Arctostaphylos rudis), Seaside Bird's-beak (Cordylanthus rigidus littoralis), Black-flowered Figwort (Scrophularia atrata) and Hoover's Bentgrass (Agrostis hooveri).

Oak Savannah and Woodland

Oak woodlands dominated by Coast Live Oak (Quercus agrifolia) cover many lower coastal slopes and canyons and moist interior hills. The trees in some places form a continuous canopy (woodland), while in others they occur as scattered individuals (savannah) in association with grassland, coastal sage scrub and chaparral species. Oak savannah, with widely spaced trees, often of Valley Oak (Quercus lobata) occurs on deep soils of inland valleys. Oak reproduction over large areas is limited by current land uses, and oak trees are protected by Santa Barbara County policy [Comprehensive Plan, 1982]. The rare Hoffmann's Snakeroot (Sanicula hoffmannii) is found in oak woodland.

Evergreen Forests

These include mixed evergreen forest, closed-cone pine forests and Douglas fir forest, all composed of dense aggregations of broad-leaved evergreen trees and conifers. In the Study Region these are restricted to small areas of cool, moist habitat on mountain crests, north-facing slopes and sides of deep, shaded canyons. Some communities are associated with unusual soil types that discourage competing vegetation (e.g., the Bishop Pine Forest on the crests of the Purisima Hills). These forests are relictual (remnant) within the Study Region, having had a much greater distribution in the area during the pluvial period of the Pleistocene epoch. A number of endemic and rare plant species occur in evergreen forest communities.

Coastal Wetlands

Well-developed coastal wetlands that include freshwater, transitional (estuarine) and saltwater habitats are found near the mouths of the Santa Ynez and Santa Maria rivers and San Antonio Creek. Coastal freshwater ponds are frequent among dunes on San Antonio Terrace (within Vandenberg AFB) and south of Oceano. Vernal pools occur near the coast as well as inland. Estuaries are characterized by low-growing, often succulent species that exhibit zonation according to salinity and soil moisture gradients. Freshwater habitats support a diverse array of perennial herbs, including many tall reed-like plants, and rare species such as Gambel's Watercress (Nasturtium gambelii) and La Graciosa Thistle (Cirsium loncholepis). Coastal wetlands are sensitive to sedimentation, water pollution, terrestrial and marine oil spills, trampling and human activities that alter the influx of fresh or salt water. Several endemic species occur in coastal wetland habitats within the Study Region. Coastal wetlands have suffered significant declines in area and quality both locally and statewide [Smith, 1976; Jensen, 1983]. They are protected by the California Coastal Act [1976] and by Santa Barbara County policy [Comprehensive Plan, 1982; Local Coastal Plan, 1982] because of their ecological importance, sensitivity, and limited areal extent.

Riparian Woodland

These streamside woodlands, dominated by dense growths of tall deciduous trees and shrubs, vary from narrow bands in stream canyons to extensive floodplain groves. Even though all perennial and some intermittent streams of the Study Region support riparian woodland, the community is limited in area and has been much reduced throughout southern California by human activity [Jensen, 1983]. The riparian community is protected by Santa Barbara County policy [Comprehensive Plan, 1982] because of its value as essential wildlife habitat and importance as a buffer against flooding and erosion.

Interior Wetlands

These include freshwater upstream marshes and sloughs, and inland vernal pools, seeps and marshy places. Important plants include emergent and submergent aquatic and semi-aquatic species. A few widely scattered vernal pools, all with one or more vernal pool endemic species of restricted range, occur within the Study Region. All interior wetlands are important as essential wildlife habitat and as traps and filters for sediments and pollutants, and are protected by Santa Barbara County policy [Comprehensive Plan, 1982].

Ruderal Vegetation

These are highly disturbed habitats, such as roadsides and vacant lots, dominated by weedy colonizing species that depend on repeated disturbances for their ability to persist.

Agricultural and Other Modified Habitats

Agricultural lands used primarily for vegetables and truck crops are extensive within the floodplains of the Santa Maria and Santa Ynez River valleys. These floodplains are also reported to be the world's largest center for flower seed production [Shipman, 1972]. Vineyards cover many acres of the interior valleys, terraces and lower foothills. Large stands of planted eucalyptus are found in the northern part of the Study Region and smaller stands of planted trees are scattered throughout. Some livestock grazing occurs in most habitats of the Study Region, and heavily used wet pastures are especially frequent in the vicinity of Santa Maria.

WILDLIFE

Wildlife species distributions are determined largely by the distributions of their preferred habitats. Many wildlife species are restricted to one or a small number of plant communities, and often require additional special environmental features (e.g., rocky cliffs as nesting sites for certain birds) in order to complete their life cycles. Thus, areas like the Study Region, characterized by a high degree of topographic complexity and a large variety of plant community types, provide considerable wildlife habitat diversity. This habitat diversity, along with its geographic location in a climatic transition zone and relatively undisturbed condition, are factors that contribute to the diverse assemblage of amphibians, reptiles, mammals, and especially birds found within the Study Region. The following discussion of Study Region wildlife is organized mainly by plant community-based habitat types. (See Technical Appendix F, Section 2.2, for more detailed information.) Table 4.6-1 provides general summaries of species diversity in some habitats discussed below. Common names used for birds are standardized by the American Ornithologist's Union [1983].

Wildlife of Coastal Beach and Dune Habitats

Sandy beach areas are important habitats for large numbers of shorebirds, gulls and feeding land birds, although few birds nest there (e.g., Brewer's Blackbird, House Finch). Much sandy beach within the Study Region is heavily disturbed by recreational use, especially along the South Coast. The most protected beaches are at Vandenberg AFB, and these support the only breeding localities remaining in the County for the federally-listed as endangered California Least Tern and the locally declining Snowy Plover. (See also Section 4.5.2.6.) Foredunes with coastal strand vegetation attract few birds. Coastal beach and dune habitats support a subset of reptiles, amphibians and mammals characteristic of coastal scrub (see below).

Wildlife of Coastal Scrub Habitats

This habitat is well-developed along the coast and extends considerably inland within the Study Region. Coastal dune scrub, found only along the North Coast and in southwestern San Luis Obispo County, is characterized by relatively few breeding birds (e.g., Bewick's Wren, California Thrasher and White-crowned Sparrow). Coastal sage scrub is more extensive, and includes as breeders California Quail, Anna's Hummingbird, Song Sparrow and towhees,

Table 4.6-1

NUMBER OF WILDLIFE SPECIES UTILIZING HABITAT TYPES IN THE PROJECT AREA[1]

General Habitats	Number of Species[2] Amphibians	Reptiles	Mammals	Birds
Coastal Scrub	3	12	31	61
Chaparral	3	15	30	61
Grassland	6	7	19	62
Riparian Woodland	8	13	29	114
Oak Woodland/Savannah	7	12	31	94
Evergreen Forests	4	8	28	90
Wetlands (Salt & Freshwater)	5	8	20	153
Agricultural/Modified	5	4	17	144

[1] For full species lists see Technical Appendix F, Appendices 1, 2 and 3.
[2] Includes all species expected to occur within the Project Area (bat species not included due to lack of data).

Greater Roadrunner (mainly North Coast), and along the North Coast only, Costa's Hummingbird, and Rufous- and White-crowned Sparrows. Amphibians are scarce in coastal scrub, but reptiles are abundant, especially lizards and snakes. Small mammals (shrews, rats and mice) are abundant, and larger mammals such as rabbits, Coyote (Canis latrans), Raccoon (Procyon lotor), Gray Fox (Urocyon cinereoargenteus), Long-tailed weasel (Mustela frenata), skunks and bobcat (Felis rufus) are common. The Ringtail (Bassariscus astutus), an uncommonly encountered state-protected mammal, may occupy sites in this habitat near water and rocky outcroppings.

Wildlife of Grassland Habitats

Grasslands are well-developed along the coast at Hollister Ranch and inland in the Santa Maria Valley and Casmalia Hills, and occur in small patches throughout the Study Region. These altered grasslands (see discussion under vegetation) are characterized by the House Finch, Savannah Sparrow (winter only) and Western Meadowlark. A variety of raptors, including the protected Black-shouldered (White-tailed) Kite, feed in grasslands. In the Santa Maria Valley, irrigated short-grass pastures are used by large numbers of Long-billed Curlews and other shorebirds, Horned Larks and Water Pipits. Grasslands in the vicinity of Point Sal Ridge (just north of Vandenberg AFB) are possibly the only remaining breeding locality on the North Coast for the Grasshopper Sparrow. Grasslands support large rodent populations, which are an important food source for raptors and carnivores such as the Coyote, Long-tailed Weasel, regionally declining Badger (Taxidea taxus) (North Coast mainly), Gray Fox and Bobcat. Mule Deer (Odocoileus hemionus) are abundant grazers in grassland. Few amphibians, but a number of reptiles (mainly snakes) occur here.

Wildlife of Chaparral Habitats

Chaparral is widespread throughout the Study Region. Characteristic lower elevation birds include the Greater Roadrunner, Anna's Hummingbird, Bewick's Wren, Wrentit, California Thrasher, towhees and Lesser Goldfinch. This habitat is too arid for most amphibians, but supports a large diversity of lizards and snakes. Many species of small mammals, and hence, a number of large, wide-ranging carnivores, such as Gray Fox, Coyote, Bobcat, Striped Skunk (Mephitis mephitis) and the state-protected Ringtail and Mountain Lion (Felis concolor) are found here.

Wildlife of Oak Woodland Habitats

Oak woodland is localized along the immediate coast, but covers many north-facing slopes within the Study Region. Over 65 species of vertebrate wildlife utilize Coast Live Oaks. Characteristic birds of oak woodland include the Band-tailed Pigeon (South Coast only), Acorn and Nuttall's woodpeckers, Western Flycatcher (summer only), Scrub Jay, Plain Titmouse, Bushtit, Hutton's Vireo and several warblers. Oak savannah, with widely spaced trees, supports the Turkey Vulture, Red-tailed Hawk, Yellow-billed Magpie, Western Bluebird, blackbirds and other bird species. Moist, shaded environments beneath the oaks harbor comparatively diverse populations of amphibians, (salamanders, frogs) as well as reptiles (snakes, lizards). Many small mammals such as mice, Botta's Pocket Gopher (Thomomys bottae), Broad-footed Mole (Scapanus latimanus) and Dusky-footed woodrat (Neotoma fuscipes) and larger, wide-ranging species such as the Coyote, Gray Fox, Raccoon, skunks, Bobcat, Feral Pig (Sus scrofa), Mountain Lion and Mule Deer frequent oak woodlands and savannahs.

Wildlife of Evergreen Forests

These are small, widely scattered forests of moist mountain environments. No localized or unique bird populations are found here. These forests contain a depauperate herpetofauna, with few species in low abundance. They support a variety of land mammals, including small mammals (shrews, rats, mice) and larger species (rabbits, Coyote, Gray Fox, Raccoon, skunks and Bobcat). Mule Deer are common in these forests. The regionally rare and declining Western Gray Squirrel (Sciurus griseus) occurs in evergreen forests on Vandenberg AFB and in the Purisima Hills.

Wildlife of Coastal Wetland Habitats

The best examples of these within the Study Region are the estuaries at the mouths of the Santa Ynez and Santa Maria rivers, used by the federally-listed Brown Pelican (roosting) California Least Tern (breeding, feeding) and American Peregrine Falcon (feeding). These habitats support large concentrations of migrant and wintering herons, waterfowl, shorebirds, gulls and terns. Coastal salt marsh is the preferred habitat of the federally-listed Light-footed Clapper Rail (South Coast only) and the state-protected Belding's Savannah Sparrow. Reptile and amphibian abundance and diversity are low. Shrews, mice and voles are common small mammals. Characteristic large mammals include the Black-tailed Jackrabbit (Lepus californicus), California Ground Squirrel (Spermophilus beecheyi), Coyote, Raccoon and Long-tailed Weasel.

Wildlife of Riparian Woodland

These woodlands have been much reduced in Santa Barbara County during the present century, especially along the South Coast. Extensive areas remain along the Santa Ynez and Santa Maria rivers and San Antonio Creek. These North Coast riparian areas support a large, diverse complement of migrant and breeding birds, including several whose local populations have declined significantly in recent years (Cooper's Hawk, Swainson's Thrush, Warbling Vireo, Yellow Warbler, Yellow-breasted Chat) or have been extirpated as breeders along the South Coast (Tree Swallow, Wilson's Warbler) or have been extirpated as breeders within Santa Barbara County (Long-eared Owl, Yellow-billed Cuckoo, Willow Flycatcher). Many other birds are abundant, including species normally associated with foothill and montane woodlands. In contrast to other Study Region habitats, riparian woodlands support a diverse assemblage of amphibians (frogs, toads, salamanders). The Barka Slough area of the San Antonio Creek drainage contains the regionally declining Red-legged Frog (Rana aurora draytonii) and possibly the California Tiger Salamander (Ambystoma californiense). Characteristic reptiles include the regionally declining Western Pond Turtle (Clemmys marmorata), lizards and snakes. Mammal diversity is relatively high. Common small mammals include shrews, mice, woodrats, gophers and ground squirrels. These woodlands provide excellent habitat for larger mammals like Virginia Opossum (Didelphis virginiana), rabbits, weasels, skunks, the Raccoon, Bobcat, Mule Deer and on Vandenberg AFB, Feral Pig.

Wildlife of Interior Wetlands

These include small marshes, ponds and vernal pools scattered throughout the Study Region, habitats that have been much reduced and degraded this century, resulting in extirpation or significant reduction in local breeding populations of White-faced Ibis, American Bittern, rails, Common Gallinule and several passerine nesters. Remaining marshy habitats support large concentrations of migrant and wintering herons, waterfowl, shorebirds, gulls and terns. Marshes and vernal pools provide breeding habitat for toads and frogs. Reptiles include the regionally declining Western Pond Turtle, and snakes. The regionally rare Red-legged Frog, Western Spadefoot Toad and California Tiger Salamander are known from marshes within the Study Region. Small mammals include shrews, mice and voles. Larger mammals such as the Raccoon, Opossum, skunks and weasels are frequent in marshy places. In northern Santa Barbara County are found introduced Muskrat (Odatra zibethica), especially in dune ponds, and Beaver (Castor canadensis), on Vandenberg AFB, especially at Barka Slough.

Wildlife of Agricultural and Other Modified Habitats

The Study Region includes large tracts of agricultural lands, particularly in the Santa Maria and Lompoc areas. These are frequented by birds (Rock Dove, Band-tailed Pigeon, European Starling, Brewer's Blackbird, House Finch and others) and other vertebrate wildlife (frogs, lizards, snakes, ground squirrels, mice, voles, the Coyote, skunks, opossums and the Raccoon) that are relatively tolerant of modified habitats and human presence.

Extensive areas of planted trees, including exotics (eucalyptus, tamarisk, bottlebrush) and species native to California (Monterey Pine, Monterey Cypress) have provided an important new winter food source for such species as Anna's Hummingbird, Ruby-crowned Kinglet, Yellow-rumped Warbler, Dark-eyed Junco and other winter birds. Sewage treatment ponds, settling ponds and reservoirs associated with agricultural lands are frequented by waterfowl and shorebirds and have hosted a large number regional rarities (Semipalmated, Curlew and Stilt sandpipers, Ruff, Franklin's Gull) over the years.

4.6.2.1 Aquatic Habitats and Biota

Freshwater habitats in the Study Region include perennial, intermittent and ephemeral streams, reservoirs, vernal pools, springs, perennial lakes and ponds, and freshwater and brackish marshes. (See Technical Appendix F, Section 2.3.) Streams are the most widely distributed of these. Major drainage networks include those of the Santa Ynez, Santa Maria and Sisquoc rivers and San Antonio Creek. Most of the perennial streams contain fish, including native species such as tidewater goby, several types of threespine sticklebacks, arroyo chub (Gila orcutti), the latter introduced in this area, and prickly (Cottus asper) and staghorn sculpins (Leptocottus armatis), and introduced species that include mosquitofish (Gambusia affinis) and fathead minnows (Pimephales promelas). The unarmored threespine stickleback, federally-listed as endangered, occurs in San Antonio Creek, and the tidewater goby, a candidate for federal listing, occurs in several Study Region streams. Small perennial streams draining the Santa Ynez Mountains often contain rainbow trout (Salmo gairdneri), whose populations are sometimes supplemented with stocking. Large perennial streams, like the Santa Ynez River, once supported extensive steelhead trout (Salmo gairdneri) runs, but only a few anadromous fish are encountered today.

Common invertebrates of perennial streams include a variety of aquatic insects, crustaceans, mollusks (primarily snails) and worms. Often there are pronounced changes from one season to the next in the types of aquatic organisms found in streams of the Study Region. Algae and aquatic plants are common to abundant in these streams.

Natural lakes and ponds are uncommon in the Study Region. A few occur among dunes in the vicinity of Oceano, including Oso Flaco, Little Oso Flaco, Celery, Black and Pipeline lakes. There are no published sources of information on the biota of these aquatic habitats. Vandenberg AFB has a few small lakes and reservoirs that are stocked with a variety of sportfish, primarily largemouth bass, and contain numerous species of aquatic invertebrates, especially insects and crustaceans. Small reservoirs are common in other areas of the Study Region, but no published sources include information on their biota and their significance to local wildlife is undocumented. Vernal pools occur in widely scattered localities within the Study Region, but little published information exists on their biotas. Various zooplankton and midge larvae reach high densities in vernal pools. Springs are located mainly in steeper terrain and contain biota typical of small streams.

Larger streams often pass though marshlands (e.g., Barka Slough on San Antonio Creek) along their inland stretches and most pass through estuarine wetlands at their mouths. The salinity and therefore, biota, of river mouth estuaries are determined largely by winter rainfall levels. Some fish species, particularly the tidewater goby, are largely restricted to estuarine coastal lagoons.

Freshwater habitats in the Study Area have been greatly modified by residential, commercial and industrial development, agricultural land use practices and intense livestock grazing, stream channelization, groundwater pumping, dam construction and water diversions.

4.6.2.2 Rare, Threatened, and Endangered Species

Rare, threatened, and endangered species are protected by one or more of the Federal Endangered Species Act of 1973 (Public Law 93-205, as amended), the California Native Plant Protection Act of 1977, and the California Endangered Species Act of 1970. The California Environmental Quality Act, [January 1984] provides additional protection for unlisted species that meet the "rare" or "endangered" criteria defined in Section 15380 of that Act.

Table 4.6-2 illustrates the state- and federally-listed rare, threatened, and endangered plants, wildlife and fish in the Study Region and Project Area. Table 4.6-3 includes federally-listed and candidate species for which a Biological Assessment is being prepared as part of the Section 7 consultation for this project. (See Technical Appendix F, Section 2.5, for detailed accounts of these species.) A total of 19 plant species, one fish species, and two invertebrate species found in the Study Region are under review for federal listing as threatened or endangered species. These include the tidewater goby, Globose Dune Beetle, Surf Thistle, Black-flowered Figwort, La Graciosa Thistle, Seaside Bird's-beak, Shagbark Manzanita, Nipomo Mesa Lupine (Lupinus nipomensis) and Curly-leaved Monardella (Monardella undulata frutescens), all known to occur within the Project Area, and several others expected there. (See Section 2.5, in Technical Appendix F.)

The following lists include additional rare species that could be protected under CEQA, Section 15380 (there is some overlap with federal and state lists):

- Inventory of Rare and Endangered Vascular Plants of California [California Native Plant Society, 1980, 1981, 1982, 1984]

- California Natural Diversity Data Base Special Plant List [California Department of Fish and Game, 1984]

- "Bird Species of Special Concern in California" [Remsen, 1978] published by the California Department of Fish and Game.

- The National Audubon Society's "Blue List" [Tate and Tate, 1982].

- The California Fish and Game Code prohibition against taking or possession of certain species.

The species listed in each of these are found in tables in Section 2.4 of Technical Appendix F. Species documented or expected in the Study Region, such as the California Newt (Taricha torosa), Red-legged Frog, steelhead trout, Ringtail, Western Gray Squirrel, Badger, Mountain Lion; Black-shouldered (White-tailed) Kite, Willow Flycatcher, Yellow Warbler and additional bird species; and Gambel's Watercress, Hoffmann's Snakeroot, Short-lobed Broomrape and many additional plant species, may be protected in this manner.

4.6.2.3 Summary of Areas of Special Importance

The landfalls and westernmost sections of the Proposed and Alternate Pipeline Routes in the vicinity of Surf are located within the North Coast Planning Area of the Coastal Zone of Santa Barbara County. Pursuant to the Coastal Act of 1976, Environmentally Sensitive Habitat Areas (ESHA) within the Coastal Zone have been mapped by the County [Local Coastal Plan, 1982]. Categories of terrestrial features designated as ESHA found where the Project

Table 4.6-2

STATE- AND FEDERALLY-LISTED RARE, THREATENED OR ENDANGERED PLANTS, WILDLIFE, AND FISH KNOWN OR EXPECTED IN THE STUDY REGION OR PROJECT AREA

Name	Status: Federal	Status: State	Potential Occurrence in Study Region
PLANTS:			
Salt Marsh Bird's Beak	E	E	Carpinteria Marsh; possible occurrence in but no records from North Coast salt marshes (e.g., Santa Ynez River)
Lompoc Yerba Santa	-	R	Chaparral, W. Santa Ynez Mts., Vandenberg AFB, Burton Mesa and near Orcutt (Pine Canyon); expected in Project Area
Santa Barbara False-lupine	-	E	Chaparral, west slopes, Santa Ynez Mts.; not expected in Project Area
Seaside Bird's-beak		E	Found in Burton Mesa Chaparral during field studies conducted for this project (Hochberg, pers. comm.); new record for Santa Barbara County.
WILDLIFE:			
California Brown Pelican	E	E	Frequent in and over nearshore waters in Study Region; rests in groups in several North Coast sites; nearest breeding locality on Anacapa Island
California Condor	E	E	Unlikely; 1-2 pair breed in interior Santa Barbara County
Bald Eagle	E	E	Infrequent in Study Region; transient; former rare breeder along South Coast; winters in vicinity of Lake Cachuma
American Peregrine Falcon	E	E	Historic breeder in Study Region; currently being introduced near Gaviota
Light-footed Clapper Rail	E	E	Local breeder in salt marshes; only location in Santa Barbara County is Carpinteria Marsh; not expected in Project Area. Has nested in the past in Goleta Slough

Table 4.6-2

STATE- AND FEDERALLY-LISTED RARE, THREATENED OR ENDANGERED PLANTS, WILDLIFE, AND FISH KNOWN OR EXPECTED IN THE STUDY REGION OR PROJECT AREA
(continued)

Name	Status: Federal	Status: State	Potential Occurrence in Study Region
Californa Least Tern	E	E	Occasional along nearshore waters in Project Area during migration; summer visitor/breeder on North Coast sandy beaches
Yellow-billed Cuckoo	-	R	Casual transient; very probably former breeder in Study Region
Least Bell's Vireo	-	E	Former breeder in Study Area, now casual visitor
Belding's Savannah Sparrow	-	E	Local breeder and year-around resident in South Coast coastal salt marshes (Goleta Slouth, Carpinteria Marsh); another local form in North Coast salt marshes; not expected in Project Area
FISH:			
Unarmored Threespine Stickleback	E	E	Resident in Study Region (San Antonio Creek below Barka Slough); absent from Project Area

Legend: E = endangered; T = threatened; R = rare.

Study Region: Western Santa Barbara County, southwestern San Luis Obispo County.

Project Area: Vicinity of pipeline and powerline corridors and facility sites; coast at Surf/Santa Ynez River mouth inland (east) to vicinity of La Purisima Mission, then north to Orcutt; also includes vicinity of Battles Gas Plant (Santa Maria) and Santa Maria Refinery (Oceano).

Source: Table 2.5-1 in Technical Appendix F.

Table 4.6-3

FEDERALLY-LISTED AND CANDIDATE SPECIES FOR WHICH A BIOLOGICAL ASSESSMENT IS BEING PREPARED AS PART OF THE SECTION 7 CONSULTATION FOR THIS PROJECT

Name	Federal Status	Occurrence In and Near the Project Area
PLANTS:		
Salt Marsh Bird's Beak (*Cordylanthus maritimus* ssp. *maritimus*)	E	Carpinteria Marsh; possible occurrence in but no records from North Coast salt marshes (e.g., Santa Ynez River mouth)
Beach Spectacle Pod (*Dithyrea maritima*)	2	Back slopes of foredunes at Surf, west of Casmalia, to Mussel Rock near Point Sal, Guadalupe Dunes, Oso Flaco Lake area and Morro Bay.
Black-flowered Figwort (*Scrophularia atrata*)	2	Diatomaceous shale, calcareous and sandy hills from Lompoc, Burton Mesa, Surf, Point Sal, Avila Beach, Point Conception to Coal Oil Point (?) near Goleta.
Brewer's Spineflower (*Chorizanthe breweri*)	2	Chaparral, mainly on serpentine, in southern San Luis Obispo County; southern Santa Lucia Mountains from Morro Creek to east fork of Corral de Piedra Creek.
Crisp Monardella (*Monardella crispa*)	2	Dunes at Surf to Burton Mesa, Purisima Hills, mouth of Santa Maria River, to Oceano.
Curly-leaved Monardella (*Monardella undulata* var. *frutecsens*)	2	Sandy places and stabilized backdunes from Callender to Point Conception.
La Graciosa Thistle (*Cirsium loncholepis*)	2	Marshes near Oceano, near the mouths of the Santa Maria and Santa Ynez rivers and near Los Alamos.
Monterey Spineflower (*Chorizanthe pungens* var. *pungens*)	2	Sandy places on Burton Mesa north of Lompoc and on dunes about Oso Flaco Lake; possibly at Point Sal and about Santa Maria.
Nipomo Mesa Ceanothus (*Ceanothus impressus* var. *nipomensis*)	2	Sandy Nipomo Mesa in chaparral.
Nipomo Mesa Lupine (*Lupinus nipomensis*)	2	Two known populations; near Callender Switching Station and at Jack Lake, both adjacent to Santa Maria Refinery.
Seaside Bird's-beak (*Cordylanthus rigidus* ssp *littoralis*)	1	Found in Burton Mesa Chaparral during field studies conducted for this project (Hochberg, pers. comm.); new record for Santa Barbara County.

Table 4.6-3
(continued)

FEDERALLY-LISTED AND CANDIDATE SPECIES FOR WHICH A BIOLOGICAL ASSESSMENT IS BEING PREPARED AS PART OF THE SECTION 7 CONSULTATION FOR THIS PROJECT

Name	Federal Status	Occurrence In and Near the Project Area
Shagbark Manzanita (*Arctostaphylos rudis*)	2	Scattered about sandy Burton Mesa, Purisima Hills, Lompoc Canyon, Corralillos Canyon (the type locality) near Point Sal and on Nipomo Mesa.
Soft-leaved Indian Paintbrush (*Castilleja mollis*)	2	About stabilized dunes in coastal dune scrub at Point Conception, Point Arguello, Surf, near Casmalia and at Guadalupe Dunes.
Surf Thistle (*Cirsium rhothophilum*)	2	Foredunes, often on sand-accumulating slopes, from Point Conception to Surf, San Antonio Terrace and Guadalupe Dunes; sandy coastal bluffs near Mussel Rock.
INVERTEBRATES:		
Globose Dune Beetle (*Coelus globosus*)	2	Low hummocks in front of foredunes near high tide line; expected in appropriate habitat at Guadalupe Dunes and other nearby dune areas (e.g., at Surf).
Morro Bay Blue Butterfly (*Plebejus icariodes moroensis*)	2	Range is poorly known; has been seen in the Mussel Rock unit of the Guadalupe Dunes; could occur in other areas containing its presumed host plant (*Lupinus chamissonis*), e.g., at Surf.
BIRDS:		
American Peregrine Falcon (*Falco peregrinus anatum*)	E	Historic breeder in Study Region; pair recently introduced at Gaviota; potential breeding area on South Vandenberg AFB.
California Brown Pelican (*Pelecanus occidentalis californicus*)	E	Common visitor to nearshore and offshore waters; most individuals from Mexican population; sizeable numbers (up to 250) sometimes roost at Santa Maria River mouth; occasional at Santa Ynez River mouth.
California Least Tern (*Sterna antillarum browni*)	E	Occasional onshore and along nearshore waters in Study Region during migration; summer breeder on North Coast sandy beaches; several breeding sites at Vandenberg AFB including one near the mouth of the Santa Ynez River.
Light-footed Clapper Rail (*Rallus longirostris lavipes*)	E	Local breeder in salt marshes; only location in Santa Barbara County is Carpinteria Marsh; has nested in the past at Goleta Slough; not expected in Project Area.

Federal Status: E = Endangered; T = Threatened; 1 = Candidate species for which sufficient information exists to support listing; 2 = Candidate species for which additional information is needed.

Area and the Coastal Zone intersect include: dunes, wetlands, a vernal pool, seabird nesting area, native plants and a perennial stream (the Santa Ynez River). (Although the Local Costal Plan [1982] is advisory only at Vandenberg AFB, the project is subject to consistency review by the Coastal Commission).

The Proposed and Alternate Pipeline Routes and the proposed and alternate processing facility sites inland from the Coastal Zone transect or are located within or near the following types of ESHA: wetlands, including streams with riparian woodland, oak-dominated vegetation, Burton Mesa chaparral and Bishop pine forest. These are protected by Santa Barbara County policy [Comprehensive Plan, 1982].

The Santa Maria Refinery is located near Oceano within the Coastal Zone (South Coast Area Plan) of San Luis Obispo County. Biological resources of the surrounding area include an extensive coastal dune-wetland complex that constitutes an important rare plant habitat and extensive planted eucalyptus groves that contain an as yet unverified Monarch butterfly overwintering area.

4.6.3 Significant Biological Features for the Onshore Area Study

The following is a general discussion that indicates regions, within the geographic limits of the onshore Area Study, where natural communities predominate, as opposed to regions where modified habitats, such as agricultural lands and developed areas form most of the land cover. In addition, features of special biological interest are noted. This information is derived mainly from maps, visual reconnaissance of those areas visible from paved roads, and interviews with biologists familiar with the area. The little published information that deals specifically with this area also has been reviewed. Field surveys not within the scope of this project would be required for a site-specific analysis of future development projects, such as the pipeline that will be required to transport Exxon's Shamrock-produced oil to a processing facility outside of the geographic limits of the onshore Area Study.

Within the geographic limits of the onshore Area Study, the Purisima Hills, Santa Rita Hills, Santa Rosa Hills, and Santa Ynez Mountains support mainly native plant communities, with some areas used as grazing lands. The higher slopes are typically covered with dense coast live oak woodlands (especially the north-facing slopes). Moist crests and high ravines support scattered small stands of evergreen forest dominated by such species as Tanbark Oak (*Lithocarpus densiflora*), Bishop Pine (*Pinus muricata*) and California Bay (*Umbellularia californica*). Lower slopes support oak savannah and woodland dominated by either Coast Live or Valley oaks or both, chaparral, coastal sage scrub and grassland composed mainly of introduced annuals. The habitat diversity, remoteness and rugged terrain of these hills, and especially of the Santa Ynez Mountains, suggest that in addition to typical wildlife species, as described in Section 4.6.2, these areas probably harbor a greater number of wide-ranging carnivores (e.g., Gray Fox, state-protected Mountain Lion) than is typical of most of the rest of the Study Region. Western Gray Squirrels are found in the Bishop Pine Forest of the Purisima Hills.

Within the Santa Rita Valley (along Highway 246) are extensive agricultural lands, grazed pastures and annual grasslands. In a few sites coastal sage scrub occupies the valley floor. The more significant biological features of this valley are two vernal pools (possibly the largest pools in Santa Barbara County) near the intersection of Campbell Road and Highway 246 (historically a breeding site for the regionally rare California Tiger Salamander, Red-legged Frog and Western Spadefoot Toad and the extensive riparian woodlands and other wetlands associated with Santa Rosa Creek (a tributary of the Santa Ynez River) and its tributary streams, which are mainly intermittent and ephemeral. Wildlife of the Santa Rita Valley is expected to be typical of agricultural lands, riparian woodland and grazed grasslands, as discussed in Section 4.6.2.

The Santa Ynez River Valley (along Santa Rosa Road) contains extensive agricultural lands, including several vineyards and some grazed grasslands. The most significant biological feature of this valley is the riparian woodlands and other wetlands associated with the Santa Ynez River and its tributary streams, which include perennial, intermittent and ephemeral types. Wildlife of the Santa Ynez River Valley is expected to be typical of agricultural lands, riparian woodland and grazed grasslands, as discussed in Section 4.6.2.

In the southern part of the geographic limits of the onshore Area Study, the drainage of perennial El Jaro and Salsipuedes creeks (along Highway 1) forms narrow, steep-sided canyons interrupted by several small valleys. The canyon walls and slopes above are covered with a complex mosaic of native vegetation, including oak woodland, chaparral, coastal sage scrub and grassland, with well-developed riparian woodland bordering the streams. The small valleys have some agricultural lands. Wildlife here probably resembles that of the hilly and mountainous areas described above, rather than that of the other valleys. Significant biological features of this area include stream-associated wetlands known to harbor regionally rare amphibians and large tracts of rugged landscape dominated by relatively pristine native vegetation where the state-protected Mountain Lion has been sighted.

4.6.4 Characteristics of Project Sites

The following discussion is based on existing information, supplemented by extensive reconnaissance-level and more detailed field observations of the Proposed and Alternate Pipeline Route corridors, proposed and alternate sites for the Lompoc Dehydration Facility and the area surrounding the Santa Maria Refinery and detailed field observations of many selected data collection sites within all habitat types of the Project Area. Further field observations for all disciplines are planned for spring 1985 to further assess the status of rare species that could not be observed during the fall and winter surveys. Important biological resources of the Project Area are shown in Figure 4.6-3. The biological resources of the Project Area are discussed in detail in Technical Appendix F, Section 4.0.

4.6.4.0 Pipeline and Utility Corridors

LANDFALL TO LOMPOC PROCESSING FACILITY SITES

Proposed Pipeline Route to Proposed Site 4

Terrestrial Plant Communities and Wildlife. The landfall of the Proposed Pipeline Route is 0.8 mile north of the mouth of the Santa Ynez River. Just east of the landfall, it crosses a small area of Coastal Strand on foredunes, then proceeds inland near the northern boundary of the floodplain, crossing annual grassland with one vernal pool (just north of the right-of-way). It continues east on the side of the gradual south-facing slope above the floodplain, crossing a large expanse of Coastal Sage Scrub and annual grassland, and further inland, plowed fields and patches of Coast Live Oak Woodland. In the floodplain below the south-facing slope is the coastal lagoon and upstream habitats of the Santa Ynez River, containing a breeding site for the federally-endangered California Least Tern and extensive, dense riparian woodlands that are important bird habitats. Just east of Oak Canyon, near the Lompoc Federal Correctional Institution, the route turns north and ascends a steep, south-facing slope along a firebreak with Burton Mesa Chaparral and scattered Coast Live Oak trees on either side. It continues east then north across Burton Mesa, following firebreaks that pass through Burton Mesa Chaparral with scattered Coast Live Oak trees, turning east about two and a half miles due west of Site 4, passing through Burton Mesa Chaparral, Oak Woodland, Coastal Sage Scrub and Annual Grassland before reaching the site. Wildlife of these plant communities is expected to be typical, and is discussed in Section 4.6.2. An important fawning area for Mule Deer is located immediately south of the pipeline route, just east of the Santa Ynez River estuary. Vegetation and wildlife for this route are discussed in detail in Technical Appendix F, Section 4.1.1.1.

Aquatic Habitats and Biota. The Proposed Pipeline Route roughly parallels the Santa Ynez River from landfall to the vicinity of the Lompoc Federal Correctional Institution. Sixteen drainages are crossed by this section of the Proposed Pipeline Route, including 11 of special biological significance. The majority of these are ephemeral, with Santa Lucia Canyon classified as perennial. (See also Section 4.3.1.) The pipeline route also passes near several vernal pools, a small pond and several springs. The biota of the Santa Ynez River includes native and introduced fishes, including the federal candidate tidewater goby, and a large variety of invertebrates. The biota of most other freshwater habitats crossed by or in the vicinity of the pipeline route are largely unstudied. Aquatic fauna of the stream in Santa Lucia Canyon and the Santa Ynez River are listed in Technical Appendix F, Appendix 4.

Areas and Species of Special Importance. Of the 40 rare species of plants, invertebrates, amphibians, fishes, birds and mammals expected along this route, 20 have been identified at sites within or near the pipeline corridor during field studies conducted for this project. Coastal strand habitat near landfall supports Surf Thistle, Dune Malacothrix, Blochman's Groundsel and possibly three additional species of endemic and rare plants, and is used by a darkly-colored Savannah Sparrow of uncertain identity that may be the state-listed as endangered Belding's subspecies, and by the

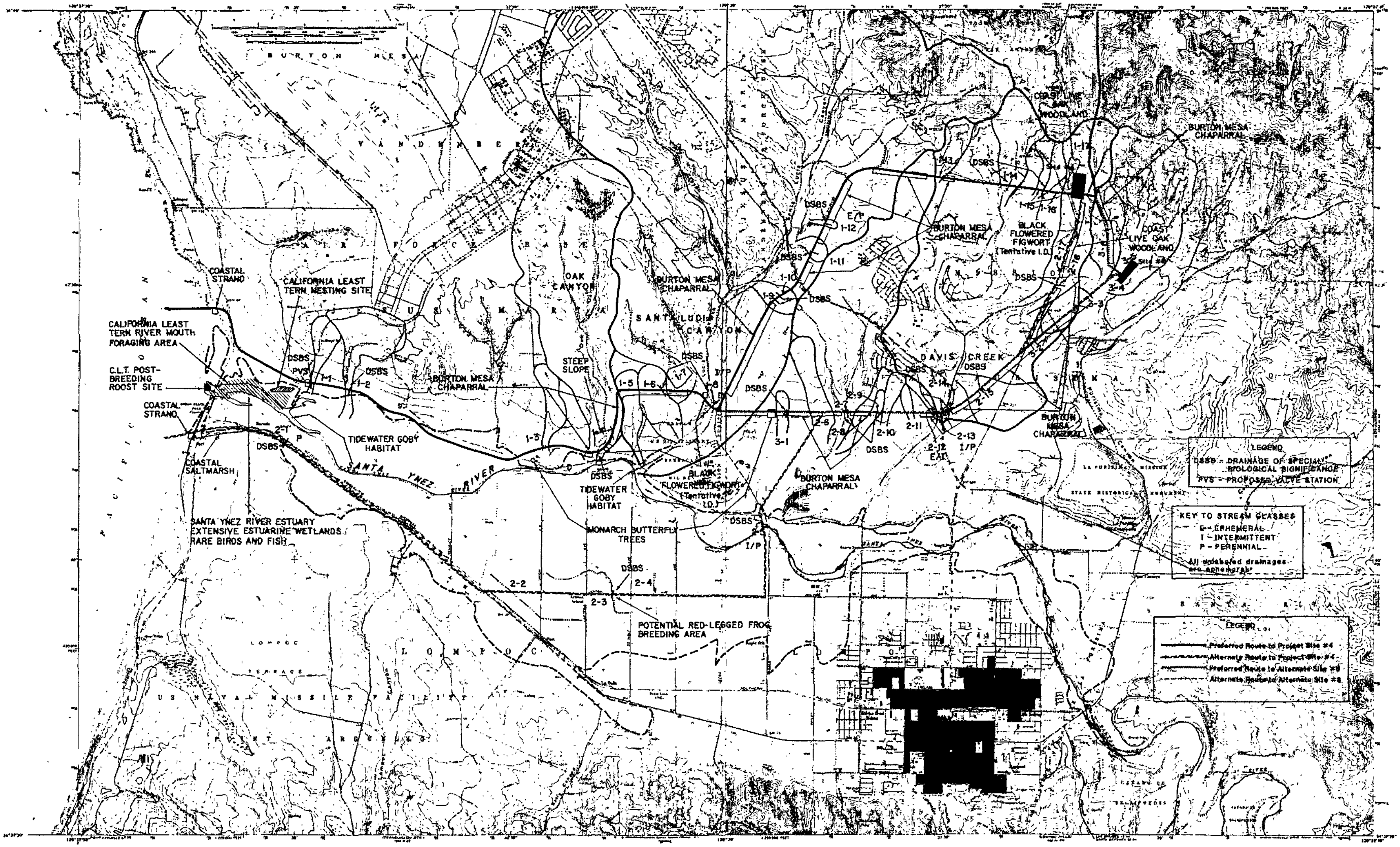

FIGURE 4.6-3 IMPORTANT IMPACT ISSUES FOR TERRESTRIAL AND FRESHWATER HABITATS AND SPECIES

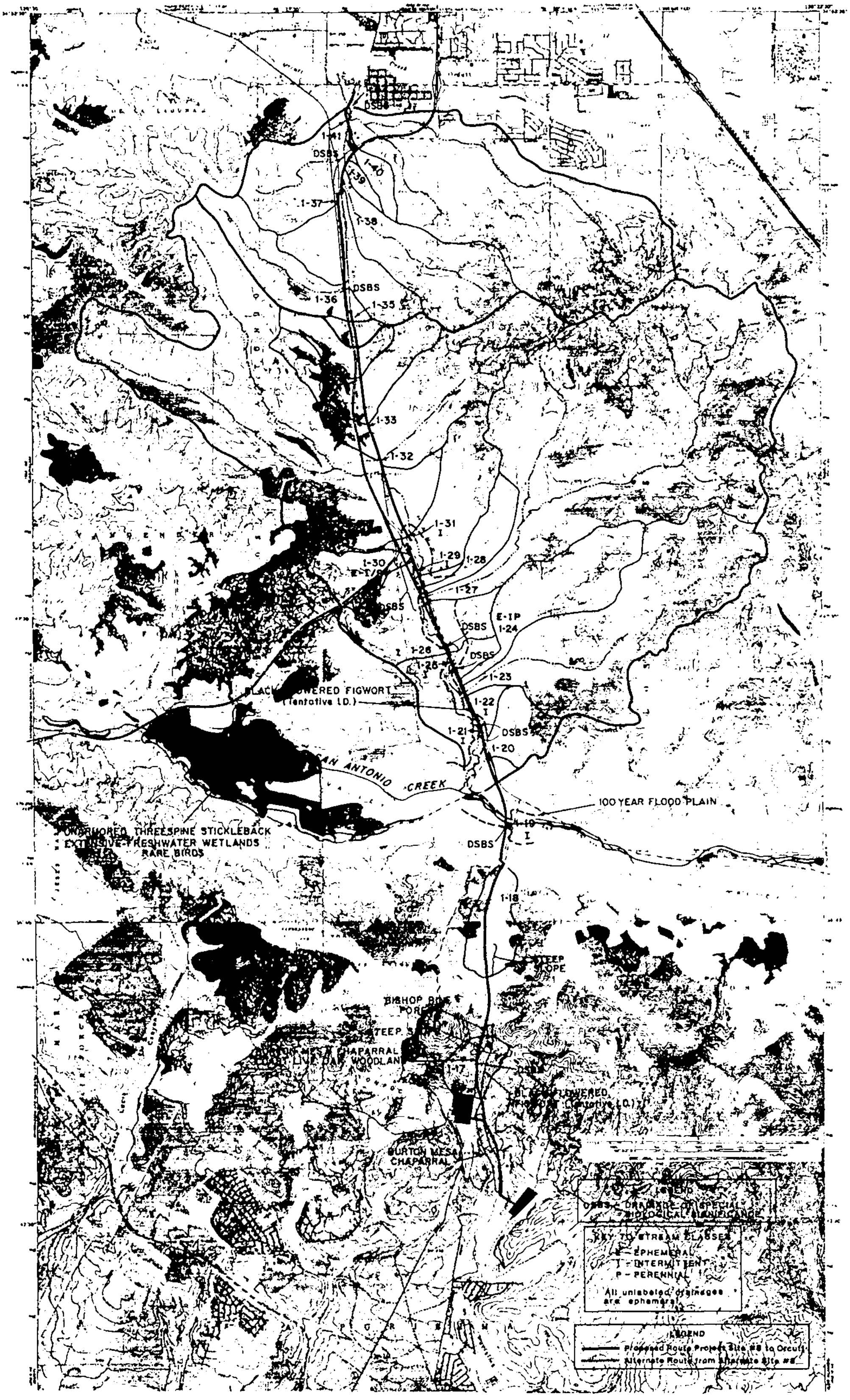

FIGURE 4.6-4 IMPORTANT IMPACT ISSUES FOR TERRESTRIAL AND FRESHWATER HABITATS AND SPECIES

federally-listed as endangered Brown Pelican. Nesting habitat for the federally- and state-listed California Least Tern and regionally rare Snowy Plover occurs near the pipeline corridor. Vernal pools, Riparian Woodland, Coast Live Oak Woodland and Burton Mesa Chaparral, which support a number of rare and endemic plants, provide breeding habitat for rare birds and amphibians and are considered sensitive by Santa Barbara County [Comprehensive Plan, 1982] are transected by the pipeline route corridor. Endemic and rare plants found within the right-of-way in Burton Mesa Chaparral include Shagbark Manzanita, Purisima Manzanita, Santa Barbara Ceanothus, Coast Ceanothus, Annual Curly-leaved Monardella, San Luis Obispo Wallflower, Black-flowered Figwort and Seaside Bird's-beak.

Primary Pipeline Route to Alternate Site 8. This route is identical to the proposed route to proposed Site 4 until Santa Lucia Canyon, where the route to Site 4 branches to the north and the primary route to alternate Site 8 continues east. From that point it crosses through Riparian Woodland, a small marsh, Burton Mesa Chaparral with scattered oaks, dense Coast Live Oak Woodland, Coastal Sage Scrub and a small area of agricultural land before reaching Site 8. Wildlife of these plant communities is expected to be typical, and is described in Section 4.6.2. Twenty-four drainages are crossed by this route from landfall to Site 8, with Santa Lucia Canyon and Davis Creek classified as perennial, and the others as ephemeral. (See also Section 4.3.1.) Thirteen of these drainages are considered biologically significant. Two springs are near this portion of the pipeline route. The biotas of these streams and springs include various invertebrates, mainly insects. The species of rare and endemic plants found within the right-of-way of this route are the same as those of the proposed route to Site 4. As for the proposed route to Site 4, 40 rare species of plants, invertebrates, amphibians, fishes, birds and mammals are expected to occur along this route, of which 20 have been identified during field studies conducted for this project.

Alternate Pipeline Route to Proposed Site 4

Terrestrial Plant Communities and Wildlife. The landfall of this route is 0.3 mile south of the mouth of the Santa Ynez River. From this point the route extends inland (east), crossing Coastal Strand on foredunes, and disturbed land near the railroad tracks (which it crosses), then extends north, then east, passing through Coastal Saltmarsh on the southern edge of the Santa Ynez River estuary. The route then crosses Coastal Sage Scrub until it reaches the northern edge of Highway 246. It runs between the highway and the railroad tracks inland (southeast) to 0.5 mile west of Central Avenue. Along this stretch the corridor passes through dense willow tree thickets and further inland, agricultural land used mainly for flower seed production. The route turns east 0.5 mile west of Central Avenue, crosses a field and then parallels Central Avenue. Along Central Avenue the Alternate Pipeline Route crosses agricultural lands that produce a variety of field and truck crops and flowers grown for seed. The route follows Central Avenue to Floradale Avenue, where it turns north and follows Floradale, crossing Riparian Woodland and other river-associated wetland habitats as it traverses the Santa Ynez River. Just north of the river crossing it turns northeast, ascends a gradual slope within the Lompoc Federal Correctional Institution covered with Coastal Sage Scrub and Annual Grassland and joins the primary route to Alternate Site 8, passing through Burton Mesa Chaparral with scattered oaks, a small marsh, dense Coast Live Oak Woodland, Riparian Woodland and Coastal Sage Scrub as it continues east, then north along Highway 1 before reaching Site 4. A diverse complement of wildlife species utilizes the coastal wetlands at the mouth of the Santa Ynez River, 0.3 mile north of landfall. Further inland, wildlife communities typical of agricultural lands and native plant communities listed above, as discussed in Section 4.6.2, are expected.

Aquatic Habitats and Biota. Aquatic habitats crossed by this route include seasonally flooded Coastal Saltmarsh on the southern margin of the Santa Ynez River estuary, the perennial Santa Ynez River at the Floradale Avenue bridge, two additional perennial drainages and 14 intermittent and ephemeral streams. (See also Section 4.3.1.) Of these 17 total, 12 are considered to have special biological significance. The biota of the Santa Ynez River and estuary have been discussed above under the proposed route to Site 4, and that of the ephemeral streams is unknown. A small brackish marsh along Highway 246 near the coast and a small freshwater marsh on the south side of Central Avenue, 0.3 mile east of Artesia Avenue, are also within the pipeline corridor.

Areas and Species of Special Importance. Thirty-five rare species of plants, invertebrates, amphibians, fishes, birds and mammals are expected to occur along this route, of which 17 have been identified during field studies conducted for this project. Most of these are found in the vicinity of the Santa Ynez River and estuary, or in Burton Mesa Chaparral. The coastal wetlands in the vicinity of the Santa Ynez River mouth are used by the federally and state-listed Brown Pelican (roosting) and California Least Tern (breeding, feeding), and may harbor the federally- and state-listed Light-footed Clapper Rail, although the latter is unlikely. Salt Marsh Savannah Sparrows of uncertain identify seen in this area may be the state-listed Belding's subspecies. The tidewater goby, a candidate for federal listing, is found in the estuary. The estuary also is an important habitat for waterfowl and shorebirds. Regionally rare amphibians breed in the Santa Ynez River. Riparian Woodland, Burton Mesa Chaparral and Oak Woodland are considered sensitive habitats by Santa Barbara County [Comprehensive Plan, 1982; Local Coastal Plan, 1982]. Endemic and rare plants found within the right-of-way in Burton Mesa Chaparral include Shagbark and Purisima Manzanitas, Annual Curly-leaved Monardella, Black-flowered Figwort and Seaside Bird's-beak (identity being determined by expert).

Alternate Pipeline Route to Alternate Site 8. This route is identical to the Alternate Route to proposed Site 4 until it reaches Highway 1, where this route crosses the highway (the other Alternate Route follows it north) and passes through Burton Mesa Chaparral, Oak Woodland, Coastal Sage Scrub and a small area of dry-farmed agricultural land before reaching Site 8. East of Highway 1 this route is identical to the primary route to Site 8. Wildlife is expected to be typical of these habitats, as discussed in Section 4.6.2. Eighteen drainages are crossed by this route from landfall to Site 8, including the Santa Ynez River and two additional perennial streams. (See also Section 4.3.1.) Eleven of these are considered to be of special biological significance. As for the Alternate Route to proposed Site 4, 35 species of rare plants, amphibians, fishes, invertebrates, birds and mammals are expected to occur along this route, of which 17 have been identified during field studies conducted for this project.

Transmission Line Routes

The proposed transmission line route is nearly identical to the Alternate Pipeline Route from landfall to the intersection of Central and Floradale avenues. From this intersection the transmission line route continues east into Lompoc (the Alternate Pipeline Route turns north and follows Floradale Avenue), crossing fields used mainly for flower seed production. Wildlife is expected to be typical of agricultural and other modified habitats, as discussed in Section 4.6.2. (See also Technical Appendix F.)

The alternate transmission line route is the same as the Proposed Pipeline Route from landfall to its intersection with Union Fee Property east of Santa Lucia Canyon. From that point the alternate transmission line route follows the primary pipeline route to Site 4 east to the intersection with a Pacific Gas and Electric line just east of Highway 1. Vegetation and wildlife communities, aquatic habitats and biota and areas and species of special importance are the same as those described above for these sections of the proposed and primary pipeline routes.

PROPOSED PIPELINE ROUTE FROM LOMPOC PROCESSING FACILITY (PROPOSED SITE 4) TO ORCUTT PUMP STATION

Terrestrial Plant Communities and Wildlife

This route extends north from proposed Site 4 through the Purisima Hills, crossing Coastal Sage Scrub and Annual Grassland at the southern base of the hills, dense Coast Live Oak Woodland on the lower slopes, Bishop Pine Forest, Burton Mesa Chaparral on the upper slopes and crests, and Coastal Sage Scrub and Annual Grassland with scattered oaks on the lower northern slopes. From the northern base of the hills, the route continues north across agricultural land used for truck crops, traverses San Antonio Creek, crosses grazed grassland, Coastal Sage Scrub, oak savannah and small patches of willows, then parallels Graciosa Road, crossing scattered freshwater wetlands in drainages, several miles of vineyards and agricultural land used for truck crops, scattered small wetlands and grazed grassland. The route crosses Highway 135 just northeast of its intersection with Highway 1, then transects grassland, Riparian Woodland and Oak Woodland before reaching the Orcutt Pump Station. This area is known locally for supporting a high density and diversity of raptors. In general, wildlife communities are expected to be typical for the plant communities listed above, as discussed in Section 4.6.2. (See also Technical Appendix F, Sections 4.1.2.0 and 4.1.2.1.)

Aquatic Habitats and Biota

Twenty-six drainages are crossed by this section of the pipeline route. Most of these are ephemeral, with San Antonio Creek classified as intermittent, and a tributary of Harris Creek classified as perennial where they intersect the pipeline route. Fourteen of these are considered to be of special biological significance. San Antonio Creek is perennial from Barka

Slough (about 1 mile downstream from its intersection with the pipeline route) to the Pacific Ocean. San Antonio Creek supports an aquatic flora and fauna typical of coastal streams in southern central California, except at Barka Slough (see discussion below). Several small agricultural impoundments also occur along the pipeline route. (See also Technical Appendix F, Section 4.1.2.2.)

Areas and Species of Special Importance

Twenty rare species of plants, amphibians, fishes, birds and mammals are expected to occur along this route, of which 13 have been identified during field studies conducted for this project. Bishop Pine Forest, Burton Mesa Chaparral, Riparian and Oak Woodlands, and stream habitat are protected by Santa Barbara County policy [Comprehensive Plan, 1980]. The Barka Slough area of San Antonio Creek is characterized by ponds, extensive marshy wetlands and undisturbed riparian habitat that support diverse terrestrial and aquatic plant and wildlife communities. The unarmored threespine stickleback, federally-listed as endangered, and the tidewater goby, a candidate for federal listing, inhabit the perennial portions of San Antonio Creek, including the Barka Slough area and an upstream section near Los Alamos for the stickleback and from the coastal lagoon to the Lompoc-Casmalia Road bridge for the goby. While the habitat is appropriate for the state-listed Least Bell's Vireo and it may have nested there in the past, there are no substantiated recent records of this species nesting at Barka Slough. At least nine other protected or regionally rare wildlife species are known from or expected to occur at Barka Slough. The rare and endemic plants, Shagbark and Purisima manzanitas, Santa Cruz Island Oak, and Black-flowered Figwort and regionally rare Western Gray Squirrels occur in Bishop Pine Forest in the Purisima Hills. (See also Technical Appendix F, Section 4.1.2.3.)

4.6.4.1 Lompoc Dehydration Facility Sites

PROPOSED SITE 4

Terrestrial Plant Communities and Wildlife

Proposed Site 4 is located in a small valley at the base of the Purisima Hills, adjacent to Highway 1. The site proper is covered with Coastal Sage Scrub dominated by Coyote Brush and Coastal Sagebrush and currently is used for cattle grazing. Power lines traverse the site and a road and several oil wells occur on the periphery. The surrounding slopes are covered with Coast Live Oak Savannah and Burton Mesa Chaparral, with Bishop Pine Forest on the hill crests to the north. Wildlife is expected to be typical of these communities, as discussed in Section 4.6.2. (See also Technical Appendix F, Sections 4.2.1.0 and 4.2.1.1.)

Aquatic Habitats and Biota

A small seep on the eastern edge of the site, near the existing road, supports wetland vegetation, but no surface water is present.

Areas and Species of Special Importance

One regionally endemic plant species, Lompoc Sticky Monkeyflower (Diplacus lompocensis), occurs at the site. The site is used as a hunting area by several species of raptors, including Red-tailed and Red-shouldered hawks and American Kestrels Burton Mesa Chaparral, Bishop Pine Forest and Coast Live Oak Savannah occur on slopes adjacent to the site. The regionally rare Badger is resident at the site. (See also Technical Appendix F, Section 4.2.1.3.)

ALTERNATE SITE 8

Terrestrial Plant Communities and Wildlife

Alternate Site 8 is located in a small valley just north of the Mission Hills Development. The site proper is currently used for dry farming. Slopes to the east are covered with Coast Live Oak Woodland and Burton Mesa Chaparral. Wildlife at the site is expected to be typical of agricultural lands as discussed in Section 4.6.2. (See also Technical Appendix F, Sections 4.2.2.0 and 4.2.2.1.)

Aquatic Habitats and Biota

No aquatic habitats are present at Site 8.

Areas and Species of Special Importance

The site and surrounding fields are used as a hunting area by several species of raptors including Red-tailed and Red-shouldered hawks and American Kestrels. Burton Mesa Chaparral and Coast Live Oak Woodland cover slopes to the east. The regionally rare Badger is resident at the site. (See also Technical Appendix F, Section 4.2.2.3.)

ALTERNATE SITE 2

Most of alternate Site 2 consists of an agricultural field, with a large pond at its southern end. The slopes above are covered with coastal sage scrub, Burton Mesa chaparral and a few small areas of Coast Live Oak woodland. The pond is fed by several springs, as well as runoff from within a small basin. Freshwater marsh vegetation with high species diversity is associated with this pond and nearby wet soil areas. This wetland is large enough and of high enough quality to support two regionally rare and declining amphibians, the California Tiger Salamander and the Red-legged Frog. Sampling in spring, 1985, will determine the presence or absence of these species. In other habitats, the wildlife of alternate Site 2 is expected to be typical, as discussed in Section 4.6.1. The biota of alternate Site 2 is discussed in further detail in Technical Appendix F, Section 4.2.3.

4.6.4.2 Santa Maria Refinery

TERRESTRIAL PLANT COMMUNITIES AND WILDLIFE

New facilities at the refinery will be located on a concrete pad adjacent to existing facilities. The refinery is surrounded by stabilized backdunes covered with Coastal Dune Scrub dominated by Dune Lupine and Mock Heather and extensive planted forests of eucalyptus. Wildlife is expected to be typical of these habitats, as discussed in Section 4.6.2. (See also Technical Appendix F, Sections 4.3.1 and 4.3.2.)

AQUATIC HABITATS AND BIOTA

A series of freshwater dune ponds and lakes are located west of the refinery. Their biota are undocumented at the present time. Reconnaissance-level field studies will be completed in spring 1983 for several of these ponds as part of the EIR/S effort. (See also Technical Appendix F, Section 4.3.3.)

AREAS AND SPECIES OF SPECIAL IMPORTANCE

Coastal dune scrub near the Santa Maria Refinery is the habitat of at least seven endemic and rare plant species, five of which are candidates for federal listing. Regionally rare and declining birds and amphibians are found in dune-associated wetlands. Eucalyptus groves near the refinery are expected to contain at least one Monarch butterfly overwintering area. Nearby dune ponds may provide breeding habitat for regionally rare amphibians. These ponds and associated marshy areas are important bird habitats, and may provide nesting areas for several regionally declining species. They offer excellent foraging habitat for the federally-endangered California Least Tern and American Peregrine Falcon. (See also Technical Appendix F, Section 4.3.4.)

4.6.4.3 Battles Gas Plant

The Battles Gas Plant will process larger amounts of materials as a result of the project, but no new facilities are planned. The surrounding area includes developed areas and agricultural lands used for truck crops. Wildlife tolerant of human presence, as discussed in Section 4.6.2, are expected in the vicinity. The regionally rare and declining Western Spadefoot Toad may be found nearby. (See also Technical Appendix F, Section 4.4.)

4.6.5 Applicable Regulatory and Institutional Setting

The applicable rules and regulations discussed here are those that were promulgated to protect biological resources.

At the federal level, a number of species that are located in the Study Region are protected by the Endangered Species Act of 1973 [as updated 50 CFR 17.11 and 17.12 January, 1982]. These have been summarized in Table 4.6-3. In accordance with Section 7(c) of the Endangered Species Act of 1973, the MMS and Vandenberg AFB have jointly initiated formal consultation with the U.S. Fish and Wildlife Service. The biological opinions are appended to this Final EIS/EIR. Section 404 of the Clean Water Act and Executive Orders 11988 and 11990 protect wetlands and floodplains.

The California Endangered Species Act of 1970 and California Native Plant Protection Act of 1977 provide protection at the state level. The listed species expected to occur in the Study Region include at least five not protected at the federal level (Table 4.6-4). In accordance with the January 1985 amendments to the California Endangered Species Act, Santa Barbara County, Energy Division, has contacted the California Department of Fish and Game to determine if a consultation is required. CEQA provides additional protection for species that are not state or federally-listed, but which meet criteria of "rare" or "endangered" as defined in Section 15380 of the Act.

In addition, the California Department of Fish and Game Code lists California protected or fully protected species. These species have no bag limit or open season, and therefore cannot be taken or possessed. Exceptions are granted through permits for taking animals for research or that are a demonstrated hazard to livestock or potential threat to humans Sections 1601-1603 of the Code protect instream habitats.

Terrestrial biology-related provisions of the Coastal Zone Act of 1976 are administered at the county level. The County of Santa Barbara has mapped Environmentally Sensitive Habitat Areas (ESHA) within the Coastal Zone. The Environmentally Sensitive Habitat designations on the land use plan and resource maps [Local Coastal Plan, 1982] are recognized by the County as representing "best available information" that might require modification in the future. The regulations outline siting requirements, development restrictions and prohibitions, and impact mitigation requirements for different types of Environmentally Sensitive Habitats. The County of San Luis Obispo has a land use plan, but does not have a certified Local Coastal Plan. Although the policies of the Santa Barbara County Local Coastal Plan [1982] are advisory only at Vandenberg AFB, the project is subject to a consistency review by the California Coastal Commission.

The Santa Barbara County Comprehensive Plan [1982] provides guidelines for land use, conservation and resource management for all of Santa Barbara County.

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4.7 SOCIOECONOMICS

4.7.1 Socioeconomic Study Area Definition

Since this project would potentially involve a number of onshore support facilities in addition to production platforms in the central Santa Maria Basin, the socioeconomic analysis must consider all geographic areas that could be measurably impacted by construction, operations, and related activities.

San Luis Obispo County must be included because of onshore processing facilities and its construction worker labor pool. Santa Barbara County must be included because of onshore processing facilities, a potential supply and crew base (Gaviota) as well as construction and operations workers labor pools. Finally Ventura County must be included because of its supply and crew base (Port Hueneme) and construction and operations worker labor pools.

This analysis focuses on a subarea of the tri-county region consisting of Santa Barbara County, western Ventura County and southern San Luis Obispo County (Figure 4.7-1). This subarea has been defined as the Study Area on the basis of: (1) the location of oil-support and service activities in Ventura and San Luis Obispo Counties, (2) patterns of commuting and local business activities in the three counties, and (3) expected patterns of regional growth as identified in the county general plans. These considerations have led to the exclusion of northern San Luis Obispo County and northern and eastern Ventura County. The Socioeconomics Technical Appendix as well as the impact discussion in the following chapter provide further support for this decision. The decision was also supported by Ventura County and San Luis Obispo County planning officials.*

Santa Barbara has two distinct economic regions, cited generally as the South Coast and North County. Their outer boundaries correspond to County limits, and the dividing line between them is the Santa Ynez Mountains. For the housing issue, the North County is divided further into the Santa Ynez, Lompoc, and the Santa Maria areas. For the public service and public finance issues, impacts are evaluated on the basis of jurisdictional boundaries with separate assessments performed for the County and cities of Santa Barbara, Carpinteria, Lompoc, Santa Maria, and Guadalupe. Cuyama will not be analyzed as a separate region because it represents only 0.5 percent of the County's total population. It will be included in North County total tabulations.

Ventura County is bordered by Kern County to the north, Santa Barbara County to the west, and Los Angeles County to the south and east. Of the ten incorporated cities in the county the fastest growing cities are Oxnard, Simi Valley, Camarillo, Moorpark, Thousand Oaks, and Ventura (San Buenaventura), which also serves as the County seat. The coastal communities of Oxnard, Camarillo, and Ventura are within the Study Area.

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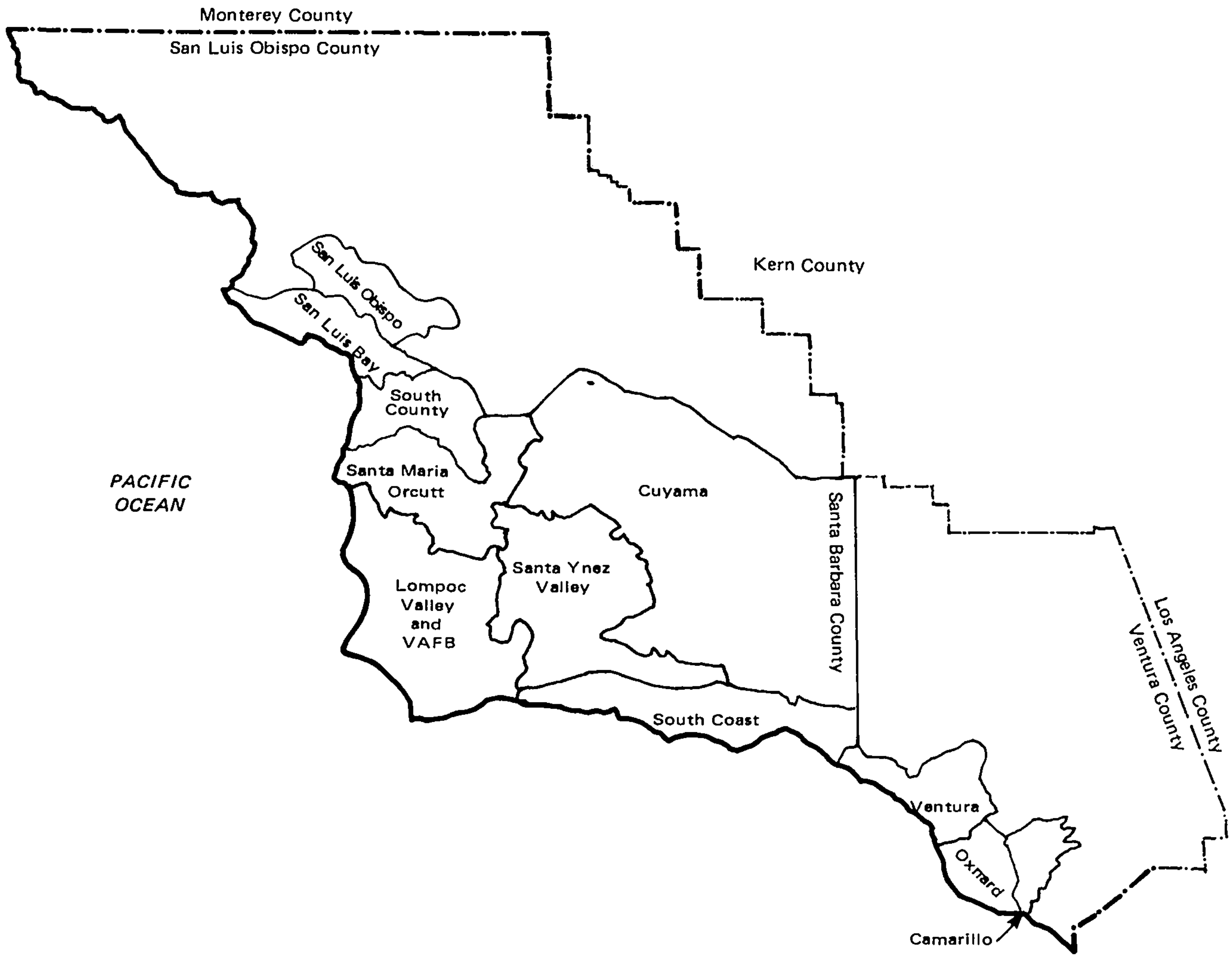
* Patricia Beck, County of San Luis Obispo, and Steve Chase, County of Ventura, meeting November 5, 1984, at Santa Barbara County Energy Office.

FIGURE 4.7-1

TRI-COUNTY REGION AND LOCAL AREAS



The population of San Luis Obispo County is concentrated in four regions which define distinct physical and trade areas: North County, North Coast, San Luis Obispo, and South County. North County contains the communities of San Miguel, Paso Robles, Templeton, Atascadero, and Santa Margarita. North Coast includes the communities of San Simeon, Cambria, Cayucos, Morro Bay and South Bay (the North Coast and Eastern Planning Areas). San Luis Obispo is the major employment and trade center of the County, but also includes the resort community of Avila Beach (the San Luis Obispo Planning Area). South County includes the coastal terrace, upland and near-coast valleys concentrated along Highway 101. The communities of Pismo Beach, Arroyo Grande, Grover City, Oceano, Halcyon and Nipomo (the San Luis Bay and South County Planning Areas) represent this area.

4.7.2 Socioeconomic Issues and Concerns

A number of issues and concerns relating to socioeconomic impacts have been raised in anticipation of potential adverse effects of the proposed project. The issues, taken from the NOP, are briefly summarized as follows:

1. Increased demand for affordable permanent housing.
2. Increased demand for available temporary housing.
3. Influence on tourism (loss of revenue)
4. Increased demand for services/utilities, especially water, fire and police.
5. Landfill availability.
6. Increased revenues to local, state and federal governments.
7. Additional employment.
8. Public hazards in onshore and offshore Project Area.
9. Changes in character of Santa Barbara and San Luis Obispo Counties from agriculture/tourist trade/urban to industrial.
10. Energy balance.
11. Expanded onshore oil development support activities (accelerated activity at existing sites and development of new sites).
12. Changes in property values of private and public property.
13. Compatibility/consistency with local, state or federal plans, goals, or policies.
14. Rezoning of agricultural land (Lompoc facility) to coastal-dependent industry.

15. For oil spills/accidents, influence on tourism.

Existing and projected conditions related to these issues are covered in the following sections that deal specifically with:

- Growth in the local economies;
- Housing;
- Public services;
- Public finance;
- Land use; and
- Energy use.

In the preparation of this section an attempt has been made to exclude the influence of any significant new project that may be planned for the region. Significant new regional projects will be incorporated as part of the cumulative impact analysis.

4.7.3 Growth in Local Economies

Table 4.7-1 presents historical and forecast population and employment for the four Study Areas, South Coast (Santa Barbara County), North County (Santa Barbara County), Ventura County Study Area, and San Luis Obispo County Study Area.

4.7.3.0 South Coast Santa Barbara County Growth

The population growth of the South Coast has slowed dramatically during the last decade, primarily because of local growth restrictions. The 2 percent average annual growth from 1970 through 1975 declined to 0.5 percent during the last half of the decade. In 1983 the South Coast population reached 173,958, a 0.6 percent/year increase over the 1980 population. The population growth is expected to further slow to 0.3 percent/year yielding a population of 180,521 in the year 2000.

In 1980 more than 85,000 people were employed on the South Coast. The general outlook is for slow but sustained growth for the economy of Santa Barbara County over the next 15 years. A 0.9 percent average annual growth is expected from 1980 through the year 2000. Overall economic development is significantly constrained by water availability and limited land development with consequent limited construction of new housing.

A detailed discussion of the various sectors of the South Coast economy is provided in the Socioeconomics Technical Appendix (Appendix K). Tourism is a key industry that deserves special discussion, however. In 1982 nearly one-fourth of the total retail business in the South Coast was attributable to tourists, GRC estimate based upon EDO data for the South Coast. These jobs are particularly valuable since they offer employment opportunities for the low-skill segments of the population. Detailed discussion of tourism, including visitor projections and historical and projected hotel room stock, is included in the "Other Uses" section (Section 4.10) and in the "Other Uses" Technical Appendix (Appendix L).

Table 4.7-1

POPULATION AND EMPLOYMENT

Year	Santa Barbara County: South Coast POP	South Coast EMP*	North County POP	North County EMP*	Ventura Planning Area* POP	Ventura Planning Area* EMP*	SLO Planning Area ** POP	SLO Planning Area ** EMP*
1980	170,856	85,385	127,838	52,084	276,273	112,804	86,062	33,332
1985	175,735	88,121	143,234	61,845	318,446	141,641	97,750	42,450
1990	178,031	92,616	161,049	71,695	346,681	171,205	111,310	50,469
1995	179,465	97,341	176,038	81,116	374,324	184,177	124,430	59,283
2000	180,521	102,306	185,124	91,776	416,158	206,694	137,040	69,752
Average annual percent of change	.3	.9	1.9	2.9	2.11	3.1	2.4	3.8

* Civilian employment
* Ventura, Oxnard, Port Hueneme, and Camarillo (including non-growth areas)
** San Luis Obispo, Sn LUis Bay, and South County

Source: 1980 U.S. Census of Population, GRC forecasts.

4.7.3.1 North County Growth

The North County's population growth has been less steady than that of the South Coast. Population growth was rapid during the 1960s because of Vandenberg AFB development. It slowed to slightly more than 1 percent annually during the 1970s with the population reaching 127,838 in 1980. Population is expected to rise sharply from 1980 to 2000 with a 1.9 percent/year growth yielding 185,124 people in 2000.

Employment is expected to rise much more rapidly than population. The 1980 employment of 52,084 is expected to increase to 91,776 by 2000, a 2.9 percent average annual growth. The North County's economy revolves around agriculture and Vandenberg AFB. A detailed discussion of the various sectors of the North County economy can be found in Technical Appendix K. The small, but growing, tourism industry is discussed in Technical Appendix L.

4.7.3.2 Ventura County Study Area Growth

Population in the four major municipalities of the Ventura County Study Area (Camarillo, Oxnard, Port Hueneme, and San Buenaventura) rose from 162,697 in 1970 to 238,204 in 1980, a 3.9 percent average annual rate. Growth in the Camarillo and Oxnard areas has been particularly rapid at 7.0 percent and 4.3 percent annually. Ventura County is forecast to have a more rapid population growth than Santa Barbara County and about the same growth as San Luis Obispo County. The Study Area growth is expected to slow to a 2.1 percent average annual rate from 1980 to 2000.

Employment is expected to increase from 112,804 in 1980 to over 206,000 by the year 2000. Ventura's economy is varied, although a large share (24 percent in 1984) of total employment is represented by the government sector. (This compares with 18 percent for the nation as a whole.) The oil and gas extraction industry accounted for approximately 2 percent of the County's employment in 1984. This industry represents both onshore extraction activities as well as offshore support activities. The onshore support activities are described more fully in Technical Appendix K where the results of a detailed survey of oil industry support firms are provided.

Tourism accounts for between 2 percent and 3 percent of Ventura County employment. It is particularly important along the coast (i.e., within the Ventura County Study Area). A discussion of tourism in Ventura County is provided in Section 4.10 of this chapter as well as in Technical Appendix L.

4.7.3.3 San Luis Obispo Study Area Growth

The population of the four major cities in the San Luis Obispo Study Area increased from 45,220 in 1970 to 59,389 in 1980, a 2.8 percent per year increase. The Study Area's population is expected to increase from 86,062 in 1980 to over 137,000 in the year 2000 (a 2.4 percent per year growth).

The economy of San Luis Obispo County is small, diverse, and quite distinct from the Santa Barbara or Ventura economies. Government also provides for a large share of employment (25 percent), but construction workers account for almost 12 percent of current employment because of the Diablo Canyon Power Plant and Vandenberg AFB construction projects. The slowing of Diablo Canyon activity has increased unemployment in the construction industry in the near term. Even with the uncertainty associated with the construction industry, total San Luis Obispo Study Area employment is forecast to grow 3.8 percent annually from 1980 to the year 2000, yielding a total employment of 69,752 at the turn of the century.

4.7.4 Housing

The four Study Areas represented 221,961 households in 1980. In the year 2000 it is expected that 333,830 households will live in the total Study Area. This 2.0 percent average annual growth will require the addition of 77,435 new housing units over the 1985-2000 period. Future housing needs, as well as household projections, for the four Study Areas are provided in Table 4.7-2. Table 4.7-3 provides 1980 median housing values and rents for the major municipalities of the four Study Areas.

4.7.4.0 South Coast Housing

There were 66,018 households in the South Coast Study Area in 1980. This number is projected to increase 0.5 percent per year yielding 73,235 households by the year 2000. This household growth will require the construction of 5,355 new housing units over the 1985-2000 period. Details on housing needs by community and by income level are provided in Technical Appendix K.

Vacancy rates in the South Coast area of Santa Barbara County are currently low because of such factors as the desirability of the area, the decline in new construction caused by water permit moratoriums, and high property acquisition and rental costs. Vacancy rates are currently around 1 percent (based upon the 1983 Federal Home Loan Bank Survey -- census/utility estimates are somewhat higher). Generally, the South Coast communities of Santa Barbara, Summerland, and Montecito experience the highest vacancy rates.

The median housing value for Santa Barbara was $130,800 in 1980. The similar value for Carpinteria was $116,800. Average rental rates for all units ranged from $317 per month in Santa Barbara to $341 per month in Carpinteria.*

Temporary housing is available in campgrounds and in hotels/motels. Occupance averages 76 percent although it is higher during the summer and on weekends.** Forecasts of hotel/motel rooms are provided in Section 4.10.2.2. Campgrounds are discussed in Section 4.10.2.0.

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* 1980 U.S. Census

** Santa Barbara Chamber of Commerce

Table 4.7-2

FUTURE HOUSING NEEDS

YEAR	SANTA BARBARA COUNTY				VENTURA PLANNING AREA		SLO PLANNING AREA	
	SOUTH COAST		NORTH COUNTY					
	Households	New Housing Requirements	Households	New Housing Requirements	Households	New Housing Requirements	Households	New Housing Requirements
1980	66,018	--	43,297	--	81,393	--	31,253	--
1985	68,350	--	49,289	--	107,077	--	36,104	--
1990	69,857	1,652	56,769	8,176	113,740	7,081	41,534	5,474
1995	71,693	2,013	63,689	7,566	125,615	12,620	47,259	5,771
2000	73,235	1,690	68,598	5,367	139,281	14,524	52,716	5,501
TOTAL	--	5,355	--	21,109	--	34,225	--	16,746

Source: 1980 U.S. Census, GRC estimates

Table 4.7-3

1980 HOUSING VALUES AND RENTS*

	Owner Occupied Unit Median Value	Median Gross Rent
Santa Barbara County		
North County		
Lompoc	$ 65,000	$244
Santa Maria	64,300	267
Guadalupe	45,100	173
South Coast		
Santa Barbara	130,800	317
Carpinteria	116,800	341
Ventura County		
Camarillo	99,500	356
Oxnard	72,000	293
San Buenaventura	93,400	306
Port Hueneme	65,300	301
San Luis Obispo County		
San Luis Obispo	87,700	284
Arroyo Grande	74,400	287
Grover City	87,300	285
Pismo Beach	87,300	281

* More recent rents and values are contained in the Socioeconomics Technical Appendix for selected areas.

Source: 1980 U.S. Census

4.7.4.1 North County Housing

There were 43,297 households in the North County Study Area in 1980. This number is projected to increase 2.3 percent per year yielding 68,598 households by the year 2000. This household growth will require the construction of 21,109 new housing units over the 1985-2000 period 9 percent vacancy rate). Details on housing needs by community and by income level are provided in Technical Appendix K.

Vacancy rates in the North County area of Santa Barbara County are generally somewhat higher than along the South Coast. Vacancy rates (according to the same Federal Home Loan Bank Survey) are currently between 1 percent (Lompoc) and 2 percent (Santa Maria).

Median housing values ranged between $45,100 in Guadalupe and $65,000 in Lompoc during 1980. Average rental rates ranged from $173 per month in Guadalupe to $267 per month in Santa Maria.

Temporary housing is available in campgrounds and in hotels/motels. According to the Chamber of Commerce occupance rates average 80 percent in Santa Ynez and 70 percent in Lompoc. These rates are upwards of 90 percent during some summer days. Santa Maria averages 85 percent during the summer (65 percent in winter). Forecasts of hotel/motel rooms are provided in Section 4.10.2.2. Campgrounds are discussed in Section 4.10.2.0.

4.7.4.2 Ventura County Study Area Housing

There were 81,393 households in the Ventura County Study Area in 1980. This number is projected to increase 2.7 percent per year yielding 139,281 households by the year 2000. This household growth will require the construction of 34,255 new housing units over the 1985-2000 time period. Details on housing needs by community and by income level are provided in Technical Appendix K.

Vacancy rates in the Ventura County Study Area are currently low for many of the same reasons cited for the South Coast Study Area: desirability of the area, high property acquisition costs, and high rental costs. Vacancy rates are currently around 1 percent (based upon the 1983 Federal Home Loan Bank Survey). The communities of Camarillo, Oxnard, and San Buenaventura have rates between 0.9 percent and 1.3 percent.

The median housing value for these communities ranged between $65,300 in Port Hueneme and $99,500 in Camarillo during 1980. Average rental rates ranged from $293 per month in Oxnard to $356 per month in Camarillo.

Temporary housing is available in campgrounds and in hotels/motels. Forecasts of hotel/motel rooms are provided in Section 4.10.2.2. Campgrounds are discussed in Section 4.10.2.0.

4.7.4.3 San Luis Obispo Study Area Housing

There were 31,253 households in the San Luis Obispo County Study Area in 1980. This number is projected to increase 2.6 percent per year yielding 52,716 households by the year 2000. This household growth will require the construction of 16,746 new housing units over the 1985-2000 period. Details on housing needs by community and by income level are provided in Technical Appendix K.

Vacancy rates in San Luis Obispo County averaged 1.9 percent in the last quarter of 1983 according to the Federal Home Loan Bank Survey.

The median housing value for San Luis Obispo Study Area communities ranged between $62,000 in Grover Beach and $87,700 in the City of San Luis Obispo during 1980. Average rental rates ranged from $281 per month in Pismo Beach to $287 per month in Arroyo Grande.

Temporary housing is available in campgrounds and in hotels/motels. Forecasts of hotel/motel rooms are provided in Section 4.10.2.3. Campgrounds are discussed in Section 4.10.2.1.

4.7.5 <u>Public Services</u>

As defined earlier, the tri-county area of Santa Barbara, Ventura, and San Luis Obispo Counties make up the area of concern. In terms of public services and utilities, Santa Barbara and Ventura counties are potentially most greatly affected.

This section provides an overview of current services and utilities; recreation and traffic are discussed in Section 4.10. Descriptions of each infrastructure component are presented for each county, since service districts cross the four Study Area boundaries.

4.7.5.0 Santa Barbara County Public Services

<u>ELECTRICITY</u>

Electrical power is provided by Pacific Gas and Electric Company in the northern portion of Santa Barbara County (including the onshore components of the project). Southern California Edison Company serves the remainder of Santa Barbara County. Electrical power is easily provided as needed for County communities.

<u>NATURAL GAS</u>

Natural gas is supplied to most South Coast communities by Southern California Gas Company. The North County is also served by Southern California Gas Company. Gas is provided as needed except for some rural areas that are not served by the existing distribution system. Existing platforms use gas generated during the production of oil.

WATER SUPPLY

Fresh water is provided by the districts and municipalities listed in Table 4.7-4. Water is a particularly critical resource in Santa Barbara County. Lompoc water supplies are currently in overdraft. Population increases suggest the continued depletion available and projected water supplies. Unless alternative sources are developed, the water supply deficit is projected to increase to 360 acre-feet per year in the Lompoc area by 1990 and to 14,450 acre-feet per year by 2000. Santa Maria Basin supplies will be exceeded by 1,969 acre-feet in 1990 and by 3,138 acre-feet in the year 2000 if no new supplies are obtained. More detail on this issue is presented in the Groundwater section of this report.

WASTE WATER TREATMENT

Waste water treatment is handled by the agencies listed in Table 4.7-4. Most of the current facilities are adequate for the present population and anticipated baseline growth except for Summerland County Sanitation District, Solvang Municipal Improvement District, and Santa Ynez Community Service District.

Current onshore and offshore oil facilities use septic tanks and EPA approved methods of ocean discharge as a means of waste disposal. The Project Description section contains additional information on this matter.

SOLID WASTE DISPOSAL

The disposal of general refuse type waste is conducted by agencies listed in Table 4.7-5. The present level of waste generation is adequately accommodated although additional growth will require opening proposed new facilities as capacities are reached in existing locations.

Drilling muds from offshore oil activities are currently disposed of at sea. Other oily wastes are brought to shore and disposed of in the Casmalia landfill. Casmalia is a Class I dump site that by definition, handles hazardous wastes, except nuclear and explosives. Casmalia receives material from as far away as San Diego and San Francisco.

FIRE PROTECTION

Each county has its own county fire department along with several city fire departments for urban and rural fire protection. The level of service is adequate for the current population, although future expansion will be required as detailed in the forecasts presented in Table 4.7-6. The Lompoc Treatment Facility is provided fire protection by County Section 52, Battles Gas Plant and the circuit pump stations are served by County Stations 21 and 22. Santa Maria Refinery is provided service by the Nipoms Fire Station.

Table 4.7-4

WATER AND WASTEWATER
SANTA BARBARA COUNTY

AGENCY	SOURCE	SERVICE AREA	TOTAL SUPPLY[1,2]	REMARKS	FORECAST DEMAND ACRE FEET/YEAR 1985	1990	2000
WATER							
Carpinteria County Water District	Carpinteria groundwater basin	Entire Carpinteria Valley	7,570 AF/Y	800 ac-ft/yr are uncommitted.			
Summerland County Water District	Cachuma Project	Summerland	400 AF/Y	Water moratorium in existence, however, recently amended to issue meters for 150 SFDs.			
Montecito County Water District	Jameson and Cachuma Lakes, Doulton Tunnel, Montecito groundwater basin	Montecito	5,280 AF/Y	Water moratorium amended for issuance of 100 new meters.	24,463	25,692	26,427
Goleta Water District and La Cumbre Mutual Water Company	Lake Cachuma, Goleta basin	Goleta/Isla Vista	13,100 AF/Y	Allotment from Lake Cachuma to be changed in 1985 Moratorium in effect since 1982.			
City of Santa Barbara	Cachuma Project, Santa Barbara groundwater basin, Gibralter Dam	Santa Barbara	16,900 AF/Y	4 billion gallons of water are available for use[3]	15,298	15,699	16,232
Solvang Municipal Improvement Dist (SMID)	Santa Ynez Uplands and Santa Ynez alluvial groundwater basins	Solvang	2,500 AF/Y	Water Use in 1984 is 1258 AF/Y			
Santa Ynez River Water Conservation District (SYRWCD)	San Ynez Uplands and Santa Ynez alluvial groundwater basins, Cachuma Project.	Santa Ynez, Los Olivos, Ballard	12,500 AF/Y	Current demand is 7000 AF/Y	9,299	9,678	10,209
Buellton Community Services District	Buellton Uplands and alluvial groundwater basins	Buellton	3,000 AF/Y	Current demand is 958 AF/Y			
Park Water Company	Lompoc Uplands groundwater basin	Vandenberg Village		The Lompoc area receives water from the Lompoc Uplands, Terrace, Plain and Santa Reta Uplands basins. These basins are interrelated and all part of the larger Lompoc Groundwater System. Safe yield is approximately 24,000 AF/YR. The Lompoc Uplands basin is midly overdrafted. The Lompoc Water Treatment facility is nearly at capacity.	24,408	27,467	34,318
Missions Hills Community Services District	Lompoc Uplands groundwater basins	Mission Hills	24,000 AF/Y				
City of Lompoc	Lompoc Plains Basin	City of Lompoc					

Table 4.7-4
(continued)

WATER AND WASTEWATER
SANTA BARBARA COUNTY

AGENCY	SOURCE	SERVICE AREA	TOTAL SUPPLY[1,2]	REMARKS	FORECAST DEMAND ACRE FEET/YEAR 1985	1990	2000
California Cities Water Company	Santa Maria groundwater	Santa Maria-Orcutt		Demand for 99,000 AF/Y; water quality will be problem in future; new well required.			
City of Santa Maria	Santa Maria groundwater	City of Santa Maria	110,000 AF/Y	Demand is currently 10,123 AF/Y.	10,449	10,857	11,270
City of Guadalupe	Santa Maria groundwater	City of Guadalupe		Demand is 743 AF/Y.	765	828	761
WASTEWATER					MILLIONS OF GALLONS PER DAY		
Carpinteria Sanitary District		City of Carpinteria	2 million gpd[3]	System is at 80 percent capacity.	1.61	1.67	1.71
Summerland Sanitary Dist.		Summerland	150,000 gpd	Plant currently at capacity.			
Montecito Sanitary District		Montecito	1.5 million[3] gpd	Current use - 900,000 gpd.	6.36	6.64	6.89
Goleta and Isla Vista Sanitary District		Goleta/Isla Vista	8.8 million gpd	Current throughout is 5.2 mgpd; need to improve quality of discharge.			
Solvang Municipal Improvement District		Solvang	540,000 gpd	Currently at capacity, expansion planned to 250,000 gpd.	1.10	1.23	1.45
Santa Ynez Community Service District		Solvang	200,000 gpd	Currently at capacity, expansion planned.			
Buellton Community Services District		Buellton	450,000 gpd	Current use - 327,000 gpd - Expansion to 650,000 million gpd planned.			

Table 4.7-4
(continued)

WATER AND WASTEWATER
SANTA BARBARA COUNTY

AGENCY	SOURCE	SERVICE AREA	TOTAL SUPPLY[1,2]	REMARKS	FORECAST DEMAND ACRE FEET/YEAR 1985	1990	2000
WASTEWATER					MILLIONS OF GALLONS PER DAY		
Lompoc Regional Wastewater Treatment		Lompoc	5 million gpd[3] (dry) 12 million gpd (wet)	Current use 3 to 3.5 million gpd.	3.75	3.97	4.44
Mission Hills Community Services District		Mission Hills	0.4 million gpd.	Current use - 220,000 gpd.			
City of Santa Barbara Public Works		City of Santa Barbara	11 million gpd.	Current use 8 million gpd.	8.07	8.28	8.55
City of Lompoc		City of Lompoc	5 million gpd.	Current use - 3.6 million gpd.	3.64	3.80	4.17
City of Santa Maria Public Works		City of Santa Maria	7.8 million gpd.	Current use - 5.2 million gpd.			
Laguna County Sanitary		Santa Maria -	2.4 million gpd.	Current use - 1.4 million gpd.	1.44	1.93	2.48
City of Guadalupe		City of Guadalupe	1 million gpd	Current use - 400,000 gpd.	.41	.44	.98

[1]Total water supply is the sum of the surface water supplies and the groundwater basins safe yield for extractions. Data from personal communications and the Santa Barbara County Water Agency.
[2]Personal communications between GRC and district personnel 10/84.
[3]Draft EIR, Getty Gaviota Facility, ERT, June 1984

Table 4.7-5

LANDFILLS
VENTURA COUNTY SUBAREA

LANDFILL	CLASS	REMAINING CAPACITY	LIFE EXPECTANCY
Tajiguas	II - I	3,960,000 tons	2000
Foxen Canyon	II	72,000	1989
Casmalia	I	17,343,000	2032
Lompoc	II	1,197,000	2020
Santa Maria	II	972,000	1994

Source: Santa Barbara County Waste Management Plan; GRC estimates.

Table 4.7-6

SANTA BARBARA COUNTY
PUBLIC SAFETY

GOVERNMENT AGENCY	SERVICE AREA	EMPLOYEES[A]	FACILITIES	EXPANSION REQUIREMENTS[B]	FORECAST EMPLOYMENT 1985	1990	2000
Santa Barbara County							
Sheriff's Dept.	Unincorporated Area	1/1200 population	3 stations	3,200 sq. ft. station expansion, jail expansion.	258	296	310
County Fire	Unincorporated area UCSB, S.B. Airport, City of Carpinteria	1.2/1000 population	13 stations	Some operate above capacity during peak periods.	184	201	222
City of Carpinteria							
Police	City of Carpinteria	2/1000 population	1 station	No plans for expansion.	23	24	24
Fire (provided by the County)							
City of Santa Barbara							
Police	City of Santa Barbara	2.3/1000 population		No plans for expansion.	179	183	189
Fire	City of Santa Barbara	1.48/1000 population	7 stations	Only 6 stations are manned.	112	115	119
City of Lompoc							
Police	City of Lompoc	1/1000 population	1 station	Current station at capacity.	44	46	50
Fire	City of Lompoc	.67/1000 population	1 station	Need for satellite station in North section of City.	19	21	23
City of Santa Maria							
Police	City of Santa Maria	1.3/1000 population	1 station	No expansion plans	77	79	81
Fire	City of Santa Maria	1/1000 population	1 station	Need a new engine	23	25	27
City of Guadalupe							
Police	City of Guadalupe	2.5/1000 population	1 station	Understaffed and requesting two additional officers.	11	12	14
Fire	City of Guadalupe	13 all volunteer	1 station	Understaffed and in need of a pumper engine.	14	15	16

[A]Full-time employees
[B]Take from 1984/85 budgets

Source: GRC estimates

POLICE PROTECTION

Police departments are also listed in Table 4.7-6 for each community. The level of service is adequate for the current population with the exception of the Cities of Lompoc and Guadalupe. Lompoc's station is currently at capacity and Guadalupe is understaffed by two officers.

EDUCATION

Santa Barbara County school districts, along with their projected enrollments, are listed in Table 4.7-7. The current situation for elementary and secondary school districts in the South Coast region of Santa Barbara County is one of declining enrollments. Several schools (e.g., Brandon, Cathedral Oaks, El Camino, and Garfield) have been shut down because of significant drops in enrollments over the last ten years.

4.7.5.1 Ventura County Public Services

ELECTRICITY

Electrical power is provided by Southern California Edison Company in Ventura County. Electrical power is easily provided as needed for County communities.

NATURAL GAS

Natural gas is supplied to communities by Southern California Gas Company. Gas is provided as needed except in some rural portions of the County that are not served by the existing distribution system. Existing platforms use gas generated during the production of oil.

WATER SUPPLY

Fresh water is provided by the districts and municipalities listed in Table 4.7-8. As in Santa Barbara County, water is a particularly critical resource for some Ventura County communities. Port Hueneme's current demand is 86 percent of capacity. The City of San Buenaventura is also straining its available capacity, although additional supply is expected from the Casita Municipal Water District.

WASTE WATER TREATMENT

Waste water treatment is handled by the agencies listed in Table 4.7-8. With the exception of the Oxnard Waste Water Treatment Plant, current facilities are adequate for the present population and anticipated baseline growth. Additional population growth will cause additional stress on the Oxnard system that serves the cities of Oxnard and Port Hueneme as well as the local Navy facilities.

Current onshore and offshore oil facilities use septic tanks and EPA approved methods of ocean discharge as a means of waste disposal. The Project Description section contains additional information on this matter.

Table 4.7-7

SCHOOL DISTRICTS - SANTA BARBARA COUNTY

DISTRICTS	SCHOOL GRADES	FACILITY CAPACITY	ENROLLMENT 1984	PROJECTED ENROLLMENT BY YEAR 1985	1990	1995	2000
Lompoc - 1	(K-12)	11,000	8,578	8,772	9,315	10,885	13,675
Santa Maria - 2	(K-8)	6,428	6,548	6,945	7,542	8,511	10,332
	(9-12)	4,330	3,872	4,108	4,180	4,738	5,926
Orcutt	(K-8)	3,200	2,929	3,111	3,379	3,813	4,628
Bonita	(K-8)	85	74	78	85	96	117
Guadualupe	(K-8)	700	620	657	714	806	978
Los Alamos	(K-8)	150	134	137	135	151	165
Los Olivos	(K-8)	300	213	222	219	246	268
Solvang	(K-8)	400	375	393	388	435	475
College	(K-8)	575	514	529	523	586	640
Blochman	(K-8)	280	131	139	151	170	207
Vista Del Mar	(K-8)	80	75	76	77	82	85
Buelton	(K-8)	430	390	410	405	453	495
Santa Ynez Valley	(9-12)	900	874	909	984	1,031	1,195
Carpinteria	(K-8)	1,705	1,610	1,625	1,635	1,755	1,817
	(9-12)	757	717	725	743	717	786
Goleta	(K-8)	4,525	3,460	3,495	3,517	3,775	3,908
Hope	(K-8)	1,290	805	812	818	878	908
Santa Barbara	(K-8)	6,500	6,374	6,448	6,489	6,965	7,210
	(9-12)	6,500	6,215	6,307	6,465	6,245	6,844
TOTALS:		50,135	44,508	45,898	47,763	52,337	60,659

Source: GRC

Table 4.7-8

WATER AND WASTEWATER
VENTURA COUNTY

AGENCY	SOURCE	SERVICE AREA	TOTAL SUPPLY/CAPACITY[A]	REMARKS[2]	FORECAST DEMAND 1985	1990	2000
WATER							
Casita Municipal Water District	Casitas Dam	Only looking at North Coast Ventura County Portion of service area.	Total for all of the District is 250,000 AF/YR.	Demand for North Coast Section of Service Area is 329 AF/YR.			
City of San Buenaventura	CMWD, UWCD & Wells	City of San Buenaventura	25,500 AF/YR	Projected demand for 1990 is 23,283 AF/YR. City anticipates additional water pending conjunctive use with CMWD.	23,456	25,579	28,350
City of Oxnard Public Works	State Water & Groundwater	City of Oxnard	25,696 AF/YR	Current demand is 18,073 AF/YR.	18,990	22,085	26,591
City of Port Hueneme	United Water Conservation District	City of Port Hueneme	4,300 AF/YR	Current annual usage is 3,700 AF/YR.	4,059	4,326	4,594
City of Camarillo	Metropolitan Water District & Wells	City of Camarillo	13,406 AF/YR	Current demand is 6,121 AF/YR.	8,937	10,216	11,495
WASTE WATER					millions of gallons/day		
City of San Buenaventura		City of San Buenaventura	14 million gpd.	Current flow is 7.2 million gpd.	7.33	7.87	9.46
Oxnard Waste Water Treatment Plant		City of Oxnard, Port Hueneme, U.S. Navy & Pt. Mugu.	22.6 million gpd.	Current flow is 19 million gpd.	19.43	21.08	24.25
City of Camarillo Wastewater Treatment Plant.		City of Camarrillo	6 million gpd.	Current flow is 3.5 mgd.	3.71	4.41	5.37

[A]Total water supply is the sum of the surface water supplies and groundwater basins believed safe yield for extractions. Data from GRC personal communications (10/19/84) or Local Coastal Plans.

SOLID WASTE DISPOSAL

The disposal of general refuse type waste is conducted by agencies listed in Table 4.7-9. The present level of waste generation is adequately accommodated although additional growth will require opening proposed new facilities as capacities are reached in existing locations.

Drilling muds from offshore oil activities are currently disposed of at sea. Other oily wastes are brought to shore and disposed of in Santa Barbara County's Casmalia landfill.

FIRE PROTECTION

Each county has its own county fire department along with several city fire departments for urban and rural fire protection. The level of service is adequate for the current population although future expansion will be required as detailed in the forecasts presented in Table 4.7-10.

POLICE PROTECTION

Police departments are also listed in Table 4.7-10 for each community in the Ventura County Study Area. The level of service is adequate for the current population with the exception of the City of Oxnard which is planning to add 11 positions during fiscal year 1984/1985 and with the exception of the County which is currently at capacity.

EDUCATION

Ventura County school districts, along with their projected enrollments are listed in Table 4.7-11. Currently, there is overcrowding in the Oxnard and Port Hueneme districts.

4.7.5.2 San Luis Obispo County Public Services

ELECTRICITY

Electrical power is provided by Pacific Gas and Electric Company in San Luis Obispo County. Electrical power is easily provided as needed for County communities.

NATURAL GAS

Natural gas is supplied to communities by Pacific Gas and Electric Company. Gas is provided as needed with the exception of some of the more rural areas that have no gas distribution system.

WATER SUPPLY

Fresh water is provided by the districts and municipalities listed in Table 4.7-12. As with the other counties, water is a critical resource in San Luis Obispo County. Both the San Luis Obispo Creek and Pismo groundwater basins are currently being overdrafted. The Study Area cities' groundwater

Table 4.7-9

LANDFILLS
VENTURA COUNTY SUBAREA

LANDFILL	CLASS	REMAINING CAPACITY	LIFE EXPECTANCY
Santa Clara	II	1,080,000	1987[a,b]
Toland Road	II	691,200	2033[a]

[a]May take oily waste with special permission.
[b]Additional 160 acres to be made available in 1987 and used until 1991, currently 80 acres.

Source: grc conversations with local officials: GRC estimates.

Table 4.7-10

VENTURA COUNTY
PUBLIC SAFETY

GOVERNMENT AGENCY	SERVICE AREA	EMPLOYEES[A]	FACILITIES	EXPANSION REQUIREMENTS[B]	FORECAST EMPLOYMENT 1985	1990	2000
Ventura County							
Police	Western Ventura County and City of Camarillo	.8/1000 population	2 stations	No immediate plans but are presently at capacity.	58	65	76
Fire	Western Ventura County and Cities of Camarillo and Port Hueneme	.75/1000 population	4 stations	Department not antici-ipating any expansion.	69	77	89
City of Camarillo	Fire and police protection provided by the County						
City of San Buenaventura							
Police	City of San Buenaventura	1.8/1000 population	1 station	Level of service adequate.	154	162	194
Fire	City of San Buenaventura	.9/1000 population	5 stations	Plans to construct an additional station.	77	80	96
City of Oxnard							
Police	City of Oxnard	1.6/1000 population	1 station	Plans to add 11 positions to the force during FY 1984-85.	206	235	291
Fire	City of Oxnard	.75/1000 population	6 stations	No plans for expansion.	95	108	135
City of Port Hueneme							
Police	City of Port Hueneme	1.3/1000 population	1 station	No plans for expansion.	27	28	32
Fire (provided by the County)							

[A]Data provided for only the western portion of the County.
[B]Taken from 1984/85 budgets.

Table 4.7-11

SCHOOL DISTRICTS - VENTURA COUNTY

DISTRICTS	SCHOOL GRADES	FACILITY CAPACITY	ENROLLMENT 1984	PROJECTED ENROLLMENT BY YEAR 1985	1990	1995	2000
Ventura County							
Oxnard	(K-8)	9,998	10,980	11,428	13,198	15,785	20,282
	(9-12)	10,028	10,710	11,195	13,386	16,756	21,931
Port Huenme	(K-8)	7,300	6,906	7,182	8,294	9,919	12,746
Ventura	(K-8)	11,115	9,681	9,836	10,768	12,283	15,632
	(9-12)	4,601	4,491	4,553	4,827	5,930	7,060
Pleasant Valley	(K-8)	6,000	5,375	5,667	6,997	8,512	10,538
Rio (Oxnard)	(K-8)	2,996	2,203	2,409	2,782	3,328	4,276
Ocean View (Oxnard)	(K-8)	2,470	2,170	2,259	2,609	3,120	4,009
	TOTALS:	54,508	52,516	54,529	62,861	75,632	96,473

Source: GRC

Table 4.7-12

WATER AND WASTEWATER
SAN LUIS OBISPO COUNTY

AGENCY	SOURCE	SERVICE AREA	TOTAL SUPPLY/CAPACITY[A]	REMARKS[2]	FORECAST DEMAND 1985	1990	2000
WATER							
	San Luis Obispo Creek Groundwater Basin	North Portion of San Luis Bay & most of SLO planning areas.	2,550 AF/YR[B]	Basin appears to be Overdrafted.			
	Pismo Groundwater	San Luis Bay planning area	2,000 AF/YR[B]	Consumption has been or 2,100 AF/YR.			
	Tri-Cities Mesa & Arroyo Grande Plain subunits of Arroyo Grande basin.	San Luis Bay planning area		Experiencing rising[B] groundwater levels.			
Nipomo Community Services District	Nipomo Mesa Sub-unit of Arroy Grande basin	Nipomo Area	Capacity to serve[C] 1,715 customers.	Currently serving 1,480 customers.			
Cal-Cities Water Company	Nipomo Mesa sub-unit of Arroyo Grande Basin	Nipomo Area	2.091 AF/YR[C]	Current use - 1,274 AF/YR			
City of Arroyo	Grandwater & Lopez Reservoir	City of Arroyo City	Approx. 3,952 AF/YR[C]	Current use - 2.580 AF/YR	2,611	2,752	3,053
City of Grover City	Groundwater & Lopez Reservoir	City of Crover City	2.500-2,600 AF/YR[C]	Current use - 1,330 AF/YR	1,568	1,685	1,914
City of Pismo Beach	Groundwater & Lopez Reservoir	City Pismo Beach	2,000 AF/YR[C]	Current use - 1,330 AF/YR	1,361	1,542	1,890
City of San Luis Obispo	2 Reservoirs	City of SLO	12,848 AF/YR[C]	Current use - 11,730 AF/YR.	11,916	12,989	15,091

Table 4.7-12

WATER AND WASTEWATER
SAN LUIS OBISPO COUNTY

AGENCY	SOURCE	SERVICE AREA	TOTAL SUPPLY/CAPACITY[A]	REMARKS[2]	FORECAST DEMAND 1985	1990	2000
South San Luis Obispo Sanitation District		Grover City, Arroyo Grande, & Ocean	3 million gpd[C]	Current flow is 2.4 - 2.5 million gpd. There are plans for plant expansion.	2.56	2.82	3.35
City of Pismo Beach Sewage Treatment Plant		City of Pismo Beach	1.2 million gpd[B]	Current flow is .92 million gpd. A need for plant expansion.	.93	1.00	1.14
Avila Beach County Water District		Developed portions of Avila Beach	180,000 gpd[CD]	Current flow is 60,000 - 70,000 gpd.	4.08	4.58	5.63
City of San Luis Sewage Treatment Plant		City of San Luis Obispo	5.1 million gpd[C]	Current flow is 4 million gpd.			

[A]Total water supply is the sum of the surface water supplies and the groundwater basins believed safe yield for extractions.
[B]Data from County Land Use Element.
[C]Data from personal communications with agency personnel (10/1984).
[D]State may be cutting back maximum permitted capacity to 100,000 gpd.

Source: GRC estimates

and reservoir supplies are also being strained. Current population projections will continue to deplete available and projected water supplies unless alternative sources are developed. The water supply deficit in the City of San Luis Obispo is expected to occur by 1990. By 2000 the deficit will exceed 2,200 acre-feet per year.

WASTE WATER TREATMENT

Waste water treatment is handled by the agencies listed in Table 4.7-12. Most of the current facilities are adequate for the present population, although expansion plans are in place for the South San Luis Obispo Sanitation District. Plant expansion is also required at the City of Pismo Beach Sewage Treatment Plant. Additional population growth will cause additional stress .

Current onshore and offshore oil facilities use septic tanks and EPA approved methods of ocean discharge as a means of waste disposal. The Project Description section contains additional information on this matter.

SOLID WASTE DISPOSAL

The disposal of general refuse type waste is conducted by agencies listed in Table 4.7-13. In San Luis Obispo County refuse is collected and disposed of by the San Luis Obispo County Sanitation District which operates a landfill with a future life of about 25 years. The present level of waste generation is adequately accommodated although additional growth will require opening proposed new facilities as capacities are reached in existing locations.

FIRE PROTECTION

Each county has its own county fire department along with several city fire departments for urban and rural fire protection. The level of service is adequate for the current population, although the City of San Luis Obispo is currently at maximum capacity. Future expansion will be required as detailed in the forecasts presented in Table 4.7-14.

POLICE PROTECTION

Police departments are also listed in Table 4.7-14 for each community. The level of service is adequate for the current population with the exception of the County Sheriff. Expansion of jail facilities is planned as well as the addition of four new positions.

EDUCATION

The San Luis Obispo County Study Area is served by two school districts: San Luis Coastal Unified School District and Lucia Mar Unified School District. Forecasts of enrollment are provided in Table 4.7-15. Within the San Luis Coastal Unified School District there will be ample capacity in the elementary and junior high schools beyond the year 2000. The high school facilities are currently being used at over capacity. (See Technical Appendix K for more detail.)

Table 4.7-13

LANDFILLS
SAN LUIS OBISPO COUNTY SUBAREA

LANDFILL	CLASS	REMAINING CAPACITY	LIFE EXPECTANCY
Cold Canyon	II	3,131,000	2014
Los Osos	II	162,000	1994*
Chicago Grade	II	252,000	1999
Paso Robles	II	360,000	2005

*1988 lease may not be renewed.

Source: GRC conversations with local officials.

Table 4.7-14

SAN LUIS OBISPO COUNTY
PUBLIC SAFETY

GOVERNMENT AGENCY	SERVICE AREA	EMPLOYEES[A]	FACILITIES	EXPANSION REQUIREMENTS[B]	FORECAST EMPLOYMENT 1985	1990	2000
County of San Luis Obispo							
Sheriff	Unincorporated Area	1/1000 population		Expansion of jail facilities and additions for 4 new positions.	186	211	259
Fire	(County contracts with California Department of Forestry)				179	180	201
City of San Luis Obispo							
Sheriff	City of San Luis Obispo	2/1000 population	1 station	No expansion requirements, only replacement of old capital equipment.	76	87	107
Fire	City of San Luis Obispo	1.42/1000 population	4 stations	At maximum capacity.	53	60	74
City of Pismo Beach							
Police	City of Pismo Beach	2.2/1000 population	1 station	No plans for expansion.	18	21	26
Fire	City of Pismo Beach	34 member all volunteer department.		City exploring service fees to combat escalating costs.	35	40	49
City of Arroyo Grande							
Police	City of Arroyo Grande	1.5/1000 population	1 station	Planning to purchase 2 patrol cars in FY 1984-85.	20	22	28
Fire	City of Arroyo Grande	37 member all volunteer department.	1 station	No plans for expansion.	38	43	53
City of Grover City							
Police	City of Grover City	1.96/1000 population		No plans for expansion.	20	22	28
Fire	City of Grover City	24 member all volunteer department.		No plans for expansion.	25	28	35

[A]Based on information from 1984/85 budgets and GRC personal conversations.

Table 4.7-15

SCHOOL DISTRICTS - SAN LUIS OBISPO COUNTY

DISTRICTS	SCHOOL GRADES	FACILITY CAPACITY	ENROLLMENT 1984	PROJECTED ENROLLMENT BY YEAR 1985	1990	1995	2000
San Luis Obispo County:							
San Luis Coastal	(K-12)	9,394	6,864	3,630	4,284	5,542	7,402
Lucia Mar	(K-8)	4,534	5,028	5,200	6,164	7,938	10,524
	(9-12)	2,093	2,298	2,369	2,808	3,617	4,795
	TOTALS:	13,928	11,892	11,200	13,256	17,097	22,721

Source: GRC estimates

The Lucia Mar Unified School District has been experiencing overcrowding due to an expanding population. Nine of the district's 11 schools are projected to be over capacity in 1985; six were over capacity in 1980. Technical Appendix K provides facility specific detail concerning this situation.

4.7.6 Public Finance

City and county governments in the tri-county area provide a wide range of services to residents of the area. Public health and safety services are the most important functions, although education, street maintenance, recreational programs, administration and legal services also are required of the respective governments. These services are supported by an equally wide range of revenue sources -- property taxes and various allocations from state and federal sources.

4.7.6.0 Public Finance in Santa Barbara County

Table 4.7-16 presents expenditure appropriations and revenues for 1984/1985 for Santa Barbara County and each of the five cities in the County. The expenditures have been grouped into categories to reflect the current cost of providing different types of public services in the County and the cities.

The local governments in Santa Barbara County spent approximately $250 million in 1984/1985 providing services to residents of the County. Thirty-two percent is spent for public protection, 15 percent for general government operations, 15 percent for public works, and the remaining 38 percent for a variety of other services including public assistance, community development, and capital improvements.*

In addition to property taxes, sales taxes, and transient occupancy taxes that are separately listed in the revenue details, there are a number of other revenue sources including licenses and permits, fines, forfeits and penalties, interest, intergovernmental revenues (from state and federal governments), charges for current services, and miscellaneous revenues which together produce 72 percent of revenue to local governments. Property tax revenue represents 17 percent of total revenue to the Santa Barbara County local governments. Sales tax accounts for approximately 9 percent of local government revenues. However, it is a major source of revenue in the cities of Santa Barbara, Santa Maria, and Carpinteria, where it is approximately 20 percent of their budgets. The transient occupancy tax or "bed tax" is a local tax on revenues (from room rental receipts) received by motels and hotels within County or city jurisdiction. Countywide, it is 2 percent of local government revenue.

Tables 4.7-17 and 4.7-18 show baseline forecasts of public revenues and expenditures for 1989/1990 and 1999/2000, respectively. A discussion of the methodology underlying these forecasts is included in Technical Appendix K.

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* 1984/85 budgets for County of Santa Barbara and Cities of Santa Barbara, Carpinteria, Santa Maria, Lompoc, and Guadalupe.

Table 4.7-16

SANTA BARBARA GOVERNMENTS EXPENDITURES AND REVENUES
FY 1984-1985

Base Year Expenditures (Appropriations)
(000's omitted)

Government Entity	General Governmental	Public Protection	Public Work/ Utilities	Other Expend.	Total
Santa Barbara County	$19,915	$56,732	$10,117	$68,839	$152,603
City of Santa Barbara	13,562	14,410	3,562	16,746	48,280
City of Carpinteria	538	1,025	226	1,262	3,051
City of Santa Maria	1,224	5,797	12,184	6,417	25,624
City of Lompoc	1,194	2,580	11,822	3,662	19,258
City of Guadalupe	88	374	202	38	702

Base Year Revenues
(000's omitted)

Government Entity	Property Tax	Sales Tax	Transient Occ. Tax	Other Revenue	Total
Santa Barbara County	$35,558	$5,125	$2,147	$106,171	$149,001
City of Santa Barbara	3,754	9,200	2,600	38,443	53,997
City of Carpinteria	433	1,004	145	425	2,873
City of Santa Maria	1,519	6,235	785	17,085	25,624
City of Lompoc	924	1,524	184	18,566	21,198
City of Guadalupe	68	132	--	533	733

Source: 1984/85 budgets.

Table 4.7-17

SANTA BARBARA GOVERNMENTS EXPENDITURES AND REVENUES
FY 1989-1990

Base Year Expenditures (Appropriations)
(000's omitted)

Government Entity	General Governmental	Public Protection	Public Work/ Utilities	Other Expend.	Total
Santa Barbara County	$18,850	$54,102	$6,978	$64,288	$144,218
City of Santa Barbara	6,053	13,994	3,487	27,166	50,400
City of Carpinteria	529	997	207	983	2,716
City of Santa Maria	1,147	5,472	9,714	7,054	23,386
City of Lompoc	938	1,209	1,709	12,388	16,244
City of Guadalupe	135	365	224	37	760
TOTAL	$27,652	$75,839	$22,320	$111,914	$237,725

Base Year Revenues
(000's omitted)

Government Entity	Property Tax	Sales Tax	Transient Occ. Tax	Other Revenue	Total
Santa Barbara County	$34,214	$1,734	$2,447	$106,007	$144,403
City of Santa Barbara	3,745	7,836	2,738	36,057	50,375
City of Carpinteria	435	539	202	1,650	2,825
City of Santa Maria	1,596	6,358	784	14,613	23,351
City of Lompoc	661	1,340	149	14,177	16,327
City of Guadalupe	83	113	1	533	729
TOTAL	$40,734	$17,919	$6,320	$173,037	$238,010

Source: GRC estimates

Table 4.7-18

SANTA BARBARA GOVERNMENTS EXPENDITURES AND REVENUES
FY 1999-2000

Base Year Expenditures (Appropriations)
(000's omitted)

Government Entity	General Governmental	Public Protection	Public Work/ Utilities	Other Expend.	Total
Santa Barbara County	$20,661	$58,876	$7,910	$70,345	$157,793
City of Santa Barbara	6,316	14,288	3,639	28,697	52,940
City of Carpinteria	572	1,074	223	1,012	2,881
City of Santa Maria	1,194	5,660	9,888	7,704	23,446
City of Lompoc	966	1,453	1,752	12,999	17,170
City of Guadalupe	150	404	248	64	867
TOTAL	$29,860	$81,755	$23,660	$120,821	$256,096

Base Year Revenues
(000's omitted)

Government Entity	Property Tax	Sales Tax	Transient Occ. Tax	Other Revenue	Total
Santa Barbara County	$39,328	$2,012	$3,086	$114,973	$159,399
City of Santa Barbara	4,298	8,016	3,007	37,909	53,230
City of Carpinteria	486	556	291	1,828	3,161
City of Santa Maria	1,741	6,670	926	15,526	24,864
City of Lompoc	932	1,462	189	14,799	17,383
City of Guadalupe	109	122	1	587	818
TOTAL	$46,894	$18,838	$7,501	$185,622	$258,855

Source: GRC estimates

It is estimated that contingency accounts will be used to meet shortfalls in revenues for the County and City of Carpinteria in 1985; for the cities of Santa Barbara, Santa Maria and Guadalupe in 1990; and for the City of Guadalupe in the year 2000.

4.7.6.1 Public Finances in Ventura County

Table 4.7-19 presents expenditures (appropriations) and revenues for the current fiscal year for Ventura County and the four cities within Ventura County under study.

The local Ventura County governments listed in the table spent almost $403 million in 1984/1985 providing services to residents of the County. Twenty-seven percent is spent for public protection, 26 for general government operations, 15 percent for public works and the remaining 32 percent for a variety of other services such as public assistance, community development and capital improvements.

Property tax collections represented 26 percent of County revenues and zero (Camarillo) to 19 percent (Port Hueneme) of municipalities' revenues in 1984/1985. Sales tax represents a larger share of total revenue in San Buenaventura, Oxnard, and Camarillo than in Port Hueneme and the County government; it reaches 20 percent of total revenues in San Buenaventura. Transient occupancy tax revenues range from less than 1 percent (Ventura County) to 2 percent (San Buenaventura). Other revenues -- from licenses, fees, intergovernmental transfers, etc. -- represent the majority of each governments revenue.

Tables 4.7-20 and 4.7-21 show baseline forecasts of public revenues and expenditures for 1989/1990 and 1999/2000 respectively. A discussion of the methodology underlying these forecasts is included in Technical Appendix K. It is expected that contingency accounts will be employed to defray budget shortfalls for Ventura County and Oxnard in 1985, 1990, and 2000.

4.7.6.2 Public Finances in San Luis Obispo County

Table 4.7-22 presents expenditure appropriations and revenues, for the current fiscal year for the County and the four cities located within the County.

The local governments in San Luis Obispo County spent approximately $107 million in 1984/1985 providing services to the County. Twenty-seven percent was spent for public protection, 22 percent for general government operation, 13 percent for public works, and the remaining 37 percent for a variety of other services including public assistance, community development, and capital improvements.

Property tax collections represented 31 percent of county revenues and from less than 1 percent (Grover City) to 11 percent (City of San Luis Obispo) of municipalities' total revenues. Sales tax revenues ranged from 2 percent of total revenues at the county to 36 percent of the total for Arroyo Grande. Transient occupancy tax revenues were less than 1 percent of the total for the

Table 4.7-19

VENTURA GOVERNMENTS EXPENDITURES AND REVENUES
FY 1984-1985
Base Year Expenditures (Appropriations)
(000's omitted)

Government Entity	General Governmental	Public Protection	Public Work/ Utilities	Other Expend.	Total
Ventura County	$172,234,087	$110,538,728	$45,595,870	$3,588,846	$331,957,585
San Buenaventura Cty	12,163	11,719,924	17,734,608	13,470,381	55,088,361
City of Oxnard	15,237,075	15,149,544	30,676,962	5,591,973	66,655,554
City of Port Hueneme	1,312,507	1,496,587	3,659,502	1,730,821	8,199,418
City of Camarillo	3,140,090	2,243,240	9,345,036	2,880,094	17,608,461
TOTAL	$204,087,208	$141,148,077	$107,011,978	$27,262,115	$479,509,378

Base Year Revenues
(000's omitted)

Government Entity	Property Tax	Sales Tax	Transient Occ. Tax	Other Revenue	Total
Ventura County	$67,458,180	$4,278,183	$19,613	$272,200,806	$331,653,782
San Buenaventura Cty	5,784,865	8,224,060	761,458	42,079,174	55,150,556
City of Oxnard	6,757,788	7,639,317	859,125	50,693,924	65,950,153
City of Port Hueneme	609,582	477,408	86,968	6,799,991	8,219,948
City of Camarillo	0	2,083,477	136,306	15,394,260	17,614,042
TOTAL	$80,610,415	$22,702,444	$1,863,469	$387,168,154	$478,588,482

[a]City of Camarillo receives no property tax revenues directly.

Source: GRC estimates

Table 4.7-20

VENTURA GOVERNMENTS EXPENDITURES AND REVENUES
FY 1989-1990

Base Year Expenditures (Appropriations)
(000's omitted)

Government Entity	General Governmental	Public Protection	Public Work/ Utilities	Other Expend.	Total
Ventura County	$191,853,527	$121,536,584	$50,442,402	$6,686,477	$370,518,991
San Buenaventura Cty	13,549,297	12,995,715	19,665,391	14,863,185	60,983,589
City of Oxnard	17,590,282	17,573,981	35,586,377	6,471,802	77,222,442
City of Port Hueneme	1,379,040	1,575,102	3,851,522	1,820,410	8,626,075
City of Camarillo	3,729,570	2,664,408	11,098,883	3,420,168	20,913,029
TOTAL	$228,011,717	$156,345,789	$120,644,576	$33,262,043	$538,264,125

Base Year Revenues
(000's omitted)

Government Entity	Property Tax	Sales Tax	Transient Occ. Tax	Other Revenue	Total
Ventura County	77,192,299	4,833,857	24,461	297,907,192	367,654,808
San Buenaventura Cty	6,391,464	9,119,283	1,044,267	46,662,052	61,518,067
City of Oxnard	7,748,196	8,861,898	1,119,038	55,885,117	73,614,248
City of Port Hueneme	789,997	502,446	100,310	7,170,300	8,697,943
City of Camarillo	0	2,474,460	183,069	18,283,057	20,940,587
TOTAL	92,010,845	25,791,945	2,471,145	425,907,718	532,425,653

[a]City of Camarillo receives no property tax revenues directly.

Source: GRC estimates

Table 4.7-21

VENTURA GOVERNMENTS EXPENDITURES AND REVENUES
FY 1999-2000

Base Year Expenditures (Appropriations)
(000's omitted)

Government Entity	General Governmental	Public Protection	Public Work/ Utilities	Other Expend.	Total
Ventura County	231,029,430	142,066,545	60,565,593	13,156,651	446,818,219
San Buenaventura Cty	16,247,873	15,693,348	23,747,879	17,941,042	73,630,142
City of Oxnard	21,903,456	21,904,636	44,355,824	8,062,640	96,226,557
City of Port Hueneme	1,560,831	1,781,285	4,355,776	2,059,909	9,756,983
City of Camarillo	4,509,746	3,221,824	13,420,098	4,182,541	25,334,209
TOTAL	275,251,336	184,667,639	146,445,171	45,401,964	651,766,111

Base Year Revenues
(000's omitted)

Government Entity	Property Tax	Sales Tax	Transient Occ. Tax	Other Revenue	Total
Ventura County	98,311,129	5,871,205	32,468	350,297,252	442,209,054
San Buenaventura Cty	7,558,033	11,012,273	1,367,673	56,347,366	74,586,346
City of Oxnard	10,819,868	11,045,748	1,577,511	65,863,700	89,306,827
City of Port Hueneme	810,644	568,198	128,131	8,142,900	9,895,072
City of Camarillo	0	2,991,917	228,937	22,176,748	25,397,602
TOTAL	117,499,674	31,489,342	3,334,719	502,827,166	641,394,901

[a]City of Camarillo receives no property tax revenues directly.

Source: GRC estimates

Table 4.7-22

SAN LUIS OBISPO GOVERNMENTS AND REVENUES
FY 1984-1985

Base Year Expenditures (Appropriations)
(000's omitted)

Government Entity	General Governmental	Public Protection	Public Work/ Utilities	Other Expend.	Total
San Luis Obispo County	$18,389,028	$21,598,951	$7,405,835	$30,688,666	$78,082,481
City of San Luis Obispo	2,454,181	5,685,423	5,238,697	5,293,817	18,672,118
Arroyo Grande	1,898,078	1,030,853	1,943,968	1,446,336	6,319,235
Grover City	867,664	613,231	874,995	830,124	3,186,014
Pismo Beach [1]	1,344,650	1,065,882	1,849,283	2,879,933	7,139,746
TOTAL	$24,953,600	$29,994,340	$17,312,779	$41,138,875	$113,399,549

Base Year Revenues
(000's omitted)

Government Entity	Property Tax	Sales Tax	Transient Occ. Tax	Other Revenue	Total
San Luis Obispo County	$25,735,073	$1,858,403	$706,932	$52,067,125	$77,946,534
City of San Luis Obispo	1,966,876	3,842,187	806,413	12,372,208	18,728,685
Arroyo Grande	814,351	1,031,871	156,890	5,711,011	6,286,123
Grover City	458,751	391,636	5,230	2,327,051	3,182,668
Pismo Beach [1]	551,191	461,201	811,739	5,315,410	7,147,541
TOTAL	$29,526,242	$7,585,298	$2,487,205	$77,792,805	$113,291,550

[1] Data from 1983-84 Budget.

Source: GRC estimates

County and for Grover City, but were 15 percent for the resort community of Pismo Beach. As with the other counties, the majority of revenues come from a wide variety of licenses, fees, and transfer payments.

Tables 4.7-23 and 4.7-24 show baseline forecasts of public revenues and expenditures for 1989/1990 and 1999/2000, respectively. A discussion of the methodology underlying these forecasts is included in Technical Appendix K.

4.7.7 Land Use

4.7.7.0 Introduction

Plans, policies, and regulations that can affect land use patterns within the Study Area include:

- Santa Barbara County Comprehensive Plan -- Of the nine mandatory and two optional elements, Circulation, Housing, Conservation, Land Use, Scenic Highway (Zone 4), Open Space, Environmental Resources Management, and Agriculture (proposed) may have direct or indirect bearing upon the project and project alternatives;

- Santa Barbara County Zoning Ordinance - Article III;

- Santa Barbara County Local Coastal Plan;

- Ventura County Comprehensive Plan;

- Ventura County Local Coastal Plan;

- San Luis Obispo County Comprehensive Plan, Land Use Element -- The South County Area Plan, which is a part of the Land Use Element, governs the site of the Santa Maria Refinery;

- San Luis Obispo County Land Use Ordinance;

- San Luis Obispo Local Coastal Plan;

- State of California - California Coastal Zone Management Program;

- California State Lands Commission - Sensitive Lands Report;

- Vandenberg Air Force Base Master Plan; and

- Individual cities' land use plans -- The City of Lompoc Land Use Element is particularly important because of the Plan's emphasis on the encouragement of infill development rather than the displacement of agricultural lands.

- Ventura County Air Quality Management Plan;

Table 4.7-23

SAN LUIS OBISPO GOVERNMENTS AND REVENUES
FY 1989-1990

Base Year Expenditures (Appropriations)
(000's omitted)

Government Entity	General Governmental	Public Protection	Public Work/ Utilities	Other Expend.	Total
San Luis Obispo County	$21,076,751	$24,755,950	$8,432,607	$34,944,030	$89,209,338
City of San Luis Obispo	3,085,932	6,558,624	6,043,250	5,823,898	21,511,704
Arroyo Grande	2,178,233	1,184,682	2,243,239	1,650,537	7,256,691
Grover City	1,042,994	702,831	1,002,752	899,543	3,648,120
Pismo Beach [1]	1,540,736	1,221,321	2,193,309	3,223,423	8,178,789
TOTAL	$28,924,646	$34,423,409	$19,915,156	$46,541,431	$129,804,642

Base Year Revenues
(000's omitted)

Government Entity	Property Tax	Sales Tax	Transient Occ. Tax	Other Revenue	Total
San Luis Obispo County	$28,581,001	$2,129,969	$881,381	$59,460,398	$88,631,750
City of San Luis Obispo	2,421,462	4,432,253	1,005,418	14,292,035	21,892,169
Arroyo Grande	939,279	1,185,787	195,543	6,182,733	7,075,342
Grover City	556,506	448,822	6,517	2,622,675	3,634,520
Pismo Beach [1]	619,487	528,472	1,011,791	6,052,997	8,220,747
TOTAL	$33,117,735	$8,725,304	$3,100,650	$88,610,839	$129,454,528

[1] Data from 1983-84 Budget.

Source: GRC estimates

Arthur D. Little, Inc.

Table 4.7-24

SAN LUIS OBISPO GOVERNMENTS AND REVENUES
FY 1999-2000

Base Year Expenditures (Appropriations)
(000's omitted)

Government Entity	General Govern-mental	Public Protec-tion	Public Work/ Utilities	Other Expend.	Total
San Luis Obispo County	$26,516,564	$31,145,576	$100,381,411	$43,020,674	$111,064,225
City of San Luis Obispo	4,380,748	8,440,603	7,777,276	6,966,364	27,564,990
Arroyo Grande	2,744,549	1,499,091	2,854,908	2,062,940	9,161,488
Grover City	1,392,956	884,813	1,262,232	1,039,854	4,549,854
Pismo Beach [1]	1,933,002	1,532,275	2,881,529	3,905,515	10,252,322
TOTAL	$36,967,820	$43,502,357	$25,157,355	$56,995,347	$162,622,879

Base Year Revenues
(000's omitted)

Government Entity	Property Tax	Sales Tax	Transient Occ. Tax	Other Revenue	Total
San Luis Obispo County	$34,844,768	$2,679,622	$1,373,535	$73,892,771	$110,369,696
City of San Luis Obispo	3,453,959	5,7003,985	1,566,971	18,454,146	28,920,061
Arroyo Grande	1,210,336	1,500,371	304,612	7,159,365	8,746,683
Grover City	770,146	564,971	10,158	3,188,046	4,533,320
Pismo Beach [1]	755,371	663,048	1,576,352	7,517,167	10,519,937
TOTAL	$41,034,579	$11,111,996	$4,831,628	$110,211,494	$163,089,698

[1] Data from 1983-84 Budget.

Source: GRC estimates

All of these plans, as they relate to the proposed project, are described and discussed in Technical Appendix K. The current Land Uses and Local Character of the project are discussed below and in the aforementioned Technical Appendix.

The various components of the proposed project are located in northern Santa Barbara County and Southern San Luis Obispo County. The discussion of regional land uses in divided by County whereas the discussion of project site land uses is grouped by project component. Land maps to supplement the discussion are included in Technical Appendix K.

SANTA BARBARA COUNTY

Santa Barbara County includes approximately 1,383,000 acres, 90 percent of which are in non-intensive uses. The Los Padres National Forest, covering approximately 44 percent of the central and eastern County (608,520 acres), is the largest solitary land use in Santa Barbara County. Recreation, protected watershed for reservoirs in the Santa Maria and Upper Santa Ynez Valleys, and limited grazing and mining are provided within this national forest.

Of the 982,000 acres outside of the national forest, over 70 percent is in private agricultural cultivation or grazing uses, 10 percent is included in Vandenberg AFB on the western coast of the County, and the remainder is developed with urban and transportation uses.

The most densely populated and urbanized section of the County is located in the southern coastal area extending from Goleta to the Ventura County line. This area includes the cities of Santa Barbara and Carpinteria and unincorporated communities of Isla Vista, Goleta, Montecito, and Summerland.

The Project Areas are confined primarily to the North County. Included within this area are the cities of Lompoc, Santa Maria and Guadalupe and the unincorporated community of Orcutt. The northern county area is rural in character and includes many properties with agricultural preserve status. The State Williamson Act enables the County to enter into contracts, with agricultural property owners, which limit the development potential of property to agricultural uses in return for decreased property taxes. Area/community goals, as referenced under local land use plans/policies, emphasize preservation and expansion of agriculture, containment of urban development within prescribed geographic limits, and protection of the County's natural environment.

Coastal lands in the northern county are primarily undeveloped and a large strip extending from Point Sal State Beach south to Jalama Beach County Park is within the restricted area of Vandenberg AFB with the exception of Ocean County Park at the Santa Ynez River mouth. For Point Sal northward, coastal sand dunes extend into San Luis Obispo County. Rancho Guadalupe Dunes County Park is located south of the Santa Maria River mouth where beach access is provided.

Vandenberg AFB represents the largest individual land use in the North County, occupying 5.6 percent of the County's lands. A large amount of Base land is open space. Uses in the Base are: a central area for Base support (including Air Force facilities), contractor areas, and housing; an airfield northwest of the central area; and missile launch facilities to the southwest and northwest. A railroad corridor passing through the coastal area is allocated to the Southern Pacific Railroad.

Additionally, recreational land uses are located on the Base including a campground, picnic grounds, equestrian trails, and a golf course. The use of these facilities is limited to Base personnel in almost all cases.

Land along the northern and eastern perimeters of the Base are primarily open space and grazing land. The Federal Correctional Institution is located adjacent to the east boundary of Vandenberg AFB and south of Vandenberg Village, and occupies 3,500 acres. In general, a buffer comprised of large agricultural areas is provided between the urban centers of Vandenberg Village, Mission Hills, the City of Lompoc and the Base.

Land uses in the City of Lompoc may be impacted by the future development of the Central Santa Maria Basin. The objectives for land development outlined in the City's Land Use Element provide for a linear trade district for the Lompoc Valley, prevention of incompatible uses, and the preservation of agriculture. In addition, new urban development will be encouraged to infill existing undeveloped urban areas rather than displace agricultural lands on the perimeter of the city.

Since agriculture is a significant use in the North County, long term stability of agricultural lands is a major determinant of future land use development in this area. Agriculturally-zoned lands are gradually being converted to urban uses.

According to the Santa Barbara County Open Space Element, the greatest possibilities for County urban expansion exist in the Santa Maria-Orcutt Study Area. This is due to a large amount of acreage being described as very suitable for urban expansion in this region. Of these lands, about 40 percent is in agricultural use.

SAN LUIS OBISPO COUNTY

Historically, San Luis Obispo County land uses have been oriented toward agriculture, services (especially government), and tourism. With the establishment of California Polytechnic State University, Atascadero State Hospital, and California's Men's Colony, a shift toward a more varied economy, with increases in the trade and service sectors, occurred after 1940. Agriculture continues to represent a significant land use. Between 1970 and 1979 (data from L.U.E.) agricultural acreage increased by 25 percent. Most urban and intensive agricultural uses occur in the valleys and coastal terraces of the westernmost ranges.

Definite trends in growth and development are indicated by land use shifts in the past ten years. One continuing trend is the conversion of agricultural lands to rural homesites, which have been offset in the past by the addition of new lands to agricultural operations.

Three planning areas are considered in this study, all of which are located in the southwestern portion of San Luis Obispo County: South County, San Luis Bay, and San Luis Obispo. (See Socioeconomics Technical Appendix for planning area boundaries.) These areas include. Emphasis will be given to the southernmost of these three, South County, which abuts Santa Barbara County.

The Santa Maria Refinery is located within the South County planning area which is 98,910 acres (154 square miles). This area extends to the urban boundaries of the five cities on the north, the coastal range on the east, the Santa Maria River to the south, and Pismo Dunes on the west. Diverse land uses are found in this region, including urban and suburban development of the older townsites, rural and agricultural use of the foothill and Nipomo Mesa areas, and scenic and natural characteristics of the coastal ridges and Pismo Dunes.

4.7.7.1 Project Site Land Uses

Because of the distance between the numerous project facility sites, each area is described separately. A more detailed discussion of the project components at each site can be found in the Project Description (Chapter II).

PIPELINE LANDFALL

Proposed Project

This site is located approximately 1/2 mile north of the Santa Ynez River mouth on Vandenberg AFB property. Because of this location, local land use and zoning designations are inapplicable. The undeveloped beach area is sandy with low-lying partially-vegetated sand dunes. Access to the beach is restricted to Vandenberg AFB personnel. Ocean County Park is located just south of the Santa Ynez River mouth and provides beach access. Surf Railroad Station, located approximately 1/2 mile south of Ocean County Park, also provides vertical beach access. Lateral access is not permitted from either Surf or Ocean County Park to surrounding Vandenberg AFB property. North of the pipeline outfall, beyond Vandenberg AFB is Point Sal, where public beach access is provided. Again, lateral access to Vandenberg AFB to the south is prohibited.

Alternative Landfall

Just south of the mouth of the Santa Ynez River, adjacent to Ocean County Park, is the site for this alternative. The portions of this site which lie outside Vandenberg AFB are governed by the Santa Barbara County Local Coastal Plan. The area contains an extensive wetland which is within an environmentally sensitive habitat zoning overlay designation. The coastal zone is approximately 1 mile wide in this area. The Southern Pacific Railroad parallels the beach in this vicinity, thus numerous strips of coastal land are under railroad ownership.

POWER CABLE LANDFALL/SUBSTATION

This site is located between Surf and Ocean County Park adjacent to the beach. The property is owned by Southern Pacific railroad and is therefore unclassified in both land use and zoning. (Railroad rights-of-way are not assigned land use or zoning designations.) All adjacent property is Vandenberg AFB.

PIPELINE CORRIDORS--LANDFALL TO PROPOSED LOMPOC FACILITY

The Proposed Pipeline route, Alternate Pipeline route, and Mitigated Pipeline route all cross undeveloped Vandenberg AFB property where surrounding land consists primarily of open space. Upon exiting Vandenberg AFB, the corridor continues east bordered by Vandenberg Village to the north and the Federal Correctional Institution to the south. As the route angles northeast toward the proposed Lompoc facility, it bisects rural agricultural lands separating Vandenberg Village from Mission Hills. These two residential developments are developed with single family residences at a density of 4.6 dwelling units per acre. Both of these developments are partially surrounded by rural areas, most of which are agriculturally zoned.

LOMPOC OIL SEPARATION FACILITY

These sites also apply to the gas processing facility that is an Area Study component.

Site 4--Proposed Site

Lying within Union's Lompoc Oil Field, this 22.5-acre site on a 256.95-acre parcel is adjacent to the east side of Highway 1, approximately 1 mile east of Vandenberg Village and 1 1/4 miles north of Missions Hills. The City of Lompoc is 3 miles to the south.

The site is zoned U (Unlimited Agriculture) with a land use designation of A-II-100, which is a classification applied to agricultural uses outside Urban, Inner Rural, and Rural Neighborhood areas. The minimum parcel size is 100 acres. General agriculture, such as livestock operations, is permitted as well as more intensive agricultural uses. It is currently leased out by Union Oil to cattle grazing operations. Several oil wells and unburied small Union oil and gas gathering lines are near the site indicating a past and present oil production land use. Adjacent parcels are owned by Union Oil and are part of the Lompoc Oil Field.

Site 8--Alternate Site

This site is south of the proposed Site 4 and is located 1/2 mile north of the northern boundary of Mission Hills residential development and 1/2 mile to the west. The only other nearby residential development is an existing rural neighborhood 1 1/2 miles to the southeast, developed in ranchettes at a density of one dwelling unit per 20 acres.

The land use and zoning designation is the same as that of Site 4: A-II-100 and U. The 14-acre site is included within a 40-80 acre area which is currently dry-farmed in grain and beans. Pipelines and roads servicing the Lompoc Oil Field cross the parcel but avoid the specific proposed site. Abutting properties are owned by Union, are rural in character, and include some dry farming. The existing Lompoc Dehydration Facility is south of the site and will remain in use as it is not part of the proposed project.

LOMPOC TO ORCUTT PIPELINE/ORCUTT PUMPING STATION

The Proposed Pipeline will lie within an existing pipeline corridor connecting the Lompoc Facility to the Orcutt Pump Station. This corridor is currently used for Union's 6-inch gas line, 8-inch oil line, and 6-inch produced water line and a Pacific Lighting gas main which joins the corridor near the Lompoc site. The corridor is located on lands which are of a rural character. Its southern portion lies within the Lompoc Oil Field where there are approximately 70 working oil wells. The route runs to the top of a ridge east of Harris Grade and then drops down the north side of the hills to cross under Highway 1. This area is undeveloped and holds agricultural land use designations with 100-acre minimum parcel sizes. The corridor crosses cultivated fields in the Los Alamos Valley and encounters the San Antonio Creek and surrounding flood plain. After crossing San Antonio Road and Highway 1 and 135 the route follows a frontage road.

Moving north, the corridor traverses agricultural lands that contain row crops, grape vineyards, and grazing lands. As the route approaches the area where Highways 1 and 135 divide, land use designations change to residential. With the exception of the Orcutt Pump Station site (4 acres with an adjacent 9-acre parcel owned by Union), the area south of Clark Avenue and east of Highway pump station is on property zoned M-2, General Industry, which permits almost all types of industrial operations subject to development standards. The land use designation for the site is General Industry.

Adjacent property to the west and south of the existing pump station is a 128-acre Planned Residential Development site. This site contains several large tanks but is otherwise undeveloped. Residences are located north of the pump station and Union Oil owns property to the east. Union's offices and vehicle repair services are located in this area. Beyond Union's facilities lies the urban area of Orcutt to the north and east.

BATTLES GAS PLANT

The Battles Gas Plant is located 1/2 mile east of Highway 101 between Betteravia and Battles Roads. The County Land Use Element designates this area as rural with a land use designation of agriculture and a Petroleum Resource Industry Area overlay. The zoning on the northern portion of the property is M-2, General Industry and the southern area is zoned M-1, Light Industry. Several light industrial operations occupy parcels along Betteravia to the south of the gas plant. The Santa Maria Pumping Station is to the northeast and Santa Maria Valley Production operations are to the north and west. Properties to the north, east, and west are agriculturally designated with 10- and 40-acre minimum parcel sizes. Agricultural land uses abutting the site consist of row crops. Agricultural operations use the Union gas plant access road for access to the fields. Several farm houses are scattered throughout the area. The urban area of the City of Santa Maria is located 2 miles to the west.

The site and surrounding area has been used historically for oil production. The Battles Gas Plant pre-dates County Zoning records and it appears that the use of it has evolved over the years. The plant's main function is to remove hydrocarbon liquids and impurities from the incoming natural gas before it is returned to the oil field for fuel or sold.

SANTA MARIA REFINERY AND VICINITY

The Santa Maria Oil Refinery (Union Oil Company of California) and the Santa Maria Chemical Plant (Union Chemical Division: Carbon Group) are on a large industrial parcel west and south of Highway 1. These facilities, located approximately 7 miles west of Nipomo, lie within the coastal zone in a rural setting. The Union refinery upgrades low gravity crude oil by a coking process and ships this semi-refined product to its San Francisco Refinery by pipeline. The chemicals plant processes coke and liquid sulfur from the refinery and then sells the products (calcined and green coke and pelletized sulfur) and ships by truck or rail car.

Only a portion of the total property area (1,134 acres east of railroad tracks) is occupied by the refinery and chemicals plant and the remaining land is undeveloped vegetated sand dunes. The Union property west of the railroad tracks is leased to the State Parks Department for an environment buffer zone between the refinery and the Pismo Dunes State Vehicular Recreation area.

Agricultural operations lie to the south of the parcel in the Santa Maria Valley, and the Guadalupe Oil Field occupies the coastal area to the southwest. A large automobile wrecking yard is the adjacent use to the east and scattered ranchette-type homes are found to the north and in the surrounding area. The nearest residential area is the new Black Lake Canyon development 3 miles to the east.

PORT HUENEME SITE

The proposed workboat transportation routes to Union's proposed Platform Irene originate in Port Hueneme. This port is located south of the City of Ventura on the Oxnard plain. Port Hueneme Harbor is bounded on the south by

Ningu Lagoon, on the east and northeast by State Highway 1 and U.S. 101, on the north by the Santa Clara River, and on the west by the coastline. Although land use in the immediate vicinity of the site is urbanized, agricultural land uses are found in the surrounding area. A large percentage of land within the City of Port Hueneme is devoted to military uses, particularly to the north of the harbor which is the U.S. Navy Construction Battalion. The Oxnard Harbor District is currently proposing expansion of Port Hueneme.

4.7.7.2 Property Values

The affected environment within the issue of property values includes a broad area, especially when analyzing the influence of Central Santa Maria Basin development and cumulative impacts. This area encompasses Ventura, Santa Barbara, and southern San Luis Obispo Counties. Current property values are considered in this study equivalent to current sales prices. Quantitative assessment of values are limited to residential properties due to the variation in values among agricultural, recreational, commercial, or industrial properties. Median housing values for owner occupied dwellings in Study Area communities are provided in Table 4.7-3. These values are provided for 1980 by the U.S. Census Bureau. More detailed current information is included in Technical Appendix K.

Many factors influence property values. Market constraints such as interest rates, construction costs, rising costs of land, and labor costs contribute to the fluctuation in property values. Another very significant value determinant is the availability of residential, industrial, and commercial properties which is often influenced by governmental land use controls. Property values may be distinctly impacted by surrounding land uses. Specific residential communities or sites which may be directly impacted by project facilities are described below.

In the Lompoc region near the proposed oil separation facility, potential affected areas are Vandenberg Village, Mission Hills, and a developed rural neighborhood to the southeast.

The undeveloped planned residential development site adjacent to the pump station may be impacted as well as residences to the north.

The Battles Gas Plant is not adjacent to any significant residential development.

Residential communities in the general vicinity of the Santa Maria Refinery include Black Lake Canyon homes which are new, and the Mesa Dunes Mobile Home Park several miles north of the refinery.

With the development of the Central Santa Maria Basin, property values of all types of land uses could experience both negative and positive impacts depending on the demand and location for onshore support facilities.

4.7.8 Energy

Energy consumption in the United States during 1980 totaled approximately 17.06 million barrels per day of oil.* Oil accounted for 42 percent of total energy use; natural gas, 26 percent; coal, 21 percent; and nuclear, hydropower, biomass, and other forms of energy, 11 percent. About 86 percent of this energy was domestically produced; 41 percent of the oil was imported.

Consumption of energy of all forms in California is approximately 8 percent of the total U.S. consumption. The production of crude oil in California has generally increased during the period 1975 to 1981, rising from roughly 325 million barrels to 385 million barrels in that period.* Increases are due to Elk Hills production, thermally enhanced oil recovery, and OCS activity. Natural gas is California's other major energy source. Over 80 percent of the gas is drawn from out-of-state sources.

It is expected that U.S. consumption of oil and natural gas will be 16.05* million barrels/day.

Starting with its first Biennial Report in 1977, the California Energy Commission (CEC) presented an energy strategy to serve as a guide for the State's decisionmakers. The strategy emphasized the two themes of "security in diversity" and "benefit in flexibility".** This strategy remains a central part of subsequent Biennial Reports. Utility companies have plans to incorporate significant quantities of renewable energy sources in the electrical generating capacity; building and appliance standards assure improved energy use efficiency in the future; and the use of energy conservation programs and renewable energy sources by customers is encouraged by utility companies. Despite these efforts, however, the State's economy could be threatened by oil supply disruptions and because of cost increases for depletable energy sources.

The 1983 Biennial Report** makes several observations and recommendations with respect to oil and gas resources. The Commission continues to strongly support reducing dependence on fossil fuels and cautions that potential price shocks and oil shortages are symptoms of an underlying overdependence on fossil fuels at this time. [Calif. Coastal Act, OCS Lands Act, County positions on OCS development to be added].

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* Citicorp Information Services, U.S. Economic Forecast, February 5, 1985.
** California Energy Commission, 1983 Biennial Report, 1983.

4.8 CULTURAL RESOURCES

4.8.1 Introduction

Cultural resources are places or objects which are important for scientific, historical, and religious reasons to cultures, communities, groups or individuals. Cultural resources may provide evidence of past human activity, such as archaeological, architectural, and shipwreck sites and associated artifacts. Cultural resources may include places described in religious traditions. A full discussion of cultural resources is contained in Technical Appendix G.

4.8.1.0 Cultural Resource Study Areas

To permit identification of cultural resources potentially subject to impacts from proposed and future development projects, the analysis focused on data obtained for two geographic areas: the onshore and offshore components of the regional Study Area which encompasses the Area Study scenarios (Figure 4.8-1) and the Project Area, as defined below.

The regional Study Area includes onshore and offshore components. The onshore regional Study Area is bounded on the south and west by the coastline between Gaviota and Point Sal, on the north and northeast by the Casmalia and Solomon Hills, and on the southeast by U.S. Highway 101 between Los Alamos and Gaviota. This area, in part, conforms with the ethnographic territory of the Purisima Chumash. The offshore regional Study Area encompasses the Central and Southern Santa Maria Basin areas between Point Conception on the south and Point Sal on the north. The eastern boundary is the present-day, back-beach bluffline along the mainland shore. The western boundary conforms roughly to the top of the Arguello Slope over the end of the Continental Mainland Shelf. These boundaries approximate the offshore submerged drainage patterns of the onshore Santa Ynez and San Antonio river valleys.

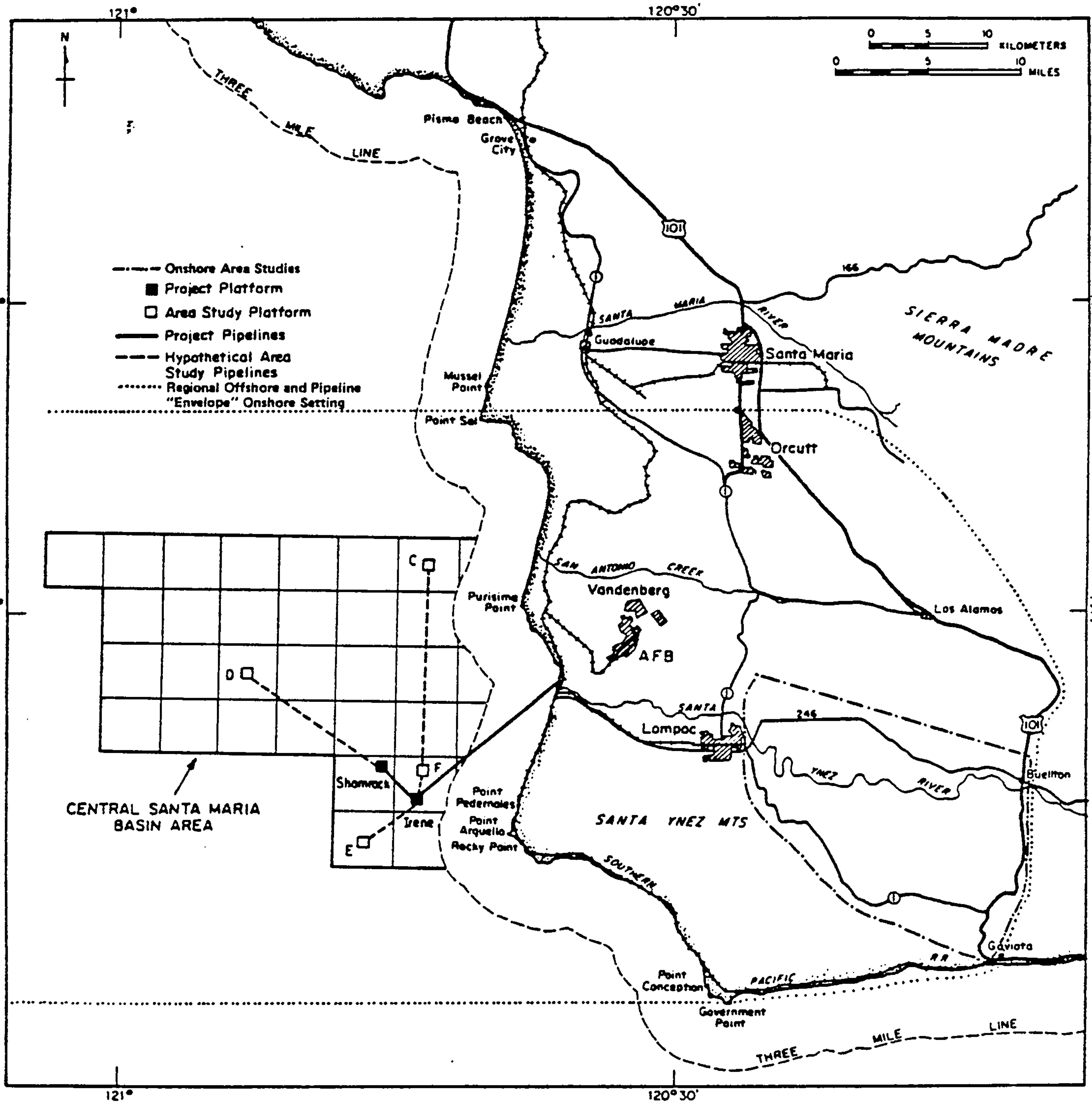
The Project Area is defined as those areas within or adjacent to components of the proposed Union/Exxon projects and their alternatives. Onshore, the Project Area consists of a corridor approximately 100 feet wide along the Surf to Lompoc pipeline and powerline corridors including alternative alignments, the Lompoc to Orcutt pipeline corridor, the proposed and alternative dehydration facility sites on the Union fee Property, and modifications to the Santa Maria Refinery. Offshore, this area consists of the federal leases in the vicinity of proposed offshore platforms and the pipeline/powerline corridors in Federal and State waters.

4.8.1.1 Definitions

Cultural resources are defined to include three categories of resources: onshore, offshore, and Native American ethnographic resources. In addition, paleontological resources are discussed under Geology, Section 4.1.8. Onshore cultural resources can be generally categorized as architectural sites, archaeological sites and isolates and Native American ethnographic sites. Offshore cultural resources include prehistoric habitation sites on ancient land forms now submerged or buried which may contain artifacts, isolated

FIGURE 4.8-1

ONSHORE AND OFFSHORE REGIONAL STUDY AREAS



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aboriginal artifacts, historic coastal shipping points and nautical sites containing shipwrecks. Native American cultural resources include areas, features, sites, plants, animals, and materials which are of cultural value to contemporary peoples, intangible spiritual qualities or essences which may be associated with environmental features, and qualities which contribute to the distinctiveness and persistence of Native American communities.

4.8.1.2 Cultural History

Early human habitation of the regional Study Area has been securely dated at 9,000 years ago [Glassow et al., 1981]. The prehistoric societies occupying the northern part of Santa Barbara County gradually evolved from simple to complex. This pattern of cultural evolution is most directly reflected in changes in artifact forms and diversity, shifts in settlement patterns, changes in artifact classes recovered from cemeteries and residential sites, and changes in faunal remains associated with stratified midden deposits. The Historic Period of the Study Area is characterized by three periods. During the Spanish Period (AD 1542-1825) the Spanish explored and colonized the area, establishing missions along the California coast. The Mexican/Americanization Period (AD 1825-1900) began after Mexico's independence from Spain and resulted in the secularization and the distribution of land to citizens. The arrival of American settlers, ranchers and farmers increased dramatically when the transcontinental railroad was established. During the Twentieth Century (1900 - present) the economic roles of the oil industry and military have increased in importance in the area. Prehistoric and historic overviews are presented in Section 2.1 of Technical Appendix G.

4.8.2 Onshore Cultural Resources

4.8.2.0 Data Sources

The identification and description of cultural resources are based on two procedures: 1) review of existing literature, records, and field surveys for both the regional Study Area and within a mile-wide corridor of the Project Area, and 2) field surface reconnaissance and limited shovel pit testing along Proposed and Alternative Pipeline routes and facility sites conducted by the Arthur D. Little project team. The literature search included published and unpublished historic documents, maps, and survey reports; archaeological site records, maps and reports on file at the Regional Office of the California Archaeological Site Inventory, University of California, Santa Barbara (UCSB); and current county, state, and federal resource listings including the National Register of Historical Places. Knowledgable individuals were also interviewed. The locations of previously and newly recorded cultural resources and the extent of former and current surveys were plotted on 7.5° U.S.G.S. topographic quadrangle maps.

Four previous archaeological field surveys [Rudolph, 1983b; Peterson et al., 1984; O'Halloran, 1984; Erlandson, 1984a, b] and a sensitivity assessment [Colten, 1983] were conducted in support of Union Oil Company's development plan by the UCSB Office of Public Archaeology (OPA). The accuracy of each survey was limited by differential vegetation coverage which affected ground surface visibility and cultural resource detection. It was estimated that accuracy was limited by moderate or low visibility rankings in approximately 75 percent of the areas surveyed [Rudolph; 1983a]. Other previous investigations included a geomorphological assessment [URS, 1984a] to identify areas which might contain buried cultural deposits, and a land use history [URS, 1984b] which discussed historic sites along the Proposed Pipeline corridor.

Field surface reconaissance conducted by Arthur D. Little covered 100-foot-wide corridors along the following Project Area segments: 1) the Proposed Pipeline route to the preferred dehydration facility Site 4, including the valve station and the alternative transmission line route; 2) the Proposed Pipeline route to the alternative dehydration facility Site 8; 3) previously recorded areas of cultural sensitivity on the route from Site 4 to Orcutt; 4) the Alternative Pipeline route between Site 8 and Site 4; and 5) portions of the Alternative Pipeline route to Site 4 including the proposed trasmission line route. Along the alternative pipeline route to Site 4, the survey excluded areas with excellent surface visibility where no sites had been previously recorded and the visibility conditions had not changed, and areas in which poor visibility prevented surface examination.

Because of dense vegetation and the high probability of buried sites in the area, a program of limited shovel pit testing was subsequently conducted at 21 locations to confirm the presence or absence of sites within the pipeline right-of-way. These areas were identified as highly sensitive, because of the presence of isolates and prehistoric sites in the vicinity.

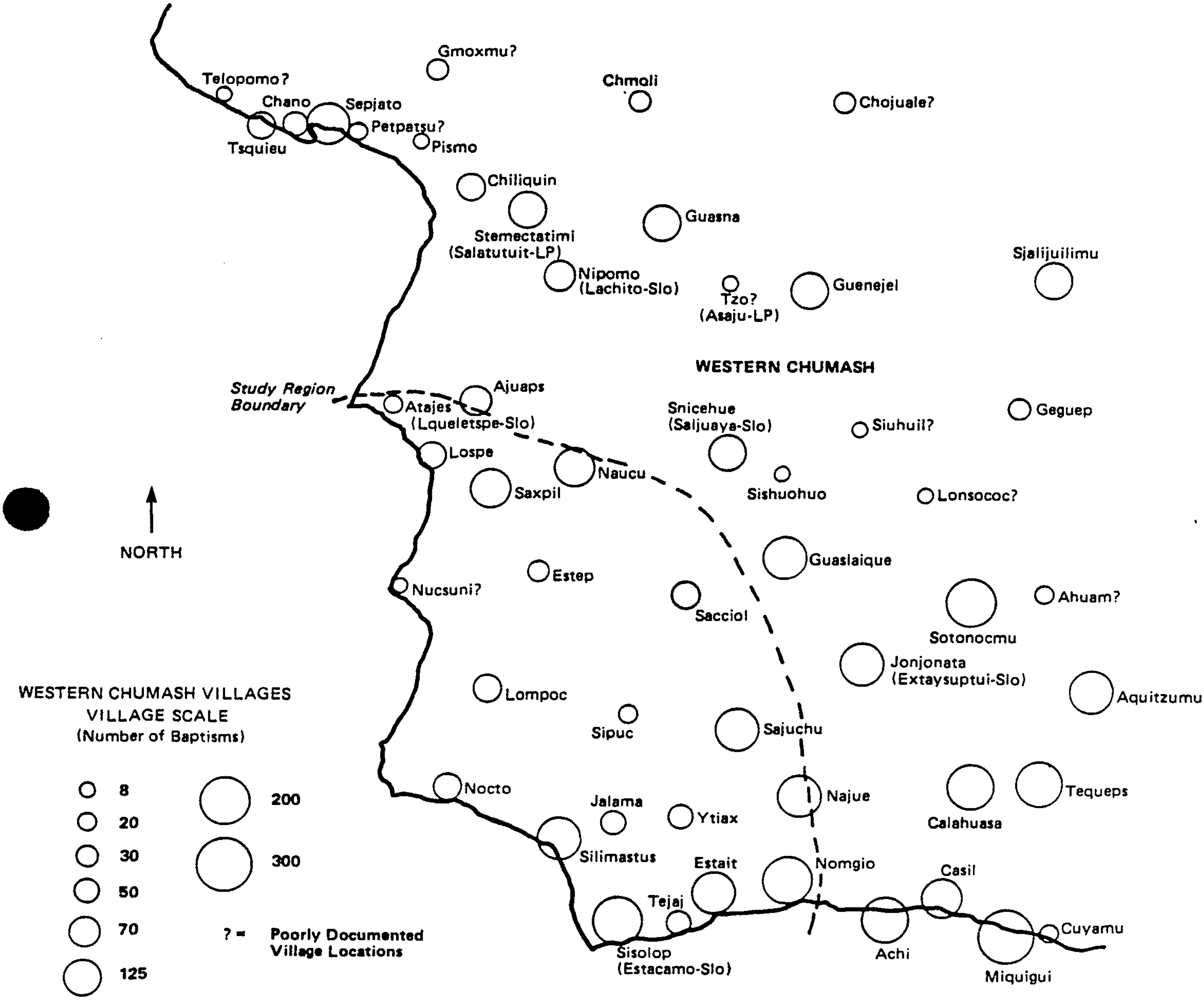
The locations of potential historical sites within the Project Area also were verified through field inspection by the project historian, in consultation with local residents and project archaeologists.

4.8.2.1 Regional Setting

The regional Study Area contains a great diversity of cultural resources representing all of the major periods in the history and prehistory of Santa Barbara County. Archaeological research in the Study Region has resulted in the recognition of a wide range of archaeological site types. Prehistoric sites range from the remains of large villages occupied for thousands of years, to the remains of camping areas used only during one day. As shown on the map in Figure 4.8-2, approximately 18 villages were established in the Study Region during the period of Missionization. Some of these were large (Gaviota with 300 residents), while most had between 50-150 residents. These villages were occupied for over 9,000 years, although locations changed over time and more small villages existed prior to historic missionization. Site types identified by previous research include: 1) villages; 2) seasonal residential bases; 3) overnight camps; and 4) day use locations [Glassow et al., 1984: Chapter 10: 12-20]. Each of these sites contains a variety of plant and animal remains and artifacts which reflect the activities conducted at the sites and the seasons of the year during which the sites were occupied. Changes in society and technology are also reflected.

FIGURE 4.8-2

SIZE AND LOCATION OF CHUMASH VILLAGES



Prehistoric archaeological sites are frequently located on bluffs overlooking drainages in mesa areas and are often near streams in foothill areas. Most sites identified in the region contain residue resulting from the manufacture of stone tools, rocks altered by heating in fires, and/or shellfish remains. In only a few areas have cemeteries or isolated burials been identified although additional isolated burials may exist. The distribution of archaeological sites exhibits the highest density near the coast and along the edges of the Santa Ynez River and San Antonio Creek. Archaeological sites are found less frequently in most other areas in the Study Region. Finds of isolated artifacts may indicate either the presence of a more substantial site deposit buried in the vicinity or the presence of a few artifacts indicating a very limited range and degree of cultural activity at a location.

In addition, the regional Study Area is rich in historic resources which represent all phases of its history and economic development. The Spanish Period is represented by ancient port sites and trails as well as by water conveyence systems, vineyards, gardens, livestock facilities, granaries, and other outlying structures associated with the Missions. The Mexican/early Americanization Period is represented by adobe homes, walls and outlying houses or ranches, temporary camps and stock-holding facilities. Typical resources from the later American Period include wooden residences, schools, dairy facilities, bridges, wharves, lighthouses, stage stops, and rail facilities.

Historical resources within the Study Region that are designated as national, state or local landmarks are listed in Table 4.8-1. In addition, the following historic resources have been identified within 1 mile of the coastline between Point Conception and Point Arguello: Ranch Complex at Canada Honda, Sudden Ranch Headquarters, Sudden South Ranch, Rennie Barn and Corral, Murphy Ranch House, Mission La Purisima Asistencia, Spanish Wine Processing Site, Jalama House (an estancia) [Chambers, 1981]. Historic wharf sites between Point Sal and Point Conception include: Point Sal, Chute Landing, Lompoc Wharf, Meherin Wharf, Point Arguello (sometimes referred to as Sudden Landing), Rancho Espada, Point Arguello Lifeboat Station, and Wreckers Wharf (Technical Appendix G, Table 3.1-2). The regional Study Area also includes the historic sites listed in Table 4.8-5.

4.8.2.2 Characteristics of the Project Area

PREHISTORIC ARCHAEOLOGICAL SITES

Nineteen prehistoric archaeological sites and eighteen isolates have been identified in the Project Area. These are listed and described in Tables 4.8-2 to 4.8-4. Each of these sites is within segments of the 100-foot wide pipeline right-of-way with the possible exception of SBa-1895. Sites are ordered in Table 4.8-2 according to project alternatives and are in sequence along the routes beginning at the ocean. The first 11 sites and eight isolates are along the Proposed Pipeline route to Site 4. The alternative transmission line route, which follows the Proposed Pipeline route to Santa Lucia Canyon, includes the first eight sites and three isolates identified in the table. Following these are six additional sites and two isolates on the

Table 4.8-1

RANKED HISTORICAL RESOURCES IN THE REGIONAL STUDY AREA

Ranked Historical Resources	Inventory
La Purisima State Historical Monument	California State Historical Landmark No. 340; National Register of Historic Places (1978)
Site of Mission Vieja de la Purisima	National Register of Historic Places, (nominated)
Well Hill No. 4	California State Historical Landmark No. 582
Point Arguello (Shipping Point)	Santa Barbara County (SBCo) Inventory
Santa Rosa (House)	SBCo Inventory.
Cordero Adobe	
Point Conception Lighthouse	SBCo Inventory.
San Julian Ranch	SBCo Inventory.
De la Cuesta Adobe	SBCo Inventory.
Artesia School	SBCo Inventory.
Gaviota Wharf	California Inventory of Historic Places
Fabing-McKay-Spanne House	Designated a local landmark by Native Daughters of the Golden West

Table 4.8-2

DESIGNATION OF PREHISTORIC ARCHAEOLOGICAL SITES AND ISOLATES BY PROJECT ALTERNATIVES

Site or Isolate	Proposed Route to Preferred Site	Proposed Route to Alternative Site	Alternative Route to Preferred Site
SBa-1888	X	X	
X-1	X	X	
SBa-1889	X	X	
SBa-912	X	X	
SBa-1890	X	X	
SBa-1909	X	X	
SBa-1891	X	X	
SBa-914	X	X	
SBa-687	X	X	
X-2	X	X	
X-3	X	X	
SOH-2	X		
SOH-3	X		
X-6	X		
SOH-4	X		
X-4	X		
SBa-1743	X		
SBa-1896	X		
SBa-1910	X		
SBa-1892		X	X
JR-12		X	X
SBa-1893		X	X
SBa-1894		X	X
SBa-1768		X	X
SBa-1769		X	X
SBa-1771		X	X
X-5			X
SBa-219			X
SBa-1895*			X

* Possibly extends within Right-of-Way

Table 4.8-3

CHARACTERISTICS OF PREHISTORIC ARCHAEOLOGICAL SITES

Site Number	Artifacts Observed - Surface Observation Only	Shell Present	Tentative Site Type
SBa-1888	Hammerstone, 2 chert cores, chert* flakes	X	Base or camp
SBa-1889	Schist charmstone fragment, 2 chert knife blank fragments, chert flakes		Base or camp
SBa-912	Fire altered rock, chert flakes	X	Camp
SBa-1890	Hammerstone fragment, chert core chert flakes	X	Base or camp
SBa-1909	Biface thinning flake, chert flake		Camp or location
SBa-1891	2 chert knife blank fragments, biface thinning flake, chert flakes, fire altered rocks	X	
SBa-914	Chert flakes, fire altered rock fragment	X	Base or camp
SBa-687	2 round + 2 concave base chert arrowpoints fire altered rocks, chert flakes	X	Base or camp
SBa-1743	Stone bowl or mortar fragment, chert bifaces, backed flakes, utilized flake, chert cores and flakes		Base or camp
SBa-1896	Chert biface thinning flake, chert flakes		Base or camp
SBa-1910	Chert flakes	X	Base, camp or location
SBa-1892	Knife fragment, 2 knife blanks, flake scraper, flakes, 5 fire altered sandstone cobbles		Base or camp
SBa-1893	Chert flakes		Camp or location
SBa-1894	Chert knife blank fragment, mano fragment, chert flakes, fire altered rocks		Base or camp
SBa-1768	1 chalcedony scraper, 3 utilized flakes, chert flakes, fire altered rock		Base or camp
SBa-1769	Hammerstone, flakes, fire altered rock		Base or camp

Table 4.8-3
(continued)

CHARACTERISTICS OF PREHISTORIC ARCHAEOLOGICAL SITES

Site Number	Artifacts Observed - Surface Observation Only	Shell Present	Tentative Site Type
SBa-1771	Mano fragment, fragment of small stemmed projectile point, 2 chert cores, utilized flakes, flakes		Base or camp
SBa-219	Hammerstone, large chert knives or knife blanks,flake tools, and flakes - tradition of many artifacts found at site (Ruth 1936)	X	Late period village
SBa-1895	Chert flakes		Base, camp, or location

*All chert is Monterey chert unless identified otherwise

Table 4.8-4

PREHISTORIC ARCHAEOLOGICAL ISOLATES
(MISCELLANEOUS ARTIFACTS AND POSSIBLE SITES)

Designation	Description	Number of Shovel Test Pits*
X-1	Shell and glass fragments	3
X-2	Chert** biface fragment, 4 chert flakes, 1 piece of mussel shell	3
X-3	3 chert flakes	2
SOH-2	Chert point midsection	0
SOH-3	Chert flake	1
X-6	Small green chert concave based arrow point	1
SOH-4	Retouched chert flake	1
X-4	Chert core and chert flake	3
JR-12	Stone pestle and 2 chert flakes	2
X-5	2 chert knife blanks, 4 chert flakes	0
JR-9	Piece of chert shatter	1
JR-7	2 chert flakes	1
JR-6	Broken Pismo clam shell	0
JR-4	Chert flake	1
JR-3	Small cluster of shell and glass	1
JR-2	Chert flake and piece of chert shatter	1
JR-1	Turban shell and piece of sawed bone	1
JR-8	3 pieces of chert shatter	0

NOTE: JR-1,2,3,4,6,7, and 9 are along the route from Site 4 to Orcutt and 1,2,3,4,7, and 9 are in the impact zone.
JR-8 is on the route from Site 8 to Orcutt and is within the pipeline corridor.

* No cultural material was found in the shovel test pit at any of the isolates identified above

** All chert is Monterey chert.

Table 4.8-5

HISTORIC RESOURCES IN THE VICINITY OF PROJECT COMPONENTS

	Historic Site	Description	Project Component
A.	Santa Lucia Canyon Adobe and House	No surface remains; set off by vegetation; site of Olivera home; Jesus Maria Ranch (mid-1800s)	Proposed pipeline to Site 4
B.	Aquaje School Site	Lumber from collapsed structure and introduced vegetation; school served early settlers in Santa Lucia Area from 1895-1925	Proposed pipeline to Site 4
C.	Surf Depot	Parts of original depot built in 1990 incorporated into current structure; SPRR station since late 1800s	Alternative Pipeline to Site 4
D.	Ocean Beach County Park	No structures; used for recreational purposes by early and current residents since the early 1900s	Alternative Pipeline to Site 4
E.	Huyckville	No structures, site of former cluster of farm residences (late 1800s)	Alternative Pipeline to Site 4
F.	Lynden School	Site of school used by Huyckville residents from early 1900s-1944.	Alternative Pipeline to Site 4
G.	Artesia School	First school in Lompoc moved to this site in 1908 and served for 85 years	Alternative Pipeline to Site 4

Table 4.8-5
(continued)

PROJECT AREA HISTORIC RESOURCES

	Historic Site	Description	Project Component
H.	Dyer Bridge	Present steel bridge at site built in 1940; original bridge built in 1889	Alternative Pipeline to Site 4
I.	Maple School	One of Lompoc's first schools; original 1908 structure burned in 1920; rebuilt and stands today	Alternative Pipeline to Site 4
J.	Well No. 4 "Hill"	First "cement" water well; still functioning - State Regional Landmark No. 582	Pipeline Route Site 4 to Site 8
K.	Heurta Matheo	Site of Matthew Gardens from Mission period, associated with SBa-1772	Pipeline Route Site 4 to Site 8
L.	Harris Ranch and Station	Site of important ranch, travel and water station from 1880s	Proposed Pipeline Route: Site 4 to Orcutt
M.	Pacific Coast Railway	No remaining structures; site of narrow gauge railway from Orcutt depot to Harris Station from 1887-1934	Proposed Pipeline Route: Site 4 to Orcutt
N.	Graciosa Town/Stage Stop	Site of small settlement and stage stop from mid-1800s. Exact locations unknown	Proposed Pipeline Route: Site 4 to Orcutt

Proposed Pipeline route to the Alternate Site 8. The remaining two sites and one isolate listed in this table are located along the Proposed Pipeline route from landfall to the point where it joins the route segment which continues to Site 8. The proposed transmission line route also includes these two sites and one isolate. Table 4.8-3 provides a brief description of the artifacts found at these sites and isolates. The sites are tentatively classified as villages, seasonal residential bases, overnight camps or day use locations. Similar information is provided in Table 4.8-4 for the 19 known isolates located along the pipeline routes from the dehydration facility sites to Orcutt. No prehistoric or historic sites were identified at the proposed and alternate substation sites, the Lompoc Dehydration Facility Sites 4 or 8, or the Santa Maria Refinery.

The Project Area includes, or is near to, prehistoric and historic Chumash archaeological sites containing the remains of diverse settlements, and many represent day-use locations or overnight camps along a trail from the interior Santa Ynez River Valley. Sites range from the historic village of Lompoc (SBa-219) and its probable predecessors to isolated artifacts. Most of the sites and trails on the north side of the Santa Ynez River are the remains of residential bases or camps used by Native Americans during hunting and/or gathering expeditions. These sites are arranged in a linear pattern suggesting a trail system. The destination of people utilizing these trails may have been the highly productive intertidal resource zones between Point Pursima and the Santa Ynez River. These sites and trails suggest that for thousands of years hunting and gathering were especially productive in the marshes of the lower Santa Ynez River.

HISTORIC SITES

Over 90 possible historic sites and structures within a 1 mile corridor of Project Components were catalogued from searches of historic maps and literature (see Technical Appendix G, Table 2.3-4). In addition to these, one site, the Old Pacific Coast narrow gauge Railway right-of-way, falls within the Proposed Pipeline right-of-way from Lompoc to Orcutt. An additional 13 sites of local importance are located near project components but do not fall within the pipeline right-of-ways or facility site boundaries. These sites, dating from the middle-to-late 19th Century to the early twentieth century, are listed in Table 4.8-5 and are characteristic of the Historic Periods discussed in Section 4.8.2.1. (See Figures 2.3-3 and 2.3-4 Technical Appendix G.

4.8.2.3 Area Study Development

Potential cultural resources in the vicinity of onshore Area Study pipelines have been discussed in Section 4.8.2.1. La Purisima Mission is particularly sensitive from both the prehistoric and historic perspectives. Native American ethnographic sites, including the highly sensitive Gaviota area, are discussed in greater detail in Section 4.8.4.1.

No prehistoric or historical sites are currently documented at the location of the consolidated processing facility at Lompoc.

4.8.3 Offshore Cultural Resources

4.8.3.0 Data Sources

The identification of offshore cultural resources involved a comprehensive review of previous studies specifically applicable to the proposed project [Horne, 1984a, b; MacFarlane 1984; Pierson 1982] as well as surveys, literature and historic accounts relevant to the Study Region. The geophysical data (side-scan, sonar, magnetometer, and subbottom profiles) were selectively reviewed again for re-interpretation of potential anomalies.

Only 5 percent of the regional Study Area (Point Conception to Point Sal) has received a preliminary offshore cultural resources remote sensing survey. The resolution of these surveys, of a scale compatible with geologic hazards surveys, is sufficient to determine the location of objects of several square meters in size from surrounding sediments, however, the resolution does not, in most cases, provide sufficient detail to identify these objects. The result is that unless the object is large and clearly the shape of a vessel hull, its existence is reported as an unidentified bottom feature. Without additional investigation, features such as older, low-profile wooden shipwreck sites are easily confused among anomalous geologic outcroppings.

Within the 30 lease blocks comprising the federal waters portion of the survey area, five whole blocks (OCS-P 0427, -P 0432, -P 0436, -P 0441, and -P 0444) and portions of five others (OCS-P 437, P 0438, -P 0439, -P 0440 and -P 0510) have been surveyed. This comprises approximately 20 percent of the MMS Area Study. In federal waters outside the Area Study, but still within the larger regional study area, an additional seven blocks (OCS-P 0416, -P 0506, -P 0448, -P 0315, -P 0316, -P 0317, and -P 0318) and portions of four others (OCS-P 0447, -P 0450, -P 0451 and -P 0452) have seen cultural resources geophysical data review. The locations of these survey areas are shown in Technical Appendix G, Figure 3.1-1.

Within California State Waters north of Point Conception, only two pipeline surveys have been conducted. These are the current project study route, (Platform Irene to shore near the mouth of Santa Ynez River) and, located at the southern limits of the regional Study Area, the Chevron Platform Hermosa to shore at Point Conception. An additional pipeline route within the Study Area leaves Platform Hermosa and rounds Point Conception to the south but will not be discussed as part of this study.

Based on these surveys in federal and state waters, 74 features and objects of potential cultural interest are found in offshore waters. Five appear to be shipwrecks of recognizable hull shape as seen by data analysts. If built in the Nineteenth Century, these vessels may be presumed to be of iron hull construction; vessels built of wood are probably of Twentieth Century manufacture due to the rapid deterioration of organic construction material in the marine environment. The identities of these vessels are currently unknown. Of far more potential cultural value are the older, now unrecognizable wooden-hulled vessels which, may be present in the Study Area.

4.8.3.1 Regional Setting

No submerged prehistoric habitation sites are known for the Study Area, although the potential for the preservation of drowned sites along unprotected coastlines is being evaluated [Masters and Flemming, 1983].

The Southern California coast was inhabited by aboriginal marine-oriented populations during post-Wisconsin time (since last glacion). Onshore settlement distribution indicates a preference towards lagunal and estuariane environments. Holocene (current geologic era) marine sediments unconformally orverlie a buried wave-cut sea cliff formed during the post-Wisconsin transgression, probably between 9,000 and 14,000 years ago. Inshore of this feature are low-relief cross-shelf channels that terminate at or near the buried sea cliff. These deposits represent estuarine environments that retreated across the present shelf. Burial in a low-energy environment may provide rare artifact preservation on the dominantly open, high-energy California Coast.

A number of prehistoric artifacts have been found in shallow coastal offshore waters south of Point Conception for many years by skin and SCUBA divers [Hudson, 1976]. These finds are of a random nature, both in their occurrence and reporting, but are thought to be the result of cliff retreat into coastal midden or ceremonial deposition (the purposeful placing of human artifacts in offshore underwater locations). However, no aboriginal artifacts have been reported as occurring offshore of the area between Point Conception and Point Sal. Accidental loss from water craft upsets or sinkings would provide artifacts as well.

The regional Study Area has a long and varied nautical history. The aboriginal populations of the California coast and Oriental and European vessels are known to have traveled in area waters [Brooks, 1975; Hudson et al., 1978; Paez, 1968]. Over 50 vessels of various descriptions and periods, are known to have gone aground or sunk within or near the regional Study Area [Marshall, 1978; Pierson, 1978]. Many more sinkings may have gone unrecorded.

Moreover, natural headlands such as El Cojo, just east of the Point Conception area, were the site of historic shipping activities, smuggling, and whaling beginning in the mid-1700s. In the 1870s, wharves were established along the entire Pacific Coast. These sites, discussed in 4.8.2.2, served as the focus of regular trading activities and transportation activities until replaced by the railroad near the end of the century.

In addition, 74 features and objects known to be in offshore waters could have cultural significance. Of the 59 bottom features identified in federal waters, four have obvious characteristics suggesting a shipwreck. The other 55 features are of unknown cultural significance. Within California State Waters, thirteen unidentified bottom features are considered anomolous and three have obvious shipwreck appearances.

These data events of unknown origin are seabottom features which appear on remote sensing records, but not enough detailed information is available to determine their identity. Outcroppings, abandoned drill sites, and shipwreck locations all have characteristics which sometimes can be confused or are indistinguishable under certain survey methodologies. Large objects and small vessels may appear as only small hard reflections on otherwise homogeneous sonar records.

4.8.3.2 Project Area Characteristics

PLATFORM IRENE AND PIPELINE ROUTES

MacFarlane [1984] notes 27 data events of unknown origin near the platform site along the pipeline route into shore. At the site of Platform Irene, three unidentified sonar targets have been identified. From Platform Irene to shore, 11 unidentified bottom features are identified [MacFarlane, 1984], and at least one is thought to be a shipwreck.

The Irene to shore power cable landfall at Surf is located near the historic Meherin Wharf (Technical Appendix G, Table 3.1-2). The archaeological extent of the activity area associated with this feature is unknown and additional investigation is needed to locate (and avoid) the site. Remnant piling stubs seaward of the surf zone could exist to mark the exact location of the wharf and the center of the historic activity in association with it.

PLATFORM SHAMROCK AND PIPELINE ROUTES

A supplemental study of the relocated Project Shamrock Platform [Horne, 1984b] shows the site to have an unidentified bottom feature located approximately 2,000 feet (610 m) northeast of the proposed location. Water depth at this location is 277 feet (84 m).

The Proposed Pipeline route running from Platform Shamrock southeast to Platform Irene is not seen as containing identifiable bottom features of potential cultural significance.

AREA STUDY PLATFORMS

The hypothetical platforms assumed to be located in Federal Lease Blocks OCS-P 0427, -P 0495, and -P 0510, have not yet received site-specific geophysical surveys to determine cultural resource presence. A fourth platform is potentially located in lease block OCS-P 0441 near Platform Irene. Since this block has already received a cultural resource survey, the additional platform would be sited according to results of that survey, summarized in Pierson [1982]. The potential for these locations and their pipeline routes to contain cultural resources is considered high due to the known level of historical maritime activity in the area and the density of unidentified bottom features of potential cultural resource significance already observed in the vicinity.

4.8.4 Native American Cultural Values

4.8.4.0 Regional Setting

The Study Region lies within the aboriginal territory of the Purisima Chumash. The Chumash, organized into large maritime villages, experienced ecclesiastical, demographic, political, and economic incorporation first under the Spanish missionaries, and later under the Mexican and U.S. governments. Today, two contemporary Native American groups are involved in cultural resource issues: the Reservation Chumash and the non-reservation Indians. The Elders Council of the Santa Ynez Indian Reservation consults on cultural resources and monitors archaeological fieldwork. The non-reservation Indians, represented locally by the United Chumash Council, include a diverse group of people who are identified as Chumash but who are not recognized as such by the Federal Government.

In recent years local Chumash have taken an increasingly active role in heritage issues. Consultation with local Chumash groups [Martin, 1984] has confirmed the conclusions of earlier ethnographic studies [Craig, 1980; Munoz, 1981a; O'Connor, 1984] regarding the types of heritage resources which are of concern. These include, in order of overall sensitivity: burial and other spiritual sites, historic village sites, and native flora and fauna.

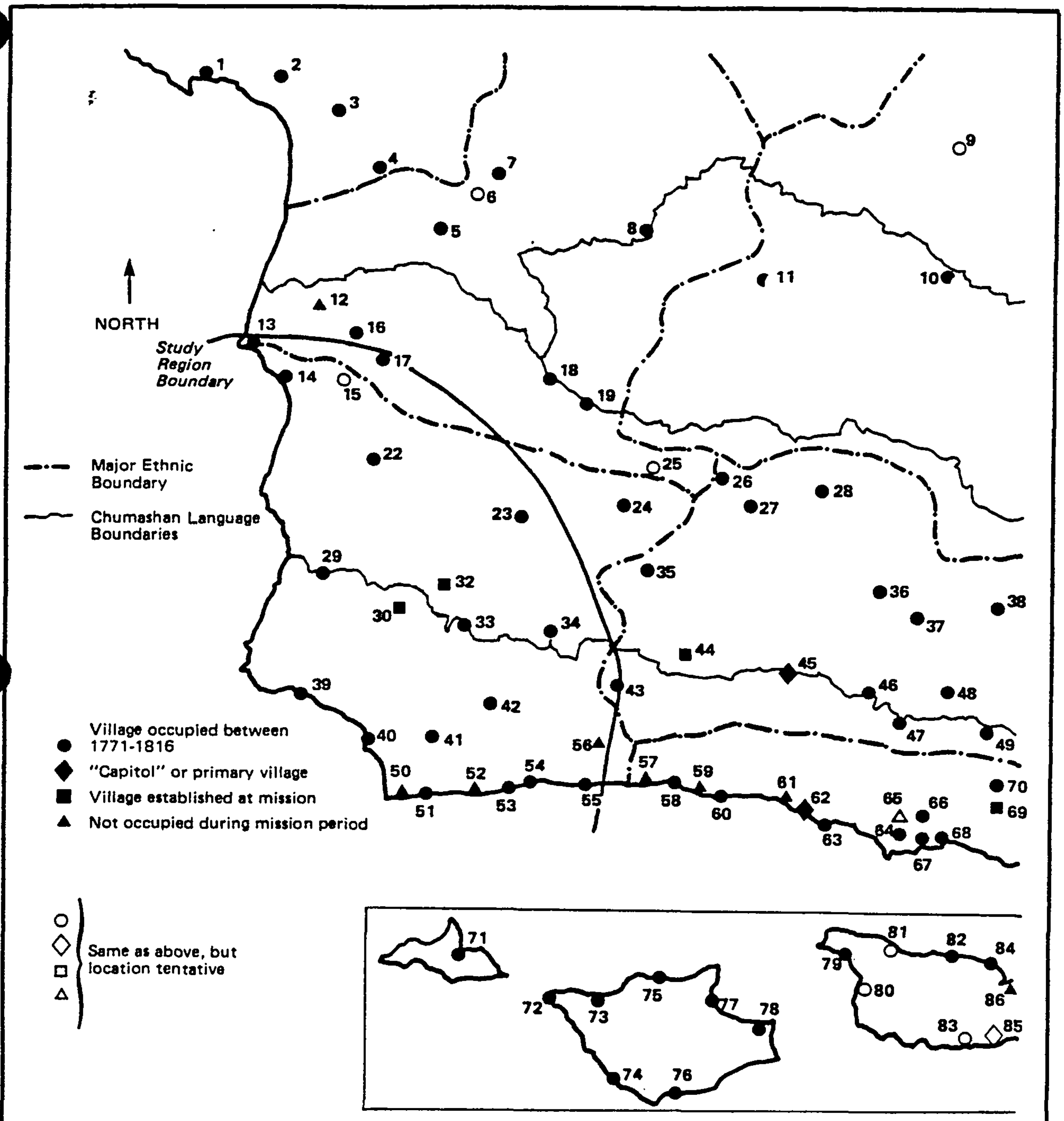
Burial sites are regarded as particularly sacred by contemporary Chumash. The actual distribution of burial sites in the regional Study Area is unknown, but intact cemetery areas are likely to exist at known Chumash village sites. Isolated burials also may exist. At least six areas (two within the Project Area) are known or expected to contain human remains. Within the regional Study Area, the area along Highway 1 between Lompoc and Gaviota contains three recorded Indian burial sites. The highly sensitive Gaviota area contains one recorded cemetery (SBa-96) and at least one other probable burial site near Alcatraz Canyon. Within this Study Region, the State historic landmark La Purisima Mission area includes potential burials. Located about 1 mile south of the Mission, SBa-221 contains late period Chumash burials.

Other spiritual sites with religious significance to contemporary Chumash are also located in the Study Region. For some segments of the Chumash community, the area of greatest sacredness within the region is Point Conception, along with associated altar sites in the foothills overlooking the peninsula. The Gaviota area is sensitive not only because of the concentrated nature of archaeological sites in the vicinity, but also because of the recent occupation of the area by members of the Brotherhood of the Tomol [O'Connor, 1984]. Additional sites from the archaeological record of potential religious significance are Chumash rock art site (SBa-480) and the sitting cave of Fernando Librado (SBa-1705H).

Archaeological sites, in particular those associated with Indian occupation in the Historic Period, are considered sacred by the Chumash. Twenty-two historic villages have been documented for the Study Region as shown in Figure 4.8-3. In particular, Naucu, Lompoc, Sipuc, Ytiax and Nomgio lie on or near proposed project components. Three prehistoric Indian villages (SBa-527, SBa-520, and SBa-1774) were part of the La Purisima Mission settlement and are also located in proximity to the Alternative Pipeline route.

Native plants and animals hold a special place in the cosmology of Chumash peoples and continue to be utilized in the traditional manner for food, medicine, spiritual objects, and craft materials. Wild plants for which greatest concern has been expressed are wetland species utilized for food, medicine, basketry and a variety of other crafts. As shown in Table 4.8-6,

LOCATIONS OF HISTORIC CHUMASH VILLAGES IN THE STUDY REGION*



HISTORIC CHUMASH VILLAGES

Compiled by Chester D. King from the Notes of John P. Harrington and Other Sources

13	Atajes	32	"AMUU" (SBA-519)	50	'Upop
14	Lospe	33	Sipuc (SBA-249)	51	Sisolop
15	Kasmali/Saxpil	34	Sajuchu	52	Lisil
17	Naucu	39	Nocto	53	Tejaj
22	Estep	40	Silimastus	54	Estait
23	Sacciol	41	Jalama	55	Nomgio (SBA-97)
29	Lompoc (SBA-219)	42	Ytiax	56	Panawpe
30	Lashsakupi				

*After Craig & King 1978:139-40; King 1984.

Table 4.8-6

WILD PLANTS UTILIZED BY LOCAL CHUMASH INDIANS

Common Name[1]	Scientific Name[2]	Use(s)
Juncus	Juncus spp.	Basketry
Tule/Bullrushes	Scirpus spp.	Basketry
Bur-Reed	Sparganium eurycarpum	Basketry
Willows	Salix Laevigata [red]	Basketry
Nettles	Urtica holosericea	Cordage, Food, Medical
Devil's Claw	Proboscidea louisianica	Basketry, Food
Cattails	Typha spp.	Cradleboards, Shoes, Food
*Teasel Rod (Fuller's Teasel)	Dipsacus sativus	Combs, Crafts
Elderberry	Sambucus mexicana	Food, Crafts, Medicinal
Soap Root	Chlorogalum pomeridianum	Soap, Brush Fibers
*Scarlet Pimpernel	Anagallis arvensis	Soap
Acorns	Quercus spp.	Food, Crafts
Thistle	Cirsium rhothophilum	Food
Miner's Lettuce	Claytonia perfoliata	Food
Catalina (Choke) Cherries	Prunus ilicifolia spp.	Food, Crafts
Brodiaea Bulb	Prodiaea pulchella	Food
*Mustard Greens	Brassica spp.	Food
*Watercress	Rorippa nasturtium-aquaticum	Food
*Anise	Foeniculm vulgare	Food
Penny Royal (Poleo)	Monardella spp.	Food, Medicinal
Yarrow	Achillea millefolium	Food, Medicinal
*Manzanita	Arctostaphylos spp. matricarioides	Food, Medicinal
Sage	Salvia mellifera [black] S. leucophylla [purple] S. apiana [white]	Medicinal Medicinal
Swamp Root	Anemopsis california	Medicinal
Chia	Salvia columbariae	Medicinal
Coffeeberry	Rhamnus california	Medicinal
Squaw Tea/Mormon Tea	Ephedra spp.	Medicinal
Wild Rose	Rosa california	Medicinal
Mugwort	Artemisia douglasiana	Medicinal
*Chickweed	Stellaria media	Medicinal
Poison Oak	Toxicodendron diversilobum	Medicinal, Basketry

[1] Wild plants not native to the area (introduced communities) are indicated by an asterisk.

[2] Compiled with the assistance of Ann Howald, project consultant in botany.

these include such communities as juncus, tule, bullrushes, bur-reed, willows, cattails, swamp root, and "mormon tea." Because the amount and quality of plant materials have declined, all wetland areas are highly sensitive for Native Americans. All segments of the Chumash community share generalized concern for the well being of animals, and for certain groups, animals such as deer, owls, eagles, and condors which have a special significance in sacred doctrine or ritual.

4.8.4.1 Characteristics of the Project Area

Information on Native American resources in the Project Area has been compiled from extant archaeological site records, new archaeological surveys of proposed corridor and facility areas, ethnographic literature review and consultations with local Chumash Indians.

BURIAL SITES

At least two areas are known or expected to contain human remains. These include the Santa Ynez River Terrace (Southern Vandenberg AFB), and the location of the historic Chumash village of Lompoc. The Vandenberg AFB segment of the Proposed Pipeline route contains numerous prehistoric sites and the potential for many buried sites. The discovery of a Charmstone (an artifact frequently associated with grave goods) suggests the possibility of human burials. The Lompoc Site (SBA-219) is highly sensitive because of the probability of burials and the potential genealogical linkages of its inhabitants to contemporary Chumash families. The Proposed Pipeline route Site 8 passes in close proximity to SBA-931, a burial site north of Surf.

OTHER SPIRITUAL SITES

Sites which may be assigned sacred or spiritual significance by Native Americans were not identified within the Project Area.

HISTORIC VILLAGE SITES

Two known Chumash historic village sites lie on or near Proposed Pipeline route and facilities site alternatives: Naucu and Lompoc. The historic village of Lompoc (SBa-219) lies directly in the path of the Alternate Pipeline route to Site 4.

NATIVE FLORA AND FAUNA

Areas designated for project pipeline corridors and facilities contain most if not all of the floral species utilized by contemporary Indians for traditional foods, medicines, and craft materials as described in Table 4.8-6. The most sensitive of these resources, however, and those with the most limited distribution are found in wetland areas along the proposed route. Two areas were identified by Native American field observers as highly sensitive. These are (traveling from west to east on the Proposed Pipeline Route) the Santa Lucia Canyon area and a wetland approximately 1/2 mile east of Santa Lucia Canyon and adjacent to SBa-1824.

Native fauna in areas of the proposed projects are plentiful. No critical habitat areas, however, were encountered or identified by Native American field observers. The distribution and sensitivity of Native Wetland resources is discussed further in Technical Appendix F - Terrestrial and Freshwater Biology.

4.8.4.2 Area Study Development

The onshore Area Study scenario, with respect to potential pipeline routes, has been discussed in Section 4.8.4.0, above. The co-located gas processing site, next to the proposed dehydration facility, is not expected to include sensitive Native American resources.

4.8.5 Regulatory and Institutional Setting

Cultural resources are protected by legislation, rules, and regulations designed to preserve the environment, historical, and archaeological resources, and Native American heritage. Federal, state, and local agencies concerned with cultural resources that may be affected by the proposed projects or their alternatives include those with jurisdiction over lands in the Project Area and those with jurisdiction over cultural resources.

4.8.5.0 Federal Laws, Rules, and Regulations

NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act of 1969 (P.L. 91-190; 30 State 852) contains a statement of national policy to "preserve important historic, cultural, and natural aspects of our national heritage, and maintain wherever possible, an environment which supports diversity and variety of individual choice." [Section 101(b)4]. The range of cultural resources protected by NEPA is broader than that provided for by legislation protecting historic sites.

The Council on Environmental Quality Regulations (36 CFR 1500-1508) implement NEPA. Public participation is considered important to ensure identification of cultural resources. Section 1501.7(a)1 of the regulations requires that the NEPA lead agency, "invite the participation of affected federal, state, and local agencies, any affected Indian Tribes, the proponent of the action, and other interested persons."

NATIONAL HISTORIC PRESERVATION ACT (NHPA)

The National Historic Preservation Act (NHPA) of 1966, as amended, established: (1) a National Register of Historic Places to be maintained by the Secretary of the Interior, (2) the position of State Historic Preservation Officer appointed by the governor of each state, and (3) an Advisory Council on Historic Preservation. Federal agencies are required to provide the Advisory Council with an opportunity to comment on any federal action which will affect properties included in or eligible for inclusion in the National Register.

Because portions of the proposed project are federally permitted actions, the Minerals Management Service, as the lead federal agency, is responsible for ensuring compliance with federal law in federal waters. Vandenberg AFB is responsible for ensuring compliance on Air Force Base lands. Section 106 of the National Historic Protection Act of 1966 (P.L. 89-665; 80 State 915) and Executive Order 11593 (36 F.R. 8921) require MMS and the Department of the Air Force to consult with the Advisory Council on Historic Preservation. Federal agencies will require compliance with this Act.

The Advisory Council regulations, "Protection of Historic and Cultural Properties" (36 CFR 800), outline the procedures to be followed by agency officials. In brief, agency officials are required to consult with the SHPO to determine whether a project encompasses any property on, or is eligible for, inclusion in the National Register of Historic Places. For each National Register or eligible property identified, agency officials must determine whether the project will have an impact on the property. If there will be an impact, the National Register criteria will be applied to determine whether the effect will be adverse. If the effect will be adverse, the regulations provide for consultation with the Advisory Council to develop conditions for the basis of a Memorandum of Agreement (MOA).

The Advisory Council regulations also encourage participation by the public and other agencies. According to 36 CFR 800.15:

> "The Council, Federal agencies, and State Historic Preservation Officers should seek assistance from the public including other Federal agencies, units of local and state government, public and private organizations, individuals and Federally recognized Indian Tribes in evaluating National Register and eligible properties, determining effect and in developing alternatives to avoid or mitigate an adverse effect."

Within this context, comments concerning the proposed projects' impact on cultural sites are sought from the California Coastal Commission, Santa Barbara County agencies, the Native American Heritage Commission, the Santa Ynez Indian Reservation, the United Chumash Council, local archaeologists, historians, and other groups and individuals concerned with cultural resources.

In addition, the Advisory Council's regulations discuss the coordination of Advisory Council comments with the NEPA review process (36 CFR 850.9). Related surveys and studies must be integrated into NEPA documents to the fullest extent possible, including studies conducted for compliance with the National Historic Preservation Act (40 CFR 1502.25).

ARCHAEOLOGICAL RESOURCES PROTECTION ACT (ARPA)

The Archaeological Resources Protection Act (P.L. 96-95; 93 State 721) is designed to ensure preservation and protection of archaeological resources on public and Indian lands. It places primary emphasis upon a federal permitting process to control the disturbance and investigation of archaeological sites on these lands. In addition, ARPA's protective provisions are enforced by civil penalties for violation of the Act.

Section 4(c) of ARPA requires Indian Tribes to be notified of possible harm to or destruction of sites having religious or cultural significance to that group. The federal land manager must notify affected tribes before issuing the permit for archaeological work.

AMERICAN INDIAN RELIGIOUS FREEDOM ACT

The American Indian Religious Freedom Act (P.L. 95-341; 92 statute 470) was passed in 1978 to minimize government actions which might restrict the freedom and cultural persistence of American Indians. The Act was prompted in part by the increased emphasis on civil rights and religious freedom. Situations had developed where Indians were denied access to sacred places and where wildlife protection laws conflicted with the possession of sacred objects made from certain animals. The Act directs federal agencies to ensure that their actions do not restrict or otherwise infringe upon the customs, ceremonies, and traditions of Native American religions. It requires agencies to protect Native American access to cultural sites and objects as well as the freedom to assemble for religious ceremonies.

The requirements of the American Indian Religious Freedom Act should be taken into account when decisions are made under NHPA, NEPA, ARPA, and state and local laws, rules, and regulations.

MMS NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS LEASES IN THE OUTER CONTINENTAL SHELF PACIFIC AREA

The Cultural Resources stipulation is applicable to all Santa Maria Basin leases. When invoked by MMS, this stipulation requires operators to mitigate any impacts to potential cultural resources.

4.8.5.1 State and Local Laws, Rules, and Regulations

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The CEQA of 1970 (13 PRC; 2100 et seq.) and "Guidelines for the Implementation of the California Environmental Quality Act" (14 Cal. Adm. Co; 15000 et seq.) both identify cultural resources as concerns.

CEQA directs agencies and persons subject to its provisions to identify the environmental effects to "any object, building, structure, site, area or place which is historically significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." (Section 20010). The Act also includes "Objects of historic aesthetic significance" (Section 21060.5). Like NEPA, CEQA covers a wide range of cultural resources. The CEQA guidelines include definition of significant effects to "...a prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group; or a paleontological site except as part of a scientific study...." [Section 15023, App. G(j)].

Appendix K of the Guidelines also limits the cost of mitigation of archaeological salvage programs under CEQA. Appendix K, however, does not limit the cost of mitigation which may be required under federal laws, the California Coastal Act, or local ordinances and policies.

CALIFORNIA COASTAL ACT AND COASTAL COMMISSION GUIDELINES

The California Coastal Act of 1976 has a basic goal of protecting and maintaining the overall quality of the coastal zone environment and its natural and artificial resources (Section 3001.5). The section on land resources addresses archaeological and historic resources and states:

> "Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall then be required." (30244)

"Coastal Commission Guidelines" [1981] include: (1) guidelines related to mitigating impacts of coastal development, and (2) guidelines for conducting archaeological studies. According to the Guidelines for impact mitigation, all resources that may be affected are to be located through surface survey and, if necessary, subsurface testing. To define site boundaries and composition and to evaluate site significance, further field work, including excavation, is to be conducted (Section 1.3). Subsequently, the potential project's impacts are assessed, and a mitigation plan is prepared.

NATIVE AMERICAN HERITAGE COMMISION CALIFORNIA SENATE BILL 297

The Native American Heritage Commission was established in 1976 to protect the heritage of California Indians and ensure a say in matters concerning heritage sites (Chapter 1:75, Section 5097.9 of Division 5 of the Public Resources Code). Senate Bill 297 also addresses the disposition of Native American human burial and skeletal remains and amends various sections of the state's Government Code, Health and Safety Code, and Public Resources Code. The amended regulations stipulate the protection of burials from disturbance, vandalism, and inadvertent destruction. The statutes empower the Native American Heritage Commission to catalog existing burials and to resolve disputes relating to the treatment and disposition of Native American burials and associated items. The regulations also provide for the punishment of vandals, and establish procedures for encouraging private owners to comply with the recommended treatment of burials. Finally, the codes as amended stipulate specific procedures to be implemented if a Native American burial is discovered during project construction.

CALIFORNIA SENATE CONCURRENT RESOLUTION NO. 43, CHAPTER 87

This Act requires, "That all the agencies of the State, with their present staff and facilities, are hereby reported to cooperate in current efforts by State and private agencies by reporting all archaeological discoveries of Indian culture in this state to the Division of Beaches and

Parks (now Department of Parks and Recreation) ... and when feasible and consistent with the reasonable exercise of powers of such agencies, to preserve such findings."

CALIFORNIA STATE EXECUTIVE ORDER B-64-80

Executive Order B-64-80 directs state agencies to inventory all significant cultural sites under their ownership and jurisdiction. It prohibits the inadvertent alteration or sale of potentially significant cultural properties. The State Lands Commission and this order is the State Department of Parks and Recreation under the Area Study scenarios.

STATE HISTORIC PRESERVATION OFFICER (SHPO) CHECKLIST GUIDELINE

The State Historic Preservation Officer (SHPO) has published a series of checklists to evaluate: 1) the adequacy of archaeological testing programs, 2) determinations of site significance and uniqueness, and 3) mitigation reports.

SANTA BARBARA COASTAL PLAN

The Local Coastal Plan addresses areas of concern to Native Americans. With respect to archaeological resources, local policies require project designs to avoid impacts to such resources where possible. When avoidance is impossible:

> "mitigations shall be designed in accord with guidelines of the State Office of Historic Preservation and the State of California Native American Heritage Commission" (Santa Barbara County 1982 Coastal Plan, 141; Policies 10-2 and 10-3).

SANTA BARBARA COUNTY COMPREHENSIVE PLAN

The Environmental Resource Management Element of the Santa Barbara County Comprehensive Plan contains five policies concerning historical and archaeological sites:

1. All available measures, including purchase, tax relief, purchase of development rights, etc., shall be explored to avoid development on significant historic, prehistoric, archaeological, and other classes of cultural sites.

2. When developments are proposed for parcels where archaeological or other cultural sites are located, project design shall be required which avoids impacts to such cultural sites, if possible.

3. When sufficient planning flexibility does not permit avoiding construction on archaeological or other types of cultural sites, adequate mitigation shall be required. Mitigation shall be designed in accord with guidelines of the State Office of Historic Preservation and the State of California Native American Heritage Commission.

4. Off-road vehicle use, unauthorized collection of artifacts, and other activities other than development which could destroy or damage archaeological or cultural sites shall be prohibited.

5. Native Americans shall be consulted when development proposals are submitted which impact significant archaeological or cultural sites.

The Conservation Element of the Santa Barbara County Comprehensive Plan also discusses Historic sites and Archaeological sites. It defines areas of particular significance, discusses impacts to sites, and makes recommendations for the protection of sites.

SANTA BARBARA CULTURAL RESOURCE GUIDELINES

The County Resource Management Department, Department of Environmental Review, has developed draft guidelines concerning archaeological investigations and draft guidelines for assessing ethnic cultural resources. These guidelines are used by the Department of Review in analyzing environmental documents.

SANTA BARBARA COUNTY PREHISTORIC ARCHAEOLOGICAL PROJECT REQUIREMENTS

These requirements, used by County staff for project review, were prepared by anthropologist, John Johnson, of the UCSB Anthropology Department. The document details types of archaeological projects required for environmental analysis and for mitigation of data loss. For each of three project types the document discusses professional qualifications of investigators, fieldwork techniques, report requirements, filing of reports, curation and documentation of artifact collections, and Native American participation.

SANTA BARBARA COUNTY DRAFT ENVIRONMENTAL IMPACT ANALYSIS GUIDELINES AND SIGNIFICANT THRESHOLD CRITERIA -- ARCHAEOLOGICAL GUIDELINES

These 1983 Guidelines for the preparation of environmental documents, discuss determination of the uniqueness of archaeological sites in compliance with Assembly Bill 952 (Appendix K of the CEQA Guidelines). The Guidelines state that the determination of uniqueness requires analysis by a professional archaeologist.

The Guidelines require the archaeologist conducting the study of uniqueness to outline the contents of a full data salvage program and programs tailored to the limited funds required of project sponsors under the provisions of CEQA Guidelines (Appendix K).

SANTA BARBARA COUNTY THE REQUIREMENTS AND PROCEDURES FOR ASSESSING ETHNIC CULTURAL RESOURCES AND CONCERNS IN COMPLIANCE WITH THE CEQA

This draft document was prepared by Dr. Susan E. Brown an anthropologist, under contract with the County Department of Environmental Review in October 1980. It discusses changes to the 1980 CEQA Guidelines including the explicit addition of "properties of historic or cultural significance to a community or ethnic group or social group" and potential restrictions on use of religious or sacred sites caused by project approval.

The document recommends that qualified ethnographers conduct ethnic impact studies and provides guidelines for the preparation of EIR ethnographic components.

4.8.5.2 Agency Responsibilities

MINERALS MANAGEMENT SERVICE (MMS)

MMS is solely responsible for cultural resources in federal waters where the proposed development activities will occur.

U.S. AIR FORCE

The Proposed and Alternative Pipeline routes cross Vandenberg AFB. The Environmental Planning Branch at the Base is responsible for reviewing projects which affect lands on the Base which, as a federal property, are afforded protection under federal law. The Air Force will oversee compliance with the laws protecting cultural resources within its domain.

U.S. DEPARTMENT OF CORRECTIONS

The Lompoc Federal Correctional Institution lands are federal property and are afforded protection under federal law. The alternative route to Site 4 passes through these lands.

ADVISORY COUNCIL ON HISTORIC PRESERVATION

The Advisory Council on Historic Preservation is responsible for compliance with Section 106 of the NHPA. This section requires consultation between the Council and federal agencies involved in actions affecting properties on or eligible for inclusion in the National Register of Historic Places. The Advisory Council has issued guidelines (36 CFR 800) for complying with Section 106. If a project's effect on historical or archaeological sites is found to be adverse in areas where federal agencies have jurisdiction, the Council will become party to a Memorandum of Agreement (MOA) which details the actions to be taken by responsible federal agencies.

STATE HISTORIC PRESERVATION OFFICER (SHPO)

The SHPO, defined by the NHPA, is responsible for submitting nominations to the National Register of Historic Places once prepared by MMS; Vandenberg AFB and Santa Barbara County, obtaining compliance of federal agencies under Advisory Council procedures, and reviewing environmental impact statements. The SHPO also aids in the determination of adequate mitigation of impacts to cultural resources in the California Coastal Zone and reviews CEQA documents.

STATE LANDS COMMISSION

This agency is responsible for compliance with state laws protecting cultural resources in state controlled waters within 3 miles of the coastline. Portions of the offshore pipeline corridors are in state waters.

CALIFORNIA COASTAL COMMISSION

Within the Coastal Zone, the Coastal Commission is responsible for the protection of California's man-made resources and reviews and adopts mitigation measures for cultural resources. On December 16, 1982, the Commission adopted guidelines for review of archaeological projects within the Coastal Zone. The Coastal Commission will review portions of the project in the Coastal Zone for consistency with the California Coastal Management Program, including those portions on Vandenberg AFB.

NATIVE AMERICAN HERITAGE COMMISSION (NAHC)

The scope of the Commission's legal authority includes assisting state agencies in any negotiations with federal agencies concerning the protection of Native American sacred places on federally-administered lands in California and making recommendations on Indian heritage in accordance with environmental law and policy. Responsible agencies are to consult with the NAHC regarding project impacts to Indian heritage. If burials of California Indians are encountered during construction or archaeological salvage, the NAHC may become involved in disputes regarding their dispositions.

CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

Pipelines within Caltrans right-of-ways require permits from Caltrans. Within the Area Study, this would also occur where a pipeline right-of-way crosses a highway. The District 5 Caltrans environmental branch will review all environmental documents concerning areas of right-of-way affected by the project.

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION

The California Department of Parks and Recreation requires notification of any proposed project which may occur in park lands, and must be provided with a justification for failure to avoid park lands. When park lands are affected (e.g., La Purisima Mission State Park under the Area Study scenarios), the Department evaluates project significance, impacts, and mitigations.

SANTA BARBARA COUNTY

Santa Barbara County is the lead agency responsible for compliance with the California Environmental Quality Act. Under CEQA, the County is responsible for reviewing projects on lands under County jurisdiction. The Santa Barbara County Resource Management Department is responsible for overseeing CEQA compliance. Policies and guidelines concerning cultural resources have been developed by the County and are discussed above.

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4.9 AESTHETIC RESOURCES

4.9.1 Overview

The aesthetic resources which may be affected by the proposed project and alternatives can be divided into three components: 1) onshore noise and vibration, 2) visual resources, and 3) release of odors and smoke.

4.9.2 Onshore Noise and Vibration

Onshore noise refers to unwanted sound which is heard by people or animals onshore, even though the source of the noise may be either onshore (e.g., equipment) or offshore (e.g., a boat). Noise or annoyance can be characterized statistically or by average levels. Noise levels fluctuate throughout the day and the spatial variation of noise is due to different kinds and intensities of human activity. A combination of federal, state, and local policies regulate noise levels. Vibration annoyance is a rare occurrence and there is no regulatory treatment as there is for noise. A detailed analysis of noise and vibration is provided in Technical Appendix I.

4.9.2.0 Definition of Terms

Noise levels are expressed in decibels on the A-weighted scale (dBA). The A-weighted scale is obtained by a frequency filtering of the noise so as to approximate the response of the human ear. The A-weighting noise levels are used in environmental noise studies because they have been found to be closely correlated with human perception of noisiness or annoyance. For example, a 10 dBA increase in noise level has been found to correspond to a doubling in the perceived noisiness or subjective loudness.

Commercially available noise measuring instruments, which are appropriate for field use and which meet applicable standards are accurate to approximately $\pm$ 2 dBA. This accuracy is quite adequate since even under controlled, ideal laboratory conditions, a change in noise level of pure tone of 1 dBA is barely perceptible while a difference of 3 dBA occurring over several minutes is just noticeable. A 4 dB difference is clearly noticeable, and 10 dB is a very significant difference [Santa Barbara 1979a].

Noise levels in a community fluctuate during the day and night. In most urban locations, they are quieter at night than during the day when there are variations in noise level due to passing events. To take account of these fluctuations, the statistical distribution of noise levels with time is considered. The current methodology for describing the statistical characteristics of the community noise level fluctuations is in terms of the percent of exceedence. For example, if the noise level during a certain time period exceed 65 dBA for 25 percent of the time (say, 15 minutes out of an hour), the exceedence for 65 dBA is stated to be 25 percent. Noise exceedence levels are denoted by L10, L50, L90, etc., where L10, for example, is the noise level exceeded 10 percent of the time.

In addition to these statistical measures, the environmental noise can be characterized by average levels, such as the energy equivalent continuous noise levels, L_{eq}. L_{eq} can be averaged over a 24-hour period or, for specific applications such as schools, can be averaged over portions of the day. The daytime noise level, L_d, refers to noise between 7 am and 7 pm. The day/night equivalent noise level, LDN, incorporates a 10 dB likelihood of annoyance during this nighttime period. In California, the measure of community noise is the CNEL, or Community Noise Equivalent Level. This measure is similar to LDN but also applies an additional evening penalty of 5 dB at the time between 7 pm and 10 pm.

Decibels are logarithmic ratios and cannot be manipulated in the same way as arithmetic numbers. The addition of decibels produces results such as those presented in the equation 70 dB + 70 dB = 73 dB. For example, if a single automobile produces a sound level of 70 dB, two such automobiles would produce a total sound level of 73 dB. Twice as much acoustic energy is being generated, and this is represented in decibels as a 3 dB change. If one automobile produces a sound level of 70 dB and the other 60 dB, the combined sound level will be 70.4 dB. When the difference between two sound levels is greater than about 10 decibels, the lesser sound is negligible in terms of affecting the total level.

4.9.2.1 Characteristics of the Project Area

The Project Area is defined as those areas within or in close proximity to onshore elements of the proposed project and its alternatives, as shown in Figure 4.9-1. The area consists of pipeline and powerline corridors, the proposed and alternate dehydration facility sites on Union Fee Property, the Orcutt Pump Station, the Battles Gas Plant and the Santa Maria Refinery. Since noise sources and receptors are very site specific, any residential, public, and wildlife areas that may be affected by noise from project construction or operations are included in this Project Area definition.

The existing noise and vibration levels in the proposed Project Area are primarily due to the major highway and rail routes that traverse the Project Area, and, to a lesser extent, the marine and air transportation activities associated with current offshore exploration and development. An additional noise source is aircraft operations at Vandenberg AFB.

The following descriptions include values of sound levels obtained by field measurements in direct support of the projects. Noise measurements were conducted at 12 sites in six general locations in order to determine the baseline noise levels (Measurement Sites 2-7 as noted on Figure 4.9-1). The six general locations were selected as representative of the various types of noise sensitive sites found in the project Study Area. Noise measurements were taken during times of maximum sensitivity or of likely exposure, whichever was appropriate. For example, locations that may be exposed to construction noise were measured during the daytime hours when construction is likely to occur, whereas locations near continuously operating equipment were measured during parts of day and night. In addition, measurements were taken of noise generated by equipment in Union's Mandalay Processing Plant in Oxnard (Measurement Site 1), a model of the new dehydration facility proposed for

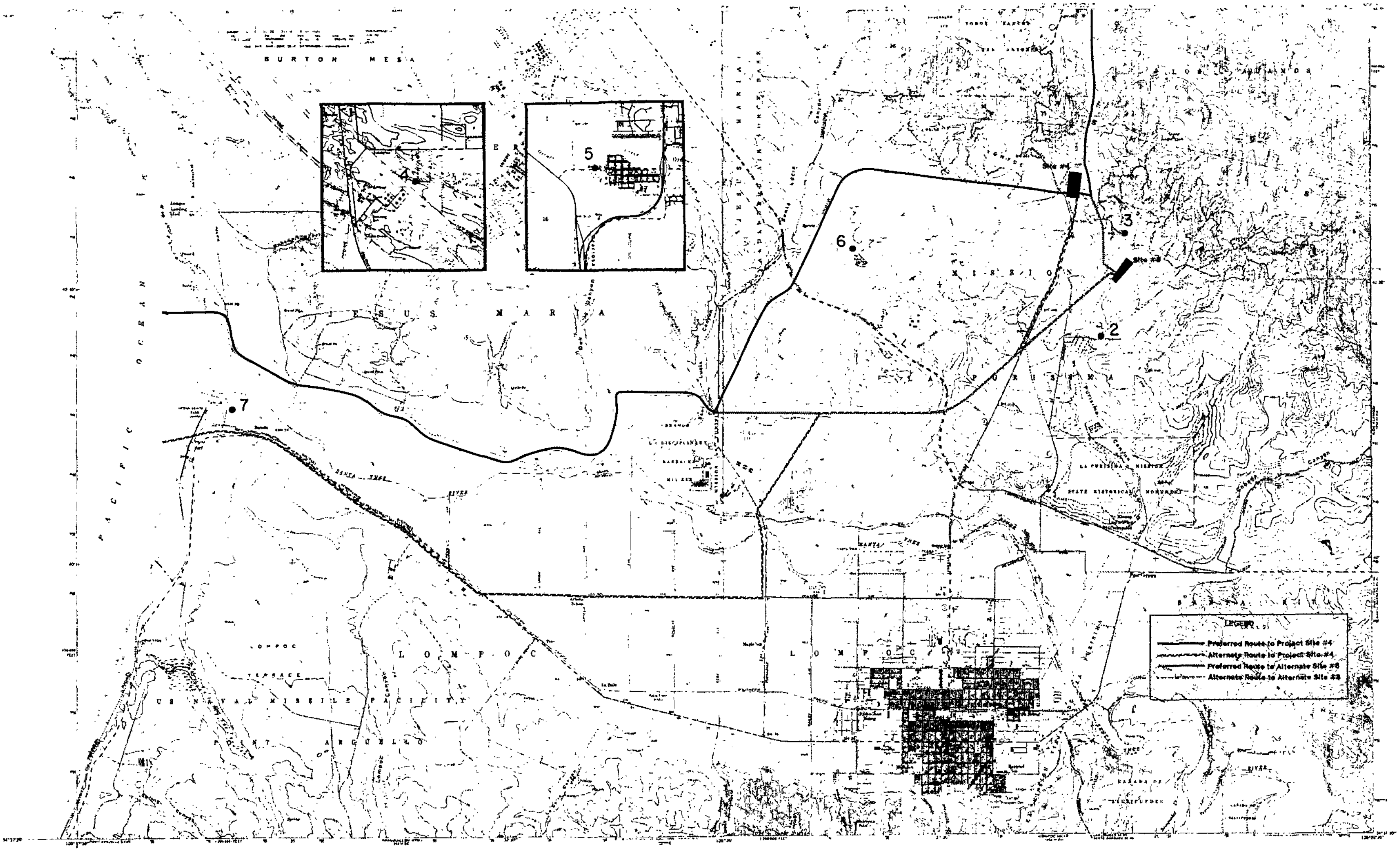

FIGURE 4.9-1

ONSHORE NOISE AND VIBRATION STUDY AREA AND MEASUREMENT SITES

Lompoc. The report describing the measurement method and results is included as an Addendum to Technical Appendix I.

The Preferred Site 4 is directly east of Highway 1 and the nearest noise sensitive location at 5,000 feet is the northeast edge of Vandenberg Village. The Mission Hills residential area (Measurement Site 2) is at a distance of 8,500 feet. The Alternate Site 8 is approximately 3,000 feet from the Mission Hills residential area and 8,000 feet from Vandenberg Village. The CNEL at the nearest residential property line (Measurement Site 2) is 61 dBA, and the major noise sources are the pumps on adjacent Union property and motor vehicles. At a location (Measurement Site 3) midway between the preferred and alternate sites, which is considered typical of most of the uninhabited portions of Union property, the hourly L_{eq} levels were 42 dBA from wildlife sources in the absence of aircraft, 63 dBA with aircraft overflights; and 60 dBA with both conditions on a combined energy basis. The estimated CNEL at the northeast edge of Vandenberg Village is 52 dBA [Santa Barbara, 1979]. These levels are somewhat higher than the 1974 CNEL contours developed for transportation sources for the Lompoc Valley [Van Houten, 1974] which encompassed the locations identified above.

The Santa Maria Refinery, adjacent to the Southern Pacific Railroad, is about 1.2 miles from the shoreline. The nearest residences are at a distance of about 3,000 feet to the northeast, but adjacent to Highway 1. On the elevated Union property line (Measurement Site 4), the hourly L_{eq} is 48 dBA and refinery steam noise is the only source. At the residences, the level is 49 dBA and is due to local residential activity and Highway 1 traffic. The refinery cannot be seen nor heard because the local street levels are shielded by the terrain surrounding the Union property.

The existing Orcutt Pump Station, located on Marcum Street in an industrial area, is adjacent to a residential area. There are residences on Clark Road 600 feet from the station (Measurement Site 5). The CNEL is 64 dBA, and the major noise sources are Clark Road traffic during the day and evening hours, and the existing engine driven pumps during nighttime in the absence of all road traffic. One resident reported noticeable house vibration due to the pumps. The measured CNEL does not conflict with the 1975 noise contours developed for transportation sources for the Santa Maria area [Van Houten, 1977].

The existing pipelines are located either in unpopulated areas or immediately adjacent to major roads and are not a source of any noise. The Proposed Pipeline route north of Vandenberg Village passes within 2,000 feet of Cabrillo High School (Constellation Avenue). The Alternate Pipeline route to Site 4 passes within 500 feet of the northwest corner of the Mission Hills residential area. The Proposed Pipeline route to Site 8 passes within about 200 feet of buildings associated with the Federal Correctional Institution residential complex, the north edge and northwest corner of Mission Hills and the south edge of Vandenberg Village. The remaining portions of the pipeline routes pass through generally unpopulated areas, from the landfall at Surf, near or through the wildlife sanctuary, and from the dehydration facility site to Orcutt.

During school day hours, the L_{eq} at the Union property line (Measurement Site 6) is 46 dBA, and the major noise sources are traffic, aircraft, and school activities. Near the Federal Correctional Institution complex and at the northwest corner of the Mission Hills residential area, the estimated L_d is 52 dBA, [Wyle, 1971; Santa Barbara, 1979a]. These levels are typical of quiet residential areas and below any of the recommended criteria. Near Ocean Beach County Park at the Santa Ynez River estuary (Measurement Site 7), the daytime hourly L_{eq} is 50 dBA due to wildlife sources in the absence of train or aircraft traffic, and 68 dBA with train and aircraft traffic. The L_d during an 8 hour daytime period was 62 dBA. These levels are generally in agreement with (or slightly higher than) the 1974 noise contours developed for transportation sources for the Lompoc Valley [Van Houten, 1974].

With respect to the Battles Gas Plant, the gas from OCS-P 0441 is expected to maintain steady load conditions at the plant. Therefore, no major changes in operating conditions, utilities, or emissions are expected (Section 2.7) and noise measurements are not needed at this facility.

The measured or estimated CNELs developed for the existing conditions are similar, generally, to the exposure levels recommended in the regulations discussed in Section 4.9.2.2.

4.9.2.2 Regulatory and Institutional Setting

FEDERAL REGULATORY SETTING

The Noise Control Act of 1972 established a national policy by statutory mandate "...to promote an environment for all Americans free from noise that jeopardizes their public health and welfare." The Environmental Protection Agency (EPA) was directed by Congress to publish information about levels of environmental noise consistent with protection of public health and welfare with an adequate margin of safety. The EPA identifies noise levels of 55 dBA or above as interfering with or annoying for outdoor activities at areas such as parks and beaches. The levels identified by the EPA, however, were established without consideration of cost or feasibility of attainment, and they do not constitute an agency standard.

With regard to highway traffic noise, the Federal Highway Program Manual, Volume 7, Chapter 7, establishes noise abatement criteria for the planning and design of highway projects funded by the federal aid system. The Federal Highway Administration has established a noise abatement level for highway projects of 65 dBA for the activity category that includes parks, residences, and schools.

No operational noise standards have been established for helicopters. The Federal Aviation Administration (FAA) regulates navigable air space and supports the voluntary efforts associated with the helicopter industry's "Fly Neighborly Program". Noise control efforts involving routing and operational limitations are best established on a cooperative basis between airports and helicopter operators.

STATE REGULATORY SETTING

The California Office of Noise Control has published guidelines for evaluating land use compatibility with various noise environments. These recommendations consider noise sensitivity factors such as: speech communication needs, subjective judgments of noise acceptability and relative noisiness, need for freedom from noise intrusions, and sleep sensitivity criteria. Different considerations are involved in determining noise sensitivities for different land uses, activities, and correction factors. The California Office of Noise Control considers the following CNEL levels as the maximum dBA normally acceptable: low-density, single-family residential - 60; multifamily, transient lodging, schools, and hospitals - 65; playgrounds and parks - 70.

The California Administrative Code, Title 4, defines airport noise standards for all airports operating under permit from the California Department of Transportation, Division of Aeronautics. These regulations, which are applicable to the Santa Barbara, Lompoc and Santa Maria airports, require each county to determine whether any of the airports within its boundaries has a "noise problem." An airport is defined by this legislation to have a "noise problem" if the 70 dBA CNEL contour around the airport includes residential uses, schools, or land uses other than specified compatible uses. After December 31, 1985, the state noise impact criterion becomes 65 dBA CNEL.

LOCAL REGULATORY SETTING

The Santa Barbara County Comprehensive Plan, Noise Element [1979a] considers 60 to 65 dBA as the maximum CNEL that is compatible with residential and other noise-sensitive land uses, such as transient lodging, hospitals and schools. These levels also are applicable to Lompoc and Santa Maria [Van Houten, 1974, 1976].

The Santa Barbara County Noise Element does not address the issue of boat noise nor does it address helicopter noise that occurs beyond that area treated at the Santa Barbara Airport.

4.9.3 Visual Resources

4.9.3.0 Definition of Terms

Visual resources are the aggregate of characteristic features imparting visually aesthetic qualities to the environment. The setting for the visual resource may be natural appearing (formed by nature, with little or no apparent human intervention), rural, or urban. For the analysis of visual impacts, baseline data for three attributes are examined: 1) visual character, 2) visual sensitivity level, and 3) visual (scenic) quality.

The visual character of the resource is comprised of the natural landforms, water surfaces, and vegetative patterns, as well as man's cultural modifications, that lend to the landscape its distinguishing, inherent and aesthetic properties. Visual sensitivity level is one factor indicating where adverse visual effects would be expected to generate the greatest controversy; relevant factors include public concern and the frequency with which the resource is viewed. Visual quality, or the overall attractiveness of the resource, reflects the appeal of inherent characteristics, and the effect on the resource of features that have been introduced and which appear incongruous.

4.9.3.1 Visual Character of the Study Region

The Study Region was defined to include all important travel routes and use areas within view of the proposed or alternative sites for project and Area Study features and associated activities (see Figure 4.9-2). Also included were outlying areas similar in visual character to those landscapes potentially affected by aspects of the project, the alternatives, or the Area Study. The Study Region was so defined to serve in comparative evaluations of scenic quality and significance of visual impacts. The region includes that segment of the coast extending from Pismo Beach to Gaviota, and the lowlands within the Santa Maria Basin. The eastern edge of the region extends northward from the coast along Highway 101 through Gaviota Pass and takes in part of the Santa Ynez Valley. From there, the boundary of the region reaches northwesterly along the foothills and lower mountain slopes surrounding the Santa Maria Basin.

Visual character is the "identity" of the visual resource and is described in terms of those features generally regarded as aesthetic and expressive of the structure, function, and formative processes of the landscape. Four categories of features are analyzed: landforms, water features, vegetative patterns, and cultural modifications, the landscape features introduced by man in the development of his culture. Two character types occur within the Study Region: the Coastal Character Type and the Santa Maria Basin Lowlands Character Type. Urban development comprises a third character type which is not described in this study since no physical features of the proposed projects, alternatives or the Area Study features would occur in urbanized areas.

<u>LANDFORMS</u>

There is great diversity in topography within the region. Included are coastal headlands, bluffs, dunes and terraces, and inland valleys, foothills, mountains and mesa-like formations. The most obvious features are the Santa Ynez Mountains, Santa Rita Hills, Purisima Hills, Solomon Hills, Casmalia Hills and the broad valleys around Solvang, Lompoc and Santa Maria. Along the coast east of Point Conception, the crest of the east-west trending Santa Ynez Mountains is especially dominant, being rugged, broad, steep, angular, and an ever-present scenic background for northerly directed views from along the coast. Elevations range up to 2,500 feet, with canyons being V-shaped and sharply incised by numerous steep, short drainages. Along the ridges, exposed rock outcroppings are characteristic, as are exposed strata striking steeply and running transverse to the major ridges.

North of Point Conception to Point Sal, the mountains along the coast are muted in form, lower, less massive, and less angular than the Santa Ynez Mountains. These conditions are also true for the Santa Maria Basin, where the Santa Rita, Purisima, Solomon and Casmalia Hills are low and rolling, generally being less than 800 feet in elevation. However, together with the small, irregular, U-shaped valleys they enclose, these landforms present moderately strong, interesting patterns. Examples of such valleys are the Santa Rita Valley, San Antonio Valley and the valleys enclosing the Santa Ynez River and Highway 1, from Los Cruces to Lompoc.

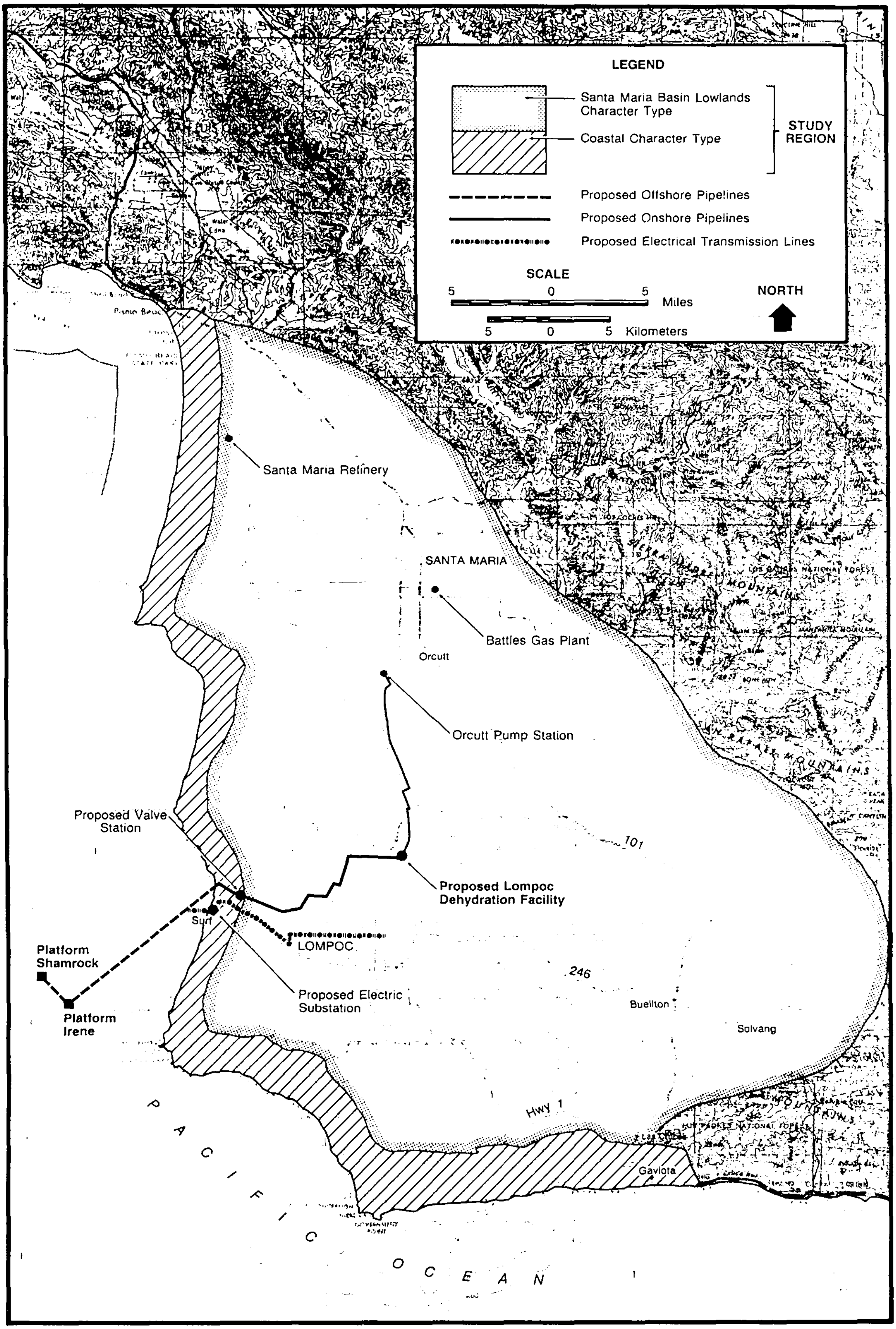

Figure 4.9-2 The Study Region relative to visual impact analysis, Landscape Character Types, and project elements.

The interior hills and mountains noted open onto the broad plains around Solvang, Lompoc, Santa Maria, and the sloping uplands of Burton Mesa, and sweep onward to the scenic headlands, bluffs, bays, dunes, estuaries and beaches of the coast. Relief for the coastal foothills east of Point Conception is generally about 400 feet, rising from an elevation of about 200 feet at the upper edge of the coastal terrace, to knolls generally not exceeding 600 feet in elevation. The coastal terrace, where there is one, ranges from 100 to 200 feet in elevation and varies considerably in width, from several thousand feet to 100 feet or less.

North of the Santa Ynez River, wide sandy beaches and foredunes are prevalent up to where the Casmalia Hills abruptly drop 1,000 feet directly to the sea at Point Sal. Past Mussel Point and on up to Pismo Beach, dunes again prevail. Elsewhere along much of the coast, the shoreline within the region presents narrow, sandy beaches backed by bluffs as high as 80 feet. Headlands are, in places, rocky, forbidding, and dramatic, with wave-sculpted sea caves undermining abrupt and craggy cliffs.

VEGETATIVE PATTERNS

Within the region, native vegetation mainly is comprised of shrub, oak woodland and modified grassland communities distributed unevenly over coastal bluffs, dunes, ravines and terraces, and across interior hills, valleys and mesas. Over many lower coastal slopes and canyons and interior hills, there are distinctive stands of live oak woodlands and oak savannah (scattered trees associated with grassland, coastal sage, and chaparral). Where the stands of oaks are in association with grassland, the patterns they create are most pronounced, given the sharp contrasts in color and texture. Among the finest examples of this association are those occurring upon the hills along State Highway 1 between U.S. Highway 101 and Lompoc, and along Santa Rosa Road between Buellton and the intersection with Highway 1. Elsewhere, oak woodlands and savannah occur in association with coastal sage scrub and chaparral. There the patterns are indistinct, the colors and textures of the several species blending well with each other. Such an oak-sage-chaparral mix occurs across Burton Mesa and much of the Purisima Hills.

Evergreen forest communities within the region are limited to small areas in relatively cool, moist mountain environments such as crests, shaded canyons and north-facing slopes. The Bishop Pine Forest on the crests of the Purisima Hills is an example of such a community.

Within interior and coastal canyons and ravines, stringers of oak trace for the drainages for much of their courses. In addition to oaks, these riparian woodlands feature dense stands of tall, deciduous trees and shrubs, which usually contrast strongly with the low vegetation on adjacent slopes. Upon floodplains, riparian growth may be extensive and prominent as seen against the backdrop of fields and slopes.

At the mouths of the main drainages (Santa Ynez and Santa Maria Rivers, Santa Antonio Creek) coastal wetlands occur. The vegetation in these wetlands is diverse in species but the vegetative variety is subtle, visually.

Along the sandy beaches and foredunes from Point Conception to Pismo Beach, there are mats of native succulent herbs and introduced species such as ice plant and beach grass. Coastal bluff scrub occupies sea bluffs and coastal canyon walls, while coast dune scrub stabilizes backdunes. These low-growing vegetative types immediately along the coast are generally muted in color, form and texture. In places, though, patches of vegetation contrast highly with the exposed parts of the dunes introducing strong, interesting patterns to foreground views.

Across the coastal hills and mountain slopes, there are two main vegetative associations: the chaparral of the steeper mountain slopes and the disturbed grasslands of the foothills and coastal terrace. In general, the patterns created by the numerous species comprising chaparral are subtle and serve as a visual backdrop for conspicuous rock outcrops and exposed strata. These species are low growing and form a dense, evenly textured cover that is muted in color. Coastal sage scrub once was prevalent along the coastal terrace and foothills but now, as a result of grazing practices over the last 100 years, occurs only on some steep, dry slopes. In the absence of sage, there is almost no transition between the chaparral-covered slopes and the grasslands, with these two vegetative types meeting in a sharply defined edge.

Within the region, agricultural activity is predominant. Extensive areas serve grazing, irrigated cropland, and dry farming within the interior and coastal valleys and along the foothills and coastal terrace.

The occurrences of irrigated and non-irrigated cropland strongly influence the landscape character of the Study Region for two reasons. First, the croplands form conspicuous patterns of introduced species. Where orchards, vineyards, or croplands are present, their foliage contrasts sharply with the background of grassland that is dun-colored from April through November. Areas used for dry farming or flower production also offer significant color contrast because of the exposure of soil during tilling and colorful displays when the flowers are in bloom. The second reason for the croplands' strong influence within the region is that they often occur close to the main travel routes.

Other vegetative patterns characteristic of the region's agricultural practices are those caused by introduced species planted in rows to serve as windbreaks or in groups planted for shade and decoration around ranch buildings.

WATER FEATURES

The region is semi-arid, dissected by numerous small streams which generally flow for limited periods during the winter and spring. Inland, many streams run westerly and, in some cases, these streams flank major and secondary travel routes. Notable among these are the Santa Ynez River, El Jaro Creek, Jalama Creek, the Santa Maria River and San Antonio Creek. However, these streams are seldom visible from the road.

Well developed coastal wetlands, which include both freshwater and saltwater habitats are found near the mouths the of Santa Ynez and Santa Maria Rivers and San Antonio Creek. Coastal freshwater ponds are numerous among the dunes along San Antonio Terrace and south of Oceano. Most significant for this study is the estuary at the mouth of the Santa Ynez River, which lends interest to views in the vicinity of Ocean Beach County Park and Surf.

The Pacific Ocean, readily seen from most vantage points along the coast, offers a seemingly limitless expanse which serves, for viewing positions east of Point Conception, as a setting for the distant Channel Islands.

CULTURAL MODIFICATIONS

The features of the region introduced directly or indirectly by man are termed "cultural modifications." A modification is considered to be a characteristic aspect of the visual resource if it is both aesthetically pleasing and expressive of an historically established land use.

Most of the Study Region is uninhabited, generally supporting cattle ranching and some crop production. As noted, practices associated with agriculture have, over many years, altered the natural vegetative patterns of the area. Where grazing has occurred, many grass species have been introduced and the distribution of some shrub species have been sharply reduced. Orchards, croplands and grazed fields have imparted new patterns upon the land; fences, windbreaks, and decorative plantings are now notably characteristic of ranch lands. The resulting pastoral landscape has become highly valued by the public [Santa Barbara County, 1979a:19].

Along the coast and inland, ranch and farm structures typically are located in the valleys, often hidden from view from public travel routes and use areas. But, along many inland routes, e.g., Santa Rosa Road, State Highways 1, 246, 135, 154, etc.), these ranches are major features in the landscape.

Urban centers, while historically a part of the development of the region, have a character all their own and cannot be compared to the open, agricultural landscape surrounding them. However, elements of the projects, alternatives, and the Onshore Area Study would not occur within developed (urbanized) areas. Therefore, urban character is not dealt with in this report.

The Southern Pacific Railroad and numerous dirt and paved roads are prominent within the region. These transportation routes are generally associated with the development of agricultural and rural areas. Seldom are these elements aesthetically pleasing by themselves, but they may reinforce attractive patterns in the landscape essentially established by other elements. Except where rights-of-way are greatly disturbed by cut and fill, roads and rail lines are treated as neutral elements in the landscape (neither characteristic or uncharacteristic of the visual resources).

Transmission lines and utilities are evident throughout the County. Although integral to the development of rural areas, there are indications that such facilities are not accepted, aesthetic landscape features. Numerous Santa Barbara County policies specifically are directed toward screening or otherwise obscuring these elements from view (see Section 4.9.3.5).

From points along the coast, occasional marine traffic far to sea is visible. However, off the Gaviota Coast one active oil production platform (Exxon Company's Hondo A) and an associated offshore storage and treating vessel dominate ocean views from U.S. Highway 101 and the Southern Pacific Railroad, and two inactive platforms owned by Texaco, Inc. are within State waters directly offshore from Hollister Ranch. Onshore oil development facilities are, in places, conspicuous and convey an industrial appearance uncharacteristic of the undeveloped, agricultural and rural areas of the region.

At Gaviota, storage tanks and oil and gas treatment facilities are in the foreground along a short stretch of U.S. Highway 101. On the outskirts south of Santa Maria, the Battles Gas Plant, numerous pump jacks throughout the agricultural fields, and several storage tanks influence views along more than 2 miles of U.S. Highway 101. In addition, storage tanks immediately southwest of Orcutt, the Union oil refinery about 6.5 miles north of Guadalupe along Highway 1, and pump jacks within the Purisima Hills (Lompoc Oil Field) are adjacent to primary travel routes, strongly affecting views from these roads.

Onshore and offshore oil and gas development facilities in the region may, in places, be considered an historic aspect of local, economic development. However, there are indications of concern over the current and future effects of such facilities on scenic views. For example, Santa Barbara County's Local Coastal Plan and its Zoning Ordinance [1982 a, b] require specific measures to reduce the visibility of oil and gas development facilities.

A significant part of the study region lies within Vandenberg AFB boundaries. Most of this land is undeveloped. In a few cases, launch facilities are within view of sensitive travel routes and public use areas. These facilities are incongruous with their rural, coastal setting and are not compatible with the scenic, agricultural features inherent to the region.

4.9.3.2 Visual Sensitivity Level

"Visual sensitivity level" is a relative measure of the degree of public interest in the visual resource and concern over adverse changes in the quality of that resource [BLM, 1978; USDA-FS, 1977]. The level of visual sensitivity is one factor indicating where adverse visual effects would be expected to be most controversial. Sensitivity is largely a function of the intensity of public concern and the frequency with which a concerned public would view the adversely affected landscape.

The approach used to assess sensitivity involves two steps. First, key travel routes and public use areas within view of landscapes potentially affected by elements of the projects, the alternatives, or the Area Study scenarios were identified and rated as being either primary or secondary in importance based on the pattern and volume of use.

Second, the proportion of the public with a major concern over visual quality was inferred from federal, state and county policies [California Coastal Act 1976, Santa Barbara County 1975, 1979b, 1982a, 1982b] and the activities associated with specific travel routes and use areas (e.g., driving for pleasure, hiking, residential). Travel route and use area importance, public concerns and the overall degree of sensitivity for potentially affected important travel routes and public use areas is summarized in Table 4.9-1. Moderately to highly sensitive travel routes and public use areas in the vicinity of Lompoc are depicted on Figure 4.9-3. Additional information on area traffic is provided in Technical Appendix L -- "Other Uses" and in Section 4.10.2 for recreation.

With respect to the proposed projects and their alternatives, several elements would be within view of highly sensitive travel routes and use areas. Segments of the Proposed and/or Alternative Pipeline and transmission line routes, the valve station, and the electrical substation would be within view of the Southern Pacific Railroad, State Highway 246, 35th Street, Terra Road, Central Avenue, De Wolff Avenue, Civilian Beach, Ocean Beach County Park, and Surf. The Orcutt Pump Station and the Battles Gas Plant would be in the foreground of Clark Avenue and U.S. Highway 101, respectively, while the proposed Union/Exxon platforms would be seen in the distance from the shore between Surf and Civilian Beach, and from Point Sal State Beach, the Southern Pacific Railroad, 35th Street, and Highway 246.

Elements of the project and/or the alternatives visible from moderately sensitive travel routes and use areas include: the dehydration facility at Site 4, the dry-oil pipeline route to Orcutt, the Union Oil Refinery north of Guadalupe, all within view of State Highway 1; and those segments of Proposed and Alternative Pipeline routes seen from Lompoc-Casmalia Road, Burton Mesa Road, State Highway 1 and 135, and State Highway 246 from 13th Street east to Lompoc.

Elements of the onshore and offshore Area Study would potentially be within view of travel routes and use areas that, with one exception, are highly sensitive. Depending on the specific route chosen, effects of installing the dry-oil pipeline might be seen from La Purisima Mission State Historic Monument, Lompoc-Casmalia Road from State Highway 1 to Highway 246; State Highway 1 from Lompoc to Las Cruces (this segment is a State Scenic Highway); and U.S. Highway 101, from Buellton to Gaviota. Those using State Highway 246 from Lompoc to Buellton (a moderately sensitive road), might see the effects of pipeline installation, as well. All Area Study platforms would be visible from Surf, Ocean Beach, Civilian Beach, 35th Street, and Terra Road with one or two also being seen from Point Sal State Beach. These public use areas and travel routes are all highly sensitive.

Table 4.9-1

SUMMARY TABLE OF SENSITIVITY LEVELS FOR KEY TRANSPORTATION ROUTES AND PUBLIC USE AREAS

	Importance		Proportion of Users with Major Concern			Sensitivity Level
	Primary	Secondary	75%+	25-75%	25%	
TRAVEL ROUTE:						
US Highway 101	●			●		1
Southern Pacific Railroad	●			●		1
State Highway 1						
-Las Cruces to Lompoc	●			*		1
-Lompoc to Pismo Beach	●				●	2
State Highway 246						
-Buellton to Lompoc	●				●	2
-Lompoc to 13th St.		●			●	3
-13th St. to Surf		●		**		1
State Highway 135						
-Orcutt to Highway 1	●				●	2
Lompoc-Casamalia Rd:						
-Highway 1 to Vandenberg AFB	●				●	2
-Highway 1 to Highway 246		●		**		1
35th Street						
-Talo Rd. to Terra Rd.		●		**		1
Terra Road						
-13th St. to Civilian Beach		●		**		1
13th Street		●			●	3
Burton Mesa Rd.		●		●		2
Rucker Rd.:						
-Calle Lindero to Highway 1		●			●	3
Central Avenue		●		*		1
De Wolff Avenue		●		*		1
Floradale/Santa Lucia Rd.		●			●	3
Clark Avenue		●		***		1
USE AREAS:						
La Purisima Mission State Historic Monument	●		●			1
Pt. Sal State Beach		●	**			1
Civilian Beach		●	**			1
Ocean Beach County Park/Surf		●	**			1

*State Scenic Highway/locally designated scenic route
**Within Coastal Zone and/or primary access to highly sensitive recreation resources
***Road fronting a residential area

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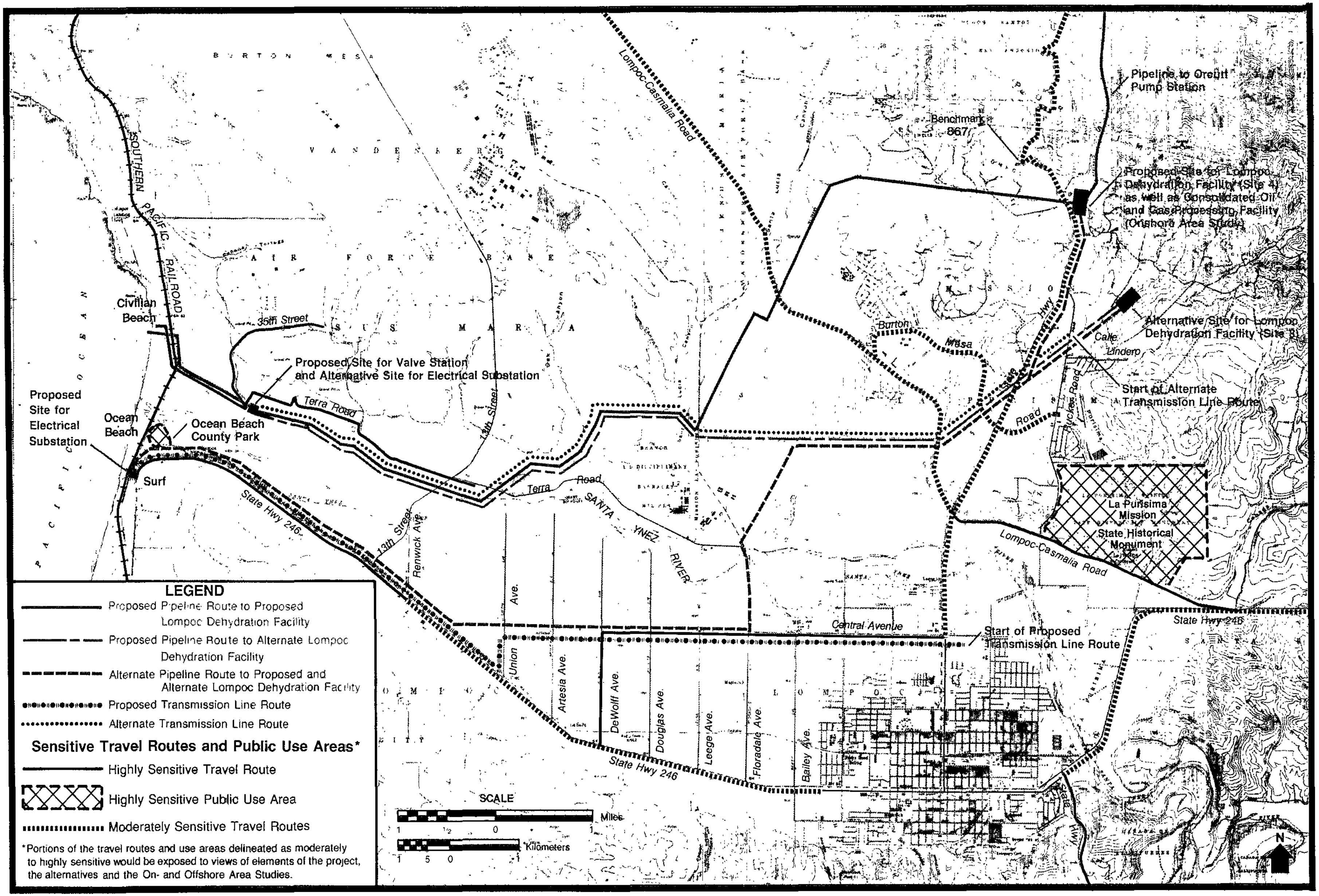

Figure 4.9-3 Moderately to highly sensitive travel routes and public use areas in the vicinity of Lompoc.

4.9.3.3 Visual Quality

A broad analysis of scenic quality within Santa Barbara County has been conducted in support of the Open Space Element of the County's Comprehensive Plan [Santa Barbara County, 1979b]. That study was undertaken to help identify scenic areas within the County that merit designation as open space or that require specific constraints on land use and development. Generally, the findings of the Countywide analyses are compatible with the following visual quality analysis, which were designed specifically to assess environmental impacts.

The quality of the visual resource, its overall attractiveness, relates to two factors: visual resource variety and visual resource condition. Visual resource variety refers to the inherent diversity of features within the field of view. Where the landforms, vegetation, water surfaces and cultural modifications are highly varied and create striking patterns, the area is thought to have strong appeal. Where these are only subtly varied and patterns are muted, the area is judged as being relatively less attractive. Measures of feature diversity are not absolute in nature, but scaled to the range of diversity found in the landscape character type. Views typifying scenery within the Coastal and Santa Maria Basin lowlands character types are shown in Figures 4.9-4 and 4.9-5, respectively.

"Visual condition" is the degree to which features appear uncharacteristic, incongruous, and attract attention. Such features tend to disrupt the continuity of the scene, compete with the established character, and distract the viewer.

Assessing current visual quality, as summarized below, is key to subsequent analyses of impacts. The potential visual effect of a proposed project is the degree to which actions would alter visual conditions, thereby affecting the overall quality of the scene, or, in other words, the degree to which activities and introduced features would be conspicuous, incongruous and draw attention away from inherent, aesthetic properties of the area.

VISUAL QUALITY FOR VIEWS OF PROJECT SITES

In general, elements of the proposed Union and Exxon projects and their alternatives would occur where scenic quality is low compared to the rest of the Study Region. Onshore elements of the projects and alternatives in the Lompoc area are shown in Figure 4.9-6. As seen from State Highway 246 west of Lompoc, Terra Road, Lompoc-Casmalia Road west of State Highway 1, Burton Mesa Road, and Highway 1 from San Antonio Valley to Orcutt, the landscape possesses little diversity and interest, although visual conditions are currently very good. From these roads, the proposed and/or alternative pipeline and utility corridors would be within sight. Visual quality is lowest for views from roads adjacent to the Battles Gas Plant and the Union Oil Refinery; existing oil development facilities command attention, detracting from views of landscapes that present little inherent scenic value.

VARIETY CLASS A | VARIETY CLASS B | VARIETY CLASS C

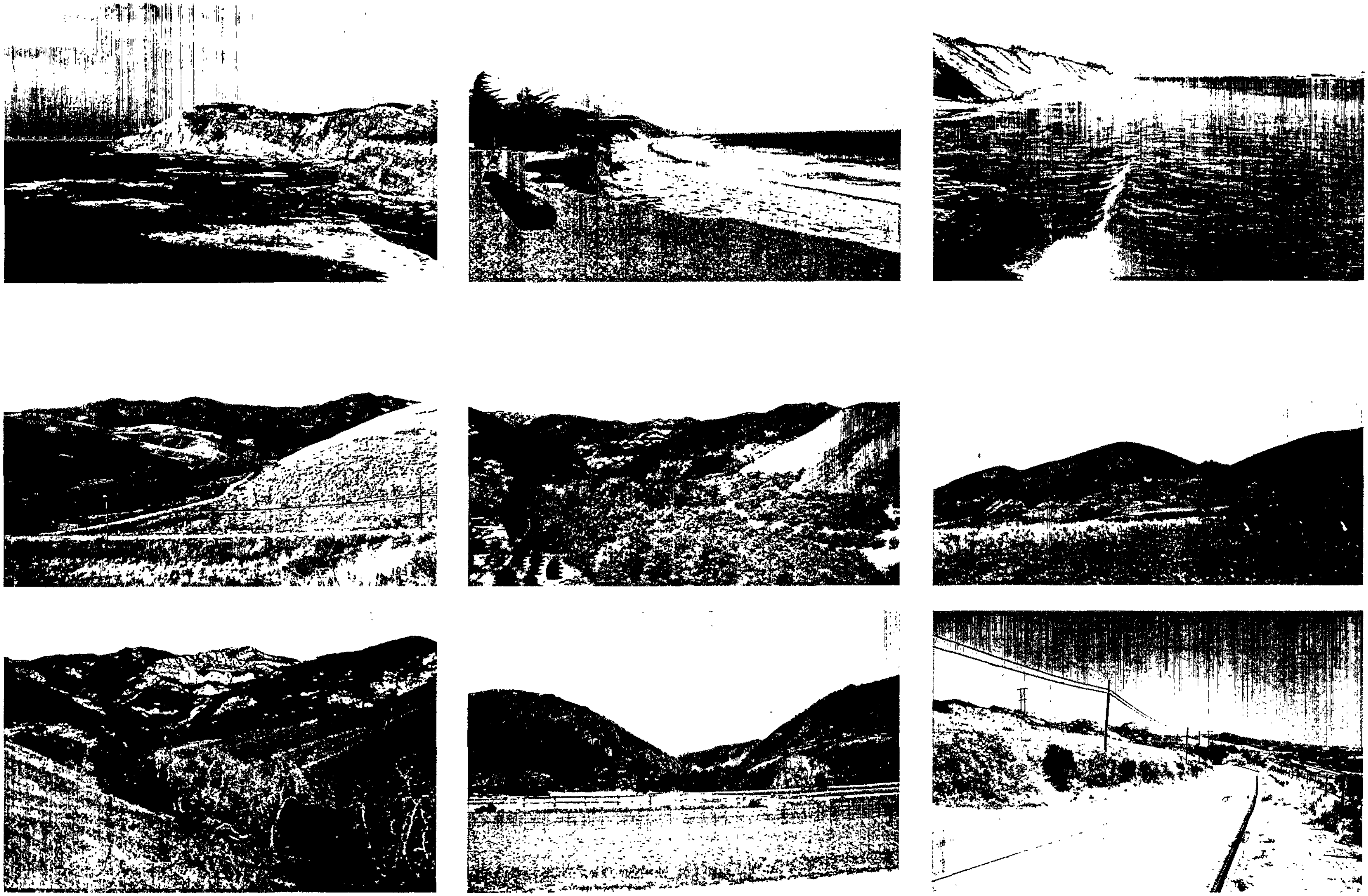

Figure 4.9-4 Views typifying Variety Class A, B, and C scenery within the Coastal Character Type.

VARIETY CLASS A | VARIETY CLASS B | VARIETY CLASS C

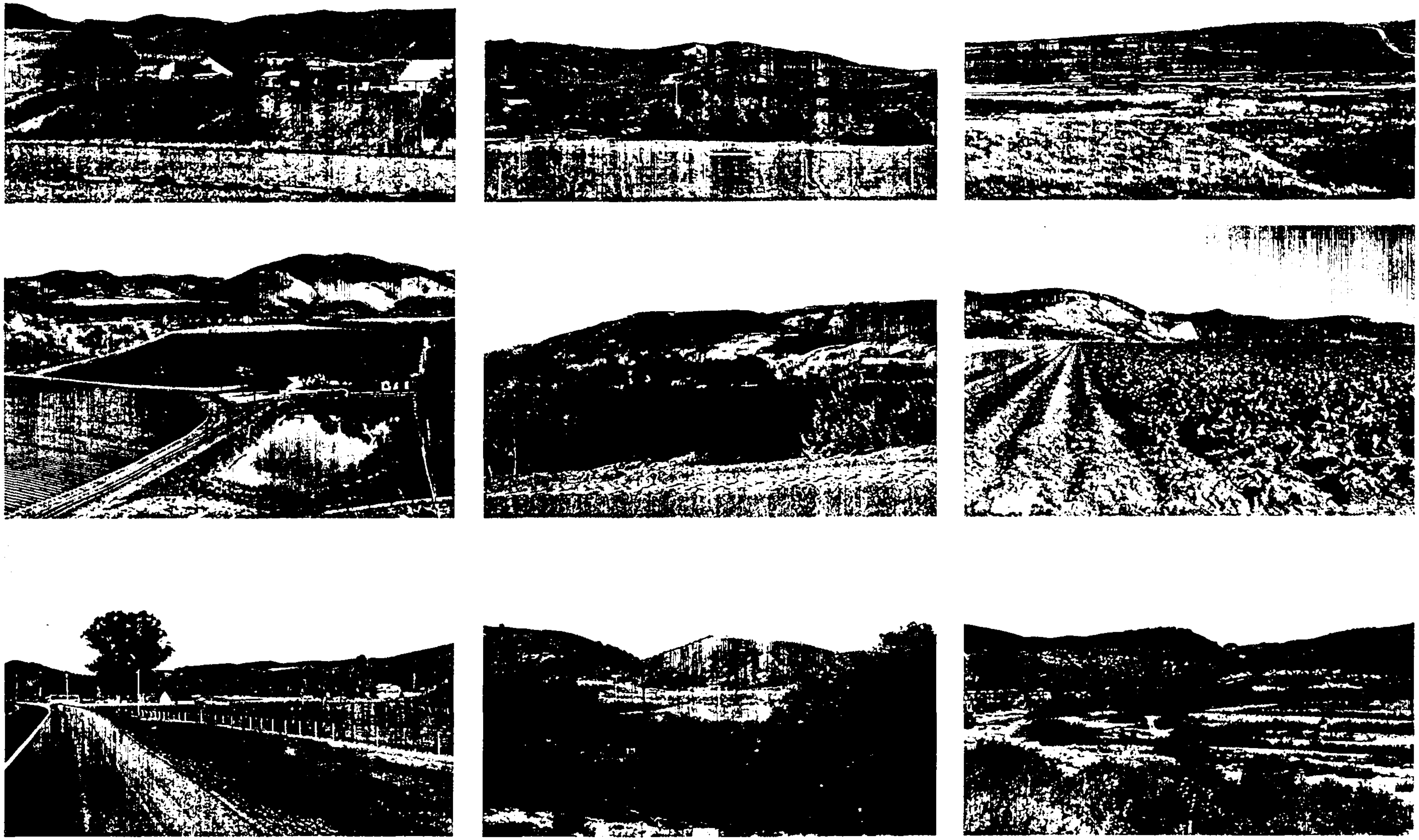

Figure 4.9-5 Views typifying Variety Class A, B, and C scenery within the Santa Maria Basin Lowlands Character Type.

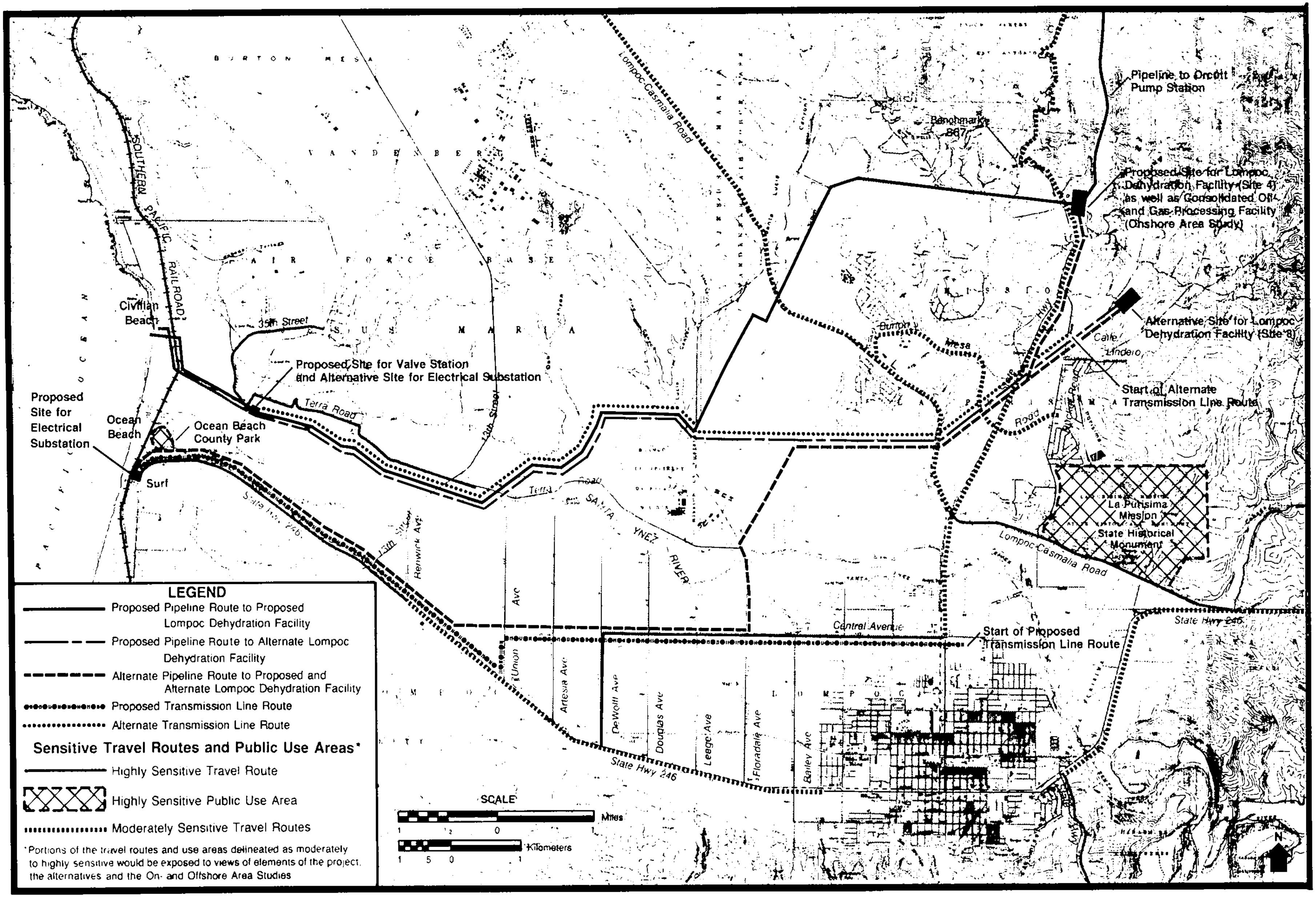

Figure 4.9-6 Onshore elements of the Project and Alternatives in the Lompoc area.

Highway 1, from Lompoc to just beyond Burton Mesa Road, also offers relatively undramatic views; however, from Burton Mesa Road to where the highway ascends the Purisima Hills, views often encompass a moderately varied landscape. The proposed site for the dehydration facility, and Proposed and Alternative Pipeline and utility routes and the consolidated oil and gas processing facilities (Area Study) would be within the foreground along stretches of this part of the highway. Current visual conditions are generally good, but, in places transmission lines and oil facilities detract from the scenery.

On the other hand, proposed and hypothetical Area Study platforms would occur within view of the highly scenic, nearly pristine shorelines (Point Sal State Beach, Ocean Beach, Civilian Beach). Offshore elements of the Project Area in relation to these beach areas are shown in Figure 4.9-7.

The dry oil pipeline corridors associated with the Area Study, though not yet specifically identified, would potentially be within view of State Highway 1, between Lompoc and Las Cruces, and U.S. Highway 101 between Buellton and Gaviota. Scenic quality along Highway 1 in this area is among the highest in the Study Region, striking and unblemished as is that along the stretch of U.S. Highway 101 that crosses Gaviota Pass. State Highway 246 between Four Corners and Buellton presents a pastoral landscape generally free of distracting elements and, in places, also inherently scenic. The dry oil pipeline route may pass within view of this travel route as well. A detailed description of the assessment of visual quality and the methodology used appears in the Technical Appendix H.

4.9.3.4 Regulatory and Institutional Setting

STATE AND COUNTY COASTAL ZONE REGULATIONS

Three elements of the proposed projects would occur within the Coastal Zone: the "wet" oil and gas and return-water pipelines, the power cable, and the electrical substation. Policies of Santa Barbara County's Local Coastal Program are in effect for all County lands within the Coastal Zone, except for federal lands. However, as explained under Land Use, Section 4.7.7, County policies concerning the Coastal Zone do apply indirectly to the Union project through the consistency determination process where federal land (Vandenberg AFB) are involved.

With regard to siting the electrical substation on Southern Pacific Railroad property at Surf, that action must conform to the County's Local Coastal Program, with the County having direct jurisdiction in this case.

In particular, the Santa Barbara Coastal Plan [1982] sets forth policies requiring: landscaping plans, structures to be compatible with the character of the natural environment in areas designated as rural on land use plan maps, bluff setbacks to minimize or avoid impacts on public views from beaches, and underground utilities, where financially feasible.

Sections of the County's Coastal Zoning Ordinance [CZO, 1982b] with relevance to visual resources address the placement of utility and electrical transmission lines underground, where feasible and the routing and landscaping

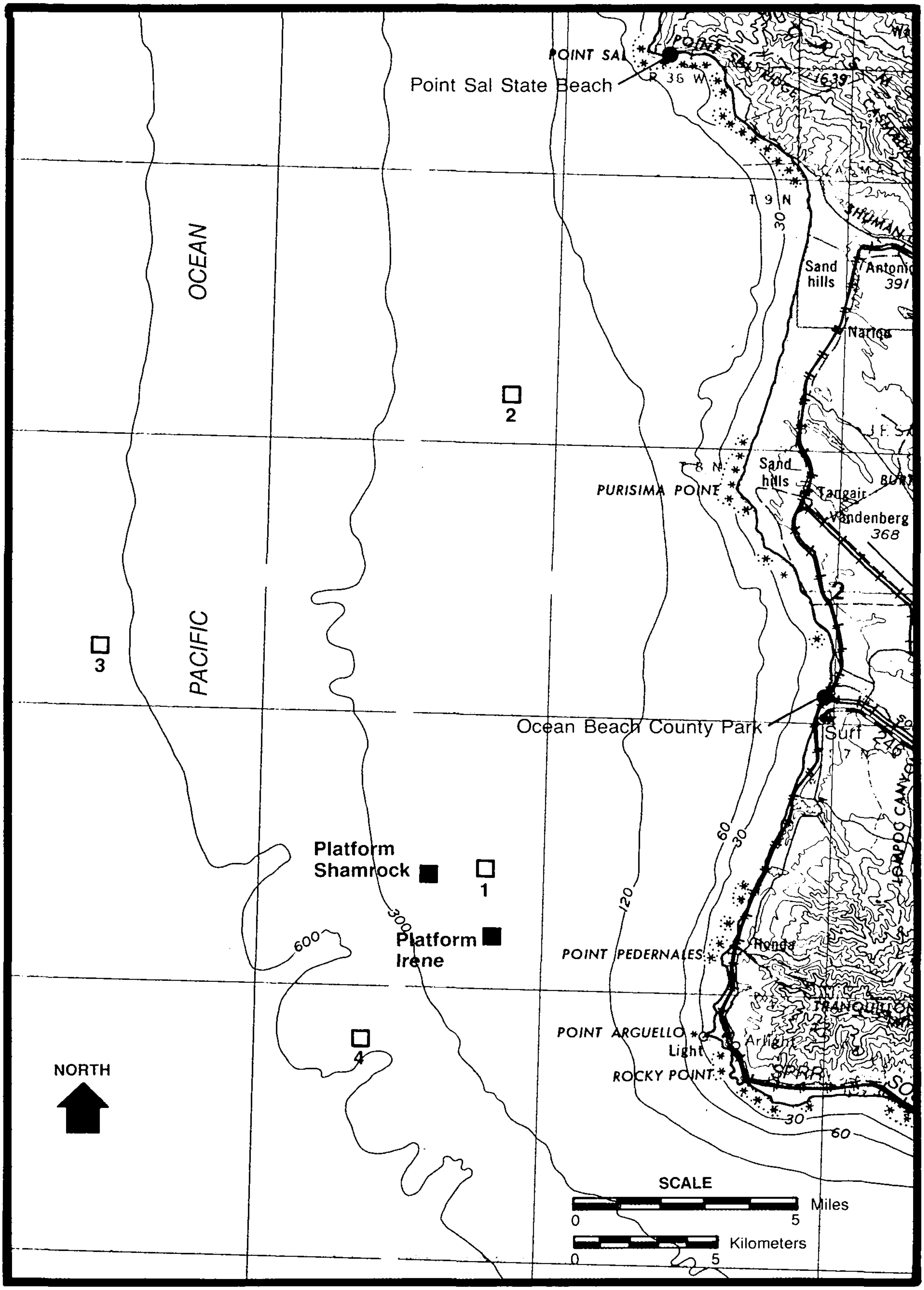

Figure 4.9-7 Approximate locations for Union's Platform Irene, Exxon's Platform Shamrock, and the four hypothetical platforms considered in the Offshore Area Study.

of rights-of-way to minimize impacts especially in scenic rural areas. The CZO also discusses the implementation and monitoring of revegetation plans for oil and gas projects, and pipeline corridor siting, backfilling, and construction restrictions.

SANTA BARBARA COUNTY ZONING ORDINANCE, ARTICLE III

This zoning ordinance applies to areas outside of the Coastal Zone and contains provisions similar to the CZO. Article III also requires structures in rural areas to be compatible with the character of the surrounding environment; requires that energy facilities be landscaped and that obtrusive lighting and alteration of drainages be minimized; and sets forth pipeline siting, landscaping, and monitoring requirements.

SANTA BARBARA COUNTY SCENIC HIGHWAY POLICIES

The dry-oil pipeline routes associated with the Area Study may be within view of parts of Highway 1 from Las Cruces to Lompoc, a segment designated as a State Scenic Highway:

> "The Rural Designated Scenic Highway is a route that travels a defined visual corridor within which all natural scenic resources and aesthetic values are protected and enhanced."

According to the State of California's Streets and Highways Codes (Section 260, Article 2.5 of Division 1),

> "It is the intent of the Legislature in designating certain portions of the state highway system as state scenic highways to establish the State's responsibility for the protection and enhancement of California's natural scenic beauty by identifying those portions of the state highway system which, together with the adjacent scenic corridors, require special scenic conservation treatment."

This section of the Code goes on to say that, in designating such scenic highways, the legislature assigns the responsibility to state and local agencies, as appropriate, for establishing and applying specific planning and design standards and procedures in order to protect the scenic resources along these highways.

Currently, Santa Barbara County has adopted no specific measures to protect the scenery adjacent to Highway 1 from Las Cruces to Lompoc. Land within view of this route primarily is now zoned AG-0 (agricultural). However, according to the County's Scenic Highway Element [County of Santa Barbara, 1975] a local plan for preservation of a scenic route eligible for inclusion in the State's system of scenic highways must contain certain enhancement and protection measures. These measures include restrictive zoning, requirements for detailed site planning, and regulation of grading and landscaping among others. The County's intent to protect the scenery along Highway 1 is implicit, however, though not manifest in specific regulations.

SANTA BARBARA COUNTY COMPREHENSIVE PLAN, LAND USE AND OPEN SPACE ELEMENTS

Those provisions of the Land Use Element of the County's Comprehensive Plan which protect visual resources are essentially the same as those found in Article III of the County's Coastal Zoning Ordinance.

Also bearing upon the scenic resources within travel corridors are policies presented in the Open Space Element of Santa Barbara County's Comprehensive Plan [1979b]:

- "Those travel corridors which are shown as Level One in scenic value [highly scenic] in Table 3 deserve prime consideration for scenic highway designation. State scenic highway standards require particular regulations of development within travel corridors...."

- "Level Two travel corridors [moderately scenic] ... may not be so scenic as to warrant preservation as open space, but should be treated with care if development is permitted. A systematic design review procedure should be employed to evaluate the impact of any development proposal."

The Open Space Element identifies U.S. Highway 101 from Los Alamos to Buellton, and State Highway 1 from Las Cruces to Lompoc as Level One travel corridors. Others were identified but are not germane to the proposed projects or the Area Studies. Relevant Level Two routes include State Highway 1 from Orcutt to the Los Alamos turnoff, U.S. Highway 101 from Buellton to Gaviota State Beach Park, and State Highway 246 from Lompoc to Buellton. Level Three (least scenic) routes important to the projects and Area Studies are U.S. Highway 101 from Santa Maria to Los Alamos, Lompoc-Casmalia Road from Highway 1 to Vandenberg Village, Highway 1 from the Los Alamos turnoff to Lompoc, and Highway 246 from Lompoc to Surf. No specific recommendations are made for Level Three roads.

The Open Space element goes on to recommend:

"Travel corridors and urban perimeter areas determined to be of the highest scenic value should be designated open space if possible. Other scenic areas should be subjected to design review before development permission is granted. Preservation of the integrity of the site and minimal visual disturbance or change from existing conditions should be the principal criteria used in the review process...."

All "urban perimeter" areas relevant to the Union and Exxon projects, their alternatives, and the Onshore Area Study are relatively low in scenic quality. The last recommendation noted above, therefore, would apply only to the highly and moderately scenic travel corridors listed.

4.9.4 Release of Odors and Smoke

4.9.4.0 Characteristics of the Study Region

The region that may be impacted by odors and smoke emitted from the projects is the same as that defined in the air quality baseline (Section 4.2.1). This includes southern San Luis Obispo County and the western and southern portions of Santa Barbara County. In addition, the San Rafael Wilderness in interior Santa Barbara County may be affected by visibility impairment. Odors from the projects would generally be perceived in populated regions nearest the facilities and they include the areas near the proposed onshore processing facility in Lompoc, the existing Battles Gas Plant and the existing refinery in Santa Maria.

Under existing conditions, odors may occur near the presently operating facilities which include the Battles Gas Plant and the Santa Maria Refinery. With regard to the Battles Gas Plant, the gas that is presently being processed has very little H_2S content. Consequently, the release of gas through leaks would not result in the perception of odorous compounds. This has been confirmed by the fact that no odor complaints have been recorded by the Santa Barbara County APCD in the last ten years.

The Santa Maria Refinery, as it presently exists, can release odors through fugitive leaks and can occasionally cause odors to be detected near the facility. Since 1980 the San Luis Obispo APCD has recorded 43 odor complaints principally from a residential area in Nipomo Mesa approximately one mile northeast of the refinery. However, it is difficult to attribute all of the occurrences to emissions from the refinery since a neighboring chemical coke plant may also release odorous pollutants.

Visibility impairment because of smoke releases from existing facilities has not been observed in the Lompoc or Santa Maria Region.

4.9.4.1 Regulatory and Institutional Setting

Odors are one of the most obvious forms of air pollution to the general public and can present significant problems for both the emitter and the surrounding community. The key to solving odor problems is to reduce the odorant concentration at the receptor, the nose. Responses to objectionable odors, however are on very short time scales and can sometimes occur as a result of an infrequent (instantaneous) exposure to an odorous pollutant.

The time scales are generally equal to the duration of a human breath, typically two to five seconds. Peak concentrations for these short times can be much higher than longer term concentrations that are required for other pollutants, and it is these peak concentrations that elicit odor complaints. Thus implementation of controls to reduce odorous pollutants, in response to objections, can sometimes involve trial and error to an excessive degree.

Petroleum activities such as those proposed for the projects can release odorous vapors that include hydrogen sulfide (H_2S) and organic sulfur compounds called mercaptans. There are no federal regulations or ambient air standards with regard to odors. However, the State of California has an ambient air standard for hydrogen sulfide of 0.03 ppm (maximum one-hour average) as a means of regulating odors. (See Table 4.2-1 on Standards.) This standard is well above the odor threshold for H_2S which is approximately 0.001 ppm, where odor threshold can be defined as the minimum concentration at which an odor can be perceived by the nose. Thus, odor complaints may be registered by the public even though the 0.03 ppm one-hour standard is not exceeded. There are no state or federal standards for mercaptans which generally have odor thresholds at levels at least ten times higher than H_2S.

With regard to smoke as it relates to visibility impairment, the State of California has an ambient air standard regarding the prevention of the prevailing visibility to less than ten miles when the relative humidity is less than 70 percent. (See Table 4.1-1.) There is a federal standard for visibility impairment only as it relates to the effects on EPA Class I (pristine) areas. Under the 1977 Clean Air Act Amendments a Class I area is defined as all: (1) international parks, (2) national wilderness areas which exceed 5,000 acres, (3) national memorial parks which exceed 5,000 acres, and (4) national parks which exceed 6,000 acres and which were in existence on the date of the Clean Air Act Amendments of 1977. The federal regulations define "visibility impairment" to mean any humanly perceptible change in visibility (visual range, contrast, coloration) from that which would have existed under natural conditions. The nearest Class I area to the projects is the San Rafael Wilderness which is approximately 25 miles from the Battles Gas Plant.

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4.10 OTHER USES

This section includes discussions of: Commercial Fishing and Kelp Harvest; Recreation and Tourism (including Sportfishing); Traffic (including Commercial Shipping); and Military Uses.

4.10.1 Commercial Fishing, Kelp Harvest, and Mariculture

4.10.1.0 Overview

The commercial harvest of marine resources in the Study Region includes three forms of activity: commercial fishing, kelp harvest, and mariculture. The first two activities are well-established and of recognized economic importance, while mariculture in the region is presently a research-oriented activity with small-scale commercialization.

Recent advances in technology have been applied to commercial fishing elsewhere in the state. However, the industry in the Study Region is still characterized by the combination of small vessels designed for inshore fishing, and by fisherman tied through numerous associations, market relations, and frequently kinship.

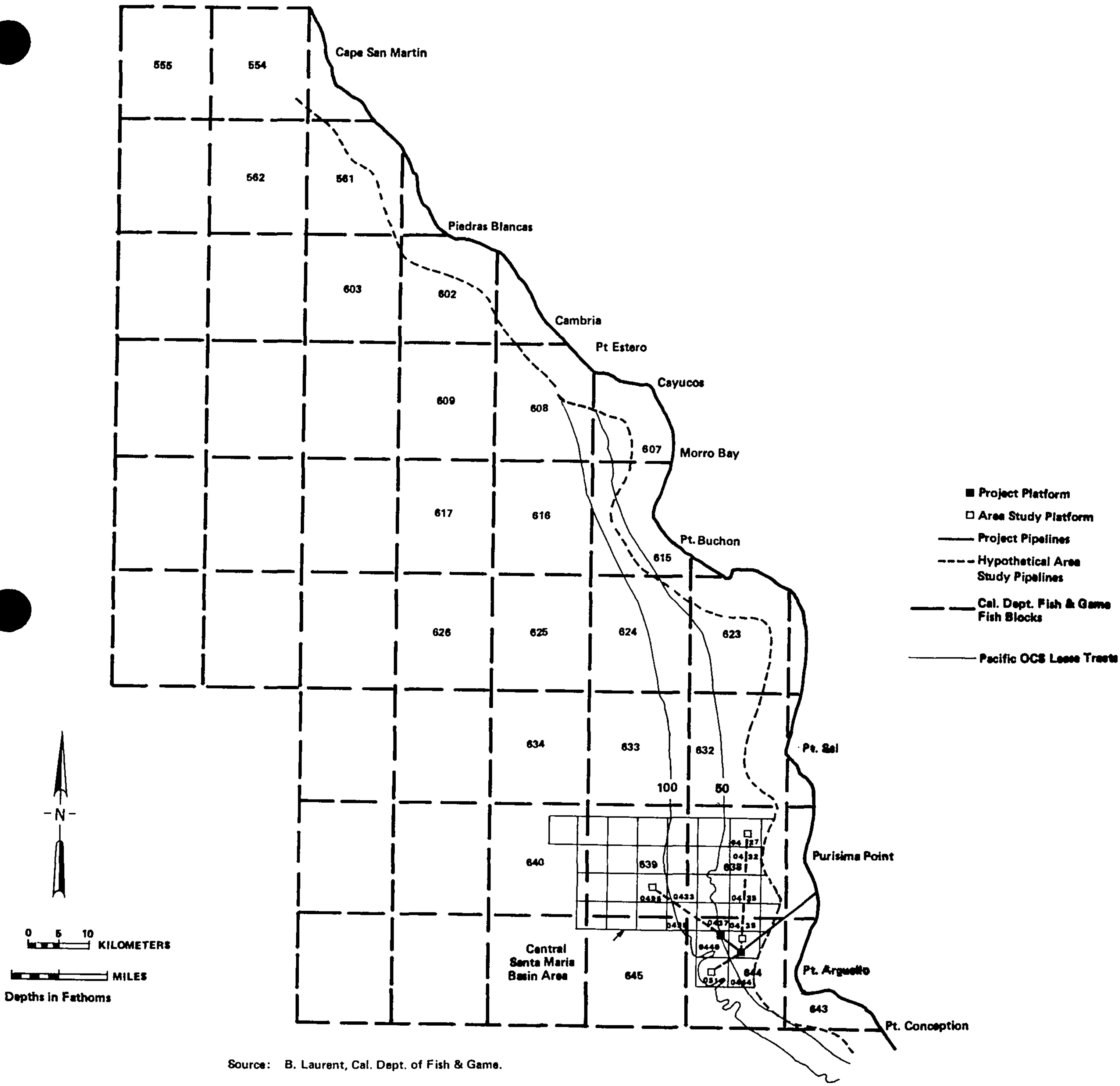
At present, Kelco Company of San Diego (a Merck Company subsidiary) harvests kelp in the Santa Barbara Channel. Beds in the Santa Barbara Channel have been harvested regularly by Kelco Company since the early 1940s. Up to 62 percent of the commercial harvest in California State in some years reportedly comes from the Channel [McPeak, 1983].

4.10.1.1 Definition of the Study Region, Area Study and Project Area

The Study Region, Area Study, and Project Area for commercial fishing, kelp harvest, and mariculture is physically defined by the area shown in Figure 4.10-1, and includes about 45 of the California Department of Fish and Game (CDF&G) Fish Blocks. From a socioeconomic standpoint, the region includes consideration of fleets and landings in the following ports: Santa Barbara, Morro Bay, San Luis/Avila, Ventura, Channel Islands (Oxnard) and Port Hueneme. Fishermen from all of these Ports make regular use of the Study Region, while fishermen from more distant ports only fish there occasionally. The Area Study focuses on facilities in three of the CDF&G blocks (638, 639, and 644). The Project Area includes proposed facilities in Blocks 644 and 643, and an alternative pipeline corridor to Block 658.

4.10.1.2 The Fishing Fleet

Table 3.0-1 in Appendix J lists the vessel and gear types of record for each of the ports in the Study Region for the 1983-1984 season. The three major ports for the entire Study Region are Santa Barbara, Morro Bay, and San Luis/Avila, regularly serving as home base for some 150-200 vessels each. For the production and pipeline locations of the Area Study and Project Area, the majority of boats are based in Morro Bay and Port San Luis/Avila. Santa Barbara-based boats fish the areas between the proposed Ellwood crew base and the Shamrock project site.



Source: B. Laurent, Cal. Dept. of Fish & Game.

FIGURE 4.10 –1 STUDY REGION FOR COMMERCIAL FISHING

The Morro Bay and Port San Luis fleet capacities expanded dramatically in the 1970s with the addition of several large trawlers formerly based on the Gulf Coast. In the 1980s fleet composition has remained relatively stable, although two large trawlers sank in 1984 [Pers. Comm. B. Laurent, CDF&G to C. Cooper, Arthur D. Little, 10/84].

4.10.1.3 Principal Types of Fishing Activity

The different types of fisheries are quite different in their degree of dependence on local waters. Trollers, for example, fish the entire California coast while small set-gear boats tend to fish close to their base of operation.

FISHERY TYPES

Purse Seining

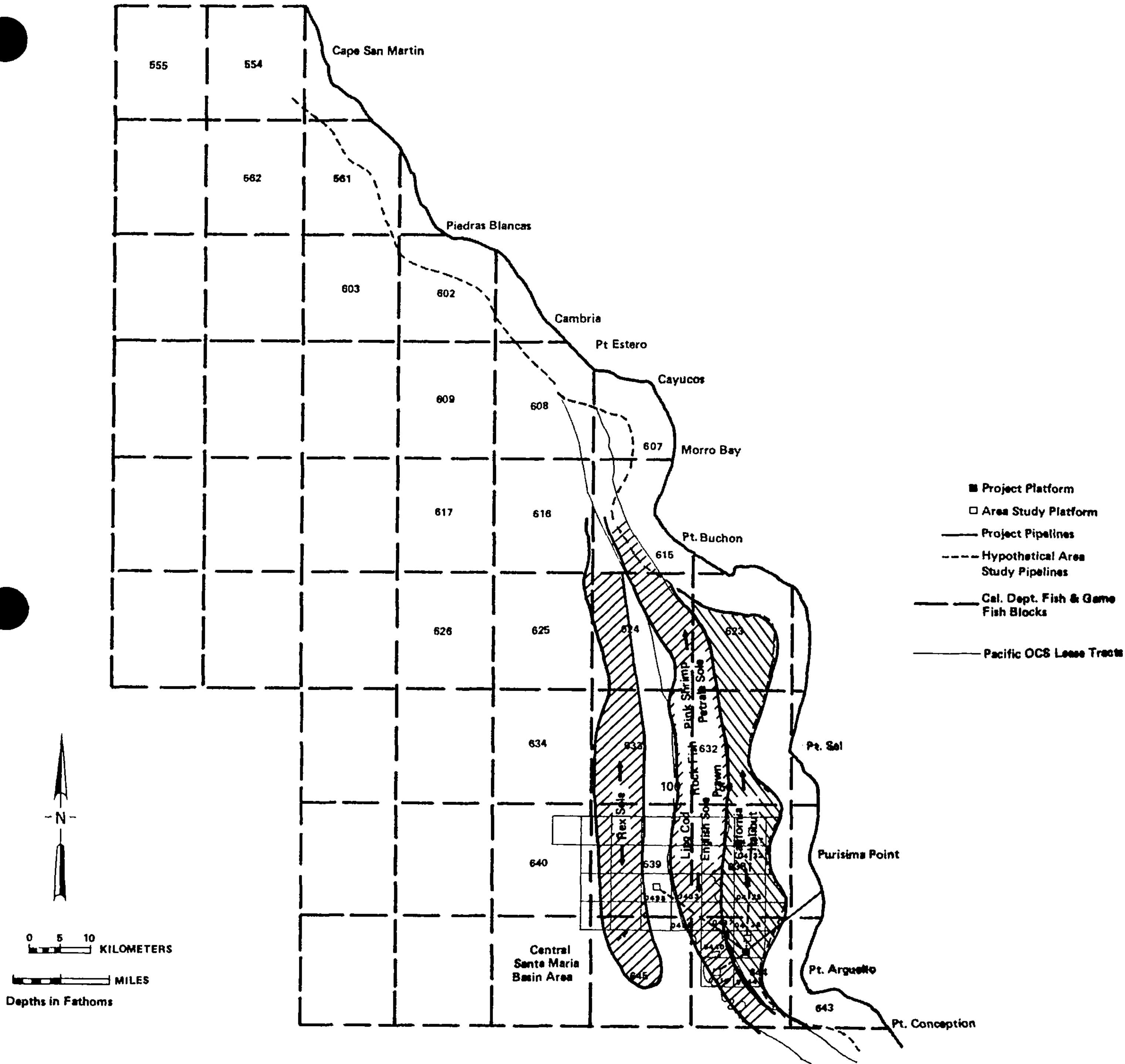
Purse seining occurs wherever fish are temporarily concentrated throughout the Study Region, Area Study, and Project Area exclusive of the shipping lanes, while lampara nets are fished in shallow areas (less than 150 feet [46 meters]). Species sought include mackerel, bonito, anchovy, and squid.

Gill Netting

Two basic types of gill net are used: stationary or set gear, and drift nets. Set gear is generally fished in relatively shallow inshore water, within the 180-foot (55 meters) depth contour, all along the coast and around the Channel Islands except within 750 feet (229 meters) of any pier, jetty, wharf, or breakwater. Deeper waters (up to 600 feet) are increasingly being fished with set gear, although this activity is still a small minority of the present effort [Hur, 1984]. Target species for set gear include seabass, rockfish, barracuda, halibut, and several varieties of shark. The Central Santa Maria Basin Area Study tracts and Project Area are not heavily used by this fishery. Most drifting for swordfish and shark occurs somewhat further offshore (i.e., at least 10-12 nautical miles) than the hypothetical and proposed platform sites. [Personal communication, B. Laurent, CDF&G, to C. Cooper, Arthur D. Little, October 1984]. Shark drifting occasionally occurs closer to shore, including within the Project Area [California Coastal Commission, 1985].

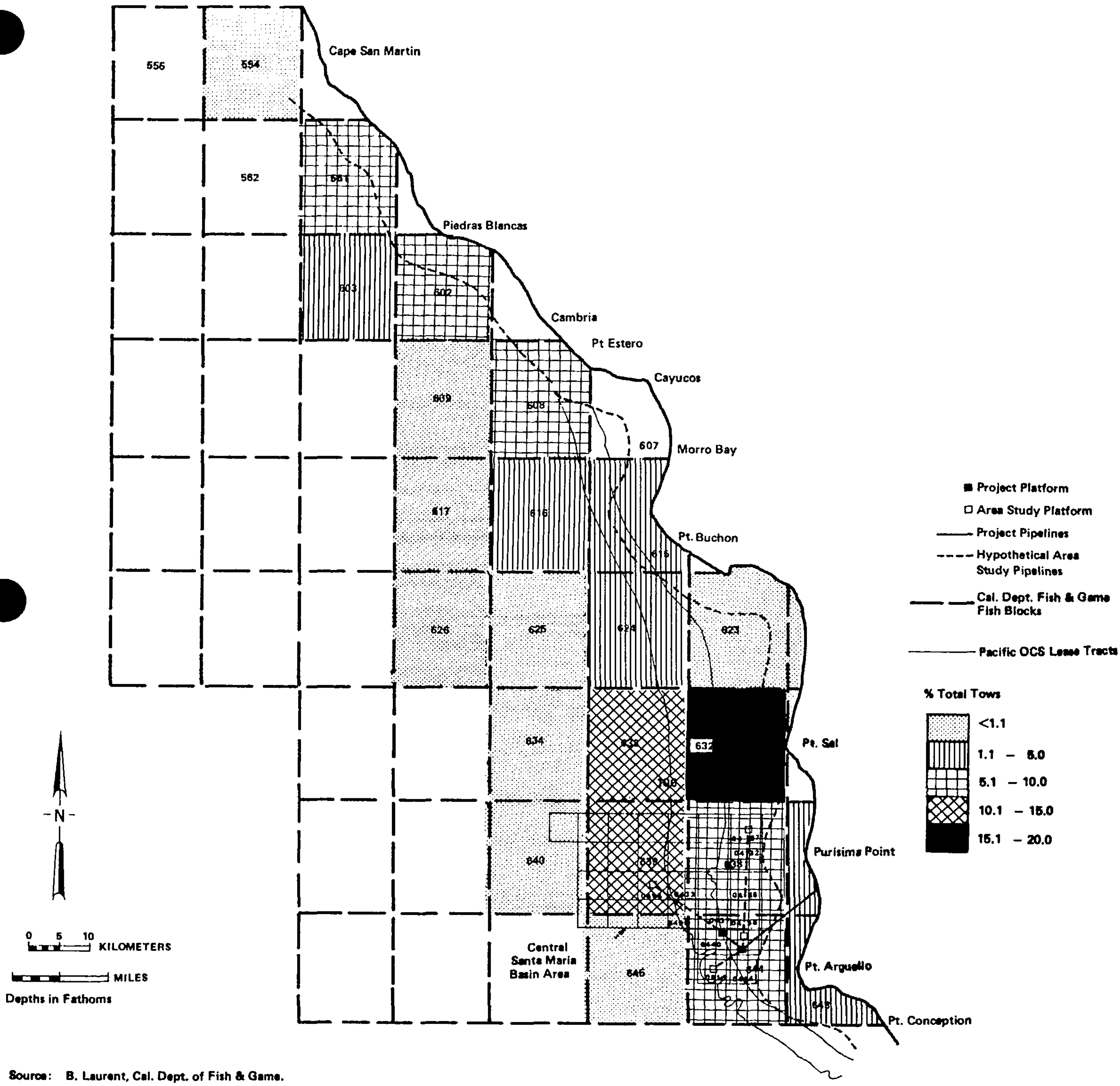
Trawling

Drag nets are used in the Santa Barbara Channel, around Point Conception, and in the area off Point Sal to Point Arguello, to fish for the many varieties of rockfish and sole, California halibut, sea cucumbers, prawns and shrimp. Shelf and slope areas are fished to depths of about 1,000 feet (300 meters) with the prime dragging depths between 300 and 750 feet [Centaur, 1984]. Figures 4.10-2 and 4.10-3 show major trawl harvest areas compiled from the trawl log records supplied to California Fish and Game for the proposed Area Study and Project Area. Review for this report of trawl records for the period 1979-1984 suggests that the area just southwest of the proposed



Source: B. Laurent, Cal. Dept. of Fish and Game.

FIGURE 4.10 – 2 PRINCIPAL DRAGGING AREAS, PT. ARGUELLO TO OCEANO



Source: B. Laurent, Cal. Dept. of Fish & Game.

Note: Based on logs taken from 8/81 to 1/82 – 1375 tows.

FIGURE 4.10 – 3 GROUNDFISH TRAWLING GROUNDS – 1981

Shamrock project platform site, the OCS-P 0495 and OCS-P 0510 hypothetical Area Study platform sites, and the north central portion of the Area Study are in areas of importance at least to Morro Bay and Port San Luis trawlers.

Dragging for prawns and shrimp occurs primarily north of the proposed platform sites and the Area Study tracts (see Figure 4.0-2 in Appendix J), and in the Santa Barbara Channel. Rockfish dragging areas for the Area Study and Project Area are primarily at the 50-150 fathom depths off Point Arguello to Point Sal (see Figure 4.10-2) on the western periphery and in the southern parts of the Area Study tracts and Project Area. As shown in Figure 4.10-2, dragging for sole is generally in somewhat deeper water off the Point Arguello to Point Sal coast. As shown in Figure 4.10-2, halibut dragging occurs generally nearer to shore (just outside the 3-mile line) between Point Arguello-Point Buchon, including in the Project Area and Area Study tracts.

Dragging occurs all year long, but is of special importance to local fishermen in fall, winter, and early spring, when they are able to supply species not readily caught further north [Giannini, per. comm. 1984].

Hook and Line

Trolling is used to harvest salmon, albacore, bonito, and barracuda. Generally, trooling is a summer and fall activity in the Area Study tracts to which many of the local fishermen turn each year. Trolling takes place in open water wherever the fish can be found. Trolling also is practiced heavily in the areas off Port San Luis and Morro Bay, north of the proposed Area Study and Project Area [Dames & Moore, 1984].

Trapping

Spiny lobster and three species of rock crab are trapped in the Study Region. Traps are placed in water less than 180 feet deep along the mainland and around the islands. Lobster are trapped heavily along the Gaviota coast and around Point Conception towards Point Arguello. They are not fished heavily in the Project Area between Point Arguello and Oceano. Two to three fishermen trap red rock crabs in about 10 fathom depths from Point San Luis south to Point Arguello, with possible room for expansion of this fishery [Pers. Comm. B. Laurent, CDF&G to C. Cooper, Arthur D. Little, 10/84].

OTHER HARVESTS

Swordfishing

Swordfish are harvested with gill nets and harpoons in the Study Region from late May to November. Most fishing for this species occurs further offshore (greater than 10 miles) than the proposed oil development tracts [Personal communication, B. Laurent, CDF&G to C. Cooper, Arthur D. Little, October 1984.]

Abalone Diving

Within the Study Region, abalone are mainly harvested along the mainland coast south of Point Arguello, and particularly south of Point Conception and around the Channel Islands out to a depth of about 100 feet. Most of the harvest is composed of red, pink, and white abalone. Black abalone are harvested for the Japanese market.

Urchin Harvest

Urchins are harvested along the mainland coast and around the Channel Islands to depths of about 60 feet. The sea urchin has replaced abalone as the overall most valuable commercial shellfish resource in this part of southern California. All but a small fraction of the sea urchin harvest is landed in the port of Santa Barbara, and this fishery is not an important activity in the Project Area/Area Study tracts.

Kelp Harvest

There is no commercial kelp harvest in the Project Area, as Bed 202 (Point Arguello to Point Sal) only supports scattered patches of kelp [McPeak, 1984c] there. Off Ellwood (Beds 28 and 29) there has historically been commercial harvest around the crew base site proposed for use by Exxon. Long-term loss of some 50 acres of canopy to vessel traffic has been reported for this site [McPeak, 1984a].

Mariculture

Mariculture is a relatively new and developing enterprise in southern California. Several mariculture operations are now present in the Study Region, but none are in the Project Area or Area Study tracts (see Appendix J).

4.10.1.4 Commercial Harvests

Harvest data are compiled by the California Department of Fish and Game on an annual basis for blocks (see Figure 4.10-1) and by port. The data are compiled from receipts completed by fish purchasers. These data, however, are not entirely accurate for several reasons. In order to maintain the secrecy of good fishing locations, fishermen will sometimes report catches in blocks other than those where they were actually taken. Also, catches by trawling and drift gillnetting often occur in more than one block but may be reported for only one block. Trawl data are reported for recent years only for major groups of blocks (e.g., the 600 "series").

Urchins, mackerel, anchovy, rockfish, squid, and albacore are the largest volume landings, and most of these landings are "cannery fish." Harvest data for the period 1975-1983 are presented in Table 4.10-1 for the species that dominate the catch by weight. The data show the development of the urchin, shrimp, and shark fisheries, and the decline of the anchovy and abalone fisheries. Although not illustrated by the table, there also was a major decline in the white sea bass fishery, which dropped from almost 80,000 pounds in 1972 to 16,000 pounds in 1981.

Table 4.10-1

COMMERCIAL FISH LANDINGS (IN THOUSANDS OF POUNDS) REPORTED FOR THE STUDY REGION PORTS FROM 1975 THROUGH 1983[1]

Species/Groups	1975	1976	1977	1978	1979	1980	1981	1982	1983
Urchins	7,188	10,467	13,066	10,095	13,816	17,014	17,713	13,338	11,034
Mackerel	0	3,967	11,339	8,819	10,980	9,864	17,022	11,663	10,251
Anchovy	50,871	38,627	29,563	13,419	17,234	22,816	20,047	14,282	6,060
Rockfish	4,779	5,844	5,540	4,971	5,814	5,327	5,171	6,538	3,316
Albacore	1,496	1,733	1,084	3,511	1,833	2,751	2,171	320	2,095
Abalone	1,411	1,058	901	812	639	814	713	794	544
Lobster	55	81	49	165	110	115	118	123	155
Crab	709	595	508	697	629	682	734	813	839
Shark	96	242	428	795	505	552	673	960	1,230
Halibut	186	406	296	267	371	332	674	545	366
Sole	1,442	1,188	1,183	1,106	1,226	834	1,048	1,006	1,313
Shrimp	241	92	1,230	106	442	1,286	1,584	923	1,165
Squid	5,117	3,388	5,366	2,584	15,902	2,414	4,908	3,094	14
Salmon	156	211	195	406	101	110	116	210	149
Swordfish	95	11	73	335	60	119	115	198	427
TOTAL	76,157	69,075	71,150	49,911	73,077	66,634	74,043	56,320	41,426

[1] Ports include Port Hueneme, Oxnard, Ventura, Santa Barbara, Grover City, Avila, San Luis, and Morro Bay.

Source: California Department of Fish and Game, unpublished data for 1977-82 and published data in Fish and Game bulletins for 1975-76.

Catch reports for several gear types combined for the fish blocks in the Project Area and Area Study are shown in Tables 4.10-3, 4.10-4, and 4.10-5 for the most recent years available at this level of detail. By comparison, these data confirm that the trawl landings are of major importance in the overall picture.

Rockfish are the primary species caught in the offshore Project Area and Area Study tracts; most are taken by dragging. Local fishermen's trawl logs indicate that the heads of the submarine canyons, including the canyon nearest the proposed Shamrock site regularly produce 1,000-7,000 pounds of rockfish per tow. Flatfish (primarily Petrale sole) are also recorded in these tows, generally less than 1,000 pounds per tow. Local fishermen report that this canyon head is particularly productive because of the opportunity to trawl around the four rock pinnacles at about 60 fathoms (see Section 4.1 of the EIR/S) [Pers. Comm. B. Cohen, 1984]. Review of trawl logs for 25 days of fishing at this canyon head from 1979-1984 showed rockfish catch in 60-100 fathom depths ranging from 300-14,500 pounds per day, with an average of 4,000 pounds per day. Flatfish catch ranged from zero to 2,700 pounds per day, with an average of 500 pounds per day. For rockfish, projection of these numbers suggests that as much as 20-25 prcent of the Morro Bay and Port San Luis landings (combined) may come from such a hotspot.

A few shrimp were reported taken in block 658 during 1981, but the primary shrimp trawling areas are located to the north and southeast of the project. (See Figure 4.0-2 in Appendix J.)

The tables show the typical range of year-to-year variation of catch by block for certain species. These factors strongly suggest that assessments be based on data from as many recent years of reporting as available, and in no case on only one year's results.

4.10.1.5 Economics of the Fishery

The volume and dollar value of the annual commercial harvest for the region vary considerably (Table 4.10.-6), with the value generally increasing in the 1970s and stabilizing in the early 1980s. Within the last 10 years, urchins have become the leading fishery for the region in terms of value landed ($3.5 million in 1981). Albacore ($1.9 million), and abalone ($1.3 million) were also very high in value [California Department of Fish and Game, unpublished data]. Kelp harvest, not illustrated in the table, has supported a $35 million a year industry in recent years, with 30-60 percent of the harvest historically occurring in the Study Region.

In total value of landings, Santa Barbara has ranked among the top 50-60 ports in the nation and sixth among the 36 ports in California in recent years [NMFS, 1984]. Morro Bay and Port San Luis rank well down the list in volume, but are important cold-weather suppliers of groundfish. What is particularly significant about fishing in the region is that fishermen and secondary businesses are dependent on the local resources. Specifically, the fishermen harvest year-round for a variety of species which are not usually caught in volume elsewhere in the winter months (e.g. flatfish), and local purchasers cannot obtain these or replacement species from outside the region at

Table 4.10-3

MORRO BAY LANDINGS (IN POUNDS)
PRELIMINARY SUMMARIES

TRAWL	1979	1980	1981	1982
SPECIES:				
Flatfish				
Petrale	259,451	158,859	84,963	87,390
Dover	16,501	107,386	62,758	210,663
Rex	45,986	136,196	86,568	127,326
English	96,584	89,962	64,489	52,599
Halibut	12,172	15,632	18,173	18,811
	430,694	508,035	316,951	496,789
Roundfish				
Rockfish	1,428,623	1,955,712	1,198,689	1,702,648
Blackcod	70,661	54,538	32,742	53,320
Lingcod	187,111	140,034	113,408	190,406
	1,686,395	2,150,284	1,344,839	1,946,374
Shellfish				
Pink shrimp	663,503	990,748	806,323	477,167
Prawns	19,002	39,422	36,980	53,110
	682,505	1,030,170	843,303	530,277
HOOK-AND-LINE				
Rockfish	1,109,474	643,018	762,774	1,104,304
Salmon	53,528	69,857	?	?
Albacore	1,298,245	1,650,007	1,674,066	211,435
Others	42,160	54,699	35,875	47,411
	2,503,407	2,417,581	2,472,715	1,363,150
SETNETS				
Halibut	13,595	20,360	49,863	71,438
Others	65,730	142,011	109,592	505,423
	79,325	162,371	159,455	576,861
TOTAL ALL SPECIES	5,352,326	6,268,405	5,137,263*	4,913,451*

*Without Salmon

Table 4.10-4

PORT SAN LUIS LANDINGS (IN POUNDS)
PRELIMINARY SUMMARIES

TRAWL	1979	1980	1981	1982
SPECIES:				
Flatfish				
Petrale	176,238	98,326	92,222	191,048
Dover	47,464	10,190	11,112	16,973
Rex	21,345	35,884	12,109	26,115
English	94,435	90,662	80,781	103,649
Halibut	24,732	28,585	34,255	54,884
	364,214	263,647	230,479	392,669
Roundfish				
Rockfish	1,198,833	1,451,141	1,130,136	1,281,213
Blackcod	98,559	13,463	32,600	26,137
Lingcod	217,130	121,119	139,095	107,777
	1,514,522	1,585,723	1,301,831	1,415,197
Shellfish				
Pink shrimp	152,768	138,832	186,079	14,100
Prawns	4,058	18,652	25,987	19,469
	156,826	157,484	212,064	33,569
HOOK-AND-LINE				
Rockfish	165,889	145,672	234,643	436,770
Salmon	50,291	34,980	?	?
Albacore	663,124	1,092,972	446,517	58,802
Others	21,292	23,099	30,699	27,326
	900,596	1,296,723	711,859	522,898
SETNETS				
Halibut	33,992	52,633	31,872	27,367
Others	69,057	85,729	53,582	123,623
	103,049	138,362	85,454	150,990
TOTAL ALL SPECIES	3,039,209	3,441,939	2,541,687*	2,515,253*

*Without Salmon

Table 4.10-5

COMMERCIAL FISH LANDINGS (IN POUNDS) FOR PROJECT AREA AND AREA STUDY BLOCKS

PROJECT AREA BLOCKS

ANNUAL CATCH (in pounds) BY SPECIES BLOCK 643 (Summary)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	Annual Avg.
Albacore			5257			1606				763
Tuna										
Anchovy										
Barracuda	5									1
Bonita									91	10
Eel								32	4	
Mackerel										
Salmon	41				288			438	1611	264
Shark, Pelagic						719	1774	5308		867
Swordfish	275									31
White Seabass	91		232				11	523	87	105
Butterfish										
Halibut		920	5456				4101	7257	1845	2175
Sablefish						105				12
Flatfish				1	81	200	49	84	97	57
Surfperch										
White Croaker										
Abalone	3319	5632	19367	7334	3662	9116	433	2672		5726
Sheephead										
Cabezon										
Giant Seabass										
Crabs				600	23364	12205	26940	30962	3951	10891
Fish				1642	1320			2179	2200	816
Lingcod						103		42	10	17
Lobster	255	10						151		46
Octopus										
Prawns										
Rockfish	54522		25348	23275	9560	15161	32490	71096	24522	28442
Sharks, Skates, & Benthic	238	1010	5502	35		15	4872	5287	2219	2109
TOTAL	58746	7572	60962	33042	38275	39230	70882	126198	36829	52415

ANNUAL CATCH (in pounds) BY SPECIES - CF&G BLOCK 644 (Summary

	1975	1976	1977	1978	1979	1980	1981	1982	1983	Annual Avg.
Albacore		39285			4967	273539	23608	23	1673	38122
Tuna		980							132	124
Anchovy			16900							1878
Barracuda			19							2
Bonita						20165				2241
Eel	11									1
Mackerel			3438	658	17				44825	5438
Salmon	318			4702	249				2572	871
Shark, Pelagic				65				6214	895	797
Swordfish									4089	454
White Seabass			656		16		6	30	9	80
Butterfish				424	2501	120			1654	522
Halibut	503		319		4		1504	2223	1124	631
Sablefish	3189			44554		763				5390
Flatfish	212525		151						183	23651
Surfperch	40			230						30
White Croaker	280		20331	29094	4214	20		668	6972	5758
Abalone			41	817						95
Sheephead										
Cabezon										
Giant Seabass										
Crabs	8745			200	3061	874		3090		1774
Fish					1095			2850		438
Lingcod	42307	173						10		4721
Lobster										
Octopus	44									5
Prawns								737	377	124
Rockfish	264458	39867	25690	13935	36897	73216	54208	66589	25079	66660
Sharks, Skates, & Benthic	617	60	356	137	1175	40		181	1431	444
TOTAL	533038	80365	51001	101716	54196	368977	79326	82615	91015	160250

Table 4.10-5
(continued)

COMMERCIAL FISH LANDINGS (IN POUNDS) FOR PROJECT AREA AND AREA STUDY BLOCKS

AREA STUDY BLOCKS

Species	BLOCK 639			BLOCK 638		
	1979	1981	1983	1979	1981	1983
Urchins						
Abalone-1		131				
Seabass, white					32	
Swordfish						
Shark (drift)-2			10,216		310	
Shark (set)-3			461	20	137	
Halibut				1,350	439	225
Lobster						
Crab-4	533			32	12,508	105
Mackerel						
Rockfish	17,567	19,184		20,738	41,859	8,759
Sole-5	983	231				
Bonito			3,528	9		
Shrimp-6	46,598	90,358			137	
Sablefish	252,306	567			59	
Albacore			2,436			10,201
Other	19	1,021	290	991	528	2
Other						
TOTAL	318,006	111,492	16,931	23,140	56,009	19,392

1 - All species.
2 - Thresher, bonito, and white.
3 - Soupfin, leopard, angel, blue, ow sevengill, brown, smoothhound, and unspecified.
4 - Rock, spider, and Dungeness.
5 - English, petrale, rex, Dover, sand, and unspecified.
6 - Pacific Ocean shrimp, ridgeback shrimp, spot prawn, and unspecified.

Source: California Department of Fish and Game, unpublished data.

Table 4.10-6

ANNUAL COMMERCIAL FISH HARVEST FOR THE STUDY REGION AND SANTA BARBARA FROM 1977 THROUGH 1982

Year	Santa Barbara		All Santa Barbara Region Ports		S.B. as % Area	
	lb	$	lb	$	lb	$
1983	9,340,546	4,297,169	41,426,024	13,045,127	23%	33%
1982	12,339,527	5,703,104	56,320,111	13,903,359	22%	41%
1981	15,508,819	6,308,033	74,042,583	16,240,765	21%	39%
1980	13,164,944	4,667,167	66,634,072	13,562,236	20%	34%
1979	12,445,969	4,025,164	73,076,782	14,401,563	17%	28%
1978	10,168,379	3,031,283	49,911,223	9,825,633	20%	31%
1977	13,612,347	2,760,138	71,150,016	6,895,263	19%	40%

Note: 1983 is an El Nino year.

[1] 1980 not available.

[2] Port Hueneme, Ventura, Oxnard, Santa Barbara, Avila, Grover City, San Luis, and Morro Bay and incidental small landings at Pismo Beach, Gaviota, Lompoc, Santa Maria, etc.

Source: California Department of Fish and Game, unpublished data.

competitive prices [Wagner, Pers. Comm. 1984]. About half of the trawl catches (especially rockfish and halibut) are generally sold directly to local fresh-fish markets, processors, and restaurants which have no alternative competitively-priced sources of supply [J. Giannini, personal communication, 1984]. A greater percentage of the catch is consumed locally when phenomena such as the El Nino reduce overall catch and supply. Species such as the soles, shrimp, salmon and mackerel are generally transhipped to Sacramento or other processing locations outside the Study Region. [B. Cohen, personal communication to C. Cooper, Arthur D. Little, 1984].

The better fishermen do well economically (see Appendix J) and [Centaur, 1984], but experience an opportunity cost when forced to switch to other target species if preempted from a particular harvest. A typical opportunity cost would be around 10¢ per pound, e.g., from 30¢ per pound for rockfish to 20¢ per pound for flatfish [Giannini, pers. comm. 1984].

4.10.1.6 Regulatory and Institutional Setting

Those state and federal regulations that affect the interaction of the commercial fishing and the oil and gas industries are highlighted below.

The Coast Guard has established safety zones around Platforms Hondo A and Grace (CFR Title 33, Section 147.05-11.02 through 11.08) and has indicated the intent to establish similar zones around all proposed platforms. The boundaries of these zones are 500 meters (1,620 feet) from the outer projections of the platforms. All vessels are excluded from these zones except: 1) vessels less than 100 feet (30 meters) in length; 2) vessels attending the platforms, and 3) vessels authorized by the Coast Guard. Since vessels in the regional fleet are less than 100 feet (30 meters) in length, they would not be excluded from the areas.

The MMS issues Pacific OCS orders, lease sale stipulations and regulations on OCS leases which are designed to mitigate impacts to fishing from OCS oil and gas activities. Specifically, Lease Sale 53 stipulations 7a and 7b entitled "Wells and Pipelines" require that pipelines, unless buried, have smooth-surface design or be protected such that trawl gear can pass over the line without snagging, which would damage the structure or the fishing gear. The Fisheries Training Program stipulation (Lease Sale 53, No. 8) requires that personnel involved in offshore oil and gas operations be trained in the value of fishing and methods used in the commercial fish industry, and potential conflicts which may arise between the two industries. Pacific OCS Order No. 1 also requires marking of equipment of such size and nature that it could be expected to interfere with fishing gear if dropped overboard so that proper ownership can be determined.

Federal laws which can be invoked to mitigate impacts to fishermen include the Fishermen's Contingency Fund, Oil Pollution Compensation Fund, and Fishing Vessel and Gear Damage Compensation Fund. The Fishermen's Contingency Fund was established by the OCS Lands Act to compensate fishermen for damages caused by oil and gas OCS activities when no responsible party can be found. The National Marine Fisheries Service (NMFS) administers these funds. Fishermen have indicated that these available mechanisms are not fully responsive to all types of losses they can incur in interactions with offshore oil and gas operations [Giannini, pers. comm. 1984].

The California Coastal Commission, through its consistency review under the Federal Coastal Zone Management Act of 1972 for all offshore and marine facilities and through the state-mandated permitting process for those facilities within state waters, imposes conditions designed to minimize impacts to the commercial fishing industry. Several California Coastal Act Sections, including 30231, protect marine organisms used for commercial purposes, and protect commercial fishery facilities from competing intrusions.

A Fisheries Liaison Office has been established in Santa Barbara to improve communications and relations between the oil and fishing industries. The Liaison Office is jointly funded by the California Coastal Offshore Operators Group (C-COG) and the fishing industry and acts as a vehicle for communication of information of mutual interest to both industries. For example, the office notifies fishermen of oil related activities (e.g., seismic surveys and tanker traffic changes), and facilitates filing of damage claims by fishermen. The U.C. Marine Advisor in Santa Barbara also publishes a monthly Newsletter for Fishermen and Offshore Operators.

4.10.2 Recreation and Tourism

This section discusses baseline information for the major topics of recreation and parks, sportfishing, and tourism.

4.10.2.0 Recreation Parks and Facilities

The tri-county area contains a varied and scenic physical environment, ranging from coastal bluffs, sand dunes and beaches, to inland mountains, and forests. The coastal region west of the Santa Barbara-Goleta area to Point Conception offers broad sweeping vistas of the coastal range, the Channel Islands, and the Pacific Ocean. The coastal area is largely undeveloped, although several existing oil facilities are interspersed with coastal parks and agriculture.

Figures 4.10.2-1, 4.10.2-2, and 4.10.2-3 locate the major parks and beaches along the coast of the tri-county area. Formally managed recreation sites and parks, in addition to dispersed recreation areas, offer a wide variety of recreation opportunities including swimming, sunbathing, and surfing at the beaches, boating, beachcombing and hiking, fishing, camping, biking, and off-road vehicle use. Given fine weather and the proximity of mountains and beaches, residents and visitors enjoy year-round participation in these activities.

Popular recreational pursuits along the coast include surfing, diving, hiking and sportfishing [California Department of Parks and Recreation, 1979a,b,c,d,e; 1983a]. Well known for surfing opportunities are the southerly facing beaches such as Rincon, Refugio, El Capitan, Tajiguas, and Molino. Excellent surfing is found west of Gaviota and along the Hollister Ranch shoreline, where access is limited to boat transportation because road access is by permit only. Diving is popular all along the coast in depths of 60 feet

FIGURE 4.10.2-1

COASTAL PARKS AND BEACHES
SAN LUIS OBISPO COUNTY
STUDY AREA OF TRI-COUNTIES

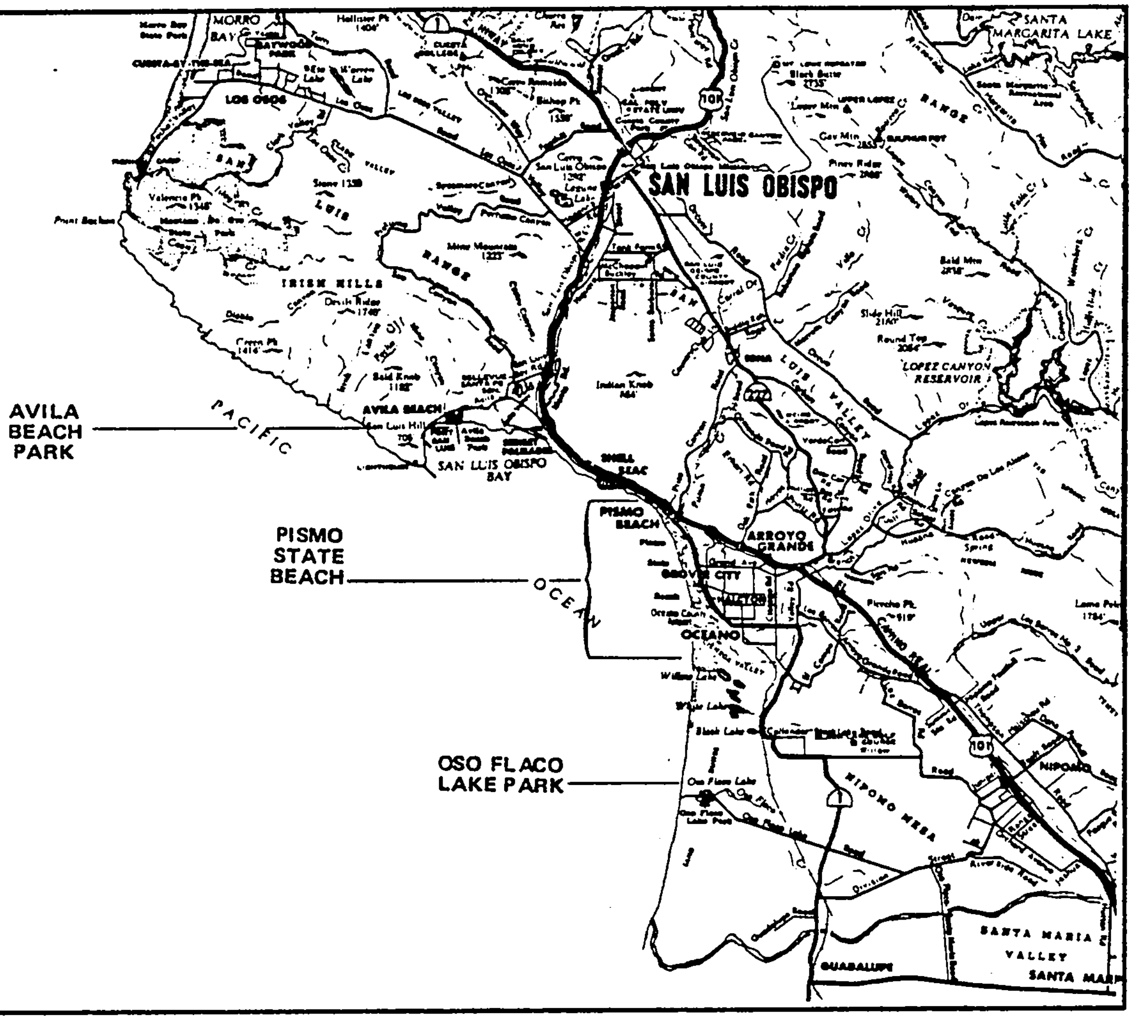


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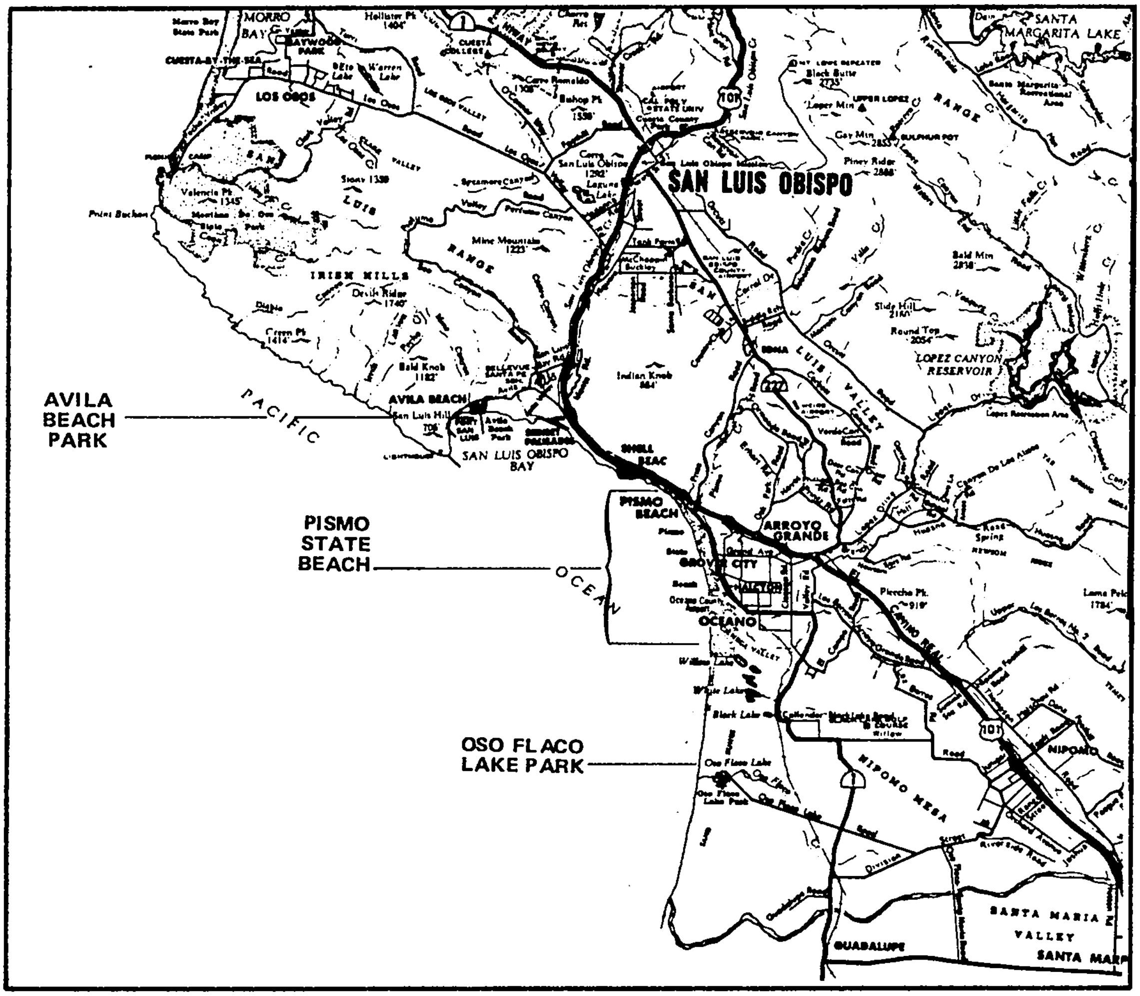
FIGURE 4.10.2-1

COASTAL PARKS AND BEACHES
SAN LUIS OBISPO COUNTY
STUDY AREA OF TRI-COUNTIES



Arthur D. Little, Inc.

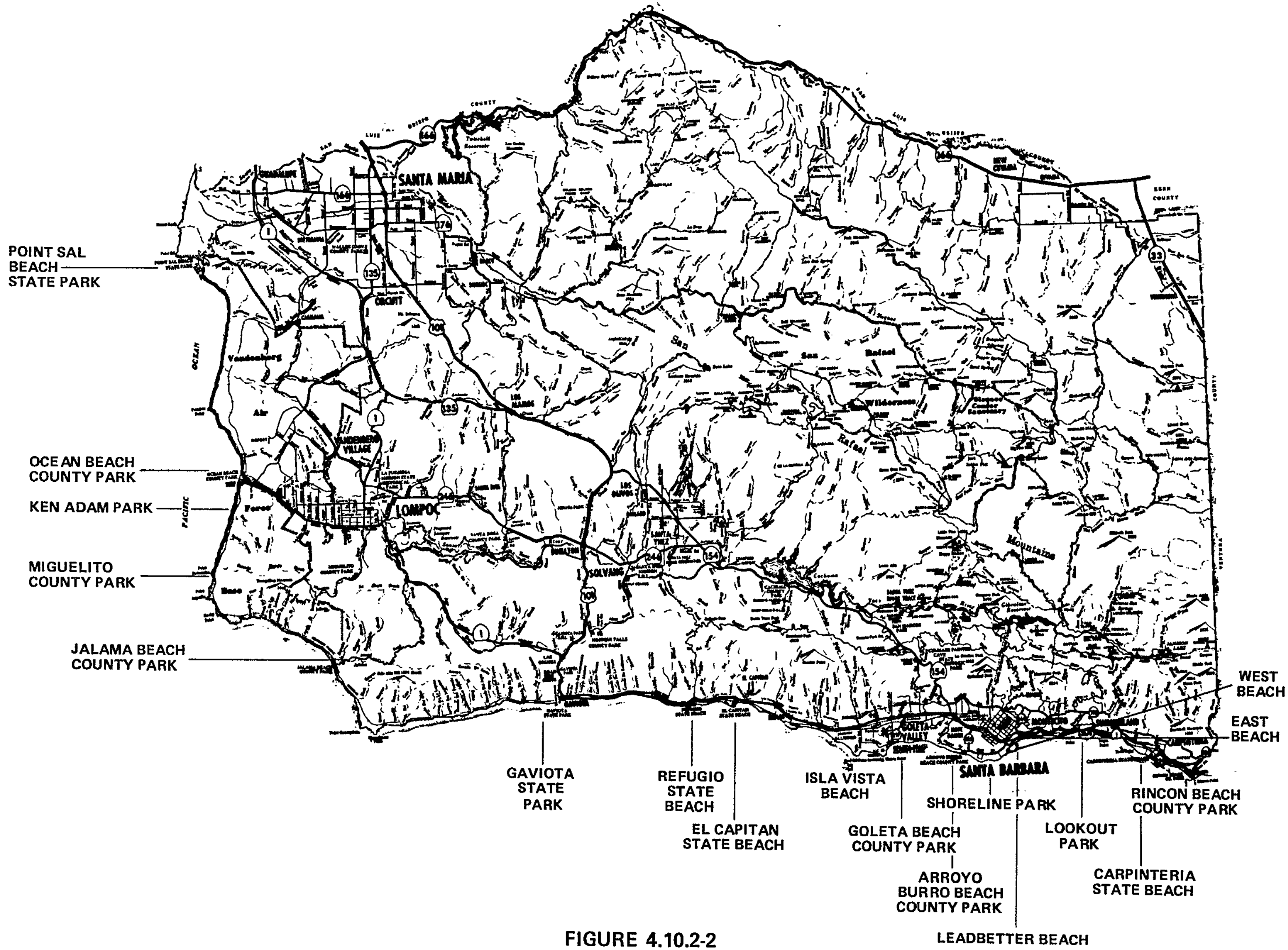
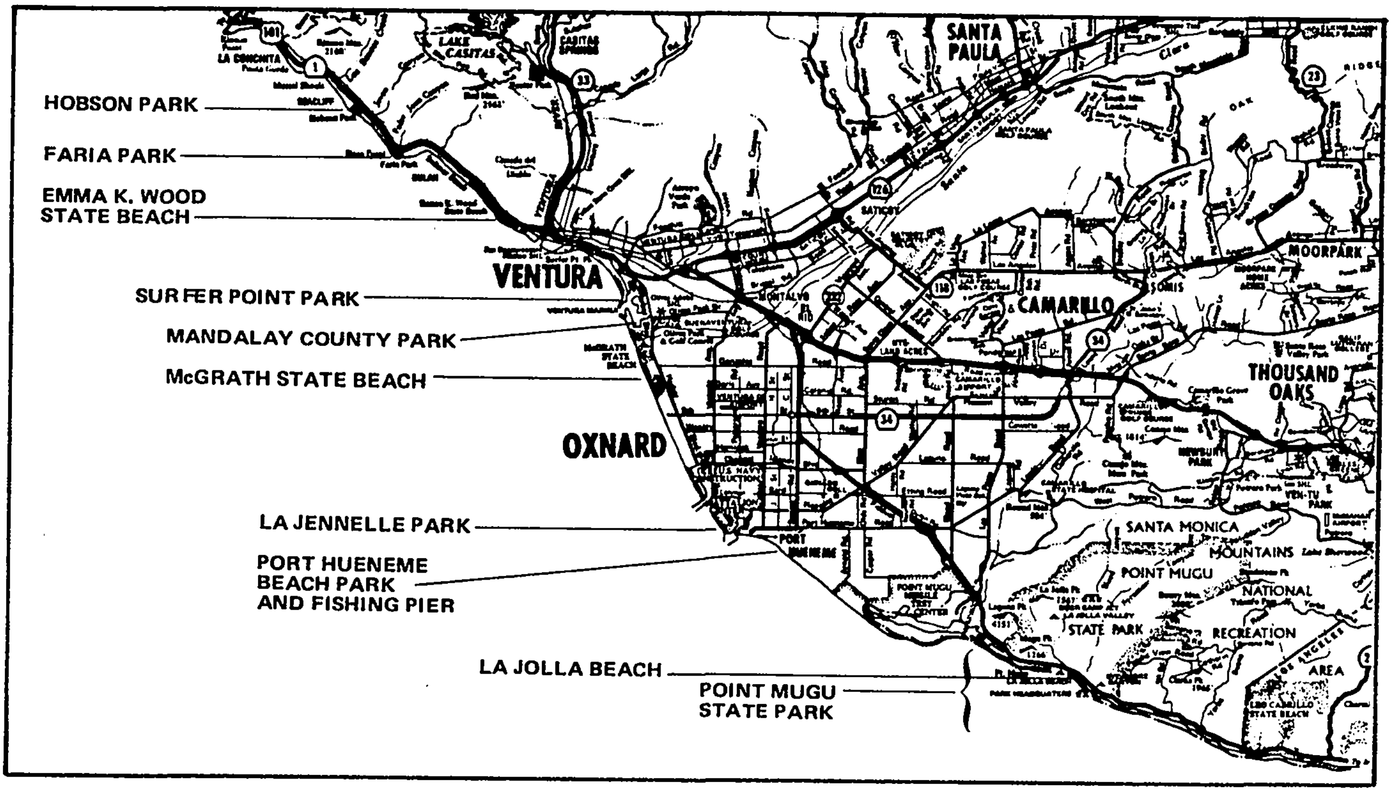


FIGURE 4.10.2-2

COASTAL PARKS AND BEACHES
SANTA BARBARA COUNTY
STUDY AREA OF TRI-COUNTIES

FIGURE 4.10.2-3

COASTAL PARKS AND BEACHES
VENTURA COUNTY
STUDY AREA OF TRI-COUNTIES



or less, where kelp beds and reefs can be found. Access to diving areas west of Gaviota and north to Point Sal is by boat only, but shore entry is possible at any of the beach or park locations noted in Figures 4.10.2-1 through 4.10.2-3. Boats can be launched from the Channel Islands, Ventura and Santa Barbara Harbors, Goleta, and Gaviota and Ellwood Piers, and at San Luis Obispo Bay. Sites for underwater state parks have been proposed near Naples Reef, Carpinteria Beach State Park, and San Miguel, Santa Rosa, and Santa Cruz islands. At present, the Channel Islands draw more than 15,000 divers each year [U.S. Department of the Interior, 1981]. The project's onshore construction and operations, as described in Chapter II, are to take place mainly within Santa Barbara County. Onshore construction workers recruited from distances too far for daily commuting are expected to be housed in the Lompoc and Santa Maria areas. (Port Hueneme in Ventura County will be used as a staging and transportation area during the construction period of the project only. therefore additional focus is brought to Santa Barbara onshore major parks and recreation areas. Tables 4.10.2-1 and 4.10.2.-2 list the acreage, amount of ocean frontage, and a description of the facilities located at each of the 15 selected County parks and four State beaches as in the coastal vicinity of Santa Barbara County.

In addition to the state and county park system, the Los Padres National Forest, which covers much of the northern half of Ventura County and much of Santa Barbara County, provides camping, backpacking, fishing, biking, and wildlife viewing. Inland lakes (Lake Casitas, Zaca Lake, Lake Piru, and Cachuma Reservoir) are popular fishing and sightseeing attractions.

Ocean Beach County Park is of significant interest due to its proximity to the pipeline and power cable components of the project. This park is located on the beach at Surf at the end of State Highway 246. The pipelines and power cable will come ashore near here and a substation will be built at Surf. Ocean Beach Park is located on 36 acres under a train trestle, and is a sand dune/wetland environment, with the Santa Ynez River mouth as a northern boundary. The park has one chemical toilet and a few fire rings. It is in a normally windy and isolated area used mostly by fishermen, windsurfers, and family picnickers. Average attendance per day is 25 to 50 people.

4.10.2.1 Marine Sport Fishing

Marine sport fishing is a recreational activity of economic and aesthetic importance along the South Coast of California, with both local residents and tourists participating. It extends from the shallow nearshore areas to depths of 600 feet (180 m) or more [Miller and Hardwick, 1973]. Five types of recreational fishing predominate: shoreline, pier and jetty, partyboat (commercial passenger fishing vessel), private boat, and skin/SCUBA diving [Pinkas et al., 1968; Yound, 1969]. Data from partyboat fishing are more readily available than for the other types of recreational fishing because the California Department of Fish and Game requires these boat operators to submit written logs that specify number of anglers, catch (numbers and average weight by species), location fished (by designated block number), date, and landing port.

Table 4.10.2-1

SELECTED COUNTY PARKS IN SANTA BARBARA COUNTY

Park (North to South)	Area (acres)	Ocean Frontage	Facilities
Ocean Beach County Park	20	NA	Picknicking
Miguelito County Park	–	NA	Group and family pickinicking facilities, dance amphitheatre, playground equipment.
Ken Adam Park		NA	Group and family picknicking facilities, barbeque pits. (Owned by Federal Government, being transferred to County.)
Jalama Beach County Park	28	0.3 mi	Picnicking and overnight campsites, with barbeque pits and tables; drinking water and sanitary facilities; surf fishing; surfing; tackle, bait, and camper supply store; snack-shop; horseshoe pits; children's play area; organized youth group area.
Isla Vista Beach	1.4	240 feet	Surf fishing; bodysurfing, swimming; access walks to UCSB; grassy area for sports.
Lake Los Carneros County Park	136.6	NA*	Stow House; otherwise undeveloped.
Stow Grove	11	NA	Group picnic sites; family picnic sites and barbeque units; two volleyball courts; horseshoe pits; softball diamond; rustic playground equipment.
Goleta Beach County Park	29	0.8 mi	Picnicking facilities; swimming; volleyball courts; horseshoe pits, playground equipment; dressing rooms; snack bar; group barbeque areas; charter boat fishing; boat rentals and launching; fish tackle available.

Table 4.10.2-1

SELECTED COUNTY PARKS IN SANTA BARBARA COUNTY
(continued)

Park (North to South)	Area (acres)	Ocean Frontage	Facilities
San Antonio Canyon County Park	106.6	NA	Group and family picnicking facilities; large, level lawn space; playground equipment; volleyball court; horseshoe pits; hiking trails to San Antonio Creek Canyon; equestrian trails.
Arroyo Burro Beach County Park	6.3	600 feet	Family picnicking facilities; swimming; volleyball court; surf fishing; snack bar; restaurant; bait and tackle shop; limited hiking and equestrian trails.
Nojoqui Falls County Park	82.5	NA	Group and family picnicking and barbeque facilities; softball diamonds; volleyball courts; horseshoe pits, children's play areas; amphitheater; trail to Nojoqui Falls.
Rocky Nook County Park	19	NA	Family picnic and barbeque areas; playground equipment; equestrian trail.
Manning Park	12	NA	Group and family picnicking and barbeque areas; softball field; tennis court; volleyball courts; horseshoe pits; two playground areas; community building.
Lookout Beach	3.4	680 ft	Family picnicking and barbeque facilities; playground equipment; restrooms; volleyball; surf fishing.

Table 4.10.2-1

SELECTED COUNTY PARKS IN SANTA BARBARA COUNTY
(continued)

Park (North to South)	Area (acres)	Ocean Frontage	Facilities
Toro Canyon County Park	64	NA	Group and family picnicking and barbeque areas; playground; horseshoe pits; volleyball courts; observation building; equestrian trails.
Rincon Beach County Park	3	1,360 ft	Family picnicking facilities; surf fishing, surfing.

Table 4.10.2-2

COUNTY PARKS IN SANTA BARBARA COUNTY

Park (North to South)	Area (acres)	Ocean Frontage	Facilities
Point Sal Beach State Park	49	.9 mi	None
Gaviota State Park	2,775	5.2 mi	Campsites; picnic facilities; pier with boat winch; concession stand; scuba diving; swimming; hiking; horseback riding.
Refugio State Beach	155.24	2.7 mi	Campsites; picnic facilities; trailer sanitation station; restrooms; beach access; swimming; surfing.
El Capitan State Beach	132.8	1.8 mi	Family and group camping; picnic and barbeque facilities; bike and nature trails, swimming; surfing; fishing; laundry facilities; snack bar/camping supply store; restrooms and showers; trailer sanitation station; drinking water; electricity.
Carpinteria State Beach	50	.8 mi	Campsites; swimming; day use parking; picnic tables; trailer sanitation station; campfire center; restrooms; visitor center.

Over the period 1963-1966, pier and jetty fishing was the most popular in southern California in terms of participation, but partyboat fishing resulted in the greatest catches and catch-per-manhour of fishing [Pinkas et al., 1968]. Boat fishing is concentrated around major harbors and several of the offshore islands [Horn, 1974]. The partyboat catch has increased at a considerable rate from 1947 to 1970 as has the number of anglers. The number of partyboats, however, declined during that period.

All types of recreational fishing occur in the Santa Barbara Channel, from Point Mugu to Point Arguello, including the four Channel Islands. In 1980, private boat and pier and jetty fishing accounted for about two-thirds of all fishing effort (excluding diving,), followed closely by shoreline fishing (see Table 4.10.2-3). Partyboats had the lowest participation level. An estimation of overall participation rate (all types of recreational fishing combined) from 1970 through 2010 in five-year increments indicates that a gradual decline is expected, particularly in the Santa Barbara area [The Granville Corp., 1981].

In the Santa Barbara Channel area, pier/jetty and shoreline fishing occur only along the mainland coast because access to the Channel Islands is generally restricted. Piers and jetties are located at the larger urban areas, and a pier is also present at Gaviota. Shoreline fishing occurs wherever public access is available, particularly in the vicinity of urban areas and at state parks and beaches such as Gaviota State Beach, Refugio State Park, El Capitan State Park, Carpinteria State Beach, and McGrath State Beach. Private boats may be launched at any of the ports and harbors or at Goleta pier and Gaviota pier. Small boats are also launched from the shore at several locations, particularly at Refugio. Private boat fishing takes place along the coastline as well as around the Channel Islands. Activity is generally concentrated in or next to kelp beds. Skin and SCUBA diving take place from the shoreline, private boats, and partyboats. Most diving occurs in kelp beds or rocky reef areas to depths of about 60 feet (18 m). The number of sport divers using partyboats has increased steadily since 1958, the date when partyboat records were initiated by the California Department of Fish and Game [Horn, 1974]. In 1977, a total of 8,841 divers were recorded from partyboats operating out of Santa Barbara, Oxnard, and Port Hueneme. Most of the dive trips were to Anacapa Island and Santa Cruz Island [The Granville Corp., 1981].

Partyboat fishing is available from Goleta (1 boat), Santa Barbara Harbor (3 boats), Ventura Marina and Channel Islands Harbor (7 boats), Port Hueneme (4 boats), and Oxnard (12-14 boats). These boats fish in coastal areas from Point Mugu to Point Arguello and around the Channel Islands. Most fishing is within 2 to 3 miles (3-5 kilometers) of shore along the coast, except in the Santa Barbara-Carpinteria areas where fishing extends 4 to 5 miles (6.5-8 kilometers) offshore to include several of the oil platforms and Four mile Reef [Benko, 1983]. White seabass are fished near Cojo Bay as are halibut. For the Santa Barbara partyboats, most fishing effort takes place south and east of the Harbor. Some fishing occurs west of Santa Barbara, but areas west of Tajiguas are seldom fished.

Table 4.10.2-3

ESTIMATED 1980 SPORTFISHING PARTICIPATION
IN THE SANTA BARBARA CHANNEL
BY TYPE OF FISHING IN THOUSANDS OF DAYS

	Type of Fishing			
Area	Piers and Jetties	Shoreline	Party/ Charter Boats	Private/ Rental Boats
Gaviota	10	9	2	10
Santa Barbara Harbor	38	37	9	38
Ventura Harbor	36	19	18	33
Channel Islands Harbor	81	43	41	73
Port Hueneme	33	17	16	30
Totals	198	125	86	184

Source: The Granville Corp., 1981.

The economic value of recreational fishing in the Santa Barbara Channel can be estimated using recommended values of $24 per day for shoreline, pier, and jetty fishing and $49 per day for boat fishing [The Granville Corp., 1981]. Participation rates have been estimated at 323,000 for shoreline fishing and at 270,000 for boat fishing in 1980. Total value would thus be $21,000,000 ($7,800,000 for shoreline and $13,200,000 for boat).

Sportfishing provides considerable net economic benefit to the State of California as a whole, as well. If an assumed value of $2 to $4 per day and 11,910,000 marine angler days for 1970 [Horn, 1974] are used, the net economic value ranges from about $24 million to $48 million. The upper value is approximately equal to the net economic value of $43 million for commercial fish landed in California during 1970. If the value of tunas caught out of state ($28 million) is excluded from the commercial catch figure, the value of recreational fishing exceeds that for commercial fishing.

4.10.2.2 Tourism

Tourism is an important and growing sector of the local Santa Barbara economy. In 1982, nearly 25 percent of the total retail business in the South Coast was attributable to tourists. The jobs created by this labor-intensive industry are particularly valuable because they offer employment opportunities to the chronically underemployed, such as teenagers, female heads of households, minorities, and the elderly, some of whom have no specialized skills, education, nor job experience.

Table 4.10.2-4 summarizes tourism/visitors projected for the North County through the year 2000. The number of hotel/motel rooms for 1985 includes 577 presently under construction (305 in the Santa Ynez area and 272 in the Santa Maria area). The increase of 500 units between 1985 and 1990 and 250 units between 1990 and 1995 reflect that 423 units in the Lompoc area are in various formal stages of planning with another 276 in informal planning stages. These developments are in anticipation of visitors attracted by Space Shuttle activities. A modest increase of 125 units is projected between 1995 and 2000. The increases in occupancy rates are associated with Vandenberg activities.

The term "visitor" is included in North County tourism discussions as there are a limited numbers of accommodations that can be considered a destinational resort (Alisal Ranch, 63 units, Zaca Lake, 18 cabins). Santa Maria area accommodations are used mainly by business and enroute travelers. Lompoc area facilities (until Space Shuttle commences) are mainly used by business visitors to Vandenberg AFB, and the Santa Ynez area caters to short-term tourists visiting Solvang and the adjacent wineries. Because of this mix of business visitors, enroute travelers and tourists, it is estimated that an average of 2 persons will occupy a room versus 2.5 on the South Coast (U.S. Census).

Table 4.10.2-5 shows tourism projections for the South Coast through the year 2000. The number of hotel rooms for 1985 includes the Parker-Red Lion project (360 rooms) and several projects in Carpinteria (320 rooms) and a 30 unit addition at the Turnpike Lodge. Thereafter the increase in hotel rooms

Table 4.10.2-4

TOURISM/VISITOR PROJECTIONS FOR NORTH COUNTY*

	1984	1985	1990	1995	2000
Transient Rooms	2,848	3,425	3,925	4,175	4,300
Occupancy Rate (%)	70.0	72.0	75.0	75.0	75.0
Total Visitor/Day	10,000	11,030	12,350	13,360	14,240
Overnight Visitors In Hotels/Day	4,000	4,930	5,890	6,260	6,450
Visitor Expenditures Per Year (Millions)	$110	$134	$142	$154	$164
Bed Tax Revenues Per Year (Millions)	$1.54	$1.90	$2,25	$2.40	$2.48
Sale Tax Revenues Returned to Area Per Year (Millions)	$0.9	$1.1	$1.2	$1.3	$1.4

* Constant 1983 dollars

Source: GRC forecasts from Socioeconomics Technical Appendix to Getty Gaviota Consolidated Coastal Facility EIR, June, 1984.

Table 4.10.2-5

TOURISM/VISITOR PROJECTIONS FOR SOUTH COAST*

	1983	1985	1990	2000
Transient Rooms	3,684	4,394	4,650	5,250
Occupancy Rate (%)	76.6	73.0	77.5	80.0
Total Visitor/Day	21,000	22,000	24,000	27,500
Overnight Visitors In Hotels/Day	7,000	7,650	9,000	10,500
Visitor Expenditures Per Year (Millions)	$230	$246	$282	$369
Bed Tax Revenues Per Year (Millions)	$3.43	$4.15	$4,69	$5.47
Sale Tax Revenues Returned to Area Per Year (Millions)	$1.90	$2.03	$2.33	$3.05

* Constant 1983 dollars.
Source: GRC forecasts fromSocioeconomics Technical Appendix to Getty Gaviota consolidated coastal Facility EIR, June 1984.

allows for one major new hotel (approximately 300 rooms) or several smaller ones every five years. The occupancy rate is projected to drop in 1985 to levels experienced in the past few years. The number of overnight visitors/tourists staying in hotel rooms was calculated from the number of rooms and occupancy rate, using an average of 2.5 persons per room. Estimates for the number of day visitors resulted from increasing the current number of day visitors at a rate of 1.3 percent per year -- which is the forecast population growth rate of the Los Angeles metropolitan area (the source of most day visitors). Visitor expenditures incorporate a 1.03 percent annual growth in average daily expenditures per visitor (currently about $30) to account for growth in real disposable income. Bed tax revenues were projected to grow by the same percentage as occupied rooms. (The figures include the increase to a bed tax rate of 10 percent in the City of Santa Barbara.) Sales tax revenues returned to local governments were estimated to be 1 percent of visitors expenditures less their room expenditures. Thereafter sales tax projections were estimated to grow at the same rate as total visitor expenditures. (All figures are in current dollars.) Comparable forecasts are not available for Ventura and San Luis Obispo Counties. Table 4.10.2-6 shows the economic impacts of tourism for 1978-1981, the only years for which these data are available.

Beach attendance in person-days at state parks is the only consistent set of data available on beach use. The number of person-days at state beaches decreased by almost 29 percent between 1965 and 1970. Beach attendance began increasing after 1970 and peaked in 1982. The number of person-days at state beaches decreased in 1983 but still remained higher than the number in 1980. The number of state beaches in Ventura County increased from two in Fiscal Year 1965, to three in Fiscal Year 1967, to four in Fiscal Year 1970, and to five in Fiscal Year 1974.[1]

4.10.3 Traffic and Transportation

The Union and Exxon projects are expected primarily to affect traffic in a number of identified areas. Some increases in air traffic will be expected at the Santa Maria Airport, and in ship traffic from Port Hueneme. However, impacts of primary importance are expected to be automobile traffic-related impacts.

Santa Maria Airport will provide helicopters basing for the majority of Central Santa Maria Basin, offshore development, unless a flight corridor is approved through Vanderberg AFB air space. If a flight corridor is obtained, Lompoc is the preferred airport for helicopter basing. For this reason both airports will be discussed (as well as Santa Barbara Airport).

Project elements that create additional traffic are both short term, during construction of onshore and offshore facilities, and long term, during operation. Possible loci of traffic generation include the project sites,

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1 Eugene Erba, California Department of Parks and Recreation, computer printouts and data sheets of visitor attendance by fiscal year, January 20, 1984.

Table 4.10.2-6

ECONOMIC IMPACTS OF TOURISM IN VENTURA COUNTY
1978-1981
(1984 Dollars)

Type of Impact	1978	1979	1980	1981
Total Domestic Expenditures (thousands of dollars)	$170,110	$187,551	$196,776	$198,965
Domestic Travel Generated Payroll (thousands of dollars)	$ 40,016	$ 39,267	$ 41,151	$ 42,432
Domestic Travel Generated Employment (numbers of jobs)	3,668	3,789	4,123	4,310
Domestic Travel Generated State Tax Receipts (thousands of dollars)	$ 9,310	$ 9,647	$ 9,275	$ 9,342
Domestic Travel Generated Local Tax Receipts (thousands of dollars)	$ 4,343	$ 3,470	$ 3,559	$ 3,672

Figures adjusted to 1984 using the Consumer Price Index.

Source: California Office of Tourism, The Economic Impact of Travel in California, 1978, 1979, 1980, 1981.

construction sites, airport vicinity and piers for supply and crew boats serving offshore facilities during construction and operation. The sites identified for analysis include (Figure 4.10.3-1):

- Highway 246 near Lompoc out to Surf,
- the Mission Hills area and the Lompoc Airport vicinity,
- Clark Avenue and Marcum Road in Orcutt,
- State Highway 1 between Lompoc and Las Cruces,
- Highway 101 and Betteravia Road in Santa Maria,
- Highway 1 and Willow Road west of Nipomo,
- the Gaviota vicinity,
- the Ellwood vicinity,
- the Port Hueneme area, and
- Intersections near the Santa Maria Airport.

4.10.3.0 Regional Setting

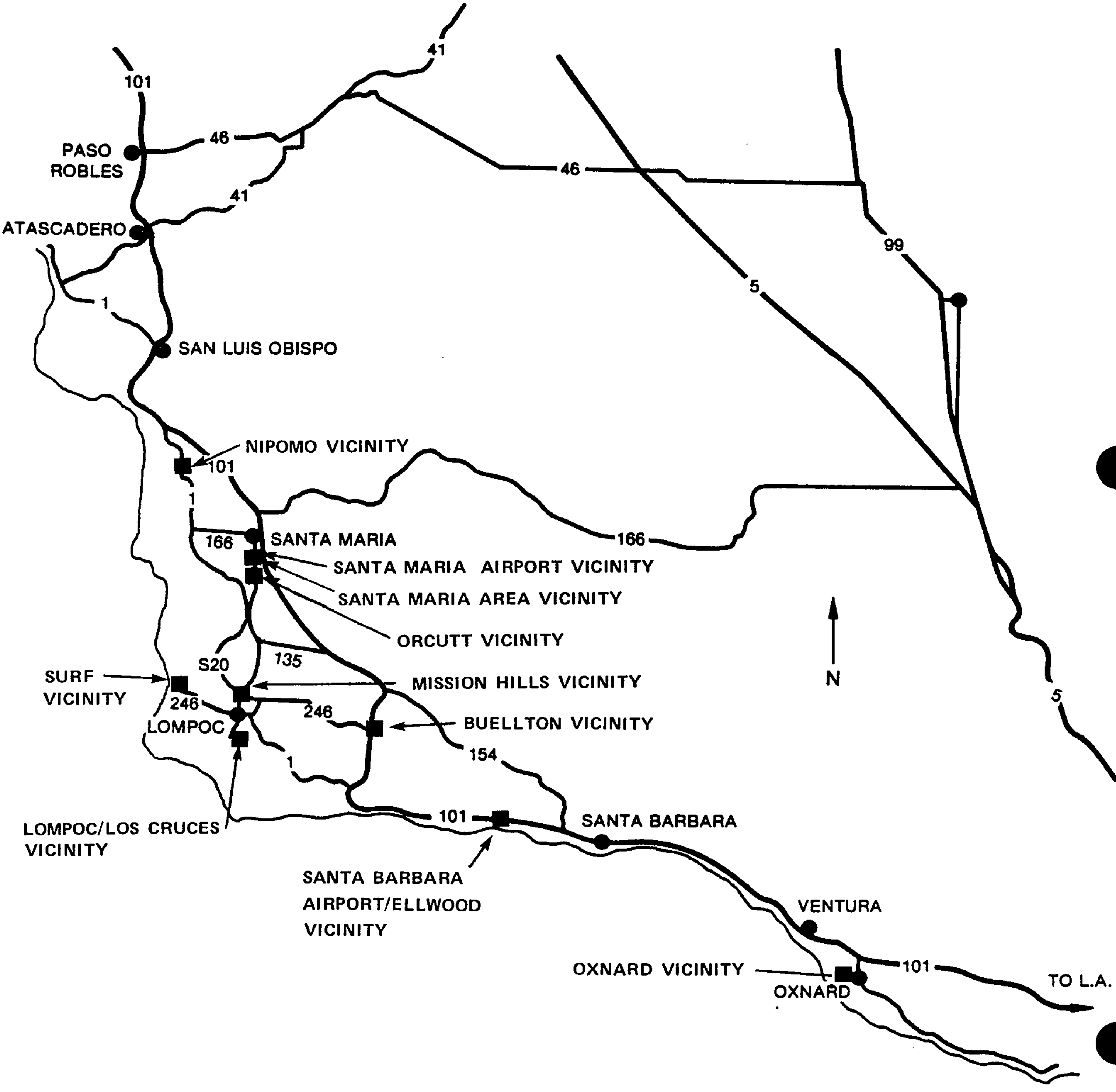
U.S. Highway 101 (the "El Camino Real") provides the major north-south link within Santa Barbara County. For much of its length, U.S. 101 is a four-lane, limited access freeway through this region. However, stretches of four-lane road with at-grade access exist along its length, and a portion of the highway through the City of Santa Barbara not only has at-grade cross traffic but also is controlled by multiphase traffic signals. The local regional transportation plan [Santa Barbara County, 1982] recognizes the U.S. 101 corridor through the South Coast and the Highway 135 corridor through the Santa Maria area as the two main corridors within Santa Barbara County facing critical capacity problems.

Within Santa Barbara County, certain sections of road are designated in the Circulation Element of the Comprehensive Plan [Santa Barbara County, 1983] as two-lane expressways and so positioned that they are likely to receive some level of project-related traffic:

- State Highway 1 linking Las Cruces and Lompoc;
- State Highway 246 from Buellton to Lompoc and out to Surf;
- State Highway 135 from Santa Maria to Los Alamos;
- State Highway 1 from State Highway 135 to Lompoc;
- County Highway S20 from State Highway 135 to Lompoc, and,

FIGURE 4.10.3-1

TRAFFIC ANALYSIS SITES



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- State Highway 1 from Orcutt to southern San Luis Obispo County junctions with U.S. 101.

In Ventura County, U.S. 101 remains the major link with Los Angeles although alternate paths are available by way of State Highway 1 along the coast (large trucks are prohibited on this route), State Highway 118 eastward through Simi Valley to the San Fernando Valley, and State Highway 126 eastward to a link-up with Interstate 5, a major north-south freeway.

In San Luis Obispo County, U.S. 101 is again the major north-south link with State Highway 1 along the coast above Morro Bay. Two-lane expressways likely to receive some project-related traffic include:

- State Highway 1 from Guadalupe to Pismo Beach and its junction with U.S. 101;

- State Highway 46 from U.S. 101 at Paso Robles to Interstate Highway 5;

- State Highway 41 from U.S. 101 at Atascadero to Interstate Highway 5; and

- State Highway 166 from U.S. 101 to junctions on Interstate Highway 5.

Tables 4.10.3-1 and 4.10.3-2 respectively provide information on existing volumes and volume/capacity ratios for the highways of interest noted above, and on historical traffic volumes for these same roads.

To interpret these tables, an understanding of Level of Service (LOS) categories and Volume/Capacity (V/C) ratios is needed.

Potential impacts will be analyzed for this report in terms of changes in Level of Service (LOS) along the road section or at intersections of concern. The LOS is estimated in terms of the ratio of the volume of traffic on the roadway or across the intersection of interest, to their corresponding capacities--i.e., the maximum traffic that they can accommodate.

The authoritative source for analysis of highways is the Highway Capacity Manual [HRB, 1965]. Capacity (C) is defined as the maximum number of vehicles that can pass over a given section of a lane or roadway in one direction (or in both directions for a multilane highway) during a given period (one hour unless otherwise specified) under prevailing roadway and traffic conditions. It is the volume of traffic that cannot be exceeded unless one or more of the prevailing conditions change. Roadway conditions refer to physical features of the roadway, which require construction or reconstruction to change. Traffic conditions refer to the characteristics of the traffic using the roadway, which can change from hour to hour, or over longer periods as a result of local or regional changes in urbanization or industrialization.

Level of Service is a term which, broadly interpreted, denotes any one of an infinite number of combinations of operating conditions that may occur on a

Table 4.10.3-1

1983 TRAFFIC VOLUMES AND VOLUME/CAPACITY (V/C) RATIOS WITH LOS FOR MAJOR HIGHWAYS OF INTEREST

U.S. Highway 101 (S-N)	V/C (LOS)	Peak Hour	Annual Average Daily Traffic (AADT)
Fairview Ave. Interchange (B)	.75 (E)	5,200	53,000
Hollister Ave. Interchange (B)	.43 (B)	3,250	22,000
Las Cruces, Rte 1 Junction (B)	.38 (B)	2,400	17,000
Buellton, Rte 246 Junction (B)	.26 (A)	1,900	13,000
Los Alamos, Rte 135 Junction (B)	.34 (A)	2,500	17,400
Clark Ave. Intechange (A)	.45 (B)	3,300	22,000
Betteravia Rd. Interchange (A)	.63 (D)	4,600	33,000
Teft Ave. Interchange (B)	.46 (B)	3,400	28,500
State Highway 1 (S-N)			
Las Cruces Jct. Rte 101 (A)	.25 (B)	420	3,500
Rte 246 East (B)	.34 (B)	530	4,400
Rte 246 West (B)-@	.19 (A)	1,350	14,300
S20 Junction (B)-*	.55 (C)	2,300	18,900
S20 Junction (A)-*	.41 (B)	490	4,100
Rucker Rd. Junction (A)-*	.09 (A)	110	950
Rte 135 East Junction (B)-*	.13 (A)	160	1,250
Rte 135 North Junction (B)-*	.22 (A)	1,750	11,000
Rte 135 North Junction (A)	.09 (A)	150	1,200
Union Oil Road (B)	.22 (B)	370	3,000
State Highway 246 (E-W)			
Buellton Jct. Rte 101 (A)-@	.68 (B)	1,250	10,500
Lompoc East Jct. Rte 1 (B)	.32 (B)	590	5,400
Lompoc West Jct. Rte 1 (A)-@	.23 (A)	1,700	15,200
Floradale Ave. (B)	.38 (B)	670	4,800
VAFB 13th Street Gate (B)	.32 (B)	570	3,800
Surf (B)	.11 (A)	200	1,650

(B) - Means just before and (A) means just after the road of concern.
AADT - Is Annual Average Daily Traffic.
* - Is 1982 Traffic Volumes; 1983 volumes are un-representative due to closure of Highway S20.
@ - Urban or suburban area: LOS relates differently.
Note: V/C ratios based on peak hour flow.

Source: Caltrans, 1983; HRB, 1965, GRC calculations.

Table 4.10.3-2

HISTORICAL TRAFFIC VOLUMES FOR MAJOR HIGHWAYS OF INTEREST

	1979		1981	
U.S. Highway 101 (S-N)	Peak Hour	AADT	Peak Hour	AADT
Fairview Ave. Interchange (B)	4,800	49,500	4,650	48,000
Hollister Ave. Interchange (B)	3,050	20,500	3,100	20,900
Las Cruces, Rte 1 Junction (B)	2,200	15,800	2,250	16,100
Buellton, Rte 246 Junction (B)	1,850	12,900	1,850	12,900
Los Alamos, Rte 135 Junction (B)	2,500	17,100	2,500	17,200
Clark Ave. Interchange (A)	3,200	21,300	3,350	22,300
Betteravia Rd. Interchange (A)	3,750	27,000	4,200	30,000
Teft Ave. Interchange (B)	3,000	25,000	3,100	26,000
State Highway 1 (S-N)				
Las Cruces Jct. Rte 101 (A)	350	2,900	380	3,200
Rte 246 East (B)	410	3,400	440	3,700
Rte 246 West (B)	1,200	12,900	1,300	13,700
S20 Junction (B)	2,200	18,200	2,350	19,600
S20 Junction (A)	480	4,000	510	4,250
Rucker Road (A)	110	950	120	1,050
Rte 135 East Junction (B)	150	1,200	160	1,300
Rte 135 North Junction (B)	1,600	10,000	1,700	10,900
Rte 135 North Junction (A)	120	1,000	150	1,200
Union Oil Road (B)	340	2,800	330	2,700
State Highway 246 (E-W)				
Buellton Jct. Rte 101 (A)	1,150	9,600	1,100	9,500
Lompoc East Jct. Rt 1 (B)	350	3,200	390	3,600
Lompoc West Jct. Rte 1 (A)	1,450	12,800	1,550	14,000
Flordale Ave. (B)	390	2,800	450	3,200
VAFB 13th Street Gate (B)	350	2,300	390	2,600
Surf (B)	35	300	160	1,300

(B) - Means just before and (A) means just after the road of concern.
AADT - Is Annual Average Daily Traffic.

Source: Caltrans, 1979 and 1981.

given lane or roadway when it is accommodating various traffic volumes. Level of Service is a qualitative measure of the effect of a number of factors, which includes speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs. Six levels of service have been established, designated by the letters A to F, providing for best to worst service in terms of driver satisfaction. General descriptions of the characteristics typical of each level of service for highway segments and intersections are given in Tables 4.10.3-3 and 4.10.3-4. A given lane or roadway may provide a wide range of levels of service. The various levels of service for any specific roadway are functions of the volume and composition of traffic and of the speeds attained. A lane or roadway designed for a certain level of service at a specified volume will actually operate at many different levels of service as the flow varies during an hour, and as the volume varies during different hours of the day, days of the week, periods of the year, and during different years with traffic growth. From the viewpoint of the driver, the level of service for any particular lane or roadway varies inversely as some function of the flow or volume, or of the density.

The design of a roadway considers the probable demand volume and provides an appropriate level of service. Each segment of road has been assigned an LOS according to the functional classification of the route, relative importance of the facility, rural or urban character, the type of terrain traversed, and other economic factors (see Tables 4.10.3-5 and 4.10.3-6). The elements of the system would generally be coordinated so that they work together at similar levels of service, e.g., within one letter class for LOS. The policy statement of the Regional Transportation Plan [Santa Barbara County, 1982] defines an acceptable LOS for freeways and arterials as one that can accommodate peak-hour traffic at somewhat less than free flow and is equivalent to Level of Service D. Actual conditions may, of course, differ widely from design projections. Changes in projected levels of service, as influenced by project-related traffic, are a common input to impact analysis.

Each level of service should be considered as a range of operating conditions bounded by values of travel speed and volume/capacity (V/C) ratios. See Table 4.10.3-7 for the relationship between LOS and V/C ratio.

Unsignalized intersections are also analyzed by the method described in Transportation Research Circular 212 [TRB, 1980]. The capacity or maximum flow of vehicles is calculated for each minor approach movement. These values are then compared to the existing demand for each movement and the probable delay, and LOS is estimated.

4.10.3.1. Local Roads and Existing Traffic Levels

The development of the road network in Santa Barbara County is controlled by the Circulation Element of the Comprehensive Plan. Each road carries a designation that determines its future design capacity. The designations and design capacities are given in Table 4.10.3-8.

Table 4.10.3-3

TRAFFIC LEVEL OF SERVICE DEFINITIONS FOR ROADWAY SEGMENTS

Level of Service	Interpretations
A	Describes a condition of free flow, with low volumes and high speeds. Traffic density is low, with speeds controlled by driver desires, speed limits, and physical roadway conditions. There is little or no restriction in maneuverability due to the presence of other vehicles, and drivers can maintain their desired speeds with little or no delay.
B	Is in the zone of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation. Reductions in speed are not unreasonable, with a low probability of traffic flow being restricted. The lower limit (lowest speed, highest volume) of this level of service has been associated with service volumes used in the design of rural highways.
C	Is still in the zone of stable flow, but speeds and maneuverability are more closely controlled by the higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes, or pass. A relatively satisfactory operating speed is still obtained, with service volumes perhaps suitable for urban design practice.
D	Approaches unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver, and comfort and convenience are low, but conditions can be tolerated for short periods of time.
E	Cannot be described by speed alone, but represents operations at even lower operating speeds than in Level D, with volumes at or near the capacity of the highway. Flow is unstable, and there may be stoppages of momentary duration.
F	Describes forced flow operation at low speeds, where volumes are below capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of the downstreet congestion. In the extreme, both speed and volume can drop to zero.

Source: Highway Research Board, Highway Capacity Manual, Spec. Rpt. No. 87, 1965.

Table 4.10.3-4

TRAFFIC LEVEL OF SERVICE DEFINITIONS FOR INTERSECTIONS

Level of Service	Interpretations
A, B	Uncongested operation, all queues clear in a single signal cycle.
C	Light congestion; occasional backups on critical approaches.
D	Significant congestion on critical approaches, but intersection functional. Cars required to wait through more than one cycle during short peaks. No long-standing queues formed.
E	Severe congestion with some long-standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es).
F	Total breakdown; stop-and-go operation.

Table 4.10.3-5

TRAFFIC LEVEL OF SERVICE BY HIGHWAY TYPE

Assigned Level of Service	Facility Type	Minimum Operating Speed (mph)
B	Freeways, expressways or multi-lane conventional highways	55
B	Two-lane conventional highways	50
C	Freeways or expressways	50
C	Multi-lane conventional highways	45
C	Two-lane conventional highways	40
C-45	Two-lane conventional highways	45
D	Freeways or expressways	40
D	Conventional highways	35
D	Conventional highways with controlling traffic signals	15-30

Table 4.10.3-6

LEVELS OF SERVICE FOR EACH FUNCTIONAL CLASSIFICATION AND TERRAIN TYPE

Rural

Principal Arterial System

Level "B" - (Except in mountainous terrain or where for other reasons improvement becomes very costly in proportion to the service provided. Those cases are then reduced to Level "C / 45.")

Minor Arterial System

Level "B" - Flat terrain.

Level "C" - 45 - Rolling terrain or in flat terrain on some routes in this system which provide a larger percentage of local service.

Level "C" - Mountainous terrain.

Level "D" - Extremely mountainous terrain or where other factors dictate limited development.

Collector System

Level "C" - 45" - Flat terrain.

Level "C" - Rolling terrain.

Level "D" - Mountainous terrain or where the facility provides primarily local service.

Urban

All Systems

level "D" - All terrain.

Table 4.10.3-7

RELATIONSHIP BETWEEN LOS AND V/C RATIO
SIGNALIZED INTERSECTIONS [1]

V/C	LOS	Traffic Description
Less than 0.60	A	Little or no delay. Excellent operation.
0.61 - 0.70	B	Short traffic delays. Some restriction of lane changing on approach. Very good operation.
0.71 - 0.80	C	Average traffic delays. No waiting through signal cycles. Good operation.
0.81 - 0.90	D	Long traffic delays. No longstanding queues. Occasional waiting through more than one cycle. Fair operation.
0.91 - 1.00	E	Very long traffic delays. Delays up to several signal cycles. Poor operation.
Greater than 1.00	F	Jammed conditions. Back-ups may block other intersections. Forced flow.

Segments[2]

2-Lane road	4-Lane Freeway		
Less than 0.20	Less than 0.35	A	Free flow, low volumes, speeds above 60 MPH.
0.20 - 0.45	0.35 - 0.50	B	Stable flow, moderate volumes, speeds above 50 MPH.
0.46 - 0.70	0.50 - 0.58	C	Stable flow, moderate to heavy volumes, speeds above 40 MPH.
0.71 - 0.85	0.58 - 0.69	D	Unstable flow, heavy volumes, speeds near 30 MPH.
0.86 - 1.00	0.69 - 1.00	E	Capacity, heavy flows, speeds near 30 MPH but vary widely.

[1] Transportation Research Board, 1980, Table 7.
[2] Highway Research Board, 1965; Table 9.1 with peak-hour factor = 0.77, Table 10.7.

Table 4.10.3-8

ROAD SYSTEM CLASSIFICATION

Class	Description		Traffic Capacity ADT*
Freeway	A four- or six-lane divided highway with full control of access and with grade separations at intersections	4 lane: 6 lane:	67,000 U 44,000 R 100,000 U 67,000 R
Expressway	A four-lane arterial highway with at least partial control of access which may or may not be divided or have grade separations at intersections		50,000 U 33,000 R
Two-lane Expressway	A two-lane arterial highway with at least partial control of access which may have grade separations at intersections		16,000 U 11,000 R
Arterial Road	A divided four-lane road with intersections at grade and partial control of access		30,000
Major Road	An undivided four-lane road with intersections at grade and partial control of access		20,000
Two-lane Major Road	An undivided two-lane road with intersections at grade and partial control of access		10,000
Collector Road	A two-lane undivided road with intersections at grade and designed to take a minimum interference from driveway traffic		5,000

*Average Daily Trips U = Urban; R = Rural

Source: Santa Barbara County, 1983.

SURF VICINITY

The major roadway at the Surf site is State Highway 246. It is a two lane expressway with 12-foot lanes and 8-foot shoulders, and is the only road out to the sites of the substation and power cable landfall. For offshore and onshore pipeline construction, intersections of Highway 246 with Floradale Avenue and the Vandenberg AFB 13th Street Gate are probable areas of heavy traffic use. The traffic out to Surf is mostly due to military (large percentage of trucks), and recreational use. The average daily traffic (ADT) is 1,650 vehicles with a peak hour rate of 200 vehicles just before Surf [Caltrans, 1984]. Just beyond the 13th Street Gate the ADT is 3,800 with a peak hour rate of 570 vehicles [Caltrans, 1984]. This corresponds to an LOS of B or better during peak hours near the 13th Street Gate (see Figure 4.10.3-2).

MISSION HILLS VICINITY

The proposed onshore dehydration facility (Site 4) is located about 1/2 mile north of the intersection of Rucker Road and Highway 1, just east of Highway 1. The alternative site (Site 8) is located 1/2 mile north of the north boundary of the Mission Hills housing area and 1/2 mile east of Rucker Road. For both sites the two primary connections to public roads are just north of the intersection of Rucker Road and Calle Lindero and on Highway 1, 2.3 miles north of its intersection with Burton Mesa Road. Highway 1 between County Highway S20 and State Highway 135 will be heavily used during the construction of this facility at either site.

The 1983 traffic counts for Highway 1 are higher than normal due to increased traffic because of washouts to County Highway S20 and Betteravia Road. See Figure 4.10.3-3 for 1982 traffic flows. See Figure 4.10.3-4 for Lompoc area map. In this vicinity Highway 1 is a two-lane major road with an ADT of 1950 above the intersection of Rucker Road and a peak hour rate of 110 [Caltrans, 1982]. This level corresponds to an LOS of A. Highway 1 between the intersection of S20 and the intersection of Burton Mesa Road has an ADT of 4,100 and a peak of 490 [Caltrans, 1982]. This level corresponds to an LOS of A for the p.m. peak hour [Plus, 1984]. If the Lompoc Airport is used as a helicopter base for the projects, Highway 1 (south of the Santa Ynez River) would be used as the entry point to the airport for vehicular traffic. Highway 1 has a peak hour traffic of 2,300 in this area [Caltrans, 1982] (see Figure 4.10.3-3).

THE SANTA MARIA AIRPORT VICINITY

The Santa Maria Airport is a general aviation airport located in the southern portion of the City of Santa Maria. Access to the airport is off of U.S. 101 at the exits of Betteravia Road and Santa Maria Way. Just north of the Betteravia Interchange on U.S. 101, the LOS is C, and just south of this interchange it is D. Santa Maria Way and Lakeview Road, probably the most used access routes to the airport, currently operate at peak hour at LOS C. See Figure 4.10.3-4 for existing traffic flows.

FIGURE 4.10.3-2

EXISTING TWO-WAY TRAFFIC FLOWS (ADT)
PEAK-HOUR VOLUME IN BRACKETS

SURF SUBSTATION VICINITY

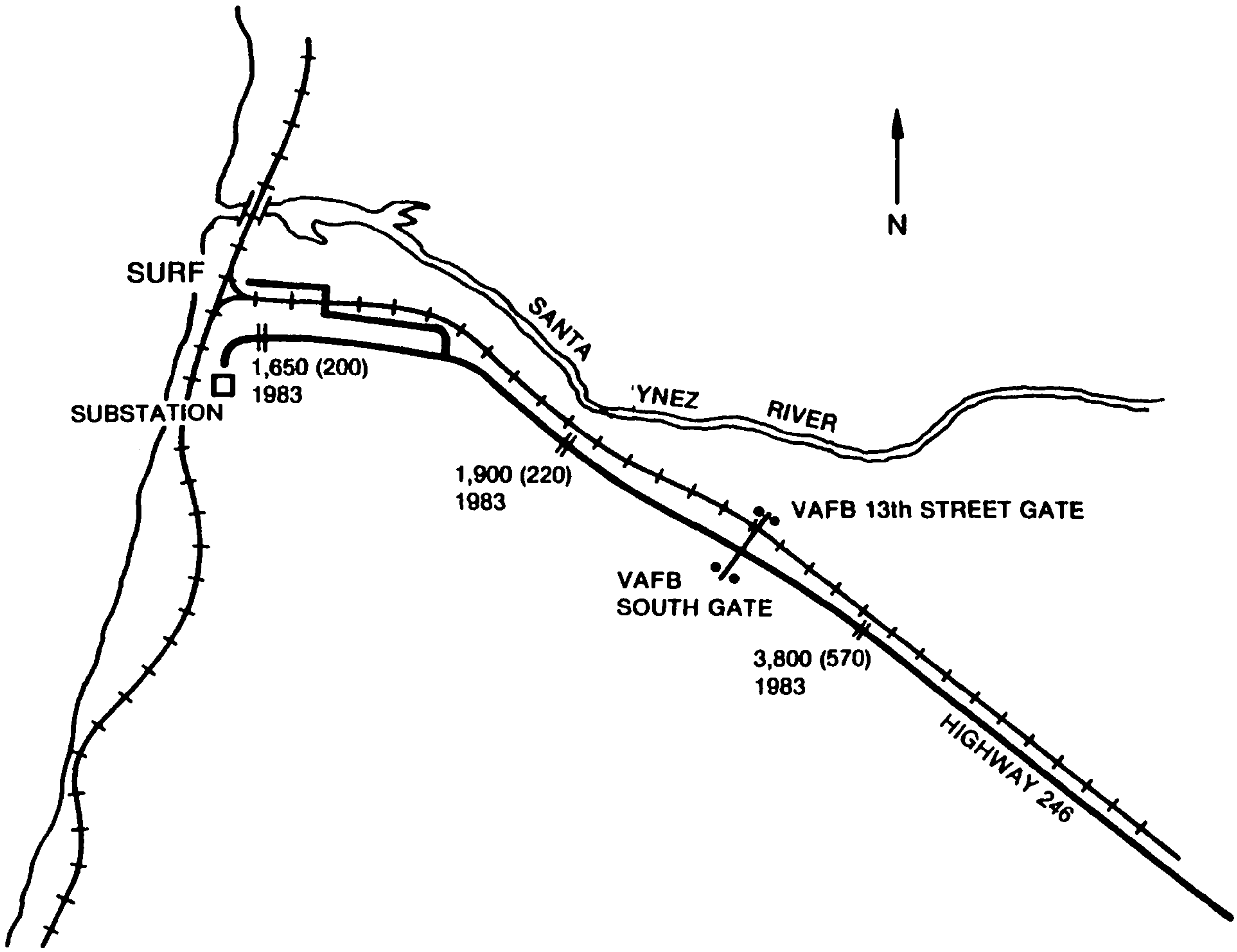

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FIGURE 4.10.3-3

EXISTING TWO-WAY TRAFFIC FLOWS (ADT)
PEAK-HOUR VOLUME IN BRACKETS

MISSION HILLS VICINITY

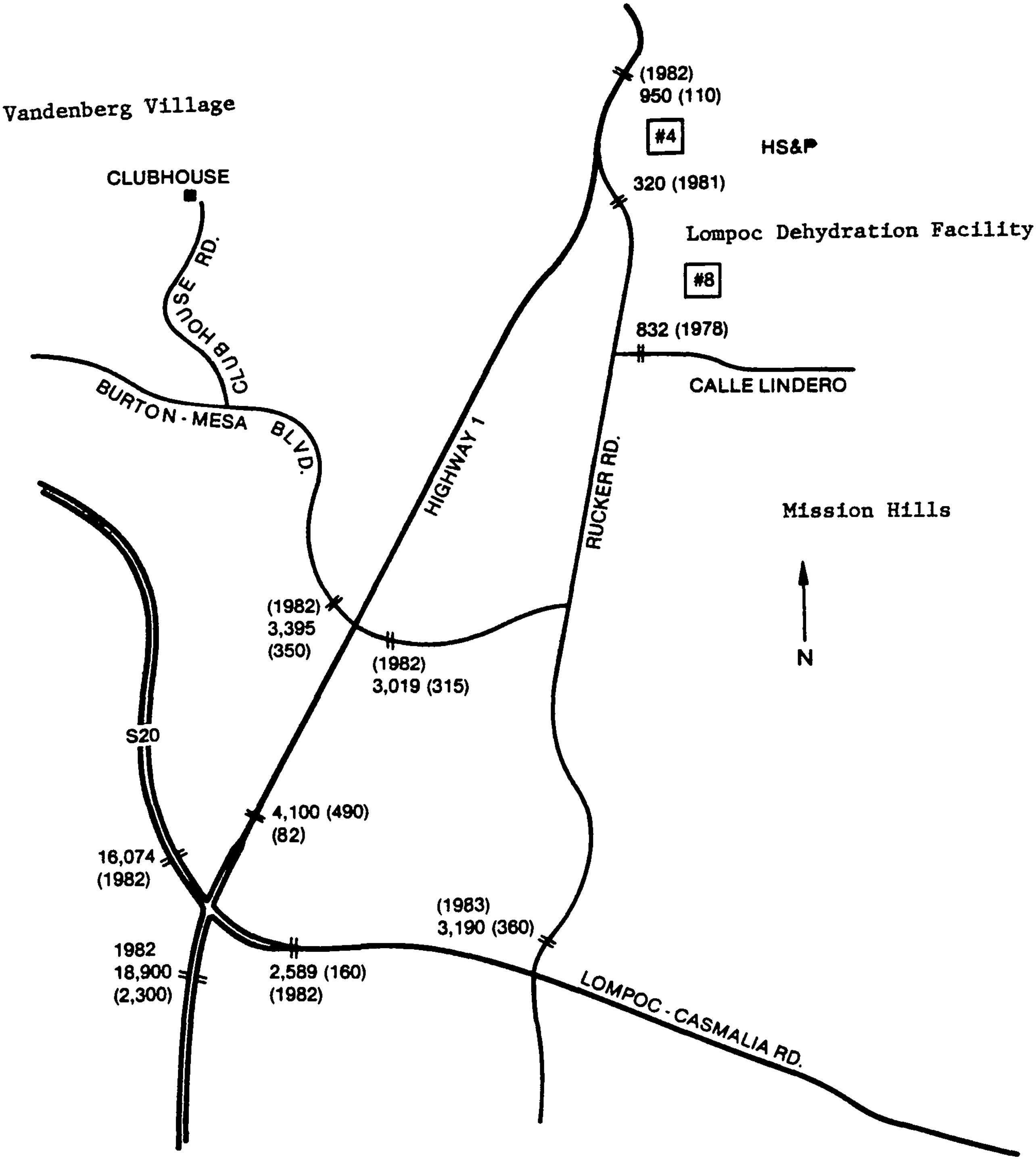

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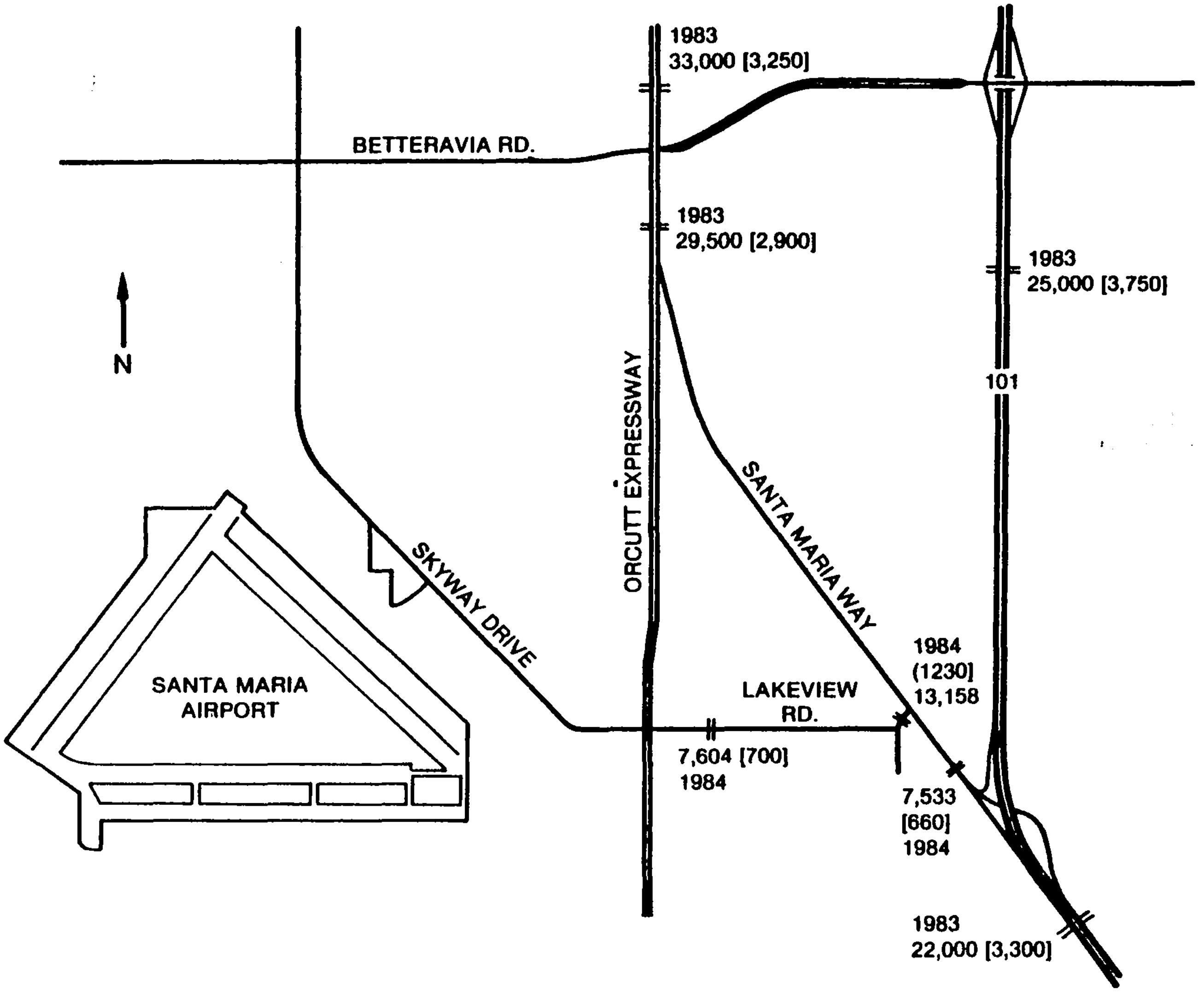
FIGURE 4.10.3-4

EXISTING TWO-WAY TRAFFIC FLOWS (ADT)
PEAK-HOUR VOLUME IN BRACKETS

SANTA MARIA AIRPORT VICINITY



BUELLTON VICINITY

The U.S. 101/State Highway 246 intersection is close to the Lompoc construction sites and should show effects of project-related traffic, especially for construction trucks. The traffic levels in this vicinity are shown on Figure 4.10.3-5. There are currently no traffic congestion problems except on weekends when visitor levels in Solvang are high. At these times the LOS of the McMurray Road/Highway 246 intersection is B with some congestion resulting from the proximity of turning movements on the freeway interchange and McMurray Road [ASL, 1982].

LOMPOC/LAS CRUCES HIGHWAY 1

This section of Highway 1 could be used by workers and trucks coming up from the South Coast of Santa Barbara to the proposed construction sites in the Lompoc area. Highway 1 is a two-lane scenic roadway and provides a direct route between Lompoc and Santa Barbara. The intersection of State Highway 1 and State Highway 246 would show the heaviest concentrations of traffic. Average daily traffic at this junction on Highway 1 is 4,400 with a peak hour rate of 530 vehicles [Caltrans, 1983]. This use corresponds to an LOS of B. Average daily traffic on State Highway 1 between Las Cruces and Lompoc is 3,300 [Caltrans, 1983]. At the junction of 101 the ADT is 3,500 with a peak hour rate of 420 vehicles [Caltrans, 1983] (see Figure 4.10.3-6).

ORCUTT VICINITY

Pump station modifications are proposed for the existing Orcutt Pump Station on Marcum Street off of Clark Avenue in Orcutt. Marcum Street is a dead end street and has little traffic. Clark Avenue is a major east/west two-lane thoroughfare which has a close junction with U.S. 101. The section of Clark Avenue near to the site is between State Highways 1 and 135. Highway 1 would probably be the main access road to this site. See Figure 4.10.3-7. West of Marcum Street, Clark Avenue has a present LOS of B, and east of Marcum a LOS of C. East of Highway 135 Clark Avenue is a four-lane road with an LOS of a high B.

SANTA MARIA VICINITY

The Battles Gas Plant is located east of Highway 101 between Betteravia Road and Battles Road. Although there is no expected change in this facility, LPG truck traffic may increase. Current truck transport at the Battles Gas Plant is five trips per day for LPG and two trips per week for sulphur to Casmalia. Betteravia Road is a major two-lane east/west thoroughfare in Santa Maria with a four-lane section just west of U.S. 101. See Figure 4.10.3-8. North of Santa Maria, a junction with State Highway 166, could have increased traffic with trucks coming from Interstate Highway 5 up from Los Angeles. On Highway 166, approximately 30 percent of the traffic is trucks [Caltrans, 1984]. The junction of 166 has an average daily traffic of 1,950, with a peak hour rate of 260 [Caltrans, 1983]. This use corresponds to an LOS of A. This figure is somewhat high because hose counters were used, which gives 2.5 vehicles per truck because of the extra axles [Caltrans, 1984].

FIGURE 4.10.3-5

EXISTING TWO-WAY TRAFFIC FLOWS (ADT)
PEAK-HOUR VOLUME IN BRACKETS

BUELLTON VICINITY

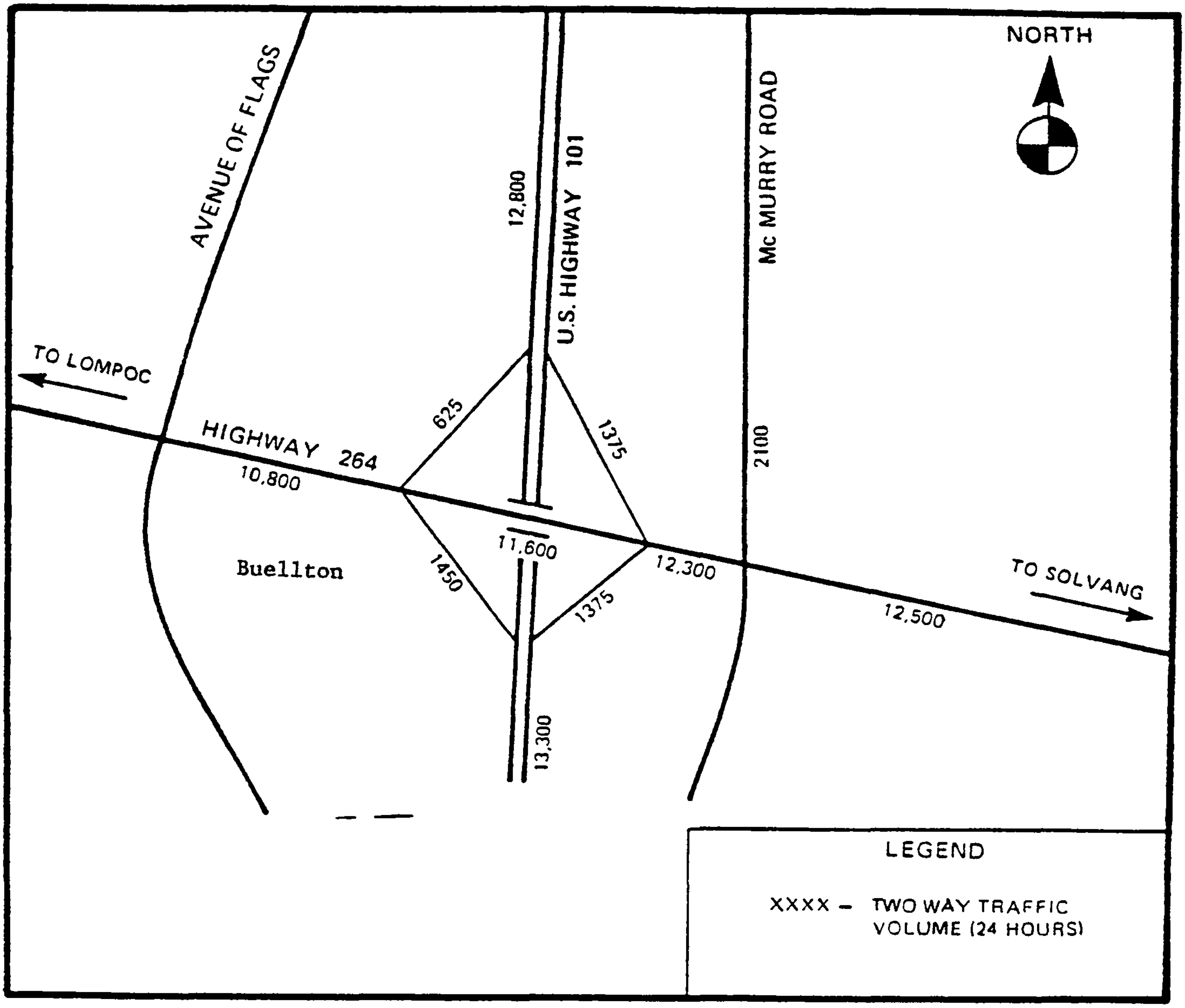


Figure 2.6 U.S. 101 / Route 246 intersection.

FIGURE 4.10.3-6

EXISTING TWO-WAY TRAFFIC FLOWS (ADT)
PEAK-HOUR VOLUME IN BRACKETS

LOMPOC/LAS CRUCES HIGHWAY 1 VICINITY

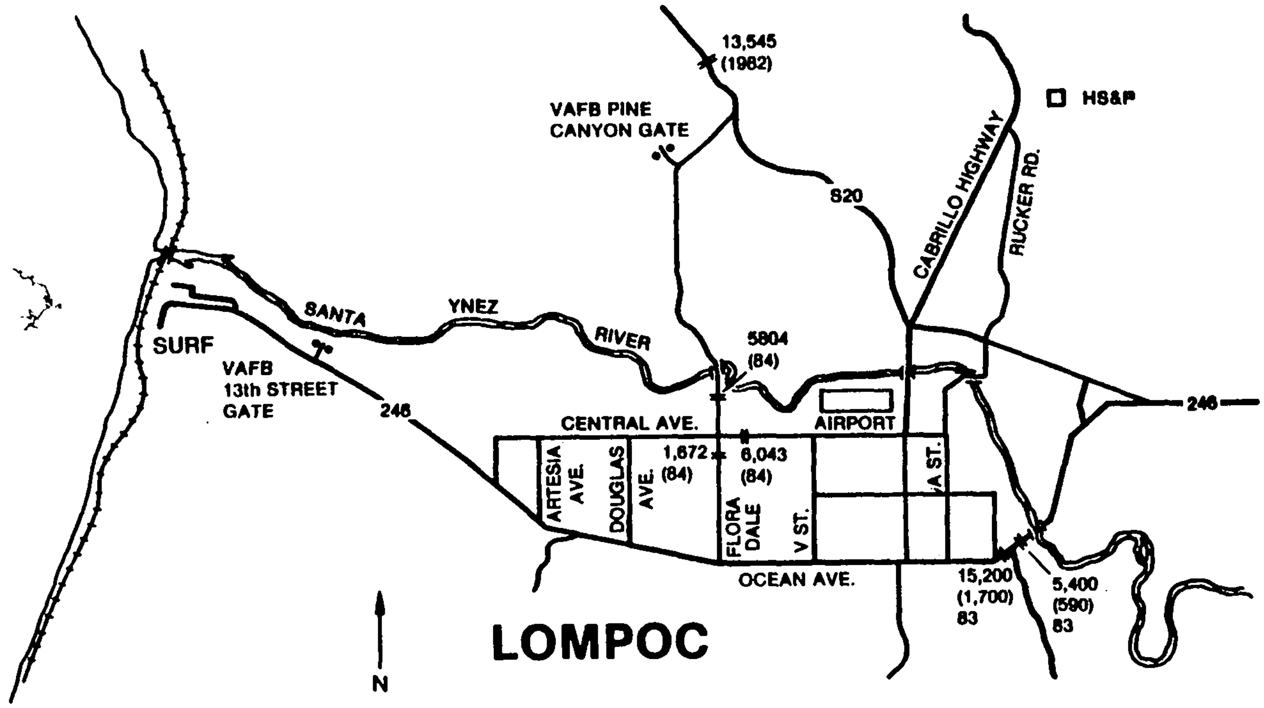


FIGURE 4.10.3-7

EXISTING TWO-WAY TRAFFIC FLOWS (ADT)
PEAK-HOUR VOLUME IN BRACKETS

ORCUTT VICINITY

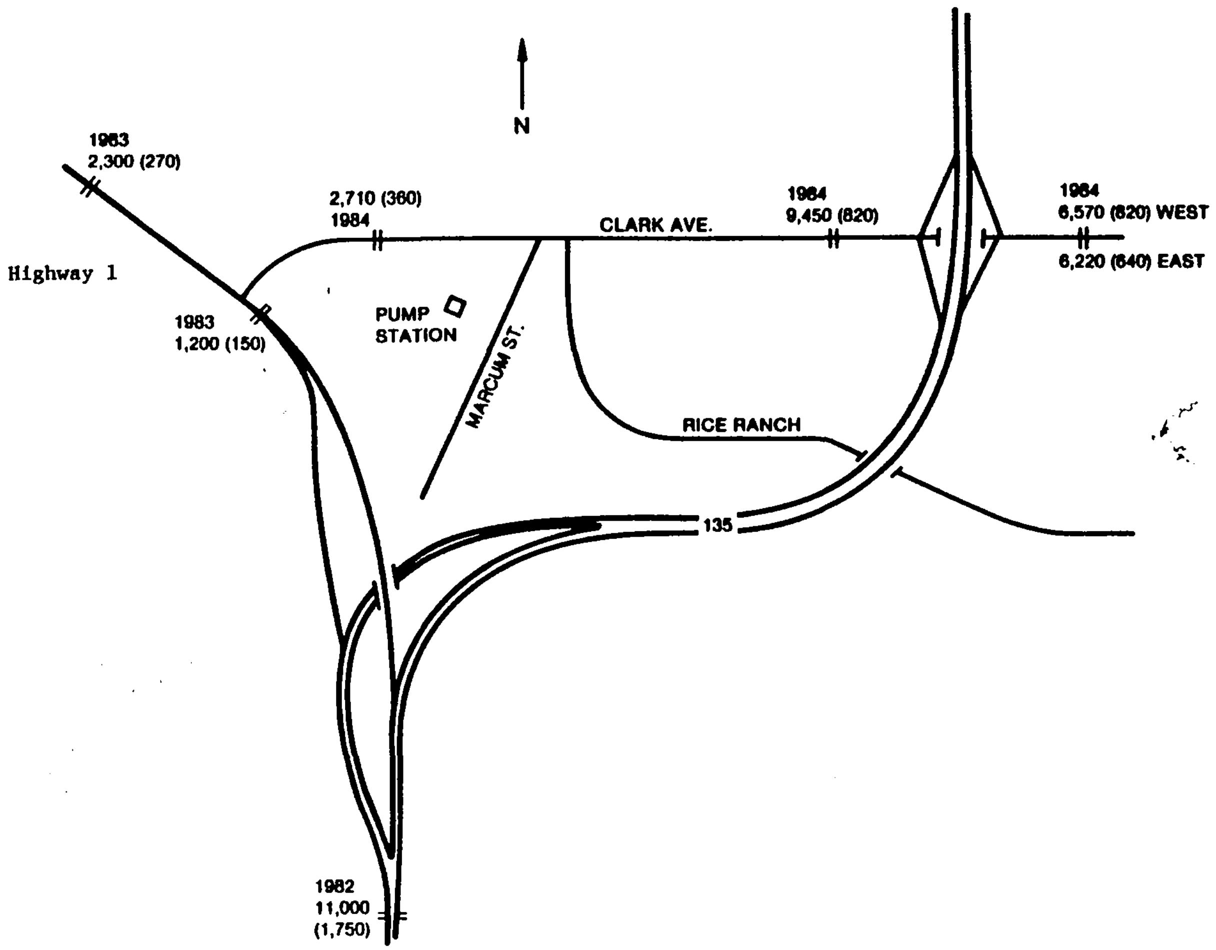


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FIGURE 4.10.3-8

EXISTING TWO-WAY TRAFFIC FLOWS (ADT)
PEAK-HOUR VOLUME IN BRACKETS

SANTA MARIA VICINITY

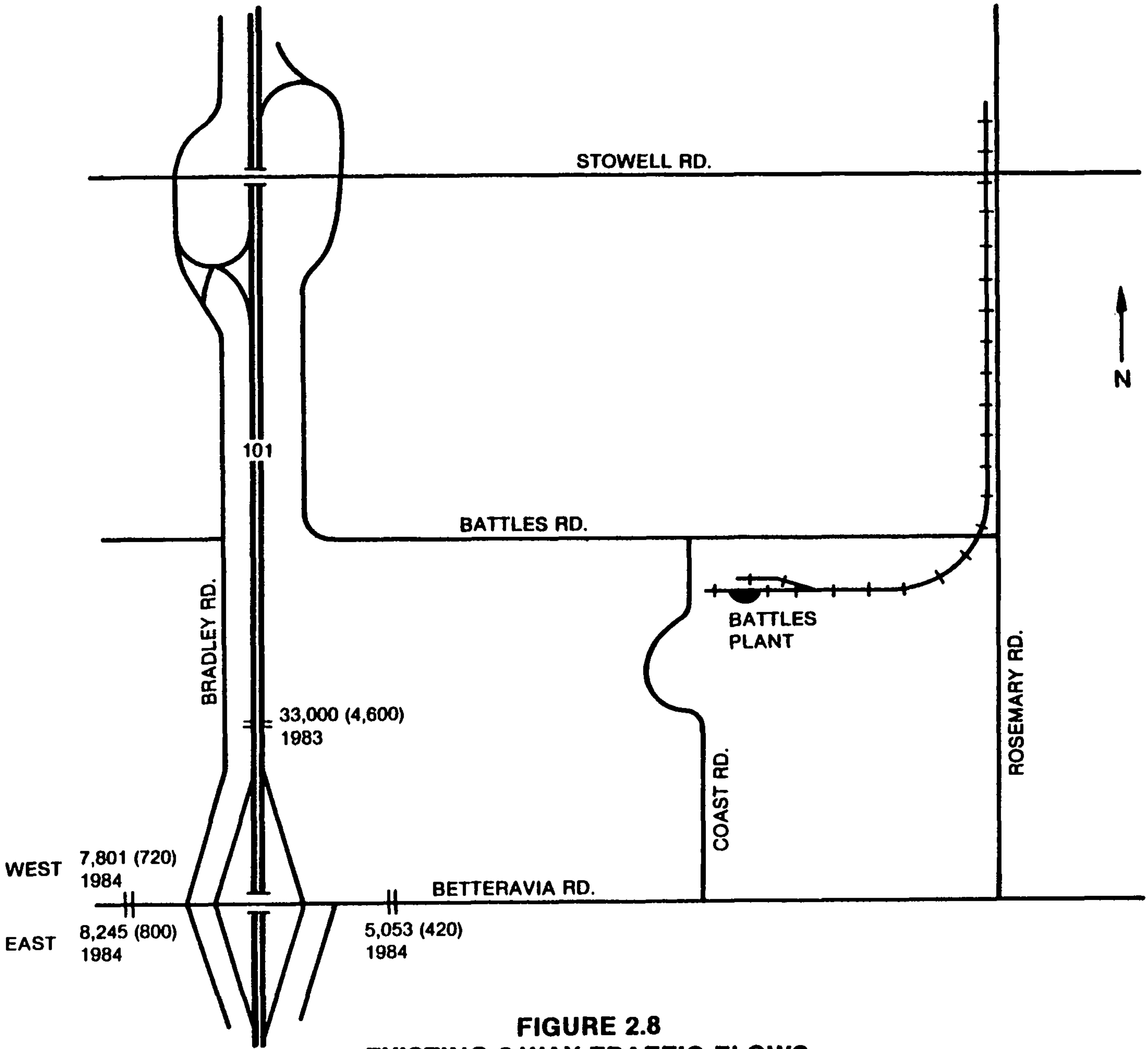

FIGURE 2.8
EXISTING 2-WAY TRAFFIC FLOWS
— PEAK-HOUR VOLUME IN BRACKETS

WEST OF NIPOMO VICINITY

The Santa Maria Oil Refinery is located on a mesa west of Nipomo off of state Highway 1 near Willow Road. Any construction at this site will affect this stretch of Highway 1 and Willow, Pomeroy, and Teft Roads leading to U.S. 101 with increased traffic concentrations. See Figures 4.10.3-9 and 4.10.3-10 [Envicom, 1982]. On Highway 1 near the Union Road, the ADT is 3,000 with a peak hour of 370 [Caltrans, 1983]. This use corresponds to a LOS of B. The Black Lake EIR (a study recently completed for an adjacent area) states that the existing levels of service and accident rates on Nipomo Mesa Roads and intersections are excellent to good (nothing exceeding design capacity); however, certain modifications need to be made, including widening and vertical realignment of Willow and Pomeroy Roads [Envicom, 1982].

THE ELLWOOD VICINITY

The Ellwood Pier is the staging area for crew boats that will be used for Exxon's Project Shamrock. The access road to the Ellwood Pier (west of Goleta) is located off Highway 101 about 0.6 mile (1 km) west of the Hollister Avenue/Winchester Canyon Road interchange. This unnamed, narrow, unstriped, two-lane access road has an at-grade "T" intersection with U.S. 101. A left turn storage "pocket" is provided on the westbound lane of U.S. 101. Approximately 60 feet (18 m) south of U.S. 101, the access road crosses the Southern Pacific Railroad. At this crossing, there are flashing lights and a crossbuck warning sign, but no railroad crossing gates. From there, the road turns westerly parallel to the freeway and railroad line for a distance of about 0.25 mile (0.4 km), then southward to the pier at the beach. Based on traffic count data obtained from the County of Santa Barbara (1979) and field observations, it is estimated that the Ellwood Pier access road normally carries about 200 vehicles per day (vpd). Workers on many of the offshore petroleum facilities park their cars in the dirt areas adjacent to this road. Exxon workers, however, use Exxon's Goleta parking lot. The section of Highway 101 near the Ellwood Pier is stripped for two lanes in each direction with a wide, landscaped median and carries approximately 22,000 vpd with a peak hour of 3,250 [Caltrans, 1983]. This is a current LOS of B.

The entrance roadway to the Ellwood Pier is in poor condition and has a rough crossing of the single main rail line of the Southern Pacific Railroad which is parallel to and approximately 100 feet south of U.S. 101. The view of the tracks from the road leading to Ellwood Pier is restricted by trees, shrubs, and earth banks as well as the curve in the track to the north. Approximately 15 trains use the track daily, and flashing lights are used to signal the presence of trains. Restricted sight, crossing roughness, inclined approach grades, proximity to U.S. 101, and the narrow width combine to create a dangerous crossing situation. The intersection of this road with U.S. 101 also has restricted the visibility of motorists exiting the site [Environmental Science Associates, 1984].

Hollister Avenue is a major east-west road in the community of Goleta, roughly paralleling U.S. 101. From its western end, near its terminus at U.S. 101, it proceeds eastward as a two-lane paved road to its intersection with Glen Annie/Storke Road, where it widens to four lanes just west of this

FIGURE 4.10.3-9

EXISTING TWO-WAY TRAFFIC FLOWS (ADT) PEAK-HOUR VOLUME IN BRACKETS

WEST OF NIPOMO VICINITY MAP A

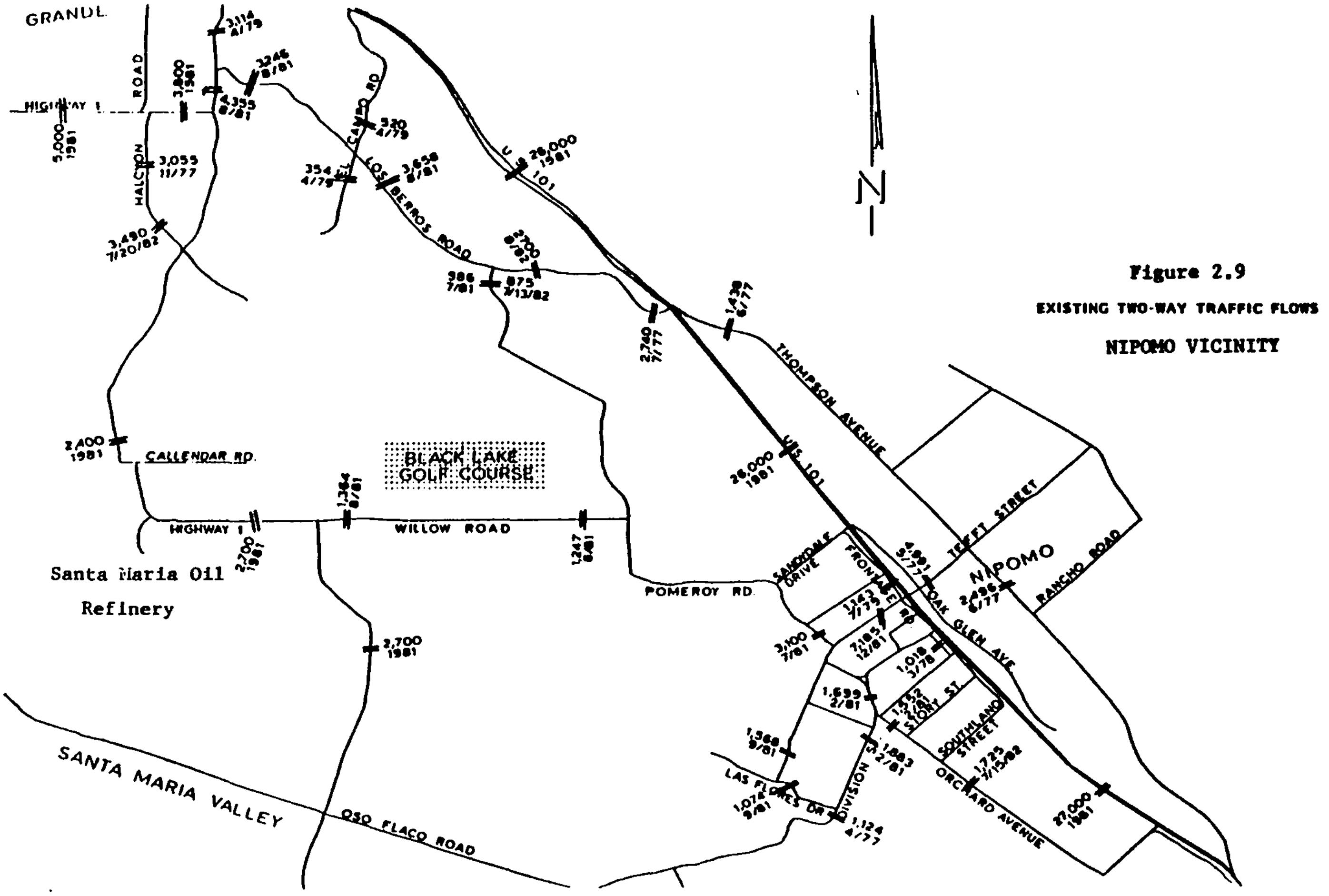

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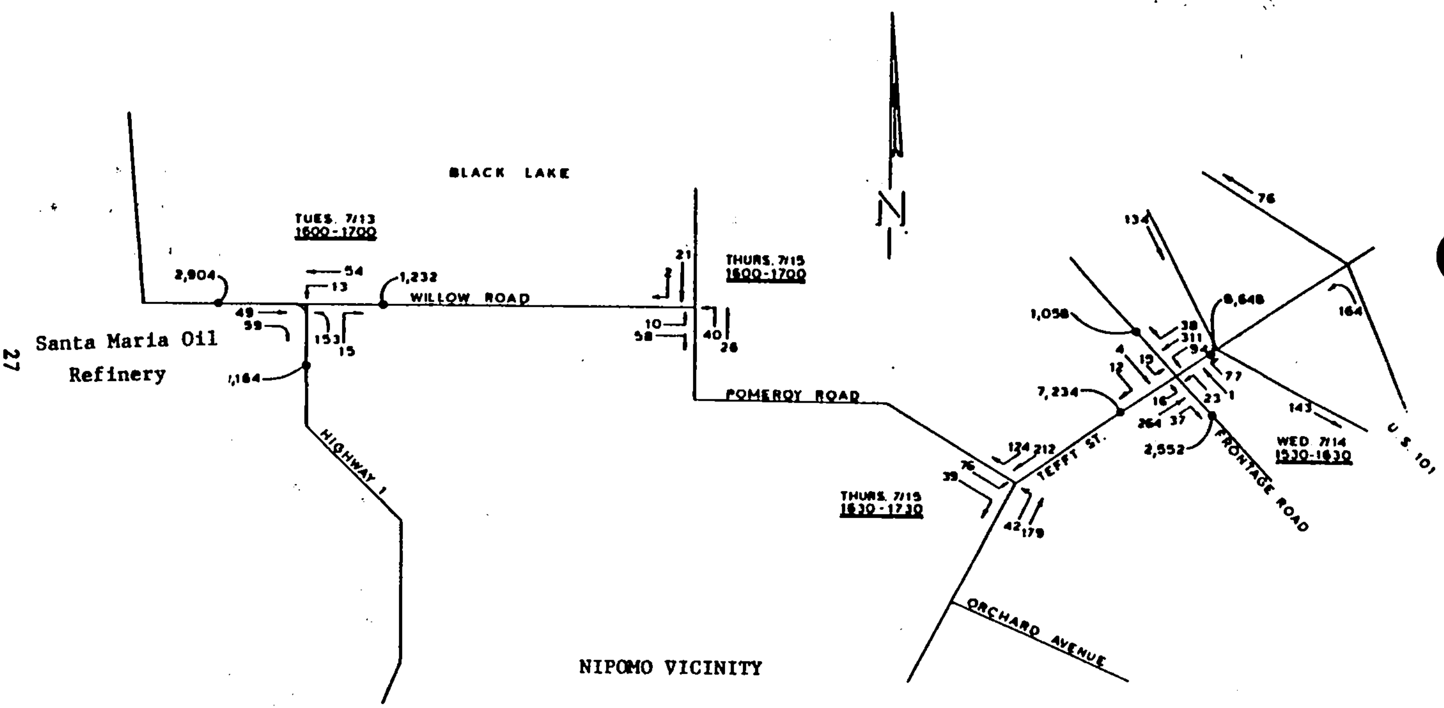
FIGURE 4.10.3-10

EXISTING TWO-WAY TRAFFIC FLOWS (ADT)
PEAK-HOUR VOLUME IN BRACKETS

WEST OF NIPOMO VICINITY
MAP B



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NIPOMO VICINITY

Figure 2.10

P.M. PEAK HOUR VEHICLE TURNING MOVEMENTS
AND ESTIMATED 24-HOUR FLOWS -- JULY 1982

signalized intersection. For much of its length, Hollister Avenue is designated in the Circulation Element of the Comprehensive Plan as an arterial, i.e., a divided four-lane road with intersections at grade, and partial control of access. Progressive upgrading of Hollister Avenue is being partially financed by developers' fees based in part on the expected generation of p.m. peak-hour traffic i.e., $1,100 per peak-hour trip generated by any projects.

Approximately 1.5 miles west of Storke Road, Via Jero Drive meets Hollister Avenue at a stop sign-controlled "T" intersection. Located between Hollister Avenue to the south and U.S. 101 to the north, Via Jero is an unstriped, two-lane cul-de-sac that provides access to Exxon's existing parking facility. This 250-space parking facility is enclosed by a 6-feet chain link fence and is guarded 24 hours per day by a security attendant. See Figure 4.10.3-11.

Traffic on Hollister Avenue near the Hollister/U.S. 101 interchange is currently light. The analysis conducted for the Exxon report [SAI, 1984], which addressed the intersection of Hollister Avenue an the U.S. 101 eastbound on and off ramps in the 5-6 p.m. peak hour, shows it to operating at LOS A. That analysis considered operation as an unsignalized intersection, with Hollister Avenue as the through street, the on and off ramps as the minor streets, and STOP sign control of the minor streets. All the maneuvers are LOS A. Traffic at the Storke/Hollister intersection is currently operating at LOS C/D (approaching unstable conditions) [EIPC, 1984].

THE SANTA BARBARA AIRPORT VICINITY

Access to the Santa Barbara Airport by automobile is mainly provided by Hollister or Fairview Avenues. Drivers wishing to use U.S. 101 when going to or departing the airport are likely to use interchanges at Ward Memorial Parkway, Los Caneros, and Fairview Avenue The Fairview/Hollister intersection is heavily congested at peak hours, and little space is available to enlarge the intersection because of the closeness of the nearby commercial buildings. At peak hour, this intersection is at capacity (service level E/F) [EIPC, 1984].

Santa Barbara Airport is also a base for several private helicopter companies that routinely ferry offshore workers and executives to and from platforms, drillships, and semi-submersible rigs in the Channel. Rotor-Aids and Petroleum Helicopters Incorporated (PHI) are two examples. Each of these companies has a limited amount of parking space available for its passengers. Rotor-Aids has about 100 spaces, while PHI has about 30 [Melancon, 1984]. The airport experiences 1,200 to 1,300 total operations on a weekend day. Helicopter operations present less than 5 percent of this total.

Vehicle parking space is in very short supply at the airport. Regular terminal users are inconvenienced because offshore workers tie-up an appreciable number of the long-term parking spaces that are provided for public use [Ruch, 1984]. Consideration has been given to raising parking fees in order to discourage this activity, but no action has been taken to date. The problem is compounded by the airport's inability to provide more parking

FIGURE 4.10.3-11

EXISTING TWO-WAY TRAFFIC FLOWS (ADT)
PEAK-HOUR VOLUME IN BRACKETS

SANTA BARBARA AIRPORT AND ELLWOOD VICINITY

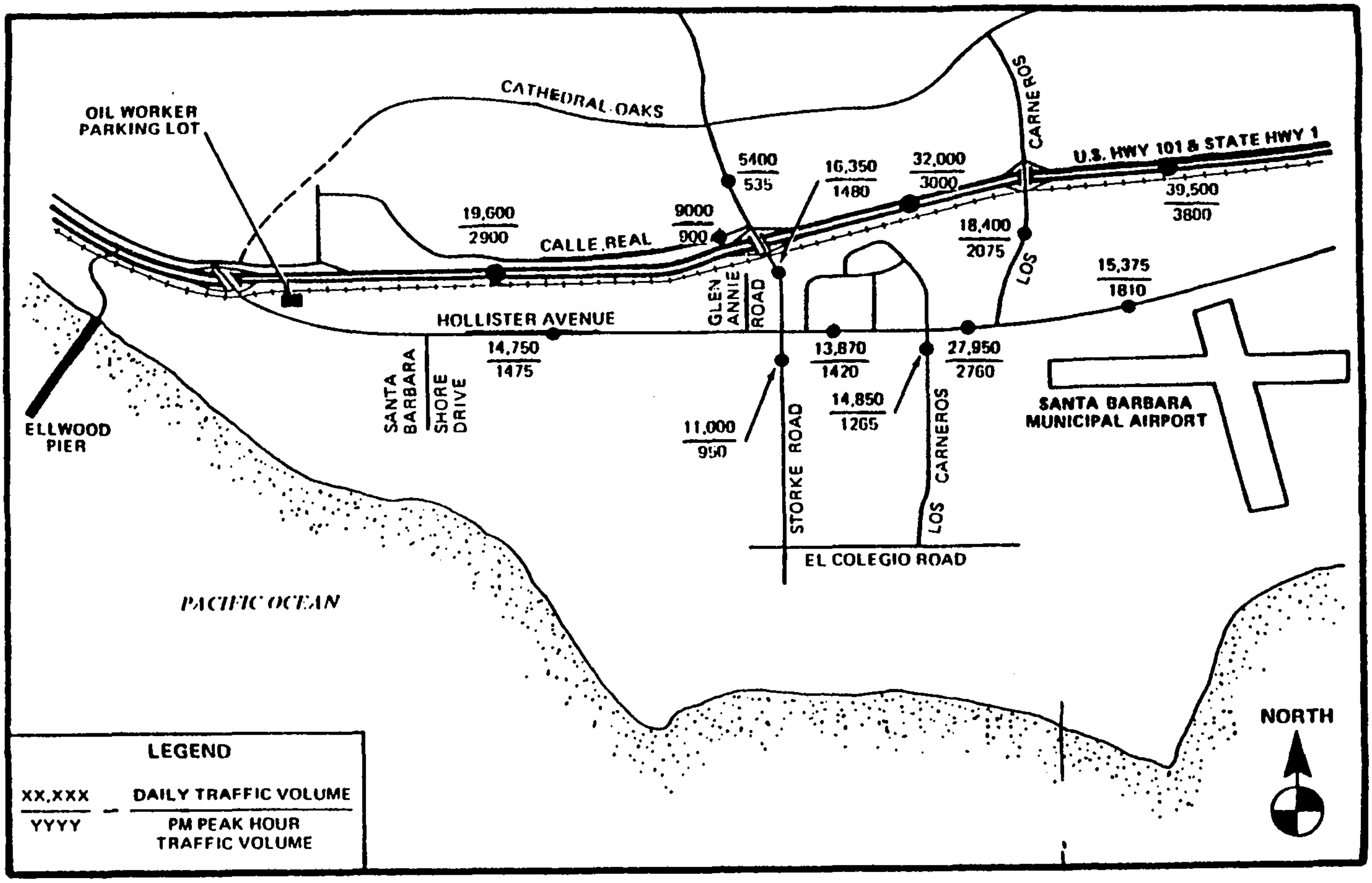

Figure 2.11 Goleta area streets and intersections.

SANTA BARBARA AIRPORT VICINITY

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space. The airport staff is actively encouraging the helicopter companies to find off-airport lots for their passengers. However, no areas other than existing airport lots are being used at this time and helicopter operators are reluctant to develop such lots without long-term contracts indicating their need (see Figure 4.10.3-11).

THE PORT HUENEME VICINITY

Supply boats and some crew boats supporting offshore construction and production activities will use Port Hueneme Harbor as a base of operations. This is the only harbor facility in Santa Barbara, Ventura and San Luis Obispo counties at which this kind of activity is permitted on a large scale, though other harbor and pier facilities are available for crew boat operations. It is possible that the Union Oil Marine Terminal Pier at Avila in San Luis Obispo county will be permitted to be used as a crew base in the future. However temporary use of the facility has been limited recently. Because of this limitation, a broad range of offshore activities depends on Port Hueneme Harbor. The majority of port activity is associated with U.S. Navy operations located adjacent to the City of Port Hueneme which is, in turn, surrounded by the City of Oxnard. Both of these communities in Ventura County will experience traffic impacts associated with the multipurpose harbor activities. Large and medium trucks as well as personal automobiles will need to traverse city streets on a daily basis for access to the harbor.

The city arterials likely to be used by project-induced traffic include Victoria Avenue, Oxnard Road, Ventura Road, Saviers Road, Rice Road, Channel Island Boulevard, Pleasant Valley Road, and Hueneme Road. The first five of these are major north-south traffic corridors and provide connections with U.S. 101. Table 4.10.3-9 shows recent daily traffic counts on each of these arterials [Genovese, 1984]. The capacity of each can be estimated on the basis of 2,000 vehicles per lane per hour of green signal. Existing peak-hour levels are approximately equal to 10 percent of the daily totals shown in Table 4.10.3-10.

Intersections close to Port Hueneme Harbor currently experiencing heavy use and peak hour congestion are: Oxnard Road at Vineyard, Gonzales Road, Wooley Road, and Fifth Street; Rice Road at U.S. 101; Ventura Road at Fifth Street, Channel Islands Boulevard, and Pleasant Valley Road; and Victoria Avenue at Channel Islands Boulevard [Genovese, 1984].

The City of Oxnard has designated truck routes as shown in Figure 4.10.3-12 [Johndoff, 1984]. These same routes are preferred by the City of Port Hueneme with one exception [Duffy, 1984]. Pleasant Valley Road east of Ventura Road will be closed to trucks once a current widening project is complete. The City of Oxnard prefers that Rice Road be used for connections with U.S. 101 [Johndoff 1984]. Rice Road may be extended southward to Hueneme Road which would make this connection more attractive. Large trucks are prohibited from going in and out of the Los Angeles area on State Route 1.

Table 4.10.3-9

TRAFFIC CONDITIONS IN THE VICINITY OF PORT HUENEME HARBOR

Arterial	Segment Counted	Average Daily Traffic (1000)	Number of Lanes each Direction
Victoria Avenue	Hemlock to Wooley	19	1 or 2
Ventura Road	Bard to Channel Isla.	28	2
Oxnard Road	Wooley to Fifth Street	34	2
Saviers Road	Channel Isla. to Wooley	25	2 or 3
Rice Road	Fifth St. to Wooley	16	1 or 2
Pleasant Valley Road	Saviers to Rose	11	2
Hueneme Road	Saviers to Perkins	9	1 or 2

Source: Genovese, 1984

4.10.3.2 Boat Traffic

Ship movements through the Santa Barbara Channel are routed along designated traffic lanes. Fishing and pleasure boats are allowed access to all parts of the channel not subject to Coast Guard or military restriction. Crew and supply boat traffic currently originates from Port Hueneme.

4.10.3.3 Helicopter Traffic

Helicopter operations are allowed at Santa Maria, Lompoc, and Santa Barbara airports. Santa Maria and Lompoc airports currently handle only transient helicopter traffic whereas Santa Barbara Airport averages approximately 50 helicopters operations per day (versus over 700 total-operations per day). In the past San Maria Airport has served as the helicopter base for oil exploration work.

4.10.4 Military Activities

The coastal waters and airspace of Central California are used intensively for military-related operations [BLM, 1980]. Military operations in the vicinity of the Union and Exxon projects are associated with the Western Space and Missile Center (WSMC) located at Vandenberg Air Force Base and the Pacific Missile Test Center (PMTC) at Point Mugu. Current operations include: all-weather flight training; air intercepts; air-to-air, air-to-surface, surface-to-air, and surface-to-surface missile launches; bomb drop exercises; dumping operations; submarine activities; space launches; and operations associated with the Air Force Space Shuttle Vehicle Flight System [BLM 1980; Abbott, 1984].

The proposed platform sites are located in the southeastern portion of Point Arguello Warning Area W-532. This area encompasses approximately 10,000 acres of open ocean forming the northern portion of the Pacific Missile Range. Aircraft and target flights, missile launches, bomb drops, and antisubmarine warfare weapons firings and gunnery are authorized in this area. The floor of the warning area is at the sea surface, and scheduling on the sea surface and in the airspace above the ocean within the warning area, is coordinated by PMTC.

Two restricted airspace areas, designated as restricted intercontinental ballistic and orbital missile launch and test areas, are located in-shore from the platform areas. Vandenberg Missile Area Restricted Area R-2516 extends three nautical miles from and parallel to the coastline between Point Sal and Point Arguello, and Restricted Area R-2517 extends from Point Arguello to Point Conception. Because activities in these restricted areas include short-range surface-to-air missile firing, fallout of launching hardware from intercontinental ballistic missiles and orbital missiles can occur. The floor of the restricted areas is at the sea surface, and scheduling within these areas is coordinated by WSMC. A new restricted airspace area is being proposed to the east of the existing areas to accommodate Space Shuttle training and the Shuttle orbiter recovery area [Abbott, 1984; Hooks, McCloskey & Associates, 1983].

The platform sites are within the Space Shuttle launch and recovery area as well as the orbiter training area, and the site is beneath the Space Shuttle recovery overflight path. During overflights, jettisoned components and falling debris could land in the area beneath the flight path. Because such occurrences are most likely to occur during launches, Western Test Range Danger Zones have been established downrange from launch complexes. A hazard corridor along the flight path and an adjacent caution zone are in effect during each launch. By order of the Commander of WSMC, hazard corridors must be cleared of nonessential personnel, and essential personnel must be sheltered in facilities capable of providing protection from potential fragment or blast impacts.

Other military uses of the coastal waters in the vicinity of the proposed project include a military dumping site and a submarine transit lane. The Shamrock Project area is about 26 nautical miles east of military dumping area "Charlie," which was established in 1959 to handle explosives, toxic chemicals, munitions, and radioactive wastes. Dumping activities at this site were discontinued in 1971. Sierra Venus submarine transit lane roughly parallels the coastline in the vicinity of the project area, running from the southeast to the northwest. At its closest point, the submarine lane is about 26 nautical miles west of OCS-P 0440, and 28 nautical miles west of OCS-P 0441.

Because of the level of military activities in the area, Leases OCS-P 0440 and -P 041, are subject to Lease Sale No. 53 Stipulations No. 4 and 5. These stipulations require that all marine vessels and aircraft within the warning areas coordinate and comply with instructions from the Commanders of WSMC and PMTC, or any other appropriate military agency. In addition, oil and gas operations may be suspended temporarily in the interest of national security requirements; electromagnetic emissions must be controlled in certain areas.

4.10.5 Commercial Shipping

Domestic and foreign cargo movements are routinely and continually conducted through the central Santa Maria basin. There are currently no established traffic control lanes North of Point Conception, although the Coast Guard has proposed lanes. Ship captains are currently allowed to travel along routes they prefer, subject to Coast Guard Safety regulations, military restrictions, and ship owner's dictates.

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4.11 SYSTEM SAFETY AND RELIABILITY

Some of the onshore facilities which will provide gas and oil treatment, processing, storage, and transport for the proposed project are in operation at the present time handling existing hydrocarbon production from onshore fields. The safety-related risks associated with these existing facilities can be regarded as the baseline safety conditions. The safety-related impacts of the proposed project will increase these baseline risk levels consistent with the increases in the facility throughputs, storage, and transportation activities.

4.11.1 Santa Maria Refinery

The major potential safety-related hazards of this facility, whose layout is shown on Figure 2.9-2, are due to the storage and transportation of flammable hydrocarbon products, in particular naphtha, gas oil, and fuel gas (natural gas). Naphtha, a liquid hydrocarbon with properties similar to gasoline, is stored at the refinery in two tanks with a total capacity of 104,000 barrels. The transportation of the naphtha is primarily by pipeline to Union's Rodeo Refinery at a current throughput of 11,000 bbl per day. Naphtha is also transported by tank truck on an occasional basis.

Gas oil is a heavier distillate which with further processing is converted primarily to gasoline products. It is stored in three tanks with a total capacity of 264,000 barrels. The transportation of the gas oil is by pipeline to the San Francisco area at a current volume of 17,000 to 25,000 bbl per day. Depending on needs, up to 7,000 bbl per day of gas oil is also delivered by pipeline to Avila for marine loading. Smaller quantities are occasionally piped to Guadalupe or delivered to Santa Maria by truck.

Fuel gas is produced at the refinery from the crude processing, and is used as an energy source for the refinery operations and for the adjacent Union Chemical operations. The surplus is transported to Union's Guadalupe facility by pipeline. Currently, this surplus amounts to 1 MMscfd. There is no storage of fuel gas at the Santa Maria Refinery.

The potential public hazards associated with these products include the possibilities of a major release of naphtha or gas oil from the storage tanks or from a break in the pipelines. A release of naphtha would likely result in a fire at or nearby the storage area, with ignition of the vaporized naphtha being most likely in the refinery processing areas. It is not likely that such a fire would present offsite consequences because of the distance to the property line. Moreover, due to the limited amount of vaporization which might occur, there is no potential for a significant vapor cloud to be developed.

A release of gas oil from storage is less likely to result in a fire due to its lower flammability. Again, however, if ignition occurs, the resultant fire would not be expected to have any potential for offsite consequences.

Table 4.11-1 displays information on some of the hazards associated with the releases described above. In conjunction with the plot plan, these distances can be used to form footprints demonstrating the extent to which the hazards may persist beyond site boundaries. Figure 4.11-1 displays the serious injury footprint for a gas oil tank rupture and fire. As can be seen in the figure, the contour only extends a minimal distance beyond the fence line. The area surrounding the Santa Maria Refinery is Union Oil owned. Only a small portion of Union's land is occupied by the refinery and the adjacent chemical plant, the rest is undeveloped vegetated sand dunes. The nearest residential area is three miles to the east of the Union property.

Ignition of a naphtha or gas oil pipeline release could be a potential hazard to the immediate public, depending upon the location of the release. However, for the most part, this pipeline routing is through relatively unpopulated areas.

Similarly, ignition of a fuel gas pipeline release could result in a jet fire or vapor cloud fire or explosion which, dependent on the location of the release, could have public safety consequences.

The storage and transportation of crude oil is not assumed to present any public risk hazards because the chance of ignition of spills of these hydrocarbon materials is extremely small. Similarly, transportation of coke and dry sulfur products is not considered hazardous.

4.11.2 Battles Gas Plant

The major potential sources of public risk from the existing operations of the Battles Gas Plant are accident events associated with the storage and transportation of propane, butane, and gasoline. These products are stored at the plant in two groups of bullet-shaped tanks near the entrance road to the plant, as shown on the plot plan on Figure 2.10-2. They include four gasoline storage tanks, with capacities from 12,500 gal to 90,000 gal, for a total storage of 205,000 gal of which only 25,000 gal is presently in use; four propane storage tanks, 23,000 to 29,000 gal capacities, for a total storage of 98,000 gal; and three butane storage tanks, 19,000 to 40,000 gal capacities, for a total storage of 89,000 gal. Accident events involving leaks or ruptures of any of these tanks could potentially result in a fire at the storage site or, for significant releases, the formation of a vapor cloud and subsequent ignition or explosion. The possibility also exists for a BLEVE under some circumstances where immediate ignition of a spill from one of the tanks occurs. A BLEVE, or boiling liquid expanding vapor explosion, can occur from a rupture of a pressurized LPG vessel immersed in a fire. The extent and downwind range of a vapor cloud, or the damaging effects of a BLEVE, could be sufficient to cause offsite hazards which could expose some members of the public to serious consequences. Typical worst case hazard distances are provided in Table 4.11-2. Figure 4.11-2 displays the serious injury footprint for a propane tank BLEVE, and the maximum extent of a butane vapor cloud from a tank rupture - which could only result if ignition did not occur until the cloud had achieved this maximum size. If ignition were to occur at this point, any explosion which might result would have a much smaller set of overpressure distances than those given in the table due to the decreased mass remaining in the cloud.

Table 4.11-1

HAZARD DISTANCES FOR SELECTED BASELINE SCENARIOS AT SANTA MARIA REFINERY

Scenario	Fire Diameter(ft)	Distance from Fire Surface(ft) Fatality	Distance from Fire Surface(ft) Serious Injury
Gas-Oil Tank Rupture; 66,000 bbl in dike	540	110	345
Naphtha Tank Rupture; 39,000 bbl in dike	500	210	280

Table 4.11-2

HAZARD DISTANCES FOR SELECTED BASELINE SCENARIOS AT BATTLES GAS PLANT

Scenario	Fire Diameter(ft)	Distance from Fire Surface(ft) Fatality	Distance from Fire Surface(ft) Serious Injury
Gasoline Tank Rupture; 1600 bbl in dike	50	65	90
Butane Tank Rupture; 825 bbl unconfined	640	240	330
Propane Tank BLEVE; 585 bbl	530	620	800

Explosion Scenarios	Distance to Specified Overpressure (ft) 3 psi	Distance to Specified Overpressure (ft) 0.5 psi
Pig Receiver; 14 kg/s for 5 min.	280	1,040
Butane Tank; 825 bbl	720	2,800
Propane Tank; 585 bbl	650	2,500

Vapor Dispersion Scenarios (F stability; 2 m/s wind)	Downwind Distance (ft)	Maximum Width (ft)
Pig Receiver; 1155 kg in 1 min.	1,800	100
Butane Tank; 825 bbl	2,800	2,200
Propane Tank; 525 bbl	2,500	2,000

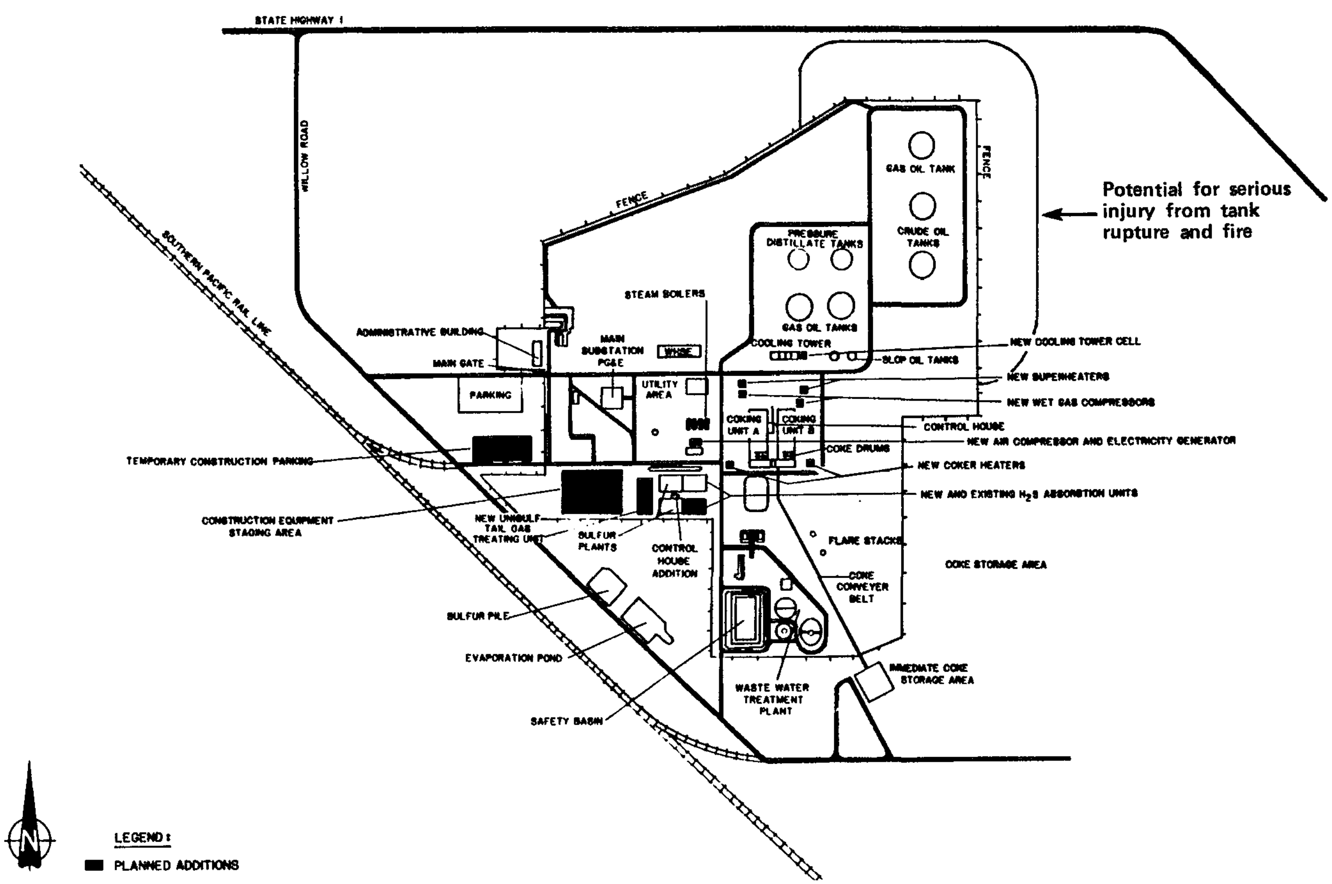
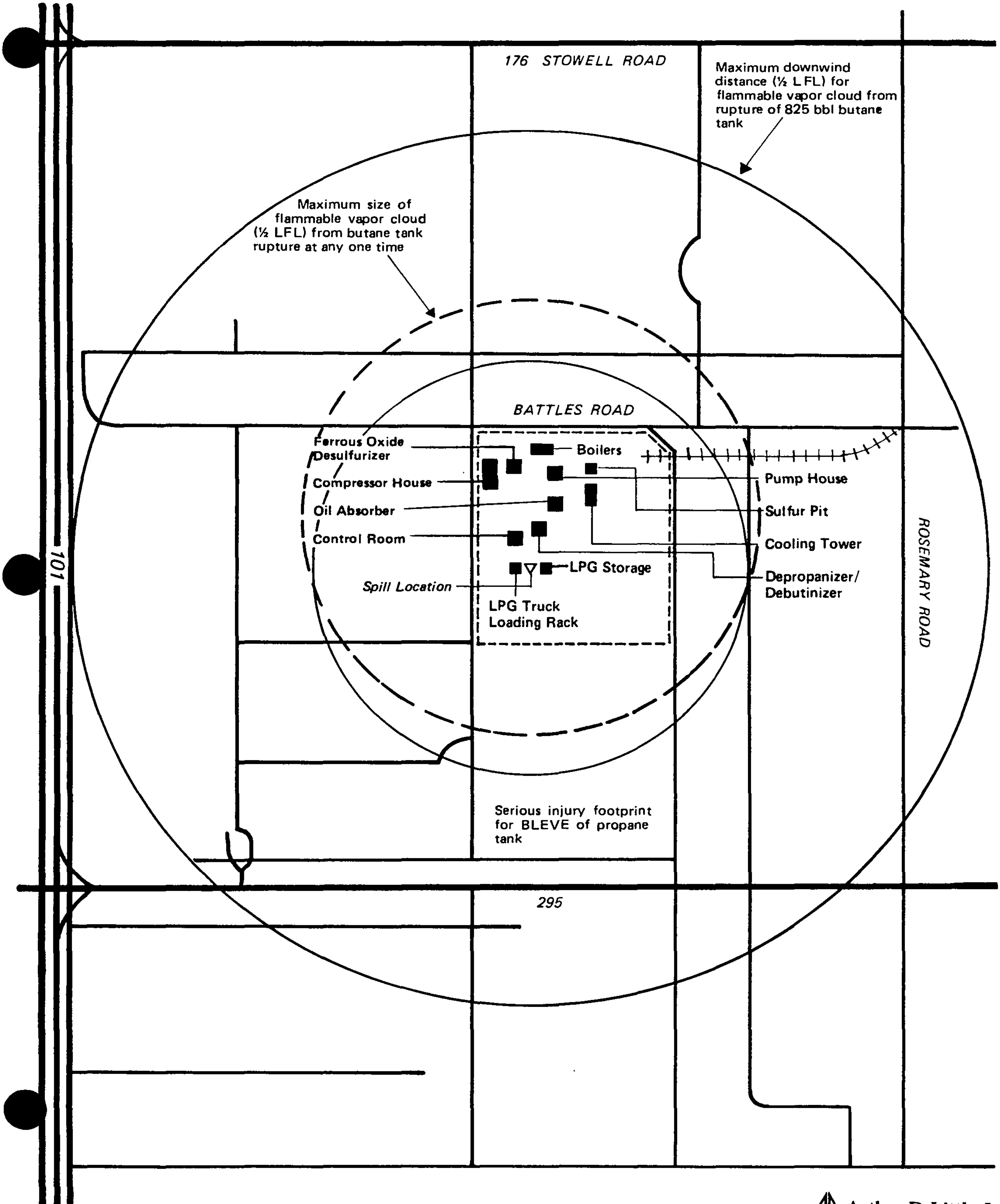


FIGURE 4.11-1

HAZARD FOOTPRINT FOR THE SANTA MARIA REFINERY

FIGURE 4.11-2

PLAN OF BATTLES GAS PLANT SHOWING ACCIDENT HAZARD ZONES



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Utilizing the baseline operational conditions at the Battles Gas Plant, and applying the fault tree methodology and results, as developed for the project in Section 2 of Technical Appendix M, leads to the following estimates for these potential accident events:

- A release from a pig receiver would be a rare* event, due to the infrequency of use.

- A BLEVE of an LPG truck at the loading station is estimated to be an unlikely* event for the current LPG truck activity, which consists of about 1,800 loadings per year.

- The possibility that the fire from an LPG truck BLEVE could cause an LPG storage tank BLEVE is determined to be a rare event. In addition, BLEVES may result from other events such as tank failures or major leaks from tanks, which under some circumstances could immerse adjacent tanks in a fire. Such events are also expected to be in the rare category.

If one of these events were to occur at Battles, the primary risk would be from vapor dispersion and subsequent ignition of the release from a propane or butane tank rupture. Such releases would have the potential to begin to reach populated areas along Highway 101 to the immediate west, northwest, or southwest of Battles if ignition did not occur near the site and the wind was blowing towards one of these areas. Even so, the number of people at risk is minimal. BLEVES of a tank truck would not add to offsite risks. However, a BLEVE of a propane or butane tank might affect a limited area bounded by Battles Road to the north and Betteravia Road to the south, and not extending as far west as Highway 101 or as far east as Rosemary Road.

The area surrounding the Battles Gas Plant is in agricultural or light industrial use, with some petroleum industry activity. The urban area of the City of Santa Maria is located 2 miles west of the plant. As discussed in Section 4.7, the areas near the facility are very sparsely populated.

The transportation of these gas processing by-products also will present possible risks to the public. Currently, propane and butane are shipped by tank truck to both local and regional customer destinations at a rate of five truck trips daily. One-half of these trips are small tank trucks (3,000 gallons) servicing local markets, and one-half are larger tank trucks (9,000 gallons) travelling to destinations as far as Los Angeles. Based on the analysis given in Addendum F of Technical Appendix M, these trucking operations would likely be involved in one truck accident every four years, with a major spill expected about once in 16 years. Since some of the truck routing is along highly populated areas, the risk to the public from such accident events can be significant.

* For definition of frequency classifications, see Table 5.11-1.

This number of truck trips and associated spills might also be expected to have a frequency of once in 42 years for one or more fatalities and once in 35 years for one or more fatalities or injuries, based on the methodology used in Addendum F of Technical Appendix M. The chance of 100 or more fatalities would be significantly less, once in 2900 years.

The transportation of the gasoline products is by a 2-inch pipeline from the storage area to a crude oil transportation pipeline 1500 feet away near Battles Road. There are no significant hazards associated with these pipelines. The transportation of sulfur slurry from the Battles Gas Plant to the hazardous waste disposal facility at Casmalia currently consists of two trips per week. Transportation of this material is not considered to have any potential for public risks, although spills into wetland areas could have environmental effects.

4.11.3 Orcutt Pumping Station

This facility receives crude oil by pipeline from Lompoc and relays it by pipeline to the Santa Maria Refinery. The present equipment includes an oil pig receiver, two oil pipeline pumps, and a 23,000 bbl capacity oil tank which serves as a storage tank to compensate for periodic differences in the oil volume flows into and out of the facility. There are no gas-related systems or pipelines at this pumping station.

The potential incidents at this facility, each of which could result in an oil spill, include a failure in the pig receiver, pump failures, or storage tank failure. The likelihood and consequences of such events, as calculated in Technical Appendix M, Sections 2 and 3, are:

Oil Pig Receiver: Short-time Release - Unlikely
Sustained Release - Rare

Pump Failure: 30-minute release - Rare

Storage Tank Failure: Assumed 75% full (17,250 bbl) - Rare

4.11.4 Pipelines

In addition to the pipelines associated with the Santa Maria Refinery products, the existing pipeline systems which carry potentially hazardous materials include the four incoming lines providing wet gas to the Battles Gas Plant and the return fuel lines from Battles to the gas fields or into the gas utility pipeline system.

The incoming lines include a 10-inch diameter pipeline from the northern gas fields, a 12-inch line from the southern gas fields, a 6-inch line from Orcutt, and an 8-inch line from Cat Canyon and Lompoc. The north and south lines are low pressure; originating at 50 psi and entering Battles at 2 psi. The Orcutt line originates at 110 psi and enters Battles at 80 psi. The Cat Canyon/Lompoc line originates at 200 psi and enters at 150 psi.

The total length of these lines is 37 miles. Based on the pipeline failure rates developed in Section 2 of Technical Appendix M, the estimated failure rate in any of these incoming lines is approximately 0.06 per year, or, on average, once in 17 years.

The outgoing lines presently deliver about 5.7 mmcfd to the fields for fuel use and 3.5 mmcfd to the gas utility system. The total length of these lines is estimated to be 20 miles, leading to a calculated failure rate of about 0.03 per year, or, on average, about once in 32 years.

Leaks or breaks in any of these lines could lead to a fire or to the generation of an ignitable vapor cloud anywhere along the pipelines' routes. Table 4.11-3 provides typical worst case hazard distances for the line from Lompoc to Battles which is the highest pressure pipeline in the set.

Table 4.11-3

HAZARD DISTANCES FOR SELECTED BASELINE SCENARIOS ASSOCIATED WITH PIPELINES

Vapor Dispersion Scenarios (F stability; 2 m/s wind)	Downwind Distance (ft)	Maximum Width (ft)
Pipeline from Lompoc to Battles; break midway; 20 kg/s of gas for 10 min.	1,800	105
Pipeline from Lompoc to Battles; break near Battles or Lompoc; 12 kg/s of gas for 10 min	1,300	80

Explosion Scenarios	Distance to Specified Overpressure (ft)	
	3 psi	0.5 psi
Pipeline from Lompoc to Battles; break midway; 20 kg/s of gas	390	1,490
Pipeline from Lompoc to Battles; break near Battles or Lompoc; 12 kg/s of gas	330	1,260

Fire Scenarios	Flame Length (ft)	Flame Diameter (ft)	Distance from Fire Surface(ft)	
			Fatality	Serious Injury
8" pipeline jet fire	140	7	23	46

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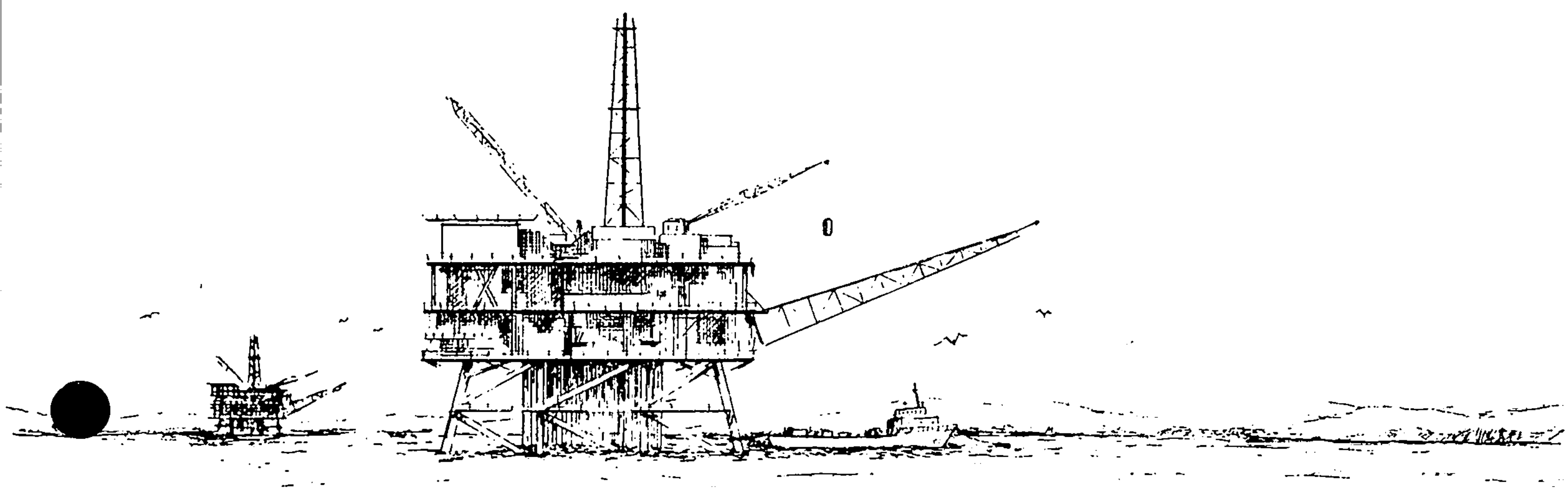

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V. ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

5.0 INTRODUCTION

This chapter assesses the impacts of the proposed projects, the project alternatives, and the Area Study development. Impacts are divided into the following classes:

- Class I - Significant adverse impacts that cannot be mititgated to insignificance: Significant impacts that cannot be effectively mitigated. No measures could be taken to avoid or reduce these adverse effects to insignificant or negligible levels.

- Class II - Significant Impacts that can be mitigated to insignificance: These impacts are potentially similar in significance to those of Class I, but can be reduced or avoided by the implementation of the mitigation measures discussed below.

- Class III - Adverse But Insignificant Impacts: These impacts would be adverse but generally not severe enough to require mitigation.

- Class IV - Beneficial Impacts: These impacts would improve conditions relative to the pre-project baseline. They are further subdivided as significant or insignificant.

- Socioeconomic Impacts: In accordance with Section 15131 of CEQA, socioeconomic impacts by themselves are not classified as significant or insignificant environmental impacts, but their significance is used as a way to judge the significance of related physical changes in the environment.

The term "significance" is used in these tables and throughout the EIS/EIR to characterize the magnitude of the potential impact. For the purposes of this EIS/EIR, criteria for designating significant impacts are defined for each subject area in the appropriate subsections of chapter 5.

In the discussions of each subject area below, criteria used to distinguish between significant and insignificant impacts are provided. To the extent feasible, distinctions are also made between local and regional significance and short- versus long-term duration. Impacts and mitigations are systematically presented in tabular form in the Executive Summary.

Mitigations discussed herein are those that would to reduce or avoid significant impacts, and where there are choices between different mitigations, these are identified.

5.1 GEOLOGY

5.1.1 Introduction/Methodology

This section discusses significance of geologic hazards and design constraints on the projects, and impacts of the projects on the geologic environment. Geologic hazards and constraints on the project are discussed in Section 5.1.2. Impacts of the project on the geologic environment are discussed in Section 5.1.3.

Impacts of geologic hazards and constraints on the project are classified as follows. Geologic conditions with the potential for causing rupture of a pipeline or piping, or failure of process equipment leading to a spill are considered Class I if design or avoidance to account for the condition is not possible, and are considered Class II if design or avoidance can account for the condition. Conditions which would cause damage to facilities but would not result in rupture and spills are considered Class III. Conditions which would not have an impact on the project are described as having "no impact." For Class II impacts, mitigation measures presented in the EIS/EIR are restricted to discussions of pipelines, other onshore facilities, and Area Study facilities. Platform designs and design criteria for Platforms Irene and Shamrock are reviewed and analyzed as part of the MMS Platform Verification Program, and are considered by MMS to be fully mitigated as a result of this review

Project impacts on the geologic environment are deemed Class I if irreversible adverse impacts not mitigable to insignificance by design or avoidance would result; e.g., soil contamination as a result of an oil spill. Impacts are Class II if the project would cause irreversible destabilization of the geologic environment or changes to the existing geomorphology which can be mitigated to insignificance by design or avoidance. Examples would be initiation of gullies or landslides as a result of project activities. Activities which could lead to adverse impacts of a minor nature are considered Class III. Project activities without impacts are classified "no impact."

"Regional" impacts result from activities which extend beyond the Project Area. "Local" impacts are confined to the Project Area. "Short-term" for all issues refers to durations of less than five years. "Long-term" impacts have a duration of five years or more.

Analysis of geologic hazards and conditions has included review of operator data and reports, data and reports prepared by contractors for the operators, review of relevant material in the open literature, review of aerial photography, spot checking of geophysical data, site visits, and calculations. Only geologic conditions which are anticipated to have the potential to affect the project are discussed. Other processes and conditions which have been considered in the analysis, are discussed in Technical Appendix A, and include uplift/subsidence from geotectonic forces (Section 2.1.8 of Technical Appendix A), cliff retreat (Section 2.1.9.2), and rock outcrops in the offshore area (Section 2.1.9.2).

5.1.2 Geologic Constraints on Proposed Project and Alternatives

5.1.2.0 Faults

NATURE OF THE CONSTRAINT

Faults constitute a hazard or constraint for the proposed projects in two ways: as a source of earthquakes (seismicity), and as a result of their potential for seafloor and ground surface displacement under project facilities. This section discusses the potential for displacement. Seismicity is discussed in Section 5.1.2.1.

Based on existing data, the active or potentially active faults along which surface rupture may have a direct impact on project facilities, alternatives or area development facilities are the Hosgri Fault Zone, Purisima Fault Zone, Lompoc Fault Zone, minor offshore faults, the Pezzoni-Casmalia Fault and the Santa Ynez Fault.

IMPACTS ON PROPOSED PROJECTS

Offshore, none of the identified active or potentially active faults intersects components of the proposed projects. Hence, there should not be a direct impact on the offshore project components from surface displacement. Though project components are not located directly over active or potentially active faults, drilling of deviated wells could intersect faults below the seafloor surface. Displacement on these subseafloor faults could shear well casings or drill strings. If such displacements close off the holes and thus "shut in" the well, release of hydrocarbons to the environment would not occur as a result of drilling activities. If displacements sheared casing or drill strings, did not close off the hole, and production was still based on natural reservoir pressures, blow-out prevention equipment (annular preventer, blind rams, pipe rams, choke and kill lines, and a director system) as required by OCS Order No. 2 would prevent release at the surface. Releases (a Class I impact) could occur only in the unlikely event that production were still based on natural flow and a pathway along a fault plane existed from the point of shearing to the ocean bottom. Impacts from other sets of conditions are Class III.

Onshore, the proposed pipeline from the Lompoc to the Orcutt facilities would cross a westward projected trace of the Pezzoni-Casmalia Fault about 2 miles (3.2 kilometers) south of Orcutt. If the fault as postulated has a 20 mile (32 kilometers) length and is capable of a 6.5 M earthquake, a surface displacement of about 2 feet (0.5 meters) is possible. Such movement is expected to be in a predominantly vertical direction with the southside downdropped relative to the northside. This fault is the only known, and in this case, projected active or potentially active fault that would cross any of the proposed project components. Impacts are potentially Class II.

IMPACTS ON AREA STUDY DEVELOPMENT

Active and potentially active faults occur primarily within the northeastern portion of the offshore Area Study leases (Figure 4.1-6). Platforms in this area or pipelines from this area to Platform Irene may intersect one or more active faults. Impacts to facilities resulting from such faults are considered Class III; that is, the faults are significant but related impacts are mitigated by design or avoidance in the context of existing regulations (i.e., OCS Order Nos. 8 and 9).

Onshore, the area development may include one or more pipelines from the Lompoc facility to Gaviota, in which case the corridor(s) would have to cross the Santa Ynez Mountains. The South and North Branches of the Santa Ynez faults would be traversed about 1.9 miles (3.0 kilometers) and 3.5 miles (5.6 kilometers) north of Gaviota, respectively. The South Branch is considered potentially active, while the North Branch is considered active. Thus, there is a potential for surface rupture of pipelines crossing these faults. Based on historic earthquakes and subsequent surface ruptures in the Southern California region (e.g., the San Fernando quake of 1971), the North and South Branches of the Santa Ynez Fault could experience displacements of 3-6 feet (1-2 meters), which could cause breakage of buried pipelines should a major nearby earthquake occur. Therefore, impacts are considered Class II, significant but mitigable by avoidance or proper design.

IMPACTS ON PROJECT ALTERNATIVES

None of the known major active or potentially active faults intersect alternative project components, either offshore or onshore. Hence, there would be no fault displacement impact on the alternative project components. Minor seafloor and subsea floor faults may be crossed by the pipeline from Shamrock to Hermosa. No evidence has been developed to indicate these short faults are capable of generating an earthquake and subsequent fault rupture though they could displace the seafloor sympathetically during a major earthquake on one of the nearby major faults. Based on their fault lengths, the amount of displacement would be small, less than 2 feet (0.6 meter), in either a horizontal or vertical direction. It is unlikely that an unconstrained seafloor pipeline would rupture under such conditions. Therefore, this impact is considered Class III, that is, adverse but not significant. Faulting would have no impact on the no-project alternative.

5.1.2.1 Seismicity

NATURE OF THE CONSTRAINT

The Central Santa Maria Basin is in a moderately active seismic region. Strong earthquake ground motion will be one of the principal hazards to facilities in the Central Santa Maria Basin. Standard methodologies for performing seismic-hazard analyses using both probabilistic and deterministic approaches are detailed in Section 2.1.2 of Appendix A. Probability-based seismic-design criteria for petroleum facilities generally encompass two levels of earthquake ground motion. The lower level is normally associated with a return period of 50 to 200 years, and is sometimes designated as the "Probable Design Earthquake" (PDE) or Strength Level Earthquake (SLE) [American Petroleum Institute, 1984]. The higher level is associated with a return period on the order of several thousand years, and is sometimes designated as the "Contingency Design Earthquake" (CDE). In accordance with

MMS guidelines, project facilities are designed to withstand the PDE without significant damage and without shutting down operations. The CDE may cause damage to, but not collapse of, offshore structures.

Some seismic-hazard studies have estimated ground motions with long return periods using a deterministic approach. The application of this approach involves the identification and location of earthquake sources. Table 4.1-1 lists maximum credible earthquakes (MCE) for all active and potentially active faults which may have an effect on project facilities and alternatives. Ground shaking, as a result of earthquakes, can be estimated using magnitude and distances of the earthquake sources from locations of facilities.

IMPACTS ON PROPOSED PROJECTS

Ground motions with average recurrence intervals of 100 to 3000 years, as calculated by previous investigations, are given in Table 5.1-1. These motions were determined by probabilistic methods. The Earth Technology Corporation report [1984] was prepared for Union Oil as part of the Platform Verification Program. To date there has not been a similar study prepared for the Shamrock project, though the proximity of the two platforms and similarity of the geologic framework suggest very similar ground motion values would be expected. See Technical Appendix A, Section 2.1.2 for discussions of both methodology and relevant reports.

It is reasonable to expect that peak ground accelerations (PGAs) between about 0.15 and 0.30 of the acceleration of gravity (0.15-0.30g) are likely to occur in the Point Pedernales Field Area with an average recurrence interval of about 200 years. The American Petroleum Institute's [1984] guidelines for generic seismic-hazards studies suggest a design acceleration of 0.25g for the Point Arguello region for this return period. PGAs of 0.60g could occur every thousand years. Detailed studies are being conducted as a part of the MMS Platform Verification Program to determine the appropriate design criteria and design needed to accommodate expected levels of ground shaking. Resulting designs are considered fully mitigated. See Technical Appendix A and Section 4.1.9 for additional details.

An indication of the ground motion that the two platform sites and the onshore facilities might experience during the MCEs for important sources for earthquakes is provided in Table 5.1-2. These values are based on a deterministic approach and are considered to represent worst-case evaluations of ground shaking. Long-period ground motion that would be generated at the platform sites from the MCE on the San Andreas Fault may not be accurately represented by the peak ground velocity (PGV) estimates in this table. Highest PGAs at the platform sites would be produced by the offshore Lompoc and Hosgri Faults. Onshore, the Pezzoni-Casmalia Fault would control design at all facility sites. Impacts are considered Class II.

IMPACTS ON AREA STUDY DEVELOPMENT

The impacts of earthquakes on area development facilities would be similar to those described for project facilities except that the level of shaking could be slightly higher or lower depending on whether the area

Table 5.1-1

GROUND MOTION ESTIMATES FOR THE PROJECT AREA

Reference	Location	T(yrs)	PGA(g)	2.0 period PGV(cm/s)
The Earth Technology Corporation (1984)	OCS Lease P0441 (Platform (Irene)	200	0.15	17
		400	0.25	24
		600	0.25	27
		1000	0.62	
				(2.5 period)
				16
				23
				26
Thenhaus & others (1980)	Pt. Arguello Area	100	0.15.0.20	15-20
		500	0.30-0.50	30-40
		2500	0.50-0.60	
Dames & Moore (1978)	Pt. Conception	100	0.25	
		200	0.28	
		500	0.33	
		1000	0.37	
		2000	0.41	
		3000	0.43	

Notes: PGA = peak ground acceleration
PGV = peak ground velocity
T = average return period

Table 5.1-2

ESTIMATED PEAK GROUND ACCELERATION (PGA)
AT PLATFORM SITES & PROCESSING FACILITIES

	Hosgri (M 7.5)		Offshore Lompoc (M 6.5)		Offshore Purisima (M 6.5)		Pezzoni-Casmalia (M 6.8)		Santa Lucia Bank (M 7.5)		San Andreas (M 8.25)	
	Dist. mi	PGA	Dist. mi	PGA	Dist. mi	PGA	Dist. mi	PGA	Dist. mi	PGA	Dist. mi	PGA
Platform Irene	8.5	0.33	5	0.27	9	0.10	20	0.13	22	0.17	67	0.07
Project Shamrock Platform	6	0.39	3.5	0.32	8	0.20	20	0.13	20	0.18	69	0.07
Surf Substation	2	0.59	11	0.14	7	0.22	13	0.17	29	0.14	60	0.11
Lompoc Facility Sites 4 & 8	17	0.20	19	0.09	16.5	0.11	8	0.24	39	0.10	48	0.13
Orcutt Pump Station	15	0.23	21	0.08	18	0.09	2	0.48	42	0.09	45	0.15
Battles Gas Plant	18	0.19	25	0.07	21	0.08	6	0.29	44	0.09	38	0.17
Santa Maria Refinery	11	0.28	19	0.09	14	0.14	5	0.31	37	0.11	45	0.15

NOTES: The PGA values (percent of one gravity, "g") were estimated using empirical deterministic regression analysis by Campbell, (1981) and using the following relationship $PGA = a \, Exp \, (bM) \, [R + C \, (M)]^D$ where:

PGA = Peak values scaled from two horizontal components.
M = Richter magnitude.
R = Distance from the fault rupture zone.
b = Coefficient for far field properties.
D = Coefficient for the geometrical attenuation rate.
a = Coefficient to scale amplitude of the peak acceleration.
C = Magnitude scaling of PGA for distance in thenear source region.

The values shown for acceleration are "peak horizontal acceleration." The repeatable accelerations are usually about two-thirds of the values shown.

Magnitudes are Maximum Credible Earthquake (MCE) from Table 4.1-1.

development facilities are nearer or farther from the causative fault. At this time, these small differences for most sites are probably not significant since a detailed site-specific seismic hazard analysis would be performed prior to construction of those facilities.

Onshore, if pipelines were extended to Gaviota, expected ground motions from the North and South Branches of the Santa Ynez fault would become important design considerations. For example, near Gaviota Pass a pipeline could undergo a PGA of 0.74 g based on an MCE of magnitude 7.5 [Campbell, 1981] should the Santa Ynez fault(s) produce a major earthquake. As with project facilities, these impacts are significant but mitigable (Class II).

IMPACTS ON PROJECT ALTERNATIVES

The impacts of earthquakes on project alternatives would be similar to those for project facilities. The level of shaking could be slightly higher or lower depending on the distance between the sites and the causative fault. Impacts are potentially significant but mitigable (Class II). Seismicity would have no impact on the no-project alternative.

5.1.2.2 Other Geologic Considerations - Offshore

NATURE OF THE CONSTRAINTS

This section discusses constraints associated with shallow gas and hydrocarbon seeps, seafloor channels, buried channels, seafloor instabilities, and erosion and scour.

Gasified sediment zones are considered potential constraints because: 1) large contrasts in load-bearing capacity may exist within these zones or between these zones and the surrounding sediments, 2) dissolved gas in interstitial spaces can contribute to spontaneous liquefaction of sediments when subjected to cyclic loading under abnormal conditions, and 3) interstitial gas could contribute to spontaneous slope failure by effectively lowering the shear strength of the sediments.

Low pressure gas which seeps into the water column is, in itself, not a geologic constraint but may indicate zones of faulting or gasified sediments and shallow gas. Tar mounds may form on the seafloor when a hydrocarbon seep is thick oil or tar. In addition to indicating the location of other possible constraints, tar seeps and mounds may also represent anomalous foundation conditions.

Shallow formational gas is confined within geologic formations and can cause abnormally high well pressure if penetrated during drilling operations. Shallow gas can also contribute to the instability of a nonindurated or semi-indurated formation by lowering the shear strength of the formation.

Channels cut by present-day seafloor currents or by ancient streams during past periods of low sea level result in two types of potential constraints on the project: active seafloor channels and buried channels.

Buried channels represent zones of potentially variable load-bearing capacity which can lead to differential settlement. Seafloor channels represent zones of potential slope instability, erosion, and scour.

Seafloor instability includes rapid downslope movement of sediments (landslides, mudflows, etc.), sediment creep, differential settlement, and liquefaction. Damage to facilities could result from loss of foundation support, uneven load-bearing capacity resulting in uneven settlement, and forces against foundation supports of facilities from failures occurring upslope. Erosion is associated with submarine channels, and scour with rock outcrops and hard bottom areas.

IMPACTS ON PROPOSED PROJECTS

While zones of gasified sediments have been mapped near and beneath the proposed platform sites (Figures 4.1-9 and 4.1-11), the platforms would not be founded directly on these sediments but would be supported on piles driven through surface sediments into more competent formations [Union Oil Company, 1984; Exxon Company, 1984]. Zones of gasified sediments are also found along the proposed offshore pipeline routes (Figures 4.1-10 and 4.1-12). These zones occur on relatively short segments of the pipeline routes and are in areas of very gentle (less than 1 percent) seafloor slopes. Pipelines would lie directly on the seafloor where they cross these zones and should not impose heavy loads that would require foundation support. Impacts on platform foundations are mitigated by existing regulations (Class III). Impacts on the preferred pipeline routes are considered adverse but not significant (Class III).

Shallow formational gas is widespread throughout the eastern portion of the Central Santa Maria Basin Study Area (Figure 4.1-8). The block hazard survey results indicate that neither of the proposed platform sites are directly over pockets of shallow formational gas. However, the drilling programs indicate that numerous wells would be directionally drilled which presents the possibility of intersecting shallow gas zones at depth. To date, there are no documented cases of drilling problems associated with shallow formational gas in the several exploration wells already drilled in the Central Santa Maria Basin or in wells drilled in the Point Arguello region and Santa Ynez Unit. The hazards are considered potentially significant but impacts are mitigated by existing regulations (Class III) . Shallow formational gas present beneath the pipeline routes is at depths of 300 feet (90 meters) or more and is apparently not directly associated with any seepage to the surface. Impacts are considered insignificant (Class III).

Neither the platform sites nor the proposed offshore pipeline routes are in the immediate vicinity of either buried or seafloor channels (Figure 4.1-8). There is no evidence of former seafloor sediment instability at either the proposed platform sites or along the pipeline routes. However, features indicative of past movement are present in other portions of the Area Study where soil conditions are somewhat similar to those found at the platform locations and along the pipeline routes (Figures 4.1-8). Some of these features may reflect zones where liquefaction or other instabilities developed as a result of cyclic loading such as may be caused by earthquakes or by storm waves in shallow water.

Liquefaction of surficial sediments should not affect the platforms, which would be supported by piles driven through the cohesionless soils. Neither platform geotechnical investigation [McClelland 1984a, McClelland, 1984b] identified soil zones or properties indicative of liquefaction potential. Within the pipeline corridor, surficial materials susceptible to liquefaction may occur within the unconsolidated sandy sediments on the seafloor off of the mouth of the Santa Ynez River. Liquefaction could significantly affect the pipeline offshore and on the beach. If liquefaction were to occur, the sediments under and surrounding the pipelines could settle, spread laterally, or flow downslope. Such events could result in unsupported spans of pipeline, buoyant rise of pipeline to the surface, and possibly rupture. The potential of liquefaction or other soil failure as a constraint on the pipelines is considered significant, but the impact on the project is considered by MMS to have been mitigated to insignificance (Class III) by compliance with the requirements of OCS Order No. 9 and adherence to related procedures administered by MMS.

Although it appears that erosion is occurring in some of the major offshore submarine channels, the project components are so located that they would not be impacted by this constraint. Similarly, while scour is occurring around offshore rock outcrops and hard bottom areas, offshore project components are located in such a way that they would not be affected by this constraint.

IMPACTS ON AREA STUDY DEVELOPMENT

The Central Santa Maria Basin has ubiquitous zones of gasified sediments and shallow formational gas which could cause foundation instabilities or blowouts. Impacts are considered potentially significant but mitigable (Class II). Potential impacts to platforms or pipelines resulting from failure of soils in buried channels and downslope mass movement or erosion in seafloor channels may be significant. However, these Class II impacts should be mitigable by siting, route selection, or foundation design.

Potential instabilities may affect development in Area Study leases where the seafloor slopes are steep or have a history of instability (Figures 4.1-3 and 4.1-8). Seafloor channels are of particular concern because of slides, slumps and related features so common along the steep-sided walls of the channels. For example, Leases OCS-P 0440 and -P 0510 have major steep-sided channels heading in their western and southwestern sides. Even though these channels do not have documented slope instability problems at these locations, such features have a high potential for instability. They are unfavorable locations for future facilities because of the steep slope, potential for uneven settlement, and erosion. Potential impacts are locally significant but mitigable (Class II) by avoidance.

A zone of possible mass movement in the northwest corner of the area study (Figure 4.1-8) and a small area of slope failure in Lease -P 0419 just north of the Area Study [Nekton, 1981] have been mapped. These features suggest that the potential for seafloor instability must be addressed in all Area Study leases. Impacts are potentially significant but mitigable (Class II), in the context of existing regulations by avoidance or design.

IMPACTS ON PROJECT ALTERNATIVES

The most significant potential constraint along the alternative alignment from Platform Shamrock to Platform Hermosa is liquefaction or other soil failure (Class II). Impacts related to shallow gas are similar to those for the proposed pipelines. The route does not cross any seafloor or buried channels, avoids rock outcrops (where scour has been observed), and does not cross any mapped areas of seafloor instability. No constraints are associated with the no-project alternative.

5.1.2.3 Other Geologic Considerations - Onshore

NATURE OF THE CONSTRAINTS

Failures of unstable slopes and areas of active erosion are considered here as geologic constraints on the project. Destabilization of slopes as a result of project activities is discussed in Section 5.1.3, as impacts of the project on the geologic environment. The slope stability problem of most concern is landslides. If movement along existing landslides should recur, or if new slides are initiated, pipelines lying on the slide or in the path of the slide mass could rupture and release hydrocarbons into the biosphere. Burial of the pipelines to 3-foot depth should be adequate to avoid surface movements of material, such as mudflows, but would not be below potential planes and depths of movement associated with landslides.

On steep stream banks along the pipeline routes, soil slumps, flows and landslides can occur and have occurred within the thicker soil accumulations, terrace deposits, and alluvial deposits. The movements are generally small and localized, involving unconsolidated materials, and therefore impose less constraint on pipeline integrity than landslides. Such failures constitute more of an environmental concern when considered as potential project impacts to the geologic, hydrologic, and biotic environments.

Downslope creep of material could also disrupt the pipeline. These movements are slow, however, and should be detectable during pipeline maintenance checks well in advance of any rupture hazard. In addition, creep is mainly a surficial phenomenon, and would be unlikely to affect pipelines buried to 3 feet or greater. Compressible, collapsible, and expansive soils are not known to be extensive in the Project Area. Headward erosion of active gullies could lead to undermining of pipeline support, sagging, buckling, and possible rupture.

Scour along stream beds occurs during floods and is dependent on, among other factors, the amount and rate of flow and local topography. Scour is prevalent throughout the Santa Ynez River flood plain, and can be anticipated in any flood-prone area in the Project Area.

IMPACTS ON PROPOSED PROJECTS

Project components which could be affected by onshore slope instability would be the pipeline routes from the proposed landfall to Site 4 and from Site 4 to Orcutt. Existing slides are concentrated on the north edge of the

Lompoc Terrace and in the Purisima Hills. (See Figures 4.1-14 and 4.1-15, Section 4.1.7 and Technical Appendix A Section 1.5.2.4.) Isolated landslides have also been noted on steep slopes close to drainage channels in the Project Area: at Santa Lucia Canyon, Davis Creek, crossings 2-7 and 2-8, and at the confluence of Harris Canyon and San Antonio Creek. This historical evidence suggests that the banks of major drainage channels and areas of higher relief are most susceptible to landsliding. On the proposed route, an existing slide is crossed on the western side of Santa Lucia Canyon. In addition, the Oak Canyon crossing would have some potential for landsliding. The route from Lompoc to Orcutt crosses the Purisima Hills, an area of historical landsliding, and passes close to, but not through, the slides at the Harris Canyon and San Antonio Creek confluence. Impacts at all of these locations are considered potentially significant but mitigable (Class II), except at the latter, which is Class III.

Very pronounced deep gullying was identified nearly continuously along the pipeline corridor between San Antonio Creek and the Orcutt facility. Lack of major channel improvement has resulted in extensive erosion of the low relief valley floor near the proposed alignment. This gullying has apparently gone unchecked for many years and will continue if not corrected. Calculated rates of gully advance indicate that, for this alignment, several gullies can be expected to advance past the pipeline during the 30 year life of the project. Impacts are considered significant but mitigable (Class II).

Impacts on the pipelines from scour would be concentrated at drainage and river crossings. The greater the depth and velocity of flood flow in any given drainage, the greater the potential depth of scour, and the greater the likelihood of undesirable exposure and lateral forces on a pipeline. Scour depths 3 to 4 times the rise in river stage have been reported [Terzaghi and Peck, 1967]. Impacts from scour are rated Class II.

IMPACTS ON AREA STUDY DEVELOPMENT

Onshore, many landslides have been mapped in the Santa Ynez Mountains, particularly on the steeper slopes along major drainages. In general, this is an area of potential landsliding and other forms of slope instability. Potentially unstable conditions relative to landsliding, slumping, mud and debris flows, and rock falls are directly related to slope terrain, geologic structure, and shear strength of rock and soil materials. Formations of particular concern are the Rincon, Monterey, and Sisquoc. Site-specific geotechnical studies would be required to identify and delineate slope instability potential. Impacts are rated potentially Class II.

As for landslides, there is ample evidence of gullying in the onshore Area Study triangle, especially in the Santa Ynez Mountains and foothills south of the Santa Ynez River. Scour could also be more significant in these areas of consolidated rock, more rugged topography, lower infiltration rates and more rapid runoff. Impacts are potentially Class II.

IMPACTS ON PROJECT ALTERNATIVES

Onshore alternative project components which could be affected by slope instability, erosion or scour would be the Lompoc Dehydration Facility Site 8, portions of the Surf to Site 4 pipeline route (Route 2), portions of the Landfall to Lompoc Site 8 route (Route 3) and portions of the Surf to Lompoc Site 8 route (Route 4). At Site 8, two possible existing minor slides were noted on the east side of the site. If movement of these landslides should recur, they could bury or otherwise exert undesirable loadings on project structures. This site is relatively flat and with no apparent areas of erosion or scour. Routes 2 and 4 run near a cluster of old landslides along Highway 246 on the north-facing slope of the Lompoc terrain, and individual features at crossings 2-7, 2-8, and Davis Creek. Route 3 crosses these latter individual features as well as an old slide west of Santa Lucia Canyon. Slope instability impacts at these locations are considered Class II.

The potential for scour constitutes a clear distinction among the preferred route and Route 3, neither of which would require a crossing of the Santa Ynez River, and Routes 2 and 4, both of which would require such a crossing. A buried pipeline crossing of the Santa Ynez River could be subject to large lateral loads during floods. Large floods can be expected to occur during the life of the project. (See Section 4.3.1.) Impacts of scour are Class II at major drainage crossings.

The onshore alternative pipeline alignments are subject, in localized areas, to erosion and gully advance past the pipeline, with the associated possibility of slope failures. Impacts are considered significant but mitigable (Class II).

There would no hazards or constraints associated with the no-project alternative.

5.1.2.4 Mitigation Measures for Geologic Constraints

FAULTS

Proposed Project

No major active or potentially active faults underlie locations of proposed project facilities offshore. The unlikely possibility of movement on a fault intercepted at depths by well boreholes which would lead to release of hydrocarbons is mitigated to the extent possible within available technology required in project design.

Onshore, the Pezzoni-Casmalia Fault could experience up to 2 feet of vertical displacement. There is some uncertainty about both the recency of movement and the locations of this fault. A fault investigation should be performed to determine capability for rupture and location in the field. If capability is established, design measures at a crossing could include placement above ground surface, use of heavier gauge steel, use of cohesionless backfill to minimize resistance of material surrounding the pipe, trench geometry design, use of geotextiles and subdrains to maintain the backfill, and use of sleeves around the line.

Area Study Development

Mitigation measures for potential impacts associated with faults within Area Study leases include avoidance and design. Design measures for crossing offshore faults include: oblique crossings, to spread potential displacement over a greater distance and to place a line in a relatively favorable stress state of tension (vs. shear); and unconfined placement of the pipeline, which permits maximum flexibility in the event of rupture. General mitigations for a crossing of the Santa Ynez Fault are similar to those described above for the Pezzoni-Casmalia Fault, and could be similar in concept to those proposed by Dames & Moore [1984] for the crossing of the South Branch of the Santa Ynez Fault by the PAOS and PAGS pipelines.

Project Alternatives

Mitigations for crossing of unnamed minor faults would be similar to those described above for the Area Study leases.

SEISMICITY

Proposed Projects

Seismic design criteria and related design elements are examined and applied as part of the Platform Verification Program administered by MMS. MMS also looks at pipeline design. Generic studies and studies for proposed facilities indicate that design levels for short-recurrence-interval events should be in the 0.15g to 0.30g range, and for long-recurrence-interval events in the 0.40g to 0.60g range. Seismic-design should also include the effects of long-period ground motions from an 8.25 magnitude earthquake on the San Andreas fault.

Because the pipelines are linear features extending near several faults with different MCEs, seismic design should include the effects from earthquakes on the Offshore Lompoc, Purisima, Hosgri, and the Pezzoni-Casmalia Faults.

Area Study Development

Offshore, site-specific analyses are required by the MMS to determine appropriate seismic-design levels. Design levels would be similar to those presented in Section 5.1.2.1 but may vary depending on the actual location of the facility relative to major faults.

Onshore, seismic design should include effects of earthquakes on the Santa Ynez Fault (and branches) and the Hosgri Fault in particular. Other faults could be of concern depending on exact location of facilities.

Project Alternatives

Levels of ground motion for alternatives would be similar to those for project facilities, and similar types of seismic design studies should be required.

OTHER GEOLOGIC CONSIDERATIONS - OFFSHORE

Proposed Projects

In general, potential constraints imposed by conditions discussed in Section 5.1.2.2 are mitigable by avoidance or design. No faults, seafloor or burial channels, or areas of erosion and scour are crossed by project facilities. Therefore, no mitigations are required. Potential impacts associated with shallow gas, gasified sediments, and slope instability should be mitigated in the context of existing regulations. In particular, a geotechnical investigation and tests of foundation conditions along the pipeline corridor, particularly with respect to gasified sediments, and liquefaction potential of the cohesionless soils at the mouth of the Santa Ynez River woul be appropriate.

Area Study Development

Existing regulations and agency review capabilities provide a framework for mitigation of potential constraints on area development facilities. Requirements include block geohazard surveys, geotechnical investigations, and review of platform design and siting. The best mitigation is avoidance. If that is not possible, geotechnical testing and subsequent design to accommodate existing conditions would be required.

Project Alternatives

Geotechnical testing to identify areas of potential foundation instability, particularly with respect to liquefaction, should be undertaken for use in routing and design, should the alternative pipeline route from Platform Shamrock to Platform Hermosa be selected.

OTHER GEOLOGIC CONSIDERATIONS - ONSHORE

Proposed Projects

As discussed in Section 4.1.5.1, major existing landslide scars were located utilizing aerial photographic analyses and field checking. These features should be avoided if possible. Recommended realignments are shown in Figures 5.1-1 and 5.1-2. If avoidance is not possible, these features should be geotechnically investigated. Such investigation might include detailed geologic mapping, subsurface investigation, and laboratory testing and analysis, with subsequent recommendations for design criteria. Mitigations could include burying the pipeline below the slide plane, repair of the slope (e.g., retaining walls, buttress fills), removal of the slide mass, stabilizing the slope by lowering the slope ratio, dewatering a potential slide mass, and improving surface drainage on nearby slopes.

Where the pipeline crosses active stream courses and areas of excessive gullying where erosion can occur, the pipelines should be buried below the depth of recent deposits. Areas of severe erosion near steep slopes and near the heads of gullies should be avoided. If avoidance is not possible, measures could include protection of the pipeline, spanning over gullies, or arrest of gully advance.

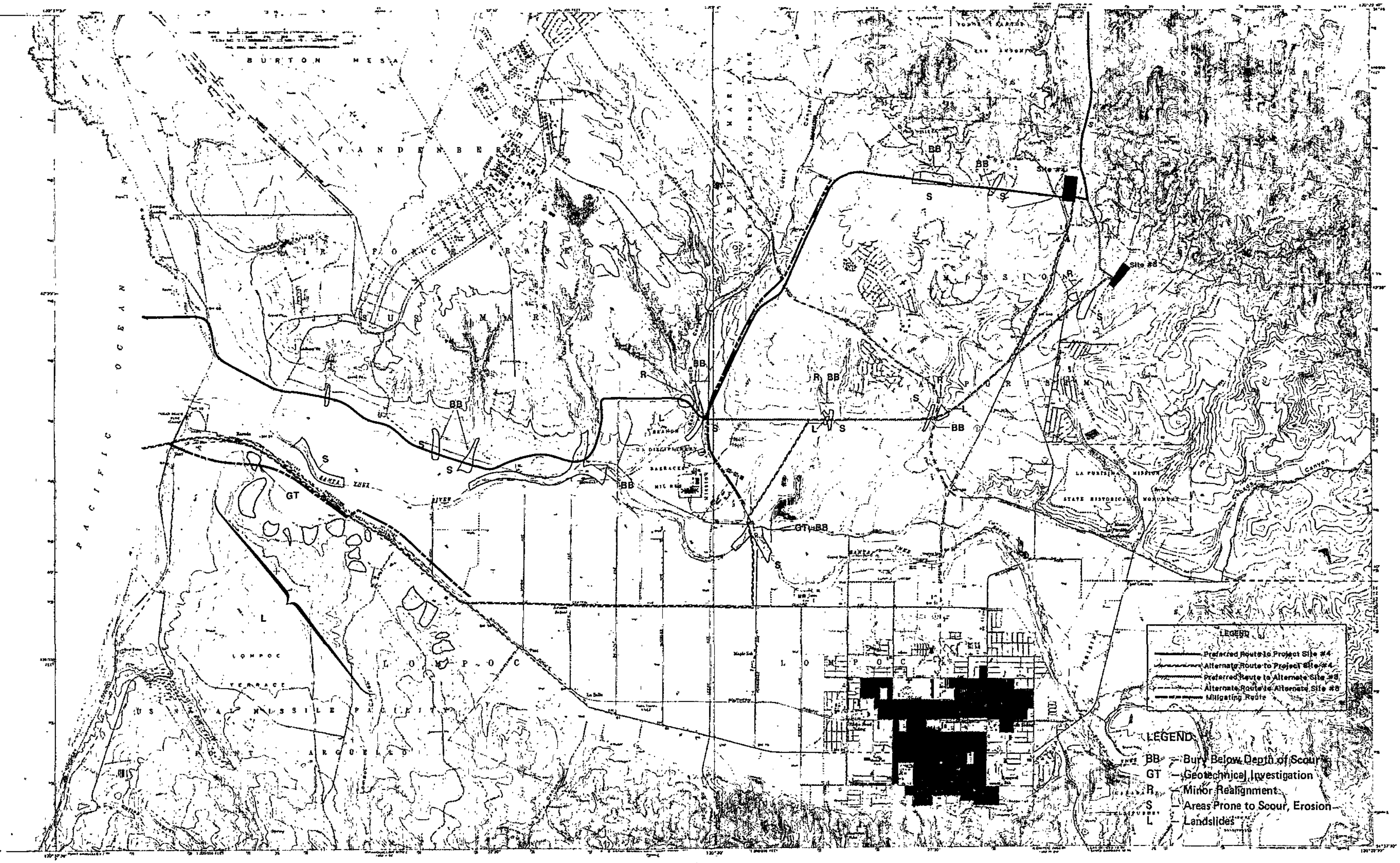

FIGURE 5.1-1

MITIGATION MEASURES FOR GEOLOGICAL CONSTRAINTS IN THE PROJECT AREA FROM LANDFALL TO LOMPOC

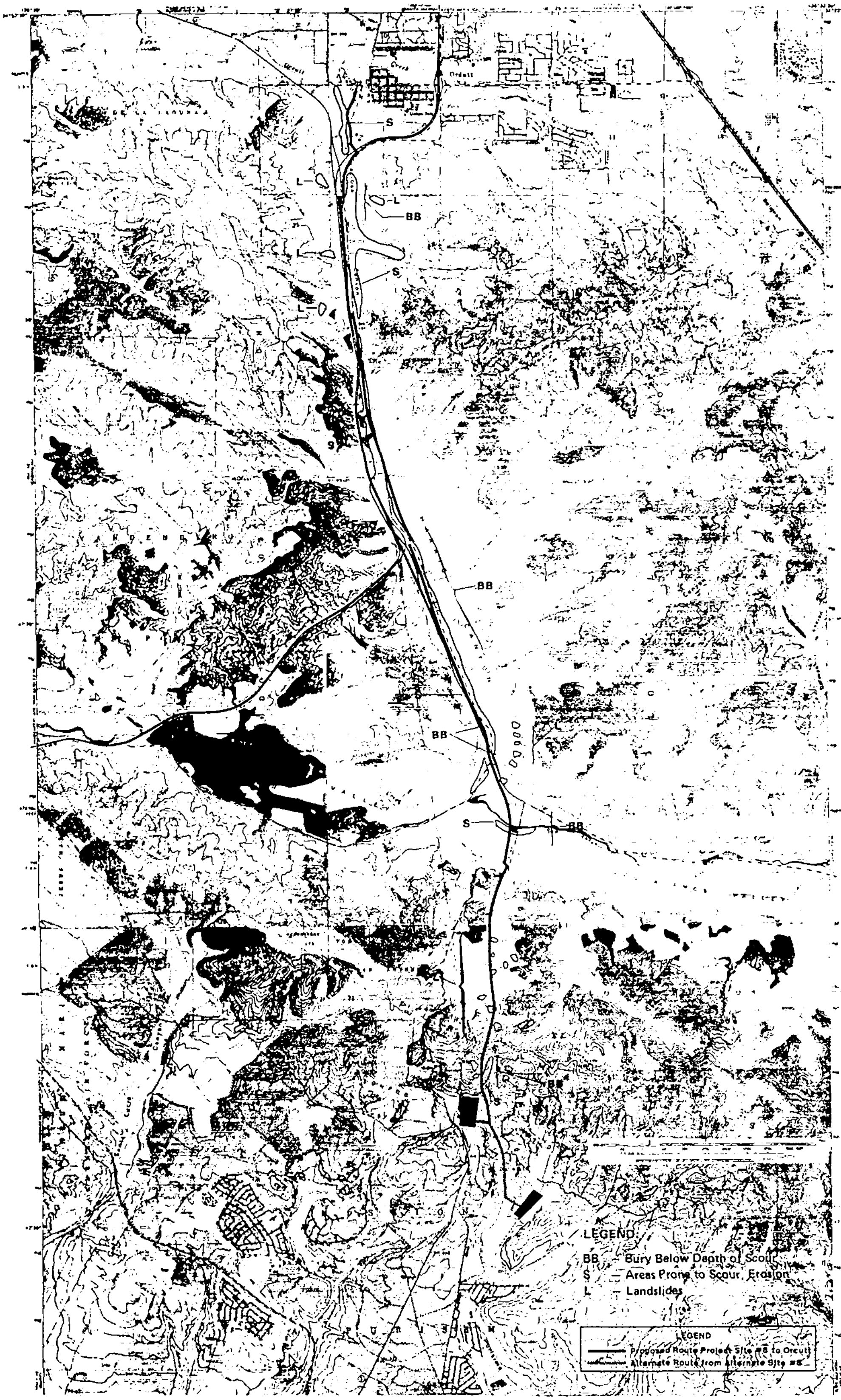

FIGURE 5.1-2

MITIGATION MEASURES FOR GEOLOGICAL CONSTRAINTS
IN THE PROJECT AREA FROM LANDFALL TO LOMPOC

Area Study Development Scenarios

Any pipeline corridor that traverse the Santa Ynez Mountains would have to be studied with regard to potential slope instability problems with particular attention given to formations such as the Rincon and Monterey, old landslides and stream crossings. This would include the same basic investigative techniques used for the project facilities. Mitigative measures would be similar to those described above for the projects.

Project Alternatives

Mitigation measures for the alternative alignments would be the same as those for project components discussed above.

Mitigating Realignment. This realignment introduces a potential additional constraint on pipeline design because it crosses the Lompoc Terrace and descends to the river plain in the vicinity of a number of old landslides, as noted above. This area is apparently prone to slides and could fail in the future. Additional field investigation should be performed to locate exactly existing slides and to develop an understanding of the mechanisms which have led to slides, so that these conditions could be accounted for in pipeline design.

5.1.3 Impacts on Geologic Environment

5.1.3.0 Impacts of Proposed Projects

This section addresses aspects of the projects which may affect the geologic setting during construction, installation, maintenance, and abandonment of the project components.

In general, the offshore construction/installation phase would have localized, short-term geologic impacts. The maintenance and development/production phases would have predominantly localized, long-term geologic impacts because of the long-term presence of the structures, though individual maintenance features would have short-term impacts. The period for abandonment of a platform and its disassemblage would be similar to that needed for installation, and impacts would be localized and short-term.

The specific impacts which are apt to be associated with platform construction and maintenance are as follows. Pile driving during platform installation might affect sediment stability in the immediate vicinity. Anchor scars from lay barges and buoy mooring would be created. Sediment disturbance and redistribution associated with all phases of the platform from installation through abandonment should be localized in area. All these potential impacts are considered marginally adverse but insignificant (Class III).

With respect to drilling operations, subsurface geologic pressure conditions in California and the Santa Barbara Channel region are normal or near normal [McCulloh, 1969; U.S. Geological Survey, 1974]. Numerous wells have already been drilled in the Point Conception area and Santa Ynez Unit, and no pressure conditions greatly exceeding normal have been noted. On the basis of these data, there does not appear to be a hazard of release of hydrocarbons from blowout or rupture of the capping rock. Impacts are Class III in significance.

An estimated 7,000 cubic feet of cuttings at Irene, and 15,000 cubic feet at Shamrock would be discharged from each of the wells to be drilled. Cuttings, sand and mud solids settling out of the water column downcurrent from the point of discharge form an areal plume and pile [Ray and Meek, 1980]. When subjected to cyclic loading, as from earthquakes, the pile may be prone to mass wasting. Should mass wasting of the discharge pile occur, impacts would be considered adverse but insignificant (Class III), because of the small volume and height of the pile.

During the production phase of Point Pedernales Field development, considerable quantities of fluids would be removed from the subsurface rock formations. Experience in other oil fields, for example, the Wilmington Oil Field near Long Beach, California, and the Ventura Oil Field, has shown that under certain circumstances oil and/or gas production can lead to surface subsidence. A comparison of the circumstances at the Wilmington Field with expected conditions in the Point Pedernales Field (see Technical Appendix A) suggests that subsidence in the Point Pedernales Field would not be a problem.

The impacts of offshore pipelines on the environment relate primarily to construction and installation, particularly air jetting and burial operations in water depths less than 60 meters (200 feet). As a whole, the combined geologic impacts of the offshore pipelines are adverse but insignificant (Class III).

Onshore, impacts are primarily associated with construction. Land clearing and trenching for pipeline installation would increase erosion and could lead to initiation of gullying. Of particular concern is trenching across oversteepened streambanks. Notching of such banks could create a preferred channel for runoff which could not be reconstructed to original conditions. (See Surface Water, Section 5.3.2 for additional discussion.) Potential impacts are rated as Class II. Construction could affect the stability of existing landslides, flows and slumps as discussed in Section 4.1.7. Impacts are considered Class II.

With regard to other project activities, maintenance activities would have minor impacts or possibly beneficial impacts (for example, if measures to control headward gully erosion are undertaken). Abandonment should not have an impact on the geologic environment if pipelines are abandoned in place. If the pipelines are removed, impacts would be similar to those described above for construction and installation.

Spills of fluids associated with project activities, including wet oil emulsion, dry oil, process fluids and miscellaneous fluids such as crankcase oil would impact the geologic environment as a result of infiltration of fluids into surface soils. Impacts are rated Class I because of the low likelihood of complete restoration of soils without destructive removal. See Section 5.3.2 for additional discussion of impacts on surface water, and 5.3.3 for impacts on groundwater. See also Technical Appendix C.

5.1.3.1 Impacts of Area Study Development

Area development should not result in any different impacts, but may add to those previously discussed. Most of these impacts are local and short-term. Two impacts may be more significant than others: subsidence caused by hydrocarbon withdrawal and topographic alteration of the seafloor. If the Point Pedernales Field is susceptible to ground subsidence from removal of hydrocarbons, additional wells producing from Area Study platforms would compound the problem. As discussed earlier, however, such subsidence is not expected to be severe and would be either arrestable or reversible by water flooding or reinjection. Impacts are considered potentially significant (because of lack of operational experience) but mitigable, Class II. Seafloor alterations such as anchor scars and cuttings piles would increase because of area development. These features do not significantly affect the geologic environment, and are considered Class III impacts.

As discussed in Section 5.1.2.3 pipelines traversing the Santa Ynez Mountains would have to be studied with regard to site-specific potential for slope instability and erosion. Impacts are considered potentially significant but mitigable (Class II). Expanded processing facilities could be accommodated at the proposed site.

5.1.3.2 Impacts of Project Alternatives

The alternatives are not expected to present any impacts to the geologic environment not already discussed in the foregoing discussion though the location of the impacts would change. For example, building a processing facility at Site 8 would require levels of construction similar to those at Site 4. Potential for destablization of slopes, old slides or oversteepened banks is somewhat different from route to route, with routes 2 and 4 crossing more major drainages, and crossing or passing close to more old slides than routes 1 and 3. For all alternatives, associated impacts are considered Class II. The no project alternative would avoid any impacts of the project or alternatives on the geologic environment.

5.1.3.3 Mitigation Measures for Impacts on the Geologic Environment

PROPOSED PROJECTS

Offshore project activities are considered to have Class III impacts. No mitigations are required.

Onshore, construction activities with the potential for destabilizing old slides or inducing erosion and gullying are considered Class II. Mitigation measures to reduce landslide-related impacts to insignificance are discussed in Section 5.1.2.4.

At locations where oversteepened stream banks are notched and could not be reconstructed and gullying could be induced, spanning of crossings would mitigate impacts to Class III. See Section 5.3.2.4 for additional discussion of erosion control measures at drainage crossings.

AREA STUDY DEVELOPMENT

The mitigation measures discussed or referred to above would also be applicable for any individual features of concern crossed by an Area Study pipeline, or identified at the selected site for expanded onshore facilities.

PROJECT ALTERNATIVES

Mitigations are in general as discussed for the project. Locations of particular concern, including recommended realignments are shown in Figure 5.1-1.

5.1.4 Paleontological Resources

5.1.4.0 Introduction

Any rock material that yields fossil material has the potential for yielding material that is unique. Invertebrate fossils (clams, snails, corals, diatoms) which are normally found in marine sediments, are generally widespread, abundant, fairly well preserved, and predictable as to various rock units and fossil localities. Therefore, the same or similar fossil can be located at a number of sites throughout Southern California. Some rock units such as the Monterey Formation or the Rincon Formation contain millions of microfossils. However, vertebrate fossils (horse, whale, camel, ground sloth), which are normally found in nonmarine sediments, are rare, sporadic, localized and are poorly preserved. Such sites, if destroyed without scientific excavation, are usually lost forever. The loss of these fossils represents a significant impact (Class II), mitigable by salvage operations.

Fossil sites normally are exposed only in cliffs, ledges, steep gullies or badlands where vertical profiles or strata are exposed. Additional vertebrate fossil sites may be discovered only when earth-moving projects unearth the fossil material.

5.1.4.1 Impacts of the Proposed Projects

The zone of disturbance considered here is the onshore pipeline corridor's maximum width of 100 feet. Within this corridor impacts to paleontological resources could result from excavating the three pipeline trenches which have an anticipated 2 to 3 feet width and buried depth of 3 to 5 feet, and which could be placed anywhere in the 100-foot corridor. The zone of potential disturbance at the Lompoc Dehydration Facility is defined as those portions of the facility where excavations for buildings would occur.

Table 4.1-3 lists the paleontological potential of the rock units in the Lompoc-Santa Maria area based upon currently available information. The list is predominantly based upon the discovery of vertebrate fossils. The proposed pipeline corridor, the Lompoc Dehydration Facility, and the additional proposed pipeline corridors do not intersect any known vertebrate fossil localities, though pipeline construction may unearth or reveal vertebrate fossil material.

The dehydration facility site is underlain by the Paso Robles Formation. Some small exposures of Careaga Formation also occur in the area. Neither of these rock units are known to contain vertebrate fossils. If vertebrate fossils are discovered during construction, salvage operations would mitigate the impact.

The proposed onshore pipeline corridor from landfall to Lompoc crosses recent alluvium, stream terrace deposits, Orcutt Sand and the Plio-Pleistocene Paso Robles Formation. Most of the corridor transects cohesionless deposits of sand, silty sands and sandy silts that are too young to contain fossiliferous material. The highest probability of any fossil discoveries would occur in the stream terrace deposits. These deposits may yield mastodon, mammoth, camel, horse and/or ground sloth.

The Lompoc-Orcutt corridor parallels an existing pipeline corridor. Sisquoc Formation in the Purisima Hills contains diatomites and diatomaceous mudstone and has yielded some pinniped and porpoise material. Removal of microfossils would be considered a Class III impact. Destruction of vertebrate material would be considered Class II, mitigable by salvage. From San Antonio Canyon to the Orcutt Pump Station, the valley floor is confined to Quaternary alluvium, stream terrace deposits and Orcutt Sand. Once again, if the pipeline follows the highway, it would only cross cohesionless deposits of sands, silts and silty muds, many of which have been excavated, reworked or cultivated. Fossil material would probably not be found. If the pipeline crosses stream terrace deposits, a possibility exists of discovering fossil material. This impact would be Class II, mitigable by salvage operations.

No excavation is planned at the Santa Maria Refinery or Battles Gas Plant. No impacts are expected. At Surf, dunes sands have very low potential for containing fossis, and impacts are not expected.

5.1.4.2 Impacts of Area Study Development

Geologic formations can be distinguished on the basis of their relative likelihood of yielding unique fossil material. (See Table 4.1-3 and Figure 4.1-5) Formations capable of yielding unique material occur in the Area Study triangle and would be crossed by a pipeline. The extent of potential impact would be dependent on the exact routing of a pipeline. In general, drainage crossings are of greatest concern, because of the presence of stream terrace deposits, which have yielded unique material in the past. Stream terrace deposits also occur at the base of the Purisima Hills and Santa Rita Hills, and in a few isolated locations south of the Santa Ynez River.

Impacts at any of the possible sites for an expanded onshore facility would be similar to those for the proposed project.

5.1.4.3 Impacts of Project Alternatives

All of the alternative pipeline alignments cross an exposure of Quaternary terrace deposits between Santa Lucia Canyon and Highway 1, which is not crossed by the preferred alignment. There is, therefore, a somewhat increased likelihood for impacts on paleontological resources for these routes when compared to the preferred route. Impacts at Site 8 are unlikely as for Site 4.

5.1.4.4 Mitigation Measures for Impacts on Paleontological Resources

Basic scientific data required for an evaluation of significance and uniqueness of paleontological material should be obtainable through a salvage operation or data recovery program. A program should be designed to record, test and obtain reliable paleontological specimens. Assessment of the value and uniqueness of material should be pursued by a competent research team.

The measures described above should be taken whenever paleontological material is unearthed during construction activities associated with the pipelines, Lompoc dehydration facility, area development facilities or project alternatives.

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5.2 AIR QUALITY/METEOROLOGY

5.2.1 Introduction/Methodology

The anticipated air emissions from the proposed projects were modeled to estimate the net changes in ambient-air concentrations resulting from construction and operation of the facilities. To estimate the contribution of each individual project to the air quality changes for the region, a project-by-project approach was undertaken, and for each project the contribution to ambient-air quality changes was evaluated. However, the interdependencies of several of the projects must be recognized. The analysis for the Exxon project presumes that Union's platform will be installed. Similarly, the Area Study of the Central Santa Maria Basin buildout includes the Union and Exxon platforms along with four additional platforms. The onshore dehydration facility at Lompoc would serve the Union offshore development. The additional onshore oil and gas processing facility under the Area Study scenario would be common to the offshore development, but the throughput would vary depending on assumptions about the Area Study.

5.2.1.0 Cases and Scenarios Evaluated

The scenarios that were analyzed to estimate the net changes in air quality include:

- A present baseline that characterizes the air quality without any of the proposed projects,
- A future baseline that adjusts the ambient-air quality to include future emission changes that are not related to the proposed projects,
- Incremental concentrations resulting from the offshore and onshore components of the proposed Union project,
- Incremental concentrations resulting from the proposed Exxon project, and
- Incremental concentrations resulting from the four additional platforms, a new onshore gas processing facility, and an expanded oil dehydration facility as part of the Area Study.

For each of the proposed projects, the ambient-air concentrations due to construction, drilling and production, under normal and upset conditions were evaluated as were the effects of mitigation measures. Emission scenarios that addressed short-term peak operations as well as annual average scenarios that dealt with typical operations were developed. The maximum concentration impacts, both short-term and annual averages, of both the inert and the reactive photochemical pollutants are addressed in this section.

5.2.1.1 Significance Criteria

The significance criteria that were used in the air quality analysis were based on definitions in DOI, EPA, ARB and Santa Barbara County APCD regulations. The criteria derived from these regulations were applied to the more general requirements of NEPA and CEQA and are described as follows:

- The incremental pollutant concentrations from the proposed projects were compared to federal and Santa Barbara County Prevention of Significant Determination (PSD) levels. If the increments for the facilities exceed the federal or County PSD levels, or are at least 50 percent of the allowed levels, the source would be significant.
- If a total concentration (incremental from the project plus the background) exceeds a state or federal standard, the project impact would be considered significant.
- For a nonattainment pollutant, such as ozone, if the project emissions contribute to additional exceedances of the standards or if they interfere with progress toward achieving attainment by causing the levels that already exceed the standards to be higher, the impact would be considered significant.

5.2.1.2 Air Quality Models and Key Inputs

To fully characterize the air quality impacts of the proposed project and related development which will have air quality impacts, several models were utilized. This section provides summary descriptions of each model, the justification for its use, and the nature of the key meteorological and emission inventory inputs used with each model. Collectively, these model runs address air quality impacts from both inert and photochemical pollutant emissions. Full details and complete descriptions of the models and inputs can be found in the Air Quality Technical Appendix B.

<u>INERT POLLUTANTS</u>

The air quality impacts of the non-reactive, or inert pollutants (Nitrogen dioxide, carbon monoxide, sulfur dioxide, and total suspended particulate matter) were estimated using three models: PTMOCS, CDMOCS, and MPTER. The PTMOCS model (Point Source Model for Overwater and Complex Terrain Settings) and the CDMOCS model (Climatological Dispersion Model for Overwater and Complex Terrain Settings) are modified versions of the EPA-approved models PTMTP and CDM, respectively. PTMOCS and CDMOCS were used to estimate peak short-term and long-term average impacts to satisfy ARB and APCD regulations, and MPTER was used to estimate short-term and long-term average impacts of the offshore platforms to satisfy DOI regulations.

PTMOCS is used to estimate hourly ground level concentrations from point source (stack) emissions at both onshore and offshore locations. Unlike the base models, PTMTP and CDM, both modified models include the treatment complex terrain, and offshore versus onshore variations in atmospheric stability. Because PTMOCS treats plume dispersion according to specific hourly meteorological impacts, this model also contains modifications to account for short-term dispersion conditions, e.g., buoyancy-induced dispersion, shoreline fumigation, and reduced overwater dispersion.

By contrast, CDMOCS uses a long-term average formulation of the short-term Gaussian dispersion algorithm found in PTMOCS. The use of both modified models is considered acceptable by the California Air Resources Board and Santa Barbara County Air Pollution Control District.

The PTMOCS model was used to estimate short-term maximum air quality impacts for each of the four inert pollutants. The estimations included modeling emissions for the following cases:

- The maximum production rates of Platform Irene (20 MB Doil and 13 MMcfd gas)
- The maximum production rate of the Shamrock Platform (20 MBD oil)
- The onshore oil dehydration facility in Lompoc at rated capacity, the pump station at Orcutt, additional processing at the Battles Gas Plant (13 MMcfd gas), the Santa Maria Refinery (20 MB/D oil), and associated pipelines
- Equivalent throughput and emissions at the alternative onshore facility site at Lompoc
- Transport of Exxon oil to Platform Hermosa
- The maximum production rates of the Area Study platforms including the two project platforms and maximum design capacity at an expanded processing facility at Lompoc (100 MB/D oil and 80 MMcfd gas) along with associated pipelines
- The maximum construction emissions for each of the first three cases above
- Upset conditions causing unusually high platform or onshore plant emissions

Peak platform production generally occurs before all development wells are drilled on the platforms. Thus, the nominal year chosen to reflect maximum platform production may occur during the "drilling" phase, rather than the "production" phase of a platform's presumed activity schedule.

Realistic worst-case meteorological conditions were used with each of the emission scenarios listed above. In particular, several wind directions were selected for each scenario, each direction representing a reasonable path over the emission sources and toward the grid of receptors. Generally, the directions were chosen to include the maximum number of emission sources in a given air parcel. Details on the selected wind directions and receptor locations are contained in Appendix B. Meteorological parameters were chosen that correspond to conditions related to the greatest impacts from the projects; this includes stable atmospheric conditions and low wind speeds. Thus the estimates obtained are representative of maximum air quality impacts under realistic "worst-case" meteorological and emissions conditions.

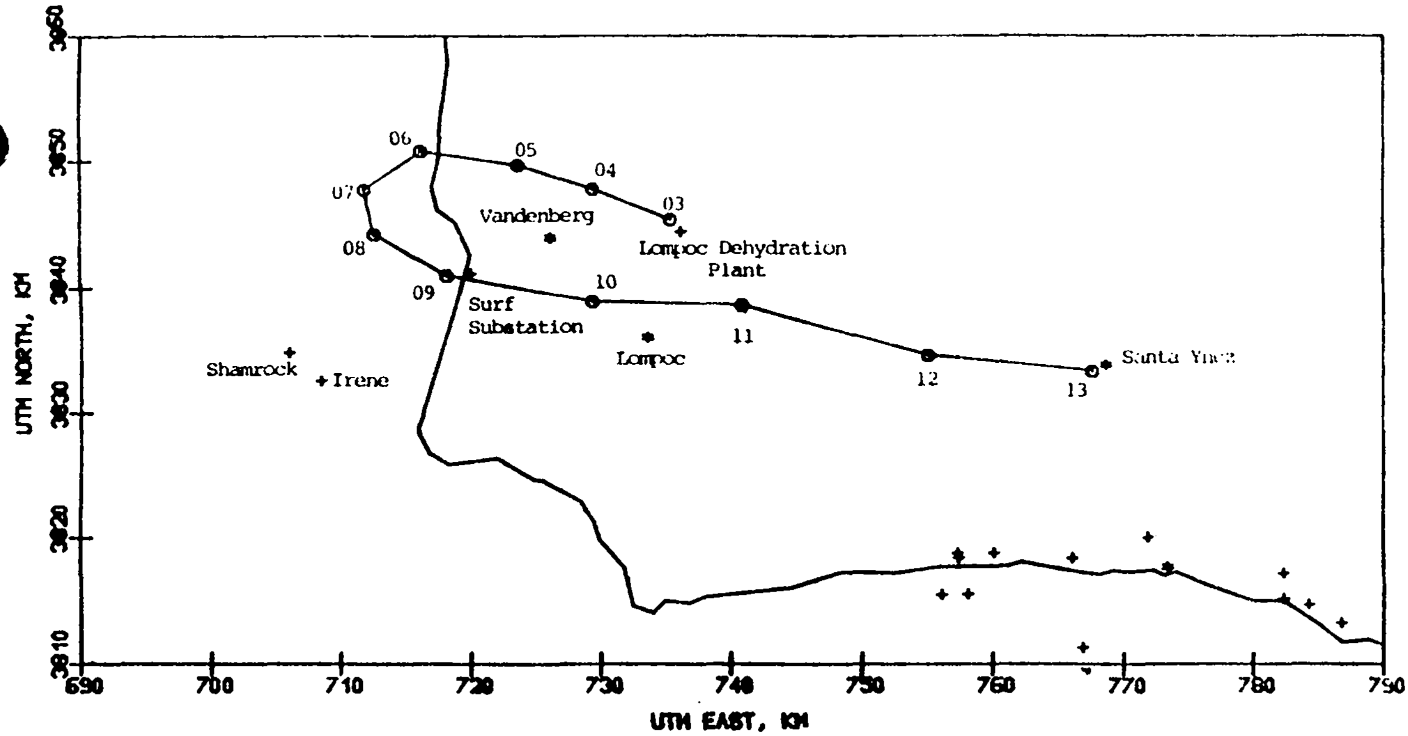
The CDMOCS model was used to evaluate long-term (i.e., annual) average impacts of the project emission sources. For this purpose, annual-average joint-frequency tables of wind speed, wind direction, and stability (commonly called a STAR tabulation) were input to the model with emissions inventories corresponding to total annual emissions from the project sources at their individual and aggregate peak production and throughput year. These annual average STAR data were derived from observations taken at Vandenberg AFB to represent overwater meteorological regimes.

The third model used for modeling inert pollutant impacts is MPTER. This model was applied specifically to evaluate maximum shoreline impacts of the six Area Study platforms including the two project platforms. This evaluation is necessary to satisfy Department of Interior (DOI) OCS air regulations, applicable to offshore developments 3 miles or more from the shoreline. MPTER can predict both annual average and maximum short-term concentrations from emission sources, because it uses a year-long sequence of hourly meteorological observations. The use of MPTER for this evaluation was approved by the Minerals Management Service. The hourly sequential meteorological data which was obtained from Vandenberg AFB along with the corresponding twice a day mixing height data was considered the most appropriate complete set of data for use in MPTER. All six platforms (two for the proposed projects plus four Area Study platforms) in their aggregate peak construction and production years were utilized in the MPTER modeling, and the emissions inventories reflect total annual emissions from all six platforms in their aggregate peak production year.

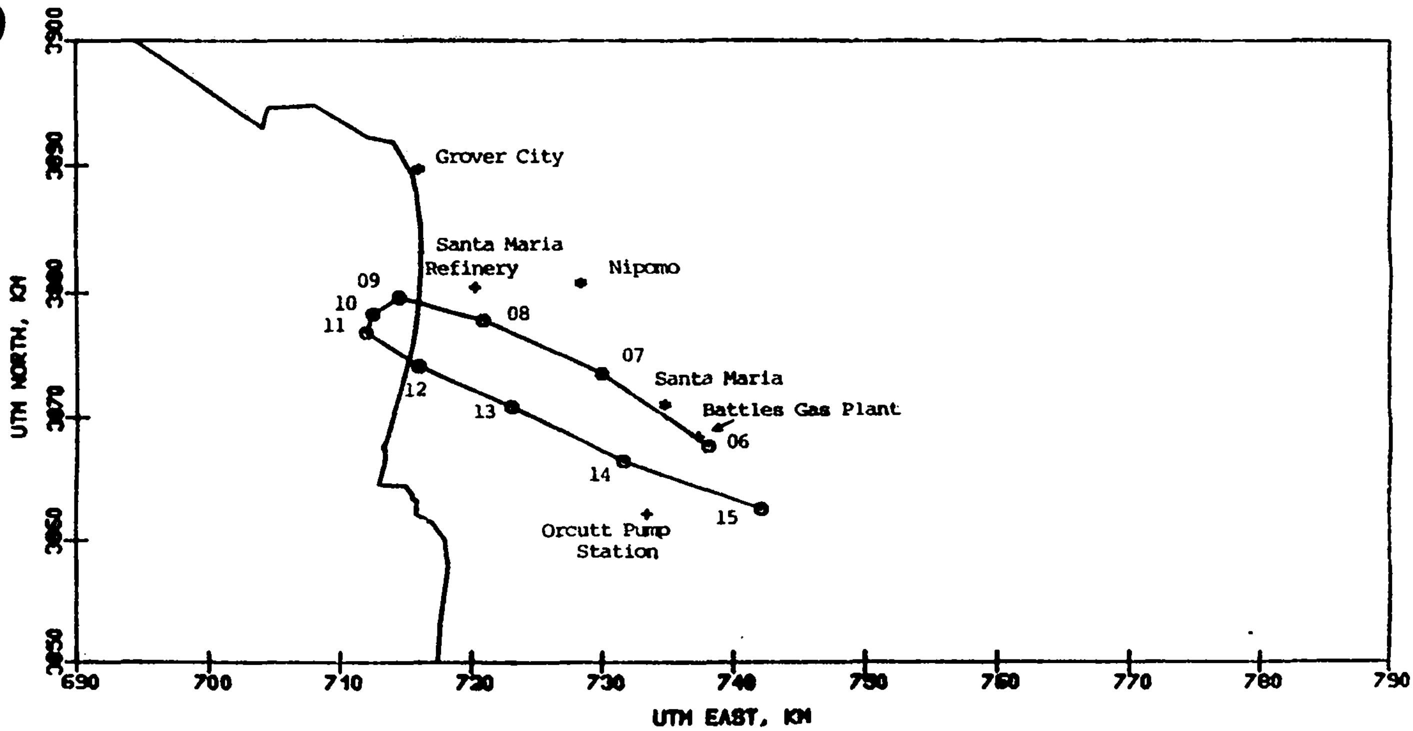
PHOTOCHEMICAL POLLUTANTS

The TRACE Model (Trajectory Model for Regional Atmospheric Chemistry and Emissions) was used to estimate the effects of the project and Area Study sources upon ambient ozone concentrations. Wind trajectories in TRACE are simulated by moving a vertical "wall" of rectangular cells across the region, according to observed wind direction, wind speed, and other meteorological parameters. For these runs, TRACE uses a wall seven cells across by five cells high, which corresponds to a trajectory "width" of 8 kilometers and a variable "height."

Eight basic trajectories were developed for evaluating photochemical pollutant impacts. Appendix B outlines the method used and detailed descriptions of each trajectory. The trajectories were designed to evaluate specific source/receptor relationships among the project sources, Area Study sources, other existing and anticipated regional sources, and fixed receptor grids. The trajectories are summarized below, and are shown on Figures 5.2-1 through 5.2-4. For each of these trajectories, a specific set of meteorological parameters and initial pollutant concentrations was established



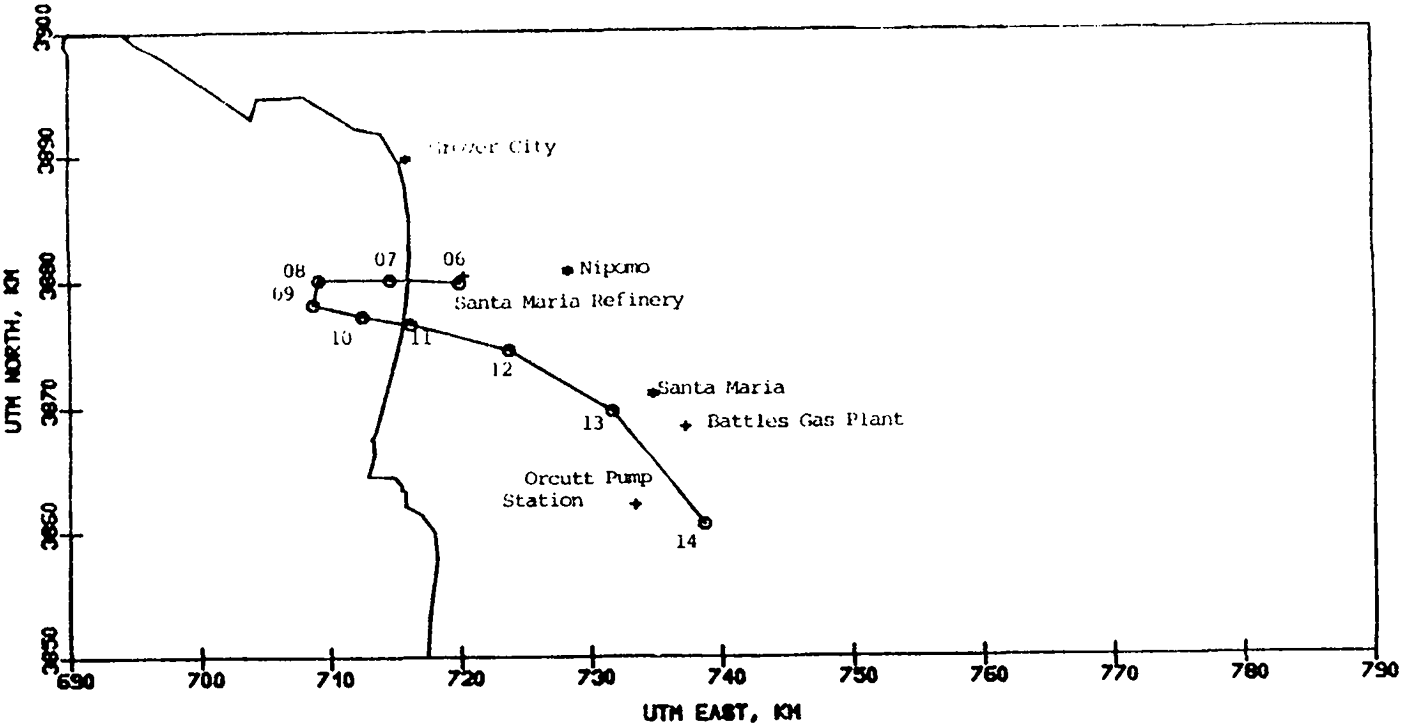
TRAJECTORY 1 - 07/06/82



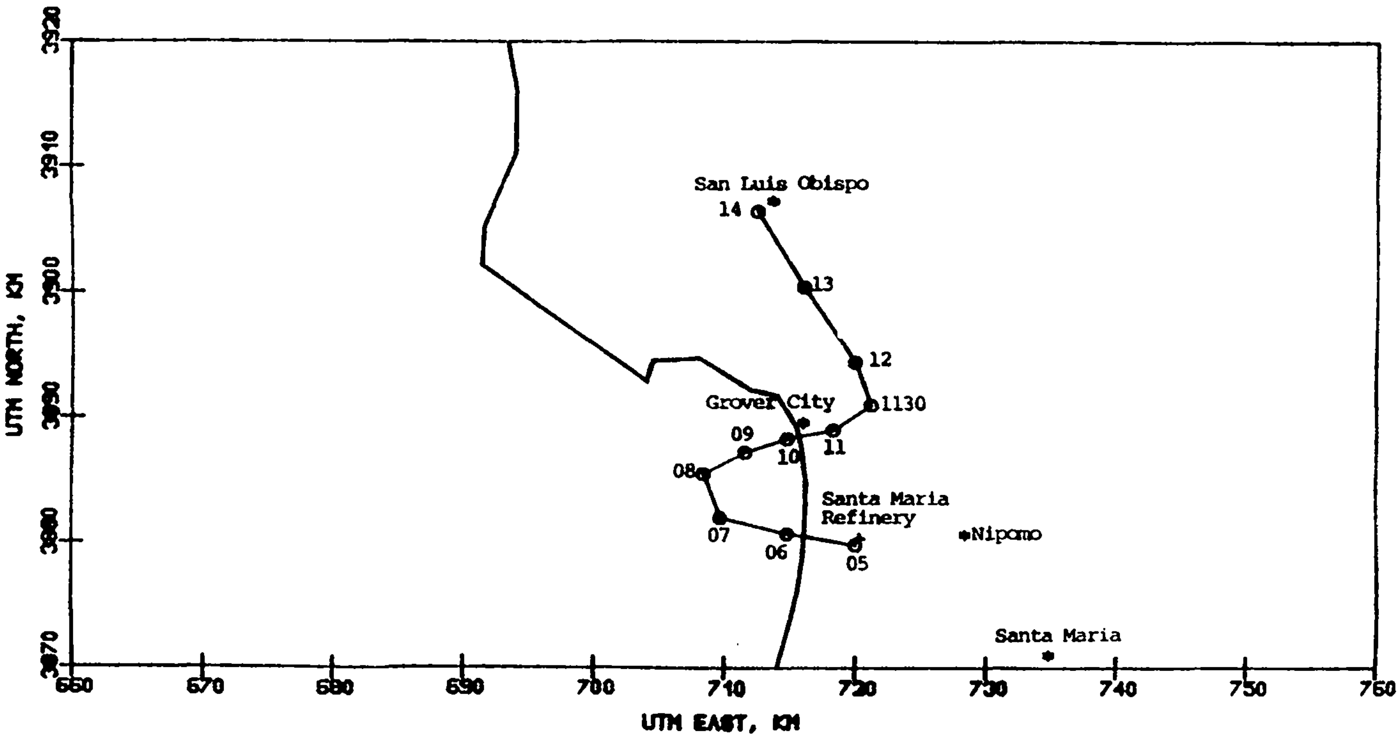
TRAJECTORY 2 - 04/20/82

Figure 5.2-1 PLOTS OF TRAJECTORIES 1 and 2

Arthur D. Little, Inc.

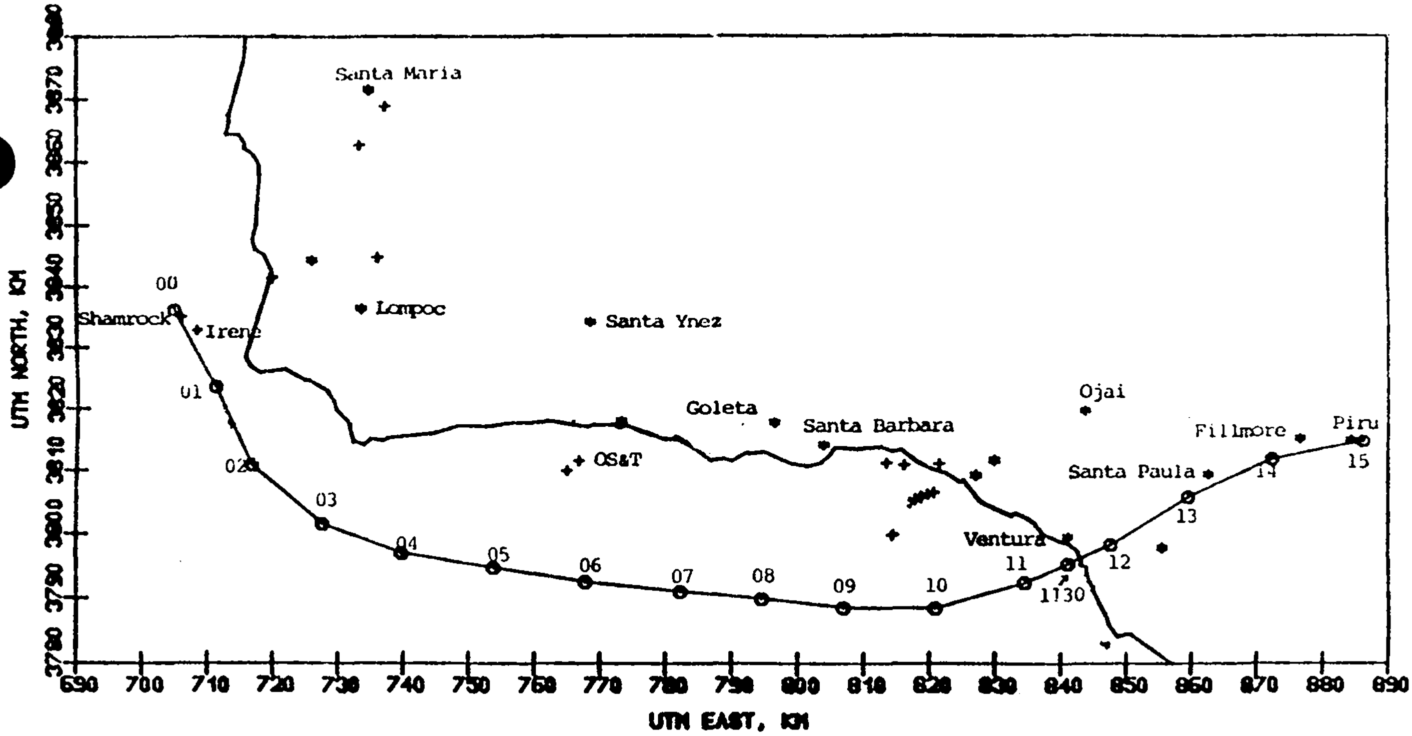


TRAJECTORY 3 - 10/28/83

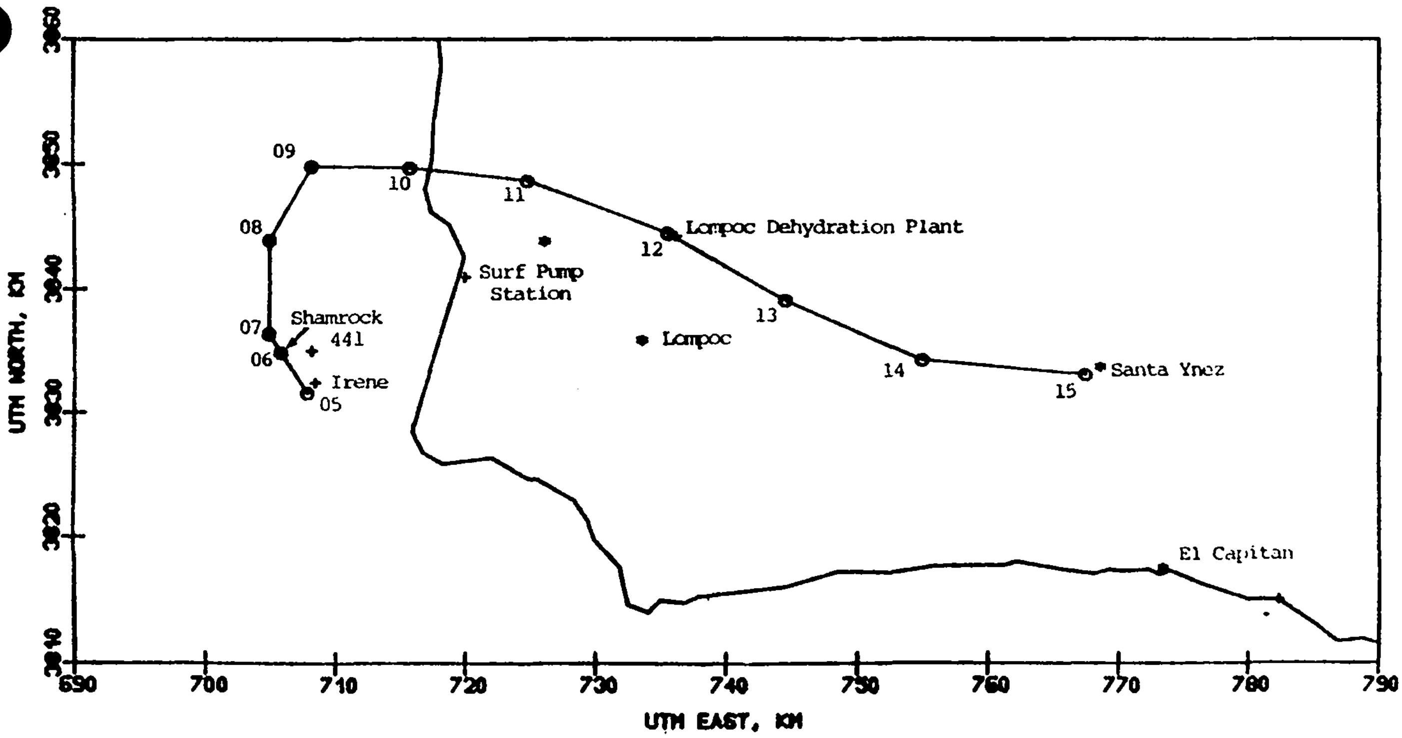


TRAJECTORY 4 - 09/09/84

Figure 5.2-2 PLOTS OF TRAJECTORIES 3 and 4

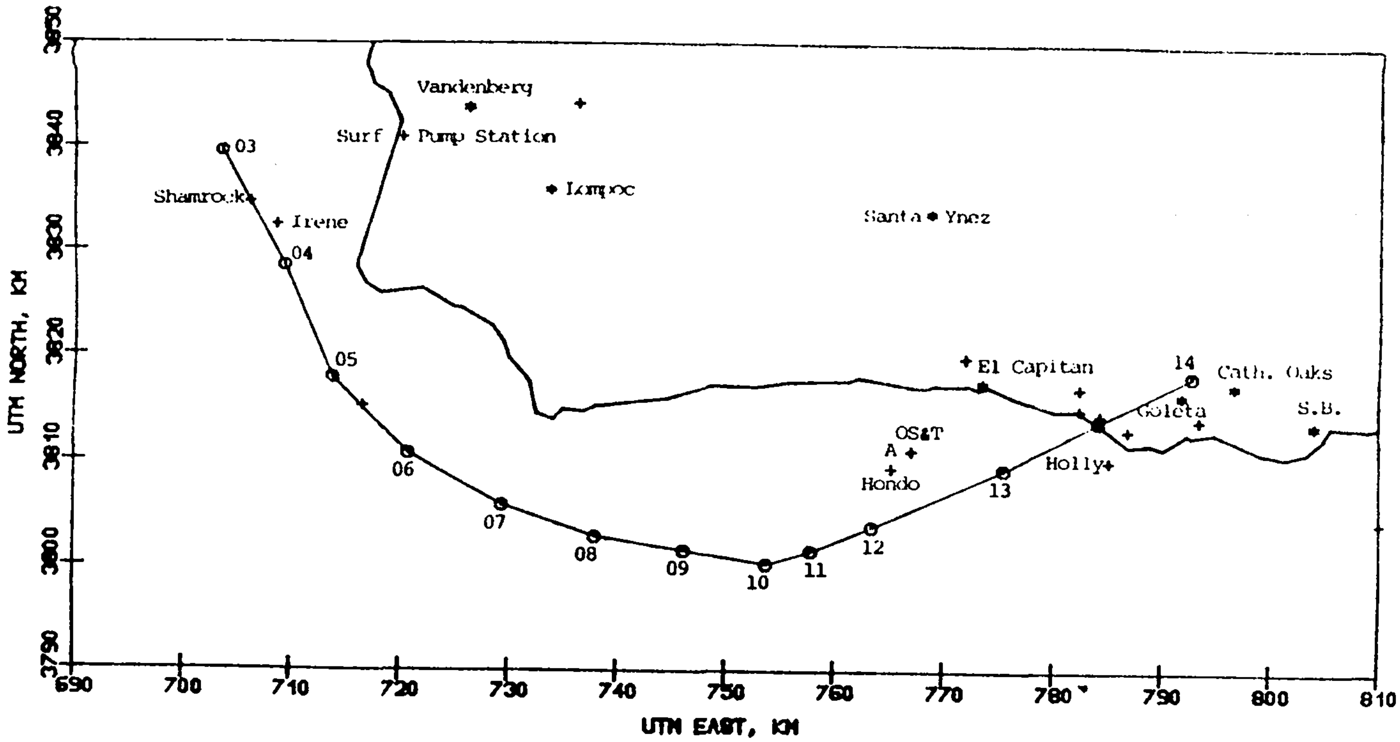


TRAJECTORY 5 - 09/11/82

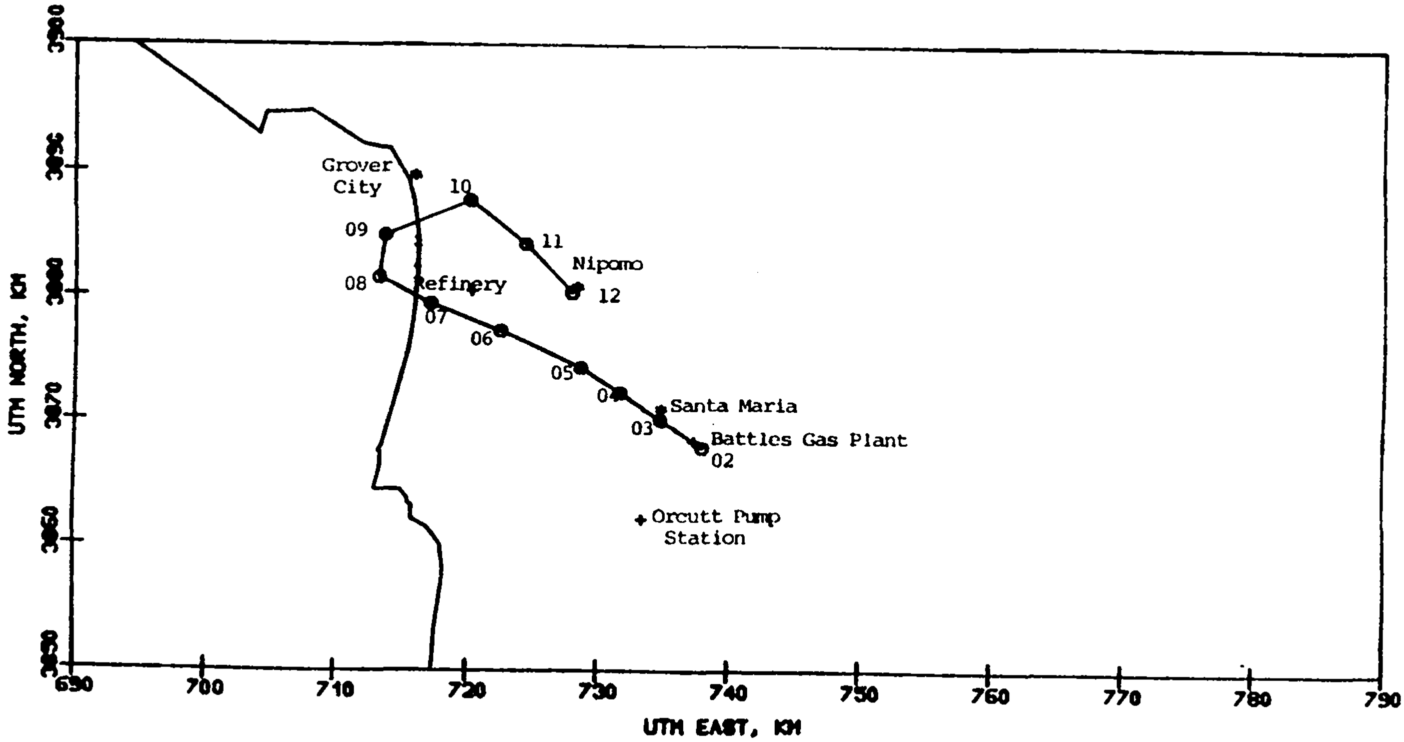


TRAJECTORY 6 - 5/25/82

Figure 5.2-3 PLOTS OF TRAJECTORIES 5 and 6



TRAJECTORY 7 - 09/17/81



TRAJECTORY 8 - 9/12/83

Figure 5.2-4 PLOTS OF TRAJECTORIES 7 and 8

based on observed data. The initial pollutant concentrations that were used in each trajectory are described in detail in Appendix B. The combinations of these trajectories and initial conditions allow a range of concentrations to be predicted at key locations for the region.

Trajectory 1, which corresponds to conditions occurring on July 6, 1982, was used to determine the impacts of the Lompoc Oil Dehydration Facility. This trajectory begins at the dehydration plant north of Lompoc at 0400 PST and is carried toward the coastline by the early morning drainage winds. The air parcel crosses north of Vandenberg AFB at 0700, drifting to the southwest. Onshore sea breeze winds begin at about 0800, carrying the parcel through the Santa Ynez Valley, reaching the Lompoc vicinity at 1000 and its final destination, Santa Ynez, at 1900.

This trajectory is a typically summertime pattern, although wind speeds on the case day selected were somewhat lower than on the average summer day. Similar trajectories during cooler months would find the sea breeze beginning several hours later, but the overall path would be similar. The ambient air quality conditions which characterized Trajectory 1 are less common than its meteorology, however. Ozone concentrations comparable to those which occurred on the case day are observed several days per month, on the average, at the Santa Ynez monitor in summer. It is likely that atmospheric conditions on other high-ozone days resemble those which occurred on this day. Thus, it appears that conditions similar to those assumed for Trajectory 1 occur at least several times per summer.

Trajectory 2 is designed to study the impacts of the Battles Gas Plant, the Santa Maria Refinery and the Orcutt Pump Station. This trajectory corresponds to conditions occurring on April 20, 1982. It originates at the Battles Gas Plant, east of Santa Maria, at 0600 PST, and is carried to the northwest through the Santa Maria River Valley by the morning drainage winds. At 0900, when the parcel is offshore to the west of the Santa Maria Refinery, onshore sea breeze winds begin. For the next four hours, the parcel moves to the southeast, reaching the Orcutt vicinity at 1400 PST.

Most summer days in the Santa Maria area are characterized by strong sea breeze winds; this results in generally low ozone concentrations (maximum 1 hour values are typically 4-7 pphm). During the day selected for modeling, onshore winds were lighter than normal, and background pollutant concentrations were higher than normal. The result was unusually high ozone levels throughout the Santa Maria area and southern San Luis Obispo County. An examination of air quality data for the area indicates a frequency of occurrence of such conditions of about 1-3 time per year, on the average. The highest frequency of occurrence appears to be April-May and September-October, when sea breeze wind velocities and mixing depths are lower than in summertime.

Trajectory 3 was developed to evaluate the impacts principally from the refinery. This trajectory, reflecting conditions on October 20, 1983, was also characterized by morning drainage winds followed by sea breeze conditions. The trajectory originates at the Santa Maria Refinery at 0600 PST, moves offshore, begins moving onshore at 0900, and reaches Orcutt at 1400.

This trajectory greatly resembles Trajectory 2, and occurs during similar meteorological conditions. The comments above apply to this case as well. Expected frequency of occurrence is one to three times per year.

Trajectory 4 was developed to study refinery impacts on the San Luis Obispo area. Meteorological conditions for September 9, 1984, indicate a trajectory in which the air parcel passes over the refinery at 0500 PST, moves offshore, and is then carried northeastward into San Luis Obispo County, reaching Grover City at 1030, Arroyo Grande at 1120, and San Luis Obispo at 1400.

The atmospheric conditions which occurred on September 9 are quite rare. This day was characterized by large-scale easterly flow throughout Southern California, bringing polluted air into the study area from the vicinity of the South Coast Air Basin. In addition, this day occurred during the memorable (and unusual) heat waves of September 1984. The result was the highest ozone concentrations observed in San Luis Obispo County in several years. Although the trajectory chosen occurs fairly frequently, the background air quality conditions are rare; thus, conditions such as those modeled probably occur only about once every three to five years.

Trajectory 5 was developed to study the impacts of the platform emissions on Ventura County. The long trajectory pathway begins with a moderately high wind speed northwest of Platforms Shamrock and Irene. Air parcels follow a southwestward direction into Santa Barbara Channel, reaching the Ventura coastline at 1230 PST. The parcels are then entrained in flow up the Santa Clara River Valley, reaching Piru at 1600 PST. Meteorological conditions related to this trajectory occurred on September 11, 1982.

This trajectory is a common one throughout the year. Northwest winds are the prevailing conditions in the Point Arguello - Santa Barbara Channel areas, occurring virtually every day in summer and very frequently in other seasons as well. Furthermore, ozone concentrations comparable to those measured on this day are common in Ventura County. Thus, it can be assumed that the conditions modeled occur with a high degree of frequency -- at least once per week in summer.

Meteorological conditions occurring on May 25, 1982, were utilized to develop Trajectory 6, for determining the project impacts on the Santa Ynez region. This trajectory corresponds to the "breakdown phase" of Santa Ana winds. Initially, southeasterly winds bring moderately pollutant-laden air over Platform Irene at 0500 PST, moving slowly northward until 0900, when the sea breeze begins moving it shoreward. The air parcel passes south of the proposed oil dehydration plant in Lompoc at 1200 PST and reaches Santa Ynez at 1400 PST.

Winds from east through south are fairly common in the Santa Barbara Channel. "Santa Ana" wind conditions also occur frequently in the area, most frequently in spring and fall months. At the Point Sal buoy, for example, winds from the south through east and less than 3 meters per second occur during 6 percent of all hours during the year. At the Point Conception buoy, the comparable figure is 4 percent, high wind conditions are even more common

[Mineral Management Service buoy data for buoys 46011 and 46023, 1980-1984 and 1982-1984, respectively]. Conditions comparable to those modeled here probably occur 5-10 times per year in the Study Area.

Trajectory 7 is designed to study the impacts of the platform emissions on the Goleta/Santa Barbara area. This trajectory, which occurred on September 17, 1981, passes over Shamrock, moves to the southeast, rounding Point Conception and turning eastward in Santa Barbara Channel, and finally reaches Goleta/ Santa Barbara at 1500 PST.

Although this trajectory closely resembles Trajectory 5, it occurs less frequently. A typical path for air parcels originating near Point Pedernales is southeastward, into the Santa Barbara Channel, and then parallel to the Channel toward Ventura County. A less common path follows the shoreline and reaches the Santa Barbara area. Such conditions (the combined path and background air quality) probably occur a few times per month in summer in the area.

The final basic trajectory (Trajectory 8) was designed to determine the impacts of the Battles Gas Plant and the refinery on the border region between Santa Barbara and San Luis Obispo Counties. The trajectory begins with the air parcel passing over the Battles Gas Plant at 0200 PST, passing just south of the Refinery at 0630, moving offshore toward Pismo Beach and then being carried inland by the sea breeze winds. The parcel reaches the Nipomo monitor at 1200 PST. Conditions related to this trajectory occurred on September 12, 1983.

All eight trajectories were calibrated to actual ambient observations by using emissions and meteorological data that were recorded for the specific days identified above. Because the trajectories were developed based on actual meteorological and air quality observations for given days, it can be assumed that they will occur again in the future. The expected frequency for each trajectory was described above. The TRACE model predicted values that were close to the observed levels in the baseline calibrations. Therefore, a reasonable confidence can be assumed when predicting impacts of the proposed projects. In the calibration runs, the predicted level was considered acceptable if the difference between the predicted value and the observed level at the time of closest approach to the monitoring station was less than 0.005 ppm, or if the maximum and minimum predicted values bracketed the monitored concentrations. Details of the calibration runs are given in Appendix B. Background levels (initial conditions) of reactive hydrocarbons, NO_x, and O_3 are also described in Appendix B.

5.2.1.3 Project Emissions Estimates

An important task in the analysis of air quality impacts is the development of emission scenarios for modeling the impacts. The emission rates, durations and likelihoods of simultaneous occurrence of all identified sources are the prime variables in developing emission scenarios. The development of emission scenarios began with a careful review of the inventory of equipment, both offshore and onshore, as proposed by the project applicants. The list of scenarios was reviewed with the Santa Barbara and San Luis Obispo APCDs and MMS and was compared with similar facilities to assure that it was substantially complete.

The project source emission rates under various operating conditions were obtained from the applicants and were checked for accuracy and consistency with independent sources. Several of the rates were revised and updated based on additional information.

Representative schedules for the operation of the equipment were developed based on the expected schedules for installation, drilling and production of the offshore platforms and construction and operations of the onshore processing facilities. These schedules provide the basis for selecting reasonably likely worst-case emission scenarios to be coupled with appropriately selected meteorological conditions for air quality calculations.

Maximum 1 hour emission rates for each of the phases that were described earlier in Section 5.2, were calculated for the simultaneously operating sources. These worst-case emission scenarios were based on maximum operations. For upset conditions, such as control or process equipment failure, separate emissions were calculated as input to specific upset condition model runs of impacts that are considered significant, the expected frequency of occurrence is analyzed in the modeling results section (Section 5.2.2). For impacts that were considered significant, the expected frequency of occurrence was analyzed in the modeling results section (Section 5.2.2). Based on information in the Project Description, it was determined that peak construction emissions would occur in 1986. It was also determined that peak production emissions would occur in 1989/90. Detailed short-term average emission rates for all of the scenarios are given in Appendix B.

Emissions were also estimated for upset conditions. These scenarios include the most likely device failures that can occur offshore and at the onshore facilities such as the failure of the electrical compressors and the failure of the sulfur recovery plant with subsequent incineration of the H_2S gas stream. Because each upset condition may be different and unique, details of the upset scenarios are given in Appendix B. Separate emissions were calculated as input to specific upset condition model runs and are also presented in the Appendix.

Annual average emissions from the proposed projects were estimated by multiplying the short-term emission rate of each device by the fraction of time in a year that it will be operating. Tables of the annual emissions are shown in the Project Description and are described in detail in Appendix B.

In the photochemical modeling, the TRACE model was calibrated for each of the eight basic trajectories. This effort required estimating the emission inputs that existed for each hour of the day of the actual trajectory. In the impact modeling runs of TRACE, hourly estimates of emissions were made for the future baseline and the proposed project operations.

5.2.2 Modeling Results

5.2.2.0 Inert Pollutants

The maximum 1 hour concentrations of the inert pollutants resulting from emissions at onshore and offshore facilities were calculated using the PTMOCS model. These levels were then converted to multi-hour averages by using a power law relationship to account for the increased meander of wind direction over longer time averages. Adjustments for extended time averages are exceedingly complex and the power law correction factors may be considered as conservative upper estimates based upon general experience with point sources. The NO_2 concentrations were estimated by applying the Ozone Limiting Method to the predicted NO_x levels.

The statistical accuracy of the short-term model PTMOCS predictions cannot readily be estimated. This would require a detailed analysis of "observed versus predicted concentrations" for the site being considered under a variety of conditions. To accomplish this would require an extensive meteorological and pollutant or tracer monitoring program. However, it can be assumed that the use of the PTMOCS model which utilizes the same algorithm for irregular terrain as EPA's model Complex II would result in conservative worst case model predictions that are consistent with the EPA Guidelines.

Two types of scenarios were examined in the PTMOCS model runs. One was based on the maximum construction/installation related emissions and the other was based on the maximum drilling/production emissions. Under the construction scenario peak short-term (1 hour to 24-hour) emissions were calculated for the installation of Platform Irene, the installation of Platform Shamrock, the construction of offshore and onshore pipelines, and the construction of facilities at Surf, Lompoc, and Orcutt. Modifications to the Santa Maria Refinery would not result in significant construction emissions. Details of the construction scenarios are given in Appendix B. During construction the maximum impacts would occur as a result of activities at each of the above mentioned individual sites with little or no contribution from emissions at the other sites. This occurs because of the large distances between the individual sites with little chance for overlapping impacts on land. Table 5.2-1 summarizes the results of the PTMOCS model runs for the construction activities. The table shows that for construction emissions the California 1 hour NO_2 standard is predicted to be exceeded during installation of the offshore pipeline. The maximum occurs onland due to emissions from the lay barge when it is near the shore. Based on Vandenberg AFB meteorological data, wind conditions related to the peak concentration may occur up to 2 percent of the time. The TSP 24-hour standard is predicted to be exceeded as a result of construction of the onshore facilities at Orcutt and Lompoc. The high levels on land are due to fugitive dust emissions during clearing and grading at the sites.

The second scenario that was modeled was based on the maximum drilling/production emissions. Tables 5.2-2 and 5.2-3 summarize the results. In the case of drilling/production, there are no overlapping contributions of inert pollutants from the combined projects at the maximum receptors. Thus, the maximum concentrations reported in the table are due to emissions from

Table 5.2-1

SUMMARY OF WORST CASE AMBIENT CONCENTRATIONS DURING CONSTRUCTION
(ug/m^3)

	Pollutant														
	NO_2		SO_2						CO				TSP	
	Contribution	1-Hour Total	Contribution	1-Hour Total	Contribution	3-Hour Total	Contribution	24-Hour Total	Contribution	1-Hour Total	Contribution	8-Hour Total	Contribution	24-Hour Total
Construction at Irene	275	313	53	157	39	115	21	47	160	15,045	88	5,578	26	191
Construction at Shamrock	282	320	58	162	23	49	23	49	186	15,071	102	5,592	31	196
Construction of Offshore Pipeline	527	565[1]	231	335	92	118	92	118	938	15,312	516	6,006	91	256
Construction of Onshore Pipeline	258	296	46	280	34	205	19	61	384	15,200	211	5,700	188	448
Construction at Lompoc	217	255	16	120	12	88	7	33	225	15,110	124	5,614	438	603[2]
Construction at Orcutt	217	255	17	251	12	183	7	49	563	15,448	310	5,800	91	351
Construction at Surf	361	399	112	216	82	158	48	74	514	15,399	283	5,773	77	242
State Standard		470		655						23,000		10,000		
Federal Standard						1,300		365		40,000		10,000		260

[1]Exceeds the State 1 hour NO_2 standard
[2]Exceeds the Federal 24-hour TSP standard

Table 5.2-2

SUMMARY OF WORST CASE AMBIENT CONCENTRATIONS DURING DRILLING/PRODUCTION
(ug/m^3)

	Pollutant													
	NO_2		SO_2						CO				TSP	
	Contribution	1-Hour Total	Contribution	1-Hour Total	Contribution	3-Hour Total	Contribution	24-Hour Total	Contribution	1-Hour Total	Contribution	8-Hour Total	Contribution	24-Hour Total
Drilling/Production at Irene	226	264	21	125	16	92	9	35	71	15,000	39	5,500	11	176
Drilling/Production at Shamrock	237	275	29	133	21	97	12	38	96	15,000	53	5,500	14	179
Operations at Lompoc Facility	197	235	6	110	4	80	2	28	38	15,000	21	5,500	2	167
Operations at Orcutt* Pump Station	280	318	0	234	0	171	0	42	56	15,000	63	5,500	1	165
Battles Gas Plant*	609	647[1]	2	236	1	172	1	43	1,197	15,800	553	6,000	2	262[4]
Refinery*	230	260	270	1,317[2]	197	962	108	527[3]	154	15,000	85	5,600	2	262[4]
State Standard		470		655						23,000		10,000		
Federal Standard						1,300		365		40,000		10,000		260

[1]Exceeds the State 1 hour NO_2 ambient air standard
[2]Exceeds the State 1 hour SO_2 ambient air standard
[3]Exceeds the Federal 24-hour SO_2 ambient air standard
[4]Exceeds the Federal 24-hour TSP ambient air standard

*Contributions are from combines production at onshore wells and at platform Irene.

Table 5.2-3

SUMMARY OF MAXIMUM INCREMENTS COMPARED WITH THE ALLOWED PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENTS*
(ug/m^3)

	Pollutant					
	NO_2 1-Hour Increment	SO_2 3-Hour Increment	24-Hour Increment	CO 1-Hour Increment	8-Hour Increment	TSP 24-Hour Increment
Drilling/Production at Irene	216	16	9	71	39	11
Drilling/Production at Shamrock	237	21	12	96	53	14
Operations at Lompoc Facility	197	4	2	38	21	2
Operations at Orcutt Pump Station*	221	0	0	56	31	1
Battles Gas Plant*	94	1	1	197	108	1
Refinery*	22	0	0	0	0	0
Allowed PSD Increment	100-470	512	91	10,000	2,500	37

*Maximum increments are due to production at Irene and Shamrock only.

each individual facility. Table 5.2-2 identifies the maximum contributions for the facilities as they will be operating in the peak drilling/production year along with the maximum total concentrations including background. For the existing facilities, the Battles Gas Plant, the Orcutt Pump Station and the Santa Maria Refinery, the maximum contributions reported in the Table are due to emissions from the onshore production combined with offshore production from platform Irene. The results in the table indicate that the predicted total NO_2 concentration would exceed the State standard by a factor of 2 near the Battles Gas Plant. Also, the predicted total 1 hour and 24-hour SO_2 concentrations at the location of maximum contribution from the modified refinery would exceed the respective State and Federal ambient air standards. This occurs because of the high background levels due to SO_2 emissions from the neighboring Coke plant. The 24-hour TSP concentrations are predicted to exceed the Federal Standard near the refinery, the Battles Gas Plant, and the Orcutt Pump station. These conditions would occur, because the maximum background value is at the allowed standard already. The TSP contribution from the facilities in Santa Maria are extremely small.

Table 5.2-3 reports the maximum increments compared with the allowed Prevention of Significant Deterioration (PSD) increments for each of the facilities. For the new facilities, such as the platforms and the oil dehydration plant, the PSD increments are the same as the total contributions. However, for the existing facilities, including the Orcutt Pump Station, the Battles Gas Plant and the Santa Maria Refinery, the PSD increments reported in the table are the increased ambient air concentrations over the base year plant contributions. The base year is defined by the PSD regulation as 1979. Table 5.2-3 shows that for the maximum 1 hour NO_2 increments all of the projects except for emissions from the refinery modifications would exceed the Santa Barbara County minimum PSD value of 100 micrograms per cubic meter, thus, triggering a fee requirement. However, none of the NO_2 increments exceed the allowed increment of 470 micrograms per cubic meter. None of the other pollutant increments would exceed the allowed PSD levels. In the case of SO_2, future emissions from the refinery would result in a net reduction from the base year by approximately 80 percent. Thus, there would be no SO_2 increment.

The CDMOCS model was used to calculate annual average concentrations of the inert pollutants. The results, which are summarized in Table 5.2-4, show that there are no predicted standard exceedances.

5.2.2.1 Photochemical Pollutants

The maximum ozone values predicted by TRACE for each of the eight trajectories are given in Table 5.2-5. This table summarizes four basic sets of runs that were carried out for each trajectory:

(1) Baseline calibration runs in which adjustments are made so that the model reasonably predicts monitored values for given days.

Table 5.2-4

PREDICTED MAXIMUM ANNUAL AVERAGE CONCENTRATIONS
DUE TO PROJECT SOURCES
(ug/m^3)

	Pollutant					
	NO_2		SO_2		TSP	
	Increment	Total	Increment	Total	Increment	Total
Offshore Construction	3.3	10.8	0.2	34.1	0.3	43.3
Drilling/Production	0.7	8.2	0.1	33.9	0.1	43.0
Onshore Oil Dehydration Facility near Lompoc:						
Construction	0.3	7.8	0.1	33.9	4.1	47.1
Operation	4.5	12.0	3.1	37.0	0.2	43.2
Santa Maria Refinery and Battles Gas Plant						
Construction	0.1	7.5	0.1	33.9	0.1	43.0
Production*	50.5	58.0	14.8*	48.7	0.1*	43.0
Allowed PSD Increment			20		19	
Most Stringent Standard		100		80		75

*Increments for presently operating onshore facilities include total contributions at peak throughput (Irene plus onshore wells)

Table 5.2-5

MAXIMUM ONE HOUR OZONE CONCENTRATIONS FOR THE PROPOSED PROJECTS COMPARED WITH THE PRESENT AND FUTURE BASELINES*
(ppm)

Trajectory	Present Baseline	Future Baseline	Union Project	Union and Exxon Project	Project Sources in the Trajectory
1	.100	.099	.107	--**	Dehydration Facility
2	.100	.114	.117	--**	Battles Gas Plant S.M. Refinery Orcutt Pump Station
3	.070	.078	.082	--**	S.M. Refinery Orcutt Pump Station
4	.110	.109	.126	--**	S.M. Refinery
5	.090	.092	.093	.096	Irene Shamrock
6	.110	.109	.123 (.118)***	.153 (.123)***	Irene Shamrock Dehydration Facility
7	.080	.082	.088	.096	Irene Shamrock
8	.090	.098	.098	--**	Battles Gas Plant S.M. Refinery

*Federal Standard 0.12 ppm, California Standard 0.10 ppm
**Trajectories do not include Exxon Platform.
***Levels in parenthesis do not include temporary emissions; See Section 5.2.2.1.

(2) Future no-project baseline runs in which the future baseline levels are predicted without the projects during expected years of maximum emissions for the projects.

(3) Future baseline plus the Union project runs to estimate the effects of the projects and future baseline sources.

(4) Future baseline plus the Union and Exxon project runs to estimate the effects of both projects and future baseline sources.

The table show that the proposed projects can cause maximum incremental concentrations ranging from 0.001 to 0.044 ppm above the future baseline with the greatest increments occuring in Santa Ynez for Trajectory 6 and in San Luis Obispo for Trajectory 4. The maximum concentration for Trajectory 6 occurs as a result of emissions from platforms Irene and Shamrock as well as the dehydration facility in Lompoc. The contribution for this trajectory include emissions from backup generators at the platforms during routine maintenance testing as well as flaring. The principle contribution to Trajectory 4 includes increased emissions of the precursor pollutants NO_x and RHC from the refinery in Santa Maria.

The incremental ozone concentrations from the Union Projects range from "no change" to 0.017 ppm over future baseline levels. The incremental concentrations from the Exxon Shamrock project are as high as 0.030 ppm above the concentrations of the future baseline and the Union project.

In both cases (Union and Exxon projects) the Federal Standard is predicted to be exceeded in Santa Ynez with Trajectory 6. As was stated earlier in Section 5.2.1, meteorological data in support of the development of Trajectory 6 probably occur five to ten days per year in the region or less than 3 percent of the time. This factor combined with the fact that some of the peak emission sources will not operate continuously leads to the conclusion that the predicted high ozone levels for Trajectory 6 would occur infrequently during the life of the project. However, the use of potential peak emissions in evaluating maximum impacts is consistent with NEPA and CEQA in that reasonable worst case impacts should be considered during the life of the platforms.

TRACE modeling runs were also carried out to determine the predicted ozone impacts under strictly normal operations, i.e., with temporary emissions not operating at both platforms. The peak ozone concentration for the Union facility would decrease from .123 to .118 ppm. Hence, the onshore peak without temporary emissions at Irene would be slightly below the Federal Standard. For both the Union and Exxon facilities without temporary emissions, the onshore peak would reduce from 0.153 to 0.123 ppm but would still exceed the Federal Standard. The results of the TRACE modeling runs for trajectory 6 that do not include these temporary emissions are also shown in Table 5.2-5.

A calculation was made to estimate the expected frequency of occurrence of the temporary emissions from Irene, which is 1.1 percent of the time during the time of occurrence of meteorology related to Trajectory 6, which is 1.5 to 3 percent of the time. Based on an estimated probability of up to 3.3 x 10^{-4}. the expected frequency of occurrence would be 1.5 to 3 times (hours) per year. Over five years of simultaneous drilling/production at the platform a total of 15 hours of peak ozone levels could occur.

For the combined facilities (Union plus Exxon), in which the peak ozone level was predicted to be 0.153 ppm, temporary emissions were assumed to occur at both platforms Irene and Shamrock. The expected frequency of this occurrence during meteorology related to Trajectory 6 would be 0.06 times (hours)/year; or, over five years of drilling/production, the expected accumulated time would be 0.3 hours.

The results of Trajectory 4 show that the Federal Standard is also predicted to be exceeded in San Luis Obispo as a result of increased precursor emissions from the Santa Maria Refinery. In Section 5.2.1 it was stated that the atmospheric conditions which led to the development of Trajectory 4 are quite rare. Although the actual trajectory chosen can occur fairly frequently, the background air quality conditions are rare and conditions such as those modeled probably occur only about once every three to five years. In fact, on the actual day of the trajectory, the highest ozone concentrations in several years were observed in San Luis Obpispo County. Thus, the occurrence of the high ozone level in Trajectory 4 would be quite rare.

5.2.3 Impacts of Proposed Projects

The air quality impacts from the proposed projects must be analyzed for consistency with NEPA and CEQA requirements as well as DOI regulations. In this analysis the predicted ambient concentrations are compared with the appropriate federal, state, and local standards.

5.2.3.0 Inert Pollutants

In the analysis of project impacts relative to the regulations and standards, future baseline levels must be considered along with the predicted increments. The future baseline levels of the inert pollutants are not expected to change significantly from the present baseline because no major additional emissions are expected to occur near the proposed facilities. Additional emissions that would occur after the Union and Exxon projects are included in the cumulative analysis.

The annual emissions for each of the proposed Union and Exxon platforms were compared with the DOI exemption levels. Both platforms were found to be below the limit requiring further analysis. However, both platforms were modeled along with the four hypothetical Area Study platforms to test for significance levels. The results are reported in the Area Study Section 5.2.5.

MAXIMUM SHORT-TERM IMPACTS FROM ONSHORE AND OFFSHORE PROJECT CONSTRUCTION

During construction of the pipelines immediately offshore, the emissions may result in maximum 1 hour nitrogen dioxide concentrations that will exceed the California standard of 470 ug/m^3. The TSP 24-hour standard may also be exceeded during cutting, filling, and grading at the onshore sites. Many of the construction activities are intermittent, and the high emission sources may not occur during the time of worst case meteorological conditions that were used in the modeling analysis. Although these exceedances are significant, the frequency of occurrence would be less than from plant operations, because construction operations would be intermittent and temporary.

PRODUCTION IMPACTS

The maximum short-term impacts during drilling/production from either the Exxon or the Union platforms would occur as a result of emissions at the onshore facilities. At the locations of maximum onshore concentrations, the offshore platforms do not contribute any measureable amount to the predicted levels.

The maximum short-term concentrations, Table 5.2-2, indicate the following significant air quality impacts.

- Exceedance of the California 1 hour NO_2 ambient air standard near the Battles Gas Plant. This exceedance occurs due to the combined emissions from the gas processing of on-land wells plus the gas from platform Irene.

- Exceedance of the State 1 hour SO_2 ambient air standard and the Federal 24-hour SO_2 standard due to emissions from the modified refinery. Although SO_2 emissions from the refinery would be reduced by over 80 percent after modifications, the net emissions from the refinery combined with SO_2 emissions from the neighboring coke plant are predicted to cause standard exceedances. Under this condition the principle contributors to the high SO_2 levels are due to the coke plant.

- Exceedance of the Federal 24-hour Suspended Particulate Matter (TSP) Standard near the refinery and the Battles Gas Plant are due mainly to the high background levels reported for the region. The maximum contributions from the modified refinery and from the increased gas throughput at Battles are predicted to be one to two micrograms per cubic meter or less than 1 percent of the peak concentration. Thus, the increased levels would not be significant.

5.2.3.1 Photochemical Pollutants

The results of the TRACE model (Table 5.2-5) indicate that for Trajectory 6 the maximum 1 hour ozone level during drilling/production at the Union platform would exceed the Federal Standard in Santa Ynez. The Federal Standard is predicted to be exceeded by a greater margin during additional drilling/production at the Exxon platform. The principal emission during the predicted exceedance would occur from diesel operated equipment during drilling such as cement pumps, cranes and supply boats that are idling at the platforms, as well as other temporary emissions such as the testing of standby generators or flaring which can occur 96 times per year according to Union. The predicted levels for Trajectory 6 are not expected to exceed the Federal Standard under future conditions without the Union and Exxon projects. The TRACE model results that are summarized in Table 5.2-5 show that, for Trajectory 4, the Federal Standard is predicted to be exceeded in San Luis Obispo due to emissions from the Santa Maria refinery. The results of Table 5.2-5 also indicates that the California 1 hour standard of 0.10 ppm is predicted to be exceeded for Trajectories 2, 4 and 6. There is essentially no increase over the future baseline for Trajectory 2. Thus, the impacts for Trajectory 2 would not be significant. The impacts for Trajectories 4 and 6 would be significant.

The impacts due to the projects can result in additional exceedances of the standard only under circumstances in which levels are already approaching the standards. This requires unique conditions in which the initial mix of pollutants in the ambient-air parcel along with emissions from the project as well as from other sources entrained in the parcel would be involved in photochemical reactions that produce more ozone. For a given trajectory the probability of all of these events occurring at the right sequence to produce more ozone can be very low. However, it can be generally assumed that the proposed projects can hinder the area from achieving attainment of the standard by contributing precursor pollutant emissions which lead to ozone formation. This is discussed further in Section 5.2.3.6, Consistency with the Air Quality Attainment Plan. Also, the Federal ozone standard is a maximum 1 hour average not to be exceeded more than once in a given year and the State Standard is a maximum 1 hour average never to be exceeded. Thus, the potential of a State and Federal ozone standard exceedance during the life of the projects is within the APCD's category of reasonable worst case.

5.2.3.2 Other Pollutants

The pollutant emissions such as hydrogen sulfide (H_2S) would occur as a result of large accidental releases of sour gas both at the offshore platforms or at the onshore facilities. Such potential occurrences are described in the system safety section. Lower levels of H_2S emissions such as leaks at gas seals and valves would not be toxic but could lead to the detection of odorous pollutants. These potential impacts are described in the Odors and Smoke section (Section 5.9.3). Under upset conditions the gases containing H_2S would be incinerated resulting in the release of less toxic sulfur dioxide.

Other trace toxic pollutants such as metals or polycyclic organic matter (POM) can be emitted as a result of diesel fuel combustion. Low levels of POM would occur periodically near the onshore facilities. These periods include start-up conditions or during the operation of emergency back-up diesel engines.

5.2.3.3 Acid Fog

Fog water acidity has recently become a concern in California as a result of recent field studies conducted in Los Angeles and Bakersfield [Hoffmann, et al.]. The studies that took place in 1981 indicated that in the Los Angeles area, higher acidity and higher concentrations of sulfate and nitrate ions occurred in the fog droplets than had previously been observed. The fog water in these areas was found to have acidity or pH levels ranging from 2.2 to 4.0 as compared with natural fog water levels of pH 5.6. Moreover, acid fog was generally correlated with higher sulfate particulate levels that occurred during the previous afternoons, thus, implying that acid fog is a multi-day event resulting from regional SO_2 and NO_x emissions. There have been no acid fog measurements made in the project region. Thus, fog water acidity for the project region under existing and future conditions must be made by comparing the peak nitrate and sulfate levels in Santa Barbara County with levels observed in Los Angeles and by inferring what the corresponding fog water acidity would be.

Table 5.2-6 summarizes the peak sulfate and nitrate levels that have been observed in Los Angeles and in the Santa Barbara County region. The table shows that high sulfate and nitrate levels in Los Angeles can be as much as two to four times the levels observed in Santa Barbara County. It may be inferred that corresponding pH levels of fog water in Santa Barbara would be more neutral than those observed in Los Angeles.

The additional emissions of NO_x and SO_x from the proposed projects on a regional scale are less than 0.01 percent of the baseline emissions (Section 4.2) for Santa Barbara County. The pH levels due to additional project emissions should, therefore, not change significantly, although there may be a potential for increased localized fog acidity. No guidelines or regulations concerning acid fog have been adopted, and the impacts of low fog water pH are not clearly understood. More research is needed to better understand the mechanisms leading to acid fog formation. A monitoring program of fog water pH should be undertaken in the Santa Barbara County region to determine present and future levels.

5.2.3.4 Offset Requirements

The new Santa Barbara County APCD Rule 205.C [3.b.(2.)(a)] requires that sources at the onshore facilities with net emission increases of reactive hydrocarbons, nitrogen oxides, sulfur oxides or particulate matter exceeding 10 pounds per hour should offset their emissions. The emissions listed in Appendix B indicate that reactive hydrocarbons would exceed the 10-pound limit.

Union has proposed reducing emissions from its existing operations at Lompoc for potential offsets. Although the Lompoc Field is mainly all electric, there are still natural gas engines in service for water injection pumps, gas compression, and well pumping units. In addition a glycol dehydration unit is in service. By converting the engines to motors and connecting the glycol unit to vapor recovery, the following emission reductions for offsets would be available.

Table 5.2-6

HIGH 24-HOUR AVERAGE AMBIENT SULFATE AND NITRATE CONCENTRATIONS IN THE LOS ANGELES AND SANTA BARBARA COUNTY REGIONS (1982)

Locations	High 24-hour Sulfate Levels (ug/m³)	High 24-hour Nitrate Levels (ug/m³)
Los Angeles County	12 to 49 (11 monitors in area)	24 to 55 (10 monitors in area)
Santa Barbara County	12 to 29 (4 monitors in area)	15 (1 monitor at El Capitan Beach)

Source: California Air Quality Data; Annual Summaries Published by California Air Resources Board.

	lbs/hr	tons/yr
NO_x	6.15	26.94
SO_x	0.067	.29
CO	36.38	159.34
RHC	24.2	106.00

Additional emission reductions in reactive hydrocarbons actually would be required. Union has proposed additional offsets from the Casmalia and Orcutt Hill fields eight and ten miles away.

Union is required to submit an application for permission to construct and operate the Lompoc facility to the Santa Barbara APCD. As part of the permit process, these issues and details on additional offsets will need to be resolved.

5.2.3.5 Upset Related Impacts

Upsets are usually the result of process equipment failure. They are important because they can result in large releases of air pollutants. The main source of air pollution can occur as a result of flaring emissions due to failure of major pieces of equipment including compressors, shipping pumps, gas sweetening units, sulfur removal plants and sulfur dioxide scrubbers. The frequency magnitude and duration of upset events have bee estimated based on data on failure rates and operational demands of equipment similar to that identified for the projects. Details of the specific upset events are given in Appendix B.

Based on information regarding the frequency of failure of various devices, the following upset occurrences were chosen for air quality modeling:

- Flaring upset at the platforms and the onshore facilities due to failure of gas compressors.

- SO_2 release at the modified refinery in Santa Maria due to an amine unit failure.

- Minor loss of oil at a pump or valve station.

Impacts from a major oil spill such as a blowout would not be considered as an upset, but would be an accident, principally because of the expected low frequency of occurrence (see Sections 5.11). Modeling results in the Exxon Santa Ynez Unit EIS/EIR indicated that high ozone impacts could occur only under conditions in which a blowout ignited. The additional chance of a fire occurring during a blowout is extremely low because of the high water content in the oil emulsion from the producing wells. Further information is given in Technical Appendix M.

Table 5.2-7 shows the maximum predicted 1 hour ozone concentrations that would occur as a result of upsets at Platforms Irene and Shamrock and at the onshore facilities. It must be pointed out that in order for the predicted high ozone levels to occur under upset conditions, the meteorological

Table 5.2-7

MAXIMUM OZONE CONCENTRATIONS (PPM) FOR FUTURE BASELINE AND PROPOSED PROJECTS UNDER UPSET CONDITIONS

Trajectory	Future Baseline	Upset at Union	Peak Ozone Concentration	Upset at Exxon	Peak Ozone Concentration
1	.099	Battles Gas Plant	.099	-*	-*
5	.092	Flaring at Irene because of shutdown at Battles	.096	Flaring at Shamrock	.097
6	.109	Flaring at Irene	.128	Flaring at Shamrock	.155
7	.082	Flaring at Irene	.090	Flaring at Shamrock	.095

*Not applicable for the particular upset
California Standard 0.10 ppm
Federal Standard 0.12 ppm

conditions that would lead to high ozone values must occur during the upset event. The probabilities of these simultaneous occurrences would be lower than those described for other temporary emissions in Section 5.2.2.1 by a factor of at least one tenth. The results of Table 5.2-7 show ozone levels approximately the same level as those predicted under normal operations. This result would occur because flaring would take place for considerably less than an hour before the platform would be shut in, after which there would be no emissions from the platform. The 1 hour average emission rate during the upset would then be reduced to peak normal operating levels. Minor loss of oil at a pump or valve station was found to cause no significant increase in ozone. This would occur, because the emissions through evaporation would contain principally the less reactive hydrocarbons.

For inert pollutants the primary upset conditions would include flaring at Irene because of failure at the Battles Gas Plant or flaring at the Lompoc Dehydration Facility because of a gas compressor failure. In either case the emissions during the upset would be less than peak normal operations because the facilities would shut down in a short time. The peak' hourly emission rate would thus be smaller. An additional upset that was considered was the failure of the hydrogen sulfide removal system for the refinery gas at Santa Maria. In this case sour gas would be burned in the process heaters and other equipment, thus, releasing large amounts of sulfur dioxide (SO_2), Details of this emission scenario are given in Appendix B. The peak 1 hour SO_2 concentration from this upset was 25,194 microgram per cubic meter which is well above the standard. Based on information regarding failure rates of similar equipment, as is proposed for the Santa Maria Refinery, it is estimated that a typical failure rate for the worst case would be once every three to five years.

5.2.3.6 Consistency with the Air Quality Attainment Plan (AQAP)

A brief overview of the Santa Barbara County AQAP is provided and an evaluation of the present update of the AQAP is made to ensure that the proposed Union and Exxon projects have been considered in long range air quality projections. The implications of project emissions on attainment strategy are also discussed.

In 1984, as part of the Getty (now Texaco) Gaviota Consolidated Coastal Facility (EIR) Environmental Research and Technology (ERT) was retained to estimate the emission reductions required within the County to attain the federal ozone standard. To accomplish this end, an updated emissions inventory for onshore and offshore (e.g., state waters) sources was prepared for the study year 1990 and compared to the emission limits established in the AQAP. ERT's emissions inventory included OCS activities in the Santa Barbara Channel. These OCS activities were included in order to fulfill an EPA mandate that OCS emissions be included in the revised 1986 AQAP Update, because the County of Santa Barbara and the California Air Resources Board (CARB) have maintained that OCS activities adversely affect onshore air quality. The data sources for the inventory include the Santa Barbara Air Pollution Control District (APCD); the California Air Resources Board (CARB); applications, EIRs, and EISs for offshore projects; and other relevant studies such as the Oil Transportation

Plan. The study area included the entire south coast region of the county onshore, and the State Tidelands and Federal OCS offshore. The pollutants evaluated were oxides of nitrogen (NO_x) and reactive hyhdrocarbons (RHC), which are precursors to ozone formation.

The updated emission inventory in the report covers much of the same activity described in the cumulative impact section of this report. However, there are some differences in the OCS Platforms assumed to be operating in 1990, the Union/Exxon project emissions are not considered, and oil and gas development outside of Santa Barbara County are not included. If the Union/Exxon project emissions are included, the total allowable emissions that would permit achievement of the County Air Quality attainment goals would be exceeded, and some means of reducing overall projected emissions must be devised.

General approaches would include modification of projects to reduce emissions, emission offsets, industry consolidation, and control measures for oil and gas related development. These or other approaches would have to be adopted in order to make the Union/Exxon projects consistent with the AQAP. Details of the proposed emission reductions are described in Appendix B.

5.2.3.7 Project Alternatives

Two cases were analyzed in detail. One case considers the alternative Union onshore oil Dehydration Facility at Site 8 and the second case considers the transport of Shamrock oil to Platform Hermosa and then to Gaviota. The source emissions for the onshore facility were estimated by the same method as was used for the facility at Site 4 and are given in Appendix B. Emissions were estimated for the Shamrock production/transportation alternative and are also shown in Appendix B. Dispersion model runs were carried out to determine the impacts of the two alternative scenarios.

ALTERNATIVE DEHYDRATION FACILITY

The predicted maximum short-term pollutant concentrations from the alternate onshore facility emissions are shown in Table 5.2-8. The maximum concentrations are lower than those predicted for the Site 4 facility because the terrain near the alternate site is less steep than at Site 4. No standard exceedances are predicted for the alternate site. The ozone impacts for the alternate onshore site would be similar to Site 4, because the distance between the sites is small compared with the transport distance involved in the ozone formation.

EXXON PRODUCTION/TRANSPORTATION ALTERNATIVE

The maximum short-term inert pollution concentrations from emissions for the Exxon Project alternative route would be below the state and federal standards and would be similar to the levels given for the base scenario (Tables 5.2-2 through 5.2-4). The peak ozone impacts for the Exxon Project alternative route were determined by the TRACE model for Trajectory 6 and are given below:

Table 5.2-8

PREDICTED MAXIMUM SHORT-TERM CONCENTRATIONS
FOR THE ALTERNATE OIL DEHYDRATION FACILITY AT SITE 8
(ug/m^3)

Pollutant	Average Period	Maximum Increment	PSD Standard	Total Concentration	Ambient Standard
NO_2	1 hour	70	100-470	107	470
CO	1 hour	13	10,000	14,923	40,000
	8-hour	7	2,500	5,500	10,000
SO_2	1 hour	2	---	106	1,310
	3-hour	1	512	77	1,300
	24-hour	1	91	27	365
TSP	24-hour	1	37	66	260

Trajectory	Present Baseline	Future Baseline	Union Project	Union and Exxon Project	Union and Alternate Exxon Project
6	0.110 ppm	0.109 ppm	0.123 ppm	0.153 ppm	0.179 ppm

The standard exceedance and higher ozone level as compared with the proposed Exxon Project would occur because of increased emissions from the necessary platform design changes that would be required to transport the oil to Platform Hermosa.

No Project Alternative

With no project the air quality in both the offshore and onshore regions would be the same as the future baseline which is described in Section 4.2 for the inert pollutants. These levels are generally below the ambient air standards. For ozone the future baseline was modeled for the eight basic trajectories. The peak levels are reported in Table 5.2-5, and they indicate that there would be exceedances of the state 1-hour standard. However, no exceedances of the federal standard were predicted. The future ozone levels in the region without the projects will be dependent on the effectiveness of the Air Quality Attainment Plan which has a goal of reducing the net emissions of ozone precursor pollutants in order to assure that the federal standard will not be exceeded.

5.2.4 Impacts of the Area Study Development

The buildout of the Area Study Scenario was based on information provided by the MMS concerning platform locations, timephasing, level of activity, and likely throughputs. The peak throughput was assumed to occur in 1992, with a new pumping station at Surf, an expanded oil Dehydration Facility in Lompoc, and a new gas processing plant. Details on the platform locations, emission inventories, and the platform phasing are given in the Project Description Section 2.11 and in the Air Quality Technical Appendix B.

Emissions for production at the Area Study platforms and the onshore facilities were developed for model inputs, and maximum short-term concentrations of ozone and inert pollutants were calculated. The emissions from the new onshore Area Study facility were based on requirements to handle nominally 100 MB/D oil and 80 MMscfd gas. There will be increased dust emissions during construction of a pipeline from Lompoc to either Buellton or Gaviota. However, these emissions are temporary. During production there would be no emissions from the pipeline.

The maximum ozone levels as a result of the Area Study scenario are summarized in Table 5.2.-9. They indicate that there will be a large increase in peak ozone as compared with the future baseline for Trajectory 6 in Santa Ynez where the federal standard would be exceeded. Emissions for the hypothetical Area Study platforms on OCS P-0427 and P-0495 were based on the assumed use of gas fired turbines with a 5,600 horsepower rating.

TABLE 5.2-9

MAXIMUM OZONE CONCENTRATION (PPM) FOR FUTURE BASELINE AND PROPOSED AREA STUDY SCENARIOS

Trajectory	Future Baseline	Area Study
1	.099	.104
5	.089	.098
6	.109	.157
7	.078	.103

California Standard 0.10 ppm
Federal Standard 0.12 ppm

These hypothetical platforms may have turbines with much lower power ratings. Trajectory 6 was therefore run again with 2,800 horsepower turbines to test for the changes to peak ozone levels. The reduced turbine emissions would have negligible effects on predicted ozone impacts. The peak level would decrease from 0.162 ppm to 0.160 ppm. Therefore, reducing the turbine sizes by half would only lead to a very small decrease in the peak onshore ozone levels.

The maximum short-term concentrations of the inert pollutants were determined by using the PTMOCS model. The results are summarized in Table 5.2.-10. The table shows that there would be no standard exceedences from the production at the offshore platforms. However, exceedances of the state and federal 1-hour, 3-hour, and 24-hour SO_2 standards and PSD increments may occur. This is due mainly to emissions from the hypothetical gas processing facility. Table 5.2-11 presents the maximum annual average concentrations calculated for the Area Study by using CDMOCS. The predicted levels are well below the allowed standards.

The MPTER model, as described earlier in Section 5.2.1 was run to calculate maximum increments from all of the six Area Study platforms including Irene and Shamrock in order to test for DOI significance levels. The results of the MPTER model are summarized in Table 5.2-12. All levels for the maximum construction and production scenarios are less than the DOI significance levels. However, for peak production, approximately 90 percent of the NO_2 annual average significance level would be consumed. For the other criteria pollutants the modeled increments are well below the DOI significance levels. If a significance level is exceeded, the Best Available Control Technology (BACT) must be applied to the projects, after which the remodeled increments would be compared with Federal PSD levels to determine whether additional mitigation measures would be required.

In the case of the six Area Study Platforms, BACT for controlling NO_x emissions was already assumed for each project when conducting the significance level modeling. This equipment included the use of grid power for four of the six Area Study Platforms and the use of gas fired turbine generators with water injection NO_x control on the other two Area Study platforms. Thus, further mitigation to control emissions of inert pollutants would not be required to meet DOI regulations.

There would be increased emissions during construction of the four additional platforms as well as during construction of a pumping station at Surf and the expanded oil and gas facility at Lompoc.

5.2.5 Mitigation Measures

For the offshore platforms, both Union and Exxon have committed to the utilization of emission controls that would result in net emissions well below the DOI exemption levels which require further analysis. Additional modeling analysis that utilize DOI-approved techniques also indicate that the predicted impacts of inert pollutants are below the significance levels. Thus, additional mitigation measures would not be required by MMS to further reduce inert pollutant emissions.

Table 5.2-10

SUMMARY OF WORST CASE AMBIENT CONCENTRATIONS FOR AREA STUDY SCENARIO
($\mu g/m^3$)

	Pollutant													
	NO_2		SO_2						CO				TSP	
	1 Hour		1 Hour		3-Hour		24-Hour		1 Hour		8 Hour		24-Hour	
	Increment	Total	Increment	Total	Increment	Total	Increment	Total	Increment	Total	Increment	Total	Increment	Total
Offshore Production	219	257	17	121	12	88	7	33	56	15,000	31	5,520	1	165
Onshore Processing at Lompoc	347	385	1,415	1,519[1]	1,033[2]	1,109	566[3]	582[3]	322	15,200	159	5,648	1	165
Allowed PSD Increment	100-470				512		91		10,000		2,500		37	
State Standard		470		655						23,000		10,000		
Federal Standard						1,300	365			40,000		10,000		260

[1]Exceedance of State 1 hour SO_2 standard
[2]Exceedance of Federal 3-hour PSD standard
[3]Exceedance of Federal PSD and 24-hour SO_2 standard

Table 5.2-11

MAXIMUM PREDICTED ANNUAL CONCENTRATIONS (mg/m_3) ASSOCIATED WITH PRODUCTION ACTIVITIES FOR THE AREA STUDY

SOURCE	NO_2		SO_2		TSP	
	Maximum Predicted Conc.	Predicted Ambient Conc. (Total)	Maximum Predicted Conc.	Predicted Ambient Conc. (Total)	Maximum Predicted Conc.	Predicted Ambient Conc. (Total)
Offshore Facilities						
• Production	1.3	8.8	(0.1)	33.9	0.1	43.1
Onshore Lompoc Facilities						
• Production	2.5	10.0	1.6	35.5	0.1	43.1
Allowed PSD Increment			19		20	
Ambient Air Standard		100		80		75

Table 5.2-12

MAXIMUM CONCENTRATIONS (ug/m3) FROM 2 PROJECT PLATFORMS PLUS 4 OCS AREA STUDY PLATFORMS COMPARED WITH DOI SIGNIFICANCE LEVELS AND AMBIENT AIR STANDARDS

CONSTRUCTION

	NO_2				SO_2				CO				TSP			
Averaging Time	Increment	DOI Sign Level	Total Conc.	Std.	Incr.	Sign Level	Total Conc.	Std.	Incr.	Sign Level	Total Conc.	Std.	Incr.	Sign Level	Total Conc.	Std.
1-hour	----	----	----	----	----	----	----	1310	23.3	2000	14,908	40,000	----	----	----	----
3-hour	----	----	----	----	2.2	25	95.8	1300	----	----	----	----	----	----	----	----
8-hour	----	----	----	----	----	----	----	----	8.7	500	5500	10,000	----	----	----	----
24-hour	----	----	----	----	0.3	5	26.3	365	----	----	----	----	1.1	5	166	260
Annual	0.8	1.0	19.3	100	0.3	1.0	3.3	80	----	----	----	----	0.08	1.0	64.1	75

PRODUCTION

	NO_2				SO_2				CO				TSP			
Averaging Time	Increment	DOI Sign Level	Total Conc.	Std.	Incr.	Sign Level	Total Conc.	Std.	Incr.	Sign Level	Total Conc.	Std.	Incr.	Sign Level	Total Conc.	Std.
1-hour	----	----	----	----	----	----	----	1310	6.5	2000	14,982	40,000	----	----	----	----
3-hour	----	----	----	----	0.4	25	9.4	1300	----	----	----	----	----	----	----	----
8-hour	----	----	----	----	----	----	----	----	2.2	500	5492	10,000	----	----	----	----
24-hour	----	----	----	----	0.1	5	26.1	365	----	----	----	----	0.4	5	165.4	260
Annual	0.9	1.0	19.4	100	0.05	1.0	3.05	80	----	----	----	----	0.02	1	64.02	75

The PTMOCs modeling results that were summarized in Tables 5.2-1 through 5.2-3 indicate that, for short-term inert pollutants, significant air quality impacts can occur due to emissions from the onshore projects. These include exceedances of the Federal 24-hour TSP standard during construction at the on-land sites, including construction of the onshore pipeline, the dehydration facility and at the Orcutt Pump Station. The principal emission sources are fugitive dust from digging and grading operations. By developing TSP control plans such as the application of water spray with chemical dust inhibitors and by phasing the construction schedule, levels would be reduced to insignificance. The impact would then be considered Class II.

Table 5.2-1 shows an exceedance of the state 1 hour NO_2 standard during construction of the offshore pipeline. This peak concentration would occur due to NO_x emissions from the pipeline lay barge when it is near shore. Because the standard is exceeded only slightly, modifications of construction schedules to minimize overlapping emissions during high ozone times would lower peak 1 hour NO_2 levels below the standard. This would thus be a Class II impact.

During operations, the impacts near the refinery would be significant because of predicted exceedances of the state and federal short-term SO_2 standards. However, the PTMOCS model predicts that the maximum background level can exceed the SO_2 standards because of emissions from the neighboring coke plant without contributions from the refinery. Emissions from the refinery would contribute to an exceedance. Mitigation applied to the refinery alone would still result in standard exceedances. Reduction of SO_2 emissions by 30 percent to 50 percent from the neighboring coke plant through the use of SO_2 scrubbers on the calcining exhausts would result in no standard exceedances. This would then be a Class II impact.

Table 5.2-2 also shows a significant impacts from the Battles Gas Plant in which the NO_2 1-hour standard is predicted to be exceeded. However, the predicted increment due to the increased gas throughput from Irene is a small faction of the total contribution of the gas plant. Unless NO_x reductions occur for the existing throughput, the NO_2 standard is predicted to be exceeded. The proposed mitigative strategy would be to replace approximately 30 percent of the existing engines at the plant with electric motors or to use catalytic reduction. The impact would then be Class II.

The TRACE modeling results that were summarized in Table 5.2-5 indicate significant impacts due to emissions from a number of project sources. Table 5.2-13 summarizes the model results for the significant impacts and the impacts after mitigation. For Trajectory 4 the significant impact was due to emissions of NO_x from the Santa Maria Refinery. By using low NO_x burners at the refinery, the mitigated ozone levels would return to the future baseline value. Thus, this would be a Class II impact.

For Trajectory 6, peak NO_x emissions can occur at Platform Irene due to flaring; and at both Platform Shamrock and Platform Irene peak emissions can occur during regular maintenance operations for the standby diesel generators. Potential mitigation measures include replacing the diesel generated cement pumps at Platform Irene with an electrically operated one and reducing the simultaneous operation of NO_x emitting sources. This would include the testing of standby generators at times when no supply boat is

Table 5.2-13

SUMMARY OF SIGNIFICANT OZONE LEVELS AND THE LEVELS AFTER MITIGATION

Trajectories	Future Baseline	Union Project	Exxon Project	Union Mitigation	Exxon Mitigation
4	.109	.126	-	.109	
6	.109	.123	.153	.120	.126

present or when no flaring occurs. Another mitigation identified for Platform Irene and the Shamrock Platform is to share one supply boat. If these mitigation measures are implemented, the federal standard would not be exceeded. This would then be a Class II impact. However, it should be noted that the state standard would be exceeded. This exceedance would occur without the projects under the future baseline. Increased emissions from the mitigated projects would not cause a significant increase in ozone over the future baseline.

Similar significant impacts are predicted to occur for the Area Study scenario and the ozone impacts after mitigation measures are summarized in Table 5.2-14. Mitigation measures indentified include using grid power for the platform on OCS-P 0427, reducing the number of simultaneously operating supply boats, by sharing a common boat using electric cranes, testing standby emergency generators when there is no flaring or when no supply boats are present and the use of SCR or thermal denox at the hypothetical gas plant onshore. Details of the TRACE photochemical model runs for the mitigation measures are given in the Addendum to the Response to Comments document. Table 5.2-15 summarizes the impacts of the projects and Area Study facilities and mitigation measures.

Further discussion of the Air Quality runs and mitigation can be found in the Supplemental Information Section of this EIS/EIR.

5.2.6 Meteorology

The impacts of the projects on general climate and meteorology would be insignificant. General atmospheric circulation patterns, temperatures on a regional scale and precipitation levels will not change appreciably as a result of the offshore and onshore projects. However, on the microscale (0 to 100 m) the platforms can affect the meteorological conditions such as producing wakes.

Table 5.2-14

SUMMARY OF SIGNIFICANT OZONE LEVELS FOR AREA STUDY SCENARIO AFTER MITIGATION (PPM)

Trajectory	Future Baseline	Area Study	Area Study Mitigation
1	.099	.104	.099
6	.109	.162	.119
7	.078	.103	.094

Table 5.2-15

POTENTIALLY SIGNIFICANT AIR QUALITY IMPACTS AND MITIGATION MEASURES CLASS II. SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

Source	Descrition of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Projects				
Union	1. Emissions during grading and construction at the onshore sites may result in exceedence of the federal 24-hour particulate matter standard.	Local, Short-term	Additional control plans needed for grading the sites, including the use of chemical dust inhibitors (SBAPCD, SBC).	Insignificant; Chemical additives may cause impacts on vegetation or surface water.
Union	2. Emissions from boats during construction of the pipeline near shore may result in exceedence of the state 1-hour NO_2 standards and the 24-hour PSD level.	Local, near pipeline landfall	Use retarded injection timing to reduce NOx emissions; use lower sulfur fuel to reduce SO_2 emissions (SBAPCD, SLC, CCC)	Insignificant
Union	3. Potential to exceed the state 1-hour SO_2 standard and the federal 24-hour SO_2 standard near the Santa Maria Refinery under normal operations.	Local, high levels can occur due to SO_2 emission from nearby coking plant. Standards could be exceeded due to emissions from the coke plant alone.	Install SO_2 scrubbers on exhausts at neighboring coke plant (SLOAPCD)	Insignificant
Union	4. Exceedence of the state 1-hour SO_2 standard and 24-hour standards near the Santa Maria Refinery under upset conditions (once every two years).	Local to regional; high levels would occur during failure of one of the two amine H_2S removal trains.	Reduce the throughput at the refinery to a level below the capacity of the operating amine train during the upset (SLOAPCD)	Insignificant
Union	5. Exceedence of federal ozone standard in San Luis Obispo due to emissions from Santa Maria Refinery	Regional	Use low NO_x burners at refinery (SLOAPCD)	Insignificant
Union	6. Exceedence of state/federal ozone standards in San Luis Obispo due to NO_x emissions from the Santa Maria refinery.	Regional	Use low NO_x burners at refinery (SLOAPCD)	Insignificant; background concentrations can still exceed the state standard.
Union	7. Exceedence of state 1-hour NO_2 standard near Battles Gas Plant	Local, high levels occur due to existing throughput. Increased levels would occur due to processing of gas from Irene	Replace approximately 30 percent of the engines at gas plant with electric motors, or reduce NO_x emissions by using SCR	Insignificant

Table 5.2-15

POTENTIALLY SIGNIFICANT AIR QUALITY IMPACTS AND MITIGATION MEASURES
CLASS II, SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

Source		Description of Impacts	Scope	Mitigation Measures	Residual Impact
Union/Exxon	8.	Exceedence of federal ozone standard in Santa Ynez due to emissions from Irene and Shamrock projects	Regional, high levels can occur in Santa Ynez Valley	Use electric cement pump at Platform Irene instead of diesel; modify testing schedule for standby generators to reduce simultaneous emissions. Share a supply boat between Irene and Shamrock.	Insignificant, although state standard would be exceeded even without the projects
C. Area Study					
	1.	Potential to exceed 1-hour state and federal ozone standards in Santa Ynez due to emissions from Area Study platforms and onshore processing facility in Lompoc.	Regional	Use electric grid power for all Area Study platforms, use electric pumps and cranes on platforms. Use SCR or thermal deNOx on heaters for oil and gas facility at Lompoc. (MMS, CCC, SBAPCD)	Insignificant
	2.	Potential to exceed state 1-hour SO_2 standard near the proposed onshore Area Study oil and gas facility	Local; high levels can occur at elevated terrain near the facility in Lompoc.	Improve the SO_2 removal efficiency for the tail gas incinerator at the sulfur plant (SBAPCD)	Insignificant

5.3 ONSHORE WATER RESOURCES

5.3.1 Introduction

This section considers potential impacts on both surface water and groundwater as a result of construction, installation, operation and abandonment, as well as accidents and catastrophic events.

For project activities which affect the hydrologic environment (including surface water and groundwater), the following significance criteria are used. In general, project activities with significant impacts would preempt, preclude or impair existing or potential users of the water resource or result in an inability to maintain biological productivity. Assessment of impacts on biota as a result of changes in hydrologic conditions is presented in Section 5.6. Impacts could be related to changes in water quality, water quantity or sediment load. Class I impacts are not mitigable to insignificance in the context of project design and requirements. Class II impacts are mitigable to insignificance by design or supply changes. Other impacts, which may result in minor limitations on existing or potential users, are considered Class III.

For the water resources portions of this EIS/EIR, "regional" means impacts which extend beyond the Project Area. "Local" impacts are confined to the Project Area. "Short-term" refers to durations of less than five years. "Long-term" impacts are of duration five years or greater.

In evaluating overdraft of groundwater basins as a result of project water withdrawals, this EIS/EIR considers any withdrawal in an overdrafted basin as significant. The significance threshold criteria currently used by the Santa Barbara County Resource Management Department to evaluate impacts state that any withdrawals exceeding 1 percent of an existing overdraft are significant. This criteria has the property of establishing a threshold of significance which increases with increasing stress on the resource.

5.3.2 Surface Water

5.3.2.0 Methodology

Three basic conditions of surface water can be affected by development: streamflow, sediment loading, and water quality. Streamflows can either be increased through addition of impervious surfaces, or decreased through impoundment of streams or runoff or by alteration of discharging aquifers. Sediment load is generally increased during the construction stage and can be returned to near pre-development levels through proper landscaping and sediment conservation techniques. Water quality can be affected by the inclusion of contaminants in runoff from developed areas, through accidental spills, or through planned discharges.

For each of these categories there is a requirement for existing or potential beneficial or instream uses; that is, if there is potential for human use of the water body and hydrologically connected water bodies, or existing sensitive biota, the potential for significant impacts exists.

Impacts on surface water were evaluated through a review of operator applications and reports and other literature, site reconnaissance, and mathematical analysis. Impacts on streamflow were evaluated using the Rational Method to evaluate and compare baseline conditions and project impacts, using a design 1-hour storm with a 100-year recurrence interval assumed to occur during construction. Changes to sediment load were evaluated using the Universal Soil Loss Equation (USLE). The water quality discussion focuses on spill-related impacts, and is discussed further in Section 5.3.3.1.

5.3.2.1 Impacts of the Proposed Projects

CONSTRUCTION

Lompoc Dehydration Facility (Site 4)

Streamflow. This facility would be sited in drainage 1-17. A total of approximately 21 acres (site and pipelines) of the total drainage area of 104 acres would be disturbed by construction. For the design storm, flows would be increased 44 percent over baseline conditions, from 35 cfs to 51 cfs. This Class II impact would be short term during the period of construction.

Sediment Loading

It is estimated that sediment losses from drainage 1-17, where the facility would be sited, would increase by about 37 percent, during construction, because of increased losses from unprotected areas. After construction, retention basins would function as sediment traps. If construction were to take place during the rainy season, October through March, temporary sediment retention basins would be required by Santa Barbara County Ordinance 1756. Impacts are considered potentially significant but mitigable (Class II).

Water Quality. The major pollutants during construction would be sediment. Impacts of accidental spills are discussed below.

Proposed Pipeline Corridors

Streamflow. For the aggregate drainages crossed by pipelines, increases in streamflow and runoff are estimated to be less than 10 percent. Estimates of changes to streamflow indicate relatively large increases (ranging from 22 to 73 percent) in a total of seven of the 16 drainages crossed between landfall and Lompoc: 1-5, 1-6, 1-7, 1-9, 1-10, 1-11 and 1-12. Between Lompoc and Orcutt, increases exceed 10 percent in two of the 26 drainages: 1-17 (44 percent) and 1-18 (38 percent), both of which are in the Purisima Hills. For all of these drainages, project impacts on streamflow are locally significant (Class II). Impacts could be long term depending on the success of revegetation. After revegetation of the disturbed areas, runoff should return to pre-project levels.

Sediment Loading. During construction of the pipelines, there would be considerable disturbance within drainage channels. Loose, disturbed soil would be readily available for transport. This sediment could be carried downstream, resulting in turbid flows and deposition in downstream areas. (See Section 5.6 for a discussion of impacts to aquatic organisms.) Estimates of changes in sediment load resulting from channel disturbance and clearing of the pipeline corridor indicate that average annual soil loss exceeds 10 percent in the same drainages most affected by changes in streamflow: 1-5, 1-6, 1-7, 1-9, 1-10, 1-11, 1-12, 1-17 and 1-18. Impacts for these drainages are rated Class II, locally significant and potentially long-term depending on revegetation success.

The current plan for burial of the pipelines at drainage crossings would result in notching of the channel bank where drainages are incised. In those areas, the embankments are oversteepened and in some cases nearly vertical for short distances. The original ground profile could not be restored in those areas. The notch left in the streambank could become a corridor for overland runoff reaching the drainage. The concentrated runoff could increase the erosive hazard and lead to gullying and exposure of the pipeline. Burial of pipelines would be considered a Class II impact at these locations.

Water Quality. The major pollutant during construction would be sediment, as discussed above. Impacts of accidental spills are discussed below.

Disposal of hydrostatic test water for the pipelines and Lompoc facility at the platform outfall would have no surface water impacts. If any of the pipelines leaked, there would be a slight chance for the hydrostatic test water to reach a stream with possible consequent degradation of the water quality. This could result in significant impact of a local, short-term nature depending on the quality of the water in the pipeline because (Class II).

Other Facilities

Construction activities at Surf would have insignificant impacts (Class III) on surface water. No new grading is proposed at the Orcutt Pump Station, Battles Gas Plant or Santa Maria Refinery. No additional or different impacts on streamflow, sediment loading or water quality are anticipated.

NORMAL OPERATIONS

Normal operations associated with the pipelines are not expected to have impacts on surface water, assuming successful revegetation of the corridor. At the Lompoc site, collection of runoff and disposal to existing drainages would have insignificant impacts given current plans which include energy dissipation devices for uncontaminated runoff discharged to site drainages, and treatment of contaminated runoff water and disposal with the produced water. Disposal would reduce both runoff and sediment load in drainage 1-17. Impacts are considered to be marginally adverse but insignificant (Class III). Discharge to site drainages would also have likely Class III impacts, given the control of peak flows as a result of controlled releases from retention basins. Normal operation would not be expected to have any impacts on surface water quality. See Section 5.3.3.1 for discussion of the on-site septic system.

ABANDONMENT

Abandonment of project facilities would have negligible impacts if abandoned in place, and impacts similar to those for construction if removed.

ACCIDENT AND CATASTROPHIC EVENTS

During operation, a pipeline rupture could result in spills of oil/water emulsion, dry oil or produced water. (See Technical Appendix M for details on likelihood of various spills.) Spills into any flowing stream would result in degradation of that system, including entrainment of oil-water emulsion in the streamflow, deposition of non-soluble fractions along the stream channel, and dissolution of the soluble fraction. See Section 5.6 for discussion of impact of accidents and catastrophic events on biota. Drainages along the pipeline routes can be comparatively evaluated. Those drainages with intermittent or perennial flow would be more sensitive and vulnerable to oil spills than drainages with ephemeral flow.

The only perennial water body which could be affected by an oil spill is the area at the mouth of Santa Ynez River. Impacts of a spill affecting this area would be locally and regionally Class I. In other parts of the Project Area, existing human uses of surface water resources are closely related to the health and variety of biological communities. Direct impacts to human users are considered Class III. See Section 5.6 for discussion of spill impacts on biota at or downstream of pipeline drainage crossings, and Section 5.3.3 for discussion of impacts on groundwater.

During pipeline construction, potential pollutants include diesel fuel and engine oil from the construction equipment. Introduction of these pollutants into any waterbody or water course, by any means, would likely cause degradation of water quality. However, because of the lack of direct existing or reasonably foreseeable future human use, impacts are considered Class III.

5.3.2.2 Impacts of Area Study Development

The presence of a number of perennial streams south of the Santa Ynez River is distinguishing for this portion of the Area Study. Impacts of pipeline development would be likely regionally significant (Class II) for streamflow, sediment loading and water quality. North of the river in areas similar to the Project Area where streams are mostly enhanced, streamflow and sediment impacts could be locally significant.

5.3.2.3 Impacts of Project Alternatives

CONSTRUCTION

At Alternative Site 8, located in drainage 3-4 (a tributary of Purisima Canyon), it is estimated that construction would lead to an 11 percent increase in peak flow for the design storm. Impacts are considered potentially significant (Class II).

For the alternative pipeline alignment from Surf to Site 4 (Route 2), changes in flow for the design storm would exceed 10 percent in two of the 16 drainages crossed: 2-9 (12 percent) and 2-11 (10 percent). These are small ephemeral drainages. Impacts are Class II, locally significant. For Route 3 (Landfall to Site 8), changes in peak flow would exceed 10 percent for 11 of the 24 drainages, with increases ranging from 10 percent to 62 percent. Impacts are Class II locally significant. On Route 4, five of the 17 drainages crossed show increases in flow exceeding 10 percent: 2-9, 2-11, 3-2, 3-3, and 3-4. Impacts are locally Class II.

Estimated average annual sediment losses would exceed 10 percent for seven drainages on Route 2. For Route 3, changes in sediment load would exceed 10 percent for 14 of the 24 drainages. For Route 4, six drainages show changes exceeding 10 percent. For all alternatives, impacts are locally significant (Class II) at the identified drainages. See Technical Appendix C for identification of particular drainages.

Impacts of normal operations, abandonment, and spills are generally as described for the project. The no-project alternative would avoid any potential impacts to surface water resources.

The main distinction among the alternative and preferred routes from a surface water perspective pertains to the necessity of a crossing of the Santa Ynez River for Routes 2 and 4. These routes would cross the Santa Ynez River at Floradale Avenue. Whether the pipe is buried beneath or suspended above the stream bed, high river flows could jeopardize the pipeline. High flows can cause scouring of the river bottom, potentially exposing a buried pipe to lateral forces from the flowing water, and can cause scouring around bridge piers, potentially removing the pipe support. In addition, sufficiently high water could exert lateral forces directly on a suspended pipe. Depth of scour for a given flow is difficult to predict. Terzaghi and Peck [1967] related scour depth to rise in river stage and report that a scour depth of nearly four times the rise in stage has been observed. Scour around bridge piers can be even greater because of high velocities at the upstream edges of the piers.

The U.S. Army Corps of Engineers [1970] compiled and evaluated flood information for the Santa Ynez River. The largest flood of record occurred in January 1907, with an estimated peak flow of 120,000 cubic feet per second (cfs) near Lompoc. Other large floods occurred in January 1969 (100,000 cfs), January 1914 (75,000 cfs), February 1969 (65,000 cfs), and March 1938 (45,000 cfs). Median flow in the Santa Ynez River is approximately 3 cfs [Miller, 1976].

River stage during the 1969 flood and estimates of river stage for the Intermediate Regional Flood and Standard Project flood are given as 12, 12.2, and 12.4 feet respectively above the normal streambed. The Intermediate Regional Flood has a return period of approximately 100 years. The standard project flood is based on extremely severe hydrometeorological conditions and is not assigned a frequency.

Using the criteria given by Terzaghi and Peck [1967], and a normal depth of 2 feet, support foundation or pipe burial depths of nearly 40 feet would be required to protect the pipeline during severe floods. The January 1969 flood destroyed the Floradale Avenue bridge and left severe bank scouring [Corps of Engineers, 1970]. While scouring at this site may not reach 40 feet, the clear potential for severe scour and consequent pipeline damage warrants careful evaluation of any proposed pipeline river crossing.

5.3.2.4 Mitigation Measures

LOMPOC DEHYDRATION FACILITY

Potential Class II impacts to streamflow and sediment loading to site drainages associated with construction could be minimized if construction took place during the dry season, May to October. Sediment retention and flow diversion devices that allow continued streamflow (such as straw bales) could be installed directly downstream of the site during construction to control sediment loading. Construction during the dry season in conjunction with sediment retention and flow maintenance devices would mitigate impacts to Class III.

Mulching of slopes during construction and revegetation immediately after construction would reduce sediment losses from cut-and-fill slopes at the Lompoc site.

Monitoring of facility operations and runoff water quality from the surge tank areas and process areas coupled with treatment as necessary would ensure that water quality would not be degraded. In particular all runoff from potentially contaminated areas of the site should be routed through the treatment facility, unless it could be shown that the untreated runoff meets the secondary and primary drinking water standards for all listed parameters.

PIPELINE ROUTES

In order to mitigate potential Class II impacts resulting from notching of streambanks during construction, sensitive streams could be spanned or banks reconstructed.

Potential Class II impacts to streamflow and sediment loading to stream drainages as a result of construction could be minimized if construction took place during the dry season, May to October. Sediment retention and flow diversion devices that allow continued streamflow (such as straw bales) could be installed directly downstream of stream crossings during construction to control sediment loading resulting from disturbances of the channel. Construction during the dry season in conjunction with sediment retention and flow maintenance devices would mitigate impacts to Class III.

To mitigate post-construction impacts of erosion and sediment loading from Class II to Class III, a soil conservation/revegetation program could be developed by the operator and subjected to review and approval by federal, state and local resource agencies. The program would specify conservation techniques to be applied in areas of 20 percent or greater slopes along the pipeline route. The program should consider the replacement of topsoil at the surface of the trench to facilitate revegetation, control of surface water runoff so that runoff is not concentrated on or near the trench, and installation of erosion control measures such as filter fabric erosion checks that will maintain the topsoil on the trench until revegetation is underway.

In order to minimize Class III water quality impacts of construction, vehicles and equipment could be maintained to prevent spillage and leakage of lubricating oil and fuel into any water body. Waste oil from routine vehicle maintenance could be removed from the construction corridor and disposed of in an approved manner.

AREA STUDY

Mitigation measures for impacts on streamflow and sediment loading would be as described for the project. Sediment control and flow diversion devices could be required for any perennial or biologically sensitive streams which might be crossed. Construction could be conducted in the dry season. Together, these two general requirements would mitigate impacts to Class III.

ALTERNATIVES

Mitigation of sediment losses from cut-and-fill slopes at Site 8 during construction would be similar to those at Site 4. The mitigation measures for the Proposed Pipeline route also apply to the Alternative Pipeline routes. At a crossing of the Santa Ynez River, an appropriate design would be based on forces and depths of scour associated with at least a 100-year event. A crossing could be accomplished by spanning, trenching or boring, and could require placement of the pipelines or pipeline supports to depths of 40 feet. A site-specific investigation of geotechnical conditions, including historic depths of scour would be necessary to determine particular design parameters.

5.3.3 Groundwater

5.3.3.0 Introduction/Methodology

Potential impacts to groundwater include changes in both quality and quantity. Total availability and distribution of groundwater are affected by increased consumptive use, altered pumping schedules, and land use changes. Groundwater quality can be affected by saltwater intrusion or discharge of pollutants, either planned or accidental. Impacts on groundwater were evaluated through a combination of literature review, mathematical analysis, and site reconnaissance.

The hydrologic impacts were evaluated in terms of both the basin wide effect of consumptive use on the water balance and the local effects of pumpage on groundwater table elevations. Pollutant release impacts were evaluated in terms of their potential for degrading groundwater quality and the severity of that degradation should it occur. The analysis upon which the conclusions presented here are based is presented in Technical Appendix C.

This section considers only the impacts of direct project water requirements. Section 5.7.4, Socioeconomics, describes and evaluates the total project water requirements and impacts. The direct project water requirement impacts are evaluated in greater detail than the total water requirements because, in contrast to the indirect water requirements, the sources of the direct project water requirements are generally known, allowing consideration of local pumping impacts.

5.3.3.1 Impacts of the Proposed Projects

CONSTRUCTION

The primary consumptive water use requirements during construction are expected to be approximately 1.7 acre-feet for dust control, 13 acre feet for hydrotesting of pipelines and tanks, and 0.3 AFY for construction crews. The anticipated sources of this water are the existing Union well near Lompoc and the Union water system at Orcutt. The local drawdown impacts of these withdrawals are expected to be adverse, but not significant (Class III). However, since the basins from which the water would be drawn are currently being overdrafted, the water balance impacts are considered to be short-term adverse impacts (Class II).

The construction water requirements are not expected to induce saltwater intrusion into wells. Impacts of construction activities or groundwater quality are estimated to be Class III, and associated with minor losses of fuel, solvents, and other chemicals.

NORMAL OPERATIONS

The primary direct project water requirements during normal operations are expected to be: 1) 500 gallons per day (gpd) (0.56 acre feet per year) for drinking, sanitary, and washing purposes and 0.038 acre feet per year for irrigation at the proposed Lompoc facility, 2) 500 gpd (0.56 acre feet per year) for boiler make-up and 0.069 acre feet per year for irrigation at the Orcutt Pump Station, and 3) 0.016 acre feet per year for first year irrigation at the Surf substation. The irrigation requirements are expected to become negligible after the plantings are established. Occasional water may also be required for fire fighting.

The local drawdown impacts of the withdrawals are expected to be adverse, but not significant (Class III). However, since the basins from which the water would be drawn are currently being overdrafted, the water balance impacts are considered to be significant adverse impacts (Class II). The largest impact on groundwater from normal operations is the potentially reduced recharge, which could reach 7 AFY.

Sanitary waste water disposal in the proposed on-site septic system is expected to have an adverse, but not significant, impact (Class III) on groundwater quality.

The consumptive use water requirements for normal operation are not expected to induce saltwater intrusion into wells.

ABANDONMENT

Abandonment of the project facilities would require negligible water supplies unless the installed facilities and pipelines were removed. In the event that installed facilities and pipelines were removed, water requirements would be similar to the construction dust control water requirements. The adverse impacts of this water requirement would be negligible and may be considered Class III impacts.

ACCIDENTS AND CATASTROPHIC EVENTS

The release of dry oil or oil/brine water emulsion (wet oil) from the pipelines onshore could originate from leaks, ruptures and equipment failures. The migration routes would differ somewhat for different types of releases and for different fluids. For an oil spill, a fraction of the oil will volatilize, a fraction will dissolve in water, and a fraction will remain as a separate fluid phase. This immiscible phase can be further divided into mobile and immobile fractions.

If the release mechanism exposed fluids at the ground surface, spilled materials would spread overland in directions dictated by topography. Except on slowly permeable soils, spilled materials would also sink into the surface layer of the soils. The degree and depth of penetration are a function of soil characteristics, vegetation, depth to the water table and the volume and type of oil spilled. For example, oil will penetrate dry porous soils, such as a coarse sand, more rapidly than water-logged soils or clayey soils. Larger surface areas would be contaminated in the latter cases than in the former. Local topographic depressions could contain the areal extent of a spill and increase infiltration in any soil. Depth of penetration will be greater in coarse-textured soils than in fine-textured soils. In the event of a subsurface spill, the fluid will have a tendency to collect in the pipeline trench because of likely greater porosity and only partial recompaction of backfill. Some penetration of the fluid into the large pores of the subsoils will also occur depending on spill volume and subsoil characteristics.

The oil will migrate vertically through the soil, leaving behind a residual saturation typically in the range of 1.5 to 4 percent of the soil volume. The volume of contaminated soil in the event of either surface or subsurface spills will thus range from about 25 to 65 times the volume of infiltrated oil, depending on soil structure and composition (especially clay and organic matter content). Vertical migration of a spill may be arrested or diverted in several ways:

- Presence of soil horizons or geologic strata of low permeability to oil,
- Presence of a water table (zone of water saturation), or
- Retention capacity of the contaminated soil exceeds spill volume.

Mobile oil which reaches groundwater or impeding layers will spread out horizontally above the groundwater or impeding layer, forming an oil "pancake."

Impacts of an oil spill on soils and groundwater are considered potentially Class I, locally significant, and long-term. The intensity of the impact would decrease with time because of chemical and biological degradation, and physical dispersal. The seriousness of a particular spill would depend on a variety of factors, including proximity to existing supply wells or potential resources, depth to groundwater, presence of surface water, local topography, soil type and proximity to sensitive biological habitat. In absence of existing or reasonably foreseeable future uses impacts would be Class III. The proposed alignment does not pass close to any community water supply wells, but does traverse areas where groundwater is utilized for individual or irrigation supply. See Figure 4.3-3 for geohydrologic features of interest.

Different portions of the Project Area can be distinguished with regard to general oil mobility and relative potential for impact of a spill on groundwater. Areas of shallow groundwater are most vulnerable. Groundwater is shallowest in river bottoms, flood plains and streambeds, especially in the Santa Ynez River and San Antonio Creek flood plains. See Figures 2.3-2 and 2.3-3 in Technical Appendix C. In the Project Area, soils are mostly coarse-textured, and favorable to infiltration of spills. The formations underlying Burton Mesa are also generally porous though the presence of clay lenses would tend to deflect downward migration of mobile oil, and limit the potential for free oil to reach the regional water table. Levels of soluble hydrocarbons in infiltrating rainwater would tend to increase after passage through a spill. Impacts in areas of utilization of groundwater and shallow water tables could be Class I, locally significant.

Conditions from the San Antonio Creek drainage to Orcutt are similar to those on Burton Mesa. In the Purisima Hills, soils are generally thinner and underlying formations are finer-textured. Surface spills would tend initially to spread more and infiltrate less, affecting a larger surface area. Impacts on groundwater would be Class III because of poor permeability of rocks units to oil, great distance to the regional water table, and insignificant level of local usage.

The dissolved salts and solids in the oil/water emulsion in the pipeline running to the Lompoc Dehydration Facility and in the produced water line returning to Platform Irene would have an impact on the soils in the pipeline areas if a spill occurred. The sodium would cause a decrease in permeability and, upon drying, an increase in crusting. The high salt content would reduce available water for plants. Impacts are considered as Class I, locally significant and long-term.

5.3.3.2 Impacts of Area Study Development

The primary increased direct project water supply requirement identified in the area development scenario is 35 gpm (56.5 acre feet per year) for a gas processing facility in the Lompoc area. The source of this water has not been identified. If withdrawn from groundwater in the Lompoc Basin, a 35 gpm withdrawal would cause an adverse, but not significant, impact (Class III) on local groundwater table elevations. However, since the Lompoc Basin is already being overdrafted, the water balance impacts are considered to be significant adverse impacts (Class II).

Impacts on groundwater of area development pipelines can be characterized for the Area Study triangle in a manner similar to the Project Area. Areas of shallow groundwater, including flood plains of the Santa Ynez River and tributaries would be most vulnerable to short-term and long-term significant impacts as a result of spills (Class I). For areas underlain by consolidated low permeability rocks (e.g., Monterey, Sisquoc and Rincon Formations) spill impacts on groundwater would be insignificant. This would include areas in the Santa Ynez Mountains and foothills (see Figure 4.1-5). For areas with permeable soils and rock units but greater depth to groundwater (Lompoc Uplands, areas of the Purisima and Santa Rita Hills) impacts would be long term, locally significant (Class I) or insignificant, depending on proximity of a spill location to existing supply wells.

5.3.3.3 Impact of Project Alternatives

The impacts on groundwater if a facility were located at Site 8 would be essentially the same as those of the proposed facility site. Impacts on groundwater of Alternative Pipeline routes are distinguished by the traverse of the Santa Ynez River flood plain of Routes 2 and 4. In the event of a spill, free oil would likely reach the regional water table, because of the shallow depth to groundwater in this portion of the Project Area. This area of shallow depth to groundwater is also heavily pumped, primarily for irrigation. In addition, routes 2 and 4 pass near several community water supply wells. Route 3 avoids the areas of shallow groundwater table, but does pass near two community water supply well fields. Impacts could be Class I, locally significant in this heavily pumped area, with both short-term and long-term impacts. Impacts to groundwater would be avoided by the no-project alternative.

5.3.3.4 Mitigation

PROJECT IMPACTS

The project impacts on groundwater include increased consumptive use and the potential for quality degradation from accidental spills and waste disposal. Consumptive water use requirements come from the construction activities, normal operation of the facilities, and other development induced by the project development. Since any increased consumptive water use in an already overdrafted basin is considered to cause a significant adverse impact, consumptive water uses that cannot be eliminated in the context of the project are considered Class I impacts, even though some partial mitigation is feasible.

The construction water requirements include water for hydrotesting of the tanks and pipeline, dust control, and potable and sanitary use by construction crews. The hydrotesting requirement is governed by the size of the largest tank to be tested. Since water for testing other facilities would be drawn from water used to test the large tank at Lompoc, no further mitigation is feasible. Mitigation measures for dust control water requirements include avoiding excessive applications and recycling of hydrotesting water for dust control as much as project schedules will allow. Recycling of some hydrotesting water for dust control has been proposed by Union.

Water requirements during normal operation fall into two categories, increased consumptive uses and potentially decreased groundwater recharge. Feasible mitigation methods for the increased consumptive use at the proposed Lompoc facility include installation of water saving fixtures, such as low water use toilets, and careful use of water by the work crews. At the Orcutt facility, treatment and reuse of the boiler blow down water would mitigate the adverse impacts to groundwater, but the quantity of water involved is so small that such treatment is not likely to be economically feasible.

The potential for lost recharge is the major normal operation impact on groundwater. This impact could be mitigated by treatment of the contaminated site runoff water, with subsequent disposal in a well or infiltration basin. The feasibility of this measure depends on how badly the site runoff water is contaminated. Initially, the site runoff water contamination is expected to be very slight. As the facility continues to operate, and the grounds become more contaminated, the site runoff water would also become more contaminated. Therefore, careful operation to keep the facility grounds as clean as possible would also help to mitigate this impact.

The potential impact on groundwater of an oil spill is judged to be a Class I impact. Several post-spill mitigation measures are available, but none, short of complete removal of all contaminated soil before any oil reaches the groundwater, can offer complete confidence that groundwater quality will not be significantly degraded in some areas. Even complete removal of contaminated soil creates a new problem of contaminated soil disposal. The difficulty of groundwater cleanup makes even the best post-spill mitigation measures inferior to spill prevention, with respect to protecting groundwater quality. However, even when all reasonable preventative measures are taken, spills are still possible. Therefore, post-spill mitigation must be considered as an important part of any overall mitigation program. The primary available spill prevention methods are systems of pressure sensors coupled to automatic valves and inventory control. The former is designed to protect against large sudden leaks which would cause pipeline pressures to drop, and the latter is designed to detect slow leaks which might otherwise escape notice. The types of remedial measures which could be applicable include containment, groundwater pumping, treatment or other disposal of the pumped groundwater, removal of the contaminated soil, with subsequent proper disposal, and in-situ treatment. For any of these methods, or combinations of methods, careful design based on site-specific conditions is required for successful cleanup efforts.

The cost and effectiveness of some mitigation measures, particularly containment and pumping, depend in part on the time interval between the spill and initiation of remedial measures. Spill response plans, in conformance with state and federal requirements, will be developed for the Lompoc facility [Union, 1983]. Similar response plans for pipeline breaks could help mitigate the impact of those events.

AREA STUDY DEVELOPMENT IMPACTS

The onshore facilities considered in the Area Study scenario include:

- expansion of the Union Lompoc Dehydration Facility
- a new gas plant near Lompoc
- a pipeline from Lompoc to Gaviota or tie-in to an industry pipeline

The water use requirements for these facilities include direct water use at the facilities and increased water use elsewhere in the area induced by the facility development. Technical Appendix K presents these anticipated water use increases identified for the Area Study scenario. Since the increased water uses will be drawn from groundwater, and most groundwater basins in the area are already being overdrafted, any increased water use is considered to cause a significant adverse impact (Class II).

The major direct project water use identified in the Area Study scenario is process water for the gas plant near Lompoc. Withdrawals of this water requirement is considered a Class II impact on groundwater. The primary means of mitigating the impact of this water requirement is finding a water source other than groundwater from an already overdrafted basin. Since the nearby basins are already overdrafted, interbasin transfer is not a feasible source of water. One feasible source is the produced water from the proposed Lompoc Dehydration Facility, following suitable treatment.

The quality of produced water from the Lompoc Dehydration Facility was described in the Project Description of the EIS/EIR, Section 2.6.7, Table 2.6.3. Since this water contains generally lower concentrations of dissolved solids than sea water, treatment by desalination should be able to produce water of adequate quality for the gas facility process water. The anticipated quantity of produced water from the Lompoc Dehydration Facility is 30,000 bpd (1,410 AFY), approximately 25 times the quantity needed for the gas processing facility.

The secondary impacts associated with a desalination facility of the required size are likely to be adverse, but not significant (Class III). See Technical Appendix C for additional discussion.

REFERENCES

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Terzaghi, K. and R. B. Peck, 1967, Soil Mechanics In Engineering Practice, 2nd ed., John Wiley & Sons, Inc., New York.

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5.4 MARINE WATER RESOURCES

5.4.1 Introduction, Methodology, and Overview

Environmental consequences of the proposed project on marine water resources have been assessed by identifying and quantifying potential sources of contamination from individual project components. The approach included studies of the published literature, including reports on other California and Gulf Coast oil facilities, modeling to predict expected dilution ratios for the various waste water discharges, comparisons of pollutant mass emission rates with those from municipal discharges in the Los Angeles area where resulting marine impacts have been monitored, comparison of hydrocarbon mass emission rates with estimates for natural oil seeps in the marine environment, and -- for selected pollutants -- an evaluation of specific physicochemical properties that relate to environmental fate, biological uptake and toxicity. Additional details on impacts are provided in Appendix D.

The significance criteria shown in Table 5.4-1 were used to classify identified marine water quality impacts. Key elements of this classification scheme include the following:

1) Any expected departure from baseline (background) conditions, developing -- where possible -- expectations based on analogous documented situations and previous studies.

2) Location and extent of discernable changes, with higher significance being given to: (i) changes occurring significantly beyond distances defined by a zone of initial dilution for waste water discharges (approximately 100-200 meters radius); and (ii) changes which would cause water quality standards or criteria to be violated.

3) Persistence of adverse impacts, with added significance being given to events (e.g., a major oil spill or sediment accumulation of non-degradable pollutants from platform discharges) that might lead to long term changes lasting years to decades after the causitive events.

4) Changes in water quality or sediment chemistry that might result in subsequent changes in indigenous populations or their usage of an area.

The distinction between Class I and Class II significance levels (last two rows in Table 5.4-1) is made based upon a determination of the extent to which the impact can be mitigated. Class I impacts are not mitigable to insignificance; Class II impacts are.

Areas of special emphasis for marine water resources include: 1) proposed discharges of produced water, drilling muds and drill cuttings

Table 5.4-1

SIGNIFICANCE CRITERIA USED FOR OPERATIONS AND DISCHARGES THAT COULD POTENTIALLY AFFECT MARINE WATER QUALITY[a]

Significance Level (Class)	Discernable Changes in Background	Location and Extent of Discernable Changes	Long Term Changes in Receiving Environment	Change in Indigenous Populations or Usage of Area
Not Significant (III)	No	--	No	No
Low Significance (III)	Yes	Within zone of initial mixing; no standards exceeded	No	No
Moderate Significance (I or II)	Yes	Within and outside zone of initial mixing; no standards exceeded	Yes	No
High Significance (I)	Yes	Outside zone of initial mixing; standards violated	Yes	Yes

(a)See Appendix D for a more detailed definition of these criteria.

(including potentially associated biocides) from the offshore platforms; 2) an increase in the ocean discharge of treated process wastewaters from Union's Santa Maria refinery; and 3) oil spills, including both small, relatively frequent spills and large, infrequent spills. Associated with 1) and 2) are further emphasis on the following pollutants: biochemical and chemical oxygen demand (BOD, COD); heavy metals, especially barium, chromium, and zinc; aromatic organics, especially phenols and naphthalene; ammonia; sulfide and any biocides, emulsion treatment chemicals or surfactants that may be used. For certain heavy metals and low-solubility organics that tend to associate with suspended accumulation in the sediments. There is, finally, some emphasis on the lack of sufficient baseline data (in terms of quantity, parameters covered, time and seasonal variability, and site specificity) to accurately quantify expected impacts.

The major project phases, activities, and associated marine discharges are summarized in Table 5.4-2 along with estimates of the total mass emission loads (over the project lifetime) for selected pollutant parameters. As indicated by the footnotes in the table, some of the emission loads are derived directly from data submitted by the Operators while others are estimates by Arthur D. Little, Inc. The impacts and significance of these activities and discharges are discussed in the following subsections.

5.4.2 Impacts of Proposed Project Components

5.4.2.0 Construction Impacts

The offshore installation of Platforms Irene and Shamrock is expected to result in low-significance, short-term (Class III) impacts on the chemical quality of the receiving waters. Installation activities (cf. Tables 2.1-13 and 2.1-16) would include the discharge of treated sanitary sewage (chlorinated) and other waste waters, the discharge of desalination brine (Shamrock only), and the actual platform emplacement, which would result in some bottom sediment resuspension during pile driving. These activities would result in local and temporary (3-6 months) increases in turbidity, suspended solids, and other conventional pollutants such as BOD.

For 4-6 months overlapping the above activities, installation of the subsea pipelines between the two platforms, the pipelines and power cable between Platform Irene and the shore, would also result in temporary impacts associated primarily with increased sediment suspension from vessel anchoring, pipelaying and, in the near-shore, excavation of the pipeline and power cable trenchs. It is estimated that the proposed construction would result in resuspension of some 27,500 cubic meters (31,500 metric tons) of solids. This quantity of material is estimated to be 0.17 percent of the wet year natural flux of sediments into the Santa Maria Basin and 4 percent of that during a normal dry year. (Appendix D.)

Should the sediments in the construction area by predominantly sands, it is expected that they would have only a short-term impact (days to weeks) on turbidity, and that they would not carry a consequential contaminant load. In this case, the impact of sediment resuspended during construction should be of low (Class III) significance. If, however, a significant amount of the

Table 5.4-2

ESTIMATED TOTAL PROJECT MASS EMISSION RATES OF EFFLUENTS AND IDENTIFIABLE COMPONENTS THAT WOULD BE DISCHARGED ABOVE AMBIENT LEVELS DURING CONSTRUCTION, OPERATION AND ABANDONMENT OF PIPELINES (37.8 km), CABLES (14.5 km), PLATFORMS IRENE AND SHAMROCK, THE LOMPOC DEHYDRATION FACILITY AND THE SANTA MARIA REFINERY

Source and Discharge[1]	Discharge Volume (bbls)	Components (metric tons)						
		Solids	BOD	COD	Oil & Grease	Phenols	Cyanide	Ammonia
Construction								
Sediment Resuspension[2]	173,000	31,515						
Sewage & Wastewater[2]	53,250	0.60	1.4[7]		0.12	0.0019	0.000009	0.17
Desalinization Brines	27,000							
Platform Operations								
Drilling[4]								
Drill Cuttings	107,000	24,900						
Drill Fluids	291,000	11,400						
Prodution[5]								
Formation Water	274,000,000	1,090	3,810	3,810	1,090	17.4	0.44	2,570
Cooling Water	864,000,000							
Support Activities[6]								
Sewage & Wastewater[2]	1,038,220	10.9	25.5		2.17	0.034	0.000165	3.09
Desalinization Brines	3,010,000							
Cleaning Water	157,000							
Pipeline Operations								
Refinery[5]								
Processing Water	6,130,000	27.1	34.8	602	6.9	0.041		3.86
Transport Activities								
Oil Spills & Leaks[2,5]	21,000	2,960	10,400	10,400	2,960			
Abandonement								
Sediment Resuspension[2]	173,000	31,515						
PROJECT TOTAL	1,150,000,000	103,400	14,270	14,810	4,060	17.5	0.44	2,610

1 Unless otherwise indicated, discharge loads are derived from data submitted by the applicants. Details are provided in Appendix D.
2 Discharge loads are estimates by Arthur D. Little, Inc. as described in Appendix D.
3 Over 4 month construction period.
4 Over 3-4 year drilling period.
5 Over 20 year production period.
6 Over 24 year drilling production.
7 Estimated using Oxnard secondary treated effluent.

Table 5.4-2
(continued)

Source and Discharge[1]	Components: Metals (metric tons) Ba	Cr	As	Cd	Cu	Pb	Hg	Ni	Ag	Zn
Construction[3]										
Sediment Resuspension[2]										
Sewage & Wastewater[2]		0.00013		0.00011	0.00082	0.00009		0.00019		0.00099
Desalinization Brines										
Platform Operations										
Drilling[4]										
Drill Cuttings	60									
Drill Fluids	418	1.2								
Production[5]										
Formation		1.8	12	0.73	9.0	3.6	0.29	2.9	0.73	40.3
Cooling Water										
Support Activities[6]										
Sewage & Wastewater[2]		0.00229		0.00194	0.0150	0.00168		0.00353		0.0180
Desalinization Brines										
Cleaning Water										
Pipeline Operations										
Refinery[5]										
Processing Water		0.027		0.012	0.0019	0.0204		0.0188		0.067
Abandonment										
Sediment Resuspension										
PROJECT TOTAL	478	3.0	12	0.74	9.0	3.6	0.29	2.9	0.73	40.4

Arthur D. Little, Inc.

resuspended sediments consist of clays and organic particulates, this conclusion would have to be reevaluated taking into account the pollutant load (if any) of the sediments, the longer residence time of the fine particulates in the water column, and their transport and dispersal in the Study Area. It is unlikely that, even if the sediments were silty and clayey, the significance of impacts would be increased above Class II; it is also possible they would remain of low (Class III) significance.

The emplacement of platforms, pipelines, and moorings in the ocean will have no significant effects on local currents and waves. The structures will cause some increase in water turbulence in the wake of the structure; at the sea floor, this will result in some local scour and resuspension of bottom sediments. A locally insignificant beneficial (Class IV) impact of wake turbulence is an enhancement in dispersion of waste waters discharged from platforms.

Neither project construction nor operation would have significant impacts on local hydrography, including seawater temperature, salinity or density. Further discussion is provided in Section 5.4.3.

5.4.2.1 Normal Operations

PLATFORM

Overview

The major ocean discharges from the two platforms include drilling muds, drill cuttings, produced water (Irene only), treated sanitary sewage, desalination brine and cooling water (Shamrock only), and other miscellaneous waste waters. Data on treatment (if any), discharge rates, duration and total amounts were provided in Tables 2.1-14, 2.1-15, 2.1-17, and 2.1-18. Tables 2.1-2 and 2.1-6 described the expected drilling mud composition, while Table 2.4-3 described the expected produced water composition. (Additional information on the expected composition of all discharges is given in Appendix D.) Table 5.4-2 provided estimates of the total pollutant emissions (volume discharge and pollutant mass) for each discharge. As described in Tables 2.1-1 and 2.1-5, these discharges will enter the ocean through a number of subsurface conductors that are between 40 meters (130 feet) and 64 meters (210 feet) below the ocean's surface.

Drilling and production are scheduled to start in 1986 for both platforms. Drilling would take place over a 3-4 year period (ending near the end of 1990) and production would take place over 20 years ending about 2010. Impacts associated directly with platform discharges would stop with the end of production. Impacts which may be associated with pollutants which had, over this 20-year period, been deposited (and accumulated) in bottom sediments could persist beyond this time.

Discharges from the platforms, which are outside of California's 3-mile jurisdictional limit, are covered by the EPA's general NRDES Permit No. CA0110516 described in the Federal Register of December 8, 1983 (Fed.

Reg.; 48 [237]: 55029, 1983). New regulations are expected to be published by mid-1985. In addition, the EPA expects to propose New Source Performance Standards (NSPS), best Conventional Treatment (BCT) and, possibly, Best Available Treatment (BAT) for "toxics" later in 1985. These new regulations may force changes in the presently proposed ocean discharges of the platforms. Additional information on the status of, and expected changes in, regulations covering these platform discharges is given in Appendix D.

Existing regulations require federal and/or state marine water quality standards to be met outside of the zone of initial dilution (or "mixing zone"); a mixing zone with a lateral radius of 100 meters, and extending from the sea's surface to the seabed, may be allowed under EPA's general permit number CA0110516. Alternative mixing-zone dimensions may be defined with the use of appropriate plume dispersion models which calculate the point at which turbulent mixing, associated with the initial momentum of the discharge, stops. Dilution ratios during drilling and production are, as described below, expected to exceed 4,000 at a distance of 100 meters from the discharge.

Dispersion Model Calculations

The initial dispersion of the effluent discharges from the platforms, other than drill muds and cuttings, was estimated using the OUTPLM dispersion model [Teeter and Baumgartner, 1979]. The initial dilution of the Santa Maria Refinery waste waters exiting the submerged diffuser was estimated using the DKHPLM computer program (Teeter and Baumgartner, 1979]. Because there are uncertainties in the inputs to the model (e.g., parameters describing the discharge as well as the receiving water), and because of certain assumptions (detailed in Appendix D) associated with the model itself, the calculated dilution ratios should be considered as rough estimates. The uncertainty in the estimates is probably about a factor of two to five.

The "initial dilution" ratios calculated are for the edge of the zone where turbulent mixing associated with the momentum of the plume stops, or where the plume reaches the sea surface or sea floor if the latter occurs first. Platforms Irene and Shamrock would be covered by EPA's general permit No. CA0110516 for which a 100-meter radius mixing zone may be allowed (Fed. Reg. 48 [237]: 55042, Dec. 8, 1983). These zones of initial dilution are important for regulatory purposes since state and/or federal water quality criteria and standards are required to be met outside these zones.

Table 5.4-3 provides a summary of these model results for the centerline of the discharge plumes. All discharge plumes modeled here are buoyant (i.e., tend to rise), and several reach the surface at the edge of the zone of initial dilution. Calculated initial dilution ratios for the platform discharges (Table 5.4-3) range from 3,600 to 111,000 and indicate, typically, that dilution ratios may exceed 4,000 beyond 100 meters. Different models give very different dilution estimates. Dilution ratios for discharged drilling muds are also expected to be significantly above 1,000 at 100 meters from the point of discharge. (See Appendix D, Table 5.4.28.)

Table 5.4-3

RESULTS OF MODEL ANALYSES FOR WATER DISCHARGES
(Excluding Drill Muds and Cuttings)[a]

Item	Construction	Drilling	Operation
I. Platform Irene			
Total discharge rate (gpd)	13,650[b]	2,436[b]	1,390,000[c]
Discharge depth (below surface) (m)	55	55	45
Depth (below surface) reached by plume after initial dilution (m)	36	42	Plume Surfaces
Distance down-current plume completes initial dilution (m)	118	119	94
Initial dilution ratio	38,900	7,740	3,620
II. Platform Shamrock			
Total discharge rate (gpd)	138,600[d]	253,300[e]	26,400[e]
Discharge depth (below surface) (m)	39	39	39
Depth (below surface) reached by plume after initial dilution:	Plume Surfaces	Plume Surfaces	Plume Surfaces
Distance down-current plume surfaces (m)	124[f]	139[f]	158[f]
Initial dilution ratio	28,700	15,700	111,000

Table 5.4-3

RESULTS OF MODEL ANALYSES FOR WATER DISCHARGES
(Excluding Drill Muds and Cuttings)[a]
(Continued)

Item	Construction	Drilling	Operation
III. Santa Maria Refinery			
Total discharge rate (gpd)	--	--	273,000[g]
Dicharge depth (below surface) (m)	--	--	7.5
Depth (below surface) reached by plume after initial dilution (m)	--	--	6.1
Initial dilution	--	--	740

[a] Models used were OUTPLM for platforms and DKHPLM for refinery diffuser. See text and Appendix D for details.

[b] Treated sewage and treated wastewater.

[c] Treated sewage and deck drainage and produced water. (Includes produced water from Shamrock oil.)

[d] Treated sewage and desalination brine.

[e] Treated sewage and desalination brine and deck drainage.

[f] These distances define the down-current distance to the edge of the zone of initial dilution.

[g] Approximately 90% of this part of baseline.

No separate modeling of drill muds and cuttings was conducted. Instead, interpretation was made from the model results reported by Continental Shelf Associates, Inc. [1984] and reviews such as by the National Research Council [1983]. An extract from the Continental Shelf Associates, Inc. (CSA) model runs is given in Table 5.4-4. Here, a release of 480 barrels of mud is estimated -- on the assumption of no change in current direction during the model run -- to affect an area of 0.43 - 0.66 km^2. Between 32 and 94 percent of the solids were deposited on the ocean floor during the 10-hour simulation, during which time the average current (25 centimeters/second) could carry residual suspended sediments (6-68 percent) a distance of 8-9 kilometers.

The Union and Exxon platforms are expected to have total drilling muds discharges that are factors of 211 and 400, respectively, greater in volume than the 480 barrels discharges modeled by CSA. (Total drill cuttings discharges by Union and Exxon -- over the 20-year production period -- are factors of 80 and 142, respectively, greater than the 480 barrel quantity.) If the model results are thus extrapolated to consider total platform discharges, the maximum thickness of accumulated drilling muds is on the order of 3-50 centimeters (at a distance of 0.06-0.09 km from the platforms) if current directions are constant. Such an analysis may be considered a worst case, not only because of the assumption of no change in current direction but also a failure to consider subsequent resuspension (and loss) of deposited material. As is noted below under the discussion of Drill Fluids, there is some evidence that there is no net deposition of sediments in the Santa Maria Basin; thus resuspension and relocation of bottom sediments may be an important process.

Given that a significant fraction (32-94 percent) of the discharged solids have (according to the CSA model results) settled out within 8-9 kilometers, and that current directions will allow the sediments to be carried in most directions (but with difficulty towards the east), it appears reasonable to assume that the total area affected by such deposited material is equivalent to three quarters of a circle of radius 8-9 kilometers, or about 150-190 km^2 per platform*. Note, that since Platforms Irene and Shamrock are only 4 kilometers apart, these total affected areas would be expected to overlap, especially NW of Irene and S of Shamrock.

As described in Section 4.4.2, ocean current directions (and velocities) at the platform sites are highly variable although the predominant (surface) current directions are southerly during the July-October period, northerly during the November-February period, and offshore (westerly) during upwelling (March-June). This variability, combined with wind-driven surface currents (mostly towards the southeast) and other variable current factors (e.g., tides, eddys) means that the discharge plumes from the platforms may be carried in almost any direction, although significant transport towards shore (northeast, east, or southeast) is relatively unlikely in the absence of persistent winds blowing in those directions.

*The area affected may be envisaged as a circle with a 90-degree wedge-shaped portion removed from the right (eastern) side.

Table 5.4-4

MODEL RESULTS FROM SIMULATION OF DEPOSITION
DRILL MUDS AND CUTTINGS[A]

Model Run Code[B]	Simulation Duration (hr)	Time to deposit 33%[C] (hr)	Percent Deposited at end of simulation[D] (%)	Peak thickness of deposit[E] (cmx 10^{-3})	Distance to peak thickness[E] (km)	Area affected[E,F] (km^2)	Down Current Distance to Thickness depth (km)
PC-73-U-Ave-12	10	1.07	63.2	90.8	0.09	0.59	2.5
PC-73-D-Ave-12	10	0.80	94.1	130	0.06	0.66	2.5
PC-73-U-Ave-10	10	N/A	32.2	15.5	0.09	0.43	2.6
PC-73-D-Ave-10	10	1.31	80.4	38.2	0.06	0.63	2.6

[A] All data from Continental Shelf Associates (1984).

[B] Model runs chosen simulate the Point Conception (PC) area, in waters 73 m deep, a shunted discharge 40 m below the surface, a time period [for specification of density stratification] that is in the upwelling (U) or downwelling (D) period, average (Ave) current speeds [approx. 25 cm/s], and a discharge density of either twelve (12) or ten (10) lb/gal. In each individual simulation, 480 bbl/hr of muds or cuttings were released for 1 hour.

[C] Time required for 33% of the solids of deposit on the sea floor.

[D] Percent (%) of total solids discharged that had been deposited at the end of the 10-hour simulation.

[E] Assumes current direction does not change during simulation run.

[F] Only counts area receiving a deposit thickness greater than 10^{-4} cm.

Drill Cuttings

The discharge of drill cuttings from the platforms would result in impacts of moderate (Class II) significance primarily due to the potential for long-term impacts on sediments in areas beyond the immediate vicinity (i.e., beyond 100 meters) of the platforms. The two platforms, combined, would discharge a total of 24,900 metric tons of solids (Table 5.4-2), most of which will settle out within 300 meters of the point of discharge (Appendix D, Figure 5.4.1). The water quality impacts would be associated primarily with elevated suspended solids and turbidity levels, but this is estimated to be of low (Class III) significance. Accumulations of cuttings (and other materials) up to 5 meters high have been found beneath Platforms Hilda and Hazel in the Santa Barbara Channel [Bascom et al., 1976]; such thicknesses are, however, over an order of magnitude greater than would be predicted from adjustments of the CSA model data described above. This burial will alter the local sediments with regard to both texture and chemical composition. In particular, concentrations of barium are expected to increase while the concentrations (relative to natural sediments) of other metals such as zinc and copper may decrease. The deposited cuttings could also alter the oxygen balance in the surface sediments by both the physical burial and by the addition of material (cuttings) from anaerobic environments which might carry an appreciable oxygen demand. It should be noted that there is a significant degree of uncertainty associated with the nature and extent of impacts associated with the discharge of drill cuttings and drill fluids (discussed below).

Drill Fluids

The discharge of drill fluids from the platforms will result in impacts of moderate (Class II) significance primarily due to the potential for long-term impacts on sediments in large areas beyond the immediate vicinity of the platforms (i.e., beyond 100 meters). The two platforms, collectively, will discharge 11,400 metric tons of mud solids (Table 5.4-2). These water-based drill muds consist primarily of barite and clay, with lesser amount of lignosulfonate*, lignite and other liquid and solid additives (Tables 2.2-2 and 2.3-2). Both continuous (low-level) and bulk discharges are contemplated as part of normal drilling operations.

Water column effects would include increased suspended solids concentrations and turbidity effects in a near-surface for several kilometers down-current of each platform. The Continental Shelf Associates (CSA) [1984] model results described above indicated that 6 to 68 percent of the solids might remain suspended for more than 10 hours after discharge at which time the plume could have traveled 8-9 kilometers from the platform. Changes in pH are expected to be minor.

*Union had indicated that the muds it will use contain chrome-free lignosulfonate (Table 2.2-2). A similar commitment has been made by Exxon (personal communication to Arthur D. Little, Inc. from S. Rogalin, California Coastal Commission, February 25, 1985).

The CSA model results were also used to show that, if ocean current directions were unchanging, accumulations of drilling muds on the ocean floor would reach a peak thickness of 3-50 centimeters. Because of current variability (and possible loss of material, after resuspension, to other areas) actual peak thicknesses of accumulation will probably not exceed 1 centimeter. However, the area affected by measurable thicknesses of such deposits (10^{-4} centimeters) was estimated above to be 150-190 km^2 per platform and to involve overlapping impact areas for the two platforms which are only 4 kilometers apart.

The deposited drill fluid solids will, as with cuttings, alter both the texture and chemical composition of the bottom sediments. Concentrations of barium and chromium are expected to increase; decreases are expected for lead, nickel, vanadium and zinc; no changes are expected for cadmium and copper. Elevated concentrations of lignosulfonate may also be expected in these deposits. The nature and quantity of drilling mud additives such as biocides* and surfactants are also very important parameters in the chemical quality of the deposited sediments; it is important that all such additives be identified and evaluated for potential adverse impacts prior to use. It is important to note in this regard that the EPA's definition of a [permitted] Generic Drilling Mud (e.g., in their general permit no. CA0110516) does not exclude the use of such additives.

An increase in sediment concentrations of oil-related pollutants may also be associatd with the discharge of muds and cuttings. Elevated levels of hexane-extractable materials and, to a lesser extent, volatile solids were also found in bottom sediments near the perimeter of Platform Hazel in the Santa Barbara Channel; data on volatile solids for Platform Hilda showed no similar elevations (Appendix D, Table 5.4-38). These platforms do not discharge any formation waters at the platform sites.

A prediction of the eventual fate of drilling solids discharges (cuttings fines as well as muds) is obtained from a consideration of the behavior of riverine sediments in the Santa Maria Basin area. Work by the U.S. Geological Survey revealed that the Santa Maria Basin is an area in which no net deposition occurs [Continentinal Shelf Associates, Inc. 1984]. These findings imply that the fine-grained particles put into suspension by being discharged, or resuspended by rapid water motion, will eventually pass across the Study Area and be deposited in basins beyond the continental slope. It is not known over what time scale (e.g., years, decades or longer) such redistribution would take place for project-related deposits. These statements on sediment transport hold, as well, for sediment-associated pollutants deriving from produced water discharges. However, they may hold less validity for barite particulates which are significantly more dense than other sediments and may thus be resuspended only with difficulty. This may prove important if barite is considered a potential "tracer" in monitoring studies, as it may travel shorter distances than other constituents of greater potential toxicity.

Formation Water

The discharge of formation (produced) water from the platforms will result in water quality impacts of low (Class III) significance and sediment impacts of moderate (Class II) significance. Impacts on the water column are of low significance since no adverse effects, and no violations of marine water quality standards or criteria, are expected outside of the allowed zones of initial dilution. Impacts on sediment quality are classified as Class II since the area potentially affected extends well beyond the local area around each platform, and since the impacts may persist for years to decades after the platform discharges cease.

The formation water from both Platform Irene and Platform Shamrock will, after separation from oil in the Lompoc Dehydration Facility, all be discharged through a single submerged outfall on Platform Irene. Over the project lifetime, a total of 274,000,000 barrels of formation water are expected to be so discharged.

Formation water is essentially a brine with trace levels of heavy metals, oil-related hydrocarbons and other organics (e.g., phenols and nitrogen and sulfur heterocyclics), cyanide, ammonia, sulfide, and other chemicals and solid (mineral) matter. Associated with these constituents are the pollutant parameters: suspended solids, oil and grease, and oxygen demand. More detailed information on the expected composition of these formation waters is given in Table 2.6-3 and in Appendix D.

Effects of this discharge on the water column are expected to be of low (Class III) significance since the initial dilution factor of 3,600 (at 95 meters from the discharge) is more than adequate to insure that state and federal water quality standards are met outside the zone of initial dilution (Appendix D). This conclusion is generally supported by the review conducted by Middleditch [1984]. Such conclusion, however, does not cover treatment chemicals which may be added to the produced water. In this case, it is expected that a combination of emulsion breaking chemicals and reverse emulsion breaking chemicals will enter the produced water at the Lompoc Dehydration Facility (Table 5.4-5). At the rates of usage implied by the data in Table 5.4-5, hundreds of metric tons of these additives could be discharged per year. Some of the components which have been identified are toxic to moderately toxic in short-term (e.g., 96-hour) aquatic toxicity tests (Appendix D, Tables 5.4.27 and 5.4.45). The aquatic toxicity of formaldehyde, for example, yields LC50 values in the range of 10-100 ppm (Appendix D, Table 5.4.45). The potential for these additives to cause chronic toxic effects in the marine environment is unknown.

A significant amount of the pollutants in formation water (especially the heavy metals and hydrophobic organics) may be associated with particulates and eventually be deposited on the ocean floor. For metals, it is estimated (Appendix D) that sediment enrichments in the following order are likely: Zn, As, Cu, Pb, Ni, Cr, Cd=Ag, Hg. Enrichments of Fe are also likely [Menzie, 1982]. Large elevations of Zn have been found in sediments directly below Platforms Hilda and Hazel in the Santa Barbara Channel (Appendix D, Table 5.4.38). Other studies have found elevations of metals in sediments within 100 meters of platforms [Menzie, 1982].

A significant fraction of the organics in the produced water will be comprised of volatile liquid hyrdocarbons such as benzene, toluene and xylene. Such chemicals are unlikely to persist in the water column because of losses via volatilization (to the air), photolysis and biodegradation. Trace levels of more hydrophobic, refractory (non-degradable) organics such as

Table 5.4-5

LIST OF PROPOSED CHEMICAL ADDITIVES USED IN THE TREATMENT OF OIL AND WATER

Additive Brand Name	Purpose	Dosage/	Final Concentration/ Annual MER[a]	Description[b]
USED IN OIL TREATMENT				
NALCO-4415[c]	Emulsion Breaker	1 qt/100 bbls	60ppm/ 131 MT	Blend of polyalkylene oxide adducts in a hydrocarbon solvent and isopropanol
NALCO-301[c]	Emulsion Breaker	1 qt/100 bbls	60ppm/ 131 MT	Hydrocarbon blend of alkylphenol, formaldehyde resin, polyoxylalkylene, polyether in isopropanol
NALCO-707	Defoamer	1 qt/200 bbls	300ppm/ 65 MT	Silicone in a hydrocarbon solvent
USED IN WATER TREATMENT				
DREW-AMERCOR OF	Corrosion Inhibitor	1 qt/1000 bbls	6ppm/ 13 MT	Solution of fatty territary alkylamines
NLTC-H35	Scale Inhibitor	2 qt/1000 bbls	12ppm/ 26 MT	Alkaline organic phosphonate solution
NALCO-3338	Flocculent	1.7 qt/1000 bbls	10ppm/ 22 MT	Emulsion of a methacrylate quaternized polymer
NALCO-4810	Reverse Emulsion Breaker	1 qt/1000 bbls	6ppm/ 13 MT	Oxygenated polyamine in water and isopropanol

[a] MER = Mass emission rate based on 13,700,000 bbls of oil or water processed per year (Table 5.4.65).

[b] From the manufacturers information sheets that are packaged with each chemical.

[c] NALCO-4415 and NALCO-301 are not used at the same time. Bottle testing is used to determine which works best.

Source: Gillen, 1984a

polycyclic aromatics will also be present, and these will tend to be associated with, and accumulated in, the area sediments. Elevated total hydrocarbon concentrations have been reported in surface sediments near Platform Piper in the North Sea even though only water-based drill muds had been used [Law et al., 1982]. The elevated levels were generally within 1 nautical mile of the platform. The natural sediments around the platform were composed wholly of mud and this may have helped to absorb and retain hydrocarbons discharged form the platform. Elevated levels of hexane-extractable materials and, to a lesser extent, volatile solids were also found in bottom sediments near the perimeter of Platform Hazel in the Santa Barbara Channel; data on volatile solids for Platform Hilda showed no similar elevations (Appendix D, Table 5.4.38).

Cooling and Cleaning Waters

The discharge of deck drainage from the platforms is expected to result in impacts of low (Class III) significance. Relatively small volumes and pollutant loads are associated with such discharges.

The discharge of cooling water from Platform Shamrock is expected to result in impacts of low (Class III) significance since temperature increases outside the zone of initial dilution are expected to be minimal (0.1°F).

Sewage

The discharge of treated sewage from the two platforms is expected to result in impacts that range from non-detectable to low significance (all Class III). The discharges will add some relatively small amounts of nutrients and oxygen demand to the water column, and particulates (and associated metals) to the bottom sediments, but the quantities involved will constitute only a small fraction of the input to the project area.

Desalination Brines

The discharge of desalination brines from Platform Shamrock is expected to result in impacts of low (Class III) significance. Any effects associated with elevated temperatures or additives would involve negligible impacts outside the zone of initial dilution.

Cathodic Protection

It is assumed that the platform structures will have cathodic (corrosion) protection involving sacrificial anodes. Such anodes commonly are made of zinc or aluminum and would release such metals to the water column during the 20-year (minimum) expected life of such anodes. The significance of such releases would probably be low (Class III).

PIPELINES

Normal operation of the subsea pipelines is expected to result in impacts of low (Class III) significance. The impacts include physical disruption of the bottom contour (and, thus, benthic communities), the temperature changes due to release of heat from the transported fluids, and the leaching of metals (zinc or aluminum) from sacrificial anodes.

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USED IN WATER TREATMENT				
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polycyclic aromatics will also be present, and these will tend to be associated with, and accumulated in, the area sediments. Elevated total hydrocarbon concentrations have been reported in surface sediments near Platform Piper in the North Sea even though only water-based drill muds had been used [Law et al., 1982]. The elevated levels were generally within 1 nautical mile of the platform. The natural sediments around the platform were composed wholly of mud and this may have helped to absorb and retain hydrocarbons discharged from the platform.

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The discharge of cooling water from Platform Shamrock is expected to result in impacts of low (Class III) significance since temperature increases outside the zone of initial dilution are expected to be minimal (0.1°F).

Sewage

The discharge of treated sewage from the two platforms is expected to result in impacts that range from non-detectable to low significance (all Class III). The discharges will add some relatively small amounts of nutrients and oxygen demand to the water column, and particulates (and associated metals) to the bottom sediments, but the quantities involved will constitute only a small fraction of the input to the project area.

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The discharge of desalination brines from Platform Shamrock is expected to result in impacts of low (Class III) significance. Any effects associated with elevated temperatures or additives would involve negligible impacts outside the zone of initial dilution.

Cathodic Protection

It is assumed that the platform structures will have cathodic (corrosion) protection involving sacrificial anodes. Such anodes commonly are made of zinc or aluminum and would release such metals to the water column during the 20-year (minimum) expected life of such anodes. The significance of such releases would probably be low (Class III).

PIPELINES

Normal operation of the subsea pipelines is expected to result in impacts of low (Class III) significance. The impacts include physical disruption of the bottom contour (and, thus, benthic communities), the temperature changes due to release of heat from the transported fluids, and the leaching of metals (zinc or aluminum) from sacrificial anodes.

SANTA MARIA REFINERY

The project-related increase in the ocean discharge of waste waters from the Santa Maria Refinery will probably result in impacts of low (Class III) significance although there are unknowns - with regard to waste stream composition and ocean dispersion - that could lead to impacts of greater significance for some pollutants. The refinery outfall extends 1,700 feet (515 meters) offshore, terminating in 25 feet (7.5 meters) of water with a 40-foot (13 meter) diffuser. At a discharge rate of 273,000 gpd, the discharge plume is expected to rise 1.4 meters to the edge of the zone of initial dilution at which point the dilution ratio will be about 740 (Table 5.4-3). The refinery is currently discharging treated waste waters under NPDES Permit No. CA0000051, issued by the California Regional Water Quality Control Board (Central Coast Region) on September 30, 1980. The Board is in the process of writing a new permit for the refinery, and the new permit may alter both the baseline and project-related pollutant loads discharged. (See Appendix D for details.)

The net, project-related discharge of several pollutants (a 10 percent increase in the pollutant load currently discharged, based upon the Operator's estimates) was shown in Table 5.4-2. A review (Appendix D) of pollutants in the waste water indicates that: 1) the phenolics are unlikely to cause chronic toxic effects; 2) the impacts of discharges of oil and grease are unlikely to be detectable; 3) discharges of BOD and ammonia would be of low significance outside the mixing zone; and 4) discharges of metals (enriched vs. the natural sediments in descending order: Zn, Cr, Pb, Cu, Ni, Cd) would be of low significance.

There remain, however, uncertainties with regard to: 1) any oil treating chemicals [added at Lompoc] which may pass through the refinery's treatment plant; and 2) the specific composition of waste waters from the new/modified refinery processes (e.g., gas treatment). Reasonable worst case assumptions lead to the tentative conclusion that associated impacts (e.g., ammonia toxicity, oxygen depletion) will be of low significance (Appendix D). There are also some uncertainties over potential for sediment contamination in the areas downcurrent of the refinery outfall; these uncertainties are associated with a lack of detailed information on the nature of sediments in the area and their long-term dispersion by tides and other currents.

SUPPORT ACTIVITY

No estimates were made of the marine water quality and sediment impacts which might be associated with normal crew boat and supply boat traffic. It is expected that the small discharges of sewage and bilge water would be non-detectable or of low (Class III) significance.

5.4.2.2 Accidental Oil Spills and Leaks

Oil spills are, in general, expected to be an uncommon event. The most probable spills of oil will be those that are small in volume (within a few gallons to a few tens of barrels) originating from leaks, ruptures and equipment failures. Larger spills are less likely, but could originate from such events as well head blowouts and major pipeline ruptures. It is estimated that the chronic, low-volume spillage will result in impacts of low (Class III) significance while a large spill would result in an impact of high (Class I) significance. A detailed discussion of oil spills (probabilities, oil spill trajectories, and fate of oil after spills) is provided in Section 5.11 and in Technical Appendix M. That appendix contains spill trajectory analyses -- based on computerized model runs -- conducted both by Arthur D. Little, Inc. and the Minerals Management Service.

Spill probabilities for different spill sizes and project components are given in Section 5.11. They show, for example, a probability of 8.5×10^{-3}/year for a spill of more than 100 barrels in the area of the two platforms, and a probability of 6×10^{-5}/year for a spill of more than 3,000 barrels in the same area. Cumulative probabilities over a 20-year operational span for these two types of spills are thus 17 percent and 0.12 percent, respectively.

Based upon historical data indicating that spillage (from all causes) has averaged 72 barrels per million barrels of oil produced, it is roughly estimated that the offshore components of the proposed project could accidentally release 21,000 barrels (2,960 metric tons) of oil over the 20-year production period (Appendix D, Sect. 5.4.2.3). This total is three times the amount of 'oil and grease' expected to be discharged with the produced water. (See Table 5.4-2.) However, this amount of oil is only 3 percent of the lower estimate, and 0.3 percent of the upper estimate, of the 5,000 to 50,000 metric tons per year of oil discharged from natural seeps in the Santa Barbara Channel just south of the Study Area. Although no estimates of oil seepage are available for the Study Area*, it is unlikely that the release of this amount of oil - if released continuously at a steady rate - would be detected as different from the background of natural contamination.

Expected impacts of chronic, low-volume releases of oil include generation of BOD, COD, and turbidity, increased levels of toxic aromatic hydrocarbons and surface slicks which create a visual impact as well as a barrier to oxygen transfer and a potential for fouling biota using the air-water interface. While it is unlikely that water column parameters such as dissolved oxygen will be significantly affected, such spillage could contribute significantly to the contamination of bottom sediments and beaches in the area. Of particular concern also is the potential for chronic effects on aquatic biota which may take up and metabolize soluble oil components (both aliphatic and aromatic hydrocarbons). Histopathological conditions, including hepatocellular lipid vacuolization (fatty liver) are associated with generation of oxygenated metabolites of oil-derived hydrocarbons (Appendix D).

*The available information indicates that there are probably fewer natural oil seeps in the Santa Maria Basin than in the Santa Barbara Channel.

A large oil spill (e.g., 1,000 barrels) could result in acute effects on the water quality and/or bottom sediments. Increases in oil content in the water, and increased BOD, COD and turbidity would likely cause water quality criteria to be exceeded for such parameters as dissolved oxygen and toxic organics concentration. In addition to acute effects, the residual oil (after some weathering and degradation) will contribute to chronic sublethal effects as mentioned above for small spills.

The probability of a spill of more than 1,000 barrels occurring during the 20-year project life is about 0.7 percent for the platform area and 0.6 percent for the offshore pipelines in the area near shore. (Given these probabilities, the spills may be referred to as "unlikely" during the 20-year project life.) The conditional probability of shore contamination (near Point Arguello) in the latter case is very high (about 40-50 percent). A spill near Platform Irene would have only a 5-10 percent conditional probability of reaching shore near Point Arguello, but would have a slightly larger probability (than a near-shore pipeline spill) of reaching one of the Santa Barbara Channel Islands (approximately 2-3 percent conditional probability). Additional details on oil spill probabilities and trajectories are given in Section 5.11.

It is uncommon for more than 10 percent of oil from a major spill to be recovered (see, for example, Table 5.4-61 in Appendix D), and it is known that persistent effects can be found even after 10 years in some areas such as soft sediments in shallow protected waters (Appendix D). Because of the large areas potentially affected, the magnitude of the changes in water column and sediment chemistry, and the potentially long recovery time for sensitive marine areas, such as spills are considered to have a significant (Class I) impact.

A rupture in the 3-miles of the Landfall-Lompoc segment of the onshore pipeline could result in oil contamination of the Santa Ynez River estuary and thereby the marine environment, with up to about 20,000 barrels of oil (worst case) (Appendix D, Section 5.4.5.1 B). Such an event would be of Class I significance.

Gas leaks from the platform-to-shore gas pipeline are possible but unlikely. Impacts of such an event would probably result in Class III impacts. These impacts would be associated with the dissolution of low molecular weight hydrocarbons and some hydrogen sulfide in the water column, and would be similar to those that presently occur at sites of gas seepage, which are common in the Project Area.

5.4.2.3 Abandonment

PLATFORMS

Abandonment of the two platforms will involve impacts of low (Class III) significance. These will include sediment resuspension and other minor discharges (e.g.,sewage from work boats), but such activities would presumably take place over a short period (1-2 months) and thus generate less impact than was associated with construction.

PIPELINES

If the pipelines are properly cleaned of oil and left in place at abandonment, no significance impacts would be expected. If the pipelines are removed, impacts associated with resuspended sediments would be of low (Class III) significance.

5.4.3 Impacts of Area Study Development

As described in Section 2.9, this scenario anticipates that an additional four platforms will be installed in the Central Santa Maria Basin; the possible locations of these platforms are shown in Figure 2.9-1. It is assumed that all of the new platforms will use subsea pipelines to Union's Platform Irene in order to transport their production to shore.

In this scenario (shown in Figure 2.9-1), all platforms might tie in with Platform Irene prior to piping to shore. In such an instance, all produced water removed at the Lompoc Dehydration Facility (about 300,000 B/D) might be returned to Irene for discharge.

The onshore oil and gas treatment for the additional oil is assumed to occur at Union's Lompoc facility. Wastewaters generated during such treatment (e.g., produced waters, scrubber waters) would thus be discharged from Platform Irene (Lompoc option). The Gaviota option discussed earlier in relation to the Exxon project is not considered in detail for this EIS/EIR for the reasons described in Section 2.9.3.

Based on assumptions that each of the four new platforms would have pipelines and discharges similar to those for the proposed Union/Exxon platforms, the total volume and mass of pollutants discharged from the six platforms would be about three times the values given in Table 5.4-2 for two platforms. While the extent of the impacts will thus increase by about a factor of three, the magnitude or significance of the impacts will not increase by the same factor since a much larger area is involved and many of the impacts described above for platform discharges were local, i.e., limited to the immediate vicinity of the platforms.

In one respect the Area Study discharges would be greater than a factor of three above the baseline. A new gas processing facility at Lompoc would be required under the Lompoc option, and this would generate about 43,000 gpd of scrubber liquor waste water which would presumably be mixed with the produced water sent back to Platform Irene for subsurface disposal. Such waste waters generally have a high, rapidly-acting chemical oxygen demand (COD) which would require reevaluation with regard to the potential for excess oxygen depletion outside the zone of initial dilution. (Note that it would not be appropriate to assume that the initial dilution ratio of 3,600 (Table 5.4-3) for the original Platform Irene discharge would also hold for the increased, Area Study discharge.) This incremental impact is estimated to be of moderate (Class II) significance.

With regard to normal platform operations, most of the previously identified impacts (as described in Section 5.4.2.2 above) remain as does their level of significance with one possible exception. That exception relates to the potential for significance alternation of sediment quality (because of deposits from platform discharges), the areas for neighboring platforms. Without any overlap, the six platforms could (in theory) affect an area of over 1,000 km^2 based upon the 150-190 km^2/platform estimate (and associated assumptions) derived earlier in Section 5.4.2.0.

In the hypothesized scenario (cf. Figure 2.9-1) the four platforms on lease OCS-P 0510, OCS -P 0440 and OCS -P 0441) are close enough to have overlapping areas of affected sediments. While the total area affected for the six-platform scenario is thus reduced to the extent of any overlap, the overlap itself increases the significance of the impact to the extent: (a) that higher contaminant concentrations will exist in the overlap areas, and (b) that wide, contaminated sediment corridors are formed which might prove to be a barrier to full (healthy) use by a full array of benthic organisms, bottom feeders, or other aquatic biota. Because restriction of individual platform discharges should still provide adequate mitigation (to whatever degree required), the impacts on the sediments remain as Class II.

With regard to oil spills, the impacts described above in Section 5.4.2.2 remain and keep their same significance classification (Class III for chronic, low-volume spills and Class I for major spills); but the degree of significance (and probable impacts) increases roughly in proportion to the increased probability of such spills. For example, the probability of a spill greater than 100 barrels in the platform areas (excluding blowouts) increases from 8.5×10^{-3}/year for two platforms to 5.4×10^{-2}/year for the six-platform scenario (Section 5.11). In addition, the probability of new landfall locations (of spilled oil) increases in areas to the north of Point Arguello, e.g., around Purisma Point.

5.4.4 Impacts of Alternatives

5.4.4.0 No Project

The the proposed project is not undertaken, there would be no adverse impacts on the marine water resources at the project site.

5.4.4.1 Southern Union Pipeline Route

This alternative would avoid the use of two landfalls since the pipelines would come ashore at Surf with the power cable. There would be no significant change in the amount of sediments resuspended during pipelaying, and no significant changes in associated impacts if, as expected, the sediments in the two landfall areas are reasonably similar.

This alternative shows the oil pipeline crossing the Santa Ynez River approximately 10 kilometers upstream from the ocean. Should the pipeline rupture at this crossing, a spill of up to about 20,000 barrels is possible assuming no mitigation and worst-case situations. (Appendix D, Section 5.4.5.1(B)). A spill of this magnitude would not only impact on the river, but would also likely reach the shore and ocean where significant (Class I) estuary contamination and water quality impacts would result.

5.4.4.2 Union Power Cable Route

This alternative would involve an increase of about 14 percent in the amount of sediments resuspended during trenching for cable burial. Based on present knowledge, the impact of this alternative should, like the original proposal, be of low (Class III) significance.

5.4.4.3 Exxon Oil and Gas Processing at Gaviota

This alternative would involve a reduction, by about one-third, of resuspended sediments associated with pipelaying; the impacts associated with the remaining pipelines (to Lompoc) would remain of low (Class III) significance. No significant impacts would be associated with the laying of the 21 kilometer pipeline between Shamrock and Hermosa.

5.4.4.4 Other Listed Alternatives

No other project alternative, including the alternate site for Union's onshore dehydration facility, involves any change in project-related impacts on marine water resources.

5.4.5 Mitigation Measures

5.4.5.0 Mitigation Measures for Proposed Projects

Mitigation measures fall into three categories: 1) a survey program to upgrade impact-related baseline knowledge of the study region and its sub-components; 2) impact monitoring programs for components with potential but unestimable impacts; and 3) specific measures to mitigate expected/monitored impacts of project components. These mitigation measures focus on suspended and settled solids in the areas around the proposed discharges, at least with regard to impacts associated with normal operations. The normal discharge of waste waters from the platforms and the refinery outfall are not expected to have a direct, significant impact on the water column outside the zone of initial dilution; this is due, in part, to the use of subsurface discharges with relatively large initial dilution ratios. Thus, while water quality parameters may not be significantly changed outside the dilution zones, the particulates in the discharges (plus pollutants which become sorbed to particulates) can settle to the open floor with the potential to accumulate significant concentrations of both organic and inorganic pollutants. Additional details on the proposed mitigation measures are provided in Appendix D.

BASELINE SURVEY

In order to provide an accurate basis for judging imapact, monitoring results and the need for mitigating measures, further baseline s vey work should include seasonal studies of: 1) the characteristics of sediments on the Santa Maria shelf; 2) the characteristics of suspended particulates in the waters of the study region; 3) the current regimes in the Study Region; 4) histopathological examinations of marine organisms; and 5) sediments contributed by local stream discharges. There are existing MMS-sponsored studies that are collecting data on currents and some sediment chemistry (concentration of Ba, Cr and hydrocarbons) in the Santa Maria Basin and Santa Barbara Channel. (The MMS study will focus on monitoring specific, approved development projects (pre- and post-construction, and operation) in the Santa Maria Basin.) Some routine monitoring of discharges may also be required by the NPDES permit for each platform. The new studies could extend both the geographic and temporal coverage as well as the parameter coverage.

MONITORING PROGRAM

To quantify and mitigate water quality impacts that are not fully predictable, a monitoring program could be instituted for: 1) the amount of specific contaminants in each effluent; 2) the amount of these specific contaminants in the environment; 3) the uptake of these contaminants by organisms; and 4) the toxic impact of these bioaccumulated contaminants. Table 5.4-6 lists specific contaminants that could be included in the monitoring program. The assessment of toxic imapcts must go beyond measures of body burdens and gross pathology to include detoxification assays for metals and organic compounds that examine individual issues for their load of metals, parent organic compounds and metabolities.

SPECIFIC MITIGATION MEASURES

Construction

All construction-related impacts on marine water quality were estimated to be of low (Class III) significance, and thus no further specific mitigation measures are proposed.

Normal Operations

It was estimated that the discharge of drill cuttings, drill fluids and produced water, both individually and collectively, could result in moderate (Class II) impacts on sediment quality near the platforms. At a minimum, the Applicants should commit to not using any additive (e.g., to the drill fluids or Lompoc Dehydration Facility) that are known to be problematic; this would include biocides, chrome-based lignosulfonates and highly-toxic emulsion treating chemicals. Union has committed not to use biocides and chrome-based lignosulfonates; Exxon has also committed not to use chrome-based lignosulfonates. Data on the chemical composition, expected concentrations and aquatic toxicity of the additives to be used at Lompoc (Table 5.4-5) would need to be evaluated in greater detail prior to use.

Should the monitoring program described above show, at some time in the future, unacceptable impacts on the sediments in the project area, then additional specific mitigation measures could include barging of muds and cuttings to onshore or deep-water disposal, and/or reinjection of the produced water. Discharge onshore could only be done under strict rules (related to environmental protection) and would thus result in a negligible residual

Table 5.4-6

SPECIFIC CONTAMINANTS FOR AN EFFECTIVE MITIGATING MONITORING PROGRAM

A. Formation Water
   1) Solids
      a) Particle Size
      b) Composition
   2) BOD and COD
   3) Petroleum Hydrocarbons
      a) Aliphatic
      b) Aromatic: benzene, naphthalene, etc. and metabolites
   4) Phenol
   5) Cyanide
   6) Ammonia
      a) $NH_3.nH_2O$: relatively toxic
      b) NH_4^+: relatively nontoxic
   7) Biocides and Surfactants
      a) Specific Compounds and Metabolites
   8) Metals: Ba, Cr, As, Cd, Cu, Pb, Ag, Ni, Ag, Zn, Hg and Fe
   9) Sulfide

B. Process Water
   1) Solids
      a) Particle Size
      b) Composition
   2) BOD and COD
   3) Petroleum Hydrocarbons
      a) Aliphatic
      b) Aromatic: benzene, naphthalene, etc. and metabolites
   4) Phenol
   5) Cyanide
   6) Ammonia
      a) $NH_3.nH_2O$
      b) HN_4^+
   7) Biocides and Surfactants
      a) Specific Compounds and Metabolites
   8) Metals: Ba, Cr, As, Cd, Cu, Pb, Ag, Ni, Ag, Hg and Zn
   9) Sulfite

C. Drill Fluids
   -Same components as listed for Process Water (B)

D. Drill Cuttings
   1) Solids
   2) Metals: Ba, Cr, As, Cd, Cu, Pb, Ag, Ni, Ag, Zn, Hg, Fe
   3) COD

impact on water resources. Adverse air resources impact would be possible on a case-by-case basis. Barging to deep waters (e.g., off the continental slope) for disposal would involve some uncertainty in residual impacts since the areas that might be designated for such disposal (and any other regulations for such disposal) are not known. An alternative to reinjection of the produced water would be further treatment of the produced water (e.g., activated sludge biological treatment) at Lompoc prior to being sent back to Platform Irene for subsurface disposal. Such treatment could significantly reduce effluent concentrations of metals, organics and suspended solids. Raising the height of the discharge tubes (nearer or even above the ocean surface) would lower the concentration of settled pollutants in the areas near the platforms, but would increase the total area over which the sediments would be deposited.

No additional specific mitigation measures are proposed at this time for the Santa Maria Refinery effluent. However, it will be important to conduct the required monitoring of this effluent because of uncertainties over changes in waste water composition associated with oil treatment chemicals added at Lompoc, with the new high-sulfur oil that will be treated, and with the new processing equipment (e.g., gas treatment) being installed at the refinery. Baseline conditions in the area of the refinery outfall (including sediment nature and quality) are also poorly characterized. Should these monitoring programs indicate, at some future time, that there are significant impacts associated with the discharge, then additional pretreatment (of specific refinery waste streams) and/or tertiary treatment of the combined waste waters could be considered. An alternative mitigating measure which (in this same eventuality) would need to be considered is extension of the outfall into deep water.

Oil Spills and Leaks

Based on the commitments that Union and Exxon have provided for oil spill response and cleanup,* no additional mitigation measures are recommended. The commitments are to provide: 1) onsite (platform and shore) oil spill containment and clean-up equipment capable of handling small spills in calm seas; 2) adequate oil spill contamination and clean-up equipment and procedures for larger spills (including the provision, by Clean Seas, for a major new response vessel to serve the Point Pedernales/Point Arguello area); 3) training; and 4) most effective and least toxic dispersant, and an approved dispersant use plan. The new response vessel will be especially helpful in reducing the response time for major clean-up vessels to reach the platform areas; without the new vessel, minimum response times would be about 4-6 hours in calm seas, a time that might be too long to prevent shore contamination from a near-shore (pipeline) spill or a platform spill at times of strong winds out of the west or northwest. It would be important to have the spill response training include special response measures to be used in the mouths of rivers and creeks.

*These commitments are made: 1) in the Operator's Oil Spill Contingency Plans submitted with their Development and Production Plans; and 2) in the Consistency Review held before the California Coastal Commission operating under the authority of the Coastal Zone Management Act.

5.4.5.1 Mitigation Measures for Area Study

The mitigation measures described in Section 5.4.5.0 should be followed to mitigate any impacts expected as a result of future development expected in the Central Santa Maria Basin. The importance of these mitigation measures (especially the baseline survey and monitoring programs) takes on added importance in this scenario because of the added number of platforms involved, the associated (roughly) factor-of-three increase in pollutants discharged, and the corresponding potential for area-wide sediment impacts.

If the additional platforms and pipelines assumed for the Central Santa Maria Basin Area Study are assumed to come with similar commitments for oil spills containment and response (equipment, personnel, training, coordination, etc.) then no additional mitigation measures are recommended for oil spills.

5.4.5.2 Mitigation Measures for Alternatives

The only alternative which would require additional mitigative action is the southern Union Pipeline route. As noted in Section 5.4.2.1, this alternative calls for the pipeline to cross the Santa Ynez river; a pipeline rupture at this crossing could reach the shore and ocean. To mitigate against large spills from a pipeline rupture at this point, appropriate check valves could be installed on either side of the crossing.

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5.5 MARINE BIOLOGY

5.5.1 Introduction/Methodology

The marine biology consequences and mitigations were analyzed by superimposing the individual and combined proposed projects, alternatives, and the hypothetical Area Study development on a projected baseline of existing conditions as modified only by natural processes and continuations of present human activities. Effects of other potential projects are discussed in Section 6.5. The only major change in present conditions assumed in the future baseline is the partial recovery of the Study Region from the damage caused by storms and El Nino in 1983. Projects were analyzed as proposed by the operators including any measures they proposed to meet regulatory criteria (including the Coastal Commission Consistency Certification) and lessen environmental effects. The Area Study development was assumed to consist of additional platforms and pipelines essentially similar to those proposed by the present operators. Each potential effect was analyzed on intertidal, benthic, planktonic, nektonic, seabird, and marine mammal resources and on the integrated ecosystem. Potentially significant effects are discussed here, with additional detailed analysis presented in Section 5.5 of Technical Appendix E.

Determinations of significance, particularly when there are technical uncertainties concerning potential consequences, reflect the best professional judgment of the biologists who prepared this report. The criteria used in this section to assign significance to potential impacts and mitigation measures are as follows:

- An impact is considered locally significant if it is judged likely to cause or substantially contribute to a measurable change in species composition or distribution or recovery or function of a localized area of marine habitat of recognized importance for five to ten years or longer. A typical example of a localized area of important habitat is an offshore raised profile, hard-bottom feature of about ten acres surface area.

- An impact is considered regionally significant if it is judged likely to cause or substantially contribute to a measurable change in:

  (1) The species composition or distribution or recovery or function of several localized areas, or a single large area of any marine habitat of recognized importance for five to ten years or longer; or

(2) The size or reproductive capacity of the regional population of any species of recognized regulatory, commercial, recreational, scientific, or educational importance for five years or longer, or for a shorter time if there are special circumstances.

The habitats and species of recognized importance are identified in Section 4.5 of this report and in Appendix E. Examples include: Environmentally Sensitive Habitat Areas (ESHA's) as defined by the Santa Barbara County Local Coastal Plan, such as marine mammal hauling grounds and/or rookery areas, rocky intertidal areas (reefs), kelp beds, rocky subtidal areas (reefs), and seabird nesting sites. Examples of species of special importance are those protected by the Federal and State Endangered Species Acts, CEQA, or the Marine Mammal Protection Act.

The number of mortalities required in order to measurably impact species at the population level varies by species. Biological criteria for measuring population level impacts were the primary factors involved in designation of significance levels, but regulatory factors (e.g. objectives stated in a Recovery Plan for an Endangered Species) were also taken into account.

Mortality of few (e.g., one to five) individuals was generally considered insignificant at the regional level with the following type of exception: Mortalities of individuals of fully protected species were considered potentially regionally significant if the species populations were already reduced or prevented from attaining Recovery Plan objectives (e.g. expansion for the southern sea otter) by all other prevailing sources of mortality combined. Examples include southern sea otters and, perhaps for the near term, brown pelicans in the aftermath of the El Nino episode.

Mortality of few individuals was also generally considered insignificant at the local level with the exception of deaths of individuals that would represent a substantial percentage of the local population of the species. For example, loss of one of the very few locally resident individuals of the peregrine falcon would be considered of at least local significance. However, loss of a migrating peregrine not part of the local population would be considered locally insignificant.

Numbers of mortalities of various species that would cause re-imitation of the Section 7 Endangered Species Act Consultation for the proposed projects will be included in the Biological Opinions of the U.S. Fish and Wildlife Service and the National Marine Fisheries Service that will be part of the Final EIS/EIR. Individual deaths of more abundant species (e.g., harbor seals) would likely be of Class III significance because they would be so few as to remain indistinguishable at the population level in any given year on either a local or regional basis.

5.5.2 Impacts of Proposed Project

5.5.2.0 Proposed Construction Activities

PLATFORMS

Construction of the two proposed platforms would involve placement of structures and anchoring support vessels on the sea floor within about a 4,000-6,000 foot radius of the final location of each platform, assuming a working area of 0.3 square mile and anchor scope of 12 times the water depth around each platform (See the Project Description, Section 2.1 and Centaur Associates, 1984). The operators' geophysical and biological surveys have covered most of the potentially effected area (i.e., that portion within 4,000-5,000 feet of the platforms), and have shown no raised-profile, hard bottom features. These data and the general geophysical characterizations of the platform areas (see Section 4.1) suggest that platform construction would physically displace only soft-bottom benthic biological communities with relatively high tolerance to disturbance and rapid recovery rates, and would, therefore, be of Class III significance. The other impacts of platform construction on all forms of marine biota would be limited to sublethal disruption of organism activity patterns because of increased turbidity and construction noise and are expected to be insignificant. (See Section 5.5 of Technical Appendix E.)

PIPELINES AND POWER CABLE

Anchoring of the pipeline towing and any support vessels during the installation of the inter-platform pipelines and the pipeline and power cable from Platform Irene to shore would impact predominantly soft-bottom benthic communities in a manner similar to that described above, with Class III significance. However, a subtidal reef of at least 20 acres surface area is present in the center of the nearshore (30 feet depth) portion of the originally proposed Platform Irene-shore pipeline route. (See Figure 4.1-8.) The staff report for Union's Coastal Commission Consistency Certification [January 1985] indicates that Union has rerouted the pipeline away from this reef. Depending on the development and execution of a pipeline routing and vessel anchoring plan, impacts on the biota of this reef resulting from physical displacement would range from Class III to Class II (local). There is some uncertainty as to whether this reef, with, vertical relief on the order of 2-5 feet, is typically scoured or whether it supports organisms less frequently subject to disturbance and turnover.

Jetting of the pipelines and power cable through the sandy nearshore and intertidal zones at the pipeline landfall and the power cable landfall would be expected to have Class III impacts on all species except potentially marine mammals and seabirds. For the latter groups, disruption impacts including stunning of swimming individuals and interruption of breeding or rearing activities could range up to Class II if construction (currently proposed for fall) occurs in spring or summer, or Class I if blasting is required. Union indicates that no blasting is anticipated because of the compact sand apparent at the landfall sites. However, the variability and magnitude of local littoral processes are large enough at the pipeline landfall to suggest that less sand may be present than needed for the design burial depth of the pipeline, and blasting or construction of a groin may be required to achieve the required depth [California Coastal Commission, 1985]. Resulting transient marine mammal (sea otter, harbor seal, gray whale or other species) mortality or the disruption of seasonal least tern breeding or roosting in the lower Santa Ynez River estuary from blasting could be a Class I or Class II impact of local to regional significance. For least terns, these effects could result in population level impacts on a species of special importance. Such impact could be inconsistent with the protective intent of policies of the Local Coastal Plan, which designates areas as an Environmentally Sensitive Habitat (ESH), and the Federal Endangered Species Act. Effects on marine mammals would likely be insignificant, unless a group of pinnipeds attracted to the area were killed by a blast. Insufficient data are available to estimate the radius of potentially significant disruption due to blasting, particularly for disturbances to animals attracted to an area by the presence of fish stunned by a blast.

5.5.2.1 Normal Operations

PLATFORMS

The information presented in Section 5.4 and in Technical Appendices D and E indicated that impacts of operating noise and the various operating discharges from the proposed platforms on biota in the upper portions of the water column would likely be Class III. A possible exception of potential Class II (local) significance is the expression of sublethal pathology in platform-associated fishes. Such pathology has been documented in platform-associated spadefish and blennies off the U.S. Gulf Coast [Middleditch, 1984]. Impacts on local soft-bottom benthic invertebrates and associated demersal fishes are expected to range from insignificant for dissolved constituents in waste water to locally significant (Class II) impacts from the combined effects of produced water and sediment (mud and cutting) discharges, including creation of fine-grained, homogeneous particle substrates, organism burial, potential chemical toxicity of such produced water constituents as hydrogen sulfide, and potential chemical toxicity of long-term accumulations of cuttings and disposed muds. The variables likely to determine whether the impacts are significant include the degree to which the local, as-yet poorly studied animals are adapted to and subjected to fine sedimentation and the sublethal effects of hydrogen sulfide, metals and/or hydrocarbon uptake. These impacts are the type presently being emphasized by the EPA in their continuing assessment of the effects of development drilling [C. Menzie, personal communications to C. Cooper of Arthur D. Little, May 1984 and March 1985]. In addition, MMS will be funding a multi-year program beginning in 1985 to examine the effects of platform discharges on both soft and hard-bottom communities in the Santa Maria Basin.

Studies in a variety of offshore waters [Davies, 1981; Middleditch, 1984; Nekton, 1984] have documented benthic invertebrate community change and heavy metal accumulation and elevated (1.5-3X) liver hydroxylase levels in demersal fishes in the vicinity of production platforms. Based on these studies and the information presented in Section 5.4, these types of effects may be expected within 1 mile and up to about 5 miles from each production platform, with potentially additive overlap in the area northwest of Platform Irene and south of Platform Shamrock.

The new habitat created by the platform structures would be a beneficial (Class IV) impact of local significance as it would represent a raised-profile feature for invertebrate settlement and use by fishes on a soft-bottom area. See Section 5.5 of Appendix E for discussion of the amount of habitat created.

PIPELINES AND POWER CABLE

Normal operating effects of the pipelines are expected to include locally significant beneficial (Class IV) effects from the presence of the pipeline as a raised substrate for invertebrate colonization, locally insignificant (Class III) effects from the biotic exposure to metals leached from sacrificial anodes, and possible local impacts of changed organism abundance of likely insignificance because of changes in littoral sand transport near the pipeline landfall. The latter could be of biological significance only if groins are required to keep the pipelines buried over their operating life, an issue which is to be studied further by Union [California Coastal Commission, 1985.] See Section 5.5 of Appendix E for further quantitative discussion of amounts of substrate, and biomass lost or created.

REFINERY OUTFALL DISCHARGE

The proposed modification to the volume and chemistry of the Santa Maria Refinery outfall discharge, as analyzed in Section 5.4, is projected to have no significant measurable incremental effect on water quality and is therefore expected to have negligible to insignificant (Class III) effects on marine biota.

SUPPORT ACTIVITIES

Supply activities based in Port Hueneme are expected to have insignificant incremental adverse effects because of their similarity in type and magnitude to present activities. Exxon's crew vessel traffic to and from Ellwood would be expected to add to historical stress from this source on the kelp canopy. This impact is judged to be of Class II local to regional significance assuming no degree of greater restriction of vessel traffic to designated travel corridors than the presently anticipated 1,500-feet wide restriction mutually agreed to by the fishing and oil and gas industries. Aerial photographs of the Ellwood site show elimination of about 50 acres of the kelp canopy in the corridors used for vessel traffic [McPeak, 1984]. Incremental impact on the harbor seal hauling ground at Burma Beach is expected to be insignificant.

Disruption of marine mammals or seabirds by Union's crew helicopter noise would be of uncertain significance (Class III to Class I) because of uncertainty over the routes to be flown and the opportunities to modify the flight patterns to avoid disruption. For example, a route from Lompoc airport could pass close to the least term nesting site near the Santa Ynez River mouth, with potential disruption impacts ranging from insignificant to significant.

5.5.2.2 Abandonment

Impacts of proposed abandonment procedures are expected to be limited to locally significant (Class II) but regionally insignificant reductions in marine organism populations associated with the removed platforms, and beneficial impacts of potential local and/or regional significance because of the reductions in discharges and oil spill risks that prevailed during the operations period.

5.5.2.3 Accidents and Catastrophic Events

OVERVIEW

Unless otherwise indicated, all results discussed below are from the Arthur D. Little, Inc. probability, fate, and 5-day trajectory analyses detailed in Technical Appendix M. The results of MMS spill modeling were also reviewed and considered.

Because of the prevalence of chronic oil seeps scattered throughout the Study Region (See Sections 4.1, 5.4 and Appendices A and D), small project related spills (i.e., less than about 1,000 barrels) are expected to have negligible to insignificant adverse (Class III) effects on all species. Emphasis is therefore placed below on larger, less likely spills.

The results of the oil-spill modeling analysis in Appendix M indicate that spills originating at the proposed offshore facility locations are generally more likely to move out to sea than to reach land. However, the locations of highest overall landfall probability (up to about 0.5 percent for a spill of over 1,000 barrels over the projects' lifetime) are of recognized special importance to marine biota: the mainland coast from Gaviota to the Santa Ynez River mouth, particularly around Point Arguello. The Point Arguello area supports extensive rocky intertidal habitat, three seabird colonies and two harbor seal hauling grounds. (See Section 4.5.) Conditional landfall probabilities at other locations are generally unlikely to occur in the projects' lifetime, less than or equal to 1 in 1,000 years.

Because of their extraordinary sensitivity to oil-spill impacts and likely presence in areas affected by a spill, seabirds would be expected to incur the mortality impacts of Class I local and/or regional significance documented in past spills as a result of oiling, with the extent depending on spill size and location (see Technical Appendix E, Section 5.5.2). Fur-bearing marine mammals -- including the federally threatened/state protected southern sea otter, federal candidate Northern fur seal -- are less abundant and therefore less likely to encounter the spilled oil, but would be expected to experience Class I impacts of local to regional significance if they did because of a lack of avoidance behavior and because of the high likelihood of mortality following oiling of their pelts. (See Technical Appendix E.) Rocky intertidal areas characterize the more likely landfall locations, and the associated invertebrate communities would be expected to experience impacts of either Class III or Class I local to regional significance in the form of mortality because of smothering by oil depending on the spill volume, time of year and degree of weathering prior to impact.

Mechanical cleanup would have additive adverse impacts on these organisms. Subtidal benthos in nearshore waters including commercially exploited species would be expected to experience impacts of either Class III or Class I local significance because of smothering and cellular toxicity, with likely Class III regional significance unless weather conditions (heavy seas) caused large amounts of oil to reach the sea floor. Effects on water column organisms would include mortality of early life stages, but are expected to be locally and regionally insignificant because of the recovery potential (rapid reproductive turnover) of these groups. Section 5.5.2 of Technical Appendix E contains a detailed discussion of the above and other aspects of the oil-spill vulnerability of the Region's marine biota.

PLATFORMS

The Arthur D. Little analysis presented in Section 5.11 and Technical Appendix M indicates that major (greater than 1,000 barrels) spills originating at or near the proposed platforms are expected with an overall probability of about 2.5 percent (first five years) to 1 percent over 25 years of operations, and include the only project-related spills greater than 20,000 barrels (first 5 years only). The western part of San Miguel Island, the region's most important location for marine mammal and seabird reproduction is one of the two more likely landfall points for spills originating near the proposed platforms, with conditional annual landfall probabilities of about 1 to 2 percent. San Miguel is also prone to adverse weather and has a rocky shoreline, both factors that would make cleanup activities difficult at best. The 4 miles of mainland around Point Arguello are the other more likely landfall of a spill originating near either platform, with an annual conditional landfall probability of about 5 percent. As noted above, marine manual, seabird, and/or rocky reef communities could experience up to Class I regionally significant impacts from a landfall of about a 1,000 barrels or greater oil spill at any of these sites.

PIPELINES

Major spills from the proposed offshore pipelines were projected to be generally smaller (up to 18,000 barrels) and about as likely (slightly less than 1 percent over 25 years) than major platform spills. However, a spill from the halfway point of the proposed pipeline connecting Platform Irene to shore would have about a 40 percent likelihood of reaching shore along the mainland coast near Point Arguello, with about a 1-4 percent annual conditional likelihood of landfall between Point Arguello and the Santa Ynez River mouth. An oil spill of about 1,000 barrels or more reaching the vulnerable Point Arguello or Santa Ynez River resources could result in marine biological impacts of up to Class I regional significance.

Offshore gas line ruptures are not well documented in terms of marine biology impacts. Because of the volumes involved (see Appendix M) and the presence of gas seeps in the water column under baseline conditions, impacts are considered likely insignificant. A spill from a rupture of a produced water line would have likely insignificant effects. See the discussion of the chronic discharge effects above.

SUPPORT ACTIVITIES

Collisions of project support vessels with marine mammals are considered unlikely, but would likely result in organism mortality of Class III to Class I significance if they occurred. Support vessels could also be involved in other accidents (e.g., with tankers) that would release enough oil or other contaminants to result in significant (Class I) mortality impacts to marine biota, but the incremental likelihood is small. Spills from an accident in the shipping lanes are discussed in Section 6.5

Review of ten years of mortality records by the Santa Barbara Museum of Natural History showed that physical impact from collisions with objects of various but undetermined types appear to account for some 10-15 percent of the deaths of cetaceans and pinnipeds recovered in this region for study [Woodhouse, 1984].

5.5.2.4 Summary of Project Impacts on Rare and Endangered Species

Because of their fully protected status, long-term measurable adverse impacts on populations of any of the following species would be considered of Class I regional significance if they occurred, but such impacts are presently considered unlikely (oil spills) or avoidable (construction related). The more likely impacts of proposed activities and oil-spill impacts on federally or state-listed marine-dependent species may be summarized as follows:

- Brown Pelican (federal and state endangered), pre-emption of foraging because of construction activities (Class III - insignificant) and oil spills (Class III to Class I, local to regional, depending on spill size and location). A spill is highly unlikely to reach pelican breeding areas on the Channel Islands from the proposed projects, but if it did, potentially Class I impacts would result. Pelicans may also be vulnerable to direct oiling, but the lack of mortality data despite numerous spills in areas frequented by the species suggests that they may practice avoidance of large surface slicks.

- Southern Sea Otter (federal threatened, state protected), potentially present in small numbers during construction (Class III except for blasting); and/or oil spills, extremely vulnerable to the latter, with mortality documented due to lack of avoidance behavior, oiling of fur, and ingestion of oil and uncertain effects of rehabilitation efforts. (See Section 5.5.2.3 of Technical Appendix E.) Impacts could be significant at the population level if an oil spill contacted the southern migratory front of immature males that is prone to wander south into the Project Area.

- California Least Tern (federal and state endangered), historically nests and forages near Santa Ynez River mouth, present during pipeline construction only if rescheduled; vulnerable to oiling of nest site if spill enters Santa Ynez

River estuary under adverse weather conditions (unlikely); no documentation of other types of spill-related mortality, leading to potential expectation of avoidance. Any mortality of breeding stock is considered of Class I local to regional significance because of the small size of the resident population. (See Technical Appendix E, Section 5.5.)

- Guadalupe Fur Seal (federal candidate, state rare); likely present in small numbers should a spill reach San Miguel Island, likely vulnerable to oiling, with impact of Class I local biological and regional regulatory significance. The majority of the populations breed outside of the Study Region, but it is not clear whether the San Miguel Island groups are biologically distinct. The Guadalupe fur seals on San Miguel may be wanderers and have not bred there, so that the loss of one or a few due to oiling might be locally and regionally insignificant.

- Gray Whale (federal endangered), potentially present in vicinity of any oil-spill or offshore construction, subject to migratory disruption of likely Class III significance except for possibly more severe effects if nearshore blasting is required when they are present

- Tidewater Goby (under consideration for Federal listing), present in Santa Ynez River lagoon paralleled by proposed onshore pipeline route, subject to construction sedimentation and potential oil-spill impacts from onshore pipeline spill (Class I local to regional) or offshore spill in extreme weather (unlikely, Class I or II).

- Right, Blue, Fin, Sei, Humpback, and Sperm Whales; Leatherback, Pacific Ridley and Loggerhead Sea Turtles, regular to irregular transients offshore in generally descending order; may be present during an oil spill but not of documented high vulnerability.

5.5.3 Impacts of Area Study Development

Most of the marine biological impacts of the Area Study development would be as described above for the platform and offshore inter-platform pipeline components of the proposed projects. However, the types of impacts discussed below would likely be different and/or have significance greater than the effects of the proposed projects.

Unlike the proposed projects, combined construction and operations impacts of four additional Area Development platforms and connecting pipelines would have the potential to affect several offshore hard-bottom benthic features and associated demersal fishes of the Santa Maria Basin. These effects could be of regional as well as local significance because of the number, extent and vulnerability of the features affected. The significance of such impacts on a regional scale would be Class I, II, or III, depending on the following factors:

- Extent of damage caused by direct displacement and/or anchoring activities during construction;
- Extent and duration of burial of hard-bottom features by cuttings and mud disposal;
- Extent of toxic response to hydrogen sulfide, trace metal and/or hydrocarbon constituents in, produced water and/or deposited muds and cuttings;
- Amount of cumulative oxygen demand exerted by deposited materials; and
- Nature and extent of remaining unimpacted features at comparable depths in the Santa Maria Basin.

As indicated in Figure 4.5-3, there are verified rocky outcrops near the corners of two of the lease blocks assumed to support hypothetical Area Study platforms (OCS-P 0427 and -P 0510). This Figure and Figure 4.1-6 also show that within the Area Study boundaries long rocky ridge of undocumented relief transects OCS-P 0425, -P 0430 and -P 0433. At least some of the biota of these deepwater rocky reefs are expected to require longer than five to ten years to recover from crushing and/or displacement impacts due to anchoring activities. (See Section 5.5 of Technical Appendix E.) Of course, actual platform and pipeline siting will be a major determinant of this type of impact which could range from insignificant to significant (Class I, local to regional).

The types of platform-related waste discharge impacts on benthic invertebrates and demersal fish discussed in Section 5.5.2.1 above would be more likely of at least Class II local significance in the Area Study Development scenario. Produced water discharge volume at Platform Irene is assumed to increase by about a factor of three over that presently proposed because of additional processing at the Lompoc facility, and the discharge is assumed to include some 45,000 gpd of oxygen-depleted SO_2 scrubber water from the operation of a new co-located gas plant at the Lompoc site. In addition, the areas of measurable change in benthic sediment quality and related biological effects due to produced water and mud and cuttings discharges would potentially overlap and have additive impacts for Platforms Irene, Shamrock and the further hypothetical developments on OCS-P 0441 and -P 0510.

Means to define these impacts better and mitigate them as necessary are detailed in Section 5.5.5.

Area Study development would also likely include further seismic testing and exploratory drilling prior to production on some of the leased tracts. Impacts of seismic testing on marine biota would include potential disruption of groups and movement patterns of fish and/or any of the various species of marine mammals from the shock/noise of air gun firing. The magnitude of this type of impact is under continuing study and could have from Class III to Class I significance, depending on whether migratory patterns are substantially disrupted. Exploratory drilling would have some of the same potential construction impacts (e.g. anchor scarring) and similar operations impacts (mud/cuttings deposition) as production. The construction impacts are expected to be comparable in magnitude and significance to those described above. See for example, documentation of exploration-related anchor scarring near the proposed platform sites in Exxon's Offshore Cultural Resources Survey for the Shamrock Project. Exploratory drilling would be expected to have discharge impacts of the type described above for production, but of lesser magnitude and duration and of likely Class III significance.

The probability of oil spills would increase with the development of additional platforms and pipelines. Arthur D. Little analysis indicated that the annual probability of an offshore spill of 100 barrels or more would increase from about 1 percent for the projects to about 6 percent for the Area Study. The overall likelihood of an offshore platform on pipeline spill of 1,000 barrels or more reaching shore between the Union pipeline landfall and Gaviota, combined over 25 years is projected to increase from about .65 percent for the offshore components of the proposed projects to between 1.5 and 6 percent for the six platforms and connecting pipelines in the Area Development scenario. Also, spills from Area Study Development would place some additional marine resources at risk. For example, Arthur D. Little trajectory analysis (see Technical Appendix M) indicates about 40 times greater likelihood of spill landfall north of the Santa Ynez River mouth for spills originating at Area Study tracts versus spills from the proposed projects. Thus, spill consequences would likely be of the classes of significance described above for the proposed project platform and pipeline components, but their likelihood of occurrences would increase and additional marine biological resources would be at higher risk. These resources include members of the main breeding population of the threatened Southern Sea Otter, an Alcid colony and rocky intertidal habitat at Purisima Point, and the lagoons at the mouths of such streams as San Antonio Creek.

5.5.4 Impacts of Project Alternatives

The alternative onshore dehyrdration facility sites (Site 4 versus Site 8) have the same potential impacts on marine biota. Alternatives for which impacts may differ are discussed below.

5.5.4.0 No-Project Alternative

If the proposed projects are not built, impacts to marine biota would be negligible and limited to the removal and/or crushing of organisms by sampling gear during studies conducted in the decision-making process.

5.5.4.1 Shamrock Project Gaviota Option

Impacts on marine biota from the construction and operation of an offshore pipeline from Platform Shamrock to Chevron's Platform Hermosa would be expected to be similar to those described above for the proposed lines to and from Platform Irene with the following exceptions:

(1) The southern portion of the Alternate Pipeline route connecting Platform Shamrock to Platform Hermosa passes within anchoring distance of approximately 20 raised-profile hard bottom features, ranging in surface area up to about 100 acres. (See Sections 4.1 and 4.5.) Even with some realignments of this route, it is considered likely that Class I impacts of at least local and potentially regional significance would result from construction-related crushing and/or displacement of benthic organisms and substrates with long recovery times along this route.

(2) The risk of oil spills from this longer alternate route is calculated to be about seven times as great as that for the shorter proposed Platform Shamrock to Platform Irene connection. Further, the likelihood of any given spill from the midpoint of this pipeline reaching San Miguel Island is estimated to be about 1.5-2 times that of a spill from the Shamrock to Irene connection, and the likelihood of spills reaching the coast between Point Arguello and Jalama Beach would increase by a factor of 2-10 over that for the proposed Shamrock-Irene connection. Impact levels of spills reaching these locations would be as discussed above for the proposed project.

The Gaviota option would reduce the volume of produced water discharged at Platform Irene by about one-half, and initial formation water discharge would take place instead at the Platform Shamrock location. This discharge would be expected to translocate but not necessarily alter the material or significance of the discharge impacts discussed in Section 5.5.2.1 above.

5.5.4.2 Alternative Pipeline and Power Cable Routes

The present Union proposal involves one landfall each near Surf and about four miles north of the Santa Ynez River mouth. Consolidation of both landfalls at the northern site would somewhat increase the likelihood of the types of impacts discussed above in Section 5.5.2.0. These include construction impacts on subtidal rocky reef habitats, and increased likelihood of blasting, because of the proximity of rock to the beach surface and presence of a subtidal reef near this landfall. Consolidation at the southern landfall (Surf) would likely avoid the potentially significant impacts because of the extreme depth of sand cover at the southern site. Continuation along the mitigated alternative route would place greater distance between pipeline construction and operations and the least tern breeding site near the Santa Ynez River mouth than would either the proposed route or the original alternative southern route.

5.5.5 Mitigation Measures for Marine Biology Impacts

5.5.5.0 Overview

Tables 5.5-1 and 5.5-2 summarize the feasible mitigation measures for Class I and Class II marine biology impacts.

Table 5.5-1

POTENTIAL SIGNIFICANT MARINE BIOLOGY IMPACTS AND MITIGATION MEASURES
CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

Source	Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Project-Related Accidents Union and Exxon	1. Mortality and disturbance of seabirds and/or marine mammals due to unlikely major oil spill and cleanup activities	Local to regional, short to long-term	Achieve adequate response time at key locations; selective use of dispersants for oil; animal recovery assistance	Locally to regionally significant
	2. Damage to subtidal ecology due to major oil spill	Local or regional, short to long-term	Avoid use of chemical agents	Locally to regionally significant
	3. Damage to marine mammals due to unlikely encounters with support vessels	Regional, short- to long-term	Reporting requirements, restrictions of vessel movements	Regionally significant to insignificant, potentially inconsistent with Federal Marine Mammal Protection Act: CCA Section 30230
Area Study Development	1. Impact type 2 under Project Alternatives at additional locations	As below under Project Alternatives	As below under Project Alternatives	As below under Project Alternatives
	2. Impact types 1 and 2 under Project-Related Accidents above, likely due to additional platforms and pipelines	Local to regional, short to long term	As above for Proposed Project-Related Accidents, plus limitation of concurrent production activities	As above for Proposed Project-Related Accidents. Feasibility of production limitation uncertain
Project Alternatives Exxon	1. Impact types 1 and 2 above under Accidents more likely due to offshore Shamrock to Hermosa pipeline	Local to regional, short to long term	As above for Project-Related Accidents	Significant to insignificant
Exxon	2. Loss of hard-bottom benthos due to construction vessel anchoring along Shamrock to Hermosa pipeline route	Local individually to regional combined, short to long term	Pre-construction demarcation, restricting vessel activities, consolidated moorings, establishment of additional hard-bottom features, tie-in to Platform Hidalgo instead of Hermosa	Locally to regionally significant, feasibility of mitigation uncertain

Table 5.5-1
(continued)

POTENTIAL SIGNIFICANT MARINE BIOLOGY IMPACTS AND MITIGATION MEASURES
CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

Source	Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Cumulative Developments	1. Impact types 1 and 2 under Project-Related Accidents become likely, #3 becomes more likely	Local to regional, short to long term	As above for Area Study Development	As above for proposed Project-Related Accidents
	2. Possible disruption of gray whale migration by cumulative offshore seismic testing and construction noise	Regional, short to long term	Restriction of construction to non-migration periods, restriction of overlapping construction schedules, restriction of seismic survey activities	Uncertain, significant to insignificant
	3. Impact type 2 under project alternatives throughout Arguello Slope and Santa Maria Basin due to exploration and production activities	Regional, short to long term	As above under project alternatives	As above under project
Alternative Cumulative Development Scenario	Damage to Kelp Bed 31 due to combined construction and operation of marine terminal, supply and crew bases at Gaviota	Local to regional, long term	Establishment and enforcement of restricted construction and vessel use corridors, reestablish kelp plants	Locally to regionally significant unless alternate site used for supply base

Table 5.5-2

POTENTIAL SIGNIFICANT MARINE BIOLOGY IMPACTS AND MITIGATION MEASURES
CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Projects Union	1. Disturbance of Least Tern nesting, subtidal reef, and/or transient marine mammals near landfall due to nearshore Union pipeline construction	Local and regional, short term	Construct in late Septmber-October, restrict blasting, consolidate landfalls at Surf, avoid nearshore reefs	Insignificant if blasting and reef are avoided
Union and Exxon	2. Damage to local benthos and fish due to discharge deposition near either platform or both	Local, short to long term	Pre-operations survey of sublethal pathology in benthic organisms continue during operations; as necessary further restrict discharge mode, mud components, disposal sites	Potentially significant locally, short term; insignificant long term
Exxon	3. Damage to kelp canopy off Ellwood due to Exxon crew boat traffic	Local to regional, short- to long-termterm	Restrict and monitor vessel movements and/or require use of alternate site without kelp canopy	Insignificant
Union and Exxon	4. Loss of habitat upon removal of platforms	Local, short to long	Create or maintain similar habitats	Insignificant
Area Study Development	Cumulative damages to benthos and demersal fish due to construction and operations of offshore platforms	Regional, short to long term	Monitor effects of first-generation projects, as necessary condition second-generation per measures described for proposed project under item 2 above and/or impose cap on number of concurrent development projects	Potentially locally significant short term, insignificant long term and regionally. Feasibility of development cap uncertain.
Cumulative Development Scenarios	1. Impact types 2 and 4 under Proposed Projects of greater magnitude due to occurrence at several sites	Local and regional, long term	As above for items 2 and 4 under Proposed Projects, plus limitation of concurrent production activities	Insignificant
	2. Potentially additive discharge impacts of onshore processing facilities	Local to regional, long term	Discharge monitoring followed as necesary by discharge modification, relocation or reinjection	Likely insignificant, depends on feasibility of discharge modification
	3. Greater damage to kelp canopy off Ellwood or Gaviota due to supply and/or expanded crew vessel traffic	Local and regional, long term	As above for item 3 under Proposed Project	Insignificant if Alternative sites are used

5.5.5.1 Measures to Mitigate Impacts of the Proposed Projects

The following additional information applies to the partial mitigation measures listed on Table 5.5-1 for Class I impacts:

- To partially mitigate likely mortality and disturbance of seabirds and marine mammals from major offshore oil spills (number 1 under Project-related Accidents), the applicable operators' oil spill contingency plans could be supplemented to assure equipment and manpower on the scene at the documented breeding and haulout areas between Point Sal and Jalama Beach. To be effective, response would be required in the less than three hours from initial notification that it could take oil to reach shore from a break in the Platform Irene to shore pipeline. Such equipment and labor could be used for placing barriers to prevent oil entry into the Santa Ynez River mouth, and/or capturing and rehabilitating oiled animals. Response at other ESHAs would need to be assured, although lead time would be less critical. Capture and relocation of sea otters in the expected path of an oil spill and capture and rehabilitation of oiled sea otters are potential mitigation measures of questionable feasibility. Dispersants and/or sinking agents could be used when a spill directly threatens marine mammal or seabird aggregations beyond the removal capabilities of booming and skimming activities. There would be a tradeoff between lesser impacts on seabirds and mammals and greater toxicity potential for intertidal invertebrates and water column and benthic organisms. (See Number 2 under Project-related Accidents in Table 5.5-1.) Also, dispersants may not be effective under certain adverse weather conditions or when oil is well mixed vertically in the water column.

Additional information on measures listed in Table 5.5-2 to mitigate Class II marine biology impacts is as follows:

- Selection of the alternative southern pipeline (proposed power cable) landfall at Surf would likely ensure the avoidance of blasting because of the extensive deposition of Santa Ynez River sediments in that area.

- To minimize adverse biological effects of possible blasting near the proposed pipeline landfall, the feasibility of using a directionally drilled landfall could be established. If blasting is required, the use of multiple small charges instead of fewer large charges would be expected to have less impact on at least some organisms; and restriction of this activity to late September through March would minimize interference with least tern use of the area near the Santa Ynez River mouth. Note, however, that from December through March this would result in scheduling the activity to occur during the gray whale migration period.

To ensure mitigation of the potential effects of mud and/or cuttings and produced water discharge deposition on offshore-bottom-associated organisms (Number 2 under Proposed Project in Table 5.5-2), the following sequence of activities could be conducted. Some of these activities may be piggy-backed onto the planned work in the current MMS-sponsored long-term monitoring study of the Santa Maria Basin. Note that the monitoring efforts identified are not intended to duplicate ongoing or otherwise required monitoring programs:

(1) Conduct preconstruction field study of the status of baseline contamination of sediment, interstitial water and resident organism pathology near proposed Platform Irene and Platform Shamrock sites. Data collection would need to include periodic (at least initial and second) occupation of transects by ROV or manned submersibles and synoptic (same day) collection of sediment, water and benthic and trawl organism samples for subsequent laboratory analysis. Preservation and laboratory analysis would result in determination of concentrations of contaminants including and beyond those included in the present MMS program in the sediment, water and organism samples. Technical Appendix D, Marine Water Quality and Oceanography, Part Two, Chemical Oceanography, delineate the recommended chemical species and analytical protocols. Analysis of collected organisms would need to include examination for pathological expressions of sublethal effects of trace contamination, particularly the types of liver pathology characteristic of stresses related to exposures to complex hydrocarbons and metals, e.g., liver hydroxylase activity.

(2) Reoccupy benthic sampling locations following platform and pipeline construction to determine extent of any anchor scarring damage and extent of construction related sedimentation effects.

(3) Repeat protocols of (1) above twice during the first two years of platform operations with frequency and focus adjusted thereafter based on the results.

(4) Based on the results of items (1) through (3) modify the continued operations of the platforms as necessary by modifying any or all of the following: <u>discharge mode</u> (e.g., depth, co-mingling of mud and cooling water), <u>mud components</u> (e.g., substitution of mineral oil for diesel oil in pills, use of alternate or no biocides), <u>disposal sites</u> (e.g., barging for dispersed disposal of muds in soft bottom slope areas of active sediment transport).

(5) If the above measures in combination are judged inadequate based on continued monitoring, produced and dehydration facility water reinjection and/or onshore

disposal of contaminated sediments may be feasible. The latter would have cross-disciplinary impacts on air quality of circumstance-specific magnitude and significance.

5.5.5.2 Measures to Mitigate Impacts of Area Study Development

Additional information on measures to mitigate the Area Study development impacts listed in Tables 5.5-1 and 5.5-2 include the following:

- A program to limit cumulative impacts on offshore bottom associated species would include application to future platforms and pipelines of the mitigations believed to be appropriate on the basis of the monitoring and conditioning program for Platform Irene and/or the Shamrock project as described above.

- Restricting the number of Central Santa Maria Basin platforms and connecting pipelines constructed and operated in overlapping timeframes could serve to mitigate otherwise adverse cumulative impacts on benthos and demersal fish and to reduce to or maintain oil spill probabilities at a predetermined level of rare risk (probability of less than one in ten thousand years). For example, two rather than three platforms might be used to develop OCS-P 0440 and -P 0441.

  Also see the discussion below regarding mitigation of impacts to hard-bottom features, which could apply to Area Study development as well as the alternative Shamrock to Hermosa pipeline route.

5.5.5.3 Measures Applicable to Project Alternatives

See Tables 5.5-1 and 5.5-2 for descriptions of measures to mitigate marine biological effects of project alternatives. The selection of a different project component would mitigate each potentially significant effect of the alternatives considered.

- To partially mitigate the potential Class I losses of hardbottom benthos from construction vessel anchoring along the alternate Platform Shamrock to Platform Hermosa pipeline route, restrictions of vessel activities would need to include marking and monitoring adherence to safe vessel operating areas of minimum size, minimizing the number of anchoring events, and minimizing anchoring attempts near raised profile hard-bottom features. Exxon could be required to develop and implement an agency approved anchoring plan, including suspension of construction when weather/sea conditions prevent strict adherence to the plan. Semi-permanent moorings could be established in soft-bottom areas to allow construction vessels to tie up rather than re-anchor except when re-anchoring for work in progress or for safety reasons. If post-construction surveys document sufficient change, additional hard-bottom features could also be established by placement of boulders on the sea floor in areas upcurrent of or beyond the impact areas and areas of expected produced water, mud and cuttings deposition. To have replacement value for impacted features, such reefs would need to be established in the same depth range as the impacted features, and be of sufficient height to preclude burial by shifting sediments. A negative impact on commercial trowl fishing from establishment of new reefs could be avoided by using relatively smooth reef building materials, and rockfish habitat would be improved.

- Connection of the Shamrock platform via pipeline to Chevron's proposed Platform Hildago, rather than Platform Hermosa, would allow avoidance of most (potentially all) of the hard-bottom features between Shamrock and Hermosa. The feasibility of this measure is uncertain because Platform Hildago is scheduled for a later startup than Platform Hermosa.

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5.6 TERRESTRIAL AND FRESHWATER BIOLOGY IMPACTS AND MITIGATION MEASURES

5.6.1 Introduction/Methodology

This section describes the potential impacts to terrestrial and freshwater habitats and species from construction, operation and abandonment of onshore and offshore project and Area Study components. These findings are based on (1) reviews of environmental reports [HDR, 1984a, b, d] and other literature on the Project Area (see Section 4.6 and Technical Appendix F), (2) analyses of color aerial photographs, (3) field studies at reconnaissance level for the entire Project Area and at a more detailed level on selected data collection sites (see Section 4.6 and Appendix F), and (4) a review of available literature on the response of biota to disturbance, air pollution, oil spills and other consequences of project construction and operation. Special emphasis has been placed on biologically significant drainage crossings and other biologically significant habitats. As used in this report, "biologically significant" drainages and habitats are of the same types as those designated as Environmentally Sensitive Habitats in Santa Barbara County's Local Coastal Plan [1982], and those protected by policies of the County's Comprehensive Plan [1979, 1980, 1982]. These significant habitats include, among others, coastal dunes and salt marshes, native grasslands, vernal pools, Bishop Pine Forests, Coast Live Oak trees and riparian vegetation. These designations and policies are based on recommendations by biological experts. Impact significance criteria, outlined below, were used by terrestrial and freshwater biologists to evaluate impacts for each specific situation. The criteria complement the existing institutional and regulatory policies regarding terrestrial biota.

Various elements of the Santa Barbara County Comprehensive Plan [1979, 1982] include policies and guidelines that are intended to provide protection for species and ecological communities of unusual ecological interest; these include nests and roosts for rare and endangered raptors, Bishop pine closed cone forests, Douglas fir forests, coastal dune and strand, coastal salt marsh, coastal bluff, native grassland, vernal pools and freshwater marshes. In addition, the Conservation Element of the Comprehensive Plan recommends protection of prime examples of more common ecological communities which include coastal dunes and marshes near the mouth of the Santa Ynez River, Goleta Slough, Chaparral on the Purisima Hills, and all of Vandenberg Air Force Base.

Although at Vandenberg AFB the policies of the County's Local Coastal Plan [1982] are advisory only, these policies and the policies of the California Coastal Act of 1976 have been used as an additional basis for assessing environmental impacts. California Department of Fish and Game regulations 1601-1603 also regulate physical changes to stream beds. These policies protect coastal streams, wetlands, riparian habitat, Monarch Butterfly trees, native grasslands, Black-shouldered (White-tailed) Kite habitats, vernal pools, and Coast Live Oak trees, which are designated as Environmentally Sensitive Habitats. Under these policies, wetlands are protected against development-related reduction in productivity or degradation in water quality. Sedimentation in streams is to be minimized, riparian and native grassland vegetation is protected, disturbed areas must be revegetated with local native plants, and butterfly trees and Coast Live Oak trees are to be preserved. Species designated as rare, threatened and endangered, as well as those that are not yet designated but are similarly uncommon, are protected by one or more of the Federal Endangered Species Act of 1973, the California Endangered Species Act of 1970, the California Native Plant Protection Act of 1979, and CEQA, Section 15380 (see Sections 2.4 and 2.5 in Appendix F for further details).

In this analysis, it is considered that impacts to terrestrial and freshwater biological resources could result from four phases of the project: (1) construction, (2) normal operations, including upset conditions, (3) accidents and catastrophic events, and (4) abandonment. The types of potential impacts include, but are not limited to: (1) vegetation and wildlife habitat removal, (2) habitat disturbances from adjacent activities, (3) accelerated erosion and sedimentation, (4) oil spills and toxic vapor releases, (5) increased air emissions, and (6) accidental fires. The geographic extent of these potential impacts may vary from local (e.g., confined to a small area) to regional (i.e., affecting the Study Region resources as a whole). The following criteria attempt to take into account recognized habitat value, resource sensitivity, extent of impact and recovery potential. These criteria have been used in this analysis by experts in each biological specialization as guidelines in assigning significance to anticipated impacts.

Determinations of significance, particularly when there are technical uncertainties concerning potential environmental consequences, have been made using the best professional judgment of the biologists who prepared this report. The magnitude and duration of impacts are used as the basis for assigning impacts to significance classes.

An impact is considered locally significant if, without mitigation, it is judged likely to cause or substantially contribute to a measurable change in the species composition, recovery or function of a localized area of any terrestrial or freshwater habitat of recognized importance for a period of five to ten years or longer (i.e., long-term).

An impact is considered regionally significant if, without mitigation, it is judged likely to cause or substantially contribute to a measurable change in:

(1) the species composition, recovery or function of several localized areas, or a single large area, of any terrestrial or freshwater habitat of recognized importance for a period of five to ten years or longer, or,

(2) the size or reproductive capacity of the regional population of any species of recognized regulatory, commercial, recreational, scientific or educational importance for five years or longer, or less if there are overriding considerations.

Impacts may be adverse or beneficial, depending upon the specific kinds of changes anticipated as a result of the impact. For example, loss of an area of breeding habitat of a protected bird species would be considered adverse for that species, whereas creation of new "edge" habitat would be considered beneficial to certain wildlife species.

Locally and regionally significant adverse and beneficial impacts are further classified as Class I-Class IV as described in Section 5.0.

Feasible mitigation measures for project-related impacts are discussed in Section 5.6.5.

The project description for the onshore transportation and processing of Exxon's Shamrock project oil and gas is incomplete. Impacts to terrestrial and aquatic biota will need to be reassessed once Exxon's onshore project components are proposed.

5.6.2 Impacts of Proposed Project Components

5.6.2.0 Construction

OVERVIEW

Most of the anticipated significant impacts to terrestrial and freshwater biological resources from the proposed project would result directly and indirectly from construction activities. The principal impacts of construction are related to vegetation removal; effects include dust generation, erosion, sediment deposition, and establishment of aggressive weeds that invade into adjacent native vegetation. Wildlife may temporarily avoid construction areas and a change in species abundance near pipeline alignments could result. Edge selecting species may increase, while species that avoid open areas may decrease. Impacts from constructed related accidents such as oil spills also could be significant, but these generally have a low probability of occurrence at any given site (see 5.6.2.2). Most construction activities would be associated with pipeline and facility installation. Depending upon the route chosen, the pipeline corridor from landfall to the Orcutt Pump Station would be from about 22.5 to 24 miles long. Assuming a disturbance corridor 100 feet wide from landfall to the Lompoc Dehydration Facility site and 50 feet wide from the Lompoc site to the Orcutt Pump Station, approximately 200 to 225 acres of vegetation and wildlife habitat would be removed. Additional acreage would be subject to both temporary and long-term disturbance. Important factors in assessing construction-related impacts are: (1) the types of habitats and species affected, (2) the time required for habitat recovery after construction (with and without mitigation), and (3) the potential for accelerated erosion and/or sedimentation, which affect habitat recovery and the degree of impact to offsite vegetation and downstream habitats. Also important are the season and duration of construction and the methods used to cross streams and traverse steep slopes.

According to Union's application, construction of the pipeline from landfall to the Orcutt Pump Station is expected to take 17 weeks. Union has committed to the California Coastal Commission's recommendation that construction near the Santa Ynez River estuary take place between September and March, but timing for other construction activity is not specified. Construction of the Lompoc Dehydration Facility is expected to take 27 weeks and to be completed between May and November, 1985. Union proposes to bury the pipeline throughout its length, including at stream crossings, at a depth of three to five feet. The January, 1984 supplement to the Union Oil application [Application, 1984] includes a conceptual plan for revegetation and erosion control on the pipeline right-of-way. Those plans for right-of-way clearing and restoration are presented in Appendix F. Union has agreed to the general mitigation measures for construction in coastal areas proposed in the California Coastal Commission's Consistency Review.

The analysis of construction impacts presented here evaluates the pipeline routes and facility sites as depicted in the strip maps (1":400') and grading plans (1":100') presented as a part of the Union application to the Santa Barbara County Resource Management Department (October 1983, January 1984). The strip maps show the locations of most drainages crossed by the pipeline routes and the vegetation within a 100-foot-wide corridor along the routes. The vegetation maps were prepared using aerial photographs (scale approximately 1:24,000) taken during March 1983 [HDR, 1984a, b, d]. The entire length of all the pipeline routes was surveyed on foot by one or more members of the study team for this report.

GENERAL CONSTRUCTION IMPACTS TO SIGNIFICANT VEGETATION TYPES

Project construction will require partial or complete removal of approximately 225 to 245 acres of native vegetation and other plant cover, including 200 to 225 acres from pipeline construction, 16 acres from construction of the Lompoc Dehydration Facility and approximately two acres in construction staging areas. Acreage values for pipeline construction assume a 100-foot right-of-way from landfall to the Lompoc facility site and a 50-foot right-of-way from the Lompoc site to the Orcutt Pump Station. Approximately 60 to 80 percent of the vegetation to be removed consists of native vegetation types, with the remainder made up of agricultural and ruderal plant cover, planted trees and cleared areas. Comparisons of the acres of each vegetation type to be removed for the Proposed, Alternate, and Primary Pipeline routes is discussed below and summarized in Table 5.6-1. Acres of each type to be removed along the proposed route from the Lompoc Dehydration Facility site to the Orcutt Pump Station are summarized in Table 5.6-2. Table 5.6-3 summarizes the number of trees within the rights-of-way of the pipeline routes. Additional unquantified areas of vegetation would be adversely effected as a result of accelerated erosion and sedimentation. Table 5.2.1.2-1 in Technical Appendix F presents the response to disturbance and recovery characteristics of native vegetation types that would be affected by project construction. The general construction impacts that might be expected in native vegetation types are summarized below.

Table 5.6-1

COMPARISON OF ESTIMATES OF VEGETATION/LAND COVER TYPES (ACRES) WITHIN 100-FOOT WIDE RIGHTS-OF-WAY OF THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC PROCESSING FACILITY SITES

	PIPELINE ROUTES				
Vegetation/Land Cover Types (in acres)	Proposed[1] to Site 4	Alternate[2] to Site 4	Mitigated[3] Alternate to Site 4	Primary[4] to Site 8	Alternate[5] to Site 8
Coastal Dune	0.8[6]	2.0	2.4	0.8	2.0
Coastal Sage Scrub	17.2	13.9	18.7	25.3	9.7
Burton Mesa Chaparral (with scattered oak trees)	49.1	31.0	10.8	35.6	31.2
Coast Live Oak Woodland	2.5	7.9	0.9	3.0	1.6
Riparian Woodland/Wetlands	0.6	26.1	1.4	0.6	26.0
Annual Grassland	45.4	16.4	34.7	33.4	16.4
Agricultural/Ruderal	15.4	46.6	72.8	14.8	50.8
Cleared/unvegetated	21.0	14.8	34.3	21.6	15.0
Planted Trees	0.0	2.3	0.0	1.9	2.3
Totals	152.0	161.0	176.0	137.0	155.0
Percent Native Vegetation	76%	60%	39%	72%	56%
Percent Other Land Cover	24%	40%	61%	28%	44%
Length of Route (in miles)	12.5	13.3	14.5	11.3	12.8

1 Source: HDR, 1984a,b.

2 Source: Determined from measurements of vegetation strip maps provided with Union's application (October, 1983) and supplement (January, 1984). Sections not shown on strip maps (1. Floradale Avenue to northern boundary Lompoc penitentiary and 2. Highway 1 to Site 4) were determined by analysis of vegetation as shown in color air photographs (scale approximately 1:24,000).

3 Source: Determined from measurements of vegetation strip maps provided with Union's application (October, 1983) and supplement (January, 1984). Mitigated sections of alignment were determined by analysis of vegetation as shown in color air photographs (scale approximately 1:24,000).

4 Source: HDR, 1984a.

5 Source: HDR, 1984a and measurements of vegetation strip maps provided with Union's application (October, 1983). Section not shown on strip maps (Floradale Avenue to northern boundary Lompoc penitentiary) was determined by analysis of vegetation as shown in color air photographs (scale approximately 1:24,000).

6 Figures are estimates of the maximum numbers of acres that would be removed and/or disturbed within the 100-foot wide right-of-way.

Table 5.6-2

ESTIMATES OF VEGETATION/LAND COVER TYPES (ACRES) WITHIN WIDE RIGHT-OF-WAY OF THE PROPOSED PIPELINE ROUTE FROM THE LOMPOC DEHYDRATION FACILITY SITES TO THE ORCUTT PUMP STATION

Vegetation/Land Cover Types (in acres)	PIPELINE ROUTES: Proposed Site #4 to Orcutt	Alternate Site #8 to Orcutt
Coastal Sage Scrub	10.3	10.6
Buton Mesa Chaparral (with scattered oak trees)	1.0	5.0
Coast Live Oak Woodland	0.2	0.2
Bishop Pine Forest	0.8	0.8
Riparian Woodland/Wetlands	1.1	1.1
Annual Grassland/Ruderal	32.9	32.9
Agricultural Land	10.0	12.2
Cleared/Unvegetated	4.2	4.2
Totals	60.5	67.0
Percentage Native Vegetation	76.0%	76.0%
Percent Other Land Cover	24.0%	24.0%
Length of Route (in miles)	10.0	11.1

Source: HDR, 1984a and measurements of strip maps provided with Union's application.

Table 5.6-3

COMPARISON OF NUMBERS OF TREES[1] WITHIN THE ROWS OF THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC PROCESSING FACILITY SITES

	Proposed Route to Site 4		Alternate Route[2] to Site 4		Primary Route to Site 8		Alternate Route[3] to Site 8	
	Present in ROW	To be Removed	Present in ROW	To be Removed	Present in ROW	To be Removed	Present in ROW	To be Removed
Trees Present								
Coast Live Oaks	1518	275 (18%)	1406	293 (21%)	1751	329 (19%)	1552	321 (21%)
Willows	8	0	144	144 (100%)	8	0	144	144 (100%)
Eucalyptus	0	0	0	0	101	1 (1%)	101	1 (1%)
Other Species	0	0	5	5 (100%)	0	0	5	5 (100%)
Totals	1526	275	1555	442	1860	330	1802	471

1. Includes all stems 6 inches in diameter or larger at a distance of 4 feet above ground level. (Many oaks of the Project Area are multi-trunked.)

2. These data do not include (1) Floradale Avenue north to prison boundary (probably zero or low number) and (2) Highway 1 to Site 4 (at least several thousand oak stems occur within the ROW, which includes over 8 acres classified as oak woodland).

3. These data do not include the section from Floradale Avenue north to prison boundary.

Source: Tree counts provided in Union Oil Application (October, 1983) and Supplement (January, 1984).

Coastal Strand/Coastal Dune Scrub

Between 0.8 and 2.0 acres of this vegetation, depending upon the route chosen, will be removed as a result of pipeline construction. Mitigation proposed by Union (see Section 5.2.1.0 in Appendix F) is probably not adequate to ensure restoration of this vegetation on coastal foredunes within ten years, although additional mitigations (see Section 5.6.5) would facilitate recovery. Several designated (federal candidates for listing) rare plants are found in these vegetation types in the Project Area (see Section 4.6) and therefore, construction-related impacts are classified as regionally significant, Class II. Disturbance of coastal strand and dunes is inconsistent with the recommendations of the Santa Barbara County Comprehensive Plan [1979, 1982].

Coastal Sage Scrub

Approximately 10 to 25 acres of Coastal Sage Scrub would be removed as a result of pipeline construction. In addition, most of the 16 acres of the proposed Lompoc Dehydration Facility site (Site 4) is covered by coastal sage scrub. Mitigation proposed by Union (Appendix F, Section 5.2.1.0) would probably result in the reestablishment of some form of this community within the pipeline right-of-way in five to ten years, although species composition may differ from that of the pre-disturbance (or an equivalent undisturbed) community. Vegetation at the facility site would not be restored during the lifetime of the facility (30-35 years). Construction-related impacts to Coastal Sage Scrub are classified as regionally significant, Class II.

Annual Grassland

Pipeline construction would result in the removal of between 16 and 45 acres of Annual Grassland. Mitigation proposed by Union (see Section 5.2.1.1, Appendix F) would result in reestablishment of some form of this community within one to two years after disturbance, although species composition would differ from that of the pre-disturbance community. Construction-related impacts to Annual Grassland are classified as Class III.

Burton Mesa Chaparral

Between 30 and 50 acres of Burton Mesa Chaparral (which includes hundreds of mature oak trees) would be removed as a result of pipeline construction. The vegetation is made up of fire-dependent shrubs and herbs, and a low-growing, multiple-trunked form of Coast Live Oak trees. The mitigations proposed by Union (see Technical Appendix F, Section 5.2.1.0) would not result in the recovery of this vegetation within five to ten years. Potential mitigations identified in Section 5.6.5 would promote the reestablishment of some species that compose this vegetation, but regrowth of the dominant shrubs and trees is expected to take decades, with the mitigations identified below. Without mitigation the fire-dependent species of this community may be replaced by weedy native and non-native shrubs of adjacent communities that are tolerant of sandy soils. Impacts to Burton Mesa Chaparral from project construction are classified as regionally significant, Class I. Removal of chaparral on the Purisima Hills may be inconsistent with the recommendations of the Santa Barbara County Comprehensive Plan [1979, 1982].

Coast Live Oak Woodland

Pipeline construction would result in the removal of between one and eight acres of Coast Live Oak Woodland. Table 5.6-3 summarizes the number of oaks that would be removed. In addition, construction of the Lompoc Dehydration Facility at Site 4 may result in the removal of several small groves of oak trees located on the margin of the site. This vegetation will not recover within five to ten years following mitigations proposed by Union (see Section 5.2.1.0, Appendix F). Coast Live Oak trees regenerate very slowly from seed and planted trees and would require many decades to reach maturity. Mitigations identified in Section 5.6.5 would promote the very gradual recovery of this community after disturbance. Construction-related impacts to Coast Live Oak Woodland and oak trees in other vegetation are classified as regionally significant, Class I. Removing coast live oak trees may be inconsistent with the recommendations of the Santa Barbara County Local Coastal Plan [1982].

Bishop Pine Forest

Approximately 2 acres of this forest would be removed in the Purisima Hills as a result of construction of the pipeline segment from the Lompoc Dehydration Facility site to the Orcutt Pump Station. Bishop Pines and many of the shrubs that grow with them are fire-dependent species that probably would not become reestablished either without mitigation or as a result of the mitigations proposed by Union (see Section 5.2.1.0 in Appendix F). Additional mitigations, identified in Section 5.6.5, would promote the recovery of this community, however, the regrowth of mature Bishop Pine Forest is expected to require at least several decades. Impacts to this community from pipeline construction are classified as locally significant, Class I because of the limited amount of Bishop Pine forest in the region and its long reestablishment time. Removal of Bishop Pine forest may be inconsistent with the recommendations of the Santa Barbara County Comprehensive Plan [1979, 1982].

Wetland Communities, including Riparian Woodland

Between 0.5 and 26 acres of Coastal wetlands, Interior Wetlands and Riparian Woodland habitats would be removed as a result of pipeline construction, depending on the route chosen. Mitigations proposed by Union (see Appendix F, Section 5.2.1.0) would probably result in some recovery of these vegetation types within five to ten years, depending upon the hydrologic and soil conditions after disturbance. Additional mitigations presented in Section 5.6.5 would accelerate the recovery of these communities. Construction-related impacts to wetland vegetation types are classified as locally to regionally significant, Class I to II, depending on the location and the mitigation measures employed. Removal of marshes and riparian habitats may be inconsistent with the recommendations of the County's Comprehensive Plan and Local Coastal Plan.

GENERAL CONSTRUCTION IMPACTS TO WILDLIFE

Impacts to wildlife anticipated as a result of construction include loss of wildlife habitat in rights-of-way and at facility sites as a consequence of vegetation removal and degradation of habitat value of adjacent areas due to noise, traffic and human activity or intrusion into offsite areas. Construction activities could cause sensitive species to avoid an area greater than that which is physically disturbed during construction.

Removal of agricultural, coastal sage scrub, chaparral and grassland habitats would have minor (Class III) impacts on wildlife due to the relative abundance of similar habitats throughout the Project Area and Study Region. The creation of habitat "edge" between coastal sage scrub, chaparral and more open vegetation which colonizes the pipeline corridor after construction would benefit wildlife by increasing species diversity within this new "edge" habitat and would constitute a Class IV insignificant impact.

Removal of coastal wetlands, interior wetlands, riparian woodland and vernal wetland habitats is expected to have a greater effect on wildlife because of the limited areal extent of these habitats, their importance to a number of regionally sensitive species and the length of time required for habitat recovery. Impacts associated with removal of these habitats would be locally to regionally significant and would range from moderate to long-term but are considered to be mitigable (Class II) in most, if not all, instances through a combination of measures. These include: pipeline realignments to minimize impacts to sensitive wildlife habitats (e.g., willow riparian woodlands), and habitat restoration such a slope and soil stabilization and revegetation using locally obtained native plants.

Noise associated with the actual construction of the pipeline is expected to have an adverse but not significant (Class III) impact on wildlife. A typical construction site can generate maximum sound levels ranging from 75 dBA to 95 dBA at 15 meters (50 feet) from the source [Westec 1983b.] Sound levels decrease with distance from the source along the line of sight by simple spreading of energy. Topographic features between the source and receptor can further reduce sound levels impinging on a receptor.

Noise levels above 60 dBA are generally considered loud, and levels above 75 dBA are considered capable of producing damaging physiological effects in animals [Welch and Welch, 1970; Fletcher, 1971]. Arthur D. Little model results indicate that the maximum expected noise levels generated by construction would be 76 dBA (landfall to Lompoc) and 73 dBA (Lompoc to Orcutt) at 200 feet. This would be attenuated to 62 dBA and 58 dBA at 1,000 feet (see 5.9).

It is assumed that wildlife would attempt to avoid physiological damage from noise by moving away from the sources or retreating into burrows. Of concern is the amount of wildlife habitat temporarily lost or reduced in quality during exposure to high noise levels generated during construction. Also of importance is whether noise generated during construction will interfere with mate recognition, nesting activity and prey detection. Although thresholds for such responses are not known they are assumed to lie between 60 dBA and 75 dBA.

Coast Live Oak Woodland

Pipeline construction would result in the removal of between one and eight acres of Coast Live Oak Woodland. Table 5.6-3 summarizes the number of oaks that would be removed. In addition, construction of the Lompoc Dehydration Facility at Site 4 may result in the removal of several small groves of oak trees located on the margin of the site. This vegetation will not recover within five to ten years following mitigations proposed by Union (see Section 5.2.1.0, Appendix F). Coast Live Oak trees regenerate very slowly from seed and planted trees and would require many decades to reach maturity. Mitigations identified in Section 5.6.5 would promote the very gradual recovery of this community after disturbance. Construction-related impacts to Coast Live Oak Woodland and oak trees in other vegetation are classified as regionally significant, Class I. Removing coast live oak trees may be inconsistent with the recommendations of the Santa Barbara County Local Coastal Plan [1982].

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Wetland Communities, including Riparian Woodland

Between 0.5 and 26 acres of Coastal wetlands, Interior Wetlands and Riparian Woodland habitats would be removed as a result of pipeline construction, depending on the route chosen. Mitigations proposed by Union (see Appendix F, Section 5.2.1.0) would probably result in some recovery of these vegetation types within five to ten years, depending upon the hydrologic and soil conditions after disturbance. Additional mitigations presented in Section 5.6.5 would accelerate the recovery of these communities. Construction-related impacts to wetland vegetation types are classified as locally to regionally significant, Class I to II, depending on the location and the mitigation measures employed. Removal of marshes and riparian habitats may be inconsistent with the recommendations of the County's Comprehensive Plan and Local Coastal Plan.

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Impacts to wildlife anticipated as a result of construction include loss of wildlife habitat in rights-of-way and at facility sites as a consequence of vegetation removal and degradation of habitat value of adjacent areas due to noise, traffic and human activity or intrusion into offsite areas. Construction activities could cause sensitive species to avoid an area greater than that which is physically disturbed during construction.

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Noise associated with the actual construction of the pipeline is expected to have an adverse but not significant (Class III) impact on wildlife. A typical construction site can generate maximum sound levels ranging from 75 dBA to 95 dBA at 15 meters (50 feet) from the source [Westec 1983b.] Sound levels decrease with distance from the source along the line of sight by simple spreading of energy. Topographic features between the source and receptor can further reduce sound levels impinging on a receptor.

Noise levels above 60 dBA are generally considered loud, and levels above 75 dBA are considered capable of producing damaging physiological effects in animals [Welch and Welch, 1970; Fletcher, 1971]. Arthur D. Little model results indicate that the maximum expected noise levels generated by construction would be 76 dBA (landfall to Lompoc) and 73 dBA (Lompoc to Orcutt) at 200 feet. This would be attenuated to 62 dBA and 58 dBA at 1,000 feet (see 5.9).

It is assumed that wildlife would attempt to avoid physiological damage from noise by moving away from the sources or retreating into burrows. Of concern is the amount of wildlife habitat temporarily lost or reduced in quality during exposure to high noise levels generated during construction. Also of importance is whether noise generated during construction will interfere with mate recognition, nesting activity and prey detection. Although thresholds for such responses are not known they are assumed to lie between 60 dBA and 75 dBA.

Pipeline construction is expected to occur during daylight hours for eight to ten hours per day and is expected to be completed within 17 weeks over the 22.5- to 24-mile pipeline corridor. Two construction spreads would be used, each about 1,500 feet long, spaced approximately 1/4 mile apart. The spread would move about 4 to 5 miles per week. Noise levels above 60 dBA would be experienced by a given receptor for a period ranging from about two days, for a receptor located 700 meters (2,300 feet) from the pipeline alignment, to five to six days for a receptor located adjacent to the corridor.

Nocturnal wildlife would not be affected by noise except perhaps if their daytime roosts, burrows or dens are in the vicinity of the pipeline corridor. Diurnally active wildlife such as snakes, lizards and some birds would be affected by the noise and disturbance related to pipeline construction. The most sensitive species would be those that might abandon nesting attempts within the line of sight or the radius of propagation of land noises (maximum of 700 meters [2,300 feet]) from alignment. This would be considered an adverse but not significant (Class III) effect for common or widespread species. However, for regionally rare or declining species, the effect of nest abandonment could in the worst case cause a locally or regionally significant loss of one year's recruitment to the population. In the case of multiple brood species the loss would probably be, in the worst case, one brood. The level and significance of such worst case impacts would depend upon many factors including the presence of the species in the affected location, area of nesting sites, proportion of the local population affected, timing of passage of the construction spread near the nest sites, and so forth. (Field studies aimed at determining the presence and location of regionally rare and declining breeding bird species along the pipeline routes are scheduled for late April and early May, 1985 and the results should allow for a more focused analysis.) In the interim, it is assumed that a number of regionally rare or declining species would be significantly effected. This impact (Class II) could be mitigated by postponing the construction start date until later in the dry season, beginning in late August or September in any areas determined to have nesting regionally rare or declining avian species near the pipeline corridor. The Applicant has committed to the California Coastal Commissions' recommendation that construction take place between September and March at the mouth of the Santa Ynez River.

Changes in the water quality in creeks crossed by the pipeline and downslope from the pipeline could be affected by runoff from discharged or dumped chemicals (e.g., fuel oil) and by increased sedimentation from erosion associated with soil disturbance by pipeline construction activities. These changes could impact freshwater-dependent, regionally declining or endangered amphibians and birds. This impact (Class II), regionally significant, could be avoided by completing construction before the wet season in order to lessen the chances that spilled chemicals or sediment loads could be carried downstream during periods of storm runoff and by stabilizing disturbed soils through a revegetation program following construction.

Effects of sedimentation will continue until disturbed soils are stabilized either naturally or through human intervention. Methods of revegetation will be discussed in the mitigations section. Impacts on wildlife from sedimentation are expected to be adverse but of a short-term nature (Class II).

GENERAL CONSTRUCTION IMPACTS TO AQUATIC HABITATS AND BIOTA

The impacts from construction on aquatic habitats and biota would result primarily from increased erosion and sedimentation as a result of pipeline construction. Depending upon the route chosen, between 42 and 52 drainages would be crossed from landfall to the Orcutt Pump Station. Major drainages include the Santa Ynez River, Santa Lucia Canyon, Davis Creek, San Antonio Creek upstream from Barka Slough and upper Harris Canyon. Although many drainages contain ephemeral streams, a large number of these are tributary to major drainages. At least two perennial springs could be affected. The alternate pipeline route passes through the southern edge of the estuary of the Santa Ynez River mouth and the estuary could also be affected by erosion along the proposed and primary routes since these parallel the northern margin of the estuary (see Figures 5.6-1 and 5.6-2).

Pipeline construction would result in vegetation removal from a 100- or 50-foot wide right-of-way and modification of stream beds, banks and riparian vegetation. These activities would increase erosion and thereby, sediment loads to streams and other aquatic habitats. As a result, turbidity would increase and over the long-term sediments would accumulate in depositional areas (pools, the lagoons, and slough) and scour erosional areas (riffles). Increased turbidity would result in a decline in primary production by benthic (bottom-dwelling) algae; however, a countering effect is that increased nutrients found in sediments and increased light resulting from removal of riparian vegetation could result in increased primary productivity. Increased algal growth could result in decreased levels of dissolved oxygen due to algal respiration at night and decomposition of dead algal material. Deposited sediment would smother benthic algae and invertebrates (the primary food supply for many fish) and sediments carried in the water column would abrade the gills and integuments, and clog the gills of fish and invertebrates. Substrate characteristics would be modified by sediment accumulation in the interstices of rocks, gravel and sand. Declines in habitat diversity resulting from sediment deposition would lead to a decreased diversity of benthic invertebrates. This effect would be most pronounced in streams with a range of substrate sizes (from fine sediments to coarse rocks).

Of particular concern are the effects of increased sediment loads on benthic fish, such as the federal candidate tidewater goby. Increased sediment loads could fill in the burrows of spawning gobies and smother their eggs, as well as cover their benthic invertebrate food sources. In the past, gobies have disappeared from lagoons affected by construction activities [Swift, 1984].

Increased turbidity and sedimentation affects areas of slower flow such as pools, lagoons and impoundments. Sedimentation could have moderate to long-term effects on wildlife (such as unarmored threespine stickleback) dependent upon freshwater pool or lagoon habitats through habitat alteration. Accumulation of the settled materials could make pools and lagoons shallower. These effects could be most significant in areas of the Santa Ynez River and San Antonio Creek which are downstream from the Project Area. Recovery of riparian-dependent amphibians could occur rapidly through recolonization if organisms can drift downstream from undisturbed upstream habitats.

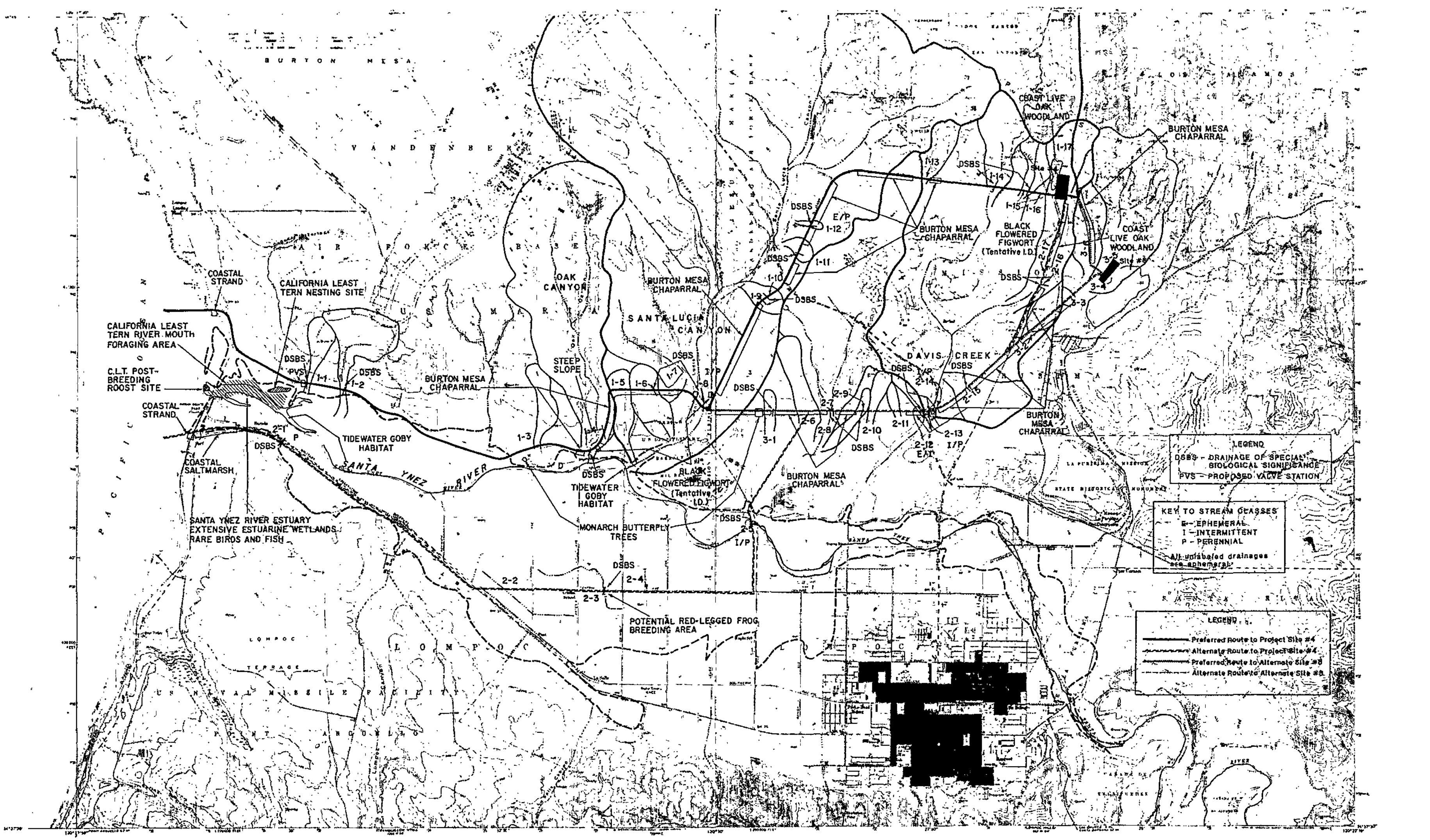

FIGURE 5.6-1 IMPORTANT IMPACT ISSUES FOR TERRESTRIAL AND FRESHWATER HABITATS AND SPECIES

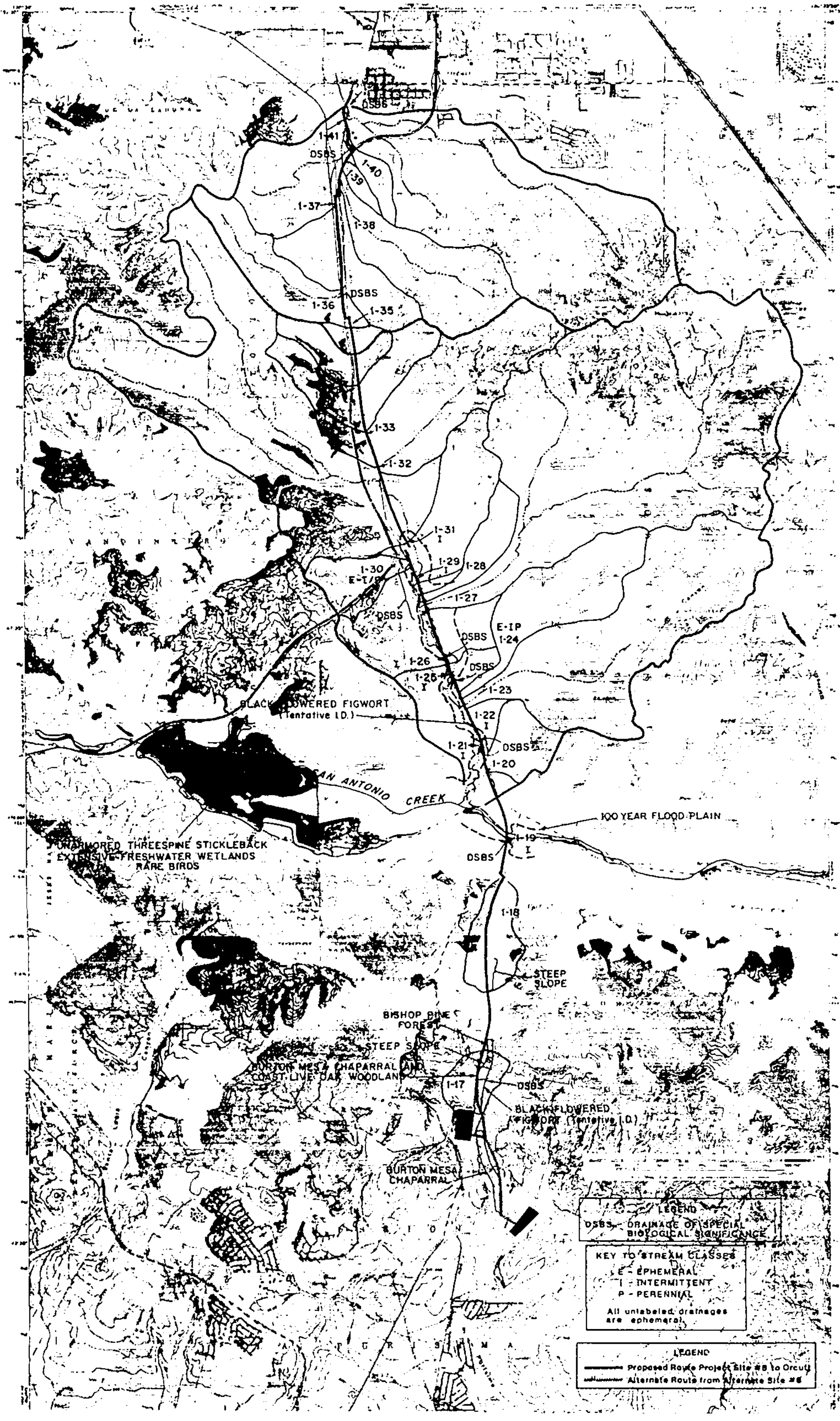

FIGURE 5.6-2 IMPORTANT IMPACT ISSUES FOR TERRESTRIAL AND FRESHWATER HABITATS AND SPECIES

The degree to which these potential effects of increased sedimentation are realized is dependent upon the amounts of sediments actually generated. At many stream crossings, the areas disturbed as a result of pipeline construction would be small (less than 1 acre) and sediment inputs would be relatively low under normal rainfall conditions. However, especially for those streams with large drainage areas (such as Oak Canyon and Santa Lucia Canyon) (see Section 1 of Technical Appendix C) unusual rainfall events could result in heavy sediment loading within a short time. Significant increases in sediment yield (greater than 30 percent over baseline) are predicted from construction at the small drainages draining into Oak Canyon, Santa Lucia Canyon, and Davis Creek and from the proposed dehydration facility site at Lompoc. (See Technical Appendix C, Section 1.)

Removal of riparian vegetation would result in increased water temperatures, loss of cover (protection for organisms) and loss of food for aquatic invertebrates and fish. For example, many aquatic invertebrates derive most of their nutrition from bacteria and fungi which colonize leaf litter. Therefore, loss of leaf litter would result in declines in abundance for these organisms. Many invertebrates may be capable of reestablishment in disturbed areas by flying in or drifting in from upstream once riparian vegetation becomes reestablished.

Union has proposed dewatering (through the use of well points), if necessary, in San Antonio Creek during pipeline burial activities which could result in the destruction of aquatic biota in that section of the creek. However, the Creek section to be affected is short, and the consequences of dewatering would probably be minimal.

These effects on aquatic habitats and biota can be minimized as a result of mitigation outlined in Section 5.6.5, including carrying out construction activities during the dry season and stabilizing disturbed stream banks before the commencement of the rainy season. Depending on the specific locations, construction impacts to aquatic habitats and biota could range from locally to regionally significant, Class I to III (specific impacts are described below).

CONSTRUCTION OF PIPELINE AND UTILITY CORRIDORS

Construction of Pipeline From Landfall to Lompoc Dehydration Facility Site

The gas, oil and produced water pipelines would be buried to a depth of 3 feet (5 feet under stream crossings) along the proposed 12.5 mile route from landfall to the Lompoc Dehydration Facility site.

The pipeline would come onshore north of the Santa Ynez River estuary (one of Santa Barbara County's most significant biological features) and parallel the river for several miles before crossing Burton Mesa to Site 4 at the South slope of the Purisima Hills. Figure 5.6-1 (in preparation) shows the important impact issues for this route.

Vegetation. A 100-foot right-of-way will be used for construction procedures, although only a 50-foot-wide portion of the right-of-way will be completely cleared of all vegetation during the nine- to ten-week construction period. The acres of each vegetation type within the right-of-way are shown in Table 5.6.-1. Direct effects of construction could impact the 152 acres within the right-of-way, while additional acreage could be impacted indirectly by erosion downstream or downslope of construction areas.

The vegetation types that pipeline construction is expected to have the most significant impacts on are Burton Mesa Chaparral, Coast Live Oak Woodland and Riparian Woodlands and Wetlands. About 50 acres of Burton Mesa Chaparral (32 percent of this section of the pipeline route) would be disturbed. Impacts are expected to be Class I, regionally significant, because many of the species in this community are rare or endemic, many are fire-dependent for reproduction, and reestablishment times are long (see Table 5.2.1.2-1, Appendix F). Construction disturbance of Coast Live Oak Woodland (removal of 275 stems -- Table 5.6-3) would have Class I, regionally significant impacts. Coast Live Oaks are very slow growing and reproduction from seeds is extremely rare, so recovery of this community would require more than 50 years. Although only 0.3 percent of the route would disturb Riparian Woodland and Wetlands (Table 5.6-1), there is potential for sedimentation to affect much larger areas because riparian areas and wetlands are associated with drainage crossings where erosion potential can be higher than in level areas. Construction of the pipeline through Coastal Strand and Coastal Dune Scrub could have Class II, regionally significant, impacts due to the existence of three federal candidate plant species.

Table 5.6-4 summarizes the numbers and types of drainages crossed by the Proposed Pipeline route and Figure 5.6-1 summarizes the impact issues associated with those crossings. Of the 16 drainages crossed by the Proposed Pipeline route eleven are considered to have special biological significance. Table 5.6-5 describes the major impacts for those crossings. Specific impact levels depend on the vegetation type and drainage characteristics. Drainages where Coastal Sage Scrub or Grassland are disturbed might be expected to have Class II or III impacts, while disturbance of Riparian Woodland might have Class I or II impacts. The removal of oak trees and chaparral on the steep slopes of Oak Canyon would have Class I, locally significant impacts. The impact at Santa Lucia Canyon crossing and the eastern tributary of Davis Creek would be Class II, regionally significant, because of the presence of the Black flowered figwort, a federal candidate for endangered listing. The short and long term impacts to these vegetation types depends on the mitigation measures employed.

Construction of the pipeline could result in a worst-case 24-hour suspended particulate level of 448 ug/m^3 which exceeds the federal standard of 260. This could have Class III impacts on vegetation less than 100 yards away due to coating leaves and reducing gas exchange or by decreasing sunlight interception.

Wildlife. The noise associated with pipeline construction ranging from 76 dBA (average hourly level equivalent) 200 feet from construction to 55 dBA at 2,000 feet from construction could have short term Class III impacts on wildlife. The disruption of habitat used by regionally rare birds (or of their feeding or nesting activity) in the vicinity of the Santa Ynez River and estuary could have Class II, regionally significant impacts. Removal of nests

TABLE 5.6-4

COMPARISON OF NUMBERS AND TYPES OF DRAINAGES CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

	Pipeline Routes				
	Proposed To Site 4 (1)	Alternate To Site 4 (2)	Mitigated Alternate to Site 4 (3)	Primary To Site 4 (4)	Alternate To Site 8 (5)
All Drainages					
Ephemeral	13	12	8	20	13
Intermittent	1	2	1	1	2
Perennial	2	3	3	3	3
Totals	16	17	12	24	18
Drainages of Special					
Biological Significance	8	6	4	9	5
Ephemeral	1	2	1	1	1
Perennial	2	4	3	3	5
Totals	11	12	8	13	11

Source: HRD, 1984a, b, d, map analyses and field studies completed for this project.

Table 5.6-5
(See also Figure 5.6-3)
(continued)

COMPARISON OF DRAINAGES OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

Drainage No.& Type	Crossed By[1] Prop. to 4	Alt. to 4	Prim. to 8	Alt. to 8	Drainage Name/ Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
1-8 (I/P)	X		X		Santa Lucia Canyon-Steep-sloped canyon with diverse wetland vegetation in the canyon bottom. Black-flowered Figwort on canyon slopes in pipeline corridor.	Construction: Removal of wetland vegetation and Black-flowered Figwort, (a) and (b). Vegetation: Class II-regional Wildlife: Class III Aquatics: Class II-local to regional Accidents: Oil spill could reach Santa Ynez River. Vegetation: Class II-local Wildlife & Aquatics: Class II-regional	4-6, 8-10, above. 11. Construct this segment between May and Nov. to avoid rainy season.
1-9 (E)	X				Unnamed tributaries to Santa Lucia Canyon-Broad swale containing diverse freshwater wetland vegetation.	Construction: Removal of wetland vegetation, (a) and (b). Vegetation: Class II-local Wildlife & Aquatics: Class III Accidents: Oil spill could reach Santa Lucia Canyon and Santa Ynez River (less likely). Vegetation, Wildlife & Aquatics: Class II-III-local to regional (depending upon size of spill).	4-6, 9, 11, above. 12. Move pipeline route ± 100 feet west into existing fuelbreak on eastern border of Vandenberg AFB.
1-10 (E)	X				Seep area with diverse freshwater wetland vegetation; probably tributary to 1-9.		
1-11 (I)	X				Unnamed intermittent spring tributary to Santa Lucia Canyon-Oak woodland with large old oaks and wetland vegetation in pipeline corridor.	Construction: Removal of 6 large oaks and wetland vegetation (11 other large oaks nearby could be lost from trenching in root zone), (a) and (b). Vegetation: Class I-local Wildlife & Aquatics: Class III Accidents: Oil spill could reach Santa Lucia Canyon and Santa Ynez River (less likely). Vegetation, Wildlife & Aquatics: Class II-III-local to regional (depending upon size of spill).	4-6, 9, 11, 12, above.
1-12 (P/E)	X				Unnamed perennial spring tributary to Santa Lucia Canyon- Willow-dominated Riparian Woodland and other diverse wetland vegetation downslope (adjacent to pipeline route).	Construction: Degradation of nearby Riparian Woodland and wetlands from (a) and (b). Vegetation & Aquatics: Class III Wildlife: Class II-III-local to regional Accidents: Oil spill could reach Santa Lucia Canyon and Santa Ynez River (less likely). Vegetation, Wildlife & Aquatics: Class II-III-local to regional, depending upon size of spill).	4-6, 9, 11, 12, above.

Table 5.6-5
(See also Figure 5.6-3)
(continued)

COMPARISON OF DRAINAGES OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

Drainage No.& Type	Crossed By[1] Prop. to 4	Alt. to 4	Prim. to 8	Alt. to 8	Drainage Name/ Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
1-14 (E)	X				Unnamed tributary of Davis Creek-Willow-dominated Riparian Woodland downslope (adjacent to pipeline route).	Construction: Degradation of nearby Riparian Woodland from (a) and (b). Vegetation, Wildlife & Aquatics: Class III Accidents: Oil spill could reach Davis Creek. Vegetation, Wildlife & Aquatics: Class II-III-local to regional (depending upon size of spill).	4-6, 9, 11, above.
1-16 (E)	X				Unnamed tributary of Davis Creek-Erosional gully with Coastal Sage Scrub and Black-flowered Figwort.	Construction: Removal of Coastal Sage Scrub and Black-flowered Figwort (a) and (b). Vegetation: Class II-regional Wildlife & Aquatics: Class III Accidents: Oil spill could reach Davis Creek. Vegetation, Wildlife & Aquatics: Class II-III-local to regional (depending upon size of spill).	4-6, 9, 11, above.
2-1 (P)		X		X	Unnamed-Permanently flooded ditch bordered by Riparian Woodland and other diverse wetland vegetation. Flows seasonally into Santa Ynez River estuary. Potential Red-legged Frog breeding habitat. Potential nesting habitat of several regionally rare and declining birds* found nearby. Tidewater goby in estuary.	Construction: Removal of Riparian Woodland and wetland vegetation (a) and (b). Vegetation, Wildlife & Aquatics: Class II-local Accidents: Oil spill could reach Santa Ynez River estuary. Vegetation: Class II-regional Wildlife & Aquatics: Class II-regional	4-6, 9, 11, above. 13. Use Southern Mitigated Pipeline Route. 14. Bury pipeline 5 to 10 feet in 100-year flood plain. 15. Install valve at landfall connecting produced water and oil lines so that oil can be displaced quickly in the event of flooding.
2-3 (I/P)		X		X	Unnamed-Local drainage now fed by agricultural runoff. Marsh on south side of Central Avenue provides breeding habitat for Red-legged Frog (presence verified by spring 1985 survey).	Construction: Removal of wetland vegetation (a) and (b). Vegetation & Aquatics: Class II-local Wildlife: potentially Class I-regional Accidents: Oil spill could affect local area. Vegetation & Aquatics: Class II-local Wildlife: potentially Class I-regional	4-6, 9, 11, 14, 15, above.

Table 5.6-5
(See also Figure 5.6-3)
(continued)

COMPARISON OF DRAINAGES OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

Drainage No.& Type	Crossed By[1] Prop. to 4	Alt. to 4	Prim. to 8	Alt. to 8	Drainage Name/ Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
2-5 (I/P)		X		X	Santa Ynez River-Perennial river channel, seasonally flooded floodplain and banks with high diversity of wetland habitats and Riparian Woodland. Potential breeding habitat of Red-legged Frog and several regionally rare bird species*. Flows directly into major willow-dominated Riparian Woodland and estuary of Santa Ynez River, the latter containing tidewater goby and nesting site of Least Tern. La Graciosa Thistle in downstream marsh habitat.	Construction: Removal of Riparian Woodland and other wetland vegetation, (a) and (b), temporary dewatering of river. Vegetation: Class II-local Wildlife & Aquatics: Class II-regional Accidents: Oil spill would affect Santa Ynez River and could reach estuary. Vegetation: Class II-regional Wildlife & Aquatics: Class II-regional	4-7, 9, above. 16. Install block valve on south side and check valve on north side of Santa Ynez River crossing. 17. Cross river by spanning or drilled crossing.
2-7 (E)		X	X	X	Both Unnamed-Two forks join in area of pipeline corridor. Oaks and willows on banks. Wetland vegetation on lower banks.	Construction: Removal of oaks, willows and wetland vegetation, (a) and (b). Vegetation: Class II-local Wildlife & Aquatics: Class III Accidents: Oil spill would affect local area. Vegetation: Class II-local Wildlife & Aquatics: Class III	4-6, 8, 9, 11 above. 18. Move pipeline route south into fuelbreak on Lompoc Federal Correctional Institution property.
2-8 (E)		X	X	X			
2-9 (E)		X	X	X	Unnamed-Entrenched ravine with with willow-dominated Riparian Woodland on banks.		
2-12 (E/I)		X	X	X	Unnamed western tributary of Davis Creek-Cottonwood and willow-dominated Riparian Woodland on banks. Several seeps occur along stream banks. Wetland vegetation in stream corridor. Shagbark Manzanita on slopes above.	Construction: Removal of cottonwoods, willows, wetland vegetation (a) and (b). Vegetation: Class II-local Wildlife & Aquatics: Class III Accidents: Oil spill would affect local area. Vegetation & Aquatics: Class II-local Wildlife: Class III	4-6, 8, 9, 11, above.
2-13 (I/P)		X	X	X	Davis Creek-Perennial stream channel with seasonally flooded slopes and banks and narrow floodplain. Willow-dominated Riparian Woodland, freshwater marsh and other wetland species.	Construction: Removal of willows, wetland vegetation (a) and (b). Vegetation & Aquatics: Class II-local Wildlife: Class III Accidents: Oil spill would affect local area and could reach Santa Ynez River (the latter is unlikely). Vegetation: Class II-local to regional Wildlife & Aquatics: Class II-local to regional	4-6, 8, 9, 11, above. 19. Install check valve on east side of Davis Creek crossing.

Table 5.6-5
(See also Figure 5.6-3)
(continued)

COMPARISON OF DRAINAGES OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

Drainage No.& Type	Crossed By[1] Prop. to 4	Alt. to 4	Prim. to 8	Alt. to 8	Drainage Name/ Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
2-14 (I/P)		X	X	X	Unnamed eastern tributary of Davis Creek-Channelized section with willow-dominated Riparian Woodland and fresh-water marsh plants.	Construction: Removal of wetland plants and possibly willows (a) and (b). Vegetation: Class II-local Wildlife & Aquatics: Class III Accidents: Oil spill would affect local area and probably Davis Creek. Vegetation, Wildlife & Aquatics: Class II-local to regional	4-6, 8, 9, 11, above.
2-15 (E)		X	X	X	Unnamed eastern tributary of Davis Creek-Broad sandy swale with Coastal Sage Scrub, chaparral shrubs and native annuals, including Annual Curly-leaved Monardella.	Construction: Removal of Coastal Sage Scrub and other native plants including Annual Curly-leaved Monardella (a) and (b). Vegetation: Class II-local Aquatics & Wildlife: Class III Accidents: Oil spill would affect local area and could reach Davis Creek. Vegetation, Wildlife & Aquatics: Class II-local to regional	4-6, 9, 11, above.
2-16 (E) 2-17 (E)		X X		X X	Unnamed eastern tributaries of Davis Creek-Freshwater marsh and other wetland vegetation. Seep and vernal pool. Black-flowered Figwort nearby.	Construction: Removal of wetland vegetation, possible loss of some vernal pool habitat (a) and (b). Vegetation: Class II-local Aquatics & Wildlife: Class III Accidents: Oil spill would affect local area and could reach Davis Creek. Vegetation, Wildlife & Aquatics: Class II-local to regional	4-6, 9, 11, above.
3-1 (E)			X		Unnamed-Freshwater marsh and other wetland vegetation with high native plant species diversity. Oak trees and Shagbark Manzanita nearby.	Construction: Removal of wetland vegetation (a) and (b). Vegetation: Class II-local Aquatics & Wildlife: Class III Accidents: Oil spill would affect local area. Vegetation: Class II-local Aquatics & Wildlife: Class III	4-6, 9, 18, above.

1. Prop. to 4= proposed pipeline route to Site 4
   Alt. to 4 = alternate pipeline route to Site 4
   Prim. to 8= primary pipeline route to Site 8
   Alt. to 8 = alternate pipeline route to Site 8
2. Numbers correspond to those used in figures and Onshore Water Technical Appendix (C); E = ephemeral, I = intermittent, P = perennial.

* (e.g., White-faced Ibis, American Bittern, Common Moorhen, Tree Swallow, Swainson's Thrush, Warbling Vireo and others; Spring surveys needed to verify presence).

or roosts for rare or endangered raptors and removal of coastal dune or marshes near the mouth of the Santa Ynez estuary are inconsistent with the recommendations of the Santa Barbara County Comprehensive Plan [1979, 1982]. These impacts would be mitigated by the Applicant's commitment to construct the pipeline when birds are not nesting (in September to March). Arthur D. Little measurements show background noise levels at the Santa Ynez River estuary were 62 dBA. Noise levels of 89 dBA might be received 1,000 feet from construction in this area.

HDR [1981] noted no significant change in California Least Tern nesting behavior when a colony exposed to a background noise level of 60-70 dB was exposed to a Minuteman launch that reached 104 dB. The response of Least Terns to Minute Man Noise is not directly comparable to the response they might have to the noise and activity associated with construction.

Aquatic Habitats & Biota. In addition to crossing 16 drainages, the Proposed Pipeline route parallels the Santa Ynez River up to the Lompoc Federal Correctional Institution and passes near several vernal pools, a small pond and several springs. Disturbance of vernal pools may be inconsistent with the Santa Barbara County Comprehensive Plan [1979, 1982] and Local Coastal Plan [1982]. Unmitigated construction, causing increased erosion and sedimentation, could have a Class II, locally significant impact on aquatic habitats which support the tidewater goby (a federal candidate fish found in the Santa Ynez River and lagoon) and possibly two regionally rare and declining amphibians which may occupy the pond northeast of the Lompoc-Casmalia Road pipeline crossing.

Rare Species. Thirty-nine rare (as defined in Section 4.6.2.5) species of plants, invertebrates, amphibians, fishes, birds and mammals could be affected as a result of pipeline construction along this route. Impacts could range from Class I to III, locally to regionally significant, depending on the species and location. Nineteen of these have been identified at sites within or near the pipeline corridor as a result of field studies conducted for this project or other recent studies, or both. Spring or summer surveys are required to determine the status of most of the remaining 20 species. The status, known or expected occurrence, and evidence for presence of these species are summarized in Table 5.2-6 in Appendix F.

Construction of Proposed Pipeline from Lompoc Dehydration Facility Site to Orcutt Pump Station

This portion of the pipeline route goes north through the Purisima Hills and then crosses the 100-year flood plain in the area of the San Antonio Creek crossing and as it follows the Harris Creek drainage. Table 5.6-2 summarizes the vegetation types that lie within the 50-foot right-of-way.

Vegetation. Of the 60 acres that would be partially or completely removed by this 10-mile pipeline route, about 47 acres are annual grassland, agricultural land, ruderal, or unvegetated. These habitats have short recovery times, and contain few rare species so impacts to these habitats would be considered Class II or III, local or regional, depending on their wildlife habitat value.

About 10 acres of coastal sage scrub would be disturbed. The shrub area in this community would not recover for five to 15 years and it would take even longer for restoration of pre-disturbance species composition. In addition, the steep slopes in the Purisima Hills present the potential for impacts due to accelerated erosion. Several rare or endangered plant species occur in Coastal Sage Scrub; therefore impacts would be locally significant, Class II.

Approximately 1 acre of Burton Mesa Chaparral plus Coast Live Oak Woodland would be removed by construction. About 25 oak stems would be removed. Chaparral contains many endemic species. Although some chaparral shrubs can resprout if their root systems are left in the ground, others have seeds that normally do not germinate in the absence of fire. However, Purisima Manzanita, Lompoc Ceanothus, and Santa Barbara Ceanothus do not sprout from stumps or root crowns and probably need heat treatment (fire) for seed germination. Expected impacts to these communities are considered locally significant, Class I.

Less than 1 acre of Bishop Pine forest would be cut. About 30 Bishop Pine trees and one oak tree would be removed. The Bishop Pine community probably requires more than 30 years to recover. Construction impacts here would be regionally significant, Class I, due to the uniqueness of this community.

A total of about 1 acre of riparian woodland and wetland vegetation would be removed from 15 small areas, causing Class II, regionally significant impacts. Removal of Coast Live Oaks, Bishop Pine Forest and riparian woodland could be inconsistent with the Santa Barbara County Comprehensive Plan [1979, 1982] or Local Coastal Plan [1982].

Wildlife. Due to the absence of many wildlife species in the right-of-way, construction should cause adverse but insignificant (Class III) impacts to wildlife. Since the right-of-way has been previously disturbed and is still in use, large species would disperse due to noise, but their abundance should not be affected.

Aquatic Habitats and Biota. Aquatic habitats and biota could be affected by pipeline construction due to: (1) direct disturbance at stream crossings, (2) increases in downstream turbidity and sedimentation and (3) spills of fuel or chemicals during construction. The magnitude and duration of these could be lessened if construction takes place in the dry season. The pipeline from the proposed dehydration facility site to Orcutt would cross 26 drainages, of which 18 are ephemeral. Fourteen are considered to have special biological significance (see Table 5.6-6). There is potential for Class II, regionally significant impacts (due to the above factors) to San Antonio creek and Barka Slough where the federally endangered unarmored threespine stickleback is found, as well as at least nine other protected or regionally rare wildlife species. Many of the drainages crossed by the pipeline flow into Barka Slough, which is one of the largest and most biologically significant riparian woodland/wetland complexes remaining in Santa Barbara County.

Rare Species. Twenty rare species of plants, amphibians, fishes, birds, and mammals could be affected as a result of pipeline construction along this route. Thirteen of these have been identified at sites within or near the pipeline corridor as a result of field studies conducted for this project or other recent studies, or both. Impacts to rare species are discussed on a species-by-species basis in Section 5.2.4. in Appendix F.

Transmission line

The proposed transmission line corridor would be between Highway 246 and the Southern Pacific Railroad tracks as it follows the alternate route to proposed Site 4 (see 5.6.3.0) and an existing PG&E pole line from Surf to Union Sugar Avenue. The line turns north 50 feet west of Union Sugar Avenue and then east within 50 feet of Central Avenue, through fields used for flower seed production, until it intersects with an existing line that parallels Highway 1 into the Lompoc substation.

The existing PG&E poles would be replaced with new poles (spaced every 350 feet) using a 50-foot temporary right-of-way. A 10-foot-wide permanent right-of-way would be maintained. The applicant does not propose to use herbicides for right-of-way maintenance. The communities and species affected by the transmission line are the same as those affected by the Alternate Pipeline route to Site 4, as far as the intersection of Floradale and Union Avenues. Pole installation may have beneficial Class IV impacts due to the creation of raptor perches.

Burial of the power cable would have Class II, locally significant, impacts on the beach and dunes. Construction of the transmission line will create the potential for Class II impacts on the Santa Ynez estuary and on the riparian woodland between the railroad tracks and Route 246, due to removal of vegetation and increased erosion and sedimentation.

The proposed route will span a drainage (#2-5 in Table 5.6-5) that empties into the estuary (where Highway 246 meets the road to Ocean Beach) and construction-related erosion could have Class II, locally significant impacts on vegetation, wildlife, and aquatics in the salt marsh. Noise would have short-term Class III impacts on wildlife.

LOMPOC DEHYDRATION FACILITY (SITE 4)

Site 4 is located east of Highway 1 in a small valley at the southern base of the Purisima Hills. Construction of the dehydration facility at this site would result in the complete removal of about 16 acres of native vegetation and wildlife habitat, consisting of heavily disturbed Coastal Sage Scrub, resulting in a Class III impact. A few large, old Coast Live Oak stems on the edge of the site would have to be trimmed as part of a firebreak 100 feet wide around the perimeter of the site. Trimming of these oaks would constitute a Class III impact. No drainages or other aquatic habitats would be affected by construction. Typical wildlife species would be affected by

Table 5.6-6
(See also Figure 5.6-2)

DRAINAGE OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED PIPELINE ROUTE FROM THE PROPOSED LOMPOC DEHYDRATION FACILITY SITE TO THE ORCUTT PUMP STATION

Drainage No. & Type	Drainage Name/Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
1-17 (E)	Unnamed. Erosional ravine with Coastal Sage Scrub and Black-flowered Figwort.	Construction: Removal of Coastal Sage Scrub and Black-flowered Figwort, (a) increased erosion and sedimentation and (b) noise will disrupt activities of some local wildlife species. Vegetation: Class II - regional. Wildlife & Aquatics: Class III. Accidents: Oil spill could affect local area. Vegetation, Wildlife & Aquatics: Class II - local.	1. Revegetate pipeline scars with local native plants. 2. Inspect pipeline frequently. 3. Develop oil containment and clean-up plans. 4. Construct this segment between September and November to avoid spring breeding (birds) and rainy seasons. 5. Keep disturbance corridor as narrow as possible.
1-19 (I)	San Antonio Creek. Disturbed sandy streambed with scattered colonies of native wetland plants on margins. Unarmored threespine stickleback occurs upstream and downstream and tidewater goby occurs downstream from pipeline crossing. Barka Slough, one of the County's largest and most biologically important remaining riparian/wetland complexes, is located about one mile downstream from pipeline crossing. Regionally rare amphibians and birds* breed at Barka Slough.	Construction: Removal of wetland plants, (a) above which could affect unarmored threespine stickleback and other species at Barka Slough, and (b) above. Vegetation: Class III. Wildlife & Aquatics: Class III - Class II, regional. Accidents: Oil spill could affect Barka Slough, especially aquatic biota, including unarmored threespine stickleback. Vegetation, Wildlife & Aquatics: Class II, local to regional (depending upon extent of spill).	1-3,5 above. 6. Construct this segment between May and November to avoid rainy season. 7. Install block valves on both sides of San Antonio Creek crossing. 8. If dewatering is necessary, filter water through sediment trap before returning to creek. 9. Store boom nearby that would be deployed to inhibit oil movement in case of a spill. 10. Realign route to east side of Highway 1. 11. Use thicker, factory-coated pipe at creek crossing. 12. Install special cathodic protection system from south side of creek to north of Harris Canyon tributaries.
1-21 (I/P)	Harris Creek, west of Highway 1. Scattered willows on banks of stream that supports other wetland vegetation, including many native species. Tributary to San Antonio Creek.	Construction: Removal of native wetland vegetation and Black-flowered Figwort, (a) which could affect unarmored threespine stickleback and other species at Barka Slough, and (b) above. Vegetation, Wildlife & Aquatics: Class III - Class II, regional.	1-5,8,9, 10, 11, above. 13. Special soil stabilization and revegetation procedures will be necessary on steep slopes
1-22 (I/P)	Harris Creek, east of Highway 1. Riparian woodland dominated by oak trees and willows, shrubby riparian vegetation and Black-flowered Figwort on steep banks of stream. Tributary to San Antonio Creek.	Accidents: Oil spill could affect Barka Slough, especially aquatic biota, including unarmored threespine stickleback. Vegetation, Wildlife & Aquatics: Class II, local to regional (depending upon extent of spill).	

Table 5.6-6
(See also Figure 5.6-2)
(continued)

DRAINAGE OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED PIPELINE ROUTE
FROM THE PROPOSED LOMPOC DEHYDRATION FACILITY SITE TO THE ORCUTT PUMP STATION

Drainage No. & Type	Drainage Name/Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
1-25 (I) 1-26 (I) I-27 (E) I-28 (E) I-29 (I)	Upper Harris Creek. Sandy streambeds and drainage ditch tributaries, some weedy and disturbed, with scattered willows and other native wetland plants. Tributary to San Antonio Creek.	Construction: Removal of native wetland vegetation, (a) which could affect unarmored threespine stickleback and other species at Barka Slough, and (b) above. Vegetation, Wildlife & Aquatics: Class III - Class II, regional. Accidents: Oil spill could affect Barka Slough, especially aquatic biota, including unarmored threespine stickleback. Vegetation, Wildlife & Aquatics: Class II, local to regional (depending upon extent of spill).	1-5,8,9, 11, 12, 13, above.
1-30 (E/P)	Unnamed Perennial and Seasonal Seeps. Diverse Riparian Woodland and other native wetland vegetation making up one of the most important wetland associations on the proposed pipeline corridor. Supports uncommonly collected Small-flowered Petunia and provides breeding habitat for regionally rare Yellow Warbler.*	Construction: Removal of native wetland vegetation, (a) and (b) above. Vegetation, Wildlife & Aquatics: Class II, local - regional. Accidents: Oil spill would affect local area. Vegetation, Wildlife & Aquatics: Class II, local - regional.	1-5 above. 14. Install pipeline immediately adjacent to Graciosa Road, or preferably realign route to east side of road south of seeps to avoid wetland habitat.
1-35 (E/P) 1-36 (E) 1-41 (E) 1-42 (E)	Graciosa Canyon Drainage. Perennial seeps and ephemeral stream with Riparian Woodland and shrubland including many native wetland plants. Steep banks with high erosion potential. Provides breeding habitat for regionally rare Yellow Warbler.* Drainage 1-42 currently heavily disturbed. Tributary to Orcutt Creek.	Construction: Removal of native wetland vegetation, (a) and (b) above. Vegetation & Wildlife: Class II, local - regional. Aquatics: Class III. Accidents: Oil spill would affect local area and could reach Orcutt Creek. Vegetation, Wildlife & Aquatics: Class II, local to regional (depending upon extent of spill).	1-5,8, 13, above. 15. Clean up dumped materials and restore native wetland habitat in highly disturbed 1-42. wetland habitat in highly disturbed 1-42.

1. Numbers correspond to those used in figures in this Technical Appendix and in Onshore Water Technical Appendix C; E = ephemeral, I =intermittent, P = perennial.

* (e.g., Red-legged Frog, California Tiger Salamander, Tree Swallow, Swainson's Thrush, Warbling Vireo, Yellow Warbler, Wilson's Warbler, Yellow-breasted Chat, Blue Grosbeak and possibly, Long-eared Owl and Willow Flycatcher.

permanent habitat loss of about 16 acres, thus resulting in a Class III impact to wildlife. These species are expected to avoid a much larger area around the site as a result of noise and human presence during the 27 weeks of construction activities, but this would be a Class III impact. One regionally rare and declining mammal, the badger, was found at Site 4 during autumn surveys.

The anticipated worst-case peak short-term NO_2 and SO_2 levels resulting from construction of the processing facility are well below the levels known to cause injury to sensitive plant species.

Construction would result in a 24-hour total suspended particulate level that is 2.7 times greater than background (438 ug/m^3 vs 165). This level exceeds the federal standard. It is difficult to assess the impact of this level on the area's vegetation because no quantitative data on thresholds for particulate injury to vegetation are available. Particulates could adversely affect nearby coast Live Oaks and Coastal Sage Scrub by clogging stomates and therefore reducing photosynthesis and growth, impacts considered to be Class III. Additional construction impacts may be created by the processing of Exxon's oil and gas (see Area Study Section 5.6.4).

ORCUTT PUMP STATION

Construction at the Orcutt Pump Station would not involve clearing any undisturbed areas.

The federal 24-hour (TSP) standard is predicted to be exceeded during construction at (Orcutt), which could result in Class III impacts if vegetation in the vicinity of the facility is coated by dust.

SANTA MARIA REFINERY

Construction would take place in an area currently used by refinery facilities and would not involve any new clearing of undisturbed areas. No significant increase in air emissions would be expected to result from construction so impacts would be Class III. Noise generated during construction is expected to reach 97 dBA during maximum activity in the 10-month construction period. Noise impacts to wildlife are expected to be Class III.

ONSHORE EFFECTS OF OFFSHORE CONSTRUCTION

If the "beach pull" method of offshore pipeline construction is used then a 100-by-600-foot area of beach habitat at Surf would be used for three weeks to store equipment. An additional area about half that size would be used to store buoys. If the lay barge method is used, a smaller area would be used to store equipment for the same length of time. Given the naturally disturbed character of this area, this could result in local, Class III impacts, due to displacement of wildlife.

Helicopter flights to the platforms may cause temporary increases in noise levels. HDR [1981] noted that helicopters might cause temporary noise levels from 80-85 dBA, but did not note the distance that received that level. Arthur D. Little estimates indicate that helicopter noise can be 65-85 dBA at 500 feet, while an average of 73 dBA might be received at 1,000 feet (normal helicopter cruising altitude). It is expected that impacts due to noise would be Class III, unless flights went directly over the Santa Ynez River estuary during the breeding and nesting season of rare birds. In that case, regionally significant, probably Class II impacts might occur to sensitive wildlife species.

5.6.2.1 Normal Operations and Upsets

OVERVIEW

The primary potential impacts due to normal operations, including upset (worst-case meteorological) conditions and periodically high air emissions are related to increases in air emissions and noise, withdrawal of groundwater, and maintenance activities. Since Santa Barbara County has already reached non-attainment status for ozone and most of the biota found near surface waters are sensitive to changes in streamflow or groundwater levels there is potential for adverse impacts due to normal operations.

PIPELINE AND UTILITY CORRIDORS

No significant impacts are anticipated once the pipeline is in place. Noise from weekly helicopter inspection of the pipeline may disturb wildlife for a short time if a flight corridor through VAFB is ever approved. Impacts would likely be Class III, although there is some uncertainty and a general lack of data concerning impacts on nesting birds. No physical or chemical pipeline right-of-way maintenance has been proposed by the Applicant. Fire suppression in the right-of-way for pipelines and around facilities could cause: (1) a fuel buildup that could result in more severe fires when they do occur or, (2) a reduction in reproduction by serotinous or fire-adapted species.

During normal operations weedy plant species could invade disturbed sites or spread into adjacent undisturbed habitats. These would be considered locally significant, Class II or III impacts to vegetation, depending on the species and habitats. The creation of new "edge" habitat along the cleared right-of-way may be a beneficial, Class IV, impact to some wildlife species.

The proposed valve station maintenance includes use of the herbicide "Atrotol" for weed control. Although leaching downslope toward the Santa Ynez River estuary is possible, small amounts should be used so impacts to terrestrial and aquatic biota from valve station maintenance should be Class III.

The maintenance of the proposed transmission line may involve trimming of willow trees near Highway 246, which could eliminate nesting sites for some bird species. This impact would be considered Class III.

LOMPOC DEHYDRATION FACILITY

It is not expected that normal operation of the facility, or vehicle use by employees, would cause significant increases in NO_2, SO_2. During unusual meteorological conditions facility emissions might contribute to an increase in ozone in the Santa Ynez Valley. Facility operation could cause one-hour maximum ozone levels of 0.107 ppm several times per summer in the Santa Ynez Valley. Foliar injury to agricultural crops can occur at 0.1 ppm in one hour [EPA, 1978], so the potential exists for Class II, regionally significant impacts. Other ozone injury levels are described in Appendix 5 of Technical Appendix F.

A maximum noise level of about 70 dBA is expected at the facility property line. It is expected that impacts of normal operations on biota would be Class III.

ORCUTT PUMP STATION

No adverse air quality impacts are anticipated. Noise and air emissions will decrease when turbine driven pumps are installed in place of the existing gas-driven pumps.

Vegetation around the station would be controlled by spot treatments, four times per year, of 10 pounds/acre of "Atrotol" herbicide, but this should have Class III impacts on vegetation.

SANTA MARIA REFINERY

It is believed that there are already high background levels of SO_2 in the vicinity of the refinery due to emissions from the neighboring coke plant. Although modifications to the refinery that are part of the proposed project would result in lower SO_2 emissions from the refinery, these, in addition to background levels from nearby coke plant operations, still will result in levels of SO_2 that are high enough to cause damage to sensitive plant species within a 1/2- to 4-mile radius of the refinery. The predicted worst-case one-hour total SO_2 concentration of 0.50 ppm (from the refinery and coke plant) would exceed the state standard by a factor of two. Some plant species sensitive to SO_2 have shown visible injury when exposed to 0.5 ppm SO_2 for one hour [Jones, 1974].

The predicted worst-case three-hour total of 0.37 ppm of SO_2 also has potential for adverse impacts to vegetation. Mature grapes have shown leaf necrosis after exposure to 0.2 ppm SO_2 for three hours [Grape, personal communication, 1976]. No change in noise levels is anticipated.

The predicted 24-hour worst-case SO_2 total of 0.20 ppm exceeds the federal standard and has potential for adverse impacts to vegetation. These conditions would be expected to occur about two days per year. Temple, [1974] reported decreased shoot growth or necrosis in sensitive tree species exposed to 0.05 ppm for 30 hours. Impacts of these air emissions on vegetation are considered Class I, regionally significant.

A failure of the hydrogen sulfide removal system at the Santa Maria Refinery and resultant burning of sour gas might occur once per year. This upset would produce a peak one-hour SO_2 concentration of 9.6 ppm within a radius of 1/2 to 4 miles, which has the potential for Class II regionally significant foliar damage to even the most resistant species. Winner and

Mooney [1980] reported greater than 50 percent decreases in photosynthesis in chaparral species at much lower SO_2 levels. Certainly a major amount of defoliation in the affected areas is a possibility. If most or all plants in a large area were killed by such an event, then erosion could become a problem.

Refinery operation could cause maximum one-hour ozone levels of 0.126 ppm at San Luis Obispo under worst-case meteorological conditions that occur about once every three to five years. This level exceeds the federal standard and the level known to cause vegetation damage (see Appendix 5 in Technical Appendix F), causing Class II, regionally significant impacts.

BATTLES GAS PLANT

Operation of the Battles Gas Plant and the Santa Maria Refinery under meteorological conditions that occur about one to three days per year would contribute to maximum one-hour ozone concentrations that range from 0.102 ppm at the coast south of the Santa Maria Refinery to 0.117 ppm in the Sisquoc area. These levels exceed plant damage thresholds and create the potential for Class II, regionally significant impacts in the Santa Maria Valley. The predicted one-hour total worst-case NO_2 concentration of 0.51 ppm exceeds the state standard by a factor of two. Leaf necrosis has been observed in areas exposed to 0.5 ppm NO_2 for two hours [Maclean, 1974]. This indicates that there may be potential for Class I regionally significant impacts to vegetation within a 1/2- to 1-mile radius of the plant.

ONSHORE EFFECTS OF OFFSHORE ACTIVITIES

It is not expected that there will be any significant onshore impacts from offshore emissions of NO_2, SO_2, CO, or particulates. Under meteorological conditions that occur five to ten times per year, the operation of Platform Irene would contribute to maximum one-hour ozone levels of 0.101 ppm at the mouth of San Antonio Creek, increasing inland to 0.123 ppm in the Santa Ynez Valley. When Shamrock production is included, the level in the Santa Ynez Valley would be 0.153 ppm. These levels exceed state and federal standards and the injury thresholds for vegetation, creating the potential for Class II, regionally significant impacts.

Daily helicopter flights to the platforms and movement of crew boats from Ellwood should not have any significant terrestrial biological impacts. The background noise level at the Santa Ynez River estuary is about 62 dBA and a helicopter at 1,000 feet (cruising altitude) produces noise at about 73 dBA. Boat noise at 5,000 feet is 55 dBA and at 660 feet is 79 dBA.

5.6.2.2 Accidents and Catastrophic Events

OVERVIEW

Terrestrial and freshwater biota could be affected by accidents and catastrophic events occurring along the pipeline and at facilities which result in: (1) oil spills; (2) fires; (3) gas leaks; and (4) produced water leaks. The potential for impacts depends on the probability of occurrence, the magnitude, and the specific location of the event (see Section 5.11 and Technical Appendix M).

ONSHORE EVENTS

Oil Spills

Careful construction of the pipeline and the use of corrosion resistant pipe material cannot eliminate the possibility of pipeline leaks or ruptures. Union's proposed use of a pipeline pressure monitoring system and of block and/or check valves to stop flow or prevent back flow could help limit the size of an oil spill, yet the potential does exist for large oil spills. Up to about 20,000 barrels of wet oil (worst case) could spill on the landfall to Lompoc segment of the onshore route due to pipeline rupture or valve failure at the valve station if no additional valves are installed (see Section 5.11). A spill of this size could have Class I, regionally significant biological effects on the sensitive species and habitats of the Santa Ynez River and estuary.

Some oil released from buried pipelines would be adsorbed by the soil, creating toxic conditions for plants (or limiting flow of water and gas to roots) and killing invertebrates it contacts. If the pipeline rupture is at a stream crossing these is risk of contamination of streams and increased potential for adverse impacts to vegetation and wildlife. The oil is expected to be highly viscous, which should help limit its spread. The volume of contaminated soil resulting from an overland or subsurface spill would range from 3-100 times the volume of oil spilled (see Technical Appendix C).

The area affected by an oil spill depends on the characteristics of the specific site, the volume of oil released, and the amount of precipitation before and during the spill. (If precipitation is high, oil may move further and affect more areas. If precipitation is low, the impact may be more localized but more significant.) If a pipeline rupture occurred east of the proposed block valve, or the valve failed, the potential exists for draining the 20,000 barrels of wet oil contained in the 11.2 mile segment of pipeline between the valve and the Lompoc Dehydration Facility into the area including the Santa Ynez River and estuary.

The probability of a pipeline break along the 1 mile segment near the block valve, with a spill greater than 3,000 barrels, is 3.6×10^{-5} per year or .09 percent over the project lifetime. This amount of oil could result in Class I, regionally significant impacts on the vegetation and wildlife of the Santa Ynez River estuary. The sensitive salt marsh vegetation may incur additional adverse impacts from cleanup operations. Birds nesting in the estuary (including the federally endangered California Least Tern) could be directly affected by or contact with the oil, or indirectly affected by loss of habitat and food. Should the produced water line break at the same time, additional oil would be added to the soil.

Although the probability of a spill greater than 1,000 barrels occuring on the pipeline segment from landfall to Lompoc is very low (6×10^{-4}/yr.or 1.5 percent over the lifetime of the pipeline) such a spill at a stream crossing could have regionally significant, Class I impacts.

The smaller pipeline diameter on the Lompoc-Orcutt section of the pipeline results in a greater spill risk. The probability of a spill greater than 1,000 barrels on this segment of the pipeline is 1.8 x 10^{-3}/yr. or 4.5 percent over the lifetime of the pipeline. A pipeline rupture at San Antonio Creek could allow oil to reach the perennial section of the creek, downstream of Barka Slough. The maximum depth of penetration of oil here is estimated to be 9 meters and under some conditions oil could reach groundwater at 10 meters (Technical Appendix C). Aquatic organisms (including the unarmored threespined stickleback) could be affected by habitat alterations, smothering with oil, and toxic reactions (acute and sublethal) to dissolved or ingested oil. HDR [1984] estimated that oil from a pipeline rupture at San Antonio Creek could take one to 2.5 hours to reach the eastern edge of Barka Slough, thus allowing time for hydrocarbon "weathering." However, this weathering might not significantly lower the potential for acute toxic effects to aquatic organisms, and the evaporated hydrocarbons could have adverse effects on vegetation.

Oil Spill at Facilities

The probability of an oil spill at the Lompoc Dehydration Facility is once in 1,800 years for a small spill (greater than 100 barrels) or 2 percent over the lifetime of the facility. The probability of a large spill (greater than 50,000 barrels) is 4 x 10^{-5}/yr. or once in 25,000 years, or 0.1 percent over the lifetime of the facility (35 years). Most of this oil should be contained in the onsite drainage system (berms), but a large spill could create the potential for Class II, regionally significant impacts to vegetation surrounding the site.

Fires

The likelihood of wildfire ignition will be increased by construction of the pipeline and both construction and operation of facilities. It is assumed that at least one major fire could occur at one of the processing facilities during its lifetime. Impacts to biota could range from Class I, locally and regionally significant to Class III, depending on the magnitude, season and location of the fire.

Produced Water Spills

A break or leak in the produced water pipeline could release water that contains 20-30 ppm of oil and 20-30 ppm of solids (including a number of toxic elements such as cadmium, lead, arsenic, and mercury). The degree of impact to terrestrial biota would depend on the actual amount of oil and solids in the water, and the location of the pipeline break. It is possible that sensitive species could be harmed if large quantities of water are released, creating Class III impacts.

Gas Releases

Gas released from a break or leak in the gas pipeline is not expected to have significant impacts on biota unless the gas creates a fire or explosion (see above) or is sour (contains H_2S). It is not likely that the gas would be sour during the first five years of platform operation. H_2S at 50-100 ppm can cause subacute poisoning to humans while 700-900 ppm can cause death within an hour.

Birds and possibly small animals may be susceptible to subacute and acute responses to H_2S at levels from 100-300 ppm which are two to three times lower than the levels affecting humans. The minimal lethal concentration of H_2S is .05 percent (by volume in air) for animals. Plant damage can be avoided at H_2S concentrations less than .03 ppm [Subcommittee on H_2S, 1978]. A release of sour gas could be fatal to local wildlife and vegetation.

Release of sour gas could potentially cause Class I, regionally significant impacts to biota, depending on the location of the pipeline break and the H_2S concentration of the gas. A rupture in the landfall to Lompoc gas pipeline could result in H_2S concentrations of 100 ppm reaching a 250-by-16-meter area within 30 minutes. Gas leaks are more likely at valve stations. Although the California Least Tern breeding area in the Santa Ynez River estuary is about 400 meters from the block valve on the Proposed Pipeline, a leak during the breeding season would create the potential for Class I, regionally significant impacts to that species.

Severe Floods

The Proposed Pipeline route crosses the 100-year floodplain for about one mile near 13th Street (from route #160-214) and again in the vicinity of San Antonio Creek (from route #212-222). The Applicant noted [January 1984] that the pipeline would not be protected from scouring and abrasion at its 36-inch depth if the flooding causes a shift in the river channel. If a major flood occurred during pipeline construction the potential for adverse erosion impacts to biota would be increased (see Section 5.3).

Offshore Events

Impacts to terrestrial and freshwater biota from offshore oil spills could range from Class I to Class II, locally to regionally significant depending on the amount and location of oil deposition.

Given the probability of an oil spill at Platform Irene and the probability of such a spill reaching the mouth of the Santa Ynez River in five days, there is a .38 percent chance that a winter or spring spill greater than 100 barrels would occur and would reach the river mouth during the platform's 25-year lifetime. There is a 1.9 percent chance that the same type of spill would cause oil landfall south of the Santa Ynez River mouth.

There is a .29 percent chance that a greater than 100 barrels winter spill would occur from the offshore pipeline between Platform Irene and land and would reach the mouth of the Santa Ynez River and a 2.5 percent chance that the same spill type would cause oil landfall south of the river mouth during the pipelines' lifetime. Although these probabilities are low, the consequences of offshore oil reaching land could be severe. Oil reaching the mouth of the Santa Ynez River could have Class I to Class II, locally to regionally significant impacts on tidewater gobies by clugging their gills, covering spawning habitat or decreasing food availability and/or on the California Brown Pelican by direct contact or by decreasing food availability.

5.6.2.3 Impacts of Abandonment

The onshore pipelines and Lompoc Dehydration Facility have an expected lifetime of 30-35 years. The onshore portions of the pipeline will be sealed and left in place when they are no longer used. This should not cause any adverse impacts.

The Lompoc Dehydration facility would most likely be disassembled and transported away and the site would be restored and revegetated. This could result in a Class IV beneficial impact, due to increased use of the site by wildlife and the elimination of air emissions due to facility operation.

5.6.2.4 Impacts to Species of Special Interest

OVERVIEW

Forty-five rare species of plants, invertebrates, amphibians, fishes, birds, and mammals could be affected by the proposed project. These species include those that have been listed or are considered candidates for listing under federal or state endangered species legislation, or both, and additional species that are considered regionally rare and declining within the Study Region. Life history and habitat requirements, and distribution and abundance within the Study Region are given in Section 2.4, Appendix F, for regionally rare and declining species and in Section 2.5, Appendix F, for rare, threatened, and endangered species (including candidates). The 45 species discussed in this section have been identified at sites within or near the Project Area, or are expected to occur at such sites, so that individuals or groups of individuals could be affected by project activities. The status and occurrence within the Project Area are given for these species in Table 5.2-6, Appendix F.

PLANTS

Arctostaphylos rudis (Shagbark Manzanita) and *Quercus parvula* (Santa Cruz Island Oak) are both found in Burton Mesa Chaparral and Bishop Pine Forest. The principal impacts to these species would be removal or disturbance during pipeline construction. Shrubs of both species may resprout after being flattened or cut off at ground level, provided that the stem base is not injured and the root system remains intact. Shagbark manzanita might lose reproductive capacity for five to ten years, until plants regrow to flowering size. It would probably take longer than ten years for the oak shrubs to reattain flowering status. At least a few, and possibly many, individuals of both species would be damaged by an oil spill in Burton Mesa Chaparral.

Two rare herbs are found on the foredunes around the landfall for the proposed route. About 25 *Cirsium rhothophilum* (Surf Thistle) individuals occur just south of the proposed right-of-way and might easily be crushed if the dunes are used for any construction-associated activity. The few individuals of *Malacothrix incana* (Dune Malacothrix) located within the right-of-way would be removed during construction of the pipeline.

Two other rare herbs that would be significantly impacted by construction activities are Monardella undulata var. Undulata (Annual Curly-leaved Monardella) and Scrophularia atrata (Black-flowered figwort). The monardella is found in Burton Mesa Chaparral along alignments for all the pipeline alternatives. Spring surveys are needed to confirm the identity of the figwort, which was found in all vegetation types except coastal dunes. Both species probably could only be reestablished from seeds.

Construction activities would not be expected to affect the colonies of Cirsium loncholepsis (La Graciosa Thistle) located in floodplain marshes on the banks of the Santa Ynez River downstream from the Floradale Avenue bridge and upstream from the estuary. However, a large oil spill at the bridge or along pipeline routes could cause the loss of a few to many individuals, and population recovery could be slowed if seeds were removed with contaminated soil.

FISH

Eucyclogobius newberryi (tidewater goby) has been located in the Santa Ynez River from its mouth up to the 13th Street Bridge and in San Antonio Creek from its mouth up to Lompoc-Casmalia Road. Gasterosteus aculeatus williamsoni (unarmored threespine stickleback) occurs in most perennial portions of San Antonio Creek and in flowing water of Barka Slough. The most likely source of impacts to both species is increased sedimentation and turbidity in the water, due to construction activities. These impacts are potentially Class II, regionally significant.

Populations of both species would also be adversely affected by oil spills that reach their habitats. Oil that contacts fish could clog their gills or oil could cover spawning sites and decrease the availability of food. Such impacts are potentially Class I, regionally significant.

AMPHIBIANS

Rana aurora drytoni (Red-legged frogs) have been found at Barka Slough and in the Santa Ynez River at the 13th Street Bridge. Construction-related disturbance, increased sedimentation and turbidity would create the potential for Class I to II, regionally significant impacts to the frogs. Oil spills would create the potential for Class I, regionally significant impacts to the frogs, due to direct toxic effects or habitat contamination.

Ambystoma californiense (California Tiger Salamander) is expected to occur at Barka Slough, but confirmation will not be obtained until spring surveys are conducted. If they are present in Barka Slough, they could be affected by increased sedimentation from construction or by accidental oil spills.

BIRDS

Construction related habitat loss in the vicinity of the Santa Ynez River estuary could have adverse impacts on Black-shouldered (white-tailed) Kites (Class II, regionally significant), Northern Harriers (marsh hawks) (Class I or II, regionally significant), and Snowy Plovers.

An offshore oil spill that reaches land, or an onshore spill in the vicinity of the Santa Ynez River estuary could have Class I, regionally significant impacts on the California Brown Pelican, the California Least Tern and the American Peregrine Falcon. The habitat loss and cleanup activity associated with an onshore oil spill that reaches Barka Slough could have Class II, regional or local impacts on Cooper's Hawk, Tree Swallow, Swainson's Thrush, Warbling Vireo, Yellow Warbler, Wilson's Warbler, Yellow-breasted Chat and Blue Grosbeak, depending on the season in which it occurs.

MAMMALS

Sciurus griseus (Western Gray Squirrel) lives in the Bishop Pine Forest in the Purisima Hills. Temporary habitat loss and noise associated with construction would probably have Class III impacts on grey squirrels.

Taxidea taxus (Badger) is a resident of many portions of the Proposed and Alternate Pipeline routes and facility sites. Loss of habitat and food sources associated with construction and accidental oil spills creates the potential for Class I, regionally significant impacts to badgers.

5.6.3 Impacts of Alternatives to the Proposed Project

5.6.3.0 No-Project Alternative

The no-project alternative would have no significant impacts on terrestrial and aquatic habitats and biota. Some Class III impacts have resulted from surveys of biota.

5.6.3.1 Alternative Pipeline Route to Proposed Site 4

The alternate, unmitigated pipeline route to proposed Site 4 could involve impacts to an additional 10 acres and one more biologically sensitive drainage crossing compared to the proposed route (Tables 5.6-1 and 5.6-4 and Figure 5.6-1). See Section 5.6.5 for discussion of mitigated realignments of this route.

VEGETATION

The alternate route to Site 4 is 13.3 miles long, and its use would result in the partial or complete removal of about 160 acres of vegetation and wildlife habitat of which 60 percent (97 acres) is made up of native types (see Table 5.6-1). Removal of approximately 34 acres of Burton Mesa Chaparral and 9 acres of Coast Live Oak Woodland constitute Class I, regionally significant impacts. Removal of about 26 acres of riparian and other wetland vegetation would cause regionally significant, Class II impacts. The identified mitigating route described below would help lessen these impacts.

The major differences in the amount of each vegetation type on the alternate route, compared to the proposed route, are that the alternate route would involve potential for impacts to an additional 25 acres of riparian woodlands or wetlands, and would cross less annual grassland and more agricultural land. It is not known how many oak trees would be removed from the 9 acres of oak woodland on the right-of-way from Highway 1 to Site 4. All of the 144 willow trees in the right-of-way near the railroad tracks and Route 246 would need to be removed (Table 5.2.1.3-2, Appendix F). Since this riparian area drains into the Santa Ynez River this could have Class I, regionally significant impacts due to increased erosion.

The crossing of 17 drainages, of which 12 have special biological significance, including Santa Ynez River (Table 5.6-5) would result in Class II, locally significant impacts in most cases, due to the removal of riparian woodlands that include oaks, willows and sensitive wetland species. From Santa Lucia Canyon to the proposed site, the alternative route has four more drainage crossings than the proposed route and they have larger drainage areas (and more are steeper) so there is the potential for greater runoff during storms. (More of this portion of the alternative route is on sand; in contrast to the Purisima Hill alluvium on the proposed route [HDR July 24]).

WILDLIFE AND AQUATIC BIOTA

Construction of the Alternate Pipeline in the alignment drawn by the Applicant could have Class I, regionally significant effects on the marsh south of Central Avenue (drainage #2-3) where Red-legged Frogs could breed.

Burying the pipeline at the Santa Ynez river crossing creates the potential for Class II, regionally significant impacts on Red-legged Frogs and several regionally rare bird species.

Impacts to the stream habitat near Davis Creek are potentially Class I, locally significant since this is appropriate habitat for California Tiger Salamanders and Red-legged Frogs.

Rare Species

Thirty-four rare species could be affected as a result of pipeline construction along the alternate route to Site 4. Sixteen of these have been identified at sites within or near the pipeline corridor during field studies conducted for this project or other recent studies, or both. Spring or summer surveys are required to determine the status of most of the remaining 18 species (see Table 5.2-6 Appendix F). Impacts to rare species are discussed on a species-by-species basis in Section 5.6.2.4.

5.6.3.2 Proposed Route to Alternate Site 8

The primary route to Site 8 is 11.3 miles long. Use of this route would result in the partial or complete removal of about 135 acres of vegetation and wildlife habitat, of which 72 percent (99 acres) is made up of native types (see Table 5.6-1). The loss of about 36 acres of Burton Mesa Chaparral, 3 acres of Coast Live Oak Woodland and 329 oak stems (more than on either route to Site 4) in this and other vegetation types would constitute Class I, regionally significant impacts. Construction impacts to other native vegetation types would be locally or regionally significant, Class II. This route crosses about eight more acres of coastal sage scrub than the proposed route to Site 4 and about 11 more acres than the alternative route to Site 4. Less Burton Mesa Chaparral is within the right-of-way for this route (but that might be "made up for" on the segment of the route from Site 8 to Site 4).

The proposed route to alternate Site 8 would cross 24 drainages of which 13 are biologically significant. The same amount of Riparian Woodland is on this route as on the proposed route to Site 4. There is potential for Class II, locally significant impacts to vegetation at drainage #3-1 (the wetland east of Santa Lucia Canyon). Forty rare species could be affected as a result of pipeline construction along this route, 19 of which have been identified as occurring at sites within or near the pipeline corridor. Spring or summer surveys are required to determine the status of most of the remaining 20 (see Table 5.2.1.3-5, Appendix F). Impacts to rare species are discussed on a species-by-species basis in Section 5.6.2.4.

5.6.3.3 Alternative Route to Alternate Site 8

This route is 12.8 miles long and pipeline construction along it would result in the partial or complete removal of about 155 acres of vegetation and wildlife habitat, of which 56 percent (87 acres) is made up of native vegetation types. Removal of Burton Mesa Chaparral (31 acres), Coast Live Oak Woodland and 321 oak stems, (19 percent of those within the right-of-way according to tree counts provided by Union) would constitute Class I, regionally significant impacts. Removal of approximately 26 acres of Riparian Woodland and other wetlands, including 144 willow stems (100 percent of those within the right-of-way) would constitute a regionally significant, Class II impact. Removal of other native vegetation types constitutes regionally or locally significant, Class II impacts.

The alternate route to Site 8 crosses 18 drainages, 13 of which are ephemeral (see Table 5.6-4). Of the 18, 11 are considered biologically significant including the perennial Santa Ynez River and Davis Creek drainages and several of their tributaries. Potential construction impacts at each of the biologically significant drainages are outlined in Table 5.6-5. It is assumed that the probability of an oil spill on this portion of the pipeline is the same as that for the landfall to proposed Site 4 route. This would represent a probability of a spill greater than 3,000 barrels of .09 percent over the project lifetime, which could have Class I, regionally significant impacts on the Santa Ynez estuary and biota.

Thirty-five rare species could be affected as a result of pipeline construction along this route. Sixteen of these have been identified at sites within or near the pipeline corridor. Spring or summer surveys are required to determine the status of most of the remaining 18 species (Table 5.2.1.3-5, Appendix F).

5.6.3.4 Alternative Power Transmission Line and Substation

The alternative power line route follows the Proposed Pipeline route to Site 4 up to the intersection with the Union property line east of Santa Lucia Canyon. From there it follows the preferred route to Site 8 until it intersects with a PG&E line east of Highway 1. The substation would be located at the valve station just east of landfall, requiring the removal of less than one acre of Coastal Sage Scrub, which would be a Class III impact. Use of this route would require installation of all new poles, which may create additional raptor perches (Class IV impact). This route may have greater adverse impacts than the proposed transmission line route because it would cross 18 drainages, eleven of which are biologically significant, (in contrast to crossing five drainages on the proposed route), thus creating greater potential for negative impacts due to erosion during construction. (Unless the Proposed Pipeline route is selected, then the right-of-way would already be disturbed.) This transmission line route would remove about 4 acres of Burton Mesa Chaparral, creating the potential for a Class I, locally significant impact. Impacts to other vegetation types would be Class II, locally significant.

OIL DEHYDRATION FACILITY SITE ALTERNATIVE (SITE 8)

Site 8 is located in a small valley about 1/2 mile north of the Mission Hills subdivision. Construction of the dehydration facility at this site would result in the permanent loss of about 16 acres of dry-farmed agricultural land. Oak woodland borders the site on the east and a few Coast Live Oak trees might have to be removed to provide a cleared firebreak 100 feet wide around the perimeter of the site, which would be a Class I, locally significant impact. Impacts to wildlife from habitat loss and noise from construction activities are expected to be Class III. No drainages or other aquatic habitats would be affected by construction.

One regionally rare and declining species, the Badger, was found at Site 8 during fall surveys. No other rare species are expected to be identified at the site during spring surveys.

No rare, endangered, or threatened plants were located on the proposed site. Near alternate Site 8 the oak and chaparral communities support Arctostaphylos rudis and Purisima manzanita [HDR].

There is no difference in the potential for air quality impacts at the alternative site, compared to the proposed site.

PROPOSED PIPELINE ROUTE FROM ALTERNATE SITE 8 TO ORCUTT

This route proceeds from Site 8 west, then north toward Site 4. From the vicinity of Site 4 it is identical to the route discussed above for the pipeline from Site 4 to Orcutt. Important impact issues for this route are shown in Figure 5.6-1.

This route is 11.1 miles long and its use would result in the partial or complete removal of about 65 acres of vegetation and wildlife habitat (see Table 5.6-2), of which 76 percent (51 acres) is made up of native vegetation types. Removal of Burton Mesa Chaparral, Coast Live Oak Woodland and Bishop Pine Forest (6 acres total) would constitute Class I, locally significant impacts. According to Union's tree count data, 90 oak stems, and 29 Bishop Pine trees would be removed, resulting in a Class I, regionally significant impact. Impacts to other vegetation types are the same as for the route from Site 4.

The proposed route from Site 8 crosses 28 drainages, of which 20 are ephemeral and 14 are considered biologically significant. Potential construction impacts to biologically significant drainages are the same as for the route from Site 4, and are outlined in Table 5.6-6.

Rare species potentially affected by construction of the pipeline on this route are the same as those for the route from Site 4 (see discussion in Section 5.6.2.0).

5.6.3.5 Onshore Impacts of Offshore Alternatives

The offshore platform changes associated with the alternative of processing Exxon's oil and gas at the Gaviota facility would have significant impacts on onshore ozone levels. Peak ozone levels in the Santa Ynez Valley as a result of this alternative would be 0.155 ppm and would create the potential for Class II, regionally significant impacts on vegetation.

5.6.4 Impacts of Area Study Development

The development of the Central Santa Maria Basin could involve up to four offshore platforms in addition to the two platforms in the proposed project. This is assumed to require expanded oil and gas processing facilities in the Lompoc area and a new pipeline to transport oil and gas from Lompoc to Gaviota and/or Buellton. A pipeline is assumed to be required to transport Exxon's Platform Shamrock production to a refinery sites. These developments would create the potential for all of the types of impacts to terrestrial and aquatic biota discussed above.

5.6.4.0 Onshore Area Study Scenario

The expanded Lompoc Oil Dehydration Facility and new Gas Facility at Site 4 could require clearing an additional 20 acres of vegetation and wildlife habitat and cutting 100 oak trees. These construction impacts would be expected to be Class I, locally significant, for Coast Live Oak Woodland and Class II, locally significant for Coastal Sage Scrub.

Operation of the expanded facility could result in significant increases in the risk of fire or toxic gas release, and/or an increase in the amount of groundwater removed (for use in SO_2 scrubbers). The probability of an oil spill would be about two times greater than for the proposed Lompoc facility.

Operation of an expanded Lompoc Dehydration Facility would contribute to maximum one-hour ozone levels of 0.104 ppm in the Santa Ynez Valley under meteorological conditions that could occur several times a summer. This could result in Class II, regionally significant impacts. The worst-case one, three and 24-hour SO_2 concentrations expected from processing at Lompoc are 0.58, 0.42 and 0.22 ppm respectively. These levels exceed thresholds for injury to some plant species (see Appendix 5, Technical Appendix F), so impacts are potentially Class II, regionally significant.

The construction of oil and gas pipelines from Lompoc to Buellton and/or Gaviota would involve disturbing vegetation and wildlife along a route approximately 20 miles long. The specific effects on terrestrial and aquatic biota cannot be assessed until a specific route is surveyed by biologists but significant impacts due to habitat loss are expected. The risk of an oil spill from a rupture in a pipeline from Lompoc to Buellton or Gaviota would be about the same as the risk on the proposed Lompoc to Orcutt pipeline, and could result in up to Class I impacts.

5.6.4.1 Onshore Effects of Offshore Area Study Development

The development of additionals platforms offshore could result in a significant increase in ozone levels onshore.

Area Study scenarios indicate that maximum one-hour ozone levels of 0.157 ppm and 0.103 ppm could occur in the Santa Ynez Valley and in Goleta, respectively. These levels exceed known injury thresholds for some plant species, thus creating the potential for Class II, regionally significant impacts.

Additional platforms would also increase the probability that sensitive coastal habitats would receive oil spilled offshore. The probability of an offshore oil spill reaching land is 5 to 10 times greater in the area study compared to the proposed project, creating the potential for Class I to Class II, regionally to locally significant impacts.

5.6.5 Mitigation Measures for Impacts to Terrestrial and Aquatic Biota

5.6.5.0 Mitigation Measures for the Proposed Project

CONSTRUCTION-RELATED MITIGATION MEASURES

The regionally and locally significant impacts described above are largely the result of disturbance to environmentally sensitive habitats by pipeline and facility construction. The Applicant's proposed erosion control and revegetation plans (see Section 5.2.1, Appendix F) would not effectively reduce the potential for adverse impacts by proposed construction and operation activities to insignificant levels, with the exception of reestablishment of annual grassland on relatively level terrain.

The California Coastal Commission's Consistency Certification for the Proposed Pipeline route recommends mitigation measures for construction that include: (1) scheduling construction between September and March at the mouth of the Santa Ynez River, (2) rerouting the pipeline to avoid sensitive species and habitats, (3) using erosion control measures to prevent sedimentation to the Santa Ynez River, and (4) revegetating the right-of-way with native plants. Although Union is committed to these recommendations, they only concern the coastal portion of the proposed project so there is need to address mitigations for the entire project area. Tables 5.6-5 and 5.6-6 above summarize potentially feasible mitigation measures for impacts to drainages of special biological significance. Figures 5.6-2 and 5.6-3 outlines some potential mitigation measures for impacts to terrestrial and freshwater biota. Specific mitigation measures for other project components, a general construction mitigation plan, and mitigation measures for environmentally

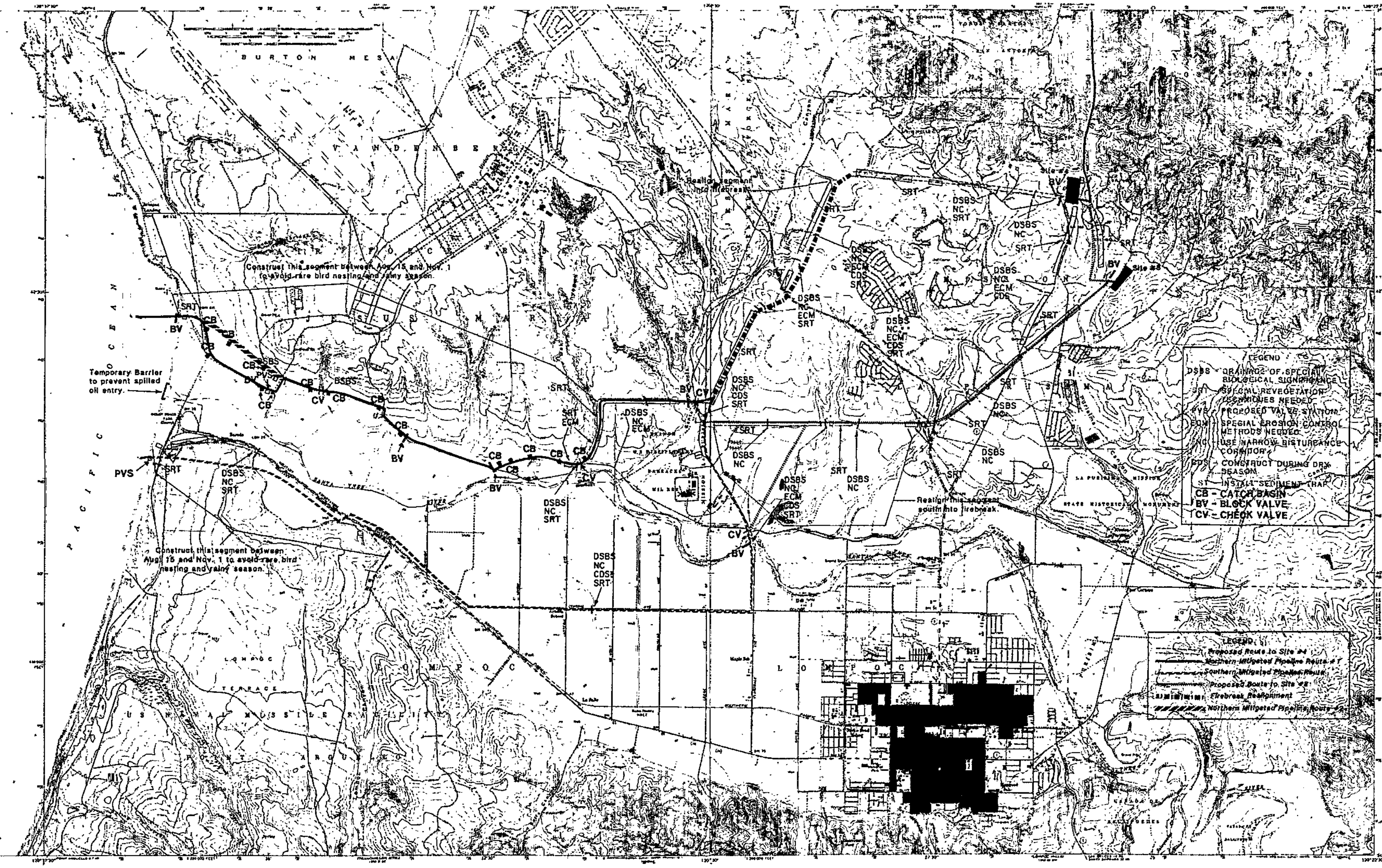

FIGURE 5.6-3 SOME POTENTIAL MITIGATION MEASURES FOR IMPACTS TO TERRESTRIAL AND FRESHWATER HABITATS AND SPECIES: LANDFALL TO LOMPOC

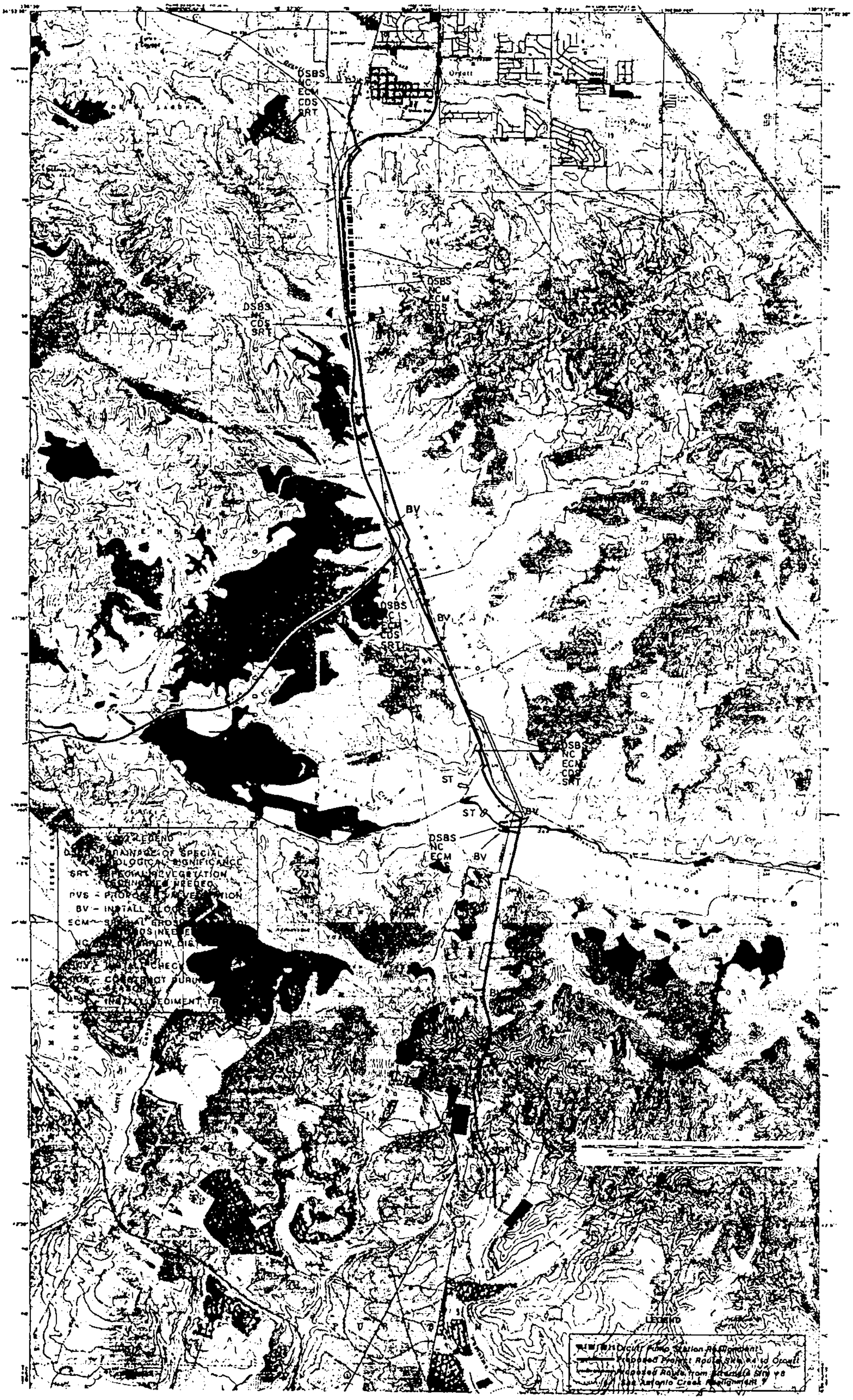

FIGURE 5.6-4 SOME POTENTIAL MITIGATION MEASURES FOR IMPACTS TO TERRESTRIAL AND FRESHWATER HABITATS AND SPECIES, LOMPOC TO ORCUTT

sensitive habitats and regionally rare or declining species are outlined below. If the measures outlined below are followed, most construction impacts might be reduced to Class III significance.

General Construction Impacts Mitigation Plan

Major contributions to construction impact significance include the loss of vegetation and destabilization of soils on steep slopes. In many cases such areas will be difficult to revegetate where streams are crossed. Impacts include downstream sedimentation problems during construction and would continue as long as slope cover is not restored. In order to prevent these impacts, an overall construction and restoration plan that would address site-specific erosion control and grading, site restoration and revegetation needs to be formulated and executed. This plan would be subjected to coordinated resource agency review and approval prior to the start of construction. Such a revegetation program should include all the following:

- Scheduling construction activities so that disruption of wildlife breeding activity is avoided.

- Procedures for minimizing all tree removal or tree root and branch damage: flagging the corridor; keeping all disturbance to the 100-foot right-of-way; providing for onsite monitoring of construction by a qualified independent biologist; and flag significant species and areas to be avoided.

- Procedures for stockpiling and replacing topsoil, for placement of spoils of excavation, minimization of grading changes, restoration and maintenance of original topography.

- Procedures for containing sediment and allowing continued downstream flow at stream crossings, including scheduling construction activities during summer low-flow; and have erosion control measures in place prior to the beginning of construction.

- Procedures for reestablishment of vegetation that replicates or is functionally equivalent to indigenous and naturalized communities along the alignment. These should include: measures preventing invasion and/or spread of undesired plant species; restoration of wildlife habitat value; and restoration with locally acquired native plant species and communities (leaving root systems intact will help reduce erosion and allow faster regeneration of sprouting species). Replace trees at an appropriate density to ensure optimal establishment and habitat function.

- Procedures for restoration of riparian corridor stream banks and stream bed substrates and elevation.

- A plan to determine baseline conditions and then to monitor the progress of site restoration and revegetation measures and to implement contingency plans for remedial actions of initial activities toward site restoration are not successful. Continue monitoring changes through construction and operation to provide information for use in mid-course corrections and for future projects.

- Advanced written weekly update of construction status and plans to supervising agencies.

These measures should reduce most impacts to terrestrial habitat along the pipeline corridor to insignificant. However, riparian habitats, estuaries, and other sensitive habitats as well as rare and declining species might still be significantly affected. The following two mitigation plans address mitigation of such potential residual impacts.

Mitigation Plan for Impacts to Sensitive Native Plant Communities

In addition to the above revegetation plan, additional measures would be needed to reduce impacts to riparian habitat, wetlands, and streams, and reduce the loss of coast live oak and other valued and difficult to reestablish species. In brief summary, these are:

- Realignment of the pipeline to avoid particularly sensitive habitats and/or species. This includes realigning the pipeline to the east side of the culvert at the San Antonio creek crossing, and a realignment of the section of the alternate route from the Floradale Bridge to the firebreak east of the Santa Lucia Canyon (see the description of the proposed mitigating route below) to minimize disturbance to Burton Mesa chaparral.

- Spanning of and access from tops of banks to streams where burial could significantly alter habitat and realignment appears either difficult or provides no mitigation. Where streams are spanned (suggested for Santa Ynez River at Floradale Bridge, if feasible), they should not be crossed by equipment or a 100-foot-wide, cleared corridor, and construction access could be achieved from previously disturbed areas, extra pipeline casing and insulation could be added to protect against vandalism and fire. Visual impact would be different, but not more significant than erosion scars.

- Burying the pipelines with a drilled crossing may be a feasible mitigation measure for crossing the Sant Ynez River.

- Scheduling of construction activities to avoid seasons with high erosion potential and critical periods in the life cycles of wildlife and vegetation. Construction near the mouth of the Santa Ynez River could take place between

September and March in order to avoid disrupting nesting or feeding activities of the California Least Tern. Since the dry season is from May to October, construction that takes place from September to November would be least damaging in this area.

- Replacement of native trees and large shrubs removed during construction across riparian and woodland habitat with saplings of the same or functionally equivalent to species propagated from locally obtained materials, including provision for supplemental irrigation or fertilization as necessary to ensure establishment. Success in replacement should be required and could be monitored by a qualified independent biologist.

If restoration or replacement is not possible, habitat loss could be compensated for by preserving a comparable community elsewhere or donating funds to an agency that could acquire similar habitat for preservation.

Table 5.6-7 summarizes additional measures that would mitigate construction impacts to specific environmentally sensitive habitats.

Mitigation Plan for Impacts on Regionally Rare and Declining Candidate Threatened or Endangered Species

Mitigation of impacts on populations of regionally rare or declining species include, as a first choice, avoidance. If avoidance is not the selected mitigation, special measures added to the above could but would not be guaranteed to mitigate adverse impacts to insignificance. Specifically, the likelihood of success of the measures below is uncertain.

- Conduct all pipeline construction activities between September and November to avoid interference with reproductive activities of California Least Terns, Snowy Plover, tree swallow, Swainson's thrush, warbling vireo, yellow warbler, Wilson's warbler, yellow breasted chat, and Blue grosbeak. Have site-restoration and revegetation measures in place prior to the start of the rainy season.

- Streams that contain tidewater gobies, unarmored threespined stickleback, California Tiger Salamanders, Red-legged frogs (Santa Ynez River and San Antonio Creek), could be crossed during seasonal low-flows, usually August-September, to keep potential adverse downstream sedimentation impacts to lagoon habitat to an absolute minimum. Baseline waterflows could be maintained and disturbance minimized in these streams.

- Sediment catchment basins could be installed to allow solids to settle to decrease the amount of a turbidity increase in San Antonio Creek.

TABLE 5.6-7

MITIGATIONS FOR CONSTRUCTION IMPACTS TO ENVIRONMENTALLY SENSITIVE HABITATS

Habitat	Impacts	Mitigations
Santa Ynez River & Estuary	Erosion into the river and estuary	Re-route the pipeline to the preferred mitigation route (see Figure 5.6-2) to avoid sensitive habitats and species.
Coastal Beach and Dune	Vegetation removal for pipeline and transmission line construction	Use physical means (like jute netting) to stablize sand until replanted native (i.e., local beachbur or sand-verbena) species are reestablished. Remove invasive introduced species (such as beach grass, Acacia and iceplant) from near the row corridor. Irrigate as needed until plants reestablish. Reduce width of disturbance row to a minimum, restrict vehicular and foot traffic outside the row. Do not use the groundcover (native iceplant) suggested in Union's proposed land-scoping plan for the substation.
Burton Mesa Chaparral and Bishop Pine Forrest	Vegetation removal, particularly in the Lompoc-Orcutt row	Minimize the row width to ten feet north of Lompoc and leave a few individuals of non-sprouting species (i.e., Purisima Manzanita) in the row to provide a seed source. Realign the proposed route into the firebreak north of Santa Lucia Canyon (see Figure 5.6-2) to reduce the amount of Burton Mesa Chaparral distrubed. Avoid oak trees and large shrubs. Char the ground surface after top soil is replaced to release nutrients and stimulate seed germination. Cut up and burn Bishop Pine trees that are removed and then replace charred branches and cones on row. Dedicate Lompoc Oil Field to presentation use when abandoned.
Coast Live Oak Woodland	Vegetation removal	Avoid oaks during clearing, or at least preserve the stem base and root system. Reduce row width to ten feet. Use locally collected acorns to grow saplings and then replant oaks, protecting them from deer browsing with wire mesh for 3-5 years. Leave as many oaks as possible in the proposed Lompoc site firebreak.

TABLE 5.6-7

MITIGATIONS FOR CONSTRUCTION IMPACTS TO ENVIRONMENTALLY SENSITIVE HABITATS
(continued)

Habitat	Impacts	Mitigations
Riparian Woodlands/Wetlands	Vegetation removal	Replant willow cuttings and plants of other wetland species (cattails, sedges and rushes) and irrigate them at least once to help in reestablish. To mitigate raptor perch reduction due to cutting willow trees for transmission line. Row use poles that are compatible with raptor use [Miller, 1975] and use mitigating route (Figure 5.6-2). Use the same route for the transmission line and the pipeline in order to minimize the amount of habitat disturbed.

- Realign the Proposed Pipeline route north of Santa Lucia Canyon about 200 feet west into the firebreak along the Vandenberg AFB property line (see Figure 5.6-2) in order to reduce the area of Burton Mesa Chaparral disturbed (from about 50 acres to 10 acres), thus reducing disturbance to Shagbark manzanita, Annual Curly-leaved monardella, and Santa Cruz Island Oak.

- Collect seeds of local Black-flowered figwort within rights-of-way to be cleared and scattered them within and outside the right-of-way after topsoil is replaced; also attempt to transplant individuals.

- Restrict vehicular activity on dunes to lessen impacts to La Graciosa Thistle and Dune Malacothrix.

- Char the ground surface of cleared areas in Burton Mesa chaparral to stimulate seed germination of shagbark manzanita.

The Applicant's proposed revegetation and landscaping plans for proposed Site 4 and the Surf substation (see 6.2 in Technical Appendix F) would require some modifications to be effective. At the proposed Lompoc Dehydration Facility, manzanita should not be used unless it is one of the native species that grows near the site in order to prevent the possibility of a horticultural variety hybridizing with the native shrubs. The proposed use of native ice plant at the Surf substation would not be effective because of the high rate of hybridization with exotic ice plant which already grows there. The invasive ice plant and acacia could be removed. Native grasses could be planted with native shrubs and trees to help reduce erosion while the area is still being irrigated. Once irrigation is stopped, the grasses would die, leaving the cover of established native shrubs and trees. If no species on the CNPS escaped exotics list are used in any revegetation effort, invasive impacts would be minimized.

MITIGATING REALIGNMENTS TO THE PIPELINE ROUTE

The route to Site 4 with the potential for the least impact to terrestrial and freshwater biota would basically include the alternate route as far as the Floradale Avenue bridge and then the proposed route from Santa Lucia Canyon to proposed Site 4.

The pipeline realignments shown on Figure 5.6-2 would be expected to at least partially mitigate the potential impacts of construction, normal operations, and accidents on sensitive habitats and species. Moving the pipeline corridor south of Route 246 for the first few miles would lessen construction impacts on the Santa Ynez River estuary and the potential for oil spills to enter the estuary.

A new alignment through the Federal Correctional Institution would then meet with the fuelbreak at the Vandenberg AFB/Union property line. Moving the Proposed Pipeline right-of-way west into the fuelbreak would minimize the amount of Burton Mesa Chaparral disturbed (reducing the number of acres of Burton Mesa chaparral disturbed from 50 to 10 acres).

Further discussion of the specific impacts associated with some of the realignments would require additional field surveys of rare plants, wildlife, aquatic biota, etc., which are being considered for inclusion in the FEIS/EIR.

MITIGATION MEASURES FOR NORMAL OPERATIONS AND UPSETS

The primary significant impacts of normal operations and upsets would be: (1) possible increases in NO_2, SO_2, or ozone to levels that are greater than the injury thresholds of sensitive wildlife and vegetation, (2) disturbance due to maintenance activities, and (3) spread of introduced weeds into biologically significant native vegetation types.

The impacts of air emissions could be minimized with the appropriate pollution control measures (see Section 5.2-5 and Appendix B). The Class I, regionally significant impacts expected from ozone increases in the Santa Ynez Valley cannot be mitigated to insignificance even with the suggested mitigations of modifying the equipment testing and decreasing flaring at platforms and using low NO_x burners at the Lompoc Dehydration Facility. Improved efficiency of the sulphur removal system at Santa Maria Refinery could help mitigate the increase in SO_2 from normal operations, but the impacts to biota would still be significant. No mitigations could reduce the Class I regionally significant impacts to biota from NO_2 emissions at Battles Gas Plant and from a SO_2 upset due to failure of the sulfur removal system at Santa Maria Refinery. The Class II impacts to biota expected from increased ozone in the Santa Maria Valley and near San Luis Obispo could be mitigated by using low NO_x burners at the Lompoc Dehydration Facility.

Areas adjacent to construction sites and on rights-of-way could be monitored and undesirable species removed by hand, not with herbicides. Any herbicide use could be conducted in the dry season.

Maintenance of the transmission line right-of-way may require trimming of willow trees to avoid treefalls on the power line. Trees trimmed outside the nesting season would help mitigate/avoid disturbance of birds that use the Santa Ynez River estuary.

The suppression of natural fires in the vicinity of facilities and on rights-of-way could result in an increase in the fuel load in vegetation (which leads to a greater risk of severe fires) and a decrease in reproduction by Chaparral and Bishop Pine Forest species.

MITIGATION MEASURES FOR ACCIDENTS AND CATASTROPHIC EVENTS

Oil Spills

Impacts of a major spill from pipelines would be nearly impossible to mitigate to a Class III level. In addition to the probability reduction mitigations found in Technical Appendix M, the following measures would reduce long-term losses to terrestrial and freshwater biota.

Mitigations for oil spill impacts to drainages of biological significance are outlined in Tables 5.6-5 and 5.6-6. These mitigations include:

- Installation of block and/or check valves every 1/2 mile along the route from landfall to the Lompoc Federal Correctional Institution border and on both sides of the crossings of the Santa Ynez River and San Antonio Creek, then every 2 miles for the rest of the pipeline route except for areas that drain into San Antonio Creek. These would need valves every 1/2 mile. The maximum spill size from a 1/2 mile segment of the landfall to Lompoc pipeline would be about 900 barrels while a 2 mile segment could potentially release 3,500 barrels of wet oil. A 2 mile segment of the Lompoc to Orcutt pipeline could release about 2,100 barrels of oil; using block valves every 1/2 mile near San Antonio Creek would reduce the potential oil release volume to about 500 barrels.

- Schedule frequent inspections of the pipeline.

- Develop site-specific oil containment and cleanup plans, in consultation with the Department of Fish and Game and the U.S. Fish and Wildlife Service.

- As discussed above, realign the alternate route from landfall inland to the vicinity of Union Sugar Avenue to avoid sensitive habitats and species of the Santa Ynez River estuary.

Impacts to both drainage and upland habitats and species could be reduced by developing a comprehensive, site-specific oil containment and cleanup plan. This would need to be reviewed by local resource agencies and Vandenberg AFB's Environmental Planning Branch, and completed before the commencement of project operation. The goal of an effective plan would be to minimize the ecological impacts of oil spills, with removal of visible oil for aesthetic reasons a secondary consideration. Since areas most vulnerable to oil spill damage are often also the most difficult to clean without causing additional impacts, high priority should be given to protection of ecologically sensitive habitats [Lindstedt-Siva, 1980]. For the Project Area, local biologists and Clean Seas, Inc., could formulate an oil spill response plan that includes the following actions and procedures:

- Locations of sensitive biological resources identified and mapped.

- Site-specific containment procedures developed; for example, protective barriers deployed at the mouth of the Santa Ynez River, San Antonio Creek, and/or other estuaries to prevent oil entry in the event of an offshore spill.

- Containment and cleanup equipment located in an accessible area near sites of potential use; for example at Surf or at the old water treatment facility at Vandenberg AFB, with a goal of decreasing response time to less than two hours in the event of a nearshore pipeline spill.

- Regular drills conducted so that personnel are familiar with the area and equipment.

- The no-cleanup option ,would need to be evaluated for ecologically vulnerable habitats such as dunes and sandy beaches, salt marshes, lagoons, and riparian areas.

- Cleanup operation using low-impacts site-specific techniques; for example, in salt marsh and other estuarine habitats, cutting of contaminated vegetation and low-pressure water flushing from boats would be preferable to extreme measures like shoveling, bulldozing, raking, and draglining [Lindstedt-Siva, 1980].

The operators also could contribute funds to support Vandenberg AFB's oiled bird rehabilitation program.

Gas Releases

The likelihood of impacts due to toxic vapor releases can be reduced by installing hydrogen sulfide monitors along the pipeline route in the event that produced gas becomes sour (contains hydrogen sulfide). Monitors would need to be capable of detecting very low concentrations of H_2S and transmitting a remote signal to a nearby manned facility. Shut-off valves installed at regular intervals along the pipeline route would provide a required complement to this monitoring.

Fires

Impacts due to fire could be reduced by:

- Preparation of a revegetation plan (approved by appropriate agencies) for post-fire restoration that would include provisions for enhancing habitat recovery. A bond posted for such an eventuality would be effective.

- Preparation of a fire management plan for the processing facility that is consistent with system safety and reliability considerations.

Table 5.6-8 outlines additional mitigation measures for oil spills and severe floods.

Table 5.6-8

ADDITIONAL MITIGATIONS FOR ACCIDENTS AND CATASTROPHIC EVENTS

Impact	Mitigation
Oil spills, produced water, and toxic gases reach Santa Ynez River estuary	• Re-route proposed pipeline route to the Northern Mitigated Route #1 and #2. Re-route alternative pipeline route to Southern Mitigated Route. For more information on routes see the Supplemental information chapter of this EIS/EIR.
	• Contribute funds to appropriate oiled bird rehabilitation projects
Oil spill at Floradale Avenue crossing of Santa Ynez River could cause losses of rare La Graciosa Thistle and other impacts	• Install remotely operated block valve on the south side and a check valve on the north side of the crossing. Attach pipeline to bridge if feasible. Otherwise pipeline would need to be buried 40 feet deep to protect it from severe flood scouring (See Technical Appendix C). Enhance cathodic protection at crossing.
Oil spills at other significant drainage crossings	• Fill pipeline trench with an impervious material (i.e., bentonite clay) to stop oil seepage
	• Put block or check valves on both sides of crossings
	• Route pipeline upstream of bridge and tributaries near crossing of San Antonio Creek, have available sorbent barriers near bridge and provide for water flow maintenance; enhance cathodic protection.
Oil spill on ROW north of Santa Lucia Canyon near pond and springs	• Construct a small berm between the pipeline and pond. Put pipeline on opposite side of ROW from springs
Severe floods	• Bury pipeline much deeper than 3 feet on 100-year floodplain near San Antonio Creek.
	• Bury pipeline below depth of scour.

5.6.5.1 Mitigation for Project Alternatives

The mitigations for impacts associated with the Alternative Pipeline, transmission line and facility locations are basically the same as the mitigations for the proposed project impacts. Mitigations for impacts specific to project alternatives are summarized below:

Impact	Mitigation
Construction impacts associated with burying pipeline under Santa Ynez River at Floradale Avenue Bridge	• Span the river by attaching pipelines to the bridge or use drilled crossing; restrict construction to low-flow/non-breeding season
Class I or II impacts from alternative transmission line	• Use proposed transmission line route, with the mitigating realignment in Figure 5.6-2
Construction and accident impacts associated with Alternative Pipeline route	• Realignment of pipeline (Figure 5.6-2)

5.6.5.2 Mitigation Measures for Area Study Development

ONSHORE AREA STUDY SCENARIO

Removal of an estimated 20 acres of Coastal Sage Scrub and Coast Live Oak Woodland for an expanded Lompoc Dehydration Facility and new gas processing facility at Site 4 could be partially mitigated by restoring equivalent nearby areas of Coastal Sage Scrub. Impacts to Coast Live Oak Woodland cannot be mitigated to a Class III level but cutting of oaks could be minimized as much as possible.

Mitigation measures for the Class II impacts expected from increased ozone and SO_2 from the operation of an expanded Lompoc Dehydration Facility, could include installation of backup devices to reduce likelihood of upsets releasing SO_2, and use of low NO_x burners. (See Technical Appendix B and Section 5.2.5.)

Site-specific mitigations for the likely significant potential impacts of a pipeline for the Exxon Shamrock Project oil to Gaviota or Buellton cannot be suggested until a specific route is proposed and surveyed by biologists.

OFFSHORE AREA STUDY DEVELOPMENT

Mitigations for increased air emissions resulting from the operation of additional platforms in the Central Santa Maria Basin would include requiring the use of grid power on platforms and the use of measures to reduce hydrocarbon and NO_x emissions as discussed in Section 5.2.5 and Technical Appendix B.

The increased oil spill risk to coastlines would be mitigated with the same measures as those outlined for the proposed project.

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5.7 SOCIOECONOMICS

This section identifies increases in tri-county employment due to the Union and Exxon Projects as well as associated housing, public service, and public finance impacts associated with this increased employment. These impacts are discussed for both Projects (Union's Platform Irene and associated onshore facilities and Exxon's platform) as well as for Area Study developments (including four additional platforms in the Central Santa Maria Basin, upgraded treatment facilities at Lompoc, a pipeline from Lompoc to an approved oil transportation system exiting the county. Land use impacts will also be discussed for the projects, Area Study developments, and project alternatives, including the Alternate Pipeline Route to Lompoc and the Alternate Site 8. There will be no separate discussion of other socioeconomic impacts for project alternatives since the employment and expenditures associated with these alternatives are equivalent to corresponding project components. Any actual differences in the alternative project cost would be too small to justify a separate socioeconomic impact analysis. These discussions are followed by a section outlining mitigation measures for both unavoidable significant impacts and avoidable significant impacts identified for the projects and Area Study developments.

The "no project" alternative is not separately discussed since the no project alternative implies a return to the baseline forecasts discussed in the previous chapter. Decommissioning is also not separately discussed for each impact measure. Decommissioning (or abandonment) will involve short-term construction impacts similar in nature to project construction impacts. Decommissioning will cause a decrease in property tax revenues and a decrease in the demand for public services (although unemployment-related services may increase temporarily.

A consistent methodology has been used throughout the socioeconomic assessments presented in this report. Essentially, the analysis is a modified economic base approach that employs estimates of project employment and local expenditures to generate direct support and indirect employment for the region. These estimates are then translated into housing impacts based upon project component locations, salary levels, and housing market area characteristics. Net new households, employees, and population generate both public service and public finance impacts. Public finance impacts directly associated with each project (i.e., property taxes) as well as land use impacts are also determined.

The models first ran to determine the baseline forecast of the economic activity in the region. Public service levels and demands for the expected future employment and population were then calculated. To determine the project's impacts, employment associated with the projects and their components were then added to the forecasts baseline. Public service levels and demands were calculated and then compared with the baseline estimates of the service levels and demands. The differences for each of the categories identified (e.g., water demands, police protection, public revenues) are defined as project impacts.

To determine Area Study impacts, this procedure was undertaken again, this time adding employment and expenditures associated with four additional Area Study platforms and with associated onshore developments. Essentially, differences in service levels and demands between baseline forecasts and baseline forecasts modified to include six platform projects and associated onshore processing and oil and gas transportation facilities were compared to determine Area Study development impacts.

For the next chapter, where cumulative impacts are discussed, the same procedure was undertaken. The baseline forecasts were modified by the addition of a series of expected oil-related and non-oil-related developments, service level demands calculated, and a comparison made with the original baseline forecast.

A more complete discussion of methodology can be found in Chapter 1 of Technical Appendix K. Additional employment and expenditure detail can be found in Technical Appendix K.

5.7.1 Significance Criteria

The significance criteria are defined for the following impact categories: temporary housing, residential development, low and moderate income housing, public services, groundwater thresholds, public finance, and land use. Impacts are cited for employment and population increases, but the notion of significance criteria is not applied to them since public concerns rest more directly upon the physical and public service impacts associated with by these employees and households rather than upon their absolute numbers alone. All of these significance criteria, with the exception of temporary housing and land-use, refer primarily to the operations phase of the project. Temporary housing impacts are most important with respect to the construction phase of the projects. Land uses are affected in the short term by construction activity and in the long term by any permanent changes induced by the projects. The criteria are listed below and the threshold values are provided in Technical Appendix K, Socioeconomics.

- Temporary Housing -- The demand for temporary housing decreases current average occupancy rates by 50 percent.
- Residential Development -- The rate of development increases by more than 10 percent over the historical rate.
- Low and Moderate Income Housing -- Demand is greater than ten units in any Housing Market Area or planning area.
- Public Services -- For water and solid waste, any increase in demand in a situation already over-capacity or 5 percent of remaining capacity; for wastewater, 0.1 percent throughput increase if at capacity or 5 percent of remaining capacity; for schools, six or more additional students (or demand for any new classrooms); and for police and fire services need for any additional staff.

- Public Finance -- An annual negative fiscal impact to the County general fund or special districts exceeding $1,000 is Class II. Any new benefits is Class IV beneficial.

- Land Use -- Any conflict with current federal, state, military, Coastal Commission, county or city plans, goals, or policies.

5.7.2 Growth Impacts

Growth impacts are defined as increases project induced in Tri-County employment, direct employment during both the construction phase and the operations phase, induced by the projects. Employment consists of individuals working directly upon project components such as platforms or onshore facilities, direct support employment, including such individuals as those supplying food to workers on the platforms, and local support employees, including employees with jobs that were created through the expenditure of wages earned directly from project-related activities. Table 5.7-1 provides construction employment estimates for both projects as well as the Area Study developments. Onshore employment is provided monthly. Platform construction will require approximately 14 weeks, and employment generated by this activity will range between 50 and 150 construction workers per platform. Ninety percent of these specialized construction workers will be brought in from outside the region. These workers will have little impact upon the local economy since the majority of their time will be spent on the platforms themselves. During hook-up and installation for Union's Platform Irene, construction workers will live on that platform for up to 28 days. On Exxon's Platform Shamrock, workers will reside on the platform for up to 14 days.

Union oil estimates that it will spend approximately $813,000 in the local economy for materials and equipment. This represents 1.2 percent of total project materials expense. Exxon estimates that $1.9 million of its project expenditures will be made locally for materials and services. The majority of local expenditures associated with construction activity are for food, fuel, oxygen and acetylene, portable toilets, dirk work, fences, concrete, bottled water, chemicals, and welding rod.

Onshore construction activity is much less specialized than offshore platform construction. Approximately 47 percent of the labor requirements for the Lompoc facility and 30 percent of the requirements for the Santa Maria Refinery modifications are for welders and pipe fitters (the largest single category of workers). Because of the sizeable cutbacks in construction activity at Diablo Canyon Nuclear Power Plant and Vandenberg AFB, there is a large supply of construction workers with skills applicable for these projects. In addition, the great majority of local expenditures for onshore facilities are for dirt and concrete work. These skills are also readily available in the local area. Ninety percent of the workers involved with the Lompoc Dehydration Facility and Santa Maria Refinery will be local.

The one onshore activity that is highly specialized is the pipeline construction. These crews are typically brought in from outside the area. Approximately 80 percent of the pipeline workforce is expected to come from

Table 5.7-1

CONSTRUCTION EMPLOYMENT[a]

MONTH/YEAR	UNION PROJECT		EXXON PROJECT	AREA STUDY	
	Offshore	Onshore		Offshore	Onshore
7/85	86			86	
8/85	79	7		79	7
9/85	79	127		79	127
10/85	69	229		69	229
11/85		241			241
12/85		235			235
1/86		295			295
2/86		318			318
3/86		221	141	141	221
4/86		227	141	141	227
5/86		175	141	141	175
6/86		140	343	343	140
7/86		92	343	343	92
8/86		30	343	343	30
9/86			62	62	
1/88			86	86	200
2/88			79	79	200
3/88			79	79	510
4/88			69	69	400
5/88					631
6/88					631
7/88					400
8/88					200
9/88					
10/88					
11/88					
12/88					
1/89				141	
2/89				141	
3/89				141	
4/89				343	
5/89				343	
6/89				343	
7/89				62	
1/90				227	
2/90				220	
3/90				220	
4/90				412	
5/90				343	
6/90				62	

[a] Average number of direct and direct-support workers.
Source: Exxon, Union project descriptions; Area Study platforms are assumed to be similar to Union's Platform Irene.

outside the region. They will take temporary accommodations during their short stays in the area.

These factors will act to minimize the impact of the construction phase upon the local economies. Highly specialized platform and pipeline workers will be brought in from outside the County on a temporary basis for relatively short periods, typically less than three months. Of the onshore workers demanded for construction activity, the majority are already residing in the area because of other large construction projects in the recent past. Peak construction impacts represent well under 2 percent of the baseline employment increases for Ventura County and Northern Santa Barbara County, the two most affected regions of the tri-county area with respect to construction projects.

Area Study construction impacts are also relatively insignificant to the local economy for the same reasons as above. The addition of four platforms will increase the economic impact upon the Ventura area because of increased supply boat activity. The additional pipeline and additional facilities improvements in Gaviota and Lompoc (gas facility) will increase baseline Tri-County employment by less than 0.5 percent during the late 1980s.

Total operations phase employment and net new households generated by that employment is provided in Table 5.7-2. This table contains estimates for 1986 (the first year of Platform Irene production), 1990, and the year 2000. Estimates are provided for the south coast of Santa Barbara County, north county area of Santa Barbara County, western Ventura County, and southern San Luis Obispo County. The same provision is included for the Area Study. Total employment includes direct, direct support, and local support employment components. The most striking feature of this table is the very small number of new households generated by the projects and by the Area Study projects. The major reasons for these small numbers are the existence of a large local construction workforce, the high degree of automation in the offshore and onshore facilities, and the fact that few materials and supplies are provided by the tri-county region (thereby generating only small multiplier impacts).

5.7.3 Housing Impacts

Housing impacts for the construction phase are discussed in the Temporary Housing Impacts section and for the operation phase in the Permanent Housing Impacts section.

5.7.3.0 Temporary Housing Impacts

Based upon the experience of large construction projects in the area (POPCO and Tracor) it is expected that few construction workers and less than 2 percent of the offshore construction workers will require temporary housing in the tri-county area. The majority of offshore construction workers will commute in and out of the region because of their extended work schedules on the platforms (where they will reside on barges). The onshore construction workers who are entering from outside the tri-county area are likely to commute on a weekly basis.

It is estimated that those construction workers employed at the Lompoc facility modification will stay in the Lompoc area.

Table 5.7-2

OPERATIONS PHASE EMPLOYMENT AND NEW HOUSEHOLDS[A]

	SOUTH COAST		NORTH COUNTY		VENTURA COUNTY		SAN LUIS OBISPO COUNTY		TOTAL	
	Employment	New Households	Employment	New Households	Employment	New Households	Employment	New Households	Employment	New Households
Union Project										
1986[B]	24	1	81	18	118	6	34	9	257	34
1990	14	1	86	19	66	3	31	8	197	31
2000	14	1	86	19	66	3	31	8	197	31
Exxon Project										
1986[B]	4	2	6	4	9	5	0	0	19	11
1990	8	5	16	10	21	13	1	0	46	28
2000	7	4	13	8	17	11	1	0	38	23
Area Study										
1986	58	38	103	64	226	141	34	21	421	264
1990	165	92	389	243	505	316	83	52	1142	703
2000	210	117	612	383	706	441	118	24	1646	965

[A] Employment includes new direct, direct support, and local support by place of residence.
[B] Union platform begins production in 1986; Exxon platform begins production in 1987, finished in 1998.

Source: GRC Forecasts

In September 1985, 45 motel rooms are expected to be occupied by construction workers engaged in the Lompoc Dehydration Facility construction. The majority of the construction activity will be completed within two months. Fourteen short-term rentals are expected to be required during the month of October. This is a Class 2 significant impact on the Lompoc area, but one of very short duration.

Construction work at the Santa Maria Refinery will involve up to 220 individuals. There will be very few non-local construction workers required at the Santa Maria Refinery. For this reason there will be only a demand for five to six short-term rentals in south San Luis Obispo County during the winter and spring of 1985-1986. Even if the schedule slips into the summer months, this will not create a significant impact on the south San Luis Obispo County area or the Santa Maria area Class III. More detail on temporary housing requirements can be found in Technical Appendix K, Socioeconomics.

Area Study projects are not expected to further increase the temporary demand for hotel rooms generated by the projects, because of their staggered construction schedules (Class III).

5.7.3.1 Permanent Housing Impacts

Table 5.7-3 provides estimates of new permanent housing requirements for both the projects and the Area Study developments. Estimates are provided for 1990 and the year 2000. Estimates are not provided for 1985 since the projects will not be in operation until after this time. Forecasts of baseline new-housing requirements for the year 2000 were given in Chapter IV, Section 4.7.

New permanent housing requirements represent less than 1 percent of the total new housing demand projected for the regions within the tri-county area. Detailed tables showing the new permanent housing requirements for each housing market area and for each of four income levels are provided in Chapter 3 of Technical Appendix K. Incremental housing demand generated by the projects represents less than ten low-to-moderate income housing units in any housing market area. This situation is also the case for the Area Study development with the exception of the Lompoc housing market area 19 low and moderate income units and the Santa Maria housing market area 12 low and moderate income units (Class II.)

5.7.4 Public Service Impacts

Project-induced growth in the number of households in the tri-county area will induce increases in the demand for public services beyond those projected to occur without the projects. The discussion of public service impacts is divided into three sections, one for each county, each of which is further subdivided into water demand, waste water, solid waste, police and fire protection, and school impacts. Electricity and natural gas demand for the projects and for new households introduced to the area by the projects can be easily met by existing utility systems. The same is true for Area Study developments.

Table 5.7-3

NEW PERMANENT HOUSING REQUIREMENTS
PROJECT & AREA STUDY

	EXISTING HOUSING	UNION PROJECT CUMULATIVE CHANGE AFTER 1984		EXXON PROJECT CUMULATIVE CHANGE AFTER 1984		AREA STUDY CUMULATIVE CHANGE AFTER 1984	
	1984	1990	2000	1990	2000	1990	2000
Santa Barbara County	116,089	20	20	14	12	115	99
South Coast							
Santa Barbara City	33,659	0	0	1	1	2	3
Carpinteria	4,159	0	0	0	0	0	0
Unincorporated	30,531	0	0	3	3	6	8
Lompoc HMA							
Lompoc City	10,065	3	3	2	1	15	24
Lompoc Valley	3,692	5	5	2	2	24	38
Santa Ynez HMA	5,969	4	4	2	2	19	30
Santa Maria HMA	16,234	2	2	1	1	8	14
Guadalupe	1,103	0	0	0	0	1	1
Unincorporated	8,754	4	4	2	2	18	28
Ventura County	104,372	3	3	13	11	27	17
City of Camarillo	16,125	1	1	3	2	6	8
City of Oxnard	43,771	2	2	6	5	12	17
City of Port Hueneme	6,729	0	0	0	0	1	1
San Buenaventura	34,207	1	1	3	3	7	9
Study Area Unincorporated	3,540	0	0	0	0	1	1
San Luis Obispo County	33,962	8	8	0	0	26	23
City of Arroyo Grande	4,896	2	2	0	0	4	6
City of Grover City	3,931	1	1	0	0	3	4
City of Pismo Beach	2,977	1	1	0	0	1	2
City of San Luis Obispo	13,670	1	1	0	0	4	5
Study Area Unincorporated	8,488	3	3	0	0	8	12
Study Area Total		31	31	28	23	169	158

Source: GRC Forecasts

5.7.4.0 Santa Barbara County Public Services Impacts

WATER DEMAND IMPACTS

From 1990 through the year 2000, the Union project will increase water consumption by 1 acre foot per year in the South Coast area, 10 acre feet per year in Lompoc area, 4 acre feet per year in the Santa Ynez area, and 4 acre feet per year in the Santa Maria area. The Exxon project will generate an increased consumption of 3 acre feet per year in the Lompoc area, 8 acre feet per year along the South Coast, 2 acre feet per year in Santa Ynez, and 3 acre feet per year in Santa Maria. Clearly these increases are very small, but for the Lompoc area must be considered significant since the supply is considered to be overdrafted (Class I). Union project demand (net of residential and commercial induced demand) for water is a Class II (Chapter 5.3) impact since it could be feasibly mitigated by desalinization. Residential and commercial demand induced by the projects is dispersed, and desalinization may not be feasible (Class I).

Based upon the existing per-capita consumption figures ranging between 0.13 acre feet per year and 0.2 acre feet per year (see Technical Appendix K for area-specific factors), the Area Study will increase consumption by 10 acre feet per year in 1990 in the South Coast area. The increase in the Lompoc area will peak at 57 acre feet per year in 1995. The Santa Maria area will experience increases of 20 acre feet per year by 1990, increasing to 34 acre feet per year by the year 1995. This demand represents less than a 0.3 percent increase for the Lompoc area and less than 0.1 percent for the other areas in Santa Barbara County. This impact is a significant impact on the Lompoc (Class I) area given that the water supply is already being overdrafted. Since the amount of overdraft has not been quantified, it is impossible to provide a precise measurement of the significance of this event. Clearly, this incremental amount is small relative to the projected baseline increases in demand.

WASTE WATER IMPACTS

Increased waste water generated because of each project is less than 2,000 gallons per day. This increase is not a significant impact upon existing systems through the year 2000 (Class III).

Area Study estimates of increased waste water are also very small -- 9,000 gallons per day in 1995 for Santa Ynez, 13,000 gallons per day for Lompoc Valley, 9,000 gallons per day for the City of Lompoc, 5,000 gallons per day for the City of Santa Maria, and 8,000 gallons per day for Santa Maria/Orcutt. In each case, this increase represents less than 1 percent of the total waste water currently being generated (Class II). Because of baseline growth these are significant impacts for Santa Ynez in 1990 and Santa Maria/Orcutt by the year 2000. For other areas the impacts are Class III.

SOLID WASTE

Platform Irene Class I contaminated waste will be less than 8 tons per day during the 36- to 43-month drilling period. This is less than 1 percent of the daily waste disposal (1,025 tons per day) for the Casmalia Class I site and is considered insignificant relative to remaining capacity (Class III). Platform Shamrock will generate comparable solid wastes with comparable impacts.

The amount of Class I contaminated muds generated by Area Study projects would be similar to that generated by the Union and Exxon projects, since the two drilling periods overlap for the two Area Study platforms that are scheduled to start in 1990. This Area Study increase would amount to about 15 tons per day in 1990. This increase would be the maximum disposal rate and, since it will be less than 2 percent of the waste disposal rate of the Casmalia Class I site (and less than 5 percent of remaining capacity), it is considered insignificant (Class III).

In and of themselves, municipal solid wastes generated by the Union project and by the Exxon project, as well as by the Area Study projects, are small. Since disposal sites in Foxon Canyon and at Lompoc and Santa Maria will reach capacity due to baseline growth during the forecast period, any additional project-induced solid waste must be considered significant (Class II) at these sites. Foxon Canyon will reach capacity by 1990, the Lompoc facility by the year 2000, and the Santa Maria facility by the year 1995. Technical Appendix K, Socioeconomics, contains detailed estimates of average annual increases in waste disposal for all of the sites in the County. Impacts elsewhere are Class III.

POLICE AND FIRE PROTECTION

Using service level standards provided by each municipality (and displayed in Technical Appendix K), additional service demand generated by each project is insufficient to cause the hiring of any new fire or police employees. The same can be said of the service demand induced by the Area Study developments. Alone, these projects are not sufficient to require the hiring of additional staff or additional capital expenditures, although the capacity of Fire Station 51 in Lompoc may be strained by local growth and the development of the Lompoc Dehydration Facility. For this reason, the Union project (and Area Study development) must be considered Class II.

SCHOOLS IMPACTS

The Union project is expected to cause the enrollment of five additional students in the Lompoc school district by 1990. The Exxon project will induce two additional students in the Lompoc district by 1990. These are insignificant impacts (Class III).

The project plus the Area Study developments will lead to a total of 67 new enrollees by 1995. Lompoc will receive 33. Santa Maria will have 15 new students by 1990, Orcutt four, and Santa Ynez Valley four students. These students represent approximately 0.1 percent of the total facility capacity in the County.

While the impact of the projects upon school systems is small, the Santa Maria Elementary district is faced with a capacity constraint that makes even these small numbers important. In 1990, Santa Maria will have 811 students beyond their current capacity, and will incur an average annual additional cost of $739,000. By the year 2000, assuming no changes there will be 1,102 students beyond their current capacity, and the average annual cost will reach $855,000. The impact upon the Lompoc district is also considered significant (Class II) for Area Study developments.

5.7.4.1 Ventura County Public Service Impacts

WATER DEMAND IMPACTS

From 1990 through 2000, Union project-induced water demand increases will be 6 acre feet per year in the City of Oxnard, 2 acre feet in Camarillo, and 3 acre feet per year in San Buenaventura are estimated. This represents less than 1 percent of the expected baseline incremental growth in water demands for these cities (and less than 5 percent of remaining supply). The Exxon project will induce water demand increases of 19 acre feet per year in the City of Oxnard, 17 acre feet in Camarillo, and 10 acre feet per year in San Buenaventura. These are adverse but insignificant impacts until 1990 in San Buenaventura and 2000 in Oxnard when demand will exceed supply due to baseline growth. The project demands then become Class II impacts, further aggravating an already strained situation.

The addition of four Area Study platforms and associated onshore facilities plus the proposed projects will induce water demand increases of 17 acre feet per year in the city of Camarillo, 1 acre foot per year in the City of Port Hueneme, 51 acre feet per year in the City of Oxnard, and 32 acre feet per year in the City of San Buenaventura by the year 1995. These increments would decrease slightly by the year 2000. Even in the City of Oxnard, this increase represents only slightly more than 1 percent of the projected total increase over this period. While these increases are not large, it is important to note that by the year 1990, San Buenaventura water supplies will be exceeded (based upon current projections), by 1995 Port of Hueneme water supplies will be exceeded, and by 2000 Oxnard supplies will be exceeded; hence the impacts are significant in these cities (Class II). The City of Camarillo has sufficient capacity past this period.

WASTE WATER IMPACTS

Each project is expected to add less than 10,000 gallons per day of waste water in Ventura County waste water systems. The Area Study projects will induce an increase of slightly more than 12,000 gallons per day in the Port Hueneme/Oxnard system. These increases are not considered significant (Class III).

SOLID WASTE IMPACTS

The average annual increase in solid waste disposal is less than 0.01 percent in Ventura County for both project and Area Study developments, but since the Santa Clara disposal site is expected to be at capacity in 1987, this is a significant (Class II) impact. Santa Clara may be expanded to provide capacity to 1991.

POLICE AND FIRE PROTECTION IMPACTS

Induced police and fire protection service demands will not involve the hiring of any new employees or any capital expenditures for either the project or the Area Study developments. Hence the increased service demand is considered insignificant (Class III).

SCHOOL IMPACTS

The Union project will add no students to Ventura County schools. The Exxon project will induce the enrollment of seven additional students throughout the County by 1990. This is an insignificant impacts (Class III).

The Area Study projects will add a total of 20 new students by 1995: four in the Oxnard K-8, five in the Oxnard high school district, three in Port Hueneme, four in Ventura, and three in Pleasant Valley. While these are not large impacts, it is important to note that the Oxnard school district is currently over capacity, (Class II). By 1990, Oxnard will have 5,746 students beyond its current capacity and will incur an average annual expenditure of $4,719,000. By the year 2000, the number of students beyond capacity will be 12,325, and the average annual additional cost will be $11,306,000.

5.7.4.2 San Luis Obispo County Public Service Impacts

WATER DEMAND IMPACTS

Projected water demand increase in 1990, because of the Union project, is 1 acre foot per year in the City of San Luis Obispo. The Exxon project will not induce measurable demand increases in San Luis Obispo County communities. Area Study projects will increase water demand to 4 acre feet per year in the City of San Luis Obispo and 1 acre foot in the City of Pismo Beach. While these amounts are very small relative to the projected increases in demand (well less than 1 percent of the projected baseline increase), they are Class II impacts in the case of the City of San Luis Obispo (Class III elsewhere) where water demand is expected to exceed supply by the year 1990.

WASTE WATER IMPACTS

Waste water impacts from each project will total less than 1,000 gallons per day in any city. An increase of less than 3,000 gallons per day is forecast as an Area Study impact for San Luis Obispo County municipalities. These are insignificant impacts (Class III).

SOLID WASTE IMPACTS

Solid waste generated by the project will be less than 0.1 percent of the average annual increase in waste disposal for San Luis Obispo County municipalities. This conclusion is the case for both the project and the Area Study development. This impact is insignificant.

POLICE AND FIRE PROTECTION IMPACTS

The Union and Exxon projects and the Area Study projects will not increase demand for police and fire protection services enough to warrant the addition of another employee or warrant the expenditure of money for capital improvements. Hence impacts are insignificant (Class III).

SCHOOL IMPACTS

The Union project will increase enrollment in the Lucia Mar schools by three students in 1990, continuing until the year 2000. The Exxon project will not impact San Luis Obispo County schools.

The Area Study projects will increase the enrollment to nine students 1990 in the Lucia Mar districts.

In and of themselves, these are very minor increases, but the Lucia Mar district is facing a capacity constraint. In 1990, Lucia Mar will have 2,101 students beyond the current capacity and incur an average annual cost of $1,172,000. By the year 2000 the number of students beyond capacity will grow to 4,462, and the average annual cost will then be $3,864,000. The increases in enrollments are considered significant impacts (Class II).

5.7.5 Public Finance Impact

Summary finance impacts are provided for each county in Tables 5.7-4 through 5.7-11. Separate tables are provided for the two projects and Area Study developments. Each table contains information for the year 1990 and the year 2000.

Detailed revenue and cost tables are provided in Technical Appendix K. These detailed tables divide revenue impacts into property tax, sales tax, transient occupancy tax, and other revenue components. The detailed expenditures impact projections provide a breakdown for general government expenses, public protection expenses, public works expenses, amortized capital, and other expenditures. The reader is encouraged to examine Technical Appendix K if more detail is required.

Santa Barbara

Santa Barbara municipalities and the County all experience net revenue increases (Class III impacts) from both the Exxon and the Union projects in 1990 and 2000, with the exception of the City of Guadalupe which is estimated to experience a trivial imbalance between revenues and costs associated with the project. Under the Area Study scenario, Guadalupe's imbalance will be $207 in the year 2000. These are insignificant impacts (Class III).

Ventura County

The Union project would induce a net revenue shortfall of $1,177 in 1990 and 2000 for Ventura County. The Exxon project will induce a $2,410 shortfall by 1990 for the Ventura County, falling to $1,566 by 2000. These impacts are considered significant, (Class II), using the adopted criteria. County municipalities receive Class IV impacts.

Table 5.7.4

UNION PROJECT FISCAL IMPACTS

SANTA BARBARA COUNTY
(1984 dollars)

Year 1990 Revenue and Cost Impact Summary

GOVERNMENT ENTITY	REVENUE IMPACT	COST IMPACT	NET REVENUE
Northern County Cities			
Santa Maria	$ 5,609	$ 4,252	$ 1,367
Lompoc	4,786	3,254	1,532
Guadalupe	155	184	(28)
South Coast Cities			
Santa Barbara	1,230	1,100	130
Carpinteria	411	213	198
Santa Barbara County	105,708	35,912	69,796
County Total	$117,899	$ 44,904	$ 72,995

Year 2000 Revenue and Cost Impact Summary

GOVERNMENT ENTITY	REVENUE IMPACT	COST IMPACT	NET REVENUE
Northern County Cities			
Santa Maria	$ 5,609	$ 4,252	$ 1,367
Lompoc	4,786	3,254	1,532
Guadalupe	155	184	(28)
South Coast Cities			
Santa Barbara	1,230	1,100	130
Carpinteria	411	213	198
Santa Barbara County	105,708	35,912	69,796
County Total	$117,899	$ 44,904	$ 72,995

Source: GRC

Table 5.7.5

EXXON PROJECT FISCAL IMPACTS

SANTA BARBARA COUNTY
(1984 dollars)

Year 1990 Revenue and Cost Impact Summary

GOVERNMENT ENTITY	REVENUE IMPACT	COST IMPACT	NET REVENUE
Northern County Cities			
Santa Maria	$ 3,497	$ 2,682	$ 815
Lompoc	2,753	1,688	1,066
Guadalupe	85	103	(18)
South Coast Cities			
Santa Barbara	9,214	8,230	984
Carpinteria	2,806	1,253	1,554
Santa Barbara County	35,763	30,151	5,612
County Total	$ 54,118	$ 44,106	$ 10,012

Year 2000 Revenue and Cost Impact Summary

GOVERNMENT ENTITY	REVENUE IMPACT	COST IMPACT	NET REVENUE
Northern County Cities			
Santa Maria	$ 2,927	$ 2,217	$ 709
Lompoc	2,376	1,514	862
Guadalupe	75	91	(16)
South Coast Cities			
Santa Barbara	7,366	6,580	787
Carpinteria	2,231	986	1,244
Santa Barbara County	30,061	25,730	4,325
County Total	$ 45,036	$ 37,125	$ 7,911

Source: GRC

Table 5.7.6

AREA STUDY FISCAL IMPACTS

SANTA BARBARA COUNTY
(1982 dollars)

Year 1990 Revenue and Cost Impact Summary

GOVERNMENT ENTITY	REVENUE IMPACT	COST IMPACT	NET REVENUE
Northern County Cities			
Santa Maria	$ 24,955	$ 18,912	$ 6,043
Lompoc	21,255	14,445	6,810
Guadalupe	689	817	(128)
South Coast Cities			
Santa Barbara	14,454	12,957	1,497
Carpinteria	4,394	2,003	2,391
Santa Barbara County	601,027	174,014	427,012
County Total	$666,775	$223,149	$443,626

Year 2000 Revenue and Cost Impact Summary

GOVERNMENT ENTITY	REVENUE IMPACT	COST IMPACT	NET REVENUE
Northern County Cities			
Santa Maria	$ 39,580	$ 30,198	$ 9,382
Lompoc	33,601	23,034	10,566
Guadalupe	1,098	1,304	(207)
South Coast Cities			
Santa Barbara	18,947	17,069	1,877
Carpinteria	5,768	2,722	3,046
Santa Barbara County	693,312	267,360	425,952
County Total	$792,305	$341,689	$450,616

Source: GRC

Table 5.7.7

UNION PROJECT FISCAL IMPACTS

VENTURA COUNTY
(1984 dollars)

Year 1990 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
Ventura County	$ 14,229	$ 15,405	$ (1,177)
Camarillo City	2,857	2,765	92
Port Hueneme City	701	620	82
Oxnard City	16,748	15,330	1,418
Ventura City	7,358	6,918	441
County Total	$ 41,894	$ 41,038	$ 856

Year 2000 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
Ventura County	$ 14,229	$ 15,405	$ (1,177)
Camarillo City	2,857	2,765	92
Port Hueneme City	701	620	82
Oxnard City	16,748	15,330	1,418
Ventura City	7,358	6,918	441
County Total	$ 41,894	$ 41,038	$ 856

Source: GRC

Table 5.7.8

EXXON PROJECT FISCAL IMPACTS

VENTURA COUNTY
(1984 dollars)

Year 1990 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
Ventura County	$ 53,260	$ 55,671	$ (2,410)
Camarillo City	11,152	10,743	410
Port Hueneme City	2,766	2,434	332
Oxnard City	60,617	54,824	5,793
Ventura City	27,199	25,386	1,813
County Total	$154,994	$149,058	$ 5,937

Year 2000 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
Ventura County	$ 41,967	$ 43,533	$ (1,566)
Camarillo City	8,863	8,530	334
Port Hueneme City	2,202	1,936	266
Oxnard City	47,407	42,763	4,644
Ventura City	21,371	19,916	1,455
County Total	$121,811	$116,678	$ 5,133

Source: GRC

Table 5.7.9

AREA STUDY FISCAL IMPACTS

VENTURA COUNTY
(1984 dollars)

Year 1990 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
Ventura County	$100,148	$104,557	$ (4,409)
Camarillo City	20,956	20,187	770
Port Hueneme City	5,188	4,566	623
Oxnard City	113,455	102,591	10,864
Ventura City	50,983	47,582	3,401
County Total	$290,731	$279,482	$ 11,249

Year 2000 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
Ventura County	$147,022	$155,341	$ (8,319)
Camarillo City	30,190	29,137	1,053
Port Hueneme City	7,414	6,535	879
Oxnard City	167,083	151,785	15,298
Ventura City	74,672	69,895	4,777
County Total	$426,381	$412,694	$ 13,688

Source: GRC

Table 5.7.10

UNION PROJECT FISCAL IMPACTS

SAN LUIS OBISPO COUNTY
(1984 dollars)

Year 1990 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
San Luis Obispo County	$131,328	$ 12,292	$119,035
San Luis Obispo City	4,127	3,251	876
City of Arroyo Grande	3,376	2,664	712
Grover City	1,164	1,088	77
City of Pismo Beach	2,495	2,283	213
County Total	$142,491	$ 21,578	$120,913

Year 2000 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
San Luis Obispo County	$131,328	$ 12,292	$119,035
San Luis Obispo City	4,127	3,251	876
City of Arroyo Grande	3,376	2,664	712
Grover City	1,164	1,088	77
City of Pismo Beach	2,495	2,283	213
County Total	$142,491	$ 21,578	$120,913

Source: GRC

Table 5.7.11

AREA STUDY FISCAL IMPACTS

SAN LUIS OBISPO COUNTY
(1984 dollars)

Year 1990 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
San Luis Obispo County	$150,626	$ 31,510	$119,116
San Luis Obispo City	11,091	8,753	2,337
City of Arroyo Grande	9,015	7,106	1,909
Grover City	3,107	2,902	205
City of Pismo Beach	6,662	6,093	569
County Total	$180,500	$ 56,364	$124,136

Year 2000 Revenue and Cost Impact Summary

JURISDICTION	REVENUE IMPACT	COST IMPACT	NET REVENUE
San Luis Obispo County	$164,163	$ 45,062	$119,102
San Luis Obispo City	15,877	12,570	3,307
City of Arroyo Grande	12,974	10,235	2,739
Grover City	4,473	4,180	293
City of Pismo Beach	9,562	8,782	380
County Total	$207,050	$ 80,830	$126,220

Source: GRC

The Area Study projects will induce a revenue shortfall of $4,409 for the County by 1990. This figure will increase to $8,319 by the year 2000. These are significant impacts (Class II).

San Luis Obispo County

There are no revenue shortfalls projected for San Luis Obispo County municipalities due to either projects or the Area Study developments (Class IV impacts). There are no measurable fiscal impacts to San Luis Obispo County from the Exxon project, hence no table is provided.

Project Alternatives

The fiscal impacts of project alternatives will not be measurably different from the proposed project components.

5.7.6 Land Use Impacts

This impact discussion is divided into two components, project impacts on existing land uses and project consistency with existing plans and policies.

5.7.6.0 Project Impacts on Existing Land-Uses

Project components that were evaluated for land use impacts include: Pipeline to Lompoc, Lompoc Dehydration Facility; pipeline from Lompoc to Orcutt Pumping Station, Orcutt Pumping Station, Battles Gas Plant, Surf substation, Power Cable, and Santa Maria Refinery.

PIPELINE TO LOMPOC

Impacts associated with the pipeline would occur mainly during its construction. Temporary adverse effects might occur because of noise, traffic, dust, and visual interferences. These potential adverse effects are discussed in separate sections of this report. The most significant construction impact is the extensive removal of the oak trees along the pipeline right-of-way. This removal represents a long term impact on the existing habitat, the extent of which is discussed under Terrestrial Biology. Other long term effects include the risk of pipeline breakage and resulting spills. The effects are discussed in the Risk Assessment section of this report. In summary, short term impacts may be significant and not readily mitigable (Class II), but long term effects, i.e., removal of oak trees, would be significant but mitigable (Class II).

LOMPOC DEHYDRATION FACILITY

The construction of the Lompoc Dehydration Facility involves the conversion of a 22.5 acre parcel of underdeveloped land to industrial use. This conversion would require a General Plan Amendment to add a Petroleum Resource Industry Overlay to the existing AG-II-100 land-use designation. The property would have to be rezoned from Unlimited Agriculture to General Industry (Class I impacts).

The construction of the facility may cause short-term impacts such as traffic on Highway 1 and noise, dust, and visual effects for those using Highway 1. Operational impacts on surrounding land uses are minimal since the facility appears to be compatible with adjacent uses. The long-term risk of upset could impact both residential and agriculture uses, however. Effects such as fire, explosion, and oil spills would have the potential for impact on Vandenberg Village and Mission Hills. Because of this risk, land use impacts must be considered to be significant but mitigable (Class II).

Indirect impacts associated with this project component center on implication of rezoning agricultural land for heavy industrial uses. This zone change represents a significant but partially mitigable impact because of the introduction of heavy industry into this setting (Class II).

PIPELINE TO ORCUTT PUMPING STATION

The Proposed Pipeline from Lompoc to the Orcutt Pumping Station follows an existing pipeline right-of-way. Because of this routing, no new long-term impacts are anticipated. Short-term impacts may include noise, traffic, dust, and visual disturbances, along with temporary disturbances to portions of agriculture operations. These short-term impacts would conclude with the completion of the construction phase (Class III).

ORCUTT PUMPING STATION

Because of the existence of the pumping station at Orcutt and the minor degree of modification required at that facility (i.e. within existing boundaries), no land use impacts are anticipated for that project component.

BATTLES GAS PLANT

No modifications or expansion are required for the Battles Gas Plant to accommodate offshore gas production. Therefore no land use impacts are anticipated.

SANTA MARIA REFINERY

The Santa Maria Refinery, although near sensitive Coast Dunes, is located on a very large parcel which provides a buffer from adjacent land uses. Because the facility already exists, proposed modifications are not anticipated to cause additional land use impacts (Class III).

POWER CABLE

Impacts associated with the Surf substation/power cable are confined primarily to the construction phase surrounding land uses including beach use and lateral beach access which will be restricted for up to a week during the power cable installation. This restriction is an adverse but not significant impact primarily because of its short-term duration (Class III).

5.7.6.1 Impacts of Area Study Development

The onshore components which would affect land use are the new gas processing facility to be located adjacent to the proposed Dehydration Facility in Lompoc; expansion of the proposed dehydration facility to accommodate Central Santa Maria Basin oil production; and a pipeline from the Dehydration Facility in Gaviota.

The gas facility would be co-located with the dehydration facility. The construction of it would require an additional conversion of 15 acres of grazing land to industrial use and would lengthen the duration of construction impacts to the site. The addition of this facility would result in further industrialization of the site, although impacts on surrounding uses would still be insignificant due to their low intensity use. The potential for increased risks to the residential communities of Mission Hills and Vandenberg Village exists with the addition of the gas processing plant.

The area study gas facility, like the dehydration facility, would be inconsistent with the Lompoc Area goals of the County Comprehensive Plan, Land Use Element. As previously stated under project impacts, industrial use of areas outside of the urban boundary is not compatible with the Lompoc Area Goals which state that industry should be of a light intensity and within urban boundaries. Because of this inconsistency, the area study gas plant is considered to result in a significant and unmitigable land use impact (Class I).

The expansion of the oil dehydration facility to accommodate increased volumes of oil could be facilitated within the existing proposed site. This could be accomplished with the addition of equipment and would not require land area other than that which is proposed for the Union project. Therefore, no additional land use impacts other than those previously identified under project impacts would occur as a result of the facility expansion.

Without a specific pipeline route, it is difficult to assess land use impacts associated with the installation of the pipeline between Lompoc and Gaviota. In general, the impacts would be similar to those identified for the pipeline route from the landfall to Lompoc and from Lompoc to Orcutt. However, the significance of any such impacts is not possible to determine at this time.

5.7.6.2 No Project Alternative

If the projects were not built, no land use impacts would occur. In fact, there may be beneficial long-term impacts due to the future abandonment of the Battles Gas Plant and possible conversion to less intense or safer, land uses.

ALTERNATIVE PIPELINE ROUTES

Short-term, Class III impacts as identified under the proposed project due to construction would apply to all of the following alternatives.

This Alternative Pipeline to Site 4 route, while consolidating the power cable and pipeline into one landfall, would necessitate crossing the Santa Ynez River. The alternate landfall, since owned by the railroad, would fall under Santa Barbara County Local Coastal Plan (LCP) and Coastal Zoning Ordinance (CZO) jurisdiction. Land use policies related to the disruption of the coastal bluff would directly apply to the landfall. Since the pipeline would be buried and the site restored with natural vegetation, this alternative appears to be consistent with LCP and CZO provisions. Additional short-term land use impacts would occur from the use of the beach area at Surf for pipeline storage and construction. Lateral beach access would be restricted for approximately three weeks during pipeline installation. These impacts may be classified as Level III (adverse but not significant) due to their short-term nature.

The Proposed Pipeline to Site 8 route diverges from the Proposed Pipeline to Site 4 route at the Union fee Property line west of Vandenberg Village. From there it proceeds easterly, south of Vandenberg Village and then northeasterly across Highway 1 and into Site 8. This path lies between Vandenberg Village and Mission Hills. Because of its proximity to these two residential developments, long-term risk of upset impacts (due to oil spill potential) may be greater than those associated with the proposed pipeline to Site 4 but would still be classified as Class II.

The Alternate Pipeline to Site 8 route is nearly identical to the Alternate Pipeline Site 4 route to except for the last segment which goes from Highway 1 northeasterly to Site 8 (same as proposed path to Site 8). No additional impacts are anticipated other than those identified above. No additional impacts are expected from the mitigated alternative pipeline.

ALTERNATE POWER CABLE ROUTE

The alternate power cable landfall and route coincides with the Proposed Pipeline landfall location north of the Santa Ynez River and represents consolidation of landfalls, thus minimizing the amount of land to be disturbed. Land use impacts would be the same as those identified under the proposed project, as the substation would be located at the pipeline valve station site.

This alternative landfall and substation, since located on Vandenberg AFB property, would not require a Conditional Use Permit from the County and LCP/CZO provisions would only apply through the federal consistency certification process, required of Vandenberg AFB.

ALTERNATE LOMPOC FACILITY -- SITE 8

Land use impacts associated with this location are focused on the Mission Hills residential community. Because this site is closer to Mission Hills, the potential for safety risks and odor impacts is greater than that of Site 4. The site would require less tree removal in the Area Study scenario but would necessitate the conversion of land which is currently in agricultural use (non-prime 40-90 acres) and agriculturally zoned to heavy industrial use. In general, Site 8 is more disturbed than Site 4 because of its use for agriculture, so onsite land use impacts would be less than those associated with the development of Site 4.

Another long-term land use impact to consider in evaluating this site is property values. Again, the proximity of Site 8 to Mission Hills may result in a more significant adverse impact onr residential property values, whether real or perceived. In summary, this alternative would result in Level II land use impacts because of the nearby residential development and the existing agricultural use.

5.7.6.1 Land Use -- Policy/Plans Consistency

A comprehensive policy/plan consistency discussion is contained in Technical Appendix K. This section of the report discusses areas of inconsistency and areas of particular interest. Note that these are preliminary statements of project consistency/inconsistency. They are based solely upon land use analysis. True findings of consistency can be made only after the full range of issues -- air quality, recreation, erosion, etc. -- is analyzed. Any potential conflicts for these provisions are listed below and in Technical Appendix K.

As mentioned in the previous section, alterations to land uses in the Lompoc area are of key importance. Land use Area Goals for the City of Lompoc state that the unique character of the area should be protected and enhanced with particular emphasis on protection of agricultural lands, grazing land, and natural amenities. Furthermore, these goals state that residential, commercial, and industrial growth should be confined to urban areas: commercial and industrial development that complements and expands the existing agricultural industry of the area should be encouraged. and urbanization should remain within the City of Lompoc in designated urban portions of the Vandenberg Village/Mission Hill/Mesa Oaks areas.

The Lompoc Area Goals raise several questions about project consistency with long-term agricultural use and industrial induced growth. Whereas, industrial growth is encouraged to be of light intensity and within urban areas, the Lompoc facility represents heavy industry outside of the urban area. The site would be rezoned to M-2, General Industry, which is the heaviest industrial zone. In granting such a rezoning, the specific findings and conditions should be developed to ensure compatibility with the Area Goals and to protect against additional heavy industrial and other growth outside urban limits.

Area plans for the 5th District (Santa Maria/Orcutt area) suggest the promotion and protection of agriculture as an industry. The project appears to be consistent, although indirect growth impacts may affect long-term agricultural uses through the conversion of agricultural lands. However, any changes of this nature would require amendments to existing County land use plans and maps.

The California Coastal Commission has found both the Union project and the Exxon project consistent with the Coastal Zone Management Act.

5.7.7 Energy Use Impacts

Expected oil and natural gas production from the project and Area Study projects is provided in Chapter II. This chapter also contain information on the energy use associated with the projects.

A major reason for the development of Outer Continental Shelf oil resources is the promotion of the national interest though energy self-sufficiency. In fact, Section 3, Subparagraph 3, of the Outer Continental Shelf Lands Act (Public Law 83-212) states: "The Outer Continental Shelf is a vital national resource reserve held by the federal government for the public, which should be made available for expeditious and orderly development, subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other national needs." These projects can contribute to this implied policy of energy self-sufficiency through the displacement of imported oil and natural gas. Insofar as this is the case, this is a noteworthy beneficial impact of the projects. It must also be mentioned that if the price of oil falls to a point where imported oil is less expensive than the oil produced from these projects, the public will be economically worse off than if the projects had not been undertaken. Since this fall in oil prices is a relatively unlikely outcome, the development of these offshore projects and their onshore components must be considered beneficial with respect to the national interest.

5.7.8 Mitigation Measures for Socioeconomic Impacts

5.7.8.0 Class I -- Unavoidable Significant Impacts

LAND USE

The rezoning of land for the Lompoc Dehydration Facility is inconsistent with the existing County Land Use Element Lompoc Area Goals. There is no mitigation short of changing the County Land Use Plan.

5.7.8.1 Class II -- Avoidable Significant Impacts

WATER USE

Increases in water demand induced by the Union project will further strain overcommitted supplies in: Lompoc, Santa Maria/Orcutt, San Buenaventura, San Luis Obispo, Oxnard, and Port Hueneme. The Exxon project will add to this strain in the Santa Maria/Orcutt, Lompoc, Oxnard and San Buenaventura. Area Study developments will also add to the strain on water supplies for all of the aforementioned cities. Partial mitigation for this impact would be to require the operators to contribute to local desalinization programs or other water reclamation measures. A fund could also be established to promote water conservation programs.

LAND USE

The risk of fire, explosion, and oil spills associated with the Lompoc facility and pipeline are significant potential impacts for the Vandenberg, Village and Mission Hills communities, each of which is approximately 1 mile from the Lompoc facility. The inclusion of additional safety equipment and protection features would mitigate this potential adverse impact. Further discussion of this issue is presented under the System Safety analysis.

The rezoning of agricultural land for industrial use will potentially add pressure for more industrialization (by acting as a precedent), but this can be mitigated by limiting the rezoning to the Lompoc site and to the specific use intended.

TEMPORARY HOUSING

The Union project will generate a demand for 14 additional rental units and 40-50 motel rooms in the Lompoc area in late 1985. This will reduce the availability of rental units and could potentially interfere with visitors wishing to view space shuttle launches during the study period. Area Study developments will further exacerbate this situation in the first half of 1988. Mitigation for these impacts would include participation in a monitoring program that would allow policymakers early warning of potential problems, the hiring of local workers whenever possible, participation in training programs for local workers in order to increase the probability of their being hired for these projects, coordination with local building trades councils and contractors as well as City Planning Department officials in order to promote the use of local construction workers, and the avoidance of construction activities during planned space shuttle launches.

PERMANENT HOUSING

The Area Study developments will generate a demand for 20 low to moderately priced houses in the Lompoc area. Subsidization of the construction of low and moderate income homes would mitigate this increase in demand. This subsidization could be implemented directly with the developer community or could be administered through local public agencies in the Lompoc area. A low-interest mortgage pool could be established for low and moderate income households. This pool could be administered by public agencies or by local lending institutions.

WASTEWATER

Wastewater from Union project-related growth and Area Study development-related growth would exacerbate capacity constraints at the SMID and Buellton wastewater treatment facilities. This will be extended to the Laguna Sanitation District under the Area Study developments. Mitigation for this impact could involve a contribution by operator to a fund set aside to finance the planned plant expansions for these districts.

SOLID WASTE

Project-related growth (Union, Exxon, and Area Study developments) will hasten the filling of landfill sites at Foxon Canyon, Santa Maria, and Santa Clara. Contribution to a fund to purchase new landfill sites and/or contribution to a fund to expand existing local landfills would partially mitigate this impact.

POLICE AND FIRE PROTECTION

Growth generated by the projects and by Area Study developments will put some additional pressure upon Lompoc Fire Station 51's response capability. Since baseline growth is expected to strain the capabilities of this station in and of itself, any additional increment of increased demand for service is significant. Partial Mitigation could involve: participation by the operators in the socioeconomic monitoring program to provide for a better response to growth pressures.

PUBLIC FINANCE

The Union project, Exxon project, and Area Study developments will each induce net fiscal shortfalls in Ventura County (relative to the revenue these projects generate). While the absolute amount of shortfall is relatively small, it is significant. Mitigation would include participation in a monitoring program that would eventually provide the basis for a comprehensive assessment of the fiscal burden of these projects. An additional mitigation would be contribution to a public service capital improvement fund that would offset these shortfalls.

Changes in the character of the coastal area from recreational/agricultural use to industrial use that are induced by the Area Study developments can be mitigated by attempting to increase the consolidation of facilities in the area into areas that are not visible from public view.

PUBLIC SCHOOLS

Area Study developments induce significant increases in enrollments at the Lompoc, Santa Maria, and Lucia Mar districts. Mitigation for these impacts include support for a local oil tax to offset additional costs for education, participation in a monitoring program to act as an early warning system for such increases in enrollment and participation in public service capital improvement to offset the cost of new classrooms and additional operating costs.

PROJECT BENEFITS

Clearly these projects also provide benefits to local communities. With the exception of Ventura County and the City of Guadalupe, the communities within the Study Area receive fiscal benefits from the Union project, the Exxon project, and the Area Study developments. San Luis Obispo and Santa Barbara Counties receive particularly large enhancements to their property tax base. In addition, substantial employment opportunities are created for local construction workers that have worked at Vandenberg AFB or Diablo Canyon projects. The Union project generates $15 million for the local economies from construction activities and $6 million per year from operations. The Exxon project is estimated to generate $55 million for local economies from construction activities and $60 million per year from operations. Area Study developments will generate an additional $50 million in local construction labor expenditures and $140 million in local annual wages.

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5.8 CULTURAL RESOURCES

5.8.1 Introduction

The types of cultural resources that may be affected by the projects include onshore and offshore cultural resources such as prehistoric and historic archaeological sites and artifacts and Native American cultural values and resources.

The determination of impacts requires both an assessment of: 1) the significance of cultural resources and, 2) an assessment of the degree to which the project will affect the significance of these resources.

All applicable laws, regulations and policies emphasize avoidance of cultural resources. When this is not possible, testing must be done to determine the significance of sites. As discussed below, significant sites (i.e., those eligible for the National Register of Historic Places) which will be adversely impacted by a project require mitigation. Mitigation options include avoidance, data salvage, or a combination of the two.

5.8.1.0 Determination of Significance

The determination of the significance of cultural resources in the Project Area is based on their significance to scientific-historic research, Native Americans, and the general public (e.g., educational and community value). The National Register of Historic Places eligibility criteria (NHPA as amended, 36 CRF 60.4) generally guided the determination of significance, as augmented by the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, CEQA, the California Native American Heritage Commission guidelines, and Santa Barbara County policies and guidelines.

Specifically, significant cultural resources include recognized sites of national, state and local importance which are listed on or eligible for the National Register of Historic Places or are designated as National Historic Landmarks, California Historical Landmarks, or Santa Barbara County Landmarks.

Sites eligible for the National Register of Historic Places sites meet the following criteria:

> ...The quality of significance in American history, architecture, archaeology and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association, and 1) that are associated with events that have made a significant contribution to the broad patterns of history; or 2) that are associated with the lives of persons significant in our past; or 3) that embody the distinctive characteristics of a type, period, or method

of construction or that represent the work of a master, or that represent a significant and distinguishable entity whose components may lack individual distinction; or 4) that have yielded, or may be likely to yield, information important in prehistory or history. (Section 36 CRF 60.4)

The criteria for determining importance provided by Appendix K of CEQA are similar to those used for determining eligibility for the National Register of Historic Places. Appendix K of CEQA states that if a project may cause damage to an important archaeological site, a project may have a significant effect on the environment. For the purposes of CEQA, an "important archaeological resource" is one which:

A. Is associated with an event or person of:

   1. Recognized significance in California or American history;

   2. Recognized scientific importance in prehistory;

B. Can provide information which is both of demonstrable public interest and useful in addressing scientifically consequential and reasonable archaeological research questions;

C. Has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind;

D. Is at least 100 years old and possesses substantial stratigraphic integrity; or

E. Involves important research questions that historical research has shown can be answered only with archaeological methods. (Appendix K;III)

Criteria A and C require specific studies to determine the temporal placement and other characteristics of sites both within the region and Project Area. It is probable that at least some of the prehistoric sites in the Project Area have special or particular qualities or are associated with events such as occupations during periods of documented environmental changes and rapid cultural changes. Because of the limited knowledge of area prehistory, it is more difficult to associate sites with specific people. If, however, a site contains a burial of a chief, as indicated by the types of artifacts found, then this person would be of recognized prehistorical importance.

The limited information concerning all of the prehistoric archaeological sites found in the Project Area is, however, adequate to indicate that they are all at least 100 years old, possess substantial stratigraphic integrity (i.e., are relatively undisturbed), and can provide information which will answer important research questions. A discussion of research problems relevent to the study of archaeological sites in the project area and instrumental to defining their importance in terms of Criteria A, B and C of CEQA are discussed in Section 6.1.2 and 6.1.4 of Technical Appendix G.

The National Register of Historic Places and Appendix K do not provide criteria for assessing the non-scientific historical significance of prehistoric sites to Native American groups. Resources with heritage significance to Native Americans include burial places and cemeteries; material remains of former settlements, places of spiritual or social importance (prayer sites, ceremonial sites and shrines); areas important in legend or folklore or areas attributed with special power or sacredness; and native biota used for foods, crafts, medicinal and religious purposes. The significance of specific resources is determined in consultation with Native American groups.

All of the prehistoric archaeological sites identified in the project area have potential to contribute to our understanding of prehistory. They are therefore potentially all eligible for nomination to the National Register of Historic Places. The information concerning the contents and organization of project area sites is very limited and should be supplemented to determine eligibility. This further testing may indicate that some sites are not significant and therefore are not eligible. Likewise all the prehistoric sites can be classed as important as defined by Appendix K of CEQA. The historic rail bed of the Pacific Coast Railroad in many places is well preserved and has integrity of setting and may be eligible for nomination to the NRHP. Similarly, the historic wharves and potential offshore cultural resources can contribute to our knowledge of history, but require additional investigation to determine significance and eligibility.

5.8.2 Impacts of Proposed Projects

5.8.2.0 Onshore Cultural Resources

All of the impacts to onshore cultural resources which have been identified in the Project Area are with in pipeline corridors and will be caused by construction, maintenance, abandonment, and accidents.

In those areas where the pipeline corridor crosses prehistoric or historical sites, the specific degree of impact will vary depending on where the pipeline is excavated through sites. Impacts will also vary depending on the distance trenches pass through sites and the types of areas (e.g., sandy, clay) which are trenched.

Any modification of the soil of an archaeological site may result in an impact. Once the relationships between the contents of archaeological sites are destroyed, there is no way to retrieve the information which is lost as a result of site disturbance.

Impacts from proposed project components and the agency with jurisdiction over the impacted site are summarized in Table 5.8-1. Overall, it appears that the proposed projects will not result in the complete destruction of any archaeological or historical site boundaries. The projects will, however, result in significant damage to the integrity of a number of archaeological sites which now appear to be relatively intact. The damage to every impacted site will be moderate. However, the disturbance to each site can be classified as a highly significant, Class II impact. In addition, Class I impacts to buried cultural deposits could occur during project construction. Because these sites are presently unknown, it is not possible to design alignments to avoid impacts in advance. The loss of information could be highly significant depending on the significance of the site.

CONSTRUCTION

Parts of eleven prehistoric archaeological sites have been identified as being present within the project right-of-way. These are identified in Table 5.8-1. Of these, the areas of at least two sites (SBa-1891 and SBa-1743) appear to extend beyond both edges of the right-of-way. All of the sites are situated on bluffs overlooking the Santa Ynez River and Santa Lucia

TABLE 5.8-1

IMPACTS TO ONSHORE PREHISTORIC AND HISTORIC SITES
Proposed Project

Site	Site Exceeds Beyond Both Edges of ROW	Site Extends Through Half of ROW	Site is Slightly Within ROW	Agency Jurisdiction
Pipeline: Landfall to Santa Lucia Canyon				
SBa-1888		X		VAFB
SBa-1889		X		VAFB
SBa-912		X		VAFB
SBa-1890		X		VAFB
SBa-1909		X		VAFB
SBa-1891	X	X		VAFB
SBa-914		X		VAFB
SBa-687		X		VAFB
Pipeline: Santa Lucia Canyon to Lompoc Site 4				
SBa-1743	X			SBco
SBa-1896		X		SBco
SBa-1910		X		SBco
Pipeline: Lompoc to Orcutt:				
Pacific Coast Railway ROW Bed			X	SBco

Canyon and are in areas with high concentrations of archaeological sites. In addition, the high winds and shifting sands contribute to the likelihood of buried sites. It is, therefore, possible that unidentified sites will be encountered during pipelines excavations.

One historical site, the ROW bed of the old narrow guage Pacific Coast Railroad, has been identified within the pipeline right-of-way from Lompoc to Orcutt. Some segments of the long portion of the railway bed still retain the topographical features of cuts and fill created in 1882-83.

No impacts to prehistoric or historical sites have been identified at the Proposed Lompoc Dehydration Facility or the Santa Maria Refinery.

NORMAL OPERATIONS

Maintenance activities are expected to have a minimal impact (Class III) since no new permanent access roads will be established, vehicular access for repairs will be limited, and public access will be restricted at Vandenberg AFB and by berms proposed at the dehyration site for both sides of Lompoc-Casmalia Road and Highway 1. Nevertheless, any development which increases accessibility to areas containing cultural materials has, historically, been associated with an increased incidence of site disturbance through unauthorized collection of artifacts and vandalism.

ABANDONMENT OF FACILITIES

Abandonment of facilities is not expected to adversely impact cultural resources assuming that the pipelines remain in the ground (Class III). Unauthorized artifact collection may continue beyond the life of the project, accelerated perhaps by the decreased visibility of oil company personnel.

ACCIDENTS AND UPSETS

The rupture of any segment of pipeline in the vicinity of an archaeological site could result in significant disturbance of intact site areas (Class I). Grading to create berms to contain spilled oil could disturb large areas, including areas outside of the projects. Oil spilled on archaeological sites would also result in soil alterations which could adversely affect the contents of sites. In addition to disturbing the relationship between contents of the site, such spills could alter samples for carbon dating, obscure soil differences and inhibit archaeological processing. Additional and unanticipated disturbance of cultural resources also may occur as a direct result of fire extinguishing and containment procedures.

Accidents and upsets are an important source of potential cultural resource impacts, in that they are likely to affect properties well outside the proposed disturbance corridors. These areas may be largely unsurveyed precisely because they are presumed to be safe from the deleterious effects of project development.

5.8.2.1 Offshore Cultural Resources

Based on the results of geophysical surveys those unidentified bottom features interpreted as having cultural resource potential are located and avoided or mitigated according to the judgment of the permitting agency. MMS specifically requires avoidance of anomolies with potential cultural significance unless more intensive investigation determines that such anomolies are not significant. Therefore, no direct, significant impacts to offshore cultural resources are likely to occur. Potential impacts to offshore cultural resources are summarized in Table 5.8-2.

CONSTRUCTION

Potential impacts could occur in the form of direct and indirect disturbance. Direct, damaging impacts to a cultural resource can result from the placement of drill rigs and pipelines or deployment of anchor arrays by construction vessels. Indirect impacts can occur in the form of "masking" or concealment of anomolies by drill-site and support-vessel litter or drilling muds deposition down current of the platform sites. Under the terms of MMS lease stipulations, direct impacts to the offshore cultural resources discussed below are not likely to occur in Federal waters, but direct Class II impacts could occur in State waters. Indirect impacts, could also occur and would be adverse but insignificant (Class III).

In the vicinity of Platform Shamrock, one unidentified sonar target is considered to have potential cultural significance. This bottom feature is located approximately 2,000 feet (610 meters) northwest of the proposed platform location in water depth of 277 feet (84 meters). If the area of potential bottom disturbance due to platform and pipeline construction activities is taken as twelve times water depth, then this unidentified bottom feature lays well within the area of impact. Avoidance of this feature, however, makes direct impacts unlikely.

At the site of Platform Irene, a large disturbance zone contains three unidentified sonar targets which are thought to be associated with exploratory drilling. No impacts to offshore cultural resources are anticipated.

MacFarlane [1984] notes 11 unidentified bottom features along the Proposed Pipeline and powerline corridors between Platform Irene and shore. Nine of these occur on the pipeline route. Two additional data events occur along the powerline corridor where it departs from the pipeline route before going ashore to the substation. One of these is interpreted as a potential shipwreck and the other may be associated with this same cultural feature (Class II impact). In addition, the power cable in the vicinity of the landfall at Surf may impact the historic Meherin Wharf (Class II). The exact location of this site has not been determined.

Along the Platform Shamrock to Platform Irene pipeline/utility corridor, analysis of geophysical data for cultural resource indications detected no data events of potential archaeological significance for this portion of the Project Area.

TABLE 5.8-2

POTENTIALLY IMPACTED OFFSHORE CULTURAL RESOURCES

Project Component	Location	Description	Agency Jurisdiction
Proposed Platform Shamrock	P-0440	Unidentified bottom feature with potential cultural significance	MMS
Proposed Pipeline: Platform Irene to shore	Powerline corridor at departure from pipeline route to shore	Potential shipwreck	Statelands
	Power cable landfall at Surf	Historic Meherin Wharf (exact location unknown)	Statelands
Alternative Pipeline: Platform Shamrock to Platform Hermosa	P-0444	Possible shipwreck	MMS
	P-0444	Possible shipwreck	MMS

NORMAL OPERATIONS

Resources lying close to the normal operations activity area may be "masked" to future remote sensing surveys by litter from drill sites and support vessels. Additionally, support-vessel anchor patterns could damage resources (Class III).

Once pipelines are in place, only an oil spill would affect nearby resources. However, a possibility exists that the artificial reef environment resulting from the platform and pipeline existence would cause an increase in specific biota of the area. The effects of an increased level of biological activity could alter environments of preservation affecting nearby stabilized cultural resources (Class III).

ABANDONMENT OF FACILITIES

The abandonment of a platform or pipeline in itself would not adversely affect a nearby resource. Removal of offshore facilities could potentially damage resources in the area. The impacts would be indirect and would depend upon the methods and routes used to dismantle and transport the facilities (Class III).

ACCIDENT AND UPSETS

Since potential cultural resources are avoided, the impact of accidents and upsets is likely to be Class II and indirect. Accidental littering and hydrocarbon leaks could alter environments of preservation, thereby affecting stabilized resources. The impact of any catastrophic occurrence such as a platform or pipeline explosion would depend on its location (proximity to cultural resources) and magnitude and could range from no impact to a Class I impact.

5.8.2.2 Native American Cultural Resources

Resources of heritage significance to Native Americans that could be adversely affected by the proposed project include burials and cemeteries, historic villages, other spiritual or social sites, and native biota used for traditional or curing practices.

The assessment of project impacts on Native American heritage values has two primary referents: 1) potential destruction or desecration of material and spiritual resources in the Project Area; and 2) potential infringement upon the customs, ceremonies, and traditions of Native American religious and other institutions which promote cultural persistence.

CONSTRUCTION

Construction impacts to Native American cultural resources associated with the proposed project are significant (Class II) in the landfall to Santa Lucia Canyon segment. Construction of the pipeline along this segment will directly impact the eight recorded prehistoric archaeological sites of importance to Native Americans (Table 5.8-1). The likelihood of buried cultural deposits increases the potential for significant cultural resource impacts and the disturbance of human remains. Construction activities such as clearing and excavating the pipeline trenches in Santa Lucia Canyon could also destroy a portion of existing stands of several native plants which are currently utilized by Native Americans for traditional foods, crafts, and medicines. Affected plants include juncus, tule, and cattails (Class II).

Construction impacts along the Santa Lucia Canyon to Site 4 segment of the proposed project are expected to be lower but remain significant and adverse (Class II). Only three sites have been recorded along this route, and no archaeological sites are currently recorded at Site 4 or along the pipeline corridor extending north to Orcutt. As noted in Section 4.8.4.0, cultural deposits associated with the historic Chumash village of Naucu are located somewhere in Graciosa Canyon although the precise location of Naucu is unknown.

NORMAL OPERATIONS

Indirect Class III impacts to Native American cultural resources during the operations phase of the projects derive primarily from illegal activities in the vicinity of the pipeline corridor. These include surface collections, pilfering and vandalism of buried sites, and/or ground disturbance associated with increased access to previously isolated areas.

ABANDONMENT OF FACILITIES

Indirect Class III impacts to cultural properties and native plant communities is expected to continue through the abandonment phase of the proposed project. However, no resource loss from direct impacts is expected to be significant.

ACCIDENTS AND UPSETS

Any emergency involving ground disturbance beyond the established perimeters of project facilities has the potential for impacting cultural properties and native plant communities which are sensitive to local Native Americans (Class I). Native plants such as those identified in Table 4.8-9 which are located within the radius of crude oil spills would be destroyed. More significantly, the extensive mopping-up operations required after such accidents can also result in the unmitigated surface disturbance of cultural properties within this radius.

5.8.3 Impacts of Area Study Development

5.8.3.0 Onshore Area Study

Area Study impacts will vary depending on the choice of future pipeline routes. Most impacts will be related to construction (Class II) although the damage or destruction of buried sites during construction would be a Class I impact. The most significant sites which are known in the Area Study are located along streams and are situated on corridors which were used for travel by those living at the sites. If pipeline corridors follow ridgetops where fewer large sites have been found, impacts would probably be less than they would be if the pipeline follows valley bottoms.

A higher probability of impacts would be expected along the Santa Ynez River and its tributaries, the various creeks intersecting Highways 1 and 246, and at the mouths of numerous canyons throughout the region. Areas in the vicinity of La Purisima Mission contain many cultural deposits associated with the late historic period. The area also includes three named historic Chumash villages (Sipuc, Ytiax, and Nomgio) and other, unknown habitation and burial sites.

Future pipelines on route to Buellton or Gaviota are likely to proceed southward toward Highway 246, an area which may contain Mission-period remains. To the extent that future pipelines border existing highways, both direct and indirect impacts to archaeological, historical, and Native American cultural resources would be minimized. The creation of overland routes, however, would be associated with a significantly higher level of cultural resource impacts, in that they are likely to follow the same natural corridors (i.e., streams, canyons) where habitation sites are most abundant.

No adverse impacts to cultural resources have been identified for the expanded oil plant or the consolidated processing facility at Lompoc.

5.8.3.1 Offshore Area Study

The hypothetical platforms to be located in federal leases OCS P-0427, P-0495, and P-0510 have not received site-specific geophysical surveys to determine cultural resource presence. The potential for these locations and their pipeline routes to contain cultural resources is considered high due to the known level of historical maritime activity in the area and the density of unidentified bottom features of potential cultural resource significance already observed in the vicinity.

Future development within the Area Study parameters should avoid all known and suspected cultural resources, given the existing regulatory framework. These resources include the shipwrecks and the Unidentified Seafloor Features identified in Technical Appendix G. Although no direct impacts are likely to result, potential Class III indirect impacts, such as masking, may, however occur.

5.8.4 Impacts of Alternatives

5.8.4.0 Onshore Cultural Resources

Impacts to onshore cultural resources attributable to the alternatives are summarized in Table 5.8-3. These impacts are characterized as signficant, adverse, Class II impacts.

NO PROJECT

The no project alternative would have no adverse impact on onshore prehistoric and historic cultural resources.

PROPOSED PIPELINE TO SITE 8

From the landfall to Santa Lucia Canyon, the Proposed Pipeline route to Site 8 is identical to the proposed pipeline route. As noted in Table 5.8-3, five archaeological sites have been identified in this segment of the pipeline

TABLE 5.8-3

IMPACTS TO PREHISTORIC AND HISTORIC SITES
ALTERNATIVES

Alternative	Site	Site Extends Beyond Both Edges of ROW	Site Extends Through One Half of Row	Site Extends Slightly Into ROW	Site May Not Be in ROW	Agency Jurisdiction
Proposed Route to Alternative Site (8)	SBa-1888*		X			VAFB
	SBa-1889*		X			VAFB
	SBa-912*		X			VAFB
	SBa-1890*			X		VAFB
	SBa-1909*		X			VAFB
	SBa-1891*	X				VAFB
	SBa-914*		X			VAFB
	SBa-687*		X			VAFB
	SBa-1892	X				SBco
	SBa-1893	X				SBco
	SBa-1894	X				SBco
	SBa-1768	X				SBco
	SBa-1769		X			SBco
	SBa-1771		X			SBco
Alternative Route to Proposed Site (4)	SBa-219	X				SBco
	SBa-1895				X	DOJ***
	SBa-1892**	X				SBco
	SBa-1893**	X				SBco
	SBa-1894**	X				SBco
	SBa-1768**	X				SBco
	SBa-1769**		X			SBco
	SBa-1771**		X			SBco

* Also along proposed Route to Site 4.
** Also along proposed pipeline to Site 8.
*** Department of Justice.

right-of-way. At least one site (SBa-1891) would extend beyond both edges of the ROW. East of Santa Lucia Canyon the pipeline trenches would intersect six more relatively intact sites. At least four sites would be bisected by the trench, including SBa-1982, SBa-1893, SBa-1894, and SBa-1768. It appears that the impacts to archaeological sites caused by the proposed route to Site 8 would be greater than those along the proposed route to Site 4.

ALTERNATE PIPELINE TO SITE 4

The alternate route to the preferred Lompoc site dehydration would intersect the six archaeological sites just mentioned in the segment east of Santa Lucia Canyon. It will also intersect SBa-219, the village of Lompoc, which is the only Project Area site identified as a village. In addition, the pipeline may pass through another site, SBa-1895. It appears that this route would result in less impact than the proposed route to the alternative site. Furthermore, the impacts along this route appear to be similar to those associated with the proposed route to the Site 4.

ALTERNATIVE PIPELINE TO SITE 8

No prehistoric or historic sites have been identified within the pipeline right-of-way between Sites 4 and 8.

ALTERNATIVE TRANSMISSION LINE AND SUBSTATION

Installation of the alternative transmission line could have impacts similar to those identified for the proposed pipeline route as described in Table 5.8-1 (Class II). The degree of impacts would depend on where the poles were installed.

No prehistoric or historic sites were identified at the alternative substation site.

ALTERNATIVE DEHYDRATION FACILITY SITE

No prehistoric or historic sites have been identified within the boundaries of Site 8.

5.8.4.1 Offshore Cultural Resources

The No Project alternative would have no adverse impacts on offshore cultural resources.

The offshore alternative pipeline runs from Platform Shamrock to Hermosa. Horne (1984) reports nine unidentified data events on this pipeline route between Platforms Shamrock and Hermosa. Two are described as possible shipwrecks (Table 5.8-2). Avoidance would result in no direct impacts to these potential resources. Indirect impacts (such as masking) would be Class III.

5.8.4.2 Native American Cultural Values

NO PROJECT

The No Project alternative would have no adverse impacts on Native American Cultural Values.

PROPOSED PIPELINE TO SITE 8

Along the Proposed Route to Site 8, plant resources which are considered highly sensitive to local Indians are concentrated in the relatively limited stretch between the Santa Lucia Canyon and Lompoc-Casmalia Roads. Approximately ten known habitation sites would be impacted by the Proposed Pipeline corridor in this area (Class II). The pipeline route also passes through a sensitive wetland approximately 1.2 kilometers east of Santa Lucia Canyon which contains extensive communities of high-quality basketry materials, oaks, and several native medicinal plants. The abundance, quality, and variety of native flora, when combined with immediately adjacent habitation sites, make this area a unique Native American resource.

ALTERNATE PIPELINE TO SITE 4

The Alternate Route to Site 4 is associated with the smallest number of potential cultural resource impacts. Only one site, the Chumash village of Lompoc, is recorded on the pipeline route west of Floradale Avenue (Class II). The historic nature of this site, however, and the likelihood of human remains in any buried intact deposits, make it of highest sensitivity to contemporary Indians. This route also parallels a portion of the highly sensitive corridor between the Santa Lucia Canyon and Lompoc-Casmalia Roads which is shared with the Proposed Route to Alternate Site 8. The Alternate Route also would impact mature stands of oak trees just south of Site 4 which were specifically noted as sensitive by Chumash consultants (Class II).

ALTERNATIVE TRANSMISSION LINE AND SUBSTATION

The impacts of installing the alternative transmission line would be identical to the Class II impacts of the proposed pipeline to Site 4. (See Section 5.8.2.2) The alternative substation is not expected to have signficant impacts to Native American resources.

OTHER PROJECT ALTERNATIVES

No impacts to Native American cultural values have been identified for the alternative pipeline route from Site 4 to Site 8. Similarly no impacts have been identified at the Alternative Dehydration Facility Site.

5.8.4.3 Comparison of Alternatives

On the basis of known and suspected sites and resources, certain statements can be made about the relative intensity of impacts associated with the proposed projects and their alternatives. In terms of the sheer density of sites and of resource variety, two regions within the Project Area, namely landfall to the prison boundaries on Vandenberg AFB and the corridor between the Santa Lucia Canyon and Lompoc-Casmalia Roads, are highly sensitive. The proposed route to Alternate Processing Site 8 crosses both of these regions, and therefore has a significant impact potential on the basis of present data. The proposed project to Site 4 avoids impacts to the area due east of Santa Lucia Canyon, and is therefore preferable. The proposed route, however, is associated with a very high impact potential to known and unknown, buried sites on Vandenberg AFB and to riparian plants of importance to Native Americans in Santa Lucia Canyon. In contrast, the alternate route to the Site 4 avoids running parallel to the Santa Ynez River terrace, and follows for almost half its length previously disturbed utility corridors and agricultural lands. Two major areas of high sensitivity remain on the alternate route, namely the Lompoc site and a more limited corridor west of the Lompoc-Casmalia Road. Despite these disadvantages, the alternate route to Site 4 may pose the least potential for overall cultural resource impacts if accompanied by a well-designed mitigation program (see Section 5.8.4 below).

Native Americans consulted in the present study declined to comment on the relative merits and demerits of the alternative pipeline corridors. This reluctance is understandable given the high probability of buried sites in the Project Area, and the difficulty of weighing the projected loss of different types of cultural resources (e.g., wetlands, oak groves and archaeological sites).

Offshore, the proposed pipeline route from Platform Shamrock to Irene is preferable to the alternative route from Shamrock to Hermosa. The former route does not appear to contain cultural resources, while the latter route encompasses two possible shipwrecks.

5.8.5 Mitigation Measures

All cultural resources which are determined to be significant and which will be adversely impacted by the proposed projects require mitigation. Mitigation of the loss of cultural resources can be achieved through: 1) avoidance, 2) data salvage guided by a defensible and SHPO coordinated research design, or 3) programs combining both avoidance and data salvage. The design of project alternatives which avoid impacts to cultural resources is preferable to mitigation through data salvage programs. [CEQA: Appendix K; 36 CRF 800.6.]

5.8.5.0 Measures for the Proposed Projects

ONSHORE CULTURAL RESOURCES

In those areas where the Proposed Pipeline corridor crosses archaeological sites or areas containing concentrations of archaeological sites, archaeological surveys should be made in the vicinity of the proposed corridor in order to locate routes which avoid cultural resources. The revised alternate route discussed below is one such option. These alternate route segments should deviate as little as possible from the proposed route. If it is not possible to design alternatives which totally avoid cultural resources, alternatives should be designed which avoid cultural resources to the greatest extent possible. Choices between impacting different sites or different areas of the same site will require archaeological test excavations to determine the degree to which deposits have been previously disturbed, the periods during which sites were occupied, the quality of preservation of artifacts, plant and animal remains, and the types of information expected to be present (e.g., the potential of impacted resources to address the "importance" criteria at CEQA, Appendix K and criteria for nomination to the National Register of Historic Places.

It appears that in some cases where sites have been identified as present in the pipeline corridor, they may not extend through the entire width of the corridor. Subsurface testing programs may indicate that placing the pipeline ditches near particular edges of the corridor will avoid or least affect sites. In such cases, the zone within which construction activities are conducted should be placed as far away from sites as possible, and its width kept to a minimum near sites.

In the vicinity of sites where particularly sensitive areas are identified such as cemeteries or the remains of structures, it may be possible to place the pipeline below the sensitive area by boring under the site. Data present in site areas which cannot be avoided should be salvaged through data recovery and monitoring programs. These programs shall comply with Santa Barbara County Prehistoric Project Requirement Guidelines and incorporate research objectives listed in Section 6.1.2 of the Cultural Resources Technical Appendix K.

Mitigated Pipeline Routes

Two mitigated pipeline routes (Northern and Southern) and three slight realignments have been proposed to minimize environmental impacts. These alignments have been surveyed in accordance with the methodology described in Section 4.8.2.0. Impacts to cultural resources along these alignments are discussed in the Supplemental Information document.

OFFSHORE CULTURAL RESOURCES

Normal practice in offshore construction operations is to avoid a potential cultural resource by a safe distance up to 12 times the depth of water. For the potential cultural resources located in Federal waters, no mitigation measures in addition to those stipulated by MMS are necessary. These three options are:

a. Employ operational procedures to ensure the protection of the potential site(s) of significance.

b. Adjust the location to avoid the site(s) of potential significance.

c. Perform additional survey to define the potential site(s) of significance and/or present an appraisal by the qualified marine archaeologist defining site(s). [Notice to Lessees and Operators of Federal Oil and Gas Leases in the Outer Continental Shelf Area March 1, 1977.]

These measures are, equally applicable to the two anamolies located in State waters that have been identified as a possible shipwreck. The preferred mitigation is avoidance. In addition, the exact location of the historic Meherin Wharf should be identified through additional survey (e.g., SCUBA reconnaissance) and avoided. If avoidance is not possible, and the site is determined to be significant, data salvage would be appropriate.

NATIVE AMERICAN CULTURAL VALUES

Native American consultation for the present project was undertaken with the United Chumash Council of Santa Barbara, the Santa Ynez Indian Elders Council, and with several other members of the local Indian community who expressed their concerns as individuals. While there is not complete unanimity of opinion on cultural resource issues in this rather diverse population, there are certain guidelines for mitigation with which consultants are in general agreement. Avoidance of all known archaeological sites, burials, and other sensitive resources has been consistently identified as the preferred mitigation. If cultural deposits or human remains are disturbed during project construction, whether inadvertently or during systematic data recovery programs, their treatment and ultimate disposition should follow specific procedures negotiated in advance of construction by Union Oil Company and pertinent Chumash groups in coordination with the Native American Heritage Commission and the County of Santa Barbara. Details of the proposed MOA are included in Technical Appendix G, Section 6.5.1.3. Similarily, construction activities should avoid the total destruction of stands of sensitive plants at any one location.

Other mitigation measures appropriate to archaeological sites in the proposed project corridor include pre-construction surveys involving subsurface testing with local Indian monitors of all areas slated for disturbance; avoidance of identified cultural remains; and compliance with procedures negotiated in the MOA regarding construction monitoring and the treatment of burials and artifacts. Special measures must be taken at the Santa Lucia Canyon crossing to minimize disturbance of the wetland and its native flora during construction. Ethnohistorical studies utilizing Mission records should be conducted for the historic Chumash village of Naucu to document the identity of its inhabitants and their potential genealogical connections with contemporary Chumash families. In addition to identifying next-of-kin in compliance with AB 297, this would help to ensure input about concerns and impacts from those most legitimately connected and would provide tribes and individuals with information that can be passed on to succeeding generations about cultural heritage.

Mitigating Pipeline Route

The mitigating pipeline route discussed above would minimize known adverse impacts to Native American values. Native Americans should be consulted about the realignment and the significance of any new impacts identified as a result of field surface reconnaissance.

5.8.5.1 Area Study Development Measures

Impacts to archaeological sites resulting from the Area Study developments would mainly result from pipeline construction. Although the types and densities of sites may vary from Project Area sites, a mitigation program similar to the program suggested for the proposed project would be applicable in most cases. An exception to this may be the archaeological sites associated with the post-1812 La Purisima Mission site where the State Department of Parks and Recreation and other interested parties should be involved in the design of mitigation programs.

Area development mitigation measures should include additional research to identify areas of greatest archaeological, historical, and Native American sensitivity, both onshore and offshore. Of special interest to Native Americans are genealogical studies of Sipuc and Ytiax, and the search for additional archival information on Indian settlements in the vicinity of La Purisima Mission. Mitigation measures designed to help preserve the cultural character of Chumash communities include data-sharing and support of heritage programs.

5.8.5.2 Measures for the Alternatives

The types of impacts associated with the alternatives are similar to those associated with the proposed projects. Therefore, the same mitigation measures are applicable.

Specifically, the proposed route to Alternate Site 8 will require extensive pre-construction archaeological surveys involving subsurface testing and pipeline corridor realignments around sites between the landfall and Lompoc-Casmalia Road. Special measures must be taken to minimize damage to the wetlands at Santa Lucia Canyon and approximately 1.2 kilometers to the west. Genealogical studies of the village of Naucu are also appropriate for the reasons mentioned above.

The Alternate Route to Preferred Site 4 requires a special pre-construction subsurface testing program in the vicinity of the village of Lompoc to determine the presence or absence of intact deposits along the Proposed Pipeline corridor. If these tests confirm such deposits, then additional mitigation measures would be required. These could include excavation and salvage.

As noted in Section 5.8.4.0, the major impacts of the alternative route to Native American cultural resources could be mitigated by rerouting the pipeline around (SBa-219) Lompoc, north on Floradale Avenue to Santa Lucia Canyon, and from that point along the proposed route to Site 4. A thorough genealogical study of the village of Lompoc also should be conducted.

Offshore cultural resources along the Alternative Pipeline Route from Shamrock Platform to Platform Hermosa are subject to the mitigations allowed by MMS under the Notice to Leasees and identified in Section 5.8.5.0.

5.9 AESTHETIC RESOURCES

The potential aesthetic consequences of the proposed projects, their alternatives, and Study Area development are determined by the degree to which the aesthetic quality of the environment may be altered. As described in Section 4.9, the aesthetic environment is addressed in terms of three components: 1) onshore noise and vibration; 2) visual resources; and 3) odors and smoke. For each of these issues, significance criteria, impacts, and mitigation measures are discussed below.

5.9.1 Onshore Noise and Vibration

5.9.1.0 Significance Criteria

Federal, state, and local regulatory standards, as described in Section 4.9.2.2, provide the basis for determining the significance of onshore noise impacts. Impacts attributable to construction, operation, and support (i.e., boat and helicopter noise) are considered significant if they exceed the following levels:

- 60-65 dBA (CNEL)--the maximum exterior noise exposure compatible with the sensitive land uses of residential, transient lodging, hospitals, and other long-term medical care facilities, and schools, libraries, and churches. (Santa Barbara County, California Office of Noise Control)

- 70 dBA (CNEL)--the maximum noise level compatible with playgrounds, parks, and beaches (California Office of Noise Control)

In addition to these criteria, the level change of the impact also must be considered. For example, a relatively sudden change in noise level, by 4 dBA or more, is quite noticeable and can be annoying even if no criteria are exceeded (see Technical Appendix I, Paragraph 2.1).

The occurrence of vibration and its annoyance to inhabitants of residential areas are addressed in the following section but are not measurable by codified standards or criteria.

5.9.1.1 Environmental Consequences

Noise and vibration experienced at the sensitive receptor sites identified in Section 4.9.2.1, would result from onshore elements of the proposed Union project and its alternatives. No onshore noise or vibration impacts would occur from the proposed Union or Exxon platforms or offshore pipelines because of the distances involved.

The impacts resulting from proposed Union Oil project construction and operation are presented in Table 5.9-1. This table lists the receptor areas and identifying numbered sites at which noise measurements were taken [Technical Appendix I, Addendum]. The second column gives the existing noise levels in terms of either L_d for construction events (no construction occurs at night), CNEL for 24-hour operation, L_{eq} for a specified portion of a day (e.g. a school day) or both L_d and CNEL or L_{eq}. The corresponding project levels in the third column apply to the appropriate activity (e.g., facility or pipeline construction or operation). Combining the two levels, on an energy basis, gives the L_d/CNEL or L_{eq} results in the fourth column. As noted in Section 4.9.1.0., dBs are not additive. The change in dB levels is shown in the fifth column to aid in the understanding of impacts.

In the sixth column, the impact of the project elements is given both in terms of level changes and in comparison to the criteria of 60-65 dBA CNEL and/or 70 dBA CNEL as appropriate. These two impact assessments indicate that although the combined level may still be below the criteria, the sensitive receptor (i.e., people or wildlife located at a particular area) would experience a marked increase in sound level which may create a strong negative reaction. The seventh column categories impacts according to the four classes identified in Section 5.0.

In addition to the receptor areas listed in Table 5.9-1, there are undefined general project locations that would be affected by boat noise in the vicinities of Port Hueneme and Ellwood Pier and by helicopter noise originating from Santa Maria Airport and Santa Barbara Airport. (See Sections 2.1.2.4 and 2.1.3.4 for descriptions of crew and supply base operations.) These impacts are summarized below and discussed in detail in Technical Appendix I.

The noise impacts attributable to the proposed projects, their alternatives, and the Area Study may be temporarily incompatible with applicable regulations during construction phases when the threshold significance criteria are exceeded.

IMPACTS OF PROPOSED PROJECTS

Construction

Temporary noise impacts would result from both pipeline and facility construction and supporting transportation modes. With respect to pipeline construction, workday L_{eq} levels would fluctuate at distances closer than 500 feet but would appear as a steady noise level at greater distances. For example, at a distance of 500 feet, the workday L_{eq} would be 68 dBA for the Surf to Lompoc pipeline and 65 dBA for the Lompoc to Orcutt pipeline; at a distance of 3 miles, L_{eq} would be 31 dBA and 28 dBA, respectively. In the immediate vicinity of major highways where the ambient background noise level is high because of road traffic, the construction noise would be perceptible for a number of days, but the combined noise level would not increase by a significant amount. The increase in traffic from the transportation of pipeline workers and supplies by truck to the construction sites would be approximately 2 percent; the associated increase in CNEL would be undetectable (Class III), having a minimal impact on the area.

Overall, with respect to noise level changes, pipeline construction would result in significant impacts (Class I) at three sensitive receptor sites. At Cabrillo School, Vandenberg Village, an increase of 9 dB would be experienced

Table 5.9-1

PROJECT SOUND LEVELS, dBA, DURING
CONSTRUCTION AND OPERATION OF PROPOSED PROJECTS

Location and/or Measurement Site	Existing Level, dBA	Project, Const/Oper F = Facility P = Pipeline	Combined Level, dBA	Level Change, dB	Impact with Respect to: Level Changes	Criteria	Class of Impact	Duration and/or Comments
Mission Hills, North Edge, Site 2	58 Ld	Const, F, 38 Ld	58 Ld	0	Insignificant	Insignificant	----	Undetectable
		Const, P, 43 Ld	58 Ld	0	Insignificant	Insignificant	----	Undetectable
	61 CNEL	Oper, F, 32 CNEL	61 CNEL	0	Insignificant	Insignificant	----	Undetectable
Dehydration Facility, Site 3	60 Ld	Levels Vary with Position and Time Throughout Immediate Area; Oper, 70 LD at Property Line			Insignificant	Insignificant	III	No Sensitive Receptor; Permanent Increase in Levels
Vandenberg Village, Cabrillo School, Site 6	46 LEQ	Const, P, 55 Ld	55 LEQ	+9	Significant	Insignificant	II	3 Week Duration, Below Any Criteria
Vandenberg Village, Northeast Corner	50 Ld*	Const, F, 44 Ld	51 Ld	+1	Insignificant	Insignificant	----	UnDetectable
	52 CNEL*	Oper, F, 38 CNEL	52 CNEL	0	Insignificant	Insignificant	----	Undetectable
Santa Ynez River Estuary, Site 7	62 Ld	Const, P, 89 Ld Max at ROW	89 Ld At ROW	+27	Significant	Significant, Temporary	II	Detectable to 2000 Ft for Several Weeks; Varies with Time
Orcutt, Clark St., Site 5	60 Ld	Const, F, 61 Ld	64 Ld	+4	Significant	Insignificant	II	4 Week Varies
		Const, P, 64 Ld	66 Ld	+6	Significant	Sig/Temporary	II	1 Week with Time
	64 CNEL	Oper, F, 50 CNEL	63 CNEL	-1	Insignificant	Insignificant	----	Undetectable
Santa Maria Refinery, Site 4	49 Ld	Const, 47 Ld	51 Ld	+2	Insignificant	Insignificant	III	2 Week Duration, Below Any Criteria.
	56 CNEL*	Oper, 46 CNEL	56 CNEL	0	Insignificant	Insignificant	----	Undetectable

*Estimated

for approximately three weeks, probably during the school year. At the Santa Ynez River estuary, a sensitive wildlife habitat, noise levels are detectable to 2,000 feet. Increases in noise levels would vary, from a maximum of 27 dB at the right-of-way to lower levels at further distances. At Clark Street in Orcutt, the increase of 6 dB would occur for approximately one week. In terms of applicable criteria, the impacts at the Santa Ynez River estuary (89 L_d maximum at the right-of-way) and Clark Street, Orcutt (66 L_d) would be significant for the durations identified above, remaining Class I impacts.

Construction of the dehydration facility would result in short-term noise impacts (Class III) to the surrounding area and the noise level would vary in accordance with the number and types of equipment used and distance from the site. Construction noise at the dehydration facility would be barely detectable at the Mission Hills receptor where the existing noise level would remain at 58 L_d. In addition, traffic noise is estimated to increase by 1/2 dB, which is negligible, resulting in an insignificant impact. Facility construction noise at the Orcutt Pump Station, however, would be significant with respect to noise level changes which would increase by 4 dB to 64 L_d for approximately four weeks (Class I). Construction associated with modifications to the Santa Maria Refinery would result in a noise increase of approximately 2 dB to 51 L_d, which is insignificant in terms of both level change and criteria (Class III).

Construction of the electrical substation would have no adverse impact. The number of vehicles and duration of construction are limited (under two weeks) and no sensitive receptors are located nearby.

Installation of the transmission line would have no adverse impacts. The noise produced would be similar to that of an idling engine and the exposure at any particular location would not exceed three days.

With respect to boat noise, the highest frequency boat schedule would occur during the Exxon platform installation at four departures per day from Ellwood Pier and, from Port Hueneme, during Exxon drilling production with one boat per day. Union's supply boats would depart from Port Hueneme once every five days. A single boat departure would create a very high level of noise, 79 dBA, decreasing to 55 dBA within approximately four minutes when it reaches 5,000 feet from shore. Although significant in terms of short time level changes, this boat noise would not exceed the criteria (Class III). When combined, the 12 hour L_d (7 am-7 pm) would increase by 2 dB to 57 dBA and the CNEL by 1 dB to 56 dBA.

Helicopter noise has an effect similar to boat noise. Short time (one minute) level changes to 65 to 85 dBA occur during an overflight. This would cause an annoyance, but, in terms of criteria, the impact is not significant (Class III). The highest frequency of helicopter flights is for seven round trips from Santa Maria Airport proposed for Union crew changes during drilling and production. These flights would occur over seven different hours, and the L_d and CNEL would increase by 1 dB to 56 dBa. The frequency of Exxon's helicopter departures from Santa Barbara Airport would be even lower (a maximum of four per day during platform installation).

Operations

Normal operation of the pipelines will create no noise impact because the pipeline contains no continuously operating valves or metering stations.

The proposed dehydration facility is similar in equipment and operation to the Mandalay plant now in use by Union Oil in Oxnard, California. Therefore, the field measurements also included the noise characteristics of this facility to provide an accurate model for the proposed project. The dehydration facility operational noise would not be detectable and no impact would occur because the operating sound levels are so low compared to the existing levels at sensitive receptors.

At the Orcutt Pump Station, the change from engine driven pumps to electric motors would reduce the pump noise and the CNEL at Clark Street residences would be reduced by 1 dBA, which is negligible. The more positive benefit of the change to electric driven pumps would be the elimination of the vibration phenomenon noticed by one resident on Clark Street (Class IV). The installation of heating boilers at the Orcutt Station also would result in no significant noise impacts.

The modifications to the Santa Maria Refinery are not expected to change the sound output of the refinery at nearby sensitive receptors. The existing levels of 56 CNEL are approximately 10 dB below the criteria and will remain so. The modifications, however, may improve efficiency thereby producing quieter operations as well.

As noted under "Construction," the boat and helicopter noise experienced infrequently by people during operations onshore may be annoying but would be insignificant according to the criteria (Class III).

Abandonment of Facilities

The dismantling of facilities is likely to have similar noise impacts to the local construction impacts described above. These would be adverse and significant in terms of temporary noise level changes although the level of impact would depend on the location (proximity to sensitive receptors) and the methods and equipment used to dismantle facilities (Class II or III). Once the dismantling was complete, the impacts would cease. Because no significant operational impacts are attributed to the projects, abandonment would not have long term environmental consequences.

AREA STUDY

During the construction of the additional equipment to expand the Lompoc Dehydration Facility, noise would not be detectable at any of the sensitive receptors.

During construction of the co-located gas treatment facility at the Lompoc site, the noise level would be the same as during the Lompoc Dehydration Facility construction. The impact would be insignificant (Class III).

If the throughput of the Lompoc Dehydration Facility was increased to 100,000 barrels per day, the operating noise level would increase by 1 dBA. Further, if a gas treatment facility were operating simultaneously next to the proposed dehydration facility, the combined operating noise level would be increased by 3 dBA. If either or both of these events were to take place, the combined sound level at any of the sensitive receptors would not change and no impact would result.

Construction of the Area Study pipelines would have short-term, localized impacts similar to those described for the project. The level of these impacts would vary by location (Class I to Class III).

The increase in boat and helicopter departures associated with Area Study development (see Section 5.10.2.1) would increase short-time noise as well. In terms of the significance criteria however, the impacts would be similar to those attributable to the proposed projects -- adverse but insignificant (Class III).

IMPACT OF ALTERNATIVES

The impacts attributable to the alternatives are identified in Table 5.9.2.

Construction

The No Project alternative would not result in adverse onshore noise and vibration impacts.

Construction of the Alternative Pipeline to Lompoc Site 4 would result in significant adverse impacts (Class I) at the northwest corner of Mission Hills. The noise level would increase by a maximum of 16 dB to 68 L_d for approximately three weeks.

The Proposed Pipeline to Site 8 passes by four sensitive receptors: the north edge and the northwest corner of the Mission Hills community, the prison residential complex, and the south edge of Vandenberg Village. The impact of pipeline construction along this alignment would be significant (Class II) in terms of both level changes and criteria at two sensitive receptors: the northwest corner of Mission Hills (an increase of 16 dB to 68 L_d) and the prison residential complex (an increase of 26 dB to 76 L_d). These temporary impacts would last for approximately three weeks at varying levels. Significant noise level changes of 9 dB to 55 L_d also would be experienced at the south edge of Vandenberg Village for approximately three weeks (Class I).

Installation of the alternative transmission line would have no adverse impact on the receptors identified for the Proposed Pipeline route. The noise levels produced would be approximately 10 dB less than the pipeline construction levels.

Impacts from construction of the alternate dehydration facility would be insignificant at the sensitive receptor sites of Mission Hills (north edge) and Vandenberg Village (northeast corner). Daytime noise levels would remain 59 dBA and 50 dBA, respectively.

Table 5.9-2

PROJECT SOUND LEVELS, dBA, DURING
CONSTRUCTION AND OPERATION OF ALTERNATE PIPELINE & FACILITY

Location and/or Measurement Site	Existing Level, dBA	Project, Const/Oper F = Facility P = Pipeline	Combined Level, dBA	Level Change, dB	Impact with Respect to: Level Changes	Criteria	Class of Impact	Duration and/or Comments
Mission Hills, North Edge, Site 2	58 Ld	Const, F, 48 Ld	59 Ld	0	Insignificant	Insignificant	----	Undetectable
	58 Ld	Const, P, 52 Ld	59 Ld	+1	Insignificant	Insignificant	----	Barely Detectable
	61 CNEL	Oper, F, 43 CNEL	61 CNEL	0	Insignificant	Insignificant	----	Undetectable
Mission Hills, Northwest Corner	52 Ld*	Const, P, 68 Ld Maximum	68 Ld Max	+16 Max	Significant	Significant, Temporary	II	3 Week Duration, at Varying Levels
Vandenberg Village, Northeast Corner	50 Ld*	Const, F, 39 Ld	50 Ld	0	Insignificant	Insignificant	-----	Undetectable
	52 CNEL*	Oper, F, 33 CNEL	52 CNEL	0	Insignificant	Insignificant	-----	Undetectable
Prison Residential Complex	50 Ld*	Const, P, 76 Ld Maximum	76 Ld Max	+26 Max	Significant	Significant, Temporary	II	3 Week Duration, at Varying Levels
Vandenberg Village, Cabrillo School, Site 6	46 L_{EQ}	No Pipeline Construction			None	None	-----	Pipeline Relocated
Vandenberg Village, South Edge	46 LD*	Const, P, 55 Ld	55 Ld	+9	Significant	Insignificant	II	3 week duration, Below Any Criteria

*Estimated

Operation

The No Project alternative would have no adverse onshore noise and vibration impacts. However, the Orcutt Pump Station vibration experienced by a Clark Street resident would not be eliminated under this alternative.

No noise impacts would be produced by the operation of the alternate pipelines or the alternate dehydration facility. The pipelines have no continuous valves producing noise. Moreover, the existing, low sound levels at Mission Hills and Vandenberg Village would not change due to facility operation.

Mitigating Alignments to Pipeline Routes

The mitigating alignments to the pipeline routes are presented in supporting information section to this EIS/EIR. The Southern Mitigated route runs close to the Federal Correctional Institution residential complex and could have adverse noise impacts during pipeline construction, similar to those described for the proposed project (Class I).

SUMMARY OF IMPACTS

All of the significant impacts from the projects and alternatives would result from construction and all are local in scope. No impacts result from pipeline or facility operation. Support operations (boat and helicopter) produce short-term, intermittent, local, Class III impacts.

Construction of the Proposed Pipeline will result in local, short-term, Class I impacts. Construction at the Orcutt Pump Station will produce the same level of impacts for nearby residents. Construction of the dehydration facility at Site 4 could result in short-term, insignificant (Class III) impacts.

The Alternative Pipeline to Site 4 would result in temporary Class I construction impacts at one sensitive receptor site. The Proposed Pipeline to Site 8, however, results in short-term, Class I and Class III construction-related impacts at four sensitive receptors. No significant impacts would result from alternative facility construction.

Operation of the Area Study consolidated processing facilities would result in long-term Class III impacts. Construction of the Area Study pipelines could result in Class I to III impacts, depending on the location of sensitive receptors while boat and helicopters noise would be a Class III impact.

5.9.1.2 Mitigation

Construction activities are expected to occur during daytime hours. During all phases of the proposed development and construction, OSHA noise exposure standards will be observed to protect the health of onsite personnel.

It is not economically feasible nor practically possible to reduce the inherent noise levels associated with pipeline installation. It may be possible, however, to schedule or reroute the supply trucks to a particular site so as to minimize the number of trips passing by a particular sensitive receptor. Although there might be a significant impact on cost and schedule to the pipeline contractor, there may be merit to assuring that deliveries of materials occur during commuting hours when transportation caused noise levels are the highest as opposed to during the quieter times of the workday. This mitigation may conflict with proposed mitigations for Class III traffic impacts (Section 5.10.6).

Support and crew boats could be required to travel in designated lanes as far from shore as practical to reduce noise exposure at sensitive receptors (see Figure 5.10-1). Speed also could be limited during the entering and departing segments of travel to reduce the engine exhaust noise levels. Time of day restrictions could also be established.

With respect to helicopter overflight noise, operators should adhere to the preferred Visual Flight Rules (VFR) corridors established by the Santa Barbara airport to avoid or minimize noise impacts to residential and other sensitive areas. A detailed helicopter noise study also could be conducted to identify possible adjustments to the current VFR routes. A monitoring program involving the airport and helicopter operations could be established and reviewed with concerned citizens [Pybus, 1985; Razz, 1985, Wesler, 1985].

5.9.2 Visual Resources

5.9.2.0 Introduction

DEFINITION OF VISUAL IMPACTS

The potential visual impact of a proposed project is the degree to which visual quality may be altered. The one attribute of visual quality which may be affected is visual condition; the other, visual resource variety, is considered generally to be stable in the face of all but catastrophic landscape changes of great magnitude. Definitions and criteria for evaluating visual resource conditions are presented in Section 2.4.2 of Technical Appendix H.

Direct visual impacts are those caused by the appearance of project-related features and associated activities during construction and operation. Indirect visual impacts may be of two kinds: 1) later occurrences triggered by construction which affect visual quality, such as landslides, eroded slopes, or, by precedent, future projects; and 2) increased exposure of the landscape to viewing through induced (new or increased) public access.

Visual impacts are considered negligible if: 1) they do not change the visual condition class rating for an area, or 2) they change the visual condition class rating only because of construction activities, the visual effects of which cease when those activities are completed.

Impacts are short term when effectively mitigated within five years of construction. Effective mitigation is deemed to have occurred when adverse effects upon visual quality are reversed to negligible levels. Long-term impacts are those requiring greater than five years for effective mitigation.

Impacts attributable to construction are of two types: 1) the presence and movement of the work force and equipment during installation; and 2) the alteration of landforms and vegetation during the construction activities from clearing, grading, trenching and backfilling. Operational impacts are those related to the appearance of visible facilities once installed, and the associated alteration of landforms and vegetation which continues to have a visual impact during the operational phases. These impacts may be short-term, lasting two to five years in some cases, and longer in others.

SIGNIFICANCE OF VISUAL IMPACTS

According to CEQA (State of California, 1983, Article 20; Definitions, Section 15382), an effect on the environment is considered to be significant if it is a substantial, or potentially substantial, adverse change in any of the physical conditions within the area being studied, "including . . . objects of aesthetic significance."

A change in physical conditions is considered to cause a substantial visual impact when, to the casual viewer, the quality of the landscape has changed perceptibly and adversely. Such a change occurs when the visual condition for the viewed area has been lowered by one or more class ratings (e.g., a Visual Condition Class II area affected so that its condition would be reduced to Class III or lower; see Technical Appendix H, Section 2.4.2.1.)

To facilitate later comparisons and evaluate partially successful mitigative actions, significant impacts are further defined in terms of their relative degree of significance (high, moderate, or low). The degree of significance is a function of the intensity of visual impacts and the degree to which effects are likely to be highly controversial. Criteria for assessing the degree of significance are displayed in a matrix (Table 3-1) in Technical Appendix H and include four factors: impact intensity, sensitivity level, visual resource variety and the relative scarcity of highly scenic landscapes.

The intensity of visual impacts is defined as the degree to which visual conditions change. Impact intensity may occur at three "levels": a Level 1 impact is one where visual conditions change by one class rating; a Level 2 impact occurs where conditions change by two class ratings; a Level 3 impact would be a change of three or more class ratings.

The potential for controversy is partly a function of the level of visual sensitivity (i.e., the number of viewers concerned over adverse changes in scenery). The potential for controversy is heightened by the degree to which the landscape to be affected is inherently appealing, i.e., the degree to which features intrinsic to the landscape are diverse and interesting, and by the scarcity or uniqueness of highly appealing landscapes.

To meet the requirements of the County of Santa Barbara, visual impacts shall be summarized as being within the four impact classes stated in Section 5.0. This requires prior evaluation of the effectiveness of suggested mitigation measures, as well as determination of significance. Therefore, these class designations are applied in Section 5.9.2.4 (Mitigation Measures) and Section 6.9.2 (Mitigation Measures Applicable to Cumulative Impacts).

METHODOLOGY

Changes in visual quality have been assessed by estimating the visual condition of an area that would occur because of project implementation and comparing it to the condition expected in the future without the project. As noted, the visual variety of the area, coupled with the change in condition, is an indication of the potential impact on overall quality. For consistent comparisons of baseline and estimated future visual conditions, the impact assessment has been made relative to the travel routes and use areas from which baseline visual quality was evaluated.

When available information was sufficient and impacts could potentially be moderately to highly significant, the element was evaluated by graphically "simulating" its appearance as seen from key viewing positions. A perspective view of the feature was painted directly on an enlarged photograph of the potentially affected site, as accurately as possible, showing the effect of the form, mass, texture, etc. of the feature relative to its setting.

Where aspects of project design and siting and/or conditions of viewing were uncertain, the "worst-case" within a reasonable range of variability was assumed.

SUMMARY OF IMPACTS

Most of the visual impacts attributable to the proposed projects would be adverse, significant, and short-term. The impacts, however, frequently would be seen from sensitive travel routes and public use areas, as discussed in Section 5.9.2.1. From landfall to Oak Canyon, long-term significant impacts would occur from scarring caused by erosion and wastage following pipeline construction (Class I). Elsewhere, the operators proposed mitigation measures would reduce impacts along the pipeline route to a level of insignificance in two to five years (Class II). The valve station, however, would have long term significant impacts on views, requiring mitigation. From Oak Canyon to the proposed Lompoc Dehydration Facility at Site 4, the impacts would be adverse but insignificant (Class III).

The proposed transmission line route would not have long-term adverse impacts on views, because the new transmission line poles would replace existing poles. The Lompoc Dehydration Facility at Site 4 would have a significant impact on views for two to five years, until the proponent's mitigation measures take effect. From landfall to Highway 1, the Alternative Pipeline route to Site 4 would produce an adverse visual impact where it crosses Lompoc-Casmalia and Burton Mesa Roads. These short-term, Class I impacts would be highly significant for two to five years, until the berms and planting proposed by the Applicant mature. From Highway 1 to Site 4, an oak woodland would be adversely affected. Locating the Lompoc Dehydration Facility at the Alternative Site (8) would have no adverse visual impacts.

The impacts associated with the Alternative Pipeline route to Site 8 would be identical to those associated with the proposed route from landfall to Santa Lucia Road. From Santa Lucia Road to Highway 1, the adverse impact on views at the Lompoc-Casmalia and Burton Mesa Road crossings would be the same. After crossing Highway 1 and continuing to Site 8, no further visual impacts would occur.

The alternate transmission line would have highly significant, long-term adverse impacts on views from several sensitive receptors.

In summary, the pipeline route to the alternative Lompoc Dehydration Facility at Site 8 would minimize the significant adverse visual impacts. Furthermore, the alternative route to the proposed Lompoc Site 4 is preferable, from the visual standpoint, to the Proposed Pipeline route. The proposed transmission line route and substation site are, however, preferable to the alternative sites for these facilities under consideration.

5.9.2.1 Visual Impacts of the Proposed Projects

The visual impacts resulting from the proposed projects are summarized in Table 5.9-3.

CONSTRUCTION

All visual impacts resulting from activities during construction/ installation are discussed below; the appearance of facilities is discussed under operations. Within this context, construction of the projects, both onshore and offshore would have a transitory, and therefore negligible (Class III), effect. All direct and indirect visual impacts resulting from the pipelines are discussed under construction since neither the pipelines, nor any aspect of their operations, would be visible.

Pipeline: Landfall to Oak Canyon

For the segment of pipeline route from landfall to Oak Canyon, the sensitive receptors exposed to the effects of installing pipelines and related utilities would be Civilian Beach, 35th Street, Terra Road, the Southern Pacific Railroad, Highway 246, and Ocean Beach County Park.

The presence of the work force and heavy equipment, though attracting attention to the point of dominating certain views, would present short-lived visual impacts and would, therefore, be negligible (Class III). Grading, clearing, trenching, and backfilling activities have the potential for long-term, adverse effects (Class I) from Lompoc-Casmalia Road and State Highway 1, but generally the impacts could be reversed to negligible levels over a comparatively short time (two to five years).

Table 5.9-3
SUMMARY OF VISUAL IMPACTS: PROPOSED PROJECTS

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

Source	Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
Proposed Projects Union	Onshore Pipelines: direct impact due to clearing, grading, trenching backfilling during pipeline installation would create an uncharacteristic linear clearing.	Short-term, locally significant impact on Terra Road. Short-term regionally significant impact on views from SPRR.	None for right-of-way across gently sloping lands.	Low significance for 2-5 years; insignificant thereafter once operator's restoration measures take effect.
	Indirect effect due to erosion and mass wastage along steep slopes.	Long-term locally significant impacts where route crosses steep slopes 1/2 mile east of electrical substation.	For steep, erodible slopes, install jute mesh to stabilize soil.	Effect of erosion would be kept to negligible levels.
Union	Electrical Substation: direct impact of utilities and screening vegetation intruding into the skyline, blocking ocean views.	Long-term, locally significant impact on views from Highway 246, near Surf.	None. Soil conditions and microclimate would not permit plantings to grow enough to fully screen facility.	Low significance.
Union	Lompoc Dehydration Facility: direct impact due to industrial appearance in rural setting.	Short-term, locally significant impact on views from Highway 1 adjacent to site entrance.	Paint facilities gray-brown or gray-green to blend with surroundings; use non-reflective paint.	Moderately significant for 2-5 years; insignificant thereafter once proposed landscaping is established.
Union/Exxon	Offshore Platforms: direct impact on ocean views due to two platforms southwest of Ocean Beach area.	Long-term, locally significant impact on views views from the shore between Surf and Civilian Beach. Long-term, regionally significant impacts on views from SPRR.	Paint platforms light blue-gray.	Highly significant.
Union/Exxon	Oil spills: direct impact on scenic quality of beach areas.	Short-term locally significant impact on sandy beach areas; potential for longer term, locally significant impacts on rocky headlands such as Point Sal and Civilian Beach.	Measures recommended to prevent or contain oil spills, as described in Section 11.	Highly significant until vestigages of oil removed; insignificant thereafter.

Table 5.9-3
SUMMARY OF VISUAL IMPACTS: PROPOSED PROJECTS
(continued)

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

Source	Description of Impacts	Scope	Mitigation Measures	Residual Impact
Proposed Projects Union	One-acre fenced gravel pad for valve station: direct impact due to size, color, location, and rectilinear shape of pad.	Long-term, locally significant impacts on views from 35th Street, Terra Road, and Ocean Beach County Park. Long-term regionally significant impacts on views from SPRR.	Reduce size of fenced, gravel pad and use dark gravel.	Insignificant.
Union	Onshore pipelines: indirect effect due to erosion and mass wastage along steep slopes.	Long-term, locally significant impacts where route crosses steep slopes 1/2 mile east of valve station.	Northern Mitigated Pipeline Routes #1 or #2 avoids impacts.	Direct impact due to appearance of pipeline aerially spanning drainage. Potentially insignificant long-term local impacts on views, from Terra Road where route crosses drainage east of valve station A.

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADEVERSE BUT NOT SIGNIFICANT

Source	Description of Impacts	Scope	Mitigation Measures	Residual Impact
Proposed Projects Union/Exxon	Construction activities: with on- and offshore pipeline and platform installation, construction of valve station Orcutt Pump Station, and Lompoc Dehydration Facility; presence and movement of heavy equipment, workforce, marine traffic and helicopter transport.	Short-term, local negligible impact on views from 35th Street, Terra Road, Ocean Beach County Park, beach areas, SPRR, Highway 246, Lompoc-Casmalia Road, Highway 1. Short-term, regional, negligible impact on views from SPRR.	N/A	N/A
Union	Onshore pipelines: direct impact due to clearing, grading, trenching, backfilling during pipeline installation would create partially visible, linear clearing at road crossings.	Short-term, local, negligible impact on views from Lompoc-Casmalia Road Road and Highway 1.	Optional: berms and plantings adjacent to road crossings, if not intended by operator as a proposed mitigation; bury pipeline in existing firebreak.	N/A
Union/Exxon	Support Base activities: direct impact of crew transport via helicopter from Lompoc Airport over Ocean Beach County Park.	Long-term, local, sporadic and negligible impact on views from Park and adjacent beaches.	N/A	N/A

Table 5.9-3
SUMMARY OF VISUAL IMPACTS: PROPOSED PROJECTS
(continued

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADEVERSE BUT NOT SIGNIFICANT

Source	Description of Impacts	Scope
Union	Electrical Substation: direct impact of utilities intruding into the skyline within Coastal Zone.	Long-term, local negligible impact on views from shore between Surf and Ocean Beach County Park. Regional negligible impact on SPRR views.
Union	Lompoc Dehydration Facility: direct impact due to industrial appearance in rural setting.	Long-term, local negligible impact on views from south-bound lane of Highway 1 adjacent to site entrance.
Union/Exxon	Offshore Platforms: direct impact on ocean views due to two platforms southwest of Ocean Beach area.	Long-term, local negligible impact on views from 35th Street, Terra Road, and Highway 246.
Union/Exxon	Abandonment: direct impact of activities involved in dismantling platforms, valve station, electrical substation, dehydration facility and Orcutt pump station.	Short-term, local negligible impact on views from 35th Street, Terra Road, Ocean Beach County Park, beach areas, Highway 246 Highway 1. Regional, negligible impact on SPRR views.

CLASS IV: BENEFICIAL IMPACTS

Source	Description of Impacts	Scope
Proposed Projects		
Union	Orcutt Pump Station: views from Clark Avenue in the vicinity of the pump station would be improved by the screening of existing and proposed facilities.	Long-term, local beneficial impacts in 10-15 years.

Visual impacts would be least severe where the route crosses comparatively flat terrain vegetated with grassland and coastal sage scrub, which is more or less the case from landfall to Oak Canyon. Proposed site restoration measures would be reasonably effective in such areas, the potential for erosion and sedimentation, with few exceptions, being minimal and the opportunity for quick revegetation good. Grassland and shrub species would become re-established within fewer than five years in most cases. However, coyote brush, which invades more rapidly than other species would cause the right-of-way to be a lighter green, leaving a subtle linear trace across the landscape (see Technical Appendix F, Terrestrial and Freshwater Biology).

On steep slopes, redistributed topsoil and shredded vegetation would serve to reduce, for at least a short period, the high soil-vegetation contrast resulting from cleaning, grading, ditching, and backfill. Without other measures, gullying and mass wasting on very steep slopes might ensue (see Technical Appendix F). Should such erosion and wastage occur for slopes in view, the exposed sandy soil would present a highly contrasting, linear scar. This scarring would be considered a long-term impact, indirectly caused by construction (Class I).

Pipeline: Oak Canyon to Dehydration Facility

The sensitive receptors exposed to views of the pipeline right-of-way from Oak Canyon to the dehydration facilities are Lompoc-Casmalia Road, and State Highway 1. During installation, specific views would be affected only for a few days by the presence and movement of heavy equipment. Such effects would therefore be negligible (Class III).

The more important activities would be the grading, clearing, trenching, and backfilling operations described earlier. Because of current visual conditions in the potentially affected areas, the distances and angles from which the right-of-way would be seen, the direction and speed of travel, and/or other factors, the visual impacts on views from Lompoc-Casmalia Road and State Highway 1 due to installing the pipeline would be negligible (Class III).

Pipeline: Lompoc Dehydration Facility to the Orcutt Pump Station

The only sensitive receptor exposed to views of the Pipeline Route is Highway 1. The segment of pipeline route most in view is that within San Antonio/Los Alamos Valley between the first two points where the pipeline would cross the highway. Visual impacts here would be negligible (Class III) because the right-of-way would cross cultivated fields, and any disturbance would not be noticeable after the first tilling subsequent to installation.

Where the route crosses the Purisima Hills to the San Antonio/Los Alamos Valley and on past the Highway 1/135 junction, the effects of installing the pipeline on the existing agricultural features would generally not be noticed by those traveling Highway 1. The impacts, though adverse, would be negligible (Class III).

Onshore Facilities

Construction of the valve station, the Lompoc Dehydration Facility and the Orcutt Pump Station would have adverse, but negligible impacts (Class III). Construction of the valve station on Vandenberg AFB could be seen from the beach, Ocean Beach County Park, and Highway 246. Since these activities would be transitory, however, the impacts would be negligible.

Construction of the Lompoc Dehydration Facility would be visible from points along State Highway 1, which runs to the west of the proposed site and to within 90 feet of the southwest corner of its boundary. Construction at the Orcutt Pump Station would be viewed from Clark Avenue, but the impacts would be negligible because of their temporary duration and the low visual quality of the site. The actual construction activities involved in modifying the Santa Maria Refinery would be concealed from view by the surround terrain.

Platforms, Subsea Pipelines, and Cables

The installation of Platform Irene and Exxon's Platform Shamrock and the installation of subsea pipelines, would have the potential for adverse visual effects (Class III). The elements associated with platform installation that would be most visible include the major marine equipment required (derrick vessel, jacket launch barge, cargo barges, tug boats, supply boats, and crew boats); the jacket as it is being towed, launched, and upended; and the helicopter transportation of supplies and crews.

Installation activities for the platforms and offshore pipelines would occur about 9 to 10 miles from Civilian Beach and the beach opposite Ocean Beach County Park and Surf, and would be about 20 miles from Point Sal State Beach. Distance and topography preclude views of the platforms from any other designated public use area. With respect to travel routes, the installation activities would be seen by Amtrak passengers from Purisima Point to Point Arguello, and by those traveling on 35th Street and a short stretch of Highway 246 opposite Surf, all highly sensitive travel routes and use areas.

The greatest potential impact on visual quality would occur on views from Ocean Beach which is highly sensitive and from the Southern Pacific Railroad, southbound at Point Arguello. The impact of installation, by itself, however, would be negligible (Class III). The passage of vessels at sea is a common sight. The movement of barges and tugs, though concentrated at the platform sites, would probably go unnoticed, at least until the platforms and deck structures are in place. Moreover, installation would be complete in a few months and the effects attributable to this action would cease once the platforms are in place.

OPERATIONS

Pipelines

The visual impacts of the onshore pipelines primarily would be associated with installation activities, as discussed previously. Although a 50-foot right-of-way would be retained, maintenance crews would access the route on foot once every three months, with vehicular access limited to emergency repairs. It is unlikely that such infrequent access would disturb the vegetation within the right-of-way. Moreover, the shrubs should be low enough not to require periodic suppression in order to permit occasional four-wheel-drive access.

Substation

The effects of the fenced enclosure, the breakers, meter, transformer, and protective devices would be visible from the beach opposite Surf, Ocean Beach County Park, and Highway 246 until landscaping matures. The visual impact on views from the beach would be adverse, but not significant (Class III), given the low visual quality of the existing landscape. If the more adaptive plant materials are selected (e.g., Monterey Cypress, myoporum laetum, etc.), moderate screening could occur within ten years, concealing much of the substation from those using the beach, and reducing adverse impacts to negligible levels. Although visible, the substation would not affect the quality of views from Ocean Beach County Park substantially. Eventually, landscape screening would conceal the substation to the point that there would be no adverse impact but would have low significance given the existing quality of views. Removal of paving combined with the proposed planting would soften the impact of the substation and its surrounding area. Full concealment of the facility is unlikely given the close distance and difficult growing conditions. Therefore, the impact will remain adverse, long-term but of low significance (Class I).

Transmission Lines

The new transmission lines would have no adverse visual impact along Central Avenue, Union Avenue, Highway 246 and at Surf. Along Central Avenue the existing and new transmission lines would be placed on the new poles. Along Union Avenue and at Surf, the new lines would replace existing lines. Where the new lines parallel existing lines on separate poles along the road, the two would be combined on a single pole, whenever possible to avoid a proliferation of poles.

Lompoc Dehydration Facility

The installation of this facility would most affect local scenic quality by changes in topography due to grading and the visibility of the structures. Although the site is gently sloping, construction of the containment basin for the 100,000-barrel oil surge tank would require substantial cut-and-fill, particularly at the basin's northwest corner and along its southern edge. Grading for the remainder of the site would, however, be minimal. Overall, visual impacts are expected to be negligible (Class III).

Immediately after installation, the proposed facility would be visible along approximately 200 feet of Highway 1. Figure 5.9-1 shows the two viewing positions used for the simulations of the proposed dehydration facility. The current view of Site 4 from viewing position #1 appears in Figure 5.9-2; a simulation of the proposed facility at this site appears in Figure 5.9-3. From viewing position #2, the current view of Site 4 is shown in Figure 5.9-4,

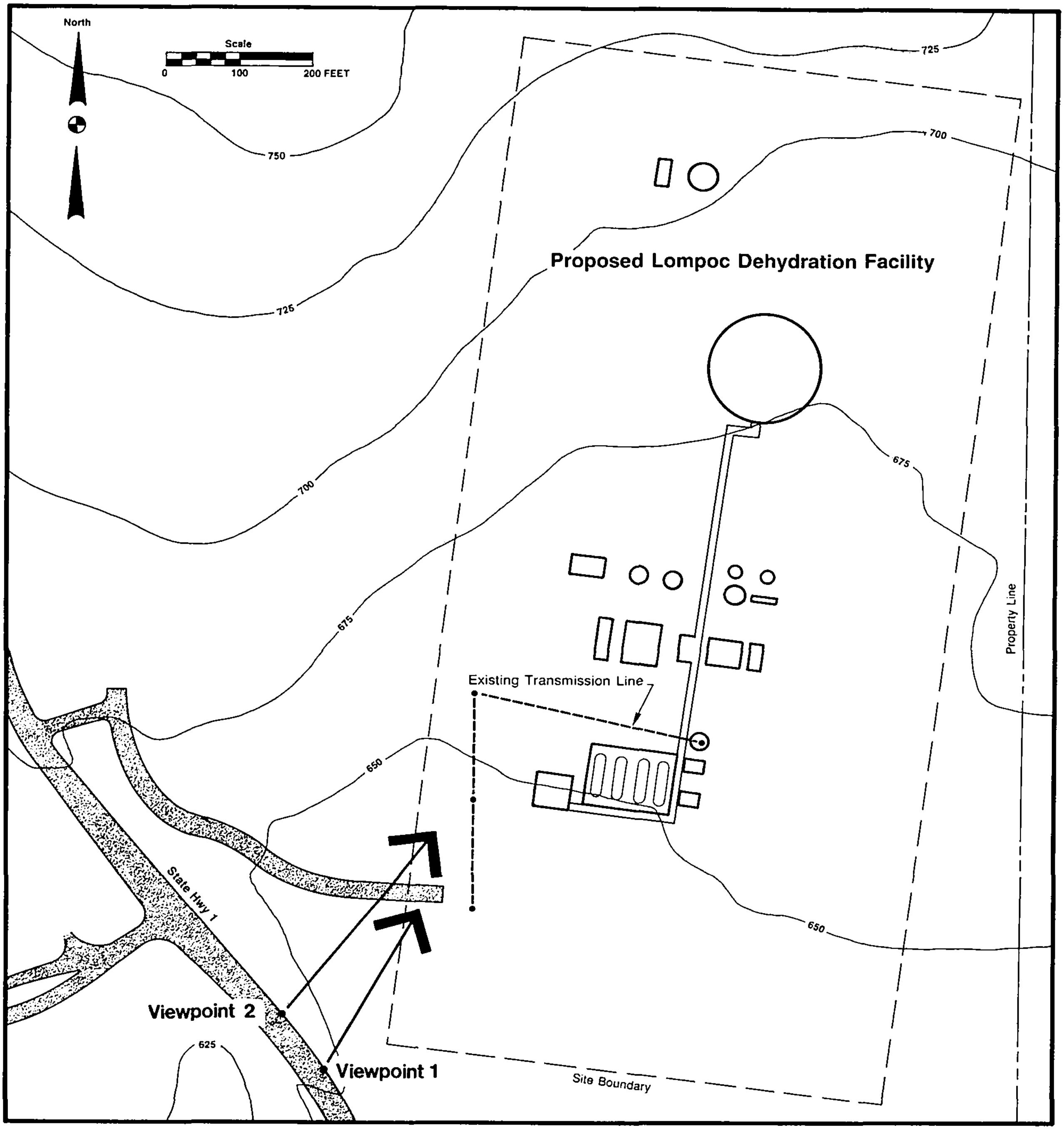

Figure 5.9-1 The two viewing positions used for graphic simulations of the Lompoc Dehydration Facility, sited as proposed.

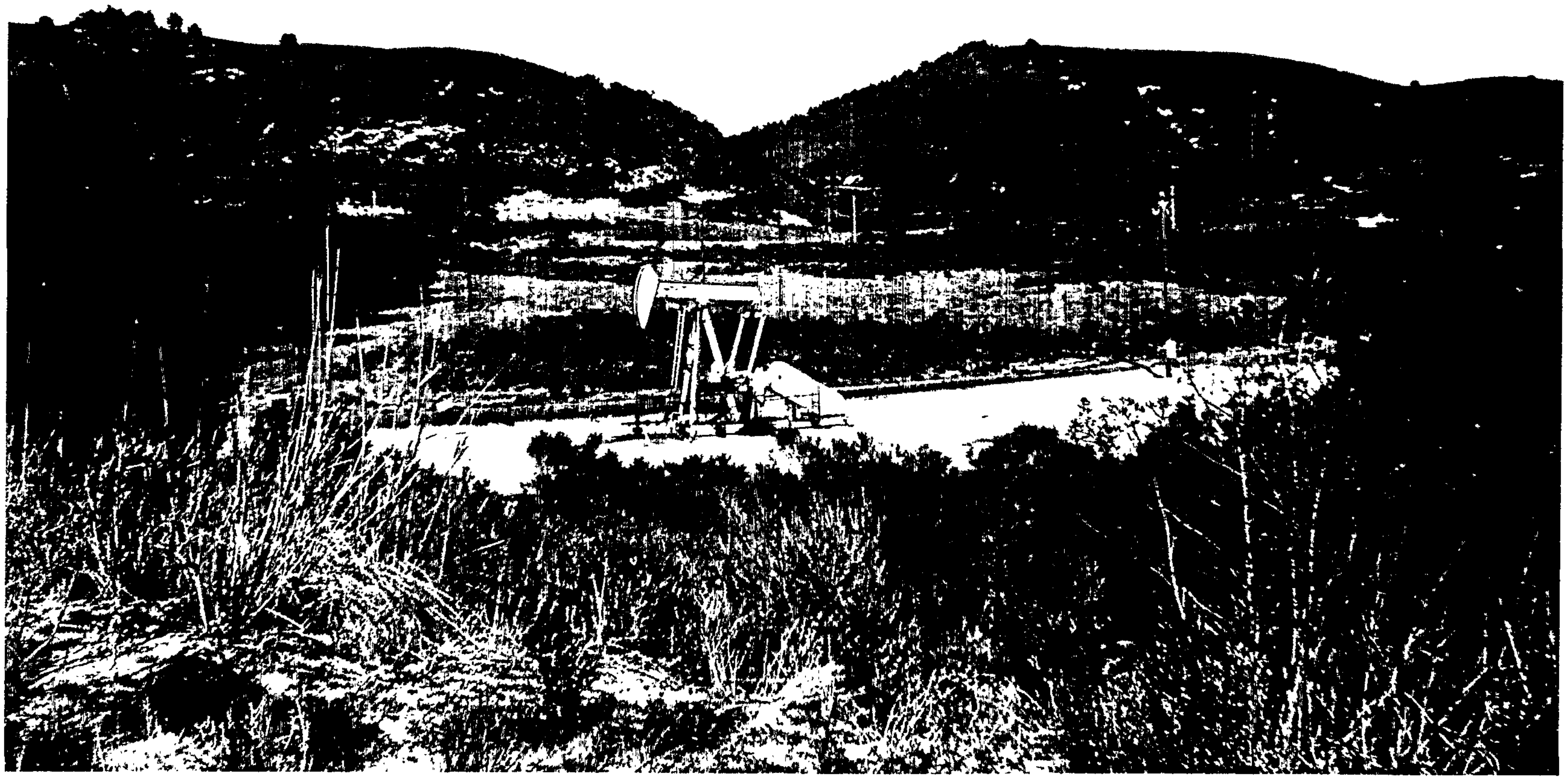

Figure 5.9-2 Current view of proposed site for Lompoc Dehydration Facility, as seen from northbound lane of Highway 1, viewing position #1.

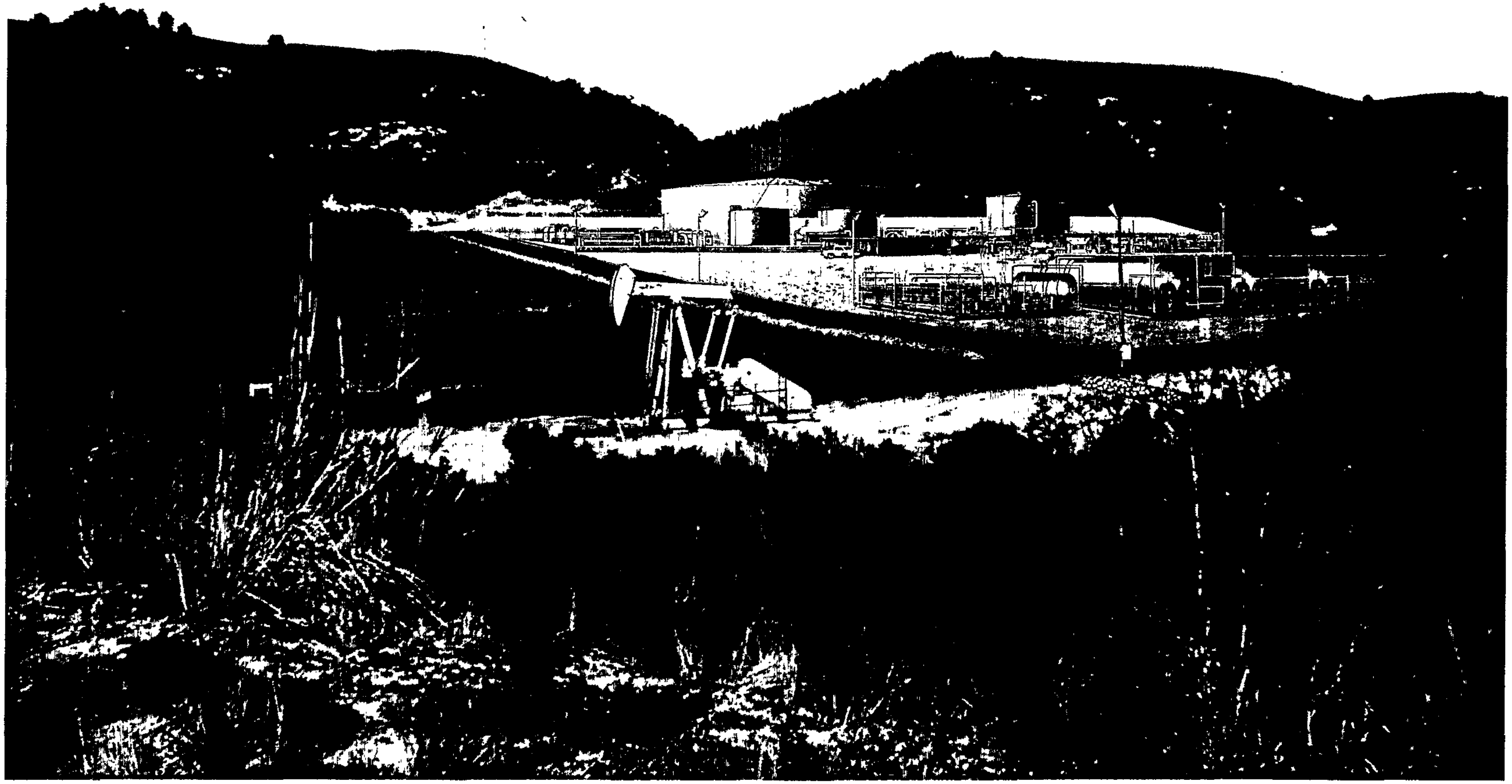

Figure 5.9-3 Simulation showing proposed Lompoc Dehydration Facility immediately after construction, seen from viewing position #1, northbound lane.

Figure 5.9-4 Current view of proposed site for Lompoc Dehydration Facility as seen from northbound lane of Highway 1, viewing position #2.

with a simulation of the facility from this viewing position provided in Figure 5.9-5. Between viewpoints #1 and #2, the facilities would be nearly continuously in view. The simulations represent the critical viewing positions with full attention directed towards the facility and should be held 12.5 inches away to replicate the visual impression of the facility as seen from an automobile traveling north along the highway.

Until screening vegetation takes effect, the visual impact of the dehydration facility would be moderately intense from the northbound lane of Highway 1. Since feature diversity is moderate in this area, while sensitivity is comparatively low, the impacts would be moderately significant. The affected views would be noticeable for only a short time (2.5 to 3 seconds). However, the size and placement of the facility is such that it would, nonetheless, dominate views in its direction and be incongruent with the surroundings (Class I).

For views from the northbound lane just southeast of the site turnoff, the facility would be effectively screened in as few as two to five years. Though moderately significant, the impacts on these views would be short-term, being mitigated to negligible levels in fewer than five years.

From the southbound lane of Highway 1, the facility would be visible for about 100 feet after the turnoff to the site. For views from the southbound lane, complete screening would take a little longer. However, the visual impact, while adverse, would be negligible (Class III) even without additional screening (Class III). The tallest structure would be concealed from the road when the plantings are 12-13 feet tall, possibly within seven to ten years.

Orcutt Pump Station

The net increase of two pumps and the addition of a small slop oil tank would present no noticeable change in the visual quality of views from Clark Avenue and, therefore, no impact. However, the proposed landscaping, while insufficient to totally screen the facility, should soften its appearance somewhat. A slight improvement in visual quality may occur.

Santa Maria Refinery

Within 0.2 mile of the refinery on Highway 1, the existing facility dominates the scene. Of the new facilities only the new tail gas unit would probably be noticeable to the general public due to its height (125 feet). Because of the proliferation of other facilities, the visual impact would not be adverse.

Offshore Platforms, Subsea Pipelines, and Cables

The platforms, once in place, would be visible from the same highly sensitive locations discussed under "Construction": Civilian Beach, the beach opposite Ocean Beach County Park and Surf, Point Sal State Beach, and along travel routes from Purisima Point to Point Arguello (Southern Pacific Railroad), 35th Street, and a short stretch of Highway 246 opposite Surf.

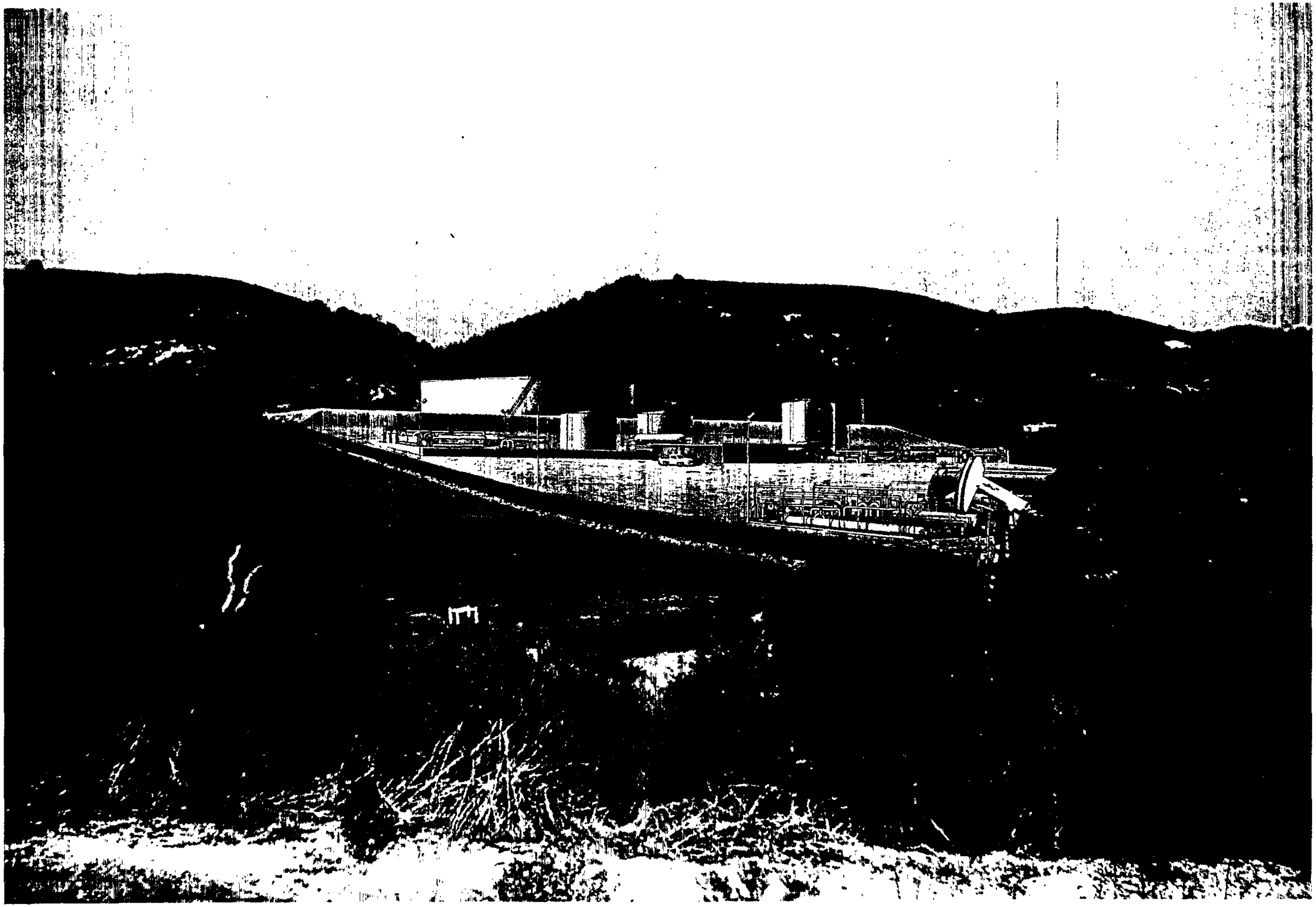

Figure 5.9-5 Simulation showing proposed Lompoc Dehydration Facility site immediately after construction, seen from viewing position #2, northbound lane.

The Ocean Beach area is highly sensitive and there is potential for a moderately substantial visual impact (Class I). Therefore, a graphic simulation was prepared showing the platforms as they would be viewed from the dune area just north of the mouth of the Santa Ynez River. Figure 5.9-6 is the "before" view and Figure 5.9-7 is the "after" view showing the platforms once installed. In studying the simulation, the image should be held about 12.5 inches away to replicate the visual impression of the platforms as seen while standing on the beach.

With respect to the operation of the platforms, the aspect of greatest importance to visual impacts would be the appearance of the platforms themselves. Vessel and helicopter traffic for supply and crew transport would also be noticeable, as would occasional flaring and navigational lights. Under optimum visibility, the two platforms and support activity in their vicinity would attract some attention, given that there would be no competing features seen on the ocean plane. Views in their direction are presently of high quality; the distracting structures and transmission lines at Surf, and Vandenberg AFB to the south are not within the normal field of vision. However, most attention is directed north to the interesting cliffs, headlands, and wave action. To the west and southwest, the constant turbulent motion of the waves draws the eye to the foreground.

Because attention would be drawn away from the platforms, although visually disruptive, they would be subordinate elements in the scene. The impacts would, nonetheless, be highly significant since scenic resources of the high quality found in this vicinity are rare in the study region and nearly any reduction in visual quality is highly important. The impact would be long-term lasting beyond the year 2000.

Though visible from 35th Street, the platforms would have a negligible impact (Class III) on scenic quality because of their distance combined with the visual dominance of the estuary, railroad grade, and Lompoc Hills. From Highway 246 to Surf, the impact of the platforms on views would be negligible as well, given the orientation of views and distracting foreground features (Class III).

The effect of the platforms on views from the rail line is more intense than that experienced from the beach. Southbound passengers on the seaward side of the Southern Pacific Railroad train would be continually exposed to views of the platforms for more than 13 miles of travel. The platforms would dominate ocean views, causing an impact of high intensity and significance (Class I).

While the platforms would generally not be noticeable from Point Sal State Beach because of their distance, helicopter traffic over recreation areas has the potential for causing some adverse visual effects. Crew transport to Platform Irene would be via helicopter from the Santa Maria Airport or from the Lompoc Airport, if a corridor across Vandenberg AFB is approved. If Santa Maria Airport is used, overflights will not have adverse visual impacts on sensitive public use areas and key travel routes. If Lompoc Airport is used for helicopter crew transport to Platform Irene, up to seven trips per day would occur directly over Ocean Beach County Park, a recreation

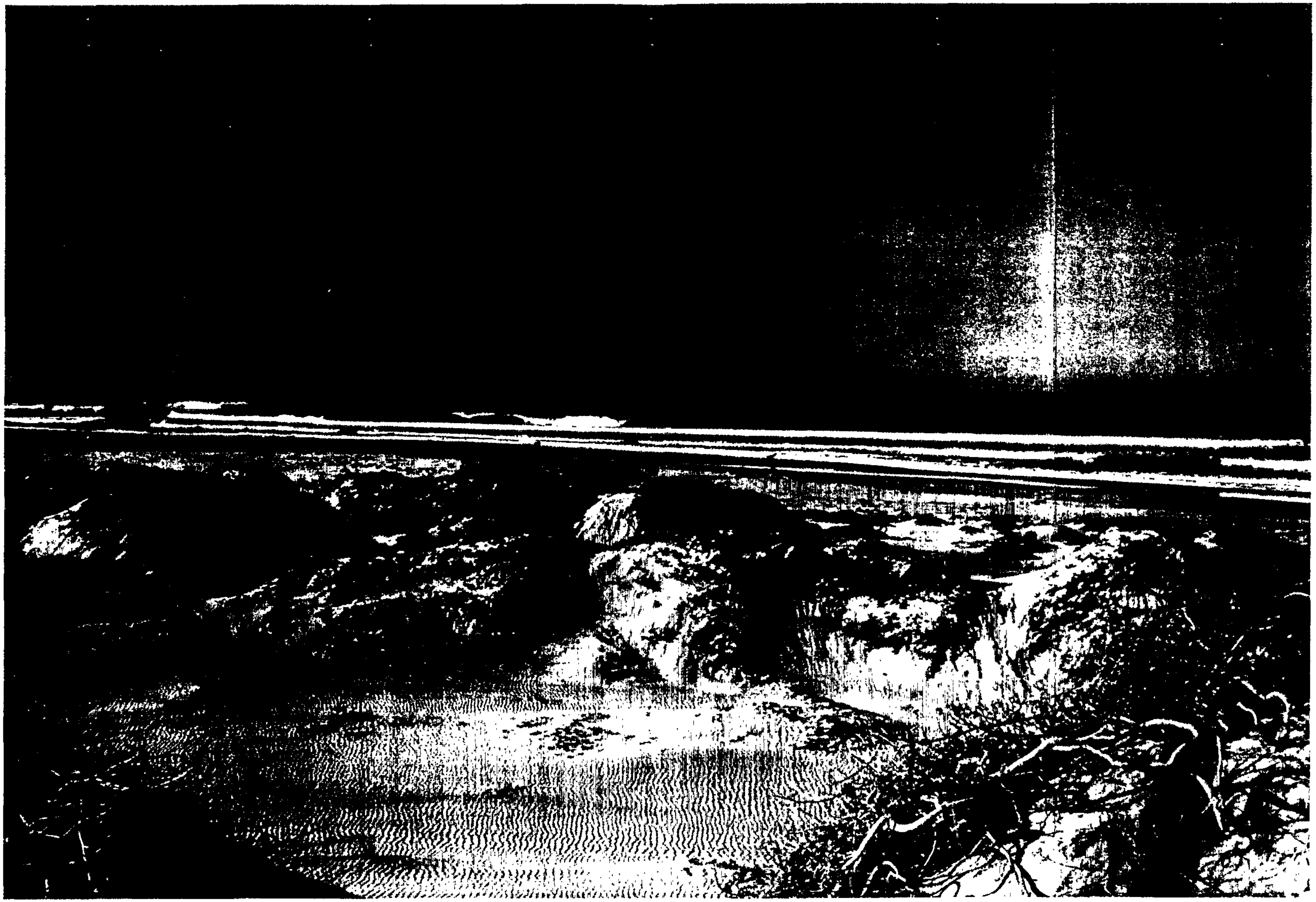

Figure 5.9-6 Representative view from Ocean Beach north of the Santa Ynez River, looking to the southwest.

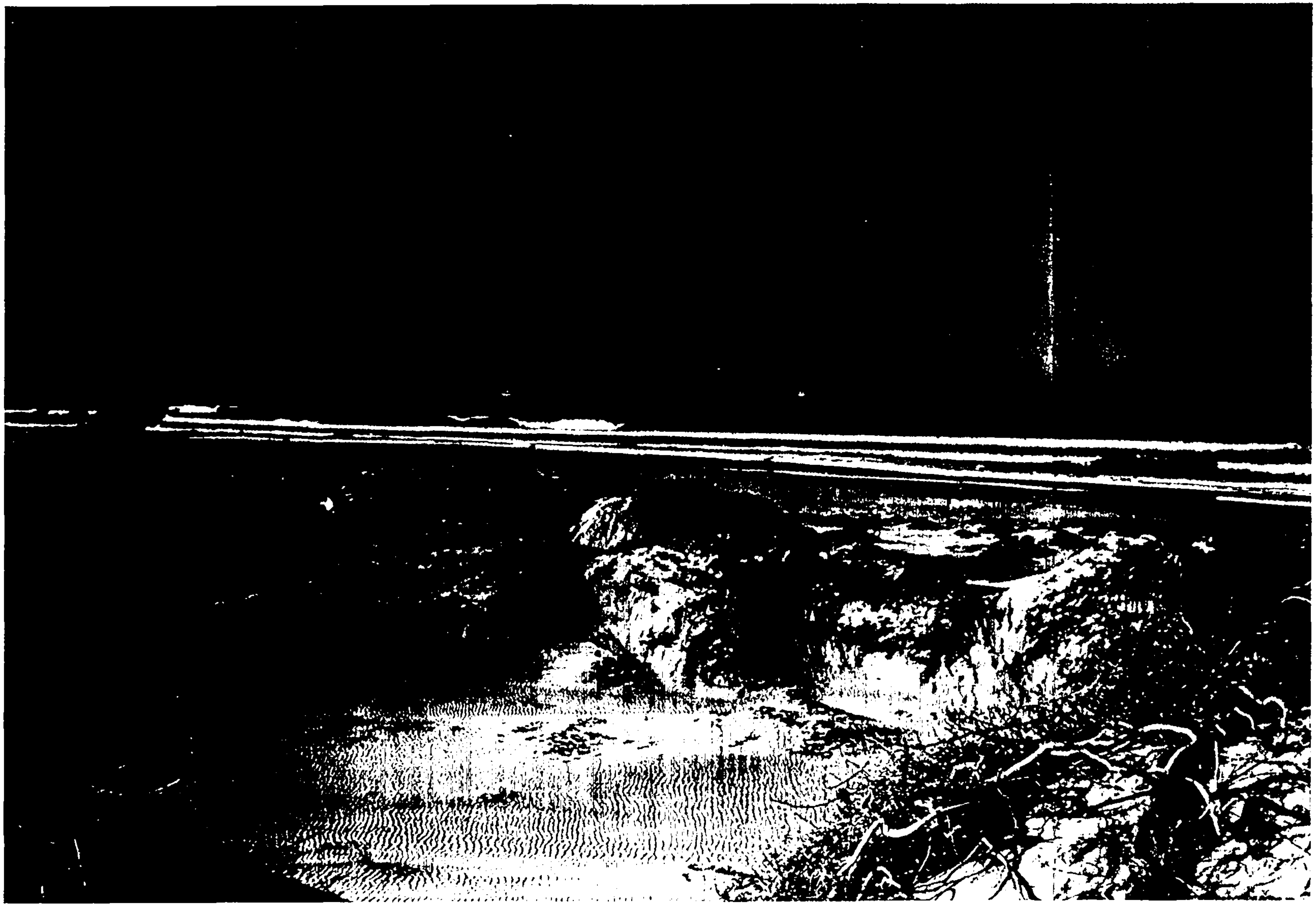

Figure 5.9-7 Simulation showing Platforms Irene and Shamrock, as seen from Ocean Beach (same viewing position as for Figure 5.9-6).

area known for its comparatively remote nature. However, the frequency and duration of exposure experienced by recreationists would be limited, and occasional air traffic is common given proximity to Vandenberg AFB. Although some adverse visual effect would occur because of helicopter traffic, the impact would not be sufficient to lower visual quality noticeably (Class III).

CONSISTENCY WITH LAWS AND REGULATIONS

Policy 4-3 of the Santa Barbara County Coastal Plan and Section 35-212, Division 3 of Article 3 of the County Zoning Ordinance require, in rural areas, that the structures be subordinate to the natural landforms and sited so as not to intrude into the skyline as seen from public places. Division 10, Sections 35-317.7 of Article III of the County's zoning ordinance requires that, in rural areas, the use be compatible with, and subordinate to, the scenic and rural character of the area. The proposed substation at Surf and the dehydration facility, if constructed at the preferred site, may be ruled inconsistent with these policies and ordinances. The substation may dominate sensitive views indefinitely and intrude into the skyline, while the dehydration facility would dominate limited views until landscaping matures in two to five years. After this time the dehydration facility may be ruled consistent.

The proposed plans call for above-ground transmission lines leading from the substation inland, which would adversely affect ocean views near the station site. It would be feasible to bury these lines, at least in the vicinity of Surf (see Mitigation Measures, Section 3.7); relative to visual impacts it would be less damaging to do so.

Section 35-157-h Division 9, of the County's Coastal Zoning Ordinance requires that a pipeline be sited so as to avoid important coastal resources. From landfall through the coastal zone, installing the pipeline as proposed would cause significant, short-term visual impacts. As noted in Section 5.9.2.2, the alternate route to the proposed dehydration facility site would have no visual impact in the Coastal Zone.

ABANDONMENT OF FACILITIES

Assuming that the onshore pipelines and facilities remain in place, abandonment would have no visual impact. The activities involved in dismantling onshore and offshore facilities would have similar impacts to construction, adverse but insignificant (Class III). The effects of removal on appearance however would range from no impact to a beneficial impact on views (Class IV).

Removal of the dehydration facility would not affect visual quality since the landscaping, if fully intact, would screen the site. Removal of the substation would result in a net improvement in visual quality (Class IV).

Removal of the transmission lines along Highway 246 would have no visual effect, since the new poles would continue to hold other transmission lines.

Removal of facilities at Orcutt would not change the visual impacts. Removal of facilities at the Santa Maria Refinery might produce a slight, but unnoticeable improvement in visual quality.

Offshore, the activities associated with removal of the platforms would have a transitory, negligible impact that would cease with completion of these activities. Once the platforms are removed, however, visual quality would improve; the degree of improvement would depend on the number and location of other platforms still in service at the time.

ACCIDENTS AND UPSETS

The visual impacts of accidents and upsets depend largely on their relative magnitude. An oil spill attributable to an onshore pipeline break probably would have a localized and minimal impact. Spills at the dehydration facilities would not be seen because of the presence of containment basins.

Offshore spills or leaks from platforms or subsea pipelines could wash up in public use areas and create, depending on the magnitude, significant visual impacts (Class I). The impact on sandy beaches would probably be short-term with total cleanup efforts completed within five years. The effects would be more obvious and longer term at Point Sal and Civilian Beach due to their rock headlands. Such oil spills, however, are considered unlikely (see Section 11).

A catastrophic accident, such as a major explosion and fire, could have significant visual impacts ranging in severity from Class I to Class III, depending upon the location and duration of the effects.

5.9.2.2 Visual Impacts of Area Study Development

The visual impacts of the onshore and offshore Area Study scenarios are summarized in Table 5.9-4.

ONSHORE AREA STUDY SCENARIO

Consolidated oil and gas processing on the Union fee Property (Site 4) would result in major industrial facilities occurring close to State Highway 1. The hypothetical gas facility, covering 15 acres, would include depropanizers, and debutanizers with towers from 80 to 100 feet high, long, cylindrical LPG and NGL storage tanks and pumps, pipes and compressors. Those facilities lower than 40 feet could be screened from view by landscaping but the visual impacts of taller structures would be long term. Although clearly visible from Benchmark 867, the impact on views from this turnout would be of low significance because of the low sensitivity of the area. The consolidated gas processing facilities also would present travelers with a strongly industrial first impression of Lompoc, which is at variance with its agricultural identity. Close to the site entrance, the impact of the industrial facilities would be moderately significant and long term since landscaping would take 15-20 years to screen the tallest facilities from views along the road. Expansion of the dehydration facility would not be noticeable by passersby.

The visual impacts of a pipeline for a tie-in with an approved transportation facility at Buellton, or to carry dry oil south to a marine terminal at Gaviota, can only be addressed in general terms, given that

Table 5.9-4

VISUAL IMPACTS OF AREA STUDY

CLASS I (Continued): SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

Source	Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
Area Study	Consolidated O&G Processing Facility (Onshore Area Study): direct impact of industrial facility in rural setting.	Long-term, locally significant impact on from Highway 1 (BM 867: indefinitely long; at site entrance: 10-15 years).	None possible for views from turnout at BM 867 due to viewing position. Near entrance: plant Monterey and Torrey pines and tall shrubs near road. Paint facility grey-brown or grey-green; use non-reflective paint.	Low significance: for views from BM 867. Moderately significant: for views near site entrance for 10-15 years, insignificant thereafter.
	Area Study Platforms: direct impact on ocean views due to six platforms.	Long-term, locally significant impact on views from beach area from Surf to Civilian Beach. Long-term regionally significant impact on views from SPRR.	Paint platforms light blue-grey.	Highly significant.

specific pipeline routes were not analyzed in the document. The potential for significant impacts would be greatest if the right-of-way is seen from La Purisima Mission, State Highway 1 between Las Cruces and Lompoc, and U.S. Highway 101 between Buellton and Gaviota. The landscape within view of these receptors is of very high quality, inherently attractive and unaffected by incongruous features; the Mission and highways noted are highly sensitive and the right-of-way could be highly conspicuous (e.g., from elevated hiking and equestrian trails). Lasting erosional scars and the loss of natural oak woodlands could cause intense long-term impacts (Class I) on the Highway 1 viewshed.

A logical pipeline route to Gaviota would roughly parallel U.S. Highway 101 since terrain in the area is rugged and steep with elevation exceeding 200 feet. In places where the terrain is exceedingly steep, an opportunity exists for long-term, intense visual impacts equal to a pipeline within view of Highway 1.

OFFSHORE AREA STUDY SCENARIO

The two proposed platforms and pipelines would be from about 8 to 16 miles from Ocean Beach, Surf and Civilian Beach and from about 8 to 23 miles from Point Sal State Beach. The four additional hypothetical platforms would be within sight of the Southern Pacific Railroad from Purisima Point to Point Arguello, 35th Street, and a short stretch of Highway 246 opposite Surf. The rail line, beaches, and roads noted are highly sensitive travel routes and use areas.

The impact of installation activities would be negligible, given the short time and distance involved (Class II). Visual impacts from operations mostly would be due to the appearance of the platforms. Supporting vessel and helicopter traffic, occasional flaring, and navigational lights also would be noticeable. For views from the Ocean Beach area, four of the six Area Study platforms, including the two proposed platforms, would be clustered to the southwest. As a group, these would draw a moderate amount of attention, representing a moderately intense impact of high significance (Class I).

The six Area Study platforms would be distantly visible from 35th Street and from Highway 246 near Surf. The impact on views from these roads would be negligible (Class III). From the rail line, on the other hand, views would be dominated by the six platforms for passengers on the seaward side of the train. The impact would be of high intensity and significance (Class I).

As viewed from Point Sal State Beach, the two proposed platforms in their specific locations and the four additional Area Study platforms in their hypothetical locations would generally have a negligible impact because of distance and other dominant landscape features (Class III). If these four additional Area Study Platforms were installed within 8 to 12 miles of Point Sal State Beach, the impact would occur relative to a highly sensitive and scenic area that is comparatively rare by virtue of its pristine and remote character. The impact would therefore be highly significant.

CONSISTENCY WITH LAWS AND REGULATIONS

A consolidated oil and gas processing facility at Site 4 of Union's fee Property would dominate views and intrude into the skyline, and may be ruled inconsistent with Section 35-212 (Development Standards) of the Santa Barbara County's Coastal Zoning Ordinance. That section requires, in designated rural areas, that structures be subordinate in appearance to natural landforms and sited so as not to intrude into the skylines or be seen from public viewing places.

Santa Barbara County's Zoning Ordinance (Section 35-296.5 (Division 8) of Article III) would require the installation to be visually compatible with the existing and anticipated surroundings. No measures could achieve such compatibility, due to the scale height and configuration of the required structures and their degree of exposure at Site 4.

Moreover, Section 35-317.7 (Division 10) of Article III of the zoning ordinance requires that a preliminary or final development plan shall be approved only if, among other things, a finding can be made that in designated rural areas the proposed facility is compatible with, and subordinate to, the scenic and rural character of the area. As noted, the consolidated facilities would not satisfy these requirements.

Since specific routes for the dry-oil pipeline are not yet under consideration, their consistency cannot be assessed at this time. Rather, pertinent regulations and policies are noted below that should bear upon the later selection of proposed and alternative routes.

Section 35-390.5 (Division 7) requires that a pipeline corridor be sited so as to avoid significant impacts to resources to the maximum extent feasible. To route the pipeline across lands within view of La Purisima Mission, State Historical Monument, State Highway 1 between Las Cruces and Lompoc, and U.S. Highway 101 between Buellton and Gaviota would incur the greatest risk of inconsistency with this regulation. The least risk of inconsistency would involve routing the pipeline toward Buellton.

State and County Scenic Highway policies are relevant given that the dry-oil pipeline route may be within view of parts of Highway 1 from Las Cruces to Lompoc, a designated State Scenic Highway. The State requires that "natural scenic resources and aesthetic values" be protected and enhanced within visual corridor along designated scenic highways. Similar language in the County's Scenic Highway Element [County of Santa Barbara, 1975] provides for protection of the scenery in the area noted.

Provisions in the Open Space Element of Santa Barbara County's Comprehensive Plan [County of Santa Barbara, 1979] also encourage the protection of scenic quality along moderately to highly scenic travel corridors. State Highway 1, from Las Cruces to Lompoc, is highly scenic; U.S. Highway 101, from Buellton to Gaviota State Beach Park, State Highway 246, from Lompoc to Buellton, and State Highway 1, from Lompoc to Orcutt, are moderately scenic.

ABANDONMENT OF FACILITIES

Removal of the onshore gas processing facility or the consolidated oil processing facility would improve visual quality significantly. Removal of the platforms offshore would also improve visual quality significantly, the degree would vary with the number and location of platforms removed.

5.9.2.3 Visual Impacts of Project Alternatives

The visual impact of project alternatives is summarized in Table 5.9-5.

NO PROJECT

The No Project alternative would have no adverse visual impacts. The slight improvement in visual quality from landscaping at the Orcutt Pump Station would not occur under this alternative.

ALTERNATIVE PIPELINE ROUTE FROM LANDFALL TO PROPOSED LOMPOC DEHYDRATION FACILITY (SITE 4)

As would be the case for the proposed route, the presence and activity of the work force and heavy machinery would present short-term, negligible visual impacts. The visual impacts of grading, clearing, trenching, and backfilling also should be negligible (Class III).

From Highway 246, Terra Road, 35th Street, and Ocean Beach County Park, the disturbance caused by installing the pipeline would be virtually unnoticeable. From the Southern Pacific Railroad, however, northbound travelers would notice some disturbance within the right-of-way north of Surf after installation, particularly the destruction of some vegetation. Along Central Avenue the land is under cultivation; installing the pipeline next to this road would have no visual effect after the first tilling. Where the alternate route crosses Lompoc-Casmalia Road, the proposed berm and roadside plantings would block unauthorized travel along the route and would screen the route from view.

The visual impact due to the crossing at Burton Mesa and at the Lompoc-Casmalia Road would be adverse but negligible (Class III). The proposed roadside plantings and berm should entirely conceal the disturbance within a few years.

Where the pipeline would parallel Highway 1 from Burton Mesa Road to the dehydration facility at the preferred site, there is an opportunity for adverse, noticeable visual impacts (Class I), depending upon the degree to which the oak woodland would be affected. Up to 8 acres of woodlands are in the right-of-way and trenching in the vicinity could kill many additional trees (see Technical Appendix F). However, this highly intense visual impact would be of low overall significance, given the low scenic quality and sensitivity along this stretch of Highway 1.

Installing the pipeline along the alternative route described appears to be compatible with all policies and regulations relevant to the protection of visual resources.

TABLE 5.9-5

VISUAL IMPACTS OF PROJECT ALTERNATIVES

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

Source	Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
Project Alternatives				
Union	Onshore Pipelines: alternative route from landfall to Lompoc Dehydration Facility Site 4: direct impact due to clearing, grading, trenching, backfilling during pipeline installation through mature oak woodlands along Highway 1; would create uncharacteristic linear clearing and remove attractive vegetative features.	Long-term, locally significant impact on views from Highway 1.	Minimize width of right-of-way, adjust route to avoid mature trees.	Low significance; some loss of oak woodland is unavoidable.
Union	Onshore Pipelines, proposed route from landfall to Lompoc Dehydration Facility Site 8: direct impact due to clearing, grading, etc. (see above) due to uncharacteristic linear clearing. Indirect effect due to erosion and mass wastage along steep slopes.	Short-term, locally significant impact on views from 35th Street, Terra Road. Short-term regionally significant.	None for right-of-way across gently sloping lands.	Low significance for 2-5 years, insignificant thereafter once operator's restoration measures take effect.
		Long-term, locally significant effect where route crosses steep slopes 1/2 mile east of Electrical substation	For steep, erodible slopes, install jute mesh to stabilize slopes.	Effect of erosion on steep slopes would be to negligible levels.
Union	Electrical substation (alternative site): Direct impact of utilities intruding into the skyline of ocean views and background of views of the estuary from County Park.	Long-term, locally impact on views from 35th Street, Terra Road, Ocean Beach Park, and Highway 246. Long-term regionally significant impact on views from SPRR.	None possible. Vegetative screening may partially screen facilities but would also appear highly uncharacteristic of the area.	Moderately significant, except for views from Highway 246, for which impact would be of low significance.

Table 5.9-5
(continued)

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO A LEVEL OF INSIGNIFICANCE

Source	Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
Union	Onshore Pipelines: proposed route to Lompoc Dehydration Facility Site 8: one-acre fenced pad for valve station; direct impact due to size, color, location, and rectilinear shape.	Long-term, locally significant impact on views from 35th Street, Terra Road, and Ocean term regionally significant impact on views from SPRR.	Reduce size of fenced, gravel pad and use dark gravel.	Insignificant
Union	Alternate Transmission Line Line route: direct impact of utilities intruding into the skyline of ocean views and background of views as seen from County Park.	Long-term, locally significant impact on views 35th Street, Ocean Beach County Park, and Highway 246. Long-term regionally significant impacts on views from SPRR.	Bury transmission lines from electrical substation to 13th Street.	Insignificant

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT INSIGNIFICANT

Source	Description of Impacts	Scope	Partial Mitigation Measures	Residual Impact
Union	Onshore Pipelines, Alternative routes from landfall to Lompoc Dehydration Facility Site 4: direct impact due to clearing grading, trenching, backfilling during pipeline installation would create partially visible, linear clearing at road crossings.	Short-term, local, negligible impact on views from Lompoc-Casmalia Road and Burton Mesa Road at route crossings.	N/A	N/A
Union	Onshore Pipelines, Proposed and Alternative routes from landfall to Lompoc Dehydration Facility Site 8: (road crossings, as per previous entry).	Short-term, local, negligible impact on views from Lompoc-Casmalia Road, Burton Mesa Road, and Highway 1 at route crossings.	Optional: bury transmission	No impact

PROPOSED PIPELINE ROUTE FROM LANDFALL TO THE ALTERNATE LOMPOC DEHYDRATION FACILITY SITE (8)

As described previously, the visual impacts from installing the pipelines along this route from landfall to Santa Lucia Canyon are substantial and adverse (Class III), but of low significance and generally short term. The visual impacts from Santa Lucia Canyon east to Highway 1 would be adverse but negligible. At Highway 1, roadside berms and plantings would, within several years, screen the disturbed right-of-way from view. After crossing Highway 1, this pipeline route is not in view of sensitive travel routes or public use areas.

ALTERNATIVE PIPELINE ROUTE FROM LANDFALL TO ALTERNATE LOMPOC DEHYDRATION FACILITY (SITE 8)

As described previously, the visual impacts of this alternative up to the intersection of the pipeline right-of-way with Highway 1 would be negligible (Class III). The visual effects of this alternative from Highway 1 to where the pipeline would access Site 8 for the dehydration facility also would be negligible (Class III).

Installing the pipeline along the route described may be compatible with all policies and regulations relevant to the protection of visual resources.

ALTERNATIVE TRANSMISSION LINE ROUTE AND ELECTRICAL SUBSTATION SITE

The receptors within view of the transmission lines and substation under this alternative would be 35th Street, Terra Road, Ocean Beach County Park, Highway 246, Lompoc-Casmalia Road, Burton Mesa Road and Highway 1 crossings.

From 35th Street and Terra Road, the moderately substation would be visible, incongruous, and would dominate some views. The impact, particularly from 35th Street, would be significant given its high intensity and the sensitivity of the travel route, scenic quality in the area is, however, low (Class I). Similarly, the impact of the transmission lines on views from Terra Road between 35th Street and 13th Street would dominate some views and be adverse and significant given the sensitivity of the route and the highly intense impact (Class II).

From Ocean Beach County Park, the substation and transmission lines would be highly discordant, attracting attention to the point that these facilities would dominate views in their direction. Because of the high intensity of the impact and the high sensitivity of the Park, the impact would be moderately significant, even though the affected views are of comparatively low quality (Class I).

The impact on views from Highway 246 would be adverse but of low significance (Class II). Where the transmission lines cross Lompoc-Casmalia and Burton Mesa Roads, they would have an adverse affect on visual quality but no significant impact because the existing transmission lines parallel the road (Class III). Similarly, for views along State Highway 1 to the preferred site, the visual impact of the transmission lines would be of low significance.

The alternate transmission lines would intrude into the skyline as seen from public places. They may be ruled inconsistent with provisions of Santa Barbara County's Comprehensive Plan at the Lompoc-Casmalia Road and Burton Mesa Road crossings, as well as Highway 1. Elsewhere, the impacts occur outside the coastal zone or on Vandenberg AFB land where county policies do not apply.

ALTERNATE SITE FOR LOMPOC DEHYDRATION FACILITY (SITE 8)

If the dehydration facility is installed at this alternative site, it would not be visible from any sensitive receptor. The facility, in this case, would have no visual impacts and may be ruled compatible with all policies and regulations directed toward protecting scenic quality.

SUBSEA PIPELINE

Installation of the subsea pipeline from Platform Shamrock to Hermosa would have no adverse visual impact due to distance and the topography of the sensitive public use areas.

ABANDONMENT OF FACILITIES

Abandonment of the Alternate Pipelines and the dehydration facility at Site 8 would have no visual impact. The pipelines would remain underground and the facility site is not visible from any sensitive receptors. Removal of the alternate transmission lines, however, would have a beneficial impact on the visual quality of views from 35th Street, Terra Road, and Ocean Beach County Park.

5.9.2.4 Mitigation Measures

All of the mitigation measures proposed below are considered to be technically feasible and effective. Special circumstances that might limit feasibility or effectiveness are noted.

MITIGATION MEASURES APPLICABLE TO PROPOSED PROJECT

Onshore Pipeline and Utility Corridors

Long-term visual impacts of low significance would occur for certain views from 35th Street and Ocean Beach County Park because of the fenced, gravel pad of the valve station at the foot of 35th Street. Using dark gravel, preferably grey-brown would reduce the high contrast and the size of the one acre pad could be reduced without compromising security or safety.

In most cases the proposed site restoration measures for the pipeline right-of-way would reduce the visual impacts noted to a level of insignificance, and no additional mitigation measures would be required. However, erosional scarring on steep terrain could be prevented by installing jute mesh across the slopes after distributing shredded vegetation cleared from the site.

Where the pipeline crosses Lompoc-Casmalia Road, the visual impacts would be negligible, since the operator is proposing to install roadside berms and plantings to conceal the right-of-way from view. By varying the pipeline within the existing firebreak there would be no adverse effect at all on views for those traveling east on Lompoc Casmalia Road.

The visual consequences of installing the dry-oil pipeline from Lompoc to Orcutt would be adverse but negligible. No mitigations measures are deemed necessary.

The substation would have long-term adverse impacts on views from Highway 246. Mitigation to a level of insignificance could not occur by landscaping.

Mitigating Alignments to Pipeline Routes

The mitigating pipeline routes are dicussed further in the supporting information section of this EIS/EIR.

Facilities

The impact of the dehydration facility on views from the northbound lane on Highway 1 would be moderately significant but mitigated to a level of insignificance within two to five years by the proposed roadside berm and planting. Further mitigation cannot be accomplished by landscaping although the facility would be painted a grey-brown or grey-green to blend with the surroundings. No mitigations are required for the Orcutt Pump Station.

Offshore Platforms

The impact of the platforms on views from Surf, opposite Ocean Beach County Park and Civilian Beach and Southern Pacific Railroad, would be highly significant. Siting, set by technical requirements, cannot be altered to mitigate visual impacts. Painting the facilities a light blue-grey to blend with the ocean, sky and natural haze would reduce the obtrusive character of the platforms, but impacts would remain significant. This mitigation is technically feasible since the platforms are not located in the high-traffic, high-risk areas of the Vessel Traffic Safety System (VTSS). In these areas, the Coast Guard typically mandates a highly visible color. (See Systems Safety Technical Appendix M, Addendum A, for VTSS and marine traffic discussion.)

Support Base Activities

Helicopter traffic would have adverse but insignificant impacts. No mitigation measures are required.

Accidents and Upsets

Visual impacts caused by accidents and upsets, such as oil spills can only be minimized by prevention and containment. These measures are discussed in Section 11, Systems Safety and Reliability.

MEASURES APPLICABLE TO AREA STUDY

Onshore, impacts of low to moderate significance would result from the consolidated facilities. Planting tree and shrub massings along the highway to screen views would be effective in 15-20 years, depending on the species.

Pipeline routes would have an adverse visual impact if seen from La Purisima Mission, Highway 1, and Highway 101. Therefore, choosing the route to Buellton to tie in with the Southern California pipeline systems would be the best mitigation.

With respect to the offshore Area Study, platforms outside of the current or proposed VTSS could be painted blue-grey, as proposed for the project. This would reduce their obtrusive character but impacts would remain significant.

MEASURES APPLICABLE TO ALTERNATIVES

From landfall to Santa Lucia Canyon, the impacts and mitigations are identical for both the Proposed Pipeline to the alternative processing facility, and the Proposed Project Pipeline. Therefore, the Alternative Pipeline impacts are adverse but negligible and require no further mitigation. Similarly, impacts associated with the proposed route to the alternate processing site are negligible and require no further mitigation.

The visual impacts of the alternative transmission lines on views from Terra Road between 35th Street and 13th Street could only be mitigated by burial from the electrical substation to 13th Street.

The substation at the alternate site (35th Street) would have moderately significant impacts. No mitigation is possible, although the facility might be partially obscured by vegetative screening, such vegetation would be uncharacteristic.

5.9.3 Release of Odors and Smoke

5.9.3.0 Significance Criteria

Significance criteria for smoke and odors are derived from applicable regulations and standards (see Appendix B). Specifically, smoke causing visibility impairment will be considered significant is it exceeds the State of California ambient air standard for the prevention of the prevailing visibility to less than 10 miles when the relative humidity is under 70 percent. Notwithstanding the State of California's ambient air standards for hydrogen sulfide (0.03 ppm), odors will be considered significant if they exceed the field odor threshold of 0.005.

5.9.3.1 Impacts of Proposed Project Components

The EPA regulations require that the impacts of visibility impairment on Prevention of Significant Deterioration (PSD) Class I areas due to smoke and secondary aerosols emitted from the projects to be evaluated under PSD, a

Class I area has been defined as a national park or wilderness area. The nearest area is the San Rafael Wilderness which is approximated 45 kilometers east northeast of the proposed Lompoc Dehydration Facility. An EPA level-1 screening analysis, which considers primary particulate aerosols emitted from the onshore facility as well as secondary aerosols that would form from nitrogen oxide and sulfur dioxide emissions, indicate that there would be no perceptible visibility impairment in the San Rafael Wilderness.

Smoke plumes would be the result of primary particulate matter being released during combustion at the proposed facilities. In all cases, the fuel used in combustion is natural gas which has very low particulate emission factors. Thus, there would be no perceptible smoke plumes from the combustion stacks, and the California visibility standard would not be exceeded.

RELEASE OF ODORS

The dehydration of oil at the Lompoc facility should not produce odor impacts.

Nuisance odors may occasionally occur in the immediate vicinity of the refinery in Santa Maria (Class II). Odorous vapors such as hydrogen sulfide and organic sulfur compounds may be released as a result of fugitive leaks. Although these emissions are expected to be very low, the odor thresholds are also extremely low. In either case, odors would be related to changes from existing conditions at both facilities. As was noted in the baseline section, there have been no odor complaints near the Battles Gas Plant in the past ten years. This situation is due principally to the fact that gas containing little or no sulfur compounds has been processed at the plant. Thus, minor leaks would not result in perceptible odors. If the future gas would contain more sulfur, odors may be perceived near the plant. However, this appears unlikely since exploratory wells from Platform Irene have not shown sulfur.

For the refinery, odors would be perceived due to leaks of valves or flanges in the refinery gas processing. The baseline indicates that 34 odor complaints have been registered near the refinery in the past few years. Although the SO_2 emissions from the modified refinery will be reduced considerably because of sulfur removal before combustion, there may still be release of odorous gases before the sulfur removal train. However, there are fewer process elements in the modified refinery as opposed to the existing refinery that may release odorous gases. Thus, the frequency of exposure to perceptible odors should be reduced from existing conditions.

5.9.3.2 Impacts of Area Study Development

VISIBILITY IMPAIRMENT FROM SMOKE

A consolidated facility to process both oil and gas is not expected to produce smoke due to the reasons mentioned above since natural gas is burned as a fuel service.

RELEASE OF ODORS

The processing of gas at the consolidated facility site could have significant adverse, long term impacts (Class II). Since the gas would contain odorous sulfur compounds, even slight leaks from gas plant valves or flanges would release odors into the atmosphere.

For the Area Study scenario, the odor threshold may be exceeded near the expanded oil and gas processing facility in Lompoc. Although the state odor standard for H_2S (42 micrograms per cubic meter) would not be exceeded, odorous gases may be released due to fugitive leaks from the expanded onshore facility. However, ambient concentration of these odorous compounds will depend on the sulfur content of the gas being processed. An upper bound of 0.5 percent H_2S was assumed even though present data indicate the sulfur content to be much lower.

5.9.3.3 Impacts of Alternatives

VISIBILITY IMPACTS OF SMOKE

No visibility impacts from smoke are expected to occur at the alternative Site 8. As is the case for Site 4, the burning of natural gas should not cause smoke or visibility impairment.

RELEASE OF ODORS

The dehydration of oil at the alternative processing facility will not release odorous vapors. Therefore, no adverse impacts are anticipated.

5.9.3.4 Mitigation Measures

Significant adverse impacts would result from the release of odors from the Santa Maria Refinery and the Area Study consolidated processing facility. Tightening and regular maintenance of the seals on valves and flanges would reduce the frequency and quantity of emissions.

5.10 OTHER USES

5.10.1 Commercial Fishing, Kelp Harvest, and Mariculture

5.10.1.0 Introduction/Methodology

Impacts on commercial fishing, kelp harvest and mariculture were evaluated on the basis of the following:

- Present commercial fishing practices, i.e., harvest of the same species by the same gear are assumed to continue throughout the lifetime of the subject developments.

- Projects were analyzed as proposed by the operators, including any measures proposed to meet regulations and lessen environmental impacts.

- Area Study development platforms and pipelines were assumed to be essentially similar to the corresponding project components proposed by the present operators.

In accordance with criteria provided by the Santa Barbara County Resource Management Department and reviewed by the other agencies on the Joint Review Panel, a physical change attributable to the projects was considered a regionally significant environmental impact if it was judged likely to:

- Temporarily (i.e., in one season or less) reduce fishing grounds in the Study Region by 10 percent or more during peak season; or

- Temporarily impact 10 percent or more of the fishermen in the Study Region; or

- Change the ability to harvest 5 percent or more of the productive area available for any individual type of fishery during a period of high productivity for more than one season; or

- Change the ability to harvest 1 to 5 percent or more of the productive area available within the Study Region for kelp harvesting or mariculture.

Three other factors generally considered more difficult to quantify than the above criteria were also considered at least qualitatively, as additional bases for assigning significance classifications. These factors are: 1) economic losses incurred by fishermen; 2) fisheries industry employment losses; and 3) economic losses to secondary businesses dependent on the local commercial fishing industry.

Significant adverse impacts (Class I or II) according to the above criteria may be considered broadly inconsistent, unless mitigated, with the intent of the California Coastal Act, including Sections 30231, which protects marine organisms used for commercial purposes, or 30234, which protects commercial fishery facilities, as appropriate.

5.10.1.1 Impacts of Proposed Projects

IMPACTS OF PROJECT CONSTRUCTION

Construction of Platform Irene and the associated pipelines and power cable to shore would be expected to pre-empt about 3 to 4 square miles of halibut dragging area for up to about four months. This impact would represent about 2 percent of the available 200 square mile tow area between Point Arguello and Oceano, and as such would likely be of Class III significance even though scheduled for the peak trawling season. (See Technical Appendix J for details of assumptions and calculations).

Construction of the Shamrock Project platform and the associated pipelines to Platform Irene would temporarily pre-empt up to about 8 square miles (about 4 percent) of the aforementioned halibut tow area, assuming some overlap of the platform and pipeline construction in early fall of 1986. The total area pre-empted during this time could be up to about 9 square miles assuming a contiguous permanent pre-emption of about 1 square mile around Platform Irene. Even with this assumption, this temporary impact does not appear likely to affect 10 percent of the fishermen, a significant part of their catch, or 5 percent of their fishing area, and is considered of likely Class III significance.

Shamrock Project platform construction could involve construction vessel anchoring and activity within about 1 mile of the head of the submarine canyon in the southwest corner of OCS-P 0440. Given that the method of trawling this productive rockfish and petrale sole fishing ground is to swing around the canyon head, it is possible that the presence of the construction activity would prevent effective fishing of this location. As there are only four such canyon heads in the region generally fished by the Morro Bay and Port San Luis fleets, and not all are equally productive (personal communication, B. Cohen, Olde Port Fish Co. to C. Cooper, Arthur D. Little, Inc., 10/84), pre-emption of this fishing location would be considered a Class I, regionally significant impact on the basis of productive area pre-emption. From an economic standpoint, recognizing that catches vary and assuming (see Section 4.10.1) some 4,500 pounds of catch per day at 20-30 cents per pound and 50 fishing days for the fleet over the five-month construction period, some $50,000 - $100,000 of catch value could be pre-empted. As this loss would represent about 1-5 percent of the annual landed value at the affected ports (see Section 4.10.1) such a pre-emption could have an economic basis for significance as well.

Construction (or operations) could affect the few drift gill netters who fish for shark on occasion in these waters, but the temporary nature of construction and of this type of fishery in any given location is such that Class III impacts would be expected.

Construction impacts on set gear, purse-seining, trolling or hook and line fishing, kelp harvest and mariculture are expected to be of regional insignificance because no construction activities are planned for the vicinities of consistently present harvestable resources of any of these types of activities.

IMPACTS OF NORMAL OPERATIONS

Other operations of the proposed project components are generally expected to have regionally insignificant adverse impacts on the various commercial fisheries. Because it would be 2 miles from the above-mentioned canyon head, the Shamrock platform is assumed not to pre-empt future trawling around that feature if a post-construction survey agreed to in the Coastal Commission Consistency Review locates and removes all significant debris. Combined long-term fishing area pre-emptions by the two platforms are estimated to be less than 3 percent of the available halibut tow area, even assuming that trawlers avoid the area between the two platforms. Even if anchor scarring persists, the affected area would represent less than 5 percent of that available.

Impacts of Exxon's crew boat traffic on the kelp bed off Ellwood would be additive to documented vessel-traffic-related reductions of kelp canopy in that area (about 50 acres) and would be of Class II or more likely Class III significance depending on the extent of restriction of the traffic to prescribed narrow travel corridors. On an industry-wide basis, crew and supply boat traffic is proposed by the Fisheries Liaison Office to be restricted to offshore areas that would minimize conflict with fishing vessels, including the halibut fishery on Hueneme Flats [California Coastal Commission, 1985]. See Figure 5.10-1 for a map of these routes.

The beneficial impacts of providing additional mariculture sites for mussels or other organisms on the platforms would likely be regionally insignificant on the historical evidence that the mariculture business is not lacking sufficient production sites.

None of the proposed waste discharges are projected to have sufficient impact on commercial species to impact the fisheries (see Section 5.5).

Support vessel service requirements of the proposed projects would compete with those of fishing industry vessels in only one location where supply of those services may be in question, Port Hueneme. Based on detailed evaluation of such potential conflicts by Centaur Associates [1981], the impacts are expected to be insignificant (Class III), because the Port Master Plan is providing for expansion of facilities to accommodate industry needs.

IMPACTS OF ABANDONMENT

Facility abandonment as proposed would have regionally insignificant beneficial impacts by removing pre-emption of fisheries in the immediate vicinity of the platform locations, and regionally insignificant adverse impacts by removing the platforms as potential mariculture sites. Anchor scarring during platform removal would likely have Class III impacts because of the limited area (about 1 square mile per platform) affected.

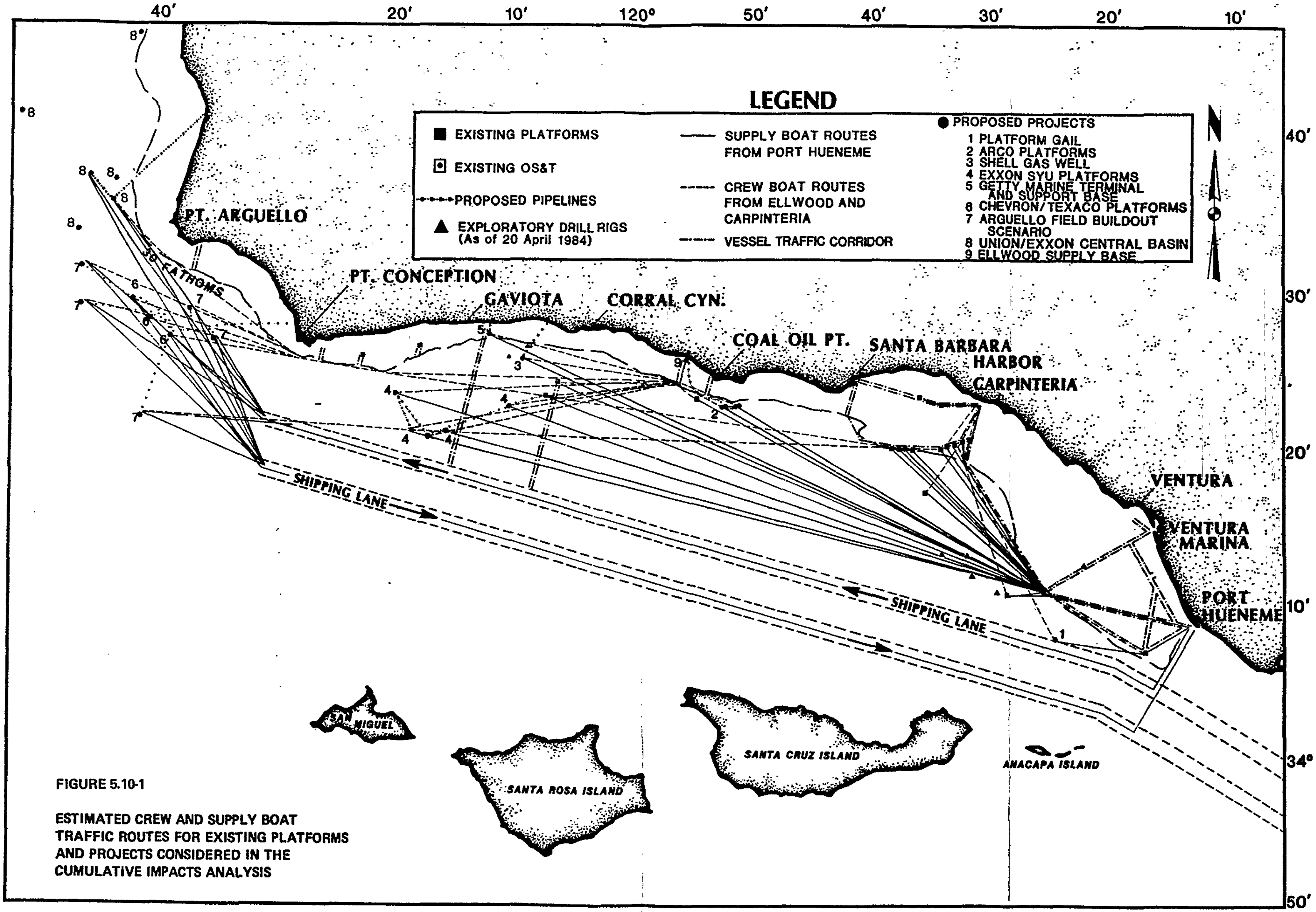

FIGURE 5.10-1

ESTIMATED CREW AND SUPPLY BOAT TRAFFIC ROUTES FOR EXISTING PLATFORMS AND PROJECTS CONSIDERED IN THE CUMULATIVE IMPACTS ANALYSIS

IMPACTS OF ACCIDENTS AND CATASTROPHIC EVENTS

Regionally significant Class I impacts can be expected to accompany any project-related offshore spills of about 1,000 barrels or more, which Arthur D. Little estimates to have an overall probability of occurrence of about 4 percent over the projects' life (see Appendix M). These spill-related impacts,which are discussed below on the basis of the Arthur D. Little modeling results, would be expected because of the likelihood of one or more of the following effects:

- From spills of about 1,000 to 100,000 barrels of oil, physical pre-emption for up to a month or more of some 15 to 750 square miles of fishing grounds, enough of the productive tow or set gear fishing areas for rockfish, sole, and/or halibut for long enough to substantially reduce the catch of the affected fishermen. The areas supporting 10 percent or more of the region's ground fish trawl effort total about 800 square miles. See Figure 4.10-3 in Section 4.10.1.

- In conjunction with the above, there could be a reduction in annual income of fishermen or any of the smaller local purchasers of the catch, who have no readily available alternative sources of supply for rockfish or halibut and, seasonally in winter, for other flatfish.

Oil spills of less than about 1,000 barrels would be expected to have regionally insignificant adverse impacts; as they would be unlikely to pre-empt large enough areas of the fishing grounds. Gas releases or produced water spills from pipeline breaks would not be expected to pre-empt fishing.

Accidents involving damage to fishing gear or vessels through collision with or hangup on project-related structures or support vessels have been made unlikely by a history of improvements in design and operating procedures. Should such events occur, they would result in economic losses that would be considered of Class II, local to regional significance.

5.10.1.2 Impacts of Area Study Development

Construction and/or operation of a cluster of three platforms on OCS-P 0440 and -P 0441 and their interconnecting pipelines could pre-empt or inhibit use of about 10 square miles, or about 5 percent of the available halibut tow area for the projects' lifetime, by the presence of platform structures. Additional pre-emption could result from remaining anchor scars. Such pre-emptions are a potential impact of Class I regional significance.

A platform situated in the central or southwestern part of OCS-P 0510 would be directly proximate to a submarine canyon head, and therefore potentially a source of long-term Class I impacts analogous to those short-term impacts described above for the Shamrock project construction activity.

Construction of a platform and connecting pipeline to Platform Shamrock or Platform Irene from OCS-P 0495 would temporarily pre-empt dragging in a portion of CDFG fishing block 639, one of the region's more important areas for rockfish and sole dragging. Depending in part on scheduling, impacts would likely be of Class II or Class III regional significance. Permanent pre-emption for a platform in this location would likely be of Class III significance, but could be Class II if severe anchor scars remained after construction [Centaur Associates, 1984].

Although not included in the hypothetical scenario portrayed here, if Area Study development occurred on OCS-P 0425, -P 0430, or portions of -P 0424 and -P 0433, pre-emption of heavily trawled areas around the rocky submarine ridge that traverses those tracts could be of Class I regional significance.

The overall likelihood of a large (greater than about 1,000 barrels) oil spill is estimated to increase from about 4 percent to greater than 10 percent for the Area Study development, with correspondingly likely impacts on fishing as described above, of Class I significance. (See Technical Appendix M.)

5.10.1.3 Impacts of Project Alternatives

The impacts of alternative project components (e.g., southern versus proposed landfall for Union's pipelines to shore and alternative Lompoc Dehydration Facility sites) on commercial fisheries would be expected to be of generally comparable extent and significance to those described above for analogous proposed project components. This applies to the alternative onshore pipeline routes, which would not affect commercial fishing. Exception for alternatives that would affect commercial fishing are as follows:

- The no-project alternative would have no incremental impact on the fishery.
- Construction of the alternative offshore pipeline from the Shamrock platform to Chevron's Platform Hermosa would cross about 15 miles as opposed to about 3 miles of the region's more important trawling fishing area with largely temporary potential impacts of likely Class II regional significance.
- Spills from the alternative offshore pipeline route to Platform Hermosa are calculated to have five to ten times the probability of occurrence than are spills from the shorter proposed pipeline to Platform Irene (see Appendix M). Class I impacts could occur following a spill of about 1,000 barrels or more from either line that headed towards a seasonally productive fishing ground.

5.10.1.4 Mitigation Measures

Tables 5.10.1-1 and 5.10.1-2 systematically list mitigation measures for each of the Class I and II impacts on commercial fishing and kelp harvest.

Table 5.10.1-1

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

(Impacts which must be addressed in a "Statement of Overriding Consideration if the project is approved (Section 15089(b), State EIR Guidelines)

COMMERCIAL FISHING AND KELP HARVEST

Source	Impact Description	Scope	Partial Mitigation Measures	Residual Impact
Proposed Projects (Exxon)	Preemption of harvest in productive rockfish and sole tow area by construction of offshore platform for Shamrock project.	Regional, short-term	Minimize extent of offshore construction SW of site, establish notification procedures and preferred schedule with Liaison Office, prevent, locate and remove construction scars.	Regionally significant to insignificant
Project-Related Accidents (Union or Exxon)	Preemption of harvest in any of various productive fishing grounds by unlikely major oil spill.	Local to regional, short to long term	Minimize spill response time at key locations, avoid use of sinking agents, compensate affected parties for lost revenue.	Locally to regionally significant, failure to use sinking agent may threaten seabirds and/or marine mammals at certain sites.
Area Study Development	1. Temporary or permanent preemption of important trawling areas on lease tracts P-0440, P-0441, P-0510, P-0425, P-0430, P-0424 or P-0433.	Regional, short to long term	Minimize extent and duration of construction, establish schedules and notification procedures with liaison office; prevent, locate and remove construction scars; create new "rock piles."	Regionally significant to insignificant; effectiveness of mitigation uncertain.
	2. Impacts of accidents described above become more likely due to additional platforms and pipelines.	Local to regional, short to long term	As above for project-related accidents, plus limitation of concurrent production activities.	As above for Project-related Accidents.
Project Alternatives (Exxon)	Preemption of halibut tow and halibut/shellfish set gear areas more likely for spill from alternative Shamrock to Hermosa pipeline.	Local to regional, short to long term	As above for project-related accidents.	As above for Project-related Accidents.
Cumulative Development Alternative Scenario	Interference with set gear and kelp harvest activities by vessel traffic from full-scale Gaviota marine terminal and supply base.	Regional, long term	Delineate minimum width and nearshore length vessel corridors; establish new kelp plants offsite.	Regionally significant unless alternate supply base used.
Both Scenarios	Impacts of accidents described above become likely due to additional production.	Local to regional, short to long term.	As above for Area Study Development.	As above for Project-related Accidents.

(Additional details on impacts and mitigation measures appear in Section 5.10.1 and 6.10.1 and Appendix J.)

Table 5.10.1-2

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved [Section 15091, State EIR Guidelines])

COMMERCIAL FISHING AND KELP HARVEST

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Projects (Exxon)	Reduction of kelp canopyu off Ellwood by Exxon crew vessel traffic.	Local to regional, long-term	Delineate and enforce minimum length and width corridor through kelp bed and re-establish kelp plants offsite; or require Exxon to use Carpinteria as crew base.	Insignificant if combined measures applied.
Project-Related Accidents (Union or Exxon)	Damage to fishing gear and/or vessels due to collision with and/or hangup on	Regional, short- to long-term	In addition to MMS requirements, ensure timely full compensation for losses.	Insignificant if all measures applied.
Area Study Development	Pre-emption of halibut, rockfish, sole tow areas by construction activities.	Regional, short-term	Restrict construction vessel activities, cooperative scheduling/notification, post-construction sruvey and removal of obstructions.	Likely insignificant.
Project Alternatives (Exxon)	Impact as above under Area Study with offshore Shamrock to Hermosa pipeline	Regional, short-term	As above under Area Study	Likely insignificant.
Cumulative Development All Scenarios	1. As above for Area Study Develop-Study Development, of greater magnitude.	Regional, short- to long-term	As above for Area Study Development	Insignificant
	2. Pre-emption of drag, shift, seine, or set fishing areas by concurrent construction of projects.	Regional, short-term	Schedule projects to avoid overlapping construction	Same as individual proposed projects

NOTE: Additional details on impacts and mitigation measures appear in Section 5.10.1 and 6.10.1.

MEASURES FOR THE PROPOSED PROJECTS

- To minimize (partially mitigate) potential Class I impacts to drag fishing around the submarine canyon head southwest of the Shamrock project platform, restrict construction activity as much as possible to remain north and east of the site, use anchoring methods that minimize scarring, establish a preferred schedule and notification procedures with the Fisheries Liaison Office, and conduct post-construction side-scan sonar surveys and test trawl runs to locate debris or bottom alterations (anchor scars) that could snag drag nets and attempt to smooth potentially problematic scars. If the above measures do not reduce the impacts to insignificance, financial compensation to affected fishermen/purchasers could also be considered. Local fishermen have also expressed positive interest in the establishment of new rocky reef habitats well before the construction period in suitable waters.

Although the measures are feasible in principle, the effectiveness of the above combination of measures is uncertain because of the range of conditions that may prevail at the time of construction.

- To mitigate the impact of Exxon crew vessel traffic on the Ellwood kelp bed, there could be specification on navigation charts and enforcement of a narrower corridor (on the order of 150 feet in width) through the bed, or Exxon could use Carpinteria as an alternative crew base site, as proposed by some other operators.

- Prompt, adequate compensation for fishing-related revenue lost due to a major oil spill would at least partially mitigate the economic aspects of physical pre-emption of local fisheries. Existing procedure are not regarded as fully adequate because they take too long and/or do not cover area pre-emption issued [Pers. Comm., J. Giannini to C. Cooper, Arthur D. Little, 10/84].

MEASURES TO MITIGATE AREA STUDY DEVELOPMENT

Measures to reduce potential impacts of constructing and operating the additional platforms and connecting pipelines assumed for Area Study Development would be similar to those above or otherwise included in the proposed projects. Measures not listed above include the following:

- To partially mitigate the pre-emption of halibut tow areas and along with the other measures mentioned above, mitigate to insignificance the impacts on dragging for other species on the various tracts, avoid overlapping construction schedules for the three platforms and connecting pipelines on OCS-P 0440 and -P 0441, place and orient support vessel mooring buoys to minimize interference with drag fishing, and monitor the activity to ensure compliance. The feasibility of achieving such scheduling for future projects is uncertain.

- To minimize vessel traffic interference with fishing activities, use existing crew vessel corridors from onshore bases out to the 30-fathom (55-meter) depth contour where available; establish such corridors if none are available. Use an extended VTSS for supply vessel traffic from Port Hueneme to future exploration and development sites.

- Continue cooperative scheduling of seismic testing activities through the Fisheries Liaison Office, to mitigate to likely insignificance interference with fishing on any given day.

- To minimize the potential for major offshore oil spills pre-empting productive fishing grounds, phase the development activities so that the cumulative major spill probabilities always remain in the rare-to-extraordinary (less than one in 10,000 years) range.

MEASURES FOR ALTERNATIVES

The measures applicable to mitigate the impacts of project alternatives are the same as those described above for the analogous proposed project components. In particular, cooperative scheduling and anchor scar minimization and repair could mitigate to insignificance the construction-related trawl pre-emptions for the Shamrock to Platform Hermosa alternate pipeline.

5.10.2 Recreation

5.10.2.0 Introduction/Methodology

The term "recreation," as used in the context of this report, includes the activities of:

- Use of oceans and harbors for swimming, surfing, board sailing, etc.; recreational boating, and sportfishing

- Use of beach lands and piers for recreation, including sportfishing

- Use of public shoreline and inshore public park areas and park facilities, and

- Tourism.

The methodology utilized to identify impacts has been to review the Union and Exxon project components and the activities that will take place during construction and operation of the project components, and to identify impacts upon the recreational resources and activities defined previously in Chapter 4 of this report.

The activities included under recreation have been grouped into three major areas for purposes of discussing impacts, i.e., recreation, sportfishing, and tourism.

Criteria have been defined for use in identifying significant impacts in each of these discussion areas. These criteria are as follows:

- Recreation: Any permanent loss of 5 or more percent in opportunities for recreation or use of recreational facilities during peak season, a 10 percent or more loss in individual park campground space during peak season, or a 2 percent loss or more in campgrounds in the Tri-county study area.

- Sportfishing: Any permanent financial loss of 5 percent or more to the local sportfishing industry, or in industry employment, or in the catch of any species. A temporary loss of 10 percent or more to the industry financially, in employment, or in the catch of any species.

- Tourism: Any permanent financial economic loss of 5 percent or more to the industry in the tri-county area; a temporary loss of five percent or more to the industry.

Impacts considered include impacts from construction of facilities, normal operations of facilities, abandonment of facilities, accidents, and/or catastrophic events.

5.10.2.1 Impacts from the Projects as Proposed

RECREATION

Platforms (Union and Exxon) Construction

During installation of the platforms, there are three activities with potential for adverse effects upon the use of recreation and park facilities in sites within the tri-county area. The first of these platform construction-related activities concerns the potential for transport of offshore construction workers by helicopter to the platform sites. It has been estimated that up to 7 helicopter trips for Union and four helicopter round trips for Exxon will be required per day during the installation/hook up phase.

For installation and hook-up of Union's platform, these flights would cross over Ocean Beach County Park if a proposed flight path from Lompoc through Vandenberg AFB is approved. (See Figure on page B7 of Addendum B to Technical Appendix M). If this proposed flight path is not approved, Union states that its helicopter flights will originate from Santa Maria airport, from where these flights would have to pass to the north of restricted air space area R-2516. (See Figure G-1 on page G3 of Addendum G to Technical Appendix M). In this latter case, the noise from the flights could be disturbing to users of Waller Grove County Park, and Santa Maria, and Rancho Maria Golf Courses (see Figure 5.10.2-1), depending upon particular flight paths used. Also, immediately north of restricted area R-2516 is Oso Flaco Lake Park in San Luis Obispo County, whose users could also find the noise from such flights to be disturbing. In these cases, however, the impacts would be considered adverse but not significant, although noise could be mitigated by setting overland flight height minimums. Chapter 5.9 discusses noise problems more specifically.

Similarly, helicopter flights for Exxon's platform installation and hook-up will have potential for producing disturbing noise in the areas of Goleta Beach County Park, Stow Grove County Park, Lake Los Carneros County Park, and the Ocean Meadows and Sand Piper golf courses, again depending upon particular flight paths utilized. The potential for alleviating disturbance to users of the parks and recreation areas could be accomplished by setting minimal flight levels over land. Another potential impact resulting from the installation/construction of platforms is the potential for preemption of use of park and recreation facilities by workers brought in from outside of the tri-county area. The use of camping or recreational vehicle facilities by these workers is not expected to meet or exceed the significance criteria thresholds defined above. Factors supporting this conclusion are as follows:

- Only the Exxon platform installation and hook up is scheduled during any peak recreational season month. (i.e., the month of June in 1986 by the end of which construction is to be completed). Schedule slippage causing construction in summer months would not induce a Class II impact.

- The number of non-local platform construction workers is a small number. The Socioeconomics Technical Appendix provides public campground lodging requirements for the Union project, Exxon project, and Area Study developments

<u>Operations</u>

A potential concern is that during drilling and production operations, a blowout or other accident could occur resulting in an oil spill with the potential for temporarily interfering with recreational use of shoreline resources and facilities. The extent of these impacts would be dependent upon the volume of spill, the origin of the spill, the trajectory of the spill, and the effectiveness of containment and offshore cleanup activities. As discussed in Section 5.11.3.1, our analysis indicates that blowouts might occur at one of the two platforms but that such accidents are predicted as unlikely. Oil spills at the platforms occurring from other types of accidents or operational faults were predicted to have such small probabilities of occurrence that they would not be expected to reoccur during the project's lifetime.[1] If a spill was to occur the recreational experience of individuals engaging in shoreline activities (e.g. hiking, surfing, scuba diving) would be adversly impacted for a short period of time (Class III unless the spill was very large.)

The Pipelines/Power Cable

Construction

The only impact identified from construction on recreation activition of the pipelines or power cable are related to accessibility to the entire beach area normally available in the vicinity of Ocean Beach County Park. That is, access to the entire stretch of beach, and perhaps to Ocean Beach County Park itself, could be restricted for as long as a week during either the months of October and November for work at the power station site related to the installation of the power cable.

However, this impact will not be of significance according to the criteria defined. These months of construction do not fall within months considered to be "peak season," but even during summer months a Class III impact would occur.

Operation

As the onshore pipelines and power cable will be installed underground, their normal operation is not expected to effect recreation in any way, nor is their eventual abandonment.

However, an onshore oil spill from pipelines might arise from accident events such as pipeline leaks and ruptures, as could an offshore spill. Oil spills resulting from onshore pipelines could potentially effect the use of Ocean Beach County Park. However, as is discussed in Section 5.11, onshore spills are generally more easily controlled than offshore spills that are dispersed through wave action and ocean water currents.

Potential impacts on Ocean Beach County park include oil in the parking lot from an onshore pipeline break and oil on the adjacent beach from an offshore spill. Both are unlikely but would adversely impact (Class III) recreational use of the area. As the pipeline routes do not border other recreation sites onshore, other impacts on recreation due to such spill accidents are not expected.

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[1] Section 4 of Technical Appendix M contains detailed estimates of annual conditional probabilities of spill landfall for a variety of spill locations -- including platforms -- and spill sizes by season of the year.

Spills resulting from accidents or failures of the offshore pipeline would have the same negative effects on shore line park and recreation areas as were referenced above regarding spills offshore in the vicinity of platforms. The liklihood of such spills reaching landfall is discussed in Section 4 of Technical Appendix M. Swimming, boating and driving as well as shoreline recreation activities (both passive and active) could be negatively affected by offshore spills. The area from Point Sal to Point Arguello is at greater risk than other areas due to the projects and the area study developments, therfore Ocean Beach County Park, Point Sal Beach State Park and Jalama Beach County Park are at greater risk than other recreation areas.

The onshore work force requiring temporary housing and utilizing public and private campground space for temporary housing has been discussed previously under socioeconomics in Section 5.7.3. As was noted, these effects are expected to be adverse in that use of some facilities will be required, but are not expected to be significant according to the criteria defined.

Onshore Facilities

Because of the locations proposed for the onshore processing and oil transportation processing facilities, their construction and normal operations are expected to have no adverse impacts on recreational activities, except for the use of public and private campground space required for temporary housing of construction workers. As is the case with the installation of pipelines and power cable onshore, the magnitude of this use of public and private campground facilities is expected to be adverse but not significant. Similarly, because of the processing facilities' location of the facilities, abandonment or accidents at the processing facilities are not expected to have adverse effects on recreational uses.

SPORTFISHING

A considerable body of experience in research has already been gained regarding the impacts of such developments on sportfishing, because of the already considerable development of projects similar to the subject project in the Santa Maria Basin, Santa Barbara Channel and Point Conception areas. Most impacts are anticipated during the construction of the project.

Platforms

Construction

Most impacts on sportfishing are expected to come from installation of the Union, Exxon and Area Study platforms. Some surface area in the vicinity of the platforms will be preempted from use by party boat fishermen, because of the existence of construction activities, construction barges, and so forth. This impact is expected to be adverse but not significant, because of its limited physical scope and short duration.

Crew boat trips as defined in Table 2.1-13 for Exxon's platform will consist of four per day during installation and hook-up of the platforms, and four supply boat trips per week will be made to that platform site. Table 2.1-12 notes that one supply boat every five days will visit Platform Irene with no crew boat trips. This level of ocean surface activity incrementally over existing traffic is not measurably adverse to party boat sportsfishing.

Differences in the behavior of sportsfish, including the avoidance of certain previously fished areas, can be expected but these effects are expected to result in only temporary changes in the distribution of fish. These impacts are expected to present a potentially minor annoyance to the sportfishermen but are not expected to be significant in terms of financial loss to the sportsfishing industry in the area.

Construction activity could be expected to impact the quality of the sportsfishing experience due to potential congestion in the Port Hueneme and Ellwood Pier vicinities. These impacts are expected to be adverse but insignificant.

Noise from the helicopter flights during the installation and hookup phases of platforms (four flights per day for each platform) is also expected to present an annoyance to sportsfishermen who prefer a more peaceful environment, but these effects are not significant, either

Normal operation of the platforms will similarly preclude some of the surface area from sportsfishing; helicopter trips will increase during drilling and production phases temporarily to ten per day and decrease to six per day once drilling is completed, (for the Exxon and Union projects.) Crew and supply boat activity is expected to decrease. (Table 2.1-12, 13). The classification of these platform-related impacts would thus not change from the construction (installation/hook-up) to operations stages (drilling/production and production alone).

Short term effects on sportsfishing due to accute toxicity from spills or discharges of toxic substances during construction and operation of the platforms are likely to occur very infrequently in only very small areas, as discussed in Sections 5.4 and 5.5. Thus, these effects would be adverse but insignificant with regard to sportsfishing activities.

The Pipelines/Power Cable

Construction

Installation of the pipelines and laying of the power cable are expected to have induce Class III impacts, although these impacts will be in the location of the pipeline/power cable route with regard to displacement of sportsfishing activity rather than at the platform sites. The amount of shoreline available for surfcasting is expected to be only minimally impacted by the projects' activities and onshore construction activities due to the installation of the pipelines and power cable (at Ocean Beach County Park, alone).

Operation

Oil spills caused by offshore pipeline accidents or failures could be expected to have Class I impacts on sports fishing activities, both for party boats and surfcasting. The probability of such spills, and their likely magnitude, is discussed in Section 5.11 dealing with system safety and reliability. Likely effects on fish populations have been discussed in Section 5.5 above.

Processing Facilities

Neither construction, modification, normal operations, abandonment, nor accidential or catastraphic events at the various processing facilities are expected to have adverse effect on sportsfishing.

TOURISM

The major factors promoting tourism activity in the tri-county area include the following factors:

- The physical attractiveness of the area's natural resources, including seashore and inland natural resources,
- The areas many recreation, park, and campground facilities,
- The reputation of Santa Barbara as a tourism "destination" for a variety of reasons including historical and architectural features as well as its shore front characteristics, and
- Other factors including the existence of Coastal Routes 1 and Highway 101 through the region.

Two factors could be expected to have adverse effects on tourism in the area are as follows:

- The potential unavailability of hotel/motel rooms and/or camping sites due to their use as temporary housing by workers involved in project construction, and
- The decrease in pleasurable siteseeing and recreational activities that could result from industrial facilities within coastal and rural settings and a major oil spill reaching landfall.

The temporary housing requirements and preemption of public and private campground space due to the need for temporary housing of workers during construction phases of the project is an adverse, but not significant impact.

Additionally, based upon the availability of motel rooms needed for temporary housing of construction workers, some adverse but not significant preemption of rooms available for tourism is expected (See Socioeconomics Technical Appendix). A very small percentage of the total temporary room nights spent by visitors in the Lompoc area are for tourism purposes, as these temporary rooms are assumed to be primarily used by activity associated with Vandenberg AFB. As primary tourism activity in the tri-county area is concentrated from the greater Santa Barbara Area south to the Channel Islands in Oxnard, the need for temporary housing in the Lompoc and Santa Maria areas is not expected to significantly impact overall tourism activity in the tri-county area.

The probability of major oil spills is discussed in Section 5.11 and extensively in Technical Appendix M. There is a probability of less than 16% that a major oil spill will occur over the projects life with major impact to the environment. The probability of any such major oil spill reaching landfall during the projects lifetime is considerably less than this, thus, according to the significance criteria for tourism, it is expected that the project would have an insignificant impact on tourism activity, unless a major spill occured. The potential adverse impact cannot be reasonalby calculated within the scope of this study.

5.10.2.2 Impacts of Alternatives

Alternate Pipeline Routes

If the power cable route were to be located north of the Santa Ynez River rather than south near Ocean Beach County Park, as is currently proposed, the impacts noted above with regard to beach access and use of Ocean Beach County Park during a week of potential closure for installation of the power cable would be alleviated.

Other impacts on recreation, sportsfishing, and tourism are expected to be the same as those cited above for the projects as proposed, as no significant changes in the size of work force required are expected. The alternate route to Site 4 and to Site 8, as well as the mitigated alignment of the alternate pipeline route involve no change in recreation impacts discussed above.5.10.2.3 Area Study Impacts

The option for a consolidated processing facility to handle Area Study production is to upgrade Union Oil's proposed Lompoc Processing Facility, to construct a gas treatment facility near Lompoc and to construct a pipeline from Gaviota to Lompoc or Buellton. This scenario assumes that the oil and gas from the Area Study platforms would connect with Platform Irene by subsea pipelines. From Platform Irene the gas and oil would be sent to the consolidated facility by the pipeline currently proposed by Union Oil.

Thus, platform and pipeline-related impacts in the Area Study are precisely those specified above for the project as proposed with the exception of increased spill probabilities due to the addition of 4 platforms. The impacts are still considered to be Class III, although there is the potential (albeit small) for great disruption of recreation at coastal parks.

However, the processing facility would require expansion. These modifications would require one month of construction with an additional work force from 15 to 20 workers, or, extension of the construction time proposed for the Lompoc Dehydration facility and no increase in the size of the work force. Because of this, no significant increase in impacts on tourism are forecast to result from the use of temporary lodging facilities by workers involved with the facility construction.

5.10.3 Traffic

Onshore traffic is discussed in 5.10.3.0. Beat traffic and helicopter traffic are discussed in 5.10.3.1 and 5.10.3.2 respectively.

5.10.3.0 Onshore Traffic

This section addresses the potential impacts on vehicular traffic roadways. The analysis commences with the onset of project construction activities which is presently scheduled to begin in the third quarter of 1985 for Union and the third quarter of 1986 for Exxon.

The analysis focuses on Level(s) of Service (LOS) on highways and intersections of concern, changes in LOS, and the duration of any such changes caused by the projects. Conventional impact analysis in terms of LOS generally considers any change in LOS to be an important impact. In addition, this analysis addresses the permanent post-construction effects of the project, which will endure for many years and are often far greater than those associated with construction. In the present case, post-construction impacts would be small, since only a few persons are required to operate the onshore facilities, and the larger numbers required for offshore production commute weekly or biweekly, rather than daily, reducing the duration of any impact. This report consequently concentrates on analysis of impacts due to construction and their duration.

IMPACTS FROM PROJECT AS PROPOSED

This section presents the results of the analyses of traffic impacts of the proposed projects by impacted sites, based on the assumptions and approaches described in the preceding section. The project impacts are all classified as either unavoidable significant impacts, significant impacts (Class II) adverse but insignificant (Class III) , Beneficial (Class IV) and Traffic (Class I) impacts for the projects and area study development are all Class III.

Traffic assignments (peak hour trips) to various road sections were based on work force estimates reported in Chapter II. LOSs are calculated from existing peak hour trips and the estimated peak hour trips from Table 5.10-8.

Figure 4.10.3-1 shows the location in the Study Area of the following areas discussed for the identification of impacts:

- Surf Vicinity
- Mission Hills Vicinity
- Santa Maria Airport Vicinity
- Buellton/Highway 246 Vicinity
- Lompoc/Las Cruces Highway 1 Vicinity
- Orcutt Vicinity
- West of Nipomo Vicinity
- Ellwood Vicinity
- Santa Barbara Airport Vicinity
- Port Hueneme Vicinity

Surf Vicinity (Figure 4.10.3-2)

Highway 246 west of Lompoc will be impacted by the onshore and offshore pipeline construction, and the subsea power cable and substation/powerline installation. Installation of the onshore and offshore pipeline and substation/powerline will overlap during the same period in the fall of 1985. The subsea power cable will be installed in late November of 1985 after construction of the offshore pipeline. As a worst case scenario, all the peak hour trips of the onshore and offshore pipeline construction and the substation/powerline will impact Highway 246 near the Vandenberg AFB 13th Street Gate. This will add 234 vph to this area. The LOS would remain at a rating of B (V/C=0.45), but change to almost a C rating. This change in LOS from middle to high B could be considered adverse, but not important in the worst case. The short duration and short peak work force overlap for these facilities would reduce the frequency and duration of any traffic delays in the area significantly during the construction periods.

Mission Hills Vicinity (Figure 4.10.3-2)

The proposed onshore dehydration (Site 4), and onshore pipeline construction from the beach and to Orcutt will impact this area on State Highway 1, State Highway 135 west of Los Alamos, and County Highway S20. Construction of the onshore dehydration facility and the onshore pipeline from the beach will start at about the same time in the fall of 1985, but the pipeline to Orcutt will not start until about March of 1986. For the first month of construction, the proposed pipeline to Lompoc and Lompoc dehydration facility will combine to generate 243 peak hour trips. If this total of 243 vph is added to Highway 1 between Rucker Road and Route 135 East Junction the LOS would change from A to B. This is an adverse, but insignificant impact (Class III). The LOS on Highway 1 between S20 and Rucker Road would change from B to C (Class III), while the LOS south of S20 would remain C.

An unsignalized "T" intersection analysis was done at the HS&P facility Site 4 on Highway 1. It was assumed that the Union road will have no special turning lanes with a Stop control, and all movements would be evenly divided between both directions, with a current peak hour volume of 110 vph on Highway 1 and a demand peak hour volume of 108 on the Union road. This would give a LOS for the intersection of A. However, this intersection has poor sight distance in either direction, and could be a safety hazard, especially with heavy truck use.

For the remaining six months of construction of the dehydration facility a total of 108 vph will impact this area during the peak hour. Then the impacts to the LOS on the above-mentioned road sections would be the same, but of lesser intensity. During production an estimated additional 11 peak hour trips would be generated by the facility. This addition would have no significant impact, nor would there be any change in LOS in this area (Class III).

For the Orcutt pipeline an additional 58 peak hour trips could be expected. On Highway 1 the LOS would remain A, as would Highway 135 east of the Highway 1 Junction and west to Clark Avenue.

<u>Santa Maria Airport Vicinity</u> (Figure 4.10.3-4)

As this is the proposed airport for the helicopter traffic to Platform Irene and for the offshore pipeline construction crew, impacts in this area will result during the construction, drilling, and production phases. For the construction of the Platform and offshore pipeline, 47 vph could impact the peak hour near the airport. The LOS on Lakeview Road and Santa Maria Way would remain C. The area would experience greater traffic delays and congestion at signals and intersections, but the impact would not be significant and is considered unimportant. Access to the airport is very good as Skyway Drive is a divided four-lane road with turning lanes. Parking space at the airport is ample -- 75 spaces for helicopter passenger use (33% of which is currently used).

<u>Buellton/Highway 246 Vicinity</u> (Figure 4.10.3-5)

The intersection of Highway 246 and U.S. 101 and Highway 246 to Lompoc might be used by some of the construction workers during the Fall of 1985. It is assumed for this analysis that 20 percent of all workers from the construction projects of the dehydration facility and onshore and offshore pipeline would use this intersection. This would add 67 peak hour trips. The LOS for Highway 246 west of Buellton would then change from high B to low C. This is considered an adverse but insignificant impact.

The Route 246/McMurray Road intersection is the one location near the Highway 246/101 intersection where congestion and delay may be a concern. This is a signal-controlled intersection. Presently it operates at LOS A though nearby motel construction may reduce it shortly to LOS B [Interface, 1982]. Peak hour traffic through the intersection (all approaches) would be about 600 vph in the absence of the project. The project would add about 10 percent to this flow though the actual nature of the turning movements cannot be predicted. This change in flow is unlikely to reduce the LOS below C. Therefore, at most, the impact of project construction traffic on conditions at the U.S. 101/Route 246 intersection area would be adverse and more probably unimportant.

Lompoc/Las Cruces Highway 1 Vicinity (Figure 4.10.3-6)

This section of Highway 1 could be impacted by workers and trucks coming up from the south coast of Santa Barbara to the proposed construction sites in the Lompoc area. Based upon the location of construction workers in the county it is assumed for the purpose of this analysis that 20 percent of the construction workers for the dehydration facility and the onshore and offshore pipeline would use this road. Then this would again add 67 peak hour trips. At both ends of this section the LOS would remain B, and therefore, the impact would be unimportant. However, the intersection of Highway 1 and Highway 246 will have increased congestion and traffic delays because it is controlled only by a Stop sign. The LOS for the intersection is unknown because the actual nature of the turning movements cannot be predicted. The impact could be adverse, but it is unlikely to be significant or important.

Orcutt Vicinity (Figure 4.10.3-7)

The construction of the pump station and the pipeline to Orcutt will impact State Highways 1 and 135 and Clark Avenue. Construction of the Orcutt pipeline will add 58 peak hour trips for seven weeks starting in March of 1986. The pump station will add 14 peak hour trips for ten weeks starting in September of 1985. This will not change the LOS for any of these roads, and because of small intensity and short duration, the impacts are unimportant.

If 30 percent of the construction workers for the dehydration facility, the pump station and the onshore and offshore pipelines use Highway 135 south of Orcutt, the additional peak hour trips would be 104. This would not change the LOS and the impact would be unimportant.

West of Nipomo Vicinity (Figure 4.10.3-9 & 4.10.3-10)

Construction at the Santa Maria Refinery will impact Highway 1, and Willow, Pomeroy, and Teft roads west of U.S. 101. Beginning in August 1985, 193 peak hour trips will impact these roads for 12 months. Near the Union Road the LOS would change from low B to high B. This is an unimportant impact. An unsignalized intersection analysis was done for the Highway 1/Union Road intersection assuming that 70 percent of the 193 peak hour trips would turn right on Highway 1. The analysis used 370 current peak hour trips, including 80 leaving the refinery and ten entering, and included a special right turn lane. For all turning movements the LOS remained A, and the intersection operates with no delays and congestion. However, because of short sight distances in both directions, and the additional traffic, there may be increased risk of accidents. For the purpose of this analysis, it is assumed that the workers (peak hour trips) will be distributed as follows: 30 percent will use Highway 1 north of the refinery, 30 percent will use Highway 1 south of the refinery, and 40 percent will travel east on Willow, Pomeroy, and Teft Roads to U.S. 101.

North of the Santa Maria Refinery, Highway 1 is a winding, narrow road winding through rolling hills until it comes to Arroyo Grande Road. Right before this junction, the average daily trips (ADT) is 2,700 with a peak of 340 vehicles per hour. This road is then currently at LOS B (V/C=0.20). The addition of 58 vph would not change the LOS (V/C=0.24). Near the Oso Flaco underpass the ADT is 3,000 and the peak hour is 370 vehicles. Again the LOS would not change and any impacts would be unimportant. Taking the capacity on Willow, Pomeroy, and Teft roads to be 1,200 vph, the addition of 77 vph on these roads would change the LOS on Willow from middle A (V/C=0.11) to high A (V/C=0.17); the LOS on Pomeroy from low B (V/C=0.23) to middle B (V/C=0.30); and the LOS on Teft from middle C (V/C=0.55) to high C (V/C=0.61). Since none of the LOS are projected to change, the impacts are Class III.

An unsignalized intersection analysis was done for the intersections of Highway 1/Willow Road and Pomeroy/Teft. 1982 turning movements were taken from the Black Hill EIR by Envicom. For the Highway 1/Willow Road intersection a change in LOS from A to C was calculated for turning movements from the minor road, Willow Road. This would change the traffic delays from no delay to average delay. This is considered an adverse but not important impact. For the Pomeroy/Teft intersection a change in LOS from B to C was calculated for turning movements from the minor road, Pomeroy Road. The traffic delays would change from short to average. This is considered again an adverse but not important impact.

The Santa Maria Refinery modifications will induce an additional 1.4 truck trips per day for sulfur and coke transport. This increase is insignificant (Class III.)

Ellwood Vicinity (Figure 4.10.3-11)

The major impact to this area is during installation of Exxon's Platform Shamrock. During the peak construction worker week in the spring of 1986, 137 additional peak hour trips are estimated to impact Hollister Avenue and the Hollister/U.S. 101 interchange. For this analysis, it is assumed that all the workers will use the Hollister/U.S. 101 interchange and park their cars in the Exxon parking lot on Via Jero Drive, and then be bused to the Ellwood Pier. This additional peak hour traffic would not change the LOS on U.S. 101, which is currently at LOS B. The Hollister/U.S. 101 interchange, which currently operates at LOS A, could be expected at worst to degrade to LOS C. which is an adverse but unimportant impact. The impact to traffic on Hollister Avenue, which is generally light at its west end, is considered to be unimportant. The peak hour traffic near the Ellwood Pier access road on Hollister Avenue is currently 335 vph with and ADT of 3,515 vpd [ESA,1984]. At this intersection the project would not change the current LOS.

Since all of the traffic associated with the offshore work force would occur for one peak hour during only one day of each week because of the shift scheduling the impact is Class III.

Santa Barbara Airport Vicinity (Figure 4.10.3-11)

The maximum impact to the Santa Barbara Airport is during installation of Exxon's Platform Shamrock. An estimated nine peak hour trips are expected to impact the airport during this 7 months. This is considered, at most, an adverse but insignificant impact, even with expected long-term congestion on U.S. 101, and the Hollister/Fairview intersection. Access to the airport from Ward Memorial Parkway would, however, lessen the impact to the Hollister/Fairview intersection.

Port Hueneme Vicinity (Figure 5.10.3-12)

For the Union and Exxon projects together, the estimated additional traffic that would impacting Port Hueneme area is four peak hour trips and 40 daily total trips for the construction, drilling, and operation phases starting in the spring of 1986. In the fall of 1985 the Union project alone would generate half of these trips. During non-peak hours, the streets and intersections are normally operating at LOS A or B and the additional traffic of 40 daily trips would not cause the LOS to change. The character of the additional traffic would be no different from that presently associated with harbor operations. Ample parking spaces for the personal vehicles of crew members appears adjacent to the dock and plans are underway to expand the area available for supply boat operations at the harbor [Arthur D. Little, 1984].

The peak hour trips associated with all the phases of both projects impacting Port Hueneme are so few in number (maximum of four) that no importance is attached to them. They would at most constitute an adverse impact at intersections operating at LOS D or E. Truck deliveries can avoid the peak hours entirely and workers can select among a number of routes to the harbor if they experience unusual delays at a particular intersection in the morning or evening.

IMPACTS OF ALTERNATIVES

This traffic analysis considers several alternatives to the proposed project facility location and pipeline routes. Each alternative may change the intensity and/or the location of traffic impacts.

The same analysis techniques and importance criteria defined above are applied in this analysis of alternatives. The analysis in this section is based upon that presented above for the proposed project, in order to ascertain whether traffic impacts are expected to be enhanced or lessened by the alternatives.

Location of Lompoc Dehydration Facility At Site 8

The intensity of the impact will not change, however, the area impacted will change. The intersection of Highway 1 and Rucker Road will be the major intersection of concern, but it will not be impacted significantly nor will it change in LOS. However, the traffic impacts at this intersection are enhanced in this alternative compared to the Union Road intersection since Rucker Road is used also (though very lightly) by people living in the residential Mission Hills ara. Also an additional "T" intersection on Rucker Road from the road to the site will be created. THe proximity to the Mission Hills area and Calle Lindero Road along with the additional intersection will enhance the impacts of the proposed project but the impacts are insignificant.

If the Lompoc Airport is used, the impacts to Highway 1 will be further enhanced.

Power Line Route North of the Santa Ynez River

This route would shift the location of the impacts from Surf and Highway 246 to VAFB 13th Street Gate and other VAFB gates. The impact (Class III), though, should not change in intensity or duration.

Alternative Onshore Pipeline Route to Site #3

This route would shift the location of the impacts farther south along Highway 246 and other streets near Lompoc rather than near the VAFB gates. Though the duration should not change, the route would enhance the frequency and intensity of the impacts along these streets (Class III).

Alternatiave Onshore Pipeline Routes to Site #8

The pipeline route to this site would shift the location of the traffic impacts near the end of the route further south, and the impacts to Highway S20 and Highway 1 here would be enhanced (Class III).

No Project Alternative

With no project there will be no traffic impacts.

Decommissioning

Decommissioning will cause similar impacts as construction of similar duration.

IMPACTS OF AREA STUDY DEVELOPMENT

Offshore

Exploration activity indicates the presence of large oil and gas reserves in the offshore Santa Maria Basin. For this reason, it is likely that platforms other than Irene will be constructed in that OCS area. For the purpose of this analysis, it is assumed that 4 additional platforms would be built following completion of Irene and Shamrock. The impacts associated with these 4 platforms (and Irene and Shamrock) constitute the offshore portion of the Area Study.

It is assumed that one additional Area Study platform is constructed each year starting in 1988, however, the last two platform designs would be Irene-like but the worker shifts would be like Shamrock. That is, the shifts would be 14 days on/7 days off and daily for construction, and 7 days on/7 off for drilling and production.

In this analysis of onshore traffic, the level of support (i.e., construction and operation personnel, truck deliveries of equipment) needed by ARea Study platforms is assumed to take place just as it would for Platform Irene. This means that offshore workers for construction, drilling, and production would be transported to their work sites via helicopters form the Santa Maria Airport. Heavy and/or large supplies would be delivered by truck transport to supply boat loading sites at Port Hueneme.

Since the only significant traffic impacts are associated with the short construction periods, the traffic generation factors in Table 2.2.1 for Platform Irene and the offshore pipeline can be used. The construction period impacts, therefore, would remain the same as the Union Project in the years 1988 and 1989, with a possible doubling in traffic during 1990 when the last two platforms are started. At the Santa Maria Airport, the peak hour vph of 43 would change to 86. This would not change the current LOS of C on lakeview Road or Santa Maria Way. There is ample parking at the airport, but the congestion at the intersections will increase, and the impact could be considered adverse, but not significant. Traffic impacts in the vicinity of Port Hueneme and Oxnard will result from supply boat activity. Delivery trucks and boat personnel vehicles will travel on city streets in that area. As in the Union Project, this activity is assumed to occur at non-peak hours, and because of small traffic volume, is not judged to be important.

Onshore

The onshore portion of the Area Study includes the construction of a consolidated gas processing facility adjacent to the Lompoc facility, an onshore pipeline exiting the Lompoc facility, and expansion of the Lompoc oil processing facility. The new gas processing facility should begin construction in July-August 1988 and require approximately 6 months to complete with an average work force of 140. Th onshore pipeline will probably start construction in August-September 1988 and require a work force of 65 for 7 to 15 weeks, depending on the route. It is not certain at this time the location or route of the pipeline, but the pipeline could tie into the Celeron pipeline in Buellton and the Getty pipeline at Gaviota. The expansion of the Lompoc oil processing facility would probably start construction in November-December 1988 and require 15-20 workers for approximately one month of installation.

The maximum workforce, therefore, associated with the onshore Area Study is 225 workers for the month of December in 1988. Depending where the workforce is on the pipeline route, a possible 205 workers could impact the Lompoc area for four months starting in August 1988. The highways that will be impacted will be Highway 1 and 246, and U.S. 101 near the end of the pipeline routes. Using the same assumptions as for the projects, the maximum peak hour trips impacting these highways will be 213 for one month and 195 for four months in late 1988 (including the operation phase of the Lompoc Dehydration facility). Since this is less than the 243 vph impacting this area for the project (see Project Impacts - Mission Hills Vicinity), the impact will be adverse, but not important.

5.10.3.1 Boat Traffic

Addendum A, Marine Traffic Hazard Analysis, to Technical Appendix M presents detailed information on expected increases in vessel traffic in the Santa Barbara Channel, Santa Maria Basin, and in the vicinity of Port Hueneme. This Addendum also presents a variety of information relating to the Coast Guard's proposal to extend the vessel traffic separation scheme currently established in the Santa Barbara Channel to a point north and west of the proposed project area, and to obtain approval of this from the International Maritime Organization as an internationally sanctioned marine traffic separation system. Tables 2.1-12 and 2.1-13 have noted that one supply boat round trip is expected every five days during the life time of the Irene project and daily trips by crew boats would be made to Exxon's platform during the project's lifetime. Additionally, up to one trip a day to and from Exxon's platform is expected by supply boats.

This incremental level of activity is not expected to adversely impact boat traffic of all types in the area, provided that normal navigational safety practices are followed. This conclusion also pertains to additional levels of activity expected with regard to Area Study Development.

5.10.3.2 Helicopter Traffic

Table 5.10.3.2-1, following presents an analysis of expected helicopter flights per day by airport for the years 1985 through 1992 for the Union project, the Exxon project, and with regard to Area Study Development. These operations represent approximately a .1 percent increase in current operations at Santa Barbara Airport.

This increase is not expected, in and of itself, to require expansion of airport facilities at Santa Barbara or Santa Maria either with regard to the proposed projects or to the Area Study development. Santa Barbara Airport is planning parking expansitons to accomodate future as well as current needs.

Details on noise impacts are included in Technical Appendix I and safety details are included in Addendum B to the Systems Safety Technical Appendix (App. M).

5.10.4 Impacts on Military Activities

As noted previously, the coastal waters and airspace of central California see considerable military use. Operations in the vicinity of the Union and Exxon projects are associated with the Western Space and Missile Center (WSMC) located at Vandenberg AFB and the Pacific Missile Test Center (PMTC) at Point Mugu.

Also mentioned earlier are two restricted airspace areas off the coast in the project vicinities, use of which is scheduled and coordinated by WSMC, and a new restricted airspace area is proposed to the east of the existing areas. Thus, transport of crews to and from the platform sites, as well as to and from the platform and pipeline/power cable laying areas could affect and/or be affected by military activities. It is not expected that project activities would significantly affect military activities.

Further, the platform sites are within the Space Shuttle Launch and Recovery Area, as well as the Orbitor Training Area, and the site is beneath the Space Shuttle Recovery Overflight Path. Western test range danger zones have been established down range from launch complexes, and a hazard corridor

Table 5.10.3.2-1

HELICOPTER RONDTRIPS/DAY BY AIRPORT

	Year							
	1985	1986	1987	1988	1989	1990	1991	1992
Union Project								
Santa Maria Airport		7	7	7	4	4	4	4
Exxon Project								
Santa Barbara Airport			3	3	2	2	2	2
Area Study*								
Santa Maria Airport		7	7	11	15	20	18	16
Santa Barbara Airport			3	3	2	2	2	2

* 5 platforms served from Santa Maria, Exxon served from Santa Barbara.

Source: ADL estimates based upon applicants project description.

along the flight path and an adjacent caution zone are in effect during each launch. By order of the Commander of WSMC, hazard corridors must be cleared of nonessential personnel during pertinent activities, and essential personnel must be sheltered in facilities capable of providing protection from potential fragment or blast impacts. Further, because of the level of military activities in the area of OCS-P 0440 and P-0441, stipulations have been established requiring all marine vessels and aircraft within the warning areas to coordinate and comply with instruction from the Commanders of WSMC and PMTC, or any other appropriate military agency. Again, these are impacts of the military on the project, rather than impacts of the project on military activities.

However, two aspects of the project will impact military activities, although these impacts are not thought to be of a Class I or Class II magnitude. These include:

- Increased usage of the 13th Street gate to Vandenberg AFB, and

- Construction of the pipeline right-of-way through Vandenberg AFB

With regard to the latter impact, it should be noted that preliminary correspondence from responsible Air Force officials indicates that the military does not expect right-of-way construction to significantly affect military operations and indications are that both construction and ongoing military activities can be accommodated through normal scheduling practices. However, Vandenberg AFB officials also have pointed to their concern that only one right-of-way be established through the base pertaining to all cumulative oil development projects, so future oil-related development within the Base may have to be restricted to the right-of-way established during this current project.

5.10.5 Commercial Shipping

Commercial shipping lanes have been established running roughly northwest/southeast of Point Arguello. Formal shipping lanes have also been proposed north/south of the existing lanes, from Point Conception.

Data provided by project participants and described in the project's description indicates that crew boat trips would in all probability total less than ten daily. This level of increase in total round trips from the (Ellwood Pier and Port Hueneme combined), to the construction sites is not expected to present a significant impact on commercial shipping traffic in the area if normal navigational and safety procedures and practices are followed.

5.10.6 Mitigation Measures

The impacts associated with the proposed and cumulative projects are amenable to mitigation in several manners.. Some of these mitigations would be fully effective while others would only reduce but not eliminate adverse or important impacts. Most of those suggested below could be implemented by the project proponent and if done so, would impose no financial burden on public agencies. However, some of the mitigations may cost little or nothing to implement.

Currently the County of Santa Barbara assesses a fee of $1,000 per peak-hour trip generated by a project. Peak-hour trips relevant to this fee are those associated with project operational activity rather than construction activity.

Suggested mitigations include:

- Street Improvements for the Goleta Area. A variety of street improvements including widening for extra lanes, signals, road alignments, additional turning lanes, restriping, and other physical modifications to the streets and intersections are outlined in many EIRs [Hyatt, Raytheon, etc.] and are certainly needed to alleviate existing congestion problems.

- Increased Airport Parking. Parking areas are presently in short supply at the Santa Barbara Airport. The use of a portion of those spaces that are available by offshore workers causes inconvenience to other airport users. Additional areas within the airport grounds could be paved and set aside for long-term parking. Otherwise, outlying parking areas could be used with workmen then bused to the airport. In either case, the impact on airport users could be eliminated.

- Staggered Timing of Construction Work Shifts. The greatest number of trips generated by the project occur during the construction phase. Traffic congestion impacts during this period would be reduced or eliminated if workmen were not on the highways during peak hours. This would be accomplished if the daily work shifts began at 7:00 or 7:30 a.m. or earlier and ended prior to 4:00 p.m. or after 5:30 or 6:00 p.m.

- Busing of Offshore Workers. Busing of all offshore workers from outlying parking areas to the staging areas (Santa Barbara and Santa Maria Airports, Ellwood Pier, etc.) would greatly reduce the adverse impacts of project-related vehicles on the areas streets, intersections, and parking areas.

- Scheduling Offshore Crew Changes at Midday. The Santa Barbara Airport is in the midst of an area currently experiencing critical peak-hour traffic flow problems. These problems are unlikely to improve because of limitations on maintenance and capital budgets with Santa Barbara County government. It is important that crew shift changes via helicopter at the airport not impose additional peak hour trips. It was assumed in the analysis that this is mostly the case. Since the crews work seven to 14 day shifts, it should be possible to move them during the midday. Other areas (Santa Maria Airport, Ellwood Pier, etc.) would also greatly benefit from this mitigation.

- Scheduling Truck Trips at Non-peak Hours. Truck transport should occur during periods of light traffic; school bus hours and commuter traffic periods (peak hours) should be avoided. If this measure is adopted, then traffic congestion, reduction in normal traffic speeds, and risk of traffic accidents will be significantly minimized.

- Development of Carpool/Vanpool Program. Carpools and vanpools could significantly reduce employee commute traffic, especially for the potentially large number of long distance commute trips. A well publicized program of employee matching that would encompass cumulative projects could significantly reduce peak hour traffic.

- Encouragement of Transit Ridership. The Transit District should consider possible route and/or schedule modifications to better serve the project areas. To complement such modifications, the projects, in coordination with adjacent developments, could provide sufficient areas for bus stops and shelters, especially in the Goleta area. New employers could also make transit information available to employees and obtain monthly transit passes for onsite sale to employees.

- Encouragement of Pedestrian and Bicycle Traffic. Include sidewalks in any site improvements to allow and encourage pedestrians. Provide bicycle racks and shower facilities to promote bicycling and running to and from work.

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5.11 SYSTEM SAFETY AND RELIABILITY

The purpose of the system safety and reliability assessment is to identify accidental events which might occur in the proposed project, assess whether they might cause adverse effects to the public or the environment, and then to suggest appropriate mitigation measures which might be adopted to reduce the assessed risks. Risks to the operators' personnel on the platforms or at the onshore facilities are not included in this assessment.

In the following sections are brief discussions of:

- Classification of safety-related impacts;
- Methodology for system safety and reliability assessment;
- Offshore oil spill hazards and mitigation measures;
- Onshore oil spill hazards and mitigation measures;
- Flammable and toxic release hazards and mitigation measures;
- Product transportation hazards and mitigation measures;
- Overall public risks from the project;
- Oil spill and safety-related risks of alternative ways of implementing the project; and
- Safety implications of Area Study development of the Central Santa Maria Basin beyond the two platforms currently proposed.

The findings of the system safety and reliability analysis are discussed briefly below, in relatively nonquantitative terms. The discussion is geared toward a general audience; those seeking more details of the system safety and reliability assessment will find them in the indicated sections of Technical Appendix M. Both this summary and Technical Appendix M focus on safety impacts as well as offshore oil spill consequences; any other environmental consequences of the accident scenarios are discussed in other sections of the main EIS/EIR volume.

5.11.1 Classification of Safety-Related Impacts

The accidental events have been classified according to their criticality and also by the frequency at which they might occur, as shown in Table 5.11-1. As indicated, there are criticality classifications for both public health hazards and oil spill consequences. The frequency classifications are particularly useful when the effectiveness of mitigation measures are evaluated.

Based on these criticality and frequency classifications, the significance of each accidental event has been presented in two ways, both of which are important:

Table 5.11-1

CRITICALITY AND FREQUENCY CLASSIFICATIONS

(a) Criticality Classification for Public Safety Hazards

Classification	Description of Public Safety Hazard
Minor	Hazard involving, at most, a few minor injuries.
Major	Hazard involving up to 10 severe injuries.
Severe	Hazard involving more than 10 severe injuries or one or more fatalities.

(b) Criticality Classification for Oil Spills**

Classification	Description of Spill Scenario
Minor	Spill of up to 1,000 gal (24 bbl) to inland waters*, or up to 10,000 gal (240 bbl) to coastal waters.
Medium	Spill of 1,000 to 10,000 gal (24 to 240 bbl) to inland waters*, or of 10,000 to 100,000 gal (240 to 2,400 bbl) to coastal waters.
Major	Spill of more than 10,000 gal (240 bbl) to inland waters*, or of more than 100,000 gal (2,400 bbl) to coastal waters.

(c) Frequency Classification for Public Safety Hazards and Oil Spills

Classification	Occurrence Rate	Description
Rare	Less than once in ten thousand years	An event which almost certainly will not occur during the project lifetime.
Unlikely	Between once in a hundred and once in ten thousand years	An event which is not expected to occur during the project lifetime.
Likely	Greater than once in one hundred years	An event which probably will occur during the project lifetime.

* This classification has been applied to all inland spills regardless of their potential to affect inland waters.

**Source: National Oil and Hazardous Substances Contingency Plan, EPA 40 CFR Part 300, July 16, 1982.

- Deterministically: the consequence if the event were to occur; and
- Probabilistically: the average annual risk caused by the accidental event, i.e., consideration of both the frequency of the event and the likelihood of the impact of concern.

5.11.2 Methodology for System Safety and Reliability Assessment

The methodology for the assessment consists of the following steps:

- Identification of system failures and accidental events;
- Estimation of possible release quantities;
- Hazard analysis of the consequences resulting from those releases;
- Assessment of overall levels of risk;
- Review of the operator's contingency plans to deal with the releases, should they occur;
- Consideration of mitigation measures that might be adopted to reduce the assessed risks of the proposed projects.

5.11.2.1 Identification of System Failures and Accidental Events

Two complementary techniques are used to identify events that might lead to impacts. The first approach is to analyze historical accident records to predict events that might occur in the Union and Exxon projects. As discussed in Appendix M, Section 2.1.4, this historical approach is valid where there is sufficient statistical information from activities similar to those proposed in these projects to permit reliable estimates. Examples where sufficient data are available include well blowouts, pipeline failures, and product transportation accidents.

However, the process equipment proposed for the platforms and for the onshore processing facilities is too complex for such a historical approach to be applicable. Thus, engineering analyses of the project-related process systems have been conducted as described below.

HAZARD IDENTIFICATION

Using the technique of hazard and operability studies, as described in Appendix M, Section 2.1.1, a critical examination is made of the preliminary piping and instrument diagrams, layouts, and process drawings to identify potentially hazardous deviations from normal conditions. Typical deviations could be caused by equipment failures (such as a normally closed valve opening wide) or by human error (such as omitting to close a valve during a sequence of operations). Consideration is then given to safety equipment, such as shutdown systems, that might control deviations automatically, as well as to information from alarms and indicators that might warn facility personnel to take appropriate action. In addition, consideration is given to external events such as earthquakes, aircraft impacts, military and space traffic hazards, and vessel collisions that might lead to rare hazards with large consequences. Other platform design inputs, such as weather-related accidents, are not considered capable of effecting serious consequences.

FAULT TREE ANALYSIS

The various system failures and accidental events are displayed in the form of fault trees (Appendix M, Section 2.1.2); logical representations of the chains of events leading to particular undesired top events, such as oil spills or releases of flammable or potentially toxic gas.

The frequencies of accidental events are then estimated, for later use in considering mitigating measures and determining overall risk. As discussed in Appendix M, Section 2.1.4, historical accident statistics are used for blowouts, pipeline failures and transportation accidents, while the frequencies of the top events in fault trees are developed by applying failure rate data to the individual elements of each tree. These failure rates are based either on information obtained from failure data files, from the literature, or on estimates that combine information supplied by the operators with information from other sources. In some cases it is necessary to use engineering judgment to modify the reported data to reflect more accurately the conditions anticipated in the operators' proposed facilities.

5.11.2.2 Estimation of Possible Release Quantities

Appendix M, Section 3 describes the following two approaches which have been applied to quantify spill amounts and to ensure their validity for the particular facilities of concern:

- Historical data are used where the physics of the discharge phenomenon are poorly understood, or where an engineering analysis would require data that are not readily available and could not be estimated without an extreme degree of uncertainty. The technique is principally used for blowouts. Historical data are also used to confirm that the results of engineering analyses or estimates are credible from a historical perspective.

- Engineering analyses are used to consider key features and characteristics of the proposed systems in order to provide more accurate assessments of spill volumes or discharge rates.

5.11.2.3 Hazard Analysis

The spills are divided into three categories, which are analyzed in distinct ways, because they affect the public and the environment differently:

- Offshore oil spills;

- Onshore oil spills;
- Flammable and/or potentially toxic releases onshore.

OFFSHORE OIL SPILL HAZARD ANALYSIS

Nearly all of the potential oil spill events identified in the assessment would be of short duration -- typically a few minutes to perhaps a few hours. Therefore, in conducting the analysis described in Appendix M, Section 4.1, it was assumed that the entire volume of oil was spilled and could be treated as an instantaneous spill. This approach leads to generally conservative estimates of the environmental risks resulting from the spill behavior, as a larger slick will result, more evaporation and more dispersion into the water column may occur. Moreover, only instantaneous spill models are currently available.

Oil spilled into the ocean will spread rapidly, with three dispersion phenomena occurring simultaneously:

- A portion of the oil (which depends on the composition of the oil) will evaporate, causing an air-quality impact which was addressed in Section 5.2 of the EIS/EIR.
- Another portion (which depends on the sea state) of the oil will form droplets which are dispersed into the water column by wave action, giving a marine water quality impact which was addressed in Sections 5.4 and 5.5 of the EIS/EIR.
- The oil remaining after evaporation and water column dispersion will form an oil slick on the surface. Depending on the sea state, it may remain as a single slick or be broken into several slicklets covering a larger area of the ocean. The impact of such an oil slick is discussed in the following pages.

Wave height and wind speed data from the Santa Barbara Channel area are used to establish three representative sea state conditions employed in estimating the time-history of the dispersion characteristics of oil slicks.

Sea State	1/3 Significant Wave Height*	Wind Speed
Mean seas: 50% of time during non-stormy conditions	4.1 feet	13 knots
Rough seas: 1% of time during non-stormy conditions	7.9 feet	18 knots
Stormy: worst annual storm conditions	16.4 feet	26 knots

* Based on average of the third-highest wave heights. Maximum wave heights are typically twice the 1/3 significant wave height.

An oil spill trajectory analysis is then performed to assess the probability that oil spills, originating offshore, would impact the coastline. This uses a "Monte Carlo" simulation technique to relate the motion of oil slicks to prevailing wind and current conditions. Eight representative spill locations, shown on Figure 5.11-1, are used to demonstrate the effects of spills at project locations as well as for representative locations applicable to the area study and to the cumulative impact study. These locations, where were selected with the assistance of the MMS, include locations under four categories:

Proposed Projects:

1. At Platform Irene.

2. Two miles offshore from the proposed Union pipeline landfall.

3. Shamrock platform.

Alternatives:

3. Midway between the Shamrock Platform and Platform Hermosa.

4. At Platform Hermosa.

8. Midway along the pipeline from Platform Hermosa to Point Conception.

Area Study:

6. A location representative of future platform locations in the Central Santa Maria Basin.

Cumulative:

5. A location in the proposed precautionary area at the junction of the major shipping lanes (discussed in Technical Appendix M, Addendum A).

Some 3,000 trajectories are simulated for each location for each of the four seasons of the year, to yield seasonal and annual average estimates of conditional contact probabilities* on the neighboring shoreline areas. As discussed in Addendum D of Technical Appendix M, 3,000 trajectories provide sufficient accuracy (i.e., convergence) for the purposes of this analysis. The shoreline areas include the environmentally sensitive mainland coast stretching from north of Point Sal down as far as Santa Barbara, the westerly Channel Islands, and the sea otter range extending from north of Point Ano Nuevo southward to the mouth of the Santa Maria River.

The methodology and results of this analysis are given in Section 4 and Addendum D of Appendix M. Not surprisingly, spill locations closest to the shore are found to have the highest shoreline conditional contact probability; the highest contact estimate on an annual basis is 40 percent for the shore

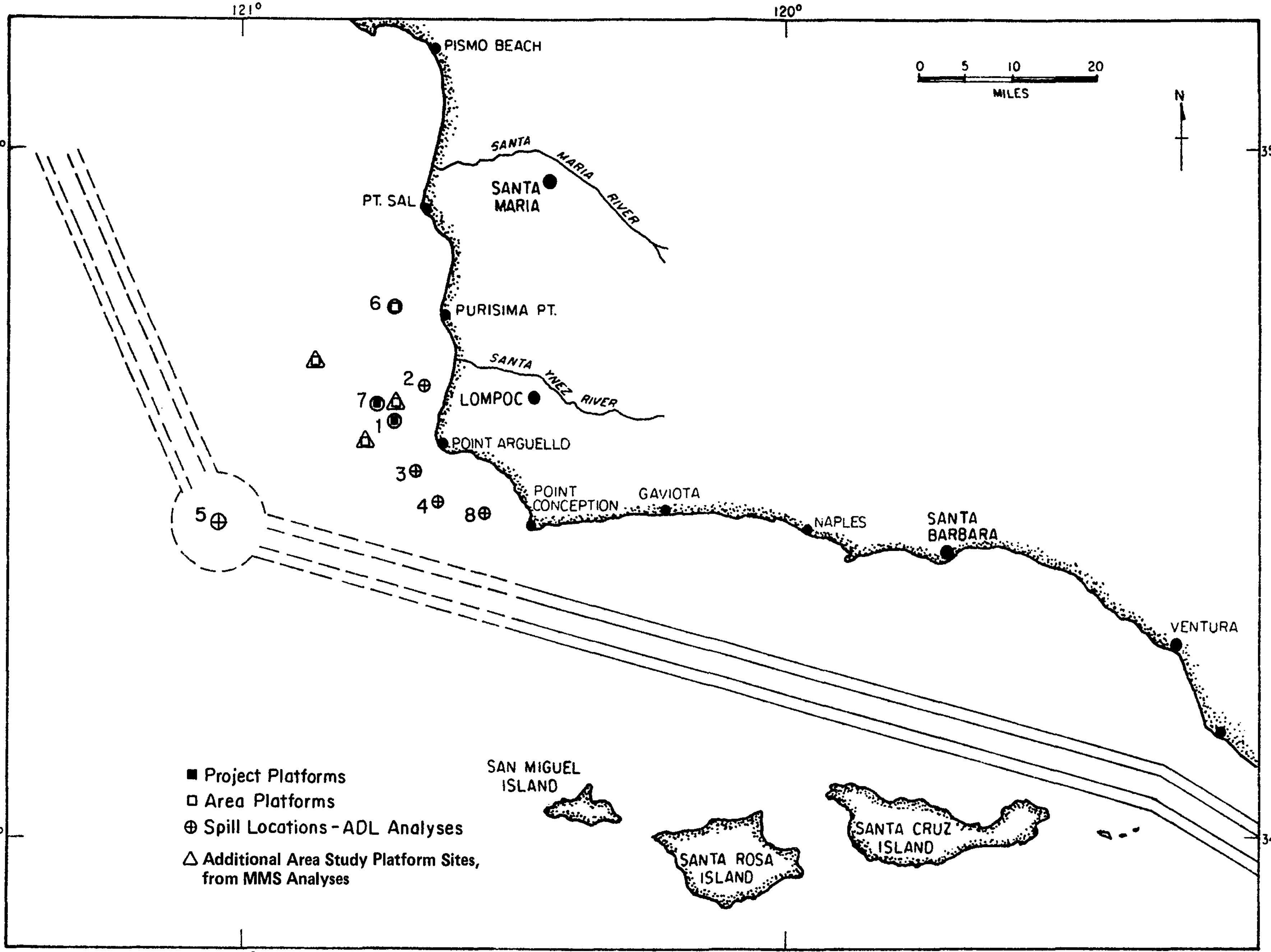

FIGURE 5.11-1 OIL SPILL LOCATIONS SELECTED FOR ANALYSIS

segment at Point Arguello, from a postulated Union project pipeline oil spill at location 2. Spills originating at the platforms have an estimated shoreline contact probability of about 10 percent over all land segments. On a seasonal basis, spill events occurring in the spring season have a somewhat higher probability of contacting the shoreline, although the variation among the seasons is not large.

Given that an oil spill does occur and contacts the shoreline, the resulting degree of coastline pollution cannot readily be predicted by a mathematical model. It is, therefore, estimated from the results of an extensive study of consequences of the Ixtoc I spill on the South Texas coast, which indicated that the landfall of approximately 120 tons of oil (900 barrels) per mile will likely result in heavy pollution, with 25 tons of oil (200 barrels) per mile causing moderate pollution. For the Ixtoc I spill, heavy pollution was defined as coverage of more than 65 percent of the intertidal zone, while medium pollution referred to coverage of 25 to 65 percent of the intertidal zone. For some environmentally sensitive areas of interest to the Union and Exxon projects, such as the Santa Maria River and Santa Ynez River mouths, for example, even light pollution could result in significant environmental damage.

Finally, the oil spill hazard analyses are combined with the frequencies at which oil spills are estimated to occur, in order to estimate the frequency with which different coastline areas might be contaminated by oil spills. Detailed results of the trajectory and fate and effects modeling efforts are found below in Section 5.11.3 and in Technical Appendix M.

ONSHORE OIL SPILL HAZARD ANALYSIS

Onshore oil spills may arise from accident events in the onshore oil dehydration or pumping facilities, or from pipeline leaks and ruptures. Maximum spills for such events are based on the results of fault tree analysis and on historical data. It is expected that most spills from facility accidents would be contained by on-site impoundments. The potential consequences and trajectories of uncontained onshore oil spills are particularly sensitive to the specific spill location, as the motion of such spills is essentially dependent upon the local terrain. Onshore spills can generally be controlled and cleaned up to minimize their impact, although spills near estuaries and other wetland areas could be significant, and are examined in Sections 5.6 and 5.7 of the EIS/EIR.

FLAMMABLE AND TOXIC RELEASE HAZARD ANALYSIS

Depending on the nature of a release and on whether there is immediate or delayed ignition, a particular hydrocarbon release may lead to one or more of the following consequences:

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* i.e., defined as the probability of contacting the shoreline, <u>given</u> that a spill has already occurred.

- Burning pool on land or water;
- Jet fire, from a continuous release from a pressurized source;
- Vapor cloud explosion;
- Fireball;
- Vapor cloud dispersion, delayed ignition, and vapor cloud fire or explosion, followed by pool or jet fire;
- Toxic vapor cloud dispersion; or
- Flammable vapor cloud dispersion without ignition, and therefore no hazard.

Toxic hazards would only pose a potential problem if the gas were to contain H_2S. Current estimates are that the project gas will likely have no H_2S, at least initially, but could have as much as 1100 ppm at some future time. For this study, two cases are evaluated: the first assumed no H_2S in the gas, while the second considered 1100 ppm of H_2S in the gas.

For each release scenario, all of the relevant consequences are calculated using the computerized hazard models described in Appendix M, Sections 4.2 and 4.3, with potential hazard distances based on the following criteria.

Thermal Radiation Hazard Criteria

The thermal radiation from a fire may cause burns on bare skin if the intensity of radiation is sufficiently high and if the exposure is of sufficient duration. The criteria adopted for steady-state radiation are 1,600 Btu/hr-ft^2 (5 kW/m^2) for injury to 50 percent of the exposed public (corresponding to unbearable pain after 13 seconds and second-degree burns after 40 seconds) and 3,200 Btu/hr-ft^2 (10 kW/m^2) for fatality to 50 percent of the exposed public and injury to the other 50 percent (assuming a 40-second exposure). For a rapidly changing thermal flux (such as the radiation from a rising fireball), the duration of exposure is only a few seconds, and the severity of burns depends on the amount of energy absorbed in the skin after its temperature reaches 130°F - an additional exposure of 7.0 Btu/feet^2 is considered to result in injury and 14 Btu/feet^2 in fatality.

For comparison, the thermal radiation at the surface of the earth on a hot summer day is on the order of 300 Btu/hr-ft^2 (1 kW/m^2), while a long-term exposure to a level of 10,000 Btu/hr-ft^2 (30 kW/m^2) would be needed to char and eventually ignite wood.

Overpressure Hazard Criteria

Explosions can injure or kill people due to the direct effects of overpressure, with 15 psi causing lung damage and 50 psi causing 50 percent fatalities. However, much lower levels can seriously damage structures, and the criteria adopted in this study are 0.5 psi for injury to 30 percent of the exposed public (resulting from shattered glass), and 3 psi for fatalities to 30 percent of the exposed public and injury to an additional 30 percent (both resulting from severe damage to buildings).

Flammable and Toxic Vapor Hazard Criteria

Vapor dispersion of flammable materials is of concern if the cloud should be ignited. In principle, it is not possible to ignite a vapor cloud whose concentration is below the lower flammable limit (LFL); however, in a dispersing cloud the concentration will fluctuate due to atmospheric turbulence. Therefore, dispersion of the cloud to a concentration of one-half the LFL is selected as the flammable hazard criterion. Thirty percent of the people within the ignited vapor cloud are assumed to be fatalities, and, the remaining 70 percent are assumed to be injured.

The dispersion of toxic vapors is measured against the "immediately dangerous to life and health" (IDLH) criteria which are considered appropriate for short-term (30-minute) acute exposure. For H_2S, the IDLH criterion is 300 ppm; accordingly, fifty percent of those exposed to an H_2S dose equivalent to 300 ppm for 30 minutes or more are assumed to be fatalities, with the remaining fifty percent being injured. Products of combustion (such as SO_2) have not been explicitly evaluated because the duration of such hazards as well as the concentrations experienced were determined to be too low to present any hazard.

Certain consequence scenarios are mutually exclusive; for example, immediate ignition of a gas release would prevent the subsequent dispersion of flammable or toxic vapor. This factor is taken into account when computing overall levels of risk.

5.11.3 Offshore Oil Spill Hazards and Mitigation Measures

Offshore oil spills may arise either from one of the platforms or from the offshore pipelines.

5.11.3.1 Oil Spills from Offshore Platforms

A particular concern during well drilling and production is that there might be a blowout - an uncontrolled discharge of oil and/or gas from a drill hole. A blowout can occur if the careful measures taken to contain the reservoir pressure fail to do so, due to equipment failure, human error, or unpredicted geopressure conditions. Such an event occurred in 1969 in the Santa Barbara Channel and led to the largest blowout-related oil spill to date on the U.S. OCS. Since that date, changes resulting from increased regulatory requirements as well as improvements in training programs, equipment, and operating practices have greatly reduced the probability of a recurrence of that particular type of event. Even so, it is predicted in Appendix M (Addendum E) that blowouts might occur during development of the Central Santa Maria Basin, but that such accidents are unlikely.

Oil spills might also occur from process and storage systems on the platforms, from a variety of causes:

- Seismic events, high-energy vessel collisions, marine casualties, or spontaneous structural failure events could lead to failure of oil-containing vessels, such as the oil-water production separators which will normally be about one-third full of oil on a dry oil basis with natural gas in the vapor space. (Criticality - minor; frequency - unlikely.)

- Maloperation or mechanical failure of oil pipeline pig launchers on the platforms or the pig receiver on Platform Irene would release wet oil at the pipeline pumping capacity until the system could be isolated. (Criticality - minor; frequency - rare for extended releases from launchers or receivers.)

- External impacts on the two platforms that might cause partial or total destruction of the platform were identified as ship-platform collisions, aborted space missions, aircraft accidents, and seismic events. If complete structural collapse of a platform were to occur, it is expected that the subsurface safety valves would prevent blowouts from the wells. Nevertheless, oil will be lost from ruptured production well casing/tubing, oil-containing vessels and tanks, and from broken pipelines or risers. The latter would provide the major sources of oil loss and the loss of either platform would result in a relatively large spill. (Criticality - major for Platform Irene, because the spill would include the contents of the Shamrock to Irene pipeline, but medium for the Shamrock platform; frequency - rare for each.)

5.11.3.2 Oil Spills from Offshore Pipelines

Important failure modes for both offshore and onshore pipelines are due to such causes as external corrosion, external impact (i.e., anchor dragging), mechanical defects, natural hazards, internal corrosion, and operating errors. Historical data indicate that the first three causes account for a majority of all pipeline failures.

A number of surveys have attempted to differentiate pipeline failures by offshore/onshore, product carried, diameter, etc., but only the diameter has proved to be significant (with the failure rate decreasing as the diameter increases). For these projects, a higher failure rate is used for the smaller pipelines (12 inches or less in diameter) than for the larger pipelines. Further details are provided in Section 2.3 of Technical Appendix M.

In the event of an oil pipeline rupturing (as discussed in Section 3.2 of Technical Appendix M), there will be early-time losses due to the continued pumping of oil until the break has been detected and all the pipeline pumps shut down. Because of the length of the pipeline from the offshore platforms to Lompoc, which will delay the onset of flow discrepancy alarms, and the need for Lompoc then to request the platform to shut down pumping, it is estimated that a reasonable reaction time will be around ten minutes. The loss due to pumping is much less than the inventory lost after pumping has stopped, hence minor variations in response times will not affect the total quantity lost appreciably.

Once pumping has stopped, ocean water will intrude into the broken pipeline sections and expel oil. If the pipeline were completely horizontal and the line were completely severed, the loss would equal the total inventory in the subsea segments. However, any rise in the pipeline across the sea bed will lead to an "intrusion trap" where lighter-than-water oil becomes trapped above water and prevents further oil release. As the project pipelines rise gradually from the Project Shamrock platform to Platform Irene and then to landfall, the extent of loss will depend greatly on the location of the rupture. Thus, the maximum loss from a break in the subsea pipeline connecting Platform Irene to Lompoc is assumed to be 18,000 barrels of dry oil (major criticality) if the break is near shore, with lesser volumes for breaks elsewhere in this line. The corresponding spill from the inter-platform oil pipeline from Shamrock to Irene was assumed to be 1,250 barrels (medium criticality).

If, instead of a rupture, there were to be a sizable leak, approximated by a two-inch diameter hole, the initial release rate would be significantly lower and only 250 to 350 barrels of dry oil would be released in the first ten minutes (medium criticality). However, unless an early repair were possible, the pipeline would slowly lose more oil, estimated at up to 2,000 barrels of dry oil for the line from Irene to shore and up to 1,250 barrels for the interplatform line (both medium criticality).

In the event of a small leak, historical data suggest that the spillage would be no more than 100 barrels of dry oil (minor criticality).

5.11.3.3 Overall Offshore Oil Spill Hazards

Table 5.11-2 shows the representative spill volumes and the frequencies of shoreline contact for various spill accidents. This table shows that oil spills of up to a few hundred barrels may arise from a variety of causes but the larger spills will be almost entirely caused by well blowouts. Figure 5.11-2 shows the size distribution of offshore oil spills. Four curves are shown on Figure 5.11-2. Two of these represent the spill distributions for the Union Oil project which may occur from location 1 or location 2 as shown on Figure 5.11-1; the upper curve is for the early years while the platforms are at risk from blowouts, and the lower curve is for the later years when production blowout spills have ceased to be possible due to insufficient downhole pressure. The third curve shows the spill distribution for the Exxon Project from the Shamrock platform or the pipeline to Irene. The overall spill frequency for both projects, for spills of 100 barrels or more, is once every 55 years during the period when production blowouts are possible, and once every 90 years afterwards. (Because of relatively low pressures in the Pt. Pedernales reservoir, it is estimated that oil well blowouts will be possible only for the first year of production from any one well.)

Table 5.11-2

EXAMPLES OF OFFSHORE OIL SPILL HAZARDS

Accidental Events	Spill Volume (bbl)	Frequency of Contacting Coastline*
Blowout	1,000 - 10,000[1] (medium to major)[2]	Once in 4,100 years (unlikely)[2]
	10,000 - 100,000 (major) (unlikely)	Once in 5,700 years
	100,000 or more (severe)	Once in 11,000 years (rare)
Separator Rupture	120 (minor)	Once in 48,000 years (rare)
Pig Receiver (1 min.)	15 (minor)	Once in 25,000 years (rare)
Platform Irene Collapse	2,500 (major)	Once in 910,000 years (rare)
Oil Pipeline Rupture-Midway to Shore	8,400 (major)	Once in 16,000 years(rare)
Interplatform Pipeline Rupture	up to 1,250 (medium)	Once in 45,000 years (rare)
Spill from Marine Traffic Precautionary Zone	**	Three percent of all spills are expected to reach land

* Roughly 80 to 90 percent of the time that landfall occurs, it will contact an environmentally sensitive area (as defined in Section 4.5).

** Typical sizes of oil tankers in this area have capacities in the range of 300,000 to 500,000 bbl distributed in up to ten tanks. Most marine casualties would involve spills from one to two tanks, or, typically, a total of 30,000 to 100,000 bbl. Other than for collisions with platforms, marine traffic casualties are not considered part of the Union or Exxon projects, but are included in the cumulative assessment.

[1] 42,000 to 420,000 gallons

[2] See Table 5.11-1 for definition of frequency and criticality classifications.

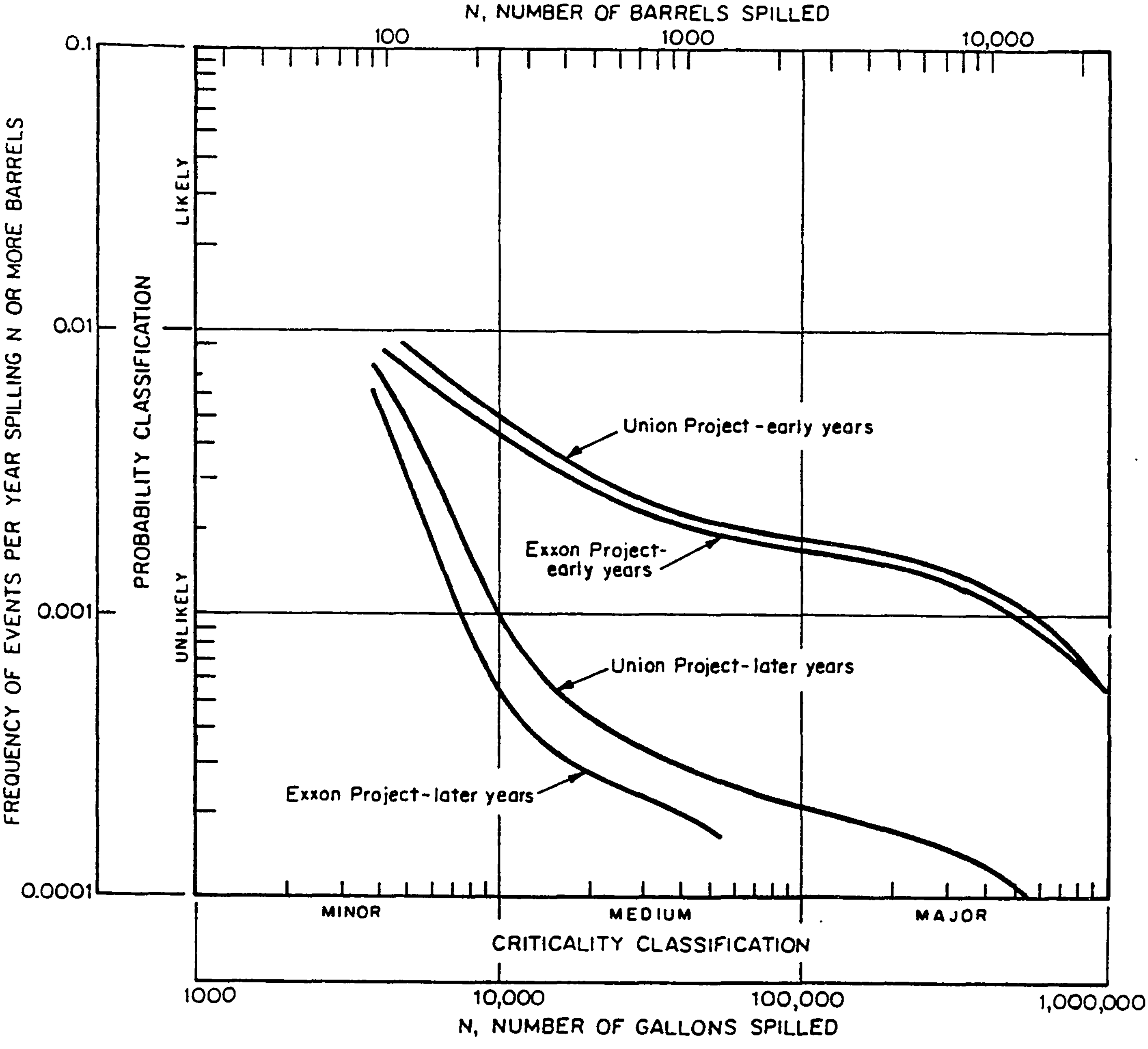


FIGURE 5.11-2 DISTRIBUTION OF OIL SPILLS - OFFSHORE

Figures 5.11-3 and 5.11-4 display the overall likelihoods of spills contacting shoreline areas as a result of the Union Oil or Exxon Projects, respectively, for a twenty-five year lifetime of the projects. As shown, there is a total of about 6 percent, or one chance in sixteen, that a spill will occur and contact the shoreline.

The overall probabilities of spills contacting environmentally sensitive areas from the representative locations considered in the ADL oil spill model analyses are shown on Table 5.11-3. As indicated, the contact probabilities over the project lifetime exceed 1 percent only at Point Arguello and at the Channel Islands.

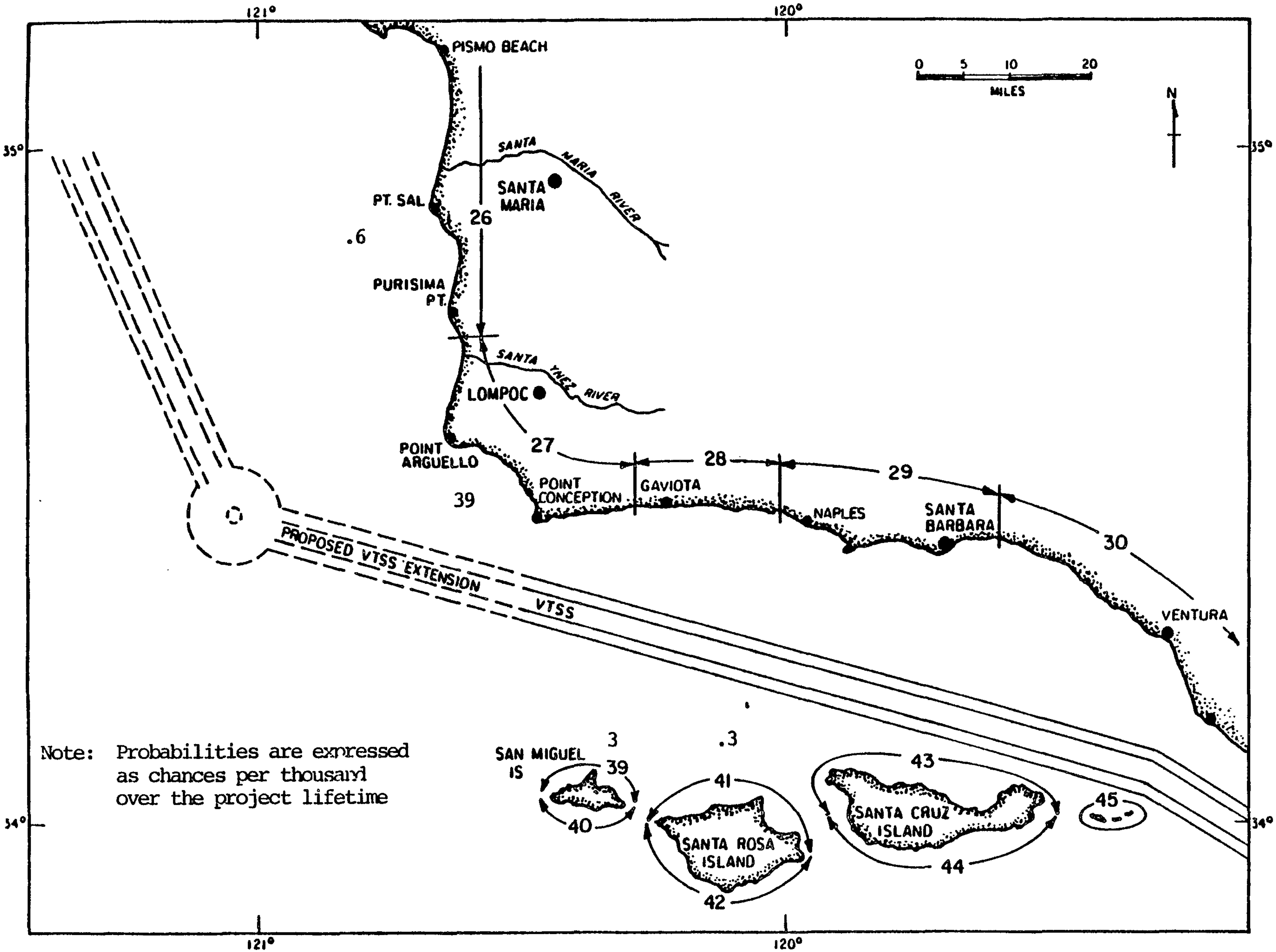
5.11.3.4 Oil Spill Contingency Plans

Oil Spill Contingency Plans have been prepared by Union for Platform Irene and by Exxon for the Project Shamrock Platform. These plans describe the organization, equipment and resources, and the notification and operational procedures that will be implemented by the response team to prevent, report, contain, and clean up potential oil spills. Under MMS guidelines, the plans will be reviewed and updated annually.

The facilities and resources for coping with an oil spill are framed within a three-level response philosophy developed by Federal and State agencies. As described in Addendum H of Technical Appendix M, the first level is a fast response utilizing onsite operator's equipment on the platform. This equipment - consisting of booms, small boats, skimmers, sorbents, etc. - would be capable of handling spills of up to about 20 barrels (840 gallons). The second level of response would include the facilities and equipment of the oil spill cooperative, Clean Seas, Inc. and other nearby cooperative organizations and outside contractors. These resources can handle oil spills of 10,000 barrels or more, are on 24-hour alert, and have equipment prepositioned for rapid deployment at various points along the coastline to protect environmentally sensitive areas. To insure rapid response to larger spills, Clean Seas, Inc. plans to acquire a well-equipped spill response vessel, 160 to 200 feet in length, for specific duty in the Point Arguello/Point Pedernales area. Clean Seas, Inc.'s existing spill response vessels will be capable of arriving to this area within four to eight hours of notification.

For even larger spills, or for spills which cannot be contained by the second-level resources because of weather limitations, the third level of response would involve the U.S. Coast Guard Pacific Strike Team. This organization maintains trained personnel and extensive oil spill containment and removal equipment as well as access to additional resources from Federal agencies and private industry outside the local spill area. This response level would be called upon after the need for more extensive resources had been established.

Table 5.11-4 summarizes the oil spill control equipment held by the different organizations.



Note: Probabilities are expressed as chances per thousand over the project lifetime

FIGURE 5.11-3: PROBABILITIES OF CONTACTING LAND SEGMENTS (AS DEFINED BY MMS) AS A RESULT OF UNION OIL PROJECT SPILLS

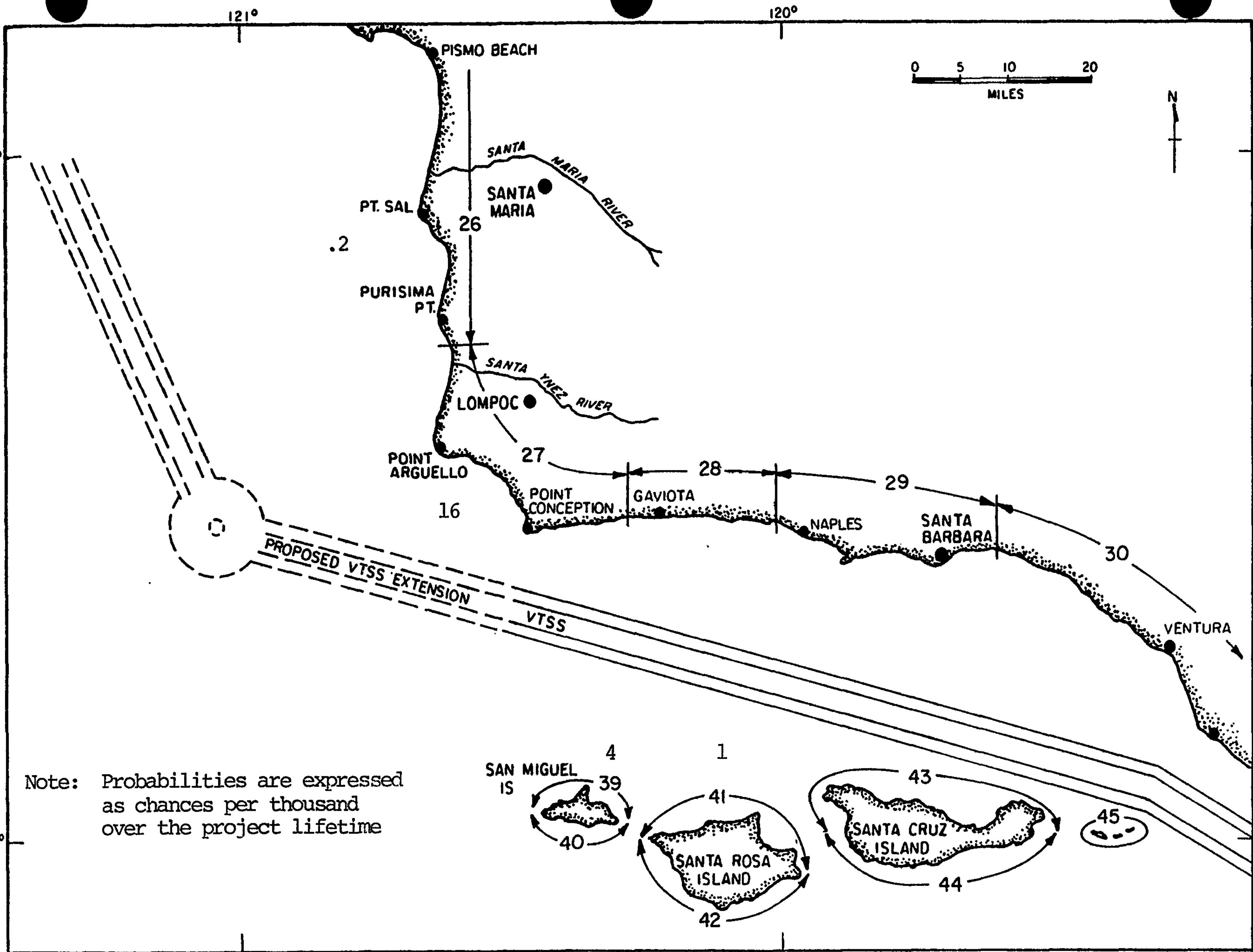


FIGURE 5.11-4

PROBABILITIES OF CONTACTING LAND SEGMENTS (AS DEFINED BY MMS) AS A RESULT OF EXXON PROJECT SPILLS

Arthur D. Little, Inc.

Table 5.11-3

TOTAL PROBABILITY (PERCENT CHANCE) OF OIL SPILL CONTACT AT ENVIRONMENTALLY SENSITIVE AREAS OVER A 25-YEAR PROJECT LIFETIME BASED ON ADL OIL SPILL MODEL ANALYSES

100 Barrels or More Spill Originating from

	Proposed Projects			Alternatives			Cumulative
Sensitive Area	Platform Irene [A]	Irene to Surf Pipeline [B]	Shamrock Platform [C]	Shamrock to Hermosa Pipeline	Platform Hermosa [D]	Hermosa to Pt. Conception Pipeline [E]	Precautionary Area [F]
Sea Otter Range	*	*	*	*	*	*	*
Point Buchon/Morro Bay	*	*	*	*	*	*	*
Purisima Point	.022	*	*	*	*	*	.050
San Antonio Creek Mouth	.011	*	*	*	*	*	.050
Santa Ynez River Mouth	.055	*	.042	*	*	*	.025
Jalama Beach Park	.044	.015	.11	.53	.28	.24	*
Santa Maria River Mouth	*	*	*	*	*	*	*
Point Arguello	.55	2.9	.56	1.1	.14	.024	.25
Point Sal	*	*	*	*	*	*	*
Government Point/Coho Bay	*	*	*	*	.21	.006	*
San Miguel Island/Castle Rock	.22	.051	.42	1.6	5.0	.96	.15
Santa Rosa Island	.034	*	.098	.53	1.4	.42	.18

*Conditional probability of contact was less than 0.001.

[A] Includes first 4.3 miles of line to Surf.
[B] Represents last 6 miles of line to Surf. Applicable to either northern (proposed) route, or to southern (alternative) route.
[C] Includes interplatform pipeline to Irene.
[D] Includes first 5 miles of pipeline to Point Conception.
[E] Represents last 5 miles of pipeline to Point Conception.
[F] Assumes spill frequency of 10^{-2}/yr

Table 5.11-4

SUMMARY OF EXISTING AND PROPOSED OIL SPILL EQUIPMENT

Proposed Platform Irene*

3	20-ft/32-ft boats to deploy boom and skimmer
1	1,600-ft boom and 1 oil skimmer
1	2,500-gallon Kepner Oil storage bag
	Sorbent boom and pads
5	drums of Corexit 9527 dispersant, and 2 sprayers

Proposed Shamrock Platform*

1	32-ft boat to deploy boom and skimmer
1	1,500-ft boom and 1 oil skimmer
1	2,500-gallon Kepner oil storage bag
	Bales of sorbent
2	drums of Corexit 9527 chemical dispersant, 20 gallons of Corexit OC-5 surface collecting agent, and 1 sprayer

Clean Seas, Inc.* (equipment distributed between Morro Bay and Point Dume)

2	130-ft/136-ft dedicated response vessels fitted with booms, skimmers, storage bags, small boats, etc.
1	weir skimmer barge and 1 tank barge
14	skimmers and 28,000 ft of booms
6	small boats
225	drums of Corexit 9527 dispersant, 2 helicopter-mounted sprayers, 1 vessel-mounted sprayer
	23,000-gallon total capacity of floating storage
6	enclosed trailer vans, 2 tank trailers and 1 flatbed trailer
1	mobile communication base

U.S. Coast Guard Strike Force

7	lightering systems
1	disc skimmer and 9 612-ft skimming barriers
4	70,000-gallon total capacity of floating storage bags

U.S. Navy

8	modularized skimmers
1	oil mop
9	1,000-ft booms
	8,000-ft miscellaneous offshore boom
3	v-boom towboats
	135-gallon capacity floating storage

* The spill-response vessel to be acquired and operated by Clean Seas, Inc. will have on board 3,000 feet of oil containment boom, a small outboard boat, adequate oil storage capacity, dispersants, and necessary application equipment. Deployment of this vessel may reduce the need for certain equipment and supplies listed above on board the platforms.

Overall, the oil spill mechanical containment and recovery resources are considered to be applicable for conditions up to 6- to 8-foot seas. As discussed in Addendum H of Technical Appendix M, sea and weather conditions in the central Santa Maria Basin should permit mechanical oil spill control and recovery at least 50 percent of the time. When mechanical containment, removal or diversion methods are not feasible, dispersants, appropriately chosen for the types of crude oil in production, may be effective. In such cases, however, the decision to use dispersants would require the approval and authorization from the Federal On-Scene Coordinator and/or the Senior EPA representative on scene in consultation with other State and Federal representatives of the Regional Response Term (RRT).

Although Union's and Exxon's oil spill contingency plans denote extensive preparations for emergency spill response; a number of specific suggestions for improving them are listed in 5.11.3.6.

5.11.3.5 Other Offshore Contingency Plans

Military missiles and space vehicles launched from Vandenberg AFB are not currently expected to fly over the Central Santa Maria Basin. If current plans were to change and lead to overflights, there would be a potential that fragments from aborted missions might impact the offshore platforms. Although the likelihood of such an event would be rare, the consequences could be severe. To reduce the potential hazards to the platform personnel, the MMS incorporates stipulations into the OCS leases to control traffic, temporarily to suspend or stabilize offshore operations, and to provide evacuation measures and personnel shelters, as required.

Detailed Platform Contingency Plans, prepared by the operators and subject to MMS approval, will delineate evacuation plans, shelter operations for essential personnel, action timelines, and damage control procedures.

5.11.3.6 Mitigation Measures for Offshore Platforms and Pipelines

Measures that would enhance the safety and reliability of the offshore platforms and pipelines include the following:

IMPROVE INTEGRITY OF PIG LAUNCHER ON PROJECT SHAMROCK PLATFORM

A pig launcher for the inter-platform oil pipeline will be located on Shamrock Platform. This should provide a warning when the unit is pressurized and should also incorporate a mechanical interlock to prevent opening under such conditions.

Effectiveness: significantly reduce frequency of offshore oil spills.
Adverse effects: none.

ENSURE THAT DRILLING AND PLATFORM CREWS HAVE SUFFICIENT TRAINING AND EXPERIENCE

Although minimum standards for the above are in force, there is a possibility that the rapid development of oil and gas resources off the California coast may lead to the use of fairly inexperienced crews, i.e., those most likely to be involved in accidents. The operators should ensure, as a minimum, that all crews are directly supervised by highly experienced industry personnel.

Effectiveness: significantly reduce frequency and volume of oil spills.
Adverse effects: drilling operations interrupted if experienced staff unavailable.

CONDUCT HAZARD AND OPERABILITY STUDIES

Formal hazard and operability (hazop) studies on the final detailed designs of platform processing equipment are becoming standard practice for many oil companies, particularly in Europe, and provide a cost-effective means of reviewing designs for safety implications and operating convenience prior to construction. It may be noted that two of the mitigating measures listed below arose from a hazop study of the preliminary designs for Platform Irene, indicating the value and power of the technique.

Effectiveness: significantly reduce frequency of offshore oil spills and significantly reduce volumes of oil spilled.
Adverse effects: none.

CONDUCT PERIODIC SAFETY AUDITS AND INSPECTIONS

Audits of all safety-related systems at periodic intervals after commissioning can serve to reduce the probability and consequences of accidents.

Effectiveness: significantly reduce frequency and volume of oil spills.
Adverse effects: additional personnel required on platform while audit in progress, but only for a few days on each audit.

EXTEND THE CURRENT VESSEL TRAFFIC SEPARATION SYSTEM

The extension of the VTSS northward to a point west of the project area, as recently recommended by the U.S. Coast Guard has been given preliminary approval by the Intergovernmental Maritime Organization. This extention would aid in avoiding vessel collisions with the proposed platforms and also tanker collisions with other vessels. Casualty records over the last 20 years indicate a dramatic decrease in the number of collisions in heavily-trafficked shipping lanes which have adopted traffic separation schemes, even though some vessels may ignore the schemes or be forced to deviate from them in adverse weather conditions.

Effectiveness: reduce the risks of oil spills from marine vessel-related casualties.
Adverse effects: slightly increased length of shipping routes.

REVIEW OFFSHORE PIPELINE ROUTES TO TAKE ADVANTAGE OF ANY POTENTIAL INTRUSION TRAPS

Undulations in a subsea oil pipeline will create natural intrusion traps in the event of pipeline rupture, limiting the amount of oil released in such a case. The current pipeline routes rise gradually from the Shamrock platform to Platform Irene and then to the landfall, so no such intrusion traps would be formed. The operators should review alternative routes to see if advantage might be taken of seabed topography to create intrusion traps.

Effectiveness: significantly reduce volume of oil spilled from subsea pipelines.
Adverse effects: potential slight increase in frequency of pipeline failure, due to some increase in pipeline length and potentially less favorable seabed conditions.

CONSIDER INSTALLING SUBSEA ISOLATION VALVES

Subsea isolation valves that can be remotely operated can potentially limit the inventory of oil or gas lost in the event of a leak or rupture. The number and placement of valves on oil pipelines should be based on analysis of any potential intrusion trap locations such that the maximum oil loss is within acceptable limits. Isolation valves on gas lines would limit discharges and associated consequences in the immediate vicinity of platforms and at nearshore shallow water locations. However, it should be noted that subsea isolation valves may be a source of leaks and furthermore are generally difficult to maintain.

Effectiveness: reduce volume of oil and gas spilled from subsea pipelines.
Adverse effects: increase frequency of minor spills, reduce availability of pipelines.

PROVIDE STATE-OF-THE-ART OIL PIPELINE INTEGRITY MONITORING SYSTEM

Union has indicated that an integrity monitoring system will be installed on the oil pipeline from Platform Irene to shore. The system has not yet been designed, but should use the latest proven techniques to give high discrimination to enable detection of small leaks. It is noted that variable compositions of the oil-water emulsion may make the measurement difficult, particularly if there is any possibility of pockets of gas in the pipeline.

Effectiveness: reduce volume of oil spilled from main oil pipeline.
Adverse effects: possible spurious shutdowns of pipeline.

INSTALL NON-RETURN VALVE IN PLATFORM IRENE PRODUCED WATER SYSTEM

If the produced water pipeline between Lompoc and Platform Irene were to rupture, the fire water header on the platform would depressurize into the ruptured water line unless an effective non-return (check) valve were fitted at the platform end of the pipeline. This measure will improve the ability of platform staff to respond to external impacts which might rupture the water pipeline and damage (but not destroy) the platform, hence reducing the likelihood of subsequent oil spills.

Effectiveness: reduce frequency of offshore oil spills.
Adverse effects: none.

INSTALL SUBSEA EARTHQUAKE DETECTION AND MEASUREMENT SYSTEMS

Such systems on both platforms would permit collection of site-specific histories of seismic events. This data could lead to a better understanding of design and safety needs for future improvements on the platforms.

Effectiveness: reduce frequency of oil spills due to vessel rupture and platform loss.
Adverse effects: none.

USE SIMULATORS IN TRAINING PROGRAMS

Improved and more frequent training on certain key safety operations could be enhanced through the use of simulators; these are particularly useful in safety training related to gas- and oil-processing failures. (Simulators are already used for blowout prevention drills.)

Effectiveness: reduce frequency and volume of oil spills.
Adverse effects: none.

REVIEW FIRE AND GAS DETECTION AND PROTECTION MEASURES PROPOSED FOR THE PLATFORMS

When the fire and gas detection and protection measures for the platforms have been designed, the operators should arrange for independent reviews to ensure the highest practicable standards have been incorporated to provide for rapid detection of fire or of gas release, and then to contain the problem, thus minimizing the likelihood of a subsequent oil spill.

Effectiveness: reduce frequency of offshore oil spills.
Adverse effects: none.

CONSIDER SUGGESTIONS TO IMPROVE OIL SPILL CONTINGENCY PLANS

Although the oil spill contingency plans must be approved by the Minerals Management Service and other state agencies, a number of suggestions arose from the review of the plans conducted as part of this EIS/EIR. It is recommended that the following suggestions be considered by the operators and the responsible agencies:

- Union Oil and Exxon should consider the provision of portable, two-way radios onboard their proposed platforms.
- Both oil companies should consider direct or indirect support of efforts to develop viable methods of wildlife preservation in the event of a major oil spill.
- Both contingency plans should be supplemented with a discussion of the potential disadvantages inherent in the use of chemical dispersants in the specific region of interest.
- Both companies should consider preplanning for the rapid provision of large quantities of drilling mud and other materials/supplies/services that may be needed to control a major well blowout.

- Exxon should consider providing details of its communications plan.
- The Exxon plan would benefit from the provision of data on the performance limitations of available equipment and from inclusion of methods for protection of shorelines via deployment of oil-containment booms.
- Exxon should define the coding scheme used to indicate preferred shoreline cleanup methods on data sheets accompanying segment specific shoreline maps. It should also provide substantially more details with respect to any preplanning for cleanup and restoration of impacted shorelines.
- Exxon should consider provision of at least one additional boom-deployment boat at its proposed platform, so that two boats would be available to control both ends of the boom.
- Union Oil should consider inclusion of shoreline segment-specific data sheets comparable to those in the Exxon plan.
- All contingency plans would benefit from a more detailed delineation of equipment performance limitations under adverse environmental conditions.
- Both companies should predesignate onshore command centers for coordination of spill response activities.
- An overall general need for contingency plans to provide greater details and reflect greater preparations for cleanup of contaminated shorelines should be met by both companies.

- Contingency plans should provide details about the composition and physical characteristics of the oil or gas being handled. Of special usefulness would be information with respect to the density of spilled heavy crude oils as a function of time and temperature, particularly if there is any chance that the oil may float below the surface of the sea under particular conditions.

- Plans should fully account for the possible presence of toxic hydrogen sulfide gas in spilled oil.

  Effectiveness: reduce potential consequences to shoreline resulting from offshore oil spills.
  Adverse effects: none.

5.11.4 Onshore Oil Spill Hazards and Mitigation Measures

5.11.4.1 Onshore Oil Spills

Despite the very different environments for subsea and onshore pipelines, the failure modes and frequencies for onshore pipelines are similar to those just discussed for offshore pipelines. It is assumed that the time to detect a major leak and to activate isolation valves is ten minutes. In the event of a complete break in the oil pipeline, losses would be due to continued pumping, compressibility losses and, in the worst case, the drainage of the entire volume contained between isolation valves.

For the portion of the line between the landfall and Lompoc, Union currently proposes to install one remotely operated isolation valve at a valve station located 7,100 feet east of landfall. If no other valves are installed along this portion of the pipeline, a pipeline break east of the valve station could result in the complete drawdown of the contents of approximately 11 miles of pipeline. In the later years of the project, it is expected that the production will be an oil emulsion containing up to 50 percent water, so that the pipeline throughput at that time will be at or near the pipeline design capacity of 36,000 B/D. For this worse case scenario, the total spill volume is estimated to be 20,400 barrels of wet oil.

Union has stated, however, that it will install additional remotely-operated isolation valves at locations recommended by this EIS/EIR. (Recommended locations for such valves are given in Section 5.6.) Assuming that these additional valves are installed, maximum spills then would consist, typically, of the drawdown of about two miles of pipeline, which, together with an assumed 10-minute pumping loss, and compressibility losses, would total about 4,100 barrels of wet oil. For a pipeline failure consisting of a two-inch diameter hole (or equivalent area), it might be possible to repair the hole in time to limit the spill to perhaps half the maximum spill, or 2,100 barrels. Smaller leaks, such as from valve packings, are not expected to spill more than 100 barrels of wet oil under the worst circumstances.

For the smaller diameter oil pipeline from Lompoc to Orcutt, Union does not propose to install any remotely operated isolation valves. It is estimated that up to three miles of the line could drain in the event of rupture. Therefore, the equivalent spills are 1,800, 900 and 100 barrels of dry oil respectively. An existing pipeline from Orcutt to Santa Maria will be utilized for the Union project and is, therefore, not considered as part of the project.

Oil spills onshore could also arise from incidents at the onshore processing facilities, principally due to rupture of oil-containing vessels, or maloperation or malfunction of oil pipeline pig receivers and launchers.

The analysis indicates the following spill size distribution:

Spill Location	Spill Size (bbl)	Frequency
Onshore oil pipelines (landfall to Lompoc)	100 or more	Once in 170 years (unlikely)
	1,000 or more	Once in 1,700 years (unlikely)
	10,000 or more	Once in 2,200 years (unlikely)
Lompoc facility	100 or more	Once in 1,800 years (unlikely)
	1,000 or more	Once in 2,800 years (unlikely)
	50,000 or more	Once in 250,000 years (rare)
Onshore oil pipelines (Lompoc to Orcutt)	100 or more	Once in 56 years (likely)
	900 or more	Once in 560 years (unlikely)
	1,800 or more	Once in 1,100 years (unlikely)
Orcutt facility	100 or more	Once in 100,000 years (rare)

This distribution does not necessarily correspond to a distribution of events that will affect ground or surface water or cause any other type of contamination. Although the majority of onshore spills would either be contained or cleaned up such that contamination of ground or surface water would be minimal, the effects on specific environmental areas may be significant for even relatively small spill quantities. The environmental consequences of the onshore oil spills are addressed in Section 5.6 of this EIS/EIR.

5.11.4.2 Mitigation Measures for Onshore Oil Spills

Appropriate mitigation measures for onshore oil spills are included with those for onshore releases of flammable or toxic materials in Section 5.11.5.2.

In the unlikely event that an oil spill were to ignite, the thermal radiation hazard zone will be limited to the immediate vicinity of the spill. Due to the separation of project elements from populated areas, no public safety impacts are expected. In the even less likely event that oil spill ignition leads to a brush fire, consequences would be similar to those of naturally occurring brush fires.

5.11.5 Flammable and Toxic Release Hazards and Mitigation Measures

5.11.5.1 Flammable and Toxic Release Hazards

Calculations at the onset of this analysis demonstrated that the platforms will be sufficiently distant from the shore that fires, explosions or toxic releases will not affect the coastline directly. Hence this analysis concentrates on releases from the onshore pipelines and the onshore dehydration and processing facilities. Because of the relatively close proximity of the public to the onshore gas pipelines and to the Lompoc, Battles and Santa Maria facilities, as compared to the platforms, they may be impacted by events leading to fires, explosions and toxic effects, and detailed analyses are required to see if in fact the public is impacted. As Battles and Santa Maria are existing facilities, the additional risks due to the Union project are those posed by the new equipment or increased throughputs associated with the project.

The onshore gas pipelines will have failure modes similar to those of the oil pipelines. However, the material released will be flammable gas releases (which may also ultimately be toxic). The main concern for public impacts is with the onshore portion of the new gas pipeline from Platform Irene to Lompoc. In addition, the existing pipeline from Lompoc to Battles is evaluated because the project will raise pipeline pressures which will influence the release rates. Three representative potential release locations are selected for each pipeline. For the landfall to Lompoc line, these are:

- near the valve station;
- near the disciplinary barracks;
- near Vandenberg Village;

Between Lompoc and Battles, the release locations are:

- near Lompoc in the Purisima Hills;
- near the entrance to Vandenberg along Route 1; and
- near Battles.

The gas pipeline pressure at the inlet to Battles will be the same as at present; therefore, releases at this location will be virtually identical to those associated with baseline conditions. The only difference will be in the potential for toxic hazards if a release did not ignite. Even in highly stable weather conditions, such hazards will be a problem only within 200 feet of the pipeline and would result in a noxious and extremely narrow cloud (less than 15 feet) from which exposed individuals could readily escape. Hence, releases from the gas pipeline in the immediate vicinity of Battles are not considered to add any risk to the baseline level.

The areas around the Lompoc Dehydration Facility are Union Oil owned and are leased out for cattle grazing. Agricultural land is also found along the pipeline corridor once it has left the undeveloped portion of Vandenberg AFB that it travels through from the point of landfall. The nearest communities to the project site at Lompoc are Vandenberg Village (1980 population: 5,839) and Mission Hills (1980 population: 2,797), each of which more than a mile away. The pipeline route is set back from the western and northern borders of Vandenberg Village, and also borders the Federal Correctional Institution.

Flammable gas releases near the Federal Correctional Institution and near Vandenberg Village are the primary concern for public hazard. Some low fatality or injury events are also possible when the pipeline is near the highway. Toxic hazards are of concern only over extremely limited distances.

The types of events for gas releases identified by the engineering analysis for the facilities are:

At Lompoc
- rupture of the gas-oil separator;
- rupture of the inlet gas scrubber;
- fitting breaks on each of the above;
- releases from the gas pig receiver;
- releases from the gas pig launcher;

At Battles
- releases from truck loading operations;
- Boiling liquid expanding vapor explosions (BLEVEs) of tank trucks, i.e., rupture of a pressurized LPG vessel in a fire resulting in a fireball;
- BLEVEs of storage tanks resulting from tank truck BLEVEs.

Apart from seismic events, which are considered separately for each key pressure vessel or storage tank, there are no significant external impacts.

Releases from the pig receiver are the largest consequence events due to operations at Lompoc; however, even though travelers on the adjacent highway might be at risk, the hazard would not extend to the populated areas of Mission Hills. Typical hazard distances for events associated with the onshore processing facilities and pipelines are shown in Table 5.11-5. The actual risk levels are discussed in Section 5.11.7.1.

5.11.5.2 Mitigation Measures for Onshore Pipelines and Facilities

Certain mitigation measures applicable to offshore facilities are also applicable to onshore facilities. These are listed below, and are followed by others specifically applicable to the onshore facilities.

- Conduct of hazard and operability studies;
- Use of simulators in training programs;
- Implementation of security and surveillance procedures;
- Training and experience requirements for facility operating personnel; and
- Conduct of periodic safety audits and inspections.

The safety impacts associated with the mitigated pipeline realignments are discussed in this EIS/EIR under supplemental information.

Table 5.11-5

EXAMPLES OF FLAMMABLE AND POTENTIALLY TOXIC HAZARDS

Accidental Events	Material Released	Consequence Scenario	Maximum Hazard Area	Impact Criteria
Onshore gas pipeline rupture (Landfall to Lompoc)	60 kg/s gas for 10 minutes	Flammable Vapor Dispersion (# LFL)	3600 feet downwind; 190 feet wide	30% fatalities 70% injuries
		Vapor Cloud Explosion (3 psi)	570 feet beyond ignition point	30% fatalities 30% injuries
		Toxic Vapor Dispersion (300 ppm; 30 min)	460 feet downwind; 30 feet wide	50% fatalities 50% injuries
Gas pig receiver failure at Lompoc	7830 kg gas in one minute	Flammable Vapor Dispersion (# LFL)	5000 feet downwind; 290 feet wide	30% fatalities 70% fatalities
		Vapor Cloud Explosion (3 psi)	340 feet beyond ignition point	30% fatalities 30% fatalities
		Toxic Vapor Dispersion (300 ppm; 30 min)	200 feet downwind; 15 feet wide	50% fatalities 50% injuries

Conduct safety review investigations of existing facilities. Although detailed safety studies of the existing Battles Gas Plant and the Santa Maria Refinery are beyond the scope of this EIS/EIR, it is considered prudent to assess the status of the important safety-related systems of these facilities prior to any modifications required by the Union project and to the introduction of OCS oil and gas.

Effectiveness: significant reduction in accident potential, identification of needs for improvements in system safety.
Adverse effects: none.

Install onshore isolation valves at strategic locations on the pipeline from Lompoc to Orcutt. As in the case of subsea valves, remotely operated isolation valves in onshore pipelines can limit the inventory of oil or gas lost in the event of a leak or rupture. Union has agreed to install one remotely operated isolation valve on the section of oil pipeline from the landfall to Lompoc, and will consider more if appropriate. Section 5.6 details several locations at which such valves would be beneficial. No similar commitment has been made for the new pipeline from Lompoc to Orcutt.

Effectiveness: reduce volume of oil spilled from onshore pipelines.
Adverse effects: increase frequency of minor spills.

Investigate the feasibility of buried isolation valve control cables for gas pipelines. The cables, if broken, would activate the shutdown of the nearest upstream and downstream valves. Burial of such cables 12" to 24" directly above the pipeline could reduce the risk of major gas releases from third party excavation-caused breaks.

Effectiveness: limit the quantity of gas released.
Adverse effects: none

Develop contingency plans for spills of oil or gas from onshore pipelines. Although the Environmental Protection Agency will require spill prevention, containment and countermeasure (SPCC) plans for the proposed onshore facilities, no such plans are apparently required for the onshore pipelines. This gap in contingency plans should be remedied.

Effectiveness: reduce consequences of spills with timely response and cleanup operations.
Adverse effects: none.

Provide water deluge systems for LPG storage tanks and vehicle loading area. Consideration should be given to installing fixed-position water deluge systems for the LPG storage vessels and LPG truck loading station at the Battles Gas Plant. These would decrease the probability of chain reaction fires/explosions.

Effectiveness: reduce potential consequences of liquefied gas releases.
Adverse effects: none.

Inert oil storage tanks. Non-pressurized tanks with the potential for flammable/explosive fuel-air mixtures in vapor spaces should be provided with inert-gas systems and/or floating roof design features to prevent the formation of such mixtures.

Effectiveness: reduce potential for explosions.
Adverse effects: none.

Segregate/protect emergency system cables and wiring. Critical emergency systems should have redundant wiring. The two sets of wires should be separate or protected as necessary to ensure that a common-mode failure (e.g., a localized fire or explosion) does not render both sets inoperable and inhibit rapid emergency action.

Effectiveness: reduce consequences and knock-on effects from minor releases.
Adverse effects: none.

Develop fire protection plans. Such plans will likely be required by the local and county fire departments for all onshore facilities.

Effectiveness: reduce potential for fires, identify procedures and equipment for containment and control of fires.
Adverse effects: none

Reduction and/or elimination of sources of ignition in the proximity of points where flammable vapors might be present is required by applicable fire codes and regulations; therefore, no further mitigating measures of this type are necessary.

5.11.6 Product Transportation Hazards and Mitigation Measures

5.11.6.1 Product Transportation Hazards

The accident events and the resulting releases of hazardous material associated with the increased truck transportation of the propane and butane by-products from the gas processing facility at Battles to market destinations locally, in Bakersfield and in the Los Angeles area are assessed in Technical Appendix M, Addendum F, using historical accident data. On that basis, it is assumed that 50 percent of accidents to large trucks would result in no spills; 25 percent, a minor release of 1 to 100 gallons; 15 percent, a larger release of up to 900 gallons; and the remaining 10 percent to involve a catastrophic release of the entire cargo volume of 9,000 gallons. In the case of the small trucks with a cargo volume of 3,000 gallons, used for local deliveries, the corresponding percentages are 50, 25, 20 and 5, respectively.

It is estimated that the small spills would give a very localized hazard with minimal risks to the public, while 25 percent of the large spills and 75 percent of the catastrophic spills would ignite immediately, resulting in a jet fire, a pool fire or, for propane, a possible fire ball. Unignited spills would result in a vapor cloud that might disperse harmlessly or encounter an ignition source, resulting in a vapor cloud fire or explosion.

It is assumed that approximately 50 percent of the LPG product truck trips will be local with an average trip length of ten miles, 10 percent will be 130-mile trips to Bakersfield, and the other 40 percent will be 180-mile trips to the Los Angeles area. Based on population densities along the various sections of the transportation routes, estimates are developed for overall frequencies of impacting the public for each route and for each gas by-product, indicating that the increased transportation risks will lead to an accident involving one or more fatalities, on average, once in 28 years. These transportation risks are distributed among the communities around Battles and bordering the routes to Bakersfield and to Los Angeles. For the low-fatality incidents, the rates per vehicle-mile are similar for the three routes because the dominance of immediate ignition means that only those people involved in the accident or in the immediate proximity of it (i.e., on the highway) are likely to be affected. The Los Angeles route is more susceptible to multiple-fatality accidents than are the local or Bakersfield routes, because of its highly-populated areas where many people might be impacted by a spill which did not immediately ignite.

In addition to the LPG by-products, the Union project will generate an estimated 1400 gal of relatively nonhazardous waste slurry per day at peak production levels, as compared to about 1000 gal under current (baseline) production. The slurry will be transported to waste disposal sites at Casmalia, and will involve one or two truck trips per week.

5.11.6.2 Mitigation Measures for Product Transportation

Plan highway tank vehicle trips. Risk analysis procedures can be used to identify those routes and travel times that result in minimum risk to the public.

Effectiveness: minimize potential exposure of public to liquefied gas spills.
Adverse effects: possible longer trip times.

Provide specialized driver training. Because of special vehicle designs and the specific hazards associated with the products that may be transported, minimum standards should be established for driver training, experience, health, etc.

Effectiveness: potential reduction of accidents, increase response capability to spills.
Adverse effects: none.

Provide rigorous and strict enforcement of tank vehicle safety standards. Vehicles should be inspected frequently by state-of-the-art means (such as non-destructive testing) and should not simply be given infrequent and relatively cursory "once-overs." Inspection personnel should be specifically trained for this purpose. Violations of safety standards should result in prompt and significant penalties.

Effectiveness: reduce rate of accidents related to vehicle condition.
Adverse effects: minor reduction in vehicle availability.

Monitor critical safety devices and systems. Recent advances in microprocessor technology and increasing sophistication in the instrumentation and controls associated with accident detection, alarms and emergency shutdown systems make it feasible to apply this technology to the truck transportation for real-time presentation of vehicle and cargo condition.

Effectiveness: provides monitoring of condition, early warning of potential problems with greater possibility of corrective behavior.
Adverse effects: none.

Develop a coordinated transport emergency response plan. Preplanning for transport emergencies, including the assignment of responsibilities, training, practice drills, and the establishment of a sound communications network, could enhance efficient response in case of an accident involving one of the liquefied gas trucks.

Effectiveness: increase response effectiveness.
Adverse effects: none.

5.11.7 Overall Public Risks and Mitigation Measures

5.11.7.1 Overall Public Risks

The public risk profiles from project activities are shown in Figure 5.11-5. Transportation risks clearly dominate the public safety impacts of the project, with transportation to Los Angeles involving the most risk due both to the number of trips and the density of population along the route. The gas pipelines can only pose safety hazards in a limited number of areas and this result is reflected by the very low expected frequency of accidents involving one or more fatalities--roughly once in 70,000 years. The project operations at Lompoc that could potentially involve a gas release do not contribute to the public risk levels because they occur well away from populated areas. A BLEVE of a propane or butane storage tank at Battles, i.e., a boiling liquid expanding vapor explosion, which could occur from the rupture of a pressurized LPG vessel immersed in a fire, is estimated as an unlikely to rare event. (Were such an event to occur, it would only contribute to the risk levels of those in the immediate area of the plant.) The area at risk is bounded by Battles Road to the north and Betteravia Road to the south, and does not extend as far west as Highway 101 or as far east as Rosemary Road.

5.11.7.2 Mitigation Measures for Overall Public Risks

In addition to the individual mitigation measures discussed earlier, an overall measure is also suggested:

Develop comprehensive risk management plans. A potential mechanism for managing safety and reliability at an acceptable level is the development and implementation of a comprehensive risk management plan. The risk management plan would ideally consist of several sub-plans which would be developed and implemented in a coordinated manner by the operators and one or more

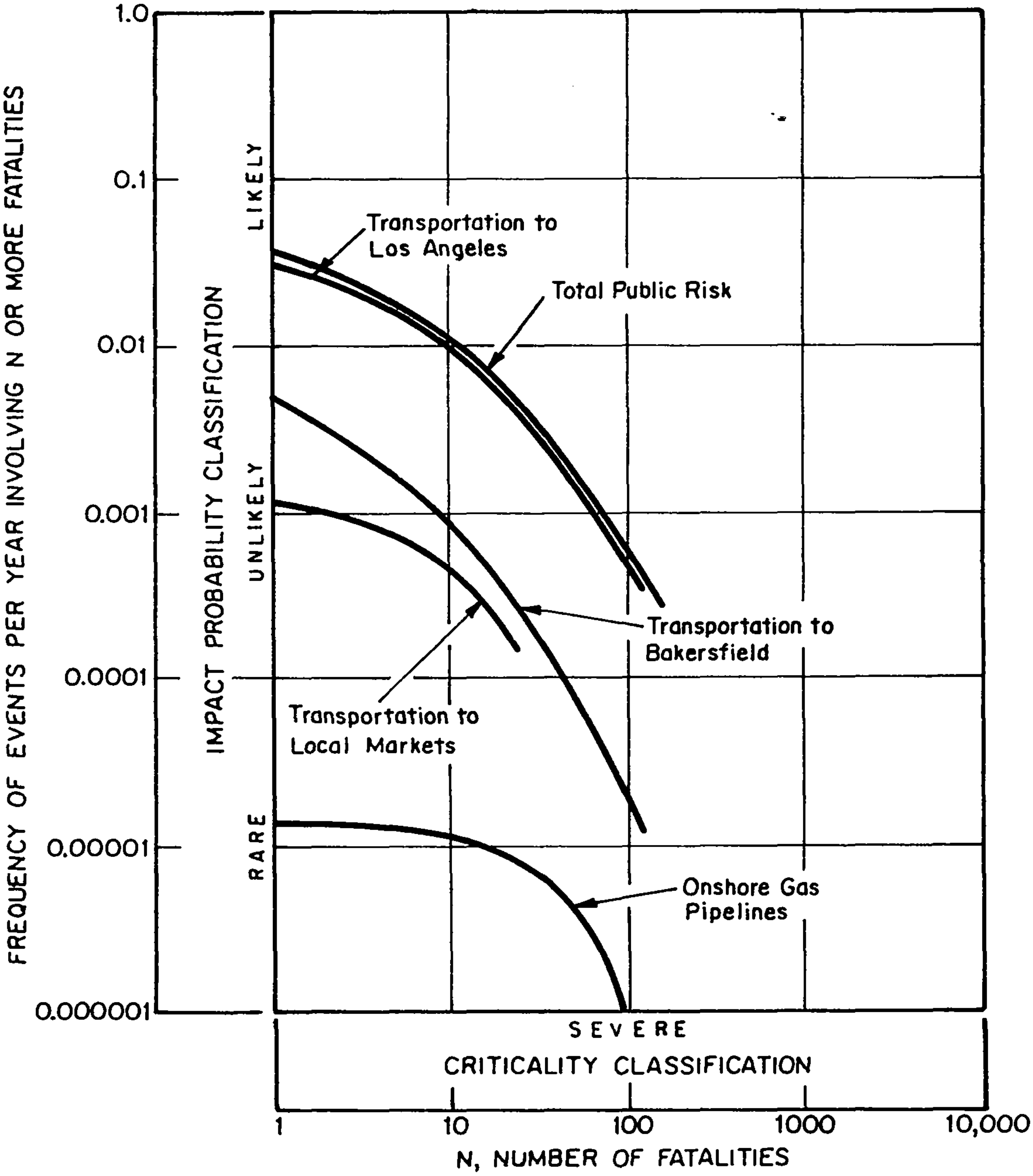


FIGURE 5.11-5 PUBLIC RISK PROFILES FROM PROJECT ACTIVITIES

regulatory authorities. The primary objective of the sub-plans and the overall combined plan would be to ensure a high level of safety throughout the life of the projects and analyze the experience gained through project operation and similar operations world-wide to develop and introduce new mitigation measures and contingency plans. As such, the risk management plan, when properly implemented, would form the basis of a dynamic safety management program (as opposed to a fixed or static safety plan).

The operators did not provide an overall risk management plan for their proposed project. It is desirable that a detailed risk management plan be developed by the operators and appropriate regulators in concert prior to project start-up. The plan could contain the elements described in Section 7.7 of Technical Appendix M.

Effectiveness: generally reduce the number and severity of accidents; also increase the effectiveness of response.
Adverse effects: none

5.11.8 Oil Spill and Safety-Related Risks of Alternatives

Alternatives have been suggested which impact the risks associated with limited portions of the projects in some cases, while other alternatives affect the baseline risks as well as those attributable to the projects. The subsections below provide brief overviews of the alternatives which have safety implications. Further discussions of the risks associated with each of these alternatives appear in Table 5.11-6. Additional details are given in Section 8 of Technical Appendix M.

5.11.8.1 Interconnection of Shamrock Platform with Platform Hermosa

If the oil from Exxon's Shamrock platform were sent to Chevron's proposed Platform Hermosa in the Point Arguello Field, rather than sending it to Platform Irene, the increased length of interplatform pipelines and the additional equipment such as that associated with the produced water system and the freewater knockout drums required on the Shamrock platform would somewhat increase the probability of offshore oil spills. On the other hand, if the number of wells were to decrease to 30 as originally proposed, the risk of blowouts and associated oil spills would also decrease. All of these changes are relatively minor (factors of two or three at most) and are unlikely to change frequency or criticality classifications.

5.11.8.2 Alternative Union Oil Pipeline Routes

An alternate pipeline route and various options for portions of it have been considered for the pipelines between Irene and Lompoc. It is concluded that these alternative routes are less desirable than the proposed route, in that they have a somewhat greater probability of leakage because of their increased length, somewhat reduced buffer zones between themselves and the closest populated areas for a small portion of the line near Vandenberg Village and Mission Hills, and a closer approach to two schools (Artesia

Table 5.11-6

SAFETY IMPLICATIONS OF ALTERNATIVES

Alternative	Effects on Project Risks	Effects on Baseline Risks
Interconnection of Platform Shamrock with Platform Hermosa	Oil: Slight increase in risk later years due to additional processing equipment and additional length of pipeline. Slight decrease in risk in early years due to decrease in number of wells drilled and thereby the potential for blowouts.	No effect on baseline risks as oil and gas from Exxon are not taken through to ultimate processing
	Gas: As the gas is planned to be reinjected, there are no differences in the safety implications.	
Alternative Union Oil Pipeline Routes	Oil: Slightly longer routes and thereby slightly greater risk of spills.	Oil: No effect on baseline risks.
	Gas: Slightly longer routes and increased proximity to populated areas along a small portion of the route serve to increase the public risks slightly.	Gas: No effect on baseline risks.
Alternative Oil Processing and Dehydration Sites	Oil: No effect on frequency of spills; potential for greater environmental consequences if containment is breached.	Oil: No effect on baseline.
	Gas: Potential for public impacts where there are none under the proposed facility.	Gas: No effect on baseline.

School and Maple School). The net changes in public risks due to accidents involving the gas pipeline, or in the magnitude of the oil emulsion spilled for accidents involving the oil pipeline, are relatively small, however.

5.11.8.3 Alternative Oil Dehydration Site

The general Lompoc area is well suited for a dehydration facility as it is relatively close to the offshore tract and can also make use of an existing and underutilized gas transmission system, minimizing the total area affected by construction and operation. However, the preferred site is about twice as far from residential areas as is the alternative site. This factor implies a smaller buffer zone and an increased susceptibility to public impacts from onsite gas releases which cannot currently reach populated areas even under worst case meteorological conditions.

5.11.9 Safety Implications of Area Study Development

The further development of the Central Santa Maria Basin is assumed to include four additional platforms, and their associated gas and wet-oil subsea pipelines, connecting through the pipelines from Irene to onshore processing facilities.

5.11.9.1 Offshore Area Study Development

As discussed in Section 9 of Technical Appendix M, the particular issues of concern from offshore accidents will be the potential spills of oil.

The assumed locations of the four additional platforms for the area are shown in Figure 9-1 of Appendix M; they lie between four and 13 miles from the coastline at water depths from 240 feet to 800 feet. The total production from the four additional platforms will be approximately equal to the anticipated production from the two project platforms, with peak production occurring between 1991 and 1993. For a total of six platforms in the area, the estimated average probability of spills from the platforms can be assumed to be three times that for the two project platforms only.

There will be a significant increase in the length of interplatform oil pipelines - adding 25 miles to the 2.5 miles of oil pipeline for the project platforms. This increase has a significant effect on the predicted frequency of offshore oil spills. The proposed oil pipeline from Irene to Lompoc will be able to handle the increased flow from the area development, however, without design changes.

Overall, it is anticipated that the frequency of oil spills during the early years of platform development, when blowouts are possible, will rise from 0.018 per year for the project to 0.076 per year for the Area Study Development, and in later years from 0.011 per year to 0.057 per year. Figure 5.11-6 gives the overall likelihood of a spill occurring and contacting the shoreline for numerous land segments during a twenty-five year period, based on the ADL oil spill risk analysis results. Overall, there is about a one in four chance of a spill contacting the shoreline over the expected lifetime of the area development.

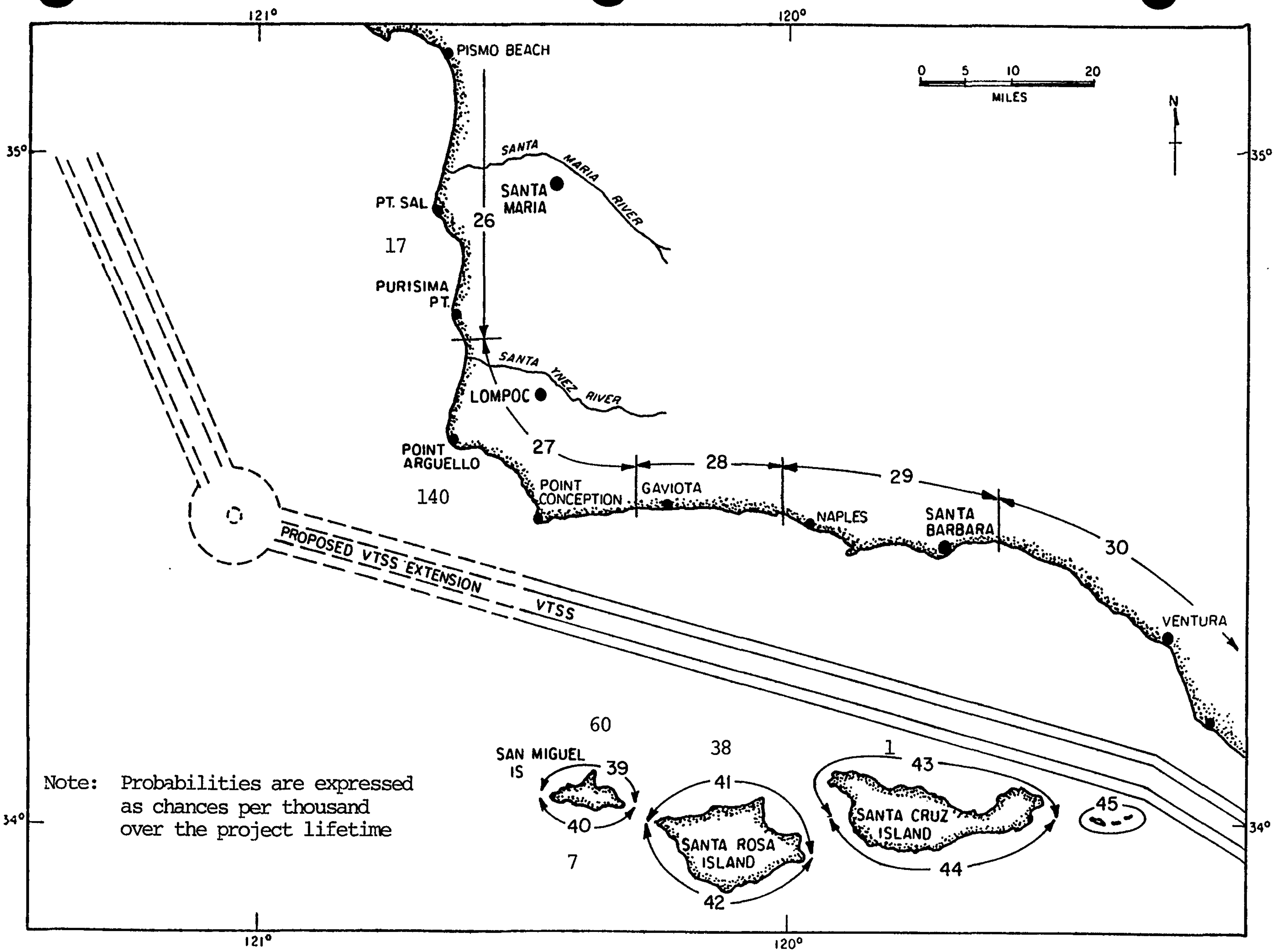


FIGURE 5.11-6

PROBABILITIES OF CONTACTING LAND SEGMENTS (AS DEFINED BY MMS) AS A RESULT OF AREA STUDY DEVELOPMENT SPILLS

Arthur D. Little, Inc.

The results generated by the MMS Oil Spill Risk Analysis Model for the Area Study are shown on Table 5.11-7. This table indicates the overall probabilities of oil spill contact to selected biologically-sensitive resources and land segments. The location of these resources and the definition of the land segments are shown on Figure 5.11-7. The overall probabilities incorporate the conditional probabilities of landfall developed from the oil spill trajectory analysis (results given in Addendum D of Technical Appendix M), the MMS oil spill occurrence rates, shown on Table 5.11-8, and the oil resource volume estimate for the Area Study (135 million barrels of oil).

5.11.9.2 Onshore Area Study Development

The onshore area study development would include a consolidated oil facility at Lompoc, consisting of an enlargement of the Union project's Lompoc Dehydration Facility with additional process equipment; and a new gas processing facility with a capacity of 80 MMscfd of gas, also at Lompoc, constructed adjacent to the oil facility. No new gas pipelines would be needed; a new industry dry oil pipeline would be necessary, however, to transport the treated oil to a tie-in with an existing pipeline system as the line to Orcutt and then onto Santa Maria Refinery could not handle the increased flow.

The major safety-related impact for the onshore area study development will be the risks to the public from the truck transportation of the NGL and LPG gas processing by-products. Based on the assumption that the gas production and subsequent gas processing from the area platforms will be about two-thirds as large as that from the Point Arguello/ southern Santa Maria Basin area, and that these gas by-products will be primarily delivered and marketed in the Los Angeles area and in Bakersfield, it is estimated that a small spill (up to 900 gallons) could occur with a frequency of 0.38/year (about once every two and one-half years on average) and that a large spill (up to 9000 gallons) would occur with a frequency of 0.26/year (about once every four years on average).

Based on these spill probabilities, together with the population densities along the assumed routes, ignition probabilities, hazard consequence models, and public impact criteria, it is estimated that the overall probability of a fatality to one or more persons from the road transportation of these by-products is about 0.27 per year, or, on average, one or more fatalities every 44 months of operation at peak processing levels.

The potentially significant accidents at the consolidated gas processing facility would include releases of gas at the pipeline pig receivers, failure of the storage tanks, tank truck loading spills, BLEVE events, and other major process equipment failures. These could result in fires, explosions, and/or toxic cloud formations, with effective ranges of serious impact extending as far as a mile or more. Under some circumstances, these effects could impact the closest populated areas which are located between one and two miles from the proposed facility site. However, these risks would still be insignificant in comparison to the transportation risks.

Table 5.11-7

MMS ESTIMATED TOTAL PROBABILITIES (EXPRESSED AS PERCENT CHANCE) OF ONE OR MORE SPILLS OCCURRING WITHIN THE CENTRAL SANTA MARIA BASIN AREA AND THE EXPECTED NUMBER OF SPILLS (MEAN) OCCURRING AND CONTACTING TARGETS AND/OR LAND SEGMENTS OVER THE EXPECTED PRODUCTION OF 135 MILLION BARRELS OF OIL* FROM THE LEASED TRACTS

Target	Within 3 Days EXISTING LEASE TRACTS		Within 10 Days EXISTING LEASE TRACTS		Within 30 Days EXISTING LEASE TRACTS	
	Prob	Mean	Prob	Mean	Prob	Mean
Land	5	0.1	13	0.1	16	0.2
North Sea Otter Range	n	0.0	n	0.0	n	0.0
South Sea Otter Range	n	0.0	n	0.0	n	0.0
Sea Otter Range	n	0.0	n	0.0	n	0.0
North Channel Island	1	0.0	12	0.1	16	0.2
South Channel Island	n	0.0	n	0.0	n	0.0
Channel Islands	1	0.0	12	0.1	16	0.2
Point Reyes Marine Sanctuary	n	0.0	n	0.0	n	0.0
Point Reyes Wildlife Area	n	0.0	n	0.0	n	0.0
Farallon Islands	n	0.0	n	0.0	n	0.0
Least Tern Range	3	0.0	3	0.0	3	0.0
Begg Rock	n	0.0	n	0.0	n	0.0
Pismo Beach	n	0.0	n	0.0	n	0.0
Oso Flaco/Santa Maria	n	0.0	n	0.0	n	0.0
San Ant./Purisima Point	n	0.0	n	0.0	n	0.0
Santa Ynez River	7	0.1	7	0.1	7	0.1
Jalama Creek	3	0.0	4	0.0	4	0.0
Goleta Slough	n	0.0	n	0.0	n	0.0
Carpinteria Marsh	n	0.0	n	0.0	n	0.0
Santa Clara River	n	0.0	n	0.0	n	0.0
Mugu Lagoon	n	0.0	n	0.0	n	0.0
Land Segment 26	1	0.0	1	0.0	1	0.0
Land Segment 27	4	0.0	4	0.0	4	0.0
Land Segment 39	n	0.0	3	0.0	5	0.1
Land Segment 40	n	0.0	1	0.0	1	0.0
Land Segment 41	n	0.0	3	0.0	3	0.0

Note: n=less than 0.5 percent. Segments with less than 0.5 percent probability of one or more contacts within 30 days are not shown.

*MMS resource estimate for Central Santa Maria Basin.

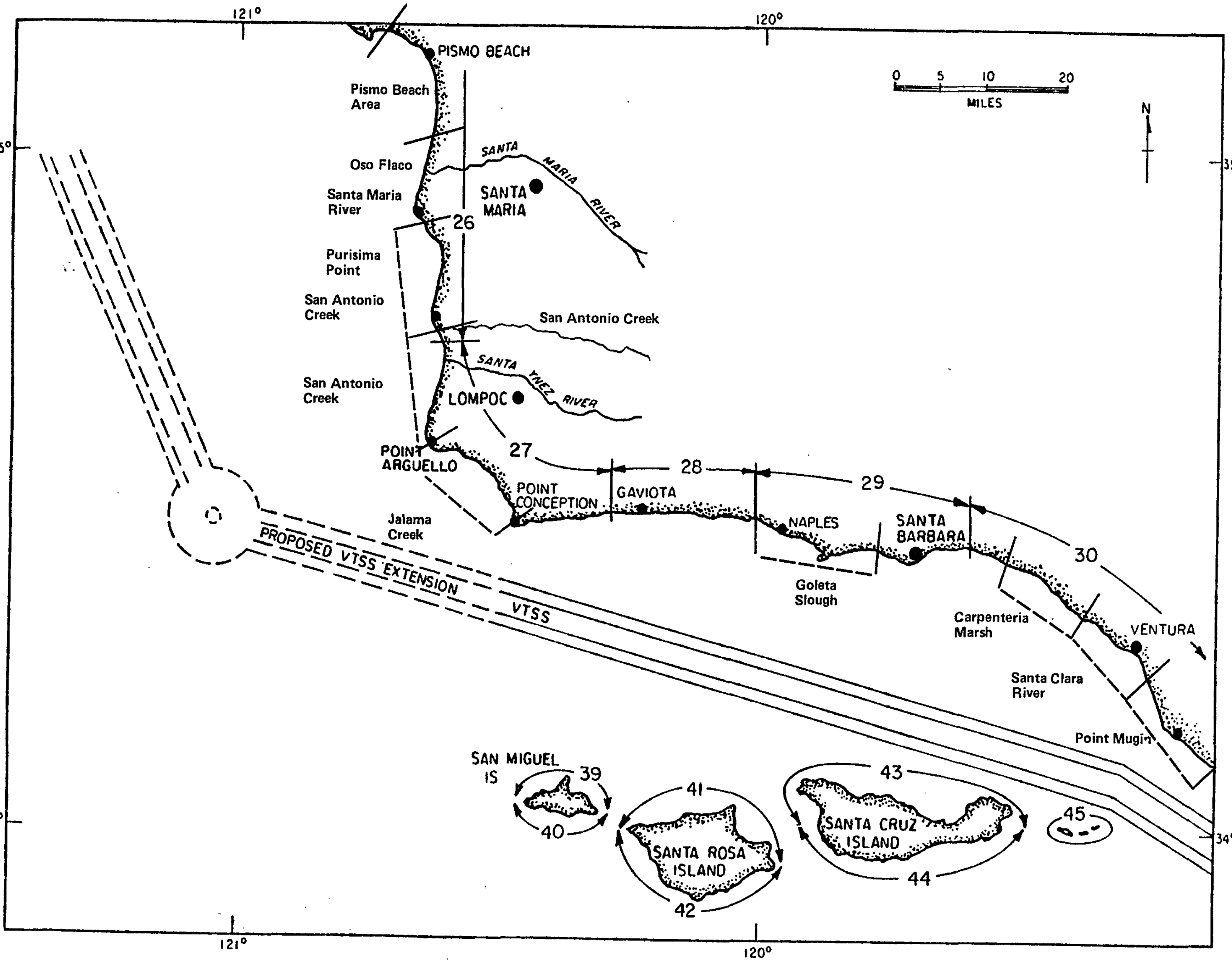


FIGURE 5.11-7 LOCATIONS OF ENVIRONMENTAL RESOURCE TARGETS AND LAND SEGMENTS DEFINED IN MMS OIL SPILL RISK ANALYSIS MODEL

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Table 5.11-8

MMS ESTIMATES OF OIL SPILL OCCURRENCES AND PROBABILITIES FOR THE CENTRAL SANTA MARIA BASIN AREA STUDY
(Based on a resource estimate of 135 million barrels of oil)

	Mean Number of Spills			Probabilities of One or More Spills		
Spill Size	Platforms	Transport.	Total	Platforms	Transpor.	Total
≥1,000 Barrels:	0.14	0.22	0.36	0.13	0.20	0.30
1,000 to 10,000 Barrels:	0.08	0.13	0.21	0.08	0.12	0.19
≥10,000 Barrels:	0.06	0.09	0.15	0.06	0.09	0.14

Breaks or leaks in the onshore oil pipelines would not result in markedly different spill quantities from those estimated for the project. Accidents involving the onshore gas pipeline, however, could result in a substantially larger release due to the effects of the higher pressure required for the increased throughput. Such releases could reach populated areas on Vandenberg AFB as well as other locations in proximity to the pipeline route. In addition, the increased level of H_2S in the gas (up to 7000 ppm) would also result in increased toxic hazard distances; however, the distances to populated areas still precludes any major impacts from toxic releases.

VI. CUMULATIVE IMPACTS AND MITIGATION MEASURES

6.0 INTRODUCTION AND DESCRIPTION OF SCENARIOS

6.0.1 Overview

Potentially significant concurrent oil and non-oil developments are described below to serve as a basis for cumulative impact assessment. Inclusion of any project or alternative in the cumulative assessment does not imply its acceptance by any agency. However, all of the developments described are considered reasonably foreseeable.

In carrying out the cumulative analysis both oil- and non-oil-related projects in Santa Barbara County, Ventura County, and San Luis Obispo County were evaluated. Table 6.0-1 gives a breakdown of the projects between future baseline, the proposed projects, the Area Study, and the cumulative analysis. This list of projects was developed through discussions with the planning departments of the three counties and with individual cities.

The future baseline included all existing and approved non-oil-related projects for the three counties. Also included in the future baseline were all the unapproved but reasonably foreseeable non-oil-related projects in Ventura and San Luis Obispo Counties. This assumption was made since the future baseline forecasts supplied by these two counties for use in the cumulative analysis, included all the reasonably foreseeable non-oil-related projects. Only existing oil-related projects were included in the future baseline.

The only non-oil-related projects included in the cumulative analysis were unapproved projects in Santa Barbara County. These are discussed in Section 6.0.3. The oil projects listed as part of the cumulative analysis in Table 6.0-1 have been divided into onshore and offshore projects, and cover exploration, production, processing, and transportation projects. Mutually exclusive projects have been evaluated in the framework of alternative scenarios. Figure 6.0-1 shows the locations for all the major oil and non-oil projects included in the cumulative impact analysis.

The significance criteria used through Chapter V are used throughout this chapter as well without modification.

6.0.2 Oil-Related Developments

Oil-related development includes offshore exploration and production facilities and onshore processing plants and transportation systems. The oil-related activities considered in the cumulative analysis encompass both offshore and onshore projects within the tri-county region. These projects are briefly described in this section.

Table 6.0-1
BREAKDOWN OF OIL AND NON-OIL PROJECTS BY FUTURE BASELINE, THE PROJECTS, THE AREA STUDY AND CUMULATIVE

Future Baseline

Non-Oil Related
- Hollister Business Park
- Santa Barbara Business Park
- Crosstown Freeway
- VAFB Development
- SCE Power Transmission Line
- Raytheon Corporation (Parts 1-4)
- Los Carneros Community
- Santa Barbara Airport Expansion
- All Ventura County Non-Oil Projects
- All San Luis Obisp• County Non-Oil Projects
- All Other Santa Barbara County Non-Oil Projects

The Projects

Union Project Impacts
- Platform Irene
- Lompoc Facility
- Orcutt Pump Station
- Santa Maria Refinery
- Battles Gas Plant
- Associated Pipelines

Exxon's Offshore Project Impacts
- Shamrock Project Platform
- Associated Pipeline to Platform Irene

The Area Study

Oil Related (Offshore)
- Central Santa Maria Basin Platforms (4)

Oil Related (Onshore)
- Expanded Lompoc Oil Facility
- New Lompoc Gas Facility
- Pipeline From Lompoc to Gaviota

Cumulative Impacts

Non-Oil Related
- Hyatt Resort and Hotel
- Raytheon Corporation (Parts 5-7)
- Santa Barbara Shores
- Refugio State Beach Expansion
- Gaviota State Park Expansion
- University Exchange Corporation

Oil Related (Offshore)

Dry Oil Transportation: Scenario I[1]	Dry Oil Transportation: Scenario II	Project	
		• Activity due to Lease Sales 48, 68, 53, 73, 80	(8 rigs/2 platforms)
		• Activity due to State Tidelands Lease Sales	(2 rigs/2 platforms)
		• Activity due to Future Lease Sales	(4 rigs)
		• Seismic Profiling Activity	
		• Exxon Santa Ynez Unit	(3 platforms)
		• Texaco Platform Harvest	(1 platform)
		• Chevron Platform Hidalgo	(1 platform)
		• Chevron Platform Hermosa	(1 platform)
		• ARCO Coal Oil Point	(2 platforms)
		• Chevron Platform Gail	(1 platform)
		• Southern Santa Maria Basin	(5 platforms)
		• Northern Santa Maria Basin	(3 platforms)
		• Cities-Service OCS-P 0409	(1 platform)
		• Union State Tidewater -PRC 2879	(1 platform)
X		• Shell Molino	(subsea)
		• Phillips/Tajiguas	(subsea)
		• Expanded OS&T	

Oil Related (Onshore)

Scenario I[1]	Scenario II	Project
X	X	• Expansion of ARCO's Ellwood Facility
X	X	• Expansion of POPCO
X	X	• Pipeline to Los Angeles
X		• Pipeline to Texas
	X	• Exxon-Coral Canyon Oil Processing Facility
X	X	• Gaviota Processing Facility
X	X	• Getty -- Supply and Crew Base
	X	• New Consolidated Marine Terminal/Tank Farm (Getty) (250 KBPD)
X	X	• City Service Oil Processing Facility
X	X	• Eagle Canyon Gas Processing Facility
X	X	• Phillips/Tajiguas Gas Processing Facility Expansion
X	X	• Chevron/Carpinteria Gas Processing Facility Expansion
X	X	• Shell/Molino Gas Processing Facility Expansion
X	X	• Nojmic• Oil Development at Vandenberg AFB
X	X	• Union Oil Development at Vandenberg AFB

[1]Assumes existing marine terminals operate at rated capacity (Aminol -- 20,000 BPD: Getty -- 70,000 BPD.)

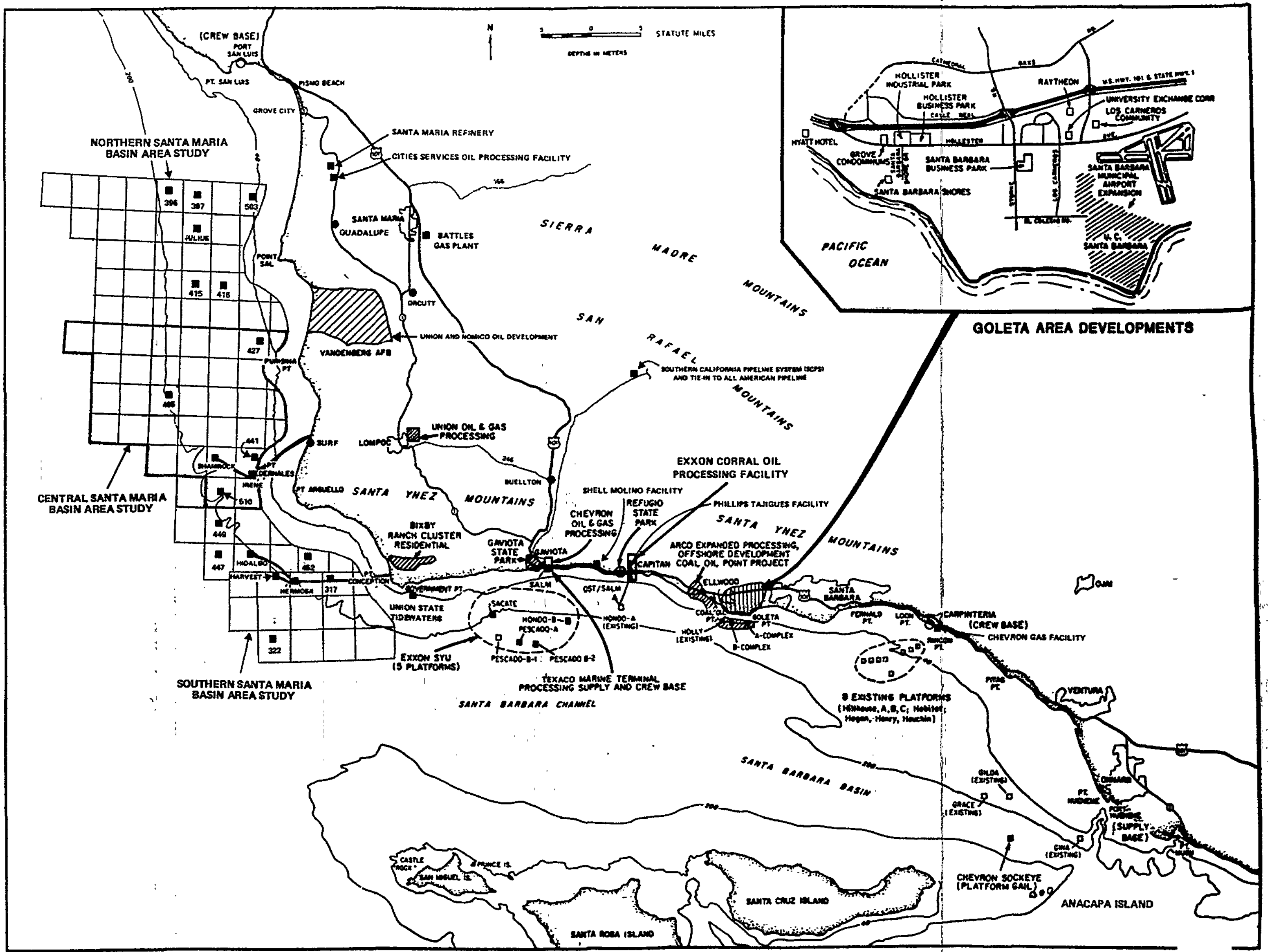


FIGURE 6.0-1

LOCATIONS OF CUMULATIVE SCENARIO DEVELOPMENT

6.0.2.1 Offshore Oil and Gas Projects

Figure 6.0-2 presents the expected schedule for the development of the expected offshore oil-related projects. Under this build-out scenario, it is estimated that up to 29 new platforms could be active in the Santa Barbara Channel and Santa Maria Basin area. Production estimates for the offshore development were made and are shown in Tables 6.0-2 and 6.0-3 for oil and gas respectively. This table indicates that the production from the Santa Barbara Channel and Santa Maria Basin should peak in 1991 at about 550,000-600,000 barrels per day of dry oil and 500 MMscfd of gas. The numbers presented in these tables represent the best estimate of average daily production by year through the year 2000. For the future development projects estimates of daily production were made based on reservoir estimates supplied by the State Lands Commission and the MMS.

The cumulative production numbers assume that current production from fields located in east Santa Barbara Channel continue, with the addition of Chevron's proposed Platform Gail and a platform on OCS-P 0203 that is owned by Union Oil. The production estimates also include the immediate projects for the development of the Point Pedernales field by Union and Exxon. The other future development projects included in the production estimates are discussed below.

EXXON SANTA YNEZ UNIT

Several fields in the Santa Barbara Channel (Hondo, Pescado, and Sacate) are proposed for development as part of the Santa Ynez Unit development. The first platform, Hondo A, has been operating since 1981. Four future platforms are projected for development of the Hondo (OCS-P 0190), Pescado (-P 0182, -P 0183) and Sacate (-P 1093) fields. The schedule for installation of the next three platforms is one each year, starting in 1988. Details of this project can be found in the Exxon Santa Ynez Unit EIR/EIS.

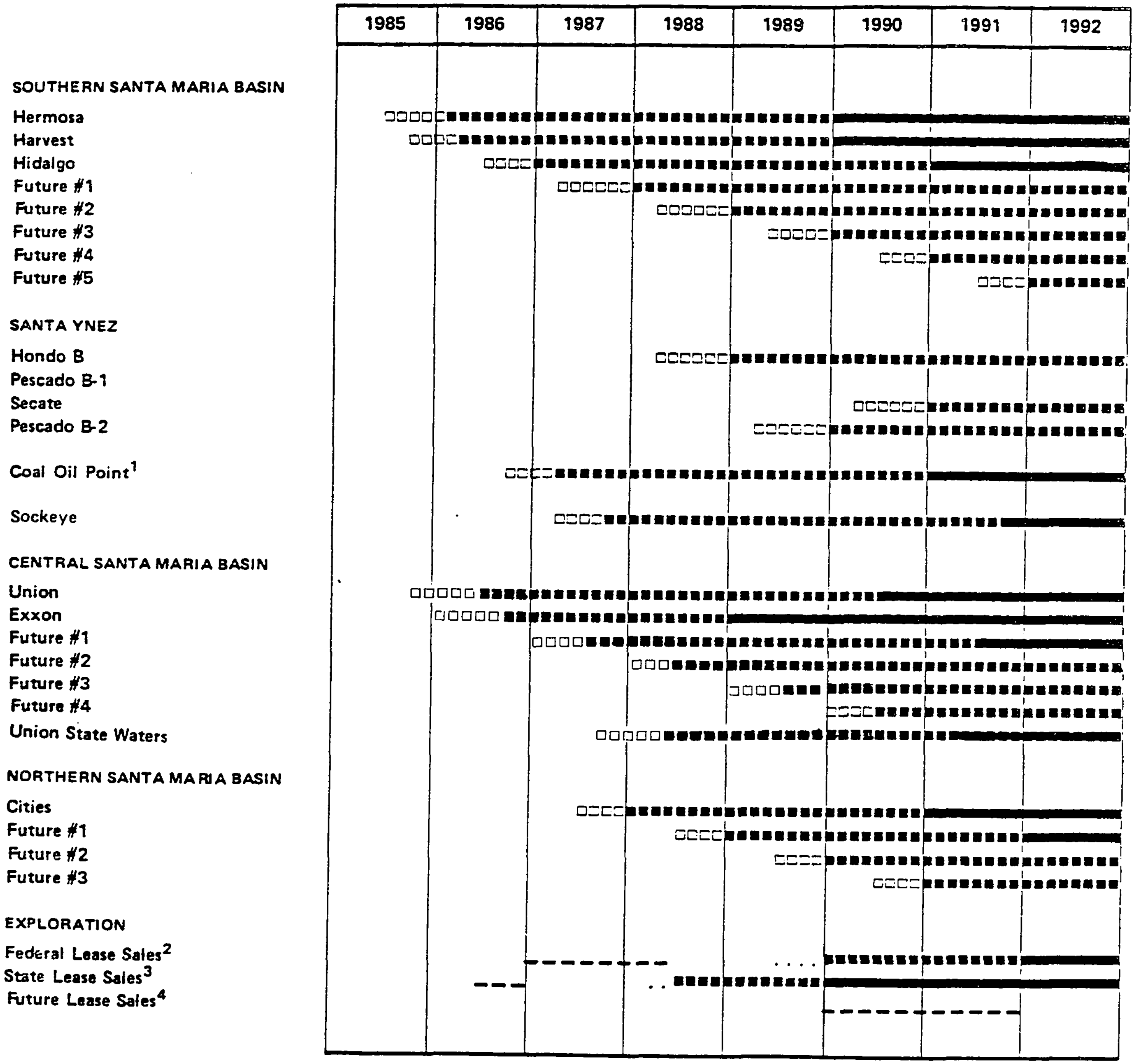
SOUTHERN SANTA MARIA BASIN

Development of the Point Arguello Field involves four operators and eight platforms as follows:

Operator	OCS Tract	Designated Platform
Chevron	-P 0316	Hermosa
	-P 0450	Hidalgo
	-P 0317	Not proposed yet
	-P 0446	Not proposed yet
	-P 0452	Not proposed yet
Texaco	-P 0315	Harvest
Getty	-P 0449	Not proposed yet
Conoco	-P 0322	Not proposed yet

FIGURE 6.0-2

SCHEDULE OF OFFSHORE DEVELOPMENTS FOR CUMULATIVE IMPACTS



1. Two platforms complexes
2. Leases 48, 68, 53, 73, 80; eight rigs, two platforms
3. Two rigs, two platforms
4. Four rigs

KEY:

- = Installation
- = Development Drilling
- = Production Only
- = Exploration
- = Uncertainty

TABLE 6.0-2

OUTLOOK FOR TOTAL CRUDE PRODUCTION--EAST SANTA BARBARA CHANNEL, STATE TIDELANDS AND SANTA MARIA BASIN
(KB/D)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000
Central Santa Maria Basin											
Union (OCS-P 0441)	3	5	12	20	20	17	15	12	10	9	4
Exxon (OCS-P 0440)	1	3	10	20	20	17	15	21	10	9	4
Future	--	1	4	10	17	27	37	32	26	21	7
Subtotal	--	9	26	50	56	61	67	56	46	39	15
Northern Santa Maria Basin											
Cities Service (OCS-P 0409)	--	--	1	4	10	9	8	6	5	4	1
Future	--	--	--	1	5	15	23	27	23	19	6
Subtotal	--	--	1	5	15	24	31	33	28	23	7
Southern Santa Maria Basin											
Arguello - Initial[1]	25	50	80	75	66	63	55	43	37	31	15
Arguello - Future	--	--	15	40	69	107	95	91	80	72	35
Subtotal	25	50	95	115	135	170	150	134	117	103	50
Santa Barbara Channel											
Santa Ynez Unit[2]	40	40	62	80(107)	80(140)	80(140)	80(134)	80(113)	80(92)	80(65)	75(45)
Coal Oil Unit Point[3]	10	20	37	57	77	76	69	63	56	50	25
Subtotal	50	60	99	137(164)	157(217)	156(216)	149(203)	143(176)	136(148)	130(115)	100(70)
East Santa Barbara Channel											
Sockeye	--	4	9	11	14	16	15	13	12	11	6
Santa Clara[4]	31	31	30	30	29	28	27	26	25	25	21
Carpinteria[4]	5	4	4	4	3	3	3	2	2	2	--
Dos Cuadros[4]	17	17	17	16	16	15	15	15	15	14	7
Hueneme[4]	6	6	6	5	5	4	4	4	3	3	--
Subtotal	59	62	65	66	67	66	64	60	57	55	34
New Discoveries											
State Wates[5]	--	5	10	28	35	35	32	26	21	7	7
Federal Lase Sales 73/80[6]	--	--	--	10	24	31	33	33	28	24	13
Subtotal	--	5	10	38	49	66	65	59	49	31	20
TOTAL	138	186	296	403(430)	479(539)	543(603)	526(580)	485(518)	433(445)	381(366)	226(196)

(1) Source: Pont Arguello Field EIR.
(2) Source: DPP for Santa Ynez Unit, Octobr 1982; includes Hondo production with OS&T; figures in () for onshore processing option.
(3) Oil Transportation Plan adjusted for Holly production per ARCO communications
(4) Oil Transportation Plan and DEIR (OTP), County of Santa Barbara, January 1984.
(5) State Lands Commission estimated production from Shell and Union leases (1984).
(6) Arthur D. Little, Inc. estimates based on EIS for OCS Sale No. 73, June 1983.
DEIS for OCS Sale No. 80, June 1983.

Arthur D. Little, Inc.

TABLE 6.0-3

OUTLOOK FOR GAS PRODUCTION - OFFSHORE SANTA BARBARA
(MMcfd)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Base Scenario										
Arquello[1]	20	35	65	109	117	120	114	101	90	79
Santa Ynez Unit[2]	30	45	65	90	90	90	90	90	90	90
Coal Oil Point[3]	10	18	40	60	70	70	60	50	40	35
Union (OCS-P 0441)[4]	1	3	3	6	8	11	12	13	13	12
Shamrock[8]	--	--	--	--	20	25	30	30	30	25
Subtotal	64	223	202	312	380	403	399	378	353	316
Federal Leases 73/80	--	--	--	3	6	10	20	25	30	35
East Santa Barbara Channel[6]	50	50	50	50	50	55	55	50	50	50
Total	114	162	252	365	436	468	474	453	433	401
Alternative										
Santa Ynez Unit[7]	30	50	75	110	135	135	125	120	110	105
Other Production	74	117	187	275	346	378	384	363	343	311
Total	104	167	262	385	481	513	509	483	453	416

Footnote on sources:

(1) Taken from basis for Area Study.
(2) From Exxon DPP; production level limited by OS&T.
(3) Peak Production from ARCO DPP; Arthur D. Little estimates for build-up and decline.
(4) Union Point Pedernales DPP.
(5) Arthur D. Little estimate.
(6) Arthur D. Little includes Sockeye.
(7) Peak production from Exxon DPP; Arthur D. Little estimte for build-up and decline.
(8) Exxon Shamrock Project DPP.
(9) Arthur D. Little estimate; includes Shell/Mollno, Union/Tidewater and Phillips/Tajiguas.

Details on these proposed platforms and the Area Study can be found in the Chevron Point Arguello Field EIS/EIR.

CENTRAL SANTA MARIA BASIN (AREA STUDY)

In addition to the two proposed platforms (Irene and Shamrock), the Central Santa Maria Basin Area Study assumes four additional platforms. For the purpose of the EIS/EIR, these have been assigned to the following locations:

- Union OCS-P 0441 (second Union platform)
- Reading Bates OCS-P 0427 and -P 0495
- Chevron OCS-P 0510

These hypothetical platforms have been previously discussed in Chapter 2 of this document.

NORTHERN SANTA MARIA BASIN

Several significant discoveries have been made in federal waters opposite Point Sal. For this analysis, development of the Northern Santa Maria Basin area is assumed to require a total of four platforms. Cities Service has filed a draft development and production plan to the MMS for a platform on OCS-P 0409. This development and production plan is to develop the San Miguel Field. The other three platforms assumed for this area are hypothetical. One of these platforms, however, may be placed on OCS-P 0415 where Reading and Bates have announced a substantial find. MMS has now revised its estimate of the number of platforms required to develop the Northern Santa Maria Basin from four to seven. The impacts associated with the full seven platforms will be considered in a separate EIS/EIR for the Northern Santa Maria Basin. For the cumulative analysis, these four platforms are assumed to be installed between 1988 and 1990.

COAL OIL POINT

ARCO plans to use two platform complexes (each consisting of a drilling platform and a production platform, connected by a bridge) to develop the Coal Oil Point Field. These platforms would be located in state tidelands near the existing Platform Holly, offshore Ellwood. A development plan had been submitted, and installation of the platforms was originally scheduled for 1987. However, the application has recently been withdrawn. This project will be evaluated in an EIS/EIR prepared by the State Lands Commission and the Corps of Engineers.

SOCKEYE

This field is part of the Santa Clara Unit located at the east end of Santa Barbara Channel. Chevron has filed a draft development and production plan to the MMS for Platform Gail to be installed on OCS-P 0205 during 1986. This plan will be subject to a separate NEPA review. Union Oil has also announced a find on OCS-P 0203 that could result in another platform for this area.

State Waters

There have been announcements of recent finds in state waters off the coast of Santa Barbara County which have been included in the production forecasts shown in Table 6.0-2 and 6.0-3. These numbers include production from the development of Union Oil's Tidelands State Tract PRC 2879 which is located off Point Conception. This development is assumed to involve one new platform. Union Oil is currently perparing an application to be submitted to the State Lands Commission under a separate CEQA review. Shell Oil is proposing to develop Tract PRC 2920 with one new platform. The tract is located just east of Gaviota and west of Ellwood in the Molino Field. Shell has submitted an application to both the County of Santa Barbara and the State Lands Commission. This project is currently undergoing a separate CEQA review.

Phillips Petroleum plans to develop Tract PRC 2933 for gas production, only using subsea completions. The gas production will be processed at the existing Tajiguas gas processing facility. This tract is also located east of Gaviota, just off the Santa Barbara coast. Phillips has submitted an application to the County of Santa Barbara which has recently been approved.

Federal OCS

It is expected that new discoveries will be associated with Lease Sales 73 and 80. The production estimates are based on reservoir information contained the Lease Sale EIS that are required by MMS, and the assumption that two hypothetical platforms could be installed on as yet unspecified leases. If and when these platforms are proposed, the operators will be required to submit DPPs to the MMS which will be subject to a separate NEPA review.

Exploration Activities

Exploration activities associated with Lease Sales 48, 68, 53, 73, 80 and RS-2 are assumed to require eight temporary drilling rigs operating in federal waters and two operating in state waters as a result of State lease sales. These would be located between the Central Santa Maria Basin and the east end of the Santa Barbara Channel. All of these exploration activities are expected to occur through the mid-1990s.

Summary of Offshore Development

For the cumulative analysis, the level of offshore activity is assumed to peak in 1991 with the currently existing 16 platforms still in operation, and with 29 new platforms assumed to have the following status:

- 12 in production mode, with development drilling complete.
- 16 still in development drilling phase.
- one platform being installed during 1991.

It is also assumed that exploration effort in 1991 has decreased to four drilling rigs. The total level of drilling activity for exploration and development is estimated at 125 wells for the year.

6.0.2.2 Onshore Oil Development

Figure 6.0-3 provides an estimate of the timing for the onshore oil development projects included in the cumulative analysis. The onshore processing facilities and oil transportation projects are described in two scenarios to reflect project uncertainties and Santa Barbara County policies to consolidate such facilities to the extent practical:

- Base Scenario: Assumes pipeline transportation for all OCS crude production and related onshore processing plants.
- Alternative: Assumes a consolidated marine terminal at Gaviota proposed by Texaco, an industry pipeline to Los Angeles, and related onshore processing plants.

In both scenarios, production from the fields located in east Santa Barbara Channel is assumed to be transported to refineries in Los Angeles by existing pipelines. Also, production from the fields in the Northern Santa Maria Basin is assumed to be treated at facilities located in San Luis Obispo County and transported by a connecting pipeline to the Southern California Pipeline System/All-American system. Furthermore, in the base scenario, the Aminoil and Texaco Marine Terminals are assumed to continue to operate at existing capacity. An overall summary of the onshore development for each scenario is presented in Table 6.0-4. The development projects included in each scenario are briefly described below.

BASE SCENARIO

Oil and Gas Processing

Santa Ynez Unit. Oil processing is assumed to be offshore at the expanded (80,000 barrels per day) OS&T. The gas treating facility owned by Pacific Offshore Pipeline Company (POPCO) in Las Flores Canyon is assumed to be expanded from a capacity of 30 MMcf to 90 MMcfd to treat the co-produced gas. This project has been covered in the Santa Ynez Unit EIR/EIS.

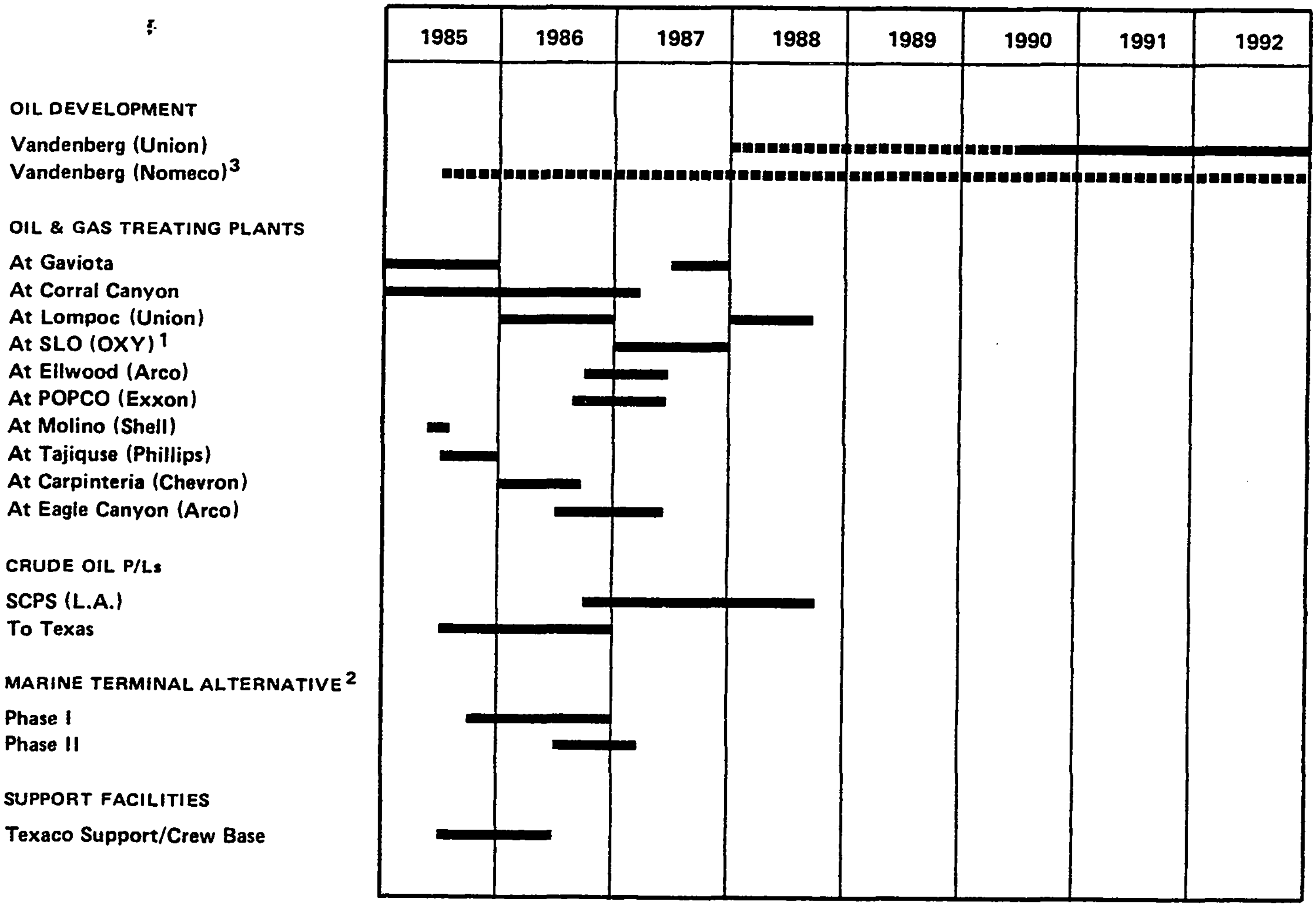
Southern Santa Maria Basin. Chevron has proposed an oil and gas processing facility at Gaviota sized to accommodate 200,000 barrels per day of dry oil and 120 MMscfd of gas. This facility has been designed to handle the expected peak production from the Southern Santa Maria Basin. This facility has been analyzed as part of the Point Arguello Field and Gaviota Processing Facility EIR/EIS recently completed for the County of Santa Barbara.

Coal Oil Point. Oil is assumed to be dehydrated at Ellwood by expanding the existing facility from 20,000 to 80,000 barrels per day. Co-produced gas will be treated in a new 60-MMcfd gas plant at Eagle Canyon; however, a new location is under consideration. This project is currently being evaluated by the State Lands Commission, which is the lead agency in the preparation of the EIR.

Sockeye. Oil and gas is assumed to be processed at the site of Chevron's existing gas plant in Carpinteria. The capacity of the existing gas facility is assumed to increase from 23 to 36 MMcfd. An EIR for this project is currently being prepared for the City of Carpinteria.

FIGURE 6.0-3

SCHEDULE OF ONSHORE DEVELOPMENTS FOR CUMULATIVE IMPACTS



1. Includes construction of connecting pipelines to major dry oil transportation systems.
2. Phase I involves expansion of existing Texaco terminal to 150 KBPD for two pipeline scenarios; Phase II at Texaco involves installation of SALM at Texaco terminal with 250 KBPD capacity for SCPS only scenario.
3. EA Graciosa Prospect Phase II Development Plan, Dames & Moore, September 1984.

KEY:

■■■ = Development Drilling

▬ = Production Only

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Table 6.0-4

SUMMARY OF SCENARIOS FOR CUMULATIVE IMPACTS

	Base Scenario	Alternative
Oil Treating Plants		
South Santa Maria Basin	250 KB/D at Gaviota as proposed by Chevron	
Santa Ynez Unit	80 KB/D at OS&T	140 MB/D at Corral Canyon
Coal Oil Point	Expand Ellwood to 80 KB/D	
Central Santa Maria Basin[1]	100 KB/D at Lompoc in future	
North Santa Maria Basin[1]	40 KB/D proposed by Cities Service[1]	
East Santa Barbara Channel	Treat in existing plants	
Gas Treating Plants		
Arguello	120 MMcfd at Gaviota as proposed by Chevron	
Santa Ynez Plant	Expand POPCO to 60 MMcfd	Expand POPCO to 135 MMcfd
Coal Oil Plant	60 MMcfd at Eagle Canyon[3]	
Central Santa Maria Basin[1]	Co-located at 80 MMcfd facility at Lompoc	
Sockeye	Expand Carpinteria to 36 MMscfd	
East Santa Barbara Channel	Treat in existing plants	
State Waters	Expand Tajiguas to 30 MMcfd Revamp Canada de la Huerta to 30 MMcfd	
Tank Farm Location[2]	Gaviota (Existing)	Gaviota (Expanded)
Marine Terminal		
Location	Gaviota	Gaviota
Maximum Throughput, KB/D	70	250
Crude Oil Pipelines	Dry oil to Los Angeles (SCPS) and to Texas (AA) via Bakersfield	Dry oil, Gaviota to Los Angeles via SCPS

1 Assumed to be located in San Luis Obispo County for impact assessment.
2 300 KB existing storage; 2500 KB expanded.
3 Since completion of the cumulative analysis, ARCO has dropped Eagle Canyon as its preferred option.

State Water. The projects requiring new, onshore development include Shell's Molino and Phillips' Tajiguas developments. Shell is proposing to revamp its existing Canada de la Huerta Gas Processing Plant which has a permitted capacity of 43 MMcfd. The maximum anticipated throughput at the plant after modification will be 30 MMcfd. The oil production from Molino is assumed to be treated in a new 20,000 barrels per day processing facility to be constructed in upper Canada de la Huerta. Phillips plans to renovate an existing gas treatment plant at Tajiguas Canyon to accommodate new gas production from State Lease PRC-2933. Peak throughput is expected to be 30 MMcfd whereas current throughput is only 1 MMcfd. The project involves restoring, replacing, and adding equipment within the plant boundaries.

Northern Santa Maria Basin. Oil from lease OCS-P 0409 and other production from this area is assumed to be processed in a consolidated oil processing facility located near Union's Santa Maria Refinery on the Nipomo Mesa. This site is where Cities Service is proposing to build a 40,000-barrel a day oil processing facility. Cities Service has stated that other operators could use the facility site for expansion; however, there are no proposed expansion plans at this time. Currently there are no plans to develop gas from the Northern Santa Maria Basin.

Vandenberg AFB Activity. Development of Union's onshore holdings proposes use of steam generators to produce 10,000-20,000 barrels per day of crude from 221 production wells. Oil treatment is proposed to be conducted at existing plants in Casmalia and Lompoc. NOMECO proposes to develop its holdings using 80 production wells. The production rate has not been specified. NOMECO currently proposes to truck its production out of the County.

Transportation and Storage

Pipelines. Dry oil is assumed to be transported out of Santa Barbara County by a single, consolidated pipeline following the permitted Getty route to Bakersfield. At a point near Emidio, the pipeline will connect to the 300,000-barrel per day SCPS, running to Los Angeles and the 300,000-barrel per day All-American Pipeline to Texas. Northern Basin production is assumed to be delivered to the SCPS by a connecting pipeline from the Cities Service Santa Maria Processing Facility.

Marine Terminals. No marine terminal expansion is assumed to occur. Getty's Gaviota Terminal and Aminoil's Ellwood Terminal are assumed to continue to operate with allowable capacities of 70,000 barrels per day and 20,000 barrels per day, respectively. Typical average rates at each terminal will be 2,500-3,500 barrels per day; mostly onshore Kern County and Santa Barbara County production. The terminals could operate at full rates during periods when a pipeline is not available due to equipment failure or maintenance.

Support Facilities

Gaviota Crew and Supply Base. An expanded Getty crew and supply base is assumed to support peak offshore activities. This facility would include a service pier, warehouses, truck staging area offices, parking, and logistical and communication support.

ALTERNATIVE SCENARIO (Expanded Marine Terminal at Gaviota)

This scenario differs from the base scenario in the following ways:

- The consolidated Getty Marine Terminal at Gaviota is assumed to provide tanker transportation for 250,000 barrels per day of production from Point Arguello, Coal Oil Point, Point Pedernales, and the Santa Ynez Unit.

- The SCPS to Los Angeles is assumed to be the only major pipeline to be installed, and is the balancing transportation system during peak production years.

- OS&T system for Santa Ynez is assumed to be replaced by an onshore treating plant located at Las Flores (Corral Canyon). The production plateau for Santa Ynez is increased from 80 to 140 MB/D because the greater capacity provided by onshore treating allows the Santa Ynez Fields to be depleted at a faster rate. The POPCO gas treating plant is assumed to be expanded to 135 MMcfd in order to handle the increased gas production associated with the increased oil production.

6.0.2.3 Estimated Production and Transportation System Allocation

The estimated oil and gas production for the cumulative scenarios is presented in Tables 6.0-2 and 6.0-3. Peak oil production for the base and alternate scenarios occurs in 1991 at 543,000 and 603,000 barrels per day, respectively. Peak gas production for the base scenario is assumed to be 474 MMcfd and occurs in 1992. For the alternate scenario, peak gas production is assumed to occur in 1991 at 513 MMcfd.

The allocation of OCS oil production to the various dry oil transportation systems is presented in Table 6.0-5 for both scenarios. The allocation of the oil among pipeline systems in the base scenario assumes that all in-state lines run at capacity during peak production years and that the interstate line to Texas handles the excess volume. During the peak years (1990-1992), the All-American Line is only 50-60 percent utilized. The All-American pipeline would have to transport some onshore production volumes in order to fill the line to economic levels.

The alternate scenario assumes that the maximum capacity of the expanded Getty Terminal is 250,000 barrels per day. Any excess volumes would be transported through intrastate pipelines, and it is assumed that SCPS is the balancing system. During the peak years (1991-1992), OCS crude transported by SCPS is approximately 250,000 barrels per day compared to the design capacity of 300,000 barrels per day of combined San Joaquin Valley and OCS crude. The transportation of extra volumes of OCS would displace an equivalent volume San Joaquin Valley crude.

TABLE 6.0-5

ALLOCATION OF OCS PRODUCTION TO TRANSPORTATION MODES
(MB/D)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000
Scenario I											
• Tanker via OS&T	40	40	62	80	80	80	80	80	80	80	75
• Tanker from Getty Terminal[6]	39	--	--	--	--	--	--	--	--	--	--
• Existing Pipelines[1]	59	62	65	66	67	66	64	60	57	55	34
• Union Pipeline System[2]	--	2	8	20	20	20	20	20	18	15	6
• All American[3]	--	82	136	137	162	177	162	125	78	31	--
• SCPS[4]	--	--	25	100	150	200	200	200	200	200	111
Subtotal	138	186	296	403	479	543	526	485	433	381	226
Scenario II											
• Tanker via OS&T[5]	40	--	--	--	--	--	--	--	--	--	--
• Tanker from Expanded Getty Terminal[3,7]	39	122	198	244	250	250	250	238	170	96	6
• Existing Pipelines[1]	59	62	65	66	67	66	64	60	57	55	34
• Union Pipeline System[2]	--	2	8	20	20	20	20	20	18	15	6
• SCPS[4]	--	--	25	100	202	267	246	200	200	200	150
Subtotl	138	186	296	430	539	603	580	518	445	366	196

Notes

(1) Limited to production from East Santa Barbara Channel fields.
(2) Limited to production from Union's platforms, up to 20 MB/D.
(3) Volumes set by difference to accommodate total production.
(4) Limited by retrofit capacity of refineries in Los Angeles area; alowing for transpor of 130-150 KBPD of San Jaunquin crud in pipeline.
(5) Expanded production via pipeline to onshore treating capacity at Corral Canyon after 1986.
(6) Existing capacity of 70 KBPD available when pipelines out of service; normally shipping onshore productin only.
(7) Phase II capacity expansion to 250 KBPD maximum.

Non-Oil-Related Development

In addition to the oil-related projects described above, all the larger unapproved non-oil-related development projects in Santa Barbara County have been considered in the evaluation of cumulative impacts. The large non-oil-related projects in both Ventura and San Luis Obispo Counties have been included in the Future Baseline and, as such, are not discretely evaluated. This approach was taken, since these projects are already accounted for in the growth projections provided by the respective counties. These projections were used in developing the Future Baseline socioeconomic impacts to both Ventura and San Luis Obispo Counties. Figure 6.0-1 shows the proposed location of these projects, most of which are scheduled for construction in the mid to late 1980s. Each of these projects is discussed below:

Hyatt Resort. Hyatt Hotels Corporation has proposed construction of a hotel and resort complex along the Goleta coast near Ellwood. The first phase would include a 574-room hotel, 24 condominiums, and resort facilities on a 64-acre parcel along the ocean and beach. The second phase would include a 50-room hotel and tennis facility on 20 acres north of U.S. 101.

Santa Barbara Shores. Santa Barbara Shores' proposes construction of a 540-room hotel and 200 residential units in the area just east of Sandpiper Golf Course in western Goleta.

University Exchange. University Exchange is a proposed project to developed in three parts. The first involves diverting the McCoy/Glen Annie Creek to provide the water requirements of the projects. The second phase would involve the construction of the Pacific Oaks Townhouses. This complex would include 110 residential units located about 1/4 mile northeast of the Devereaux Slough. The third phase would involve the construction of 500 housing units around the Ocean Meadows Golf Course.

Raytheon Corporation Park Expansion (Parts 5-7). Raytheon Corporation has plans to construct seven buildings on a 10-acre site west of Los Carneros and south of U.S. 101. The company has received approval for three office buildings of 45,000 square feet (Parts 1-4). They are seeking approval for three additional manufacturing facilities of 100,000 square feet each.

Refugio State Beach Park Expansion. The expansion plans include the general upgrading of existing facilities, improved parking and access, and improved water treatment at the park.

Gaviota State Park Expansion. The expansion plans include the general upgrading of existing facilities, improved parking, and an improved water treatment system.

6.1 GEOLOGY

6.1.1 Introduction

This section discusses geologic impacts which may accumulate as a result of future hydrocarbon development and production in the offshore and adjacent onshore region near the Central Santa Maria Basin. Geologic impacts and constraints which could be cumulative are earthquakes, ground subsidence, induced seismicity, seafloor alteration, and onshore construction activities.

6.1.2 Impacts of Cumulative Development

For future offshore development, the geological constraint with greatest potential for affecting more than one project or platform is ground motion associated with earthquakes. Provided platforms and other structures are designed to withstand earthquakes of the magnitude identified in Section 5.1, no major impacts would be anticipated.

As discussed in Technical Appendix A, ground subsidence due to hydrocarbon withdrawal probably would not have significant impacts when associated with limited production from only the two presently planned platforms. However, hydrocarbon resources in the region offshore from Point Pedernales are believed to be large and thus it is likely that numerous wells would be drilled in the future. The impact of extensive production on ground subsidence is largely unknown. Conditions in the Basin appear to be sufficiently different from other California oil fields where subsidence has occurred (e.g., Wilmington Field near Long Beach). Nevertheless, lack of experience requires this to be considered as a potentially significant cumulative impact (Class II).

Shallow focus earthquakes have been induced by fluid withdrawal from underground reservoirs. At this time it is not known whether earthquakes would be induced by hydrocarbon production in the region. Additional future production could temporarily increase the number of earthquakes, though such earthquakes are generally smaller than those which typically occur in the region. Therefore, there should be no significant cumulative impact from induced seismicity. If future facilities are designed to withstand the natural seismic regime, cumulative impacts from induced seismicity are considered Class III.

As discussed in Section 5.1.3, hydrocarbon development activities alter the seafloor [Centaur, 1984]. The alterations result primarily from pipeline laying operations and drilling operations and are generally localized and short-term. The effects of future development of the surrounding region would be cumulative with each new platform creating new anchor scars, mounds of drill cuttings, and pipelines, though impacts would be local and isolated. Taken together, impacts are considered Class III.

Onshore construction activities have potential for cumulative impact, primarily as a result of topographic alteration associated with grading, cut-and-fill operations, and potential for inducing gullying and erosion. Impacts are potentially Class II.

The portion of significant cumulative impacts attributable to Union development. Union is limited in geographic content to the Project Area. Other projects with similar potential for impacts include the Union and NOMECO oil development proposals. At this time, the absence of a defined project for Exxon's onshore project facilities does not permit a proportioning of cumulative impacts.

6.1.3 Mitigation Measures

A monitoring program could be maintained in order to establish the occurrence of subsidence, and its extent, should subsidence occur. If levels of subsidence observed are considered unacceptably high by agencies with oversight responsibility (e.g., MMS), subsidence can be arrested by reinjection.

As the other cumulative geologic impacts are generally non-additive because of their restriction to individual sites, the applicable mitigative measures are as described for individual projects and Area Development in Section 5.1.

Many impacts of onshore construction activities can be mitigated if geotechnical investigations are performed to identify potential problems, and appropriate designs to mitigate these problems are incorporated into projects. Mitigations for potential gullying, erosion and slope stability problems would be similar to measures discussed for the project.

REFERENCES

Centaur Associates, 1984. A study of Mitigation of Sea Floor Conflicts between Commercial Fishing and Offshore Oil and Gas Pipelines. Report to Minerals Management Service, U.S. Department of the Interior.

6.2 AIR QUALITY

The cumulative projects, both oil- and non-oil related, have been identified in terms of air pollution sources. For the future oil-related development, as described in Section 6.0, platform locations, timephasing, choice of operating equipment, and levels of activity were established in order to develop reasonable emission scenarios. Specific information related to the cumulative sources was obtained from submitted applications. Those facilities not identified in existing applications were characterized by their expected locations and throughputs based on anticipated future development for the region. Emissions inventories were set up for those sources identified in Section 6.0. These emissions were used in the inert pollutant modeling analysis and in the TRACE photochemical modeling runs. Details of the emission inventories of the cumulative sources are given in Appendix B.

Emissions due to non-oil related projects, as identified in Section 6.0, are not expected to be significant because they generally consist of localized residential and commercial development or light industrial R & D facilities. However, temporary localized emissions can exist during construction of these facilities. In the Socioeconomics Section (6.7) it is estimated that the increase in population in the north Santa Barbara County region during the oil-related peak emission years of 1991/1992 would be 7,000 people out of a total base population of 144,000 people. About 80 percent of this increase would be oil related. Since this accumulated growth is less than 0.5 percent per year, additional emissions associated with the increased automobile traffic and from other population-dependent sources would not be significant in the region. However this growth in population related to oil development has not been factored into the Air Quality Attachment Plan. Thus, it can be assumed that emissions related to this growth may hinder progress toward achieving attainment.

For the oil-related development scenarios that are described in Section 6.0, the Alternative Scenario would result in greater pollutant emissions than the Base Scenario because of the existence of an expanded marine terminal with increased tanker traffic at Gaviota. In the Base Scenario more oil would be transported by pipeline and the production rate for the Santa Ynez unit would be reduced. The modeling results for the alternative scenario are thus reported first.

6.2.1 Effects of the Alternative Cumulative Scenario

6.2.1.0 Inert Pollutants

For the inert pollutants, short-term concentrations were predicted by using the PTMOCS model.

The short-term inert modeling effort emphasized those cumulative project sources which would have the potential of interactions with the project and Area Study facilities to cause cumulative impacts onshore. Based on geographical considerations (source locations and shoreline orientation), only four major cumulative projects were identified as having the potential for causing onshore cumulative impacts: the Northern Santa Maria Basin

Development Facilities (including Platform Julius and the Nipomo Mesa onshore facility), the offshore platforms proposed for the Southern Santa Maria Basin and the onshore drilling projects near Vandenberg proposed by Union and NOMECO.

PTMOCS model results indicate that for all four of the major cumulative projects in combination with the Union, Exxon, and the Area Study Projects the peak concentrations would not increase significantly over the proposed project sources alone. The orientation of the cumulative projects are such that overlapping impacts with the proposed projects would be minimal. Details of the PTMOCS model results for the four components of the cumulative scenario are given in Section 15 of Appendix B.

Another component of the cumulative scenario that would include the proposed projects is the Gaviota marine terminal. Although emissions from the terminal would not directly contribute to peak concentrations of inert pollutants near the project facilities, the terminal would be used to transport a portion of the production from the Central Santa Maria Basin. The Getty Marine Terminal EIR indicates that the fully mitigated emissions at the terminal during peak throughput would result in no State or Federal standard exceedances.

The annual average concentrations under the alternative cumulative scenario are summarized in Table 6.2-1. They show that the maximum increments result in no exceedances of the annual standards. The maximum concentration would occur near the oil dehydration and gas processing facility in Lompoc. The combination of emissions from this onshore processing facility and the NOMECO oil drilling project would lead to the peak concentration. Additional peak concentrations would occur near other on-land oil and gas processing facilities such as at Gaviota.

Table 6.2-1

MAXIMUM ANNUAL AVERAGE CONCENTRATIONS
DUE TO CUMULATIVE PROJECT SOURCES (ug/m³)

Pollutant	Maximum Increment	Allowed PSD Increment	Total Concentration	Standard
NO_2	47.3	15-100	58.8	100
SO_2	4.3	20	38.2	80
TSP	2.4	19	66.4	75

The potential for the formation of acid fog under the cumulative scenario would be greater than for the project case because of the increased emissions of NO_x and SO_x, which are the main contributors to acid precipitation. The increased emissions of these pollutants would generally peak during tanker loading operations. The potential for the formation of acid fog would thus center around multi-day events that include tanker loadings and simultaneously occurring meteorological conditions that are conducive to forming sulfates, nitrates and fog.

6.2.1.1 Photochemical Pollutants

The impacts of cumulative development on ozone air quality within the affected coastal areas of San Luis Obispo, Santa Barbara and Ventura Counties was evaluated. The proposed offshore oil and gas development projects to be considered in the cumulative analysis include those located throughout the Santa Maria Basin (Northern, Central, and Southern) and those in the Santa Barbara Channel (from Point Conception to the Oxnard Plain). In addition to these offshore projects, two onshore oil drilling projects in the Lompoc Valley (proposed by Union and NOMECO) were also considered in the cumulative impact analysis.

The year selected for worst-case cumulative impact modeling was 1992, the same year modeled for the Area Study. Emissions from the cumulative sources in 1992 have been assembled in Section 15.1 of Appendix B. For each cumulative trajectory, a future baseline TRACE simulation was performed with the 1992 baseline emissions data, to serve as a basis for measuring relative impacts. Then all of the project, Area Study and cumulative source emissions were added in the full cumulative simulation. Table 6.2-2 summarizes the peak ozone levels for the cumulative scenario over the future baseline. For the cumulative levels exceeding the federal standard TRACE runs were carried out for the future cumulative levels without the proposed projects and Area Study and for the total cumulative scenarios with the fully mitigated projects. These ozone results are also reported in Table 6.2-2.

Table 6.2-2

MAXIMUM ONE-HOUR OZONE CONCENTRATIONS FOR THE CUMULATIVE SCENARIO (ppm)

Trajectory	Future Baseline	Cumulative Level	Cumulative Without The Projects	Cumulative With Mitigated Projects
1C	0.099	0.104		
4C	0.105	0.181		
5C	0.088	0.107		
6C	0.102	0.172	0.117	0.123
7C	0.075	0.124	0.119	0.12

The results of Table 6.2-2 indicate that there would be significant impacts resulting in exceedances of the federal standard in San Luis Obispo for Trajectory 4C, in the Santa Ynez Valley for Trajectory 6C, and in Goleta/Santa Barbara for Trajectory 7C. There also would be a slight increase in Santa Ynez for Trajectory 1C leading to an exceedance of the State standard.

6.2.2 Base Cumulative Scenario

Under this scenario, there would be a considerable reduction of pollutant emissions because of the reduced marine terminal operations. The levels of inert pollutant concentrations near Gaviota would thus be less than under the alternative scenario.

In the alternative cumulative scenario it was estimated that tanker loadings at the Getty terminal would result in major contributions to the maximum short-term concentrations of NO_2, SO_2, and TSP at Gaviota. The use of pipeline transportation would result in major reductions in the maximum short-term average concentrations (up to 60 percent) because of the lack of tanker emissions. The annual average concentrations may not decline a large amount because tanker loading operations are intermittent and would not contribute significantly to the annual average emission rates. The use of pipelines instead of tanker shipment should result in lower ozone levels because of the reduced emissions of reactive hydrocarbons and NO_x in the region. This would be especially for Trojectory 6C which includes emission from the taker terminal at Gaviota.

6.2.3 Mitigation Measures Applicable to Cumulative Impacts

Under the worst case cumulative scenario, even after mitigating the projects, significant ozone impacts occurred. Mitigation measures related to reducing NO_x precursor pollutant emissions for the additional cumulative projects are described below:

- Pipeline transportation of crude oil instead of using tankers. Tanker-related emissions in the Channel would be reduced significantly under this mitigative measure, thus leading to lower levels of NO_2 as well as reducing emissions that contribute to ozone formation. This reduction was discussed as the base scenario in the previous section.

- Purchasing electric power from the grid for the additional platforms. The elimination of electric generation units at the platforms would lead to significantly lower NO_x emissions and could reduce the ozone impacts. Increased Electric Grid Power demand can be accommodated by the present system. Emission increases from this demand would be difficult to evaluate specifically because of the complex power sharing network in the grid. Any increases in emmissions should not directly affect air quality near the project, because power plants are not near the project. The residual impacts of using grid power for all of the six Area Study platforms were modeled in the Area Study, and the results show the potential for exceeding the ozone standard would remain. Thus, it can be assured that after this mitigation for the additional cumulative scenario platforms, there could also be exceedances of the ozone standard. This would thus be a Class I impact. Further reductions of emissions from other facilities would be needed through AQAP revisions in order to make this a Class II impact.

- Use methanol as a fuel for diesel operated boats to reduce NO emissions. Improved impacts for this mitigation would be difficult to quantify because of the lack of specific information on boat usage in the region, relative to the trajectories. However, it can be assumed that NO_x reduction by this mitigation would significantly reduce a major source of ozone precursor emissions.

- Use NO_x controls on process heater stacks by applying thermal de-NO_x or selective catalytic reduction (SCR). Reductions as great as 90 percent can be achieved for some heaters.

6.3 ONSHORE WATER RESOURCES

6.3.1 Surface Water

Cumulative impacts to surface water would result from additional grading or trenching required for new development. Sediment yields, even with properly mulched slopes, would be increased over baseline conditions. The risk of water-quality impacts from pipeline or other spills would be increased. All but the last of these conditions could result in significant, but mitigable impacts (Class II).

For all cumulative oil-related projects, the elements with the greatest potential for regional impacts on surface water are pipelines. Regional surface-water impacts would increase because of construction of industry pipelines out of the County. Spill likelihood and impacts would vary depending on number of pipelines, pipeline size and content (e.g., dry oil vs. wet oil). Impacts associated with construction and grading activities for cumulative facilities could be significant. Future offshore development would have negligible direct impacts on surface water resources.

In order to supply future non-oil-related water demands, it may be necessary to further develop surface water resources by diversion or damming. This could lead to significant impacts to the surface water and aquatic biological resources in Santa Barbara County.

Mitigation measures for flow and erosion impacts described in Section 5.3.1, if applied to the other projects in any cumulative development scenario, would serve to mitigate impacts of their individual components and thereby limit impacts to Class III regional significance. For regional impacts associated with diversion, possible mitigations would include water reuse, process modification, other measures to reduce the demand for water, or desalination.

6.3.2 Groundwater

Most impacts to groundwater have cumulative effects. Increased consumptive use of groundwater is inherently cumulative in its effect and spills can have cumulative effects from residual contamination remaining after cleanup efforts.

This section evaluates only the direct project cumulative impacts on the groundwater basins directly affected by the Union and Exxon projects. Section 6.7, Socioeconomics, evaluates the total cumulative impact on tri-county groundwater resources of consumptive water use increases.

Four of the cumulative projects would have impacts on groundwater basins in which direct project impacts have been identified. These are:

Southern California Pipeline System
Celeron/Getty Pipelines
Nomeco Oil Development at Vandenberg AFB
Union Oil Development at Vandenberg AFB

The two pipelines above would originate near Gaviota, cross the Santa Ynez River near Buellton, and continue on to Bakersfield. While such a pipeline could impose substantial impacts of its own, the routes would be sufficiently distant from the project pipelines that direct project cumulative impacts would not be significant.

Both proposed oil developments are in the San Antonio Valley. These projects will require some water during construction, for dust control and crew support, but will require essentially no water during normal operation. If the required water were drawn from the Lompoc Basin, these projects could contribute to cumulative impacts.

The primary cumulative impacts in the tri-county Study Region would be associated with the induced population and economic growth described in the Socioeconomics sections. This growth would lead to additional strains on basins which already are in an overdraft situation and could result in overdraft situations in basins which are currently close to being overdrafted. Impacts are Class I, partially mitigable by water reuse, process modification, other measures to reduce the demand for water, or desalination.

6.4 MARINE WATER RESOURCES

6.4.1 Effects of Cumulative Scenario and Their Significance

Considering only normal operations, the cumulative oil development scenario is expected to result in some impacts of moderate (Class II) significance on marine water resources, particularly marine sediments. Other impacts of lower (Class III) significance may also occur (e.g., those associated directly with platform discharges of drill muds and cuttings, and produced water), but the impacts are expected to be near-field, i.e., restricted to the areas within 100 meters of the point of discharge. Oil spills (abnormal events for large spills) are expected to result in impacts of low (Class III) to high (Class I) significance, with Class I impacts being associated with large oil spills (e.g., more than 1,000 barrels) and the Class III impacts with periodic small spills of less than a few barrels each. This is expected for both the base and alternate cumulative scenarios.

Because the cumulative scenario components that affect marine water resources are essentially all oil-related and involve primarily the additions of new offshore oil platforms, the nature of the impacts expected on marine water resources is the same as those described in Section 5.4 for the proposed projects (two platforms, associated subsea pipelines, and refinery enhancement). Following from this viewpoint is the rough assessment that the proposed (two-platform) projects constitute slightly less than 5 percent of the cumulative scenario. The significant (Class II) impacts associated with normal operations derived primarily from expected changes in sediment texture and chemistry over extended areas (outside the zone of initial dilution allowed for waste waters -- typically about 100 meters from the point of discharge) around each platform which could persist for some time (years to decades) after termination of production activities. The changes in sediment properties were linked to the platform discharges that contained settleable solids (especially drill cuttings and drill muds) or that contained pollutants which could become associated with suspended solids and eventually reach the bottom sediments (e.g., produced water discharges). Sediment chemistry changes could include increases in concentrations of certain metals (Zn, Ba, Cr) and organics, as well as a lowering of the oxygen content due to burial and/or deposition of oxygen-demanding material.

The overall magnitude or extent of the impacts on sediments in the cumulative scenario is difficult to quantify; however, rough comparisons may be made with the impacts described for the proposed projects (two platforms) using the number of platforms as the factoring parameter to estimate total wastewater discharge volumes, sediment areas affected (Table 6.4-1), or other pollutant loads of special interest. As shown by the estimates in Table 6.4-1, the cumulative scenario could result in a roughly ninefold increase in the total waste water discharges to the Santa Maria Basin and a corresponding ninefold increase in the area of marine sediments affected by components of the platform discharges. The total sediment area affected with such deposits could exceed 1,000 square kilometers. In areas where platforms are clustered together or are aligned on a geologic feature that restricts dispersion, the sediment areas affected by such platforms may overlap and

Table 6.4-1

SUMMARY OF WASTEWATER DISCHARGE VOLUMES ASSOCIATED WITH ANALYSIS OF CUMULATIVE IMPACTS

Discharge Source	Discharge Volume[a] (bbl/yr)	Marine Sediment Area Potentially Affected (km^2)[d]
Baseline		
• Municipal wastewater outside Santa Barbara Channel	21,000,000	-?-
• Municipal wastewater outside Santa Barbara Channel	300,000,000	-?-
• Santa Maria Refinery	2,500,000	-?-
• 16 existing platforms in area of Santa Barbara Channel	383,000,000	2,400
Subtotal	706,500,000	>2,400
Project Impacts		
• 2 platforms (plus pipelines)	47,900,000	300
• Increment to Santa Maria Refinery	250,000	-?-
Subtotal	48,150,000	> 300
Cumulative Scenario[b]		
• 18 new platforms in Santa Maria Basin	431,000,000	2,700
• 29 total new platforms in Regional Study Area	694,000,000	4,350
• 45 total platforms (old + new) in Regional Study Area	1,078,000,000	6,750
• Municipal discharges and other non-oil sanitary discharges	321,000,000	-?-
Southern California[c]		
• Municipal wastewater	9,600,000,000	-?-

[a] Discharge volumes approximate; municipal wastewater values from Appendix D, Table 5.4.68. All platform discharges taken as being proportional to number of platforms (Irene, Shamrock) as base.

[b] Excluding baseline.

[c] Listed for comparison purposes; not part of cumulative analysis.

[d] Affected area values given only for oil platform discharges. Areas given are rough estimates of areas that may receive appreciable deposits from drill cuttings, muds discharges, formation water pollutants, and other platform discharges; based on estimate of 150 km^2 platform described in Section 5.4.2.1.

effect use of the seafloor by a full array of benthic organisms, bottom feeders, or other aquatic biota. This clustering is expected for the two platforms in the proposed projects, for three platforms in the Area Study, and for a portion (perhaps one-third) of the platforms considered in the cumulative scenario.

It should be emphasized that these estimates of sediment areas that may be affected have a high degree of uncertainty, especially with regard to the area that would be sufficiently affected to affect aquatic life. As noted in Appendix D, Section 5.4.4(A), studies have shown that in the southern California region (affected by major municipal outfalls as indicated in Table 6.4-1) there are widespread areas with elevated concentrations of contaminants in the sediments and that approximately 160 square kilometers have degraded or changed benthic infauna. If this was actually the full extent of the sediment area significantly affected, and if the area affected by discharges could be ratioed (without regard to source) by the discharge volume (e.g., barrels per year as in Table 6.4-1), then the area for which significant biotic effects would be expected from the cumulative scenario being considered would be relatively small -- less than 20 square kilometers for the total of 45 platforms. The discussion in Appendix D (Section 5.4.4(D)) does point out, however, that the radius for sublethal effects -- around municipal waste water discharges in southern California -- appears to be at least 200 kilometers. The marine area encompassed by this arc is about 60,000 square kilometers. In this particular instance, the sublethal effects seen may be associated with certain chlorinated hydrocarbons in the municipal waste waters that are highly bioconcentrated by the aquatic life. While the platform discharges are not expected to contain similar chemicals in high concentrations, they will contain others (e.g., polynuclear aromatic hydrocarbons) which could result in a range of sublethal effects.

Adding to the uncertainty in this cumulative analysis is uncertainty over the types of drill muds and additives (e.g., biocides) that may be used at the new platforms.

The time span over which these impacts will take place is only moderately longer than that for the proposed projects. The future platforms in the cumulative scenario are expected to be installed by 1991. A 20-year (typical) production life would then lead to cessation of discharges and project abandonment in the decade following 2010. Impacts associated with contaminated sediments, if any, could continue for years to decades after this time.

With regard to oil spills, the impacts described in Section 5.4.2.2 remain and keep their same significance classification (III for chronic, low-volume spills and I for major spills); but the degree of significance (and probable impacts) increases roughly in proportion to the increased probability of such spills. With the base cumulative scenario, it is estimated (Technical Appendix M) that over the lifetime of the platforms there is a 33 percent chance of a blowout oil spill of more than 1,000 barrels and a 20 percent chance of a blowout spill of more than 10,000 barrels. In addition there is a 5 to 10 percent chance for a spill of 1,000-10,000 barrels from the larger offshore pipelines and a 50 percent chance for spills of 500-5,000 barrels from smaller pipelines. Such oil spills not only have a direct effect on the water quality and biota in the areas affected, but can also contribute to the longer-term problem of sediment (and beach) pollution mentioned above. Additional discussion of cumulative impacts, from accidental oil spills, on marine water resources, marine biota, beaches, and wetlands is provided in Technical Appendices D, E, and F.

In the alternate cumulative scenario, which involves continued reliance on tanker transport of oil, there would be a slightly higher risk of oil spills in the marine environment than in the base scenario.

6.4.2 Mitigation of Cumulative Impacts

The mitigation measures described in Section 5.4.5.0 could be followed to mitigate any impacts expected as a result of future development in the Santa Maria Basin and the Santa Barbara Channel. The importance of these mitigation measures, especially the baseline survey in the Santa Maria Basin and monitoring programs for this Basin and the Santa Barbara Channel, takes on added importance in this scenario because of the added number of platforms involved, the approximately twofold increase in pollutants discharged from all oil-related activities, and the corresponding potential for area-wide sediment impacts.

Since 18 of the expected 29 new offshore platforms are in the Santa Maria Basin, there are greater opportunities here for a baseline study -- if initiated soon -- to provide input into the design and permitting of subsequent platforms.

Should baseline and impact monitoring programs demonstrate that significant impacts on sediments are likely to occur as part of the cumulative development, then further mitigation of platform discharges would need to be considered. These controls could include barging of drill muds and cuttings for onshore or deep-water disposal, and treatment or reinjection of produced water. Additional constraints on the use of certain drill fluid additives (e.g., biocides) might also be required.

If the additional platforms and pipelines assumed for the cumulative scenario are assumed to come with commitments for oil spill containment and response that are similar to those made by Union and Exxon for the proposed projects, then no additional oil spill mitigation measures are recommended on the part of the individual oil companies. However, it almost certainly would be necessary to increase the response capability (in terms of equipment, personnel, and response time) by both private (e.g., Clean Seas) and public (e.g., Coast Guard) spill response teams that have the capability of responding to major spills.

6.5 MARINE BIOLOGY

6.5.1 Effects of Cumulative Scenarios and Their Significance

Most of the marine biological impacts of the various projects in the cumulative development scenarios would occur at locations far enough removed from each other to have localized but generally non-additive regional significance. The discussion below focuses on those instances where impacts of additive regional significance may occur. Summaries of impacts by resource category are presented in Appendix E. Emphasis here is on cumulative oil development projects, as the non-oil development projects are generally inland.

6.5.1.0 Cumulative Effects of Platform Construction and Operations

As noted in Section 5.5 with respect to the Area Study development, construction anchor scarring and operational discharges from a total of 25-30 additional platforms, 10-15 exploratory drill units, and associated pipelines in the Santa Maria Basin and on the Point Arguello and Santa Barbara Basin Slopes could have regionally significant additive impacts on either or both hardbottom or softbottom benthic communities and finfish in the affected depth range. Present understanding of this impact potential is too limited to assign a likelihood of its regional significance, but a phased program of information gathering and mitigation as described in Section 5.5.5 would be capable of limiting impacts to regional insignificance. Greatest impact potential would be expected in instances where platforms were concurrently operating less than 5 kilometers apart, as, for example, on OCS-P 0440 and P 0441. The proposed projects, because they include platforms less than 5 kilometers apart, can be considered among the few developments with this type of impact potential.

6.5.1.1 Cumulative Effects of Nearshore Discharges from Several Processing/ Refining Facilities

In cases where large-scale onshore processing occurred simultaneously at Union's Santa Maria Refinery and a new Cities Service facility near Oceano, or at Gaviota, Coal Oil Point, and Las Flores facilities on the South Coast, several nearshore zones could be impacted by discharges similar to those from production platforms or the Lompoc Dehydration Facility each with potential Class II local significance. Taken together, this type of effect on several (three to six) nearshore areas could reach Class II regional significance because of the potential for oxygen depletion and/or ammonia-related stress on fish and shellfish populations of importance to commercial fisheries. See Section 4.5 of Technical Appendix E for more detailed information on species present in these waters. The proposed project's modified refinery discharge at Oceano appears likely to be a relatively minor contributor to this type of impact, but further monitoring of discharge effects over time would be required to verify this expectation.

6.5.1.2 Cumulative Effects of Exploration

The type of equipment used in offshore seismic testing has been shown to at least temporarily alter gray whale migration activity (see Section 5.5 of Technical Appendix E), with uncertain, if any, longer term significance. Cumulative effects of seismic testing on aggregates of fish, gray whales, and/or other cetaceans are likewise uncertain but are considered of greater potential significance (up to Class I for cetaceans) because of the possibility for repeated disturbance of migrating animals at intervals along the coast. The proposed projects are not contributors to this type of impact, as their seismic testing work has already been completed.

6.5.1.3 Cumulative Effects of Oil Spills

Based on the analyses of spill probabilities and trajectories by Arthur D. Little, Inc. (Appendix M), the cumulative development scenarios indicate the potential for two to four times greater probability of offshore oil spillage in the Study Region than prevails today. In particular, scenarios in which there is continued reliance on tanker transport leads to a cumulative probability of about 20 percent of at least one spill of 100,000 barrels of oil in the scenario timeframe (see Technical Appendix M.) Because of the differences among potential points of origin of various spills, only certain groups of marine biota would be expected to be fully subject to the additive risks associated with the higher cumulative spill probabilities. For example, trajectory analysis for the proposed projects and Central Basin Area Study suggests that additive cumulative risks would occur for those developments and the proposed Point Arguello Field and Area Study development for resources along the coast between Point Conception and Purisima Point and on the northern Channel Islands. These resources include several harbor seal rookeries and hauling grounds, least tern nesting sites, and the southern limit of the breeding population of the southern sea otter (see Section 4.5).

The proposed projects contribute about 15 percent of the cumulative platform-related oil spill risk. However, the Union project's Proposed Pipeline from Platform Irene to shore is one of only three proposed shore connections for the Santa Maria Basin, and thereby would be a relatively large contributor to the cumulative risk of mainland cost impacts from a major pipeline spill.

The Central Santa Maria Basin development would be expected to pose additive risks to the biota of the coast around Purisima Point when considered in conjunction with San Miguel Field/Northern Basin development. Additive cumulative risks to the biota of the Point Conception to Ellwood coastal area would be expected from the Point Arguello Field, Southern Santa Maria Basin and Santa Ynez Unit developments; and from the Santa Ynez Unit, Getty Gaviota and Coal Oil Point projects in circumstances in which a South Coast marine terminal and the OS&T coexist. The resources at greatest cumulative risk are likely to be seabirds and rocky intertidal habitats because of their inherent vulnerability and their distribution in areas of potential spill landfall.

A spill of greater than about 1,000 barrels of oil anywhere in the Region could be expected to have Class I regionally significant mortality impacts on seabirds, with high impact potential throughout most of the year. One or more rocky intertidal habitats of recognized regional significance between Ellwood and Purisima Point or on the coast of the Northern Channel Islands would likely have at least a 1 percent chance of Class I impacts in the event of a major spill. Although the biota of some of these communities are in some cases adapted to chronic oil seeps, and are relatively resilient compared to those of other benthic habitats, measurably adverse population declines enduring more than five years would be expected to follow a major nearshore sinking or landfall of fresh or partially weathered oil.

Depending on spill conditions, particularly spill origin and wave height, additional nearshore rocky subtidal areas would be at risk of experiencing impacts of Class I local or regional significance. One such area of acknowledged special regional importance in the Santa Barbara County Local Coastal Plan is Naples Reef, which would be at negligible risk from spills originating from the Point Pedernales Field development and proposed associated pipelines, but would be conditionally much more likely to be impacted by spills originating from development in areas off Coal Oil Point and the Santa Ynez Unit.

The cumulative likelihood of spill landfalls around San Miguel, Santa Rosa and Santa Cruz Islands could also increase with levels and locations of development and vessel traffic described above. According to the Arthur D. Little, Inc. spill modeling analysis, spills from an origin in the shipping lanes off Point Arguello would have about 5 percent conditional probability of landfall on San Miguel Island (See Technical Appendix M). While the overall probabilities suggest that a major spill is unlikely to reach one or more of the Islands, the likely impacts of such an event on pinniped mammals are of Class I regional significance, especially for landfalls at or around San Miguel Island.

6.5.2 Mitigation Measures Applicable to Cumulative Impacts on Marine Biology

The measures described in Section 5.5.5 to mitigate impacts of the proposed projects, alternatives, and area development would also apply to projects in any cumulative development scenario and would be particularly applicable to cumulative impacts of produced water discharges and muds and cuttings deposition around each group of production platforms. In addition, the following measures are also considered feasible. See the impact summary tables in Section 5.5.5 for listing of each of the measures discussed below.

6.5.2.0 Platform Construction and Operations

As described in Section 5.5.5, means to mitigate platform construction and operations impacts on marine biota include monitoring, followed, as appropriate, by discharge modifications and/or creation of new habitat (e.g. rocky reefs). In the context of cumulative impacts, additive exposure to organisms from platforms less than 5 kilometers apart could be avoided or mitigated as determined necessary by monitoring by relocating the points of discharge so as to be non-additive. For example, muds from one site could be barged to a soft-bottomed slope disposal site where there was active transport to avoid accumulation in the same area as mud from a second site. Produced water discharge and/or reinjection could likewise be sited to avoid additive contaminant loadings.

6.5.2.1 Processing Facility and Refinery Discharges

Consolidation of onshore processing at a minimum number of sites and, if monitoring indicates, requiring forced oxidation of facility waste water prior to ocean discharge would be expected to mitigate discharge effects to Class III significance. If these measures were shown by monitoring to be insufficient, reinjection of produced water could be feasible on a case by case basis.

6.5.2.2 Exploration Impacts

If ongoing studies show that restriction is needed, scheduling/restriction of seismic testing to the late spring through fall period when gray whales are largely absent form the Study Region would at least partially mitigate the potential for adverse effects on this species from cumulative seismic testing. Restriction of concurrent testing at sites along the coast would also help minimize effects to likely insignificant.

6.5.2.3 Oil Spills

To partially mitigate the greater oil spill risks of cumulative development, two measures beyond those discussed in Section 5.5.5 would be applicable: First, long-term reliance on onshore pipelines versus tanker transport of oil would lower overall probabilities of marine biological impacts from oil spills, and particularly of impacts from vessel-related accidents at random locations and nearshore terminals. Second, one or both of two means can be used to facilitate spill response and preempt the likelihood of impacting at least some of the region's areas of importance to marine biota: 1) Develop extra response equipment and manpower capabilities (e.g., vessels) in the vicinity of each center of offshore production, oil transfer, and landfall site with sensitive resources and high probability of impact. The latter includes the ESH areas of the North Coast from Purisima Point to Point Conception, and of the South Coast between Point Conception and Ellwood. 2) Limit the number of major areas where concurrent production and oil transfer takes place. For example, consolidation to allow a minimum number of terminals and sequential rather than overlapping development of the Central Basin Area Study platforms and the San Miguel Field would limit cumulative risks. This approach would complement the third principal means of reducing cumulative spill probability, which consists of determining the cumulative probabilities (particularly for major spills) that are considered sufficiently low to be acceptable to local planners and permitting only phased development to restrict the numbers and types of concurrent projects to stay within the limits of rare risks (i.e., less than one in ten thousand year probability).

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6.6 CUMULATIVE IMPACTS TO TERRESTRIAL AND FRESHWATER BIOTA

6.6.1 Effects of Cumulative Scenarios

Cumulative impacts due to oil-related development and non-oil development were evaluated. Two scenarios were assessed for oil transportation for the oil-related development. Scenario I assumes a new consolidated oil pipeline which connects to the proposed Southern California Pipeline System near Enudio, pipeline to Texas, a pipeline to Los Angeles, existing marine terminals, and an expanded OS&T. Scenario II assumes just a pipeline to Texas and a new consolidated marine terminal. The non-oil-related (onshore and offshore) projects included in the cumulative analyses are shown in Figure 6.0-1. Oil-related offshore developments included in the cumulative scenario consist of 14 exploratory rigs, 29 additional and 19 existing production platforms, and an expanded OS&T. Onshore oil-related facilities include two pipelines, nine new and expanded oil and gas processing facilities, a marine terminal, tank farm and supply/crew base and the development of two new oil and gas production fields at Vandenberg AFB. Other onshore developments include a resort/hotel complex, residential housing and other commercial projects, and expansions of the existing Gaviota and Refugio State Parks.

The major types of impacts to terrestrial and freshwater habitats and species anticipated from these developments are the same as those of the proposed projects: 1) vegetation and wildlife habitat loss and degradation, 2) habitat disturbances from adjacent activities, 3) accelerated erosion and sedimentation, 4) oil spills and toxic gas leaks, 5) air emissions, and 6) accidental fires. Considering the magnitude of cumulative future development, these impacts as a whole are classified as Class I, regionally significant. Of particular importance are expected impacts of vegetation and wildlife habitat loss, offshore oil spills that reach the coast, and increases in air emissions, especially increases in ozone in the Santa Ynez Valley, Piru, and San Luis Obispo areas, and local NO_2 and SO_2 increases near Gaviota. Many rare species could be affected by these developments, especially those that utilize North and South Coast beach and dune habitats and South Coast riparian and grassland/shrubland habitats. Rare species that would be most likely to be affected by habitat loss and oil spills include the California Least Tern, American Peregrine Falcon, California Brown Pelican, Black-shouldered (White-tailed) Kite, Snowy Plover, Red-legged Frog, Western Gray Squirrel, Tidewater Goby, Surf Thistle, Soft-leaved Indian Paintbrush, Dune Malacothrix, and Beach Spectacle Pod. Cumulative impacts to rare species are discussed further in Technical Appendix F. Native grasslands, vernal pools, and butterfly trees also are likely to be affected by onshore developments along the South Coast.

The proportionate impact of the proposed Union project to most of the above types of cumulative impacts is relatively small, and in accordance with that of the other oil and gas development proposals with analogous components (e.g., Chevron Point Arguello). Exceptions are as follows:

(1) The proposed Union onshore pipeline would likely affect more Coast Live Oak trees and Burton Mesa Chapparal habitat than any of the other development projects.

(2) The proposed Union onshore pipeline would also pose disproportionate risk to Barka Slough and Santa Ynez River Estuary, including the California Least Tern habitat. It is the only project among both construction and onshore transportation activity in direct proximity to a major least tern nesting site.

The proportionate impacts of the onshore portions of the Exxon Shamrock Project cannot be accurately assessed until the formal proposal of processing and transportation facilities by Exxon.

6.6.1.0 Construction-Related Impacts

Construction of the onshore oil-related projects would likely cause significant adverse impacts on many of the same habitat types as occur in the Project Area and these impacts could be regionally significant, Class I or II.

Impacts of the proposed Celeron/All-American Pipeline, which would transport locally produced crude oil from the Santa Barbara and Santa Maria Basins to McCamey, Texas, have been analyzed in a combined EIS/R prepared for the California State Lands Commission and U.S. Bureau of Land Management [ERT, 1984a] and in a Biological Assessment prepared for the Bureau of Land Management [ERT, 1984b]. Significant impacts to terrestrial and freshwater habitats and biota of the Study Region include potential: 1) reduction in diversity and abundance of important fish species in Refugio Creek and Gaviota Creek from fuel, lubricant, or oil spills, 2) reduction in abundance of shorebirds resulting from a major oil spill into coastal streams between Las Flores and Gaviota Canyons, 3) loss of riparian and oak woodlands, 4) affects to wildlife, sensitive plants, and communities from construction, and 5) losses of habitat and individuals of rare species from construction and oil spills.

A second pipeline that would transport local crude from the Santa Barbara area to Los Angeles has been proposed. This project would be likely to result in the types of impacts listed above for habitats and species located along the pipeline route.

Specific potential impacts from other proposed oil-related projects are described in Section 7 of Technical Appendix F. Potential exists for significant impacts to a number of environmentally sensitive habitats as a result of expansion of the ARCO Ellwood Oil Processing Facility, buildout of the Getty Gaviota Marine Terminal, and development of the Chevron Gaviota Processing Facility combined with the development of at least six other oil-related projects.

The construction of the six large non-oil-related projects identified in Section 6.0 would also have significant potential for adverse impacts to terrestrial and aquatic biota. The proposed Hyatt Hotel complex could involve clearing up to 84 acres in a coastal location. The Raytheon project would require clearing 10 acres and the University Exchange Corporation development could result in habitat degradation at Devereaux slough. Construction of Santa Barbara Shores housing project could potentially affect 40 acres of vernal pools.

6.6.1.1 Normal Operations and Upset Impacts

Air quality modeling for the cumulative scenarios indicates potential for significant increases in ozone and inert air pollutants, both onshore and offshore.

Cumulative development would contribute to worst-case one-hour ozone concentrations of 0.18 ppm in San Luis Obispo, 0.1 ppm in Piru, 0.127 ppm at the mouth of the Santa Ynez River, 0.17 ppm in the Santa Ynez Valley and 0.134 ppm in Goleta. Cumulative sources are predicted to cause one-hour worst-case NO_2 and SO_2 levels at Gaviota of 0.78 ppm and 0.53 ppm, respectively. These levels exceed levels known to cause plant injury, creating the potential for Class II, regionally significant impacts. Pollutant threshold levels for damage to wildlife are not well known. Oxidents and SO_2 are known eye irritants. A high incidence of blindness has been reported in bighorn sheep from mountain areas of California with high oxident levels [Newman, 1980]. Injury to vegetation from air emissions can indirectly affect wildlife by decreasing food sources or habitat.

6.6.1.2 Accident and Catastrophic Event Impacts

The development of projects in the cumulative scenarios would increase the risk of both onshore and offshore oil spills. There is estimate to be a 10-15 percent chance of a major oil spill during the 25-year lifetime of presently proposed onshore pipelines. Depending on the location and season of such a spill, impacts to biota could be Class I-III locally to regionally significant.

6.6.2 Mitigation Measures for Cumulative Impacts

Cumulative impacts on terrestrial biology from decreases in air quality and habitat loss and degradation range from Class I to Class III. Many could have regional significance. A number of mitigation measures, especially if applied prior to any incremental development, would help to reduce impacts of cumulative development. Many of these mitigation measures would require funding or implementation by broad range of agencies and developers, rather than a single applicant.

- Identify and protect from development representative terrestrial and freshwater habitats including several representative and undisturbed perennial streams with their watersheds between Ellwood and Gaviota, sections of North Coast beach and dune habitat, and Burton Mesa Chaparral habitats. These areas could be managed as natural resource conservation areas. Limit public access to non-consumptive use by small guided groups or individuals for scientific or educational purposes. Such properties could be purchased through common funding provided by developers in the affected counties. They could be managed by organizations such as the Nature Conservancy or the University of California Natural Land and Water Reserves System.

- Design and implement a habitat restoration and reestablishment program for the tidewater goby.

- Design and implement a program using sensitive indicator species to monitor potential air quality effects on plants. Given the uncertainty associated with air quality modeling for cumulative scenarios, and regarding local plant damage thresholds, it would be useful to establish examples of known sensitive plant species at key locations to monitor changes in air quality. Require preparation of plans for further mitigation if degradation occurs. Restricting the rate of development may be the only reliable mitigation for air quality impacts (see Technical Appendix B and Section 6.2).

- Establish a long-term regional monitoring program of selected biological resources/areas (including data on the regional status of declining species) to determine baseline conditions and to provide a basis for assessing possible changes related to development from construction, operation, and accidents.

- Establish terrestrial habitat restoration plans and implementation strategies for construction, operation, and catastrophic impacts. This could include upgrading offsite resources as well as preservation and/or upgrading at affected sites.

- Use monitoring results for input in developing restoration plans and to condition successive projects.

- Compensate for any lost aquatic resources (including wetlands) by improving other areas of impacted streams (i.e., augmenting flow, removing migration barriers, shading water, stream habitat enhancement, etc.).

- Establish fees for development projects that would support research, air effects monitoring, and acquisition, habitat improvement, or restoration related to cumulative impacts.

- Establish a native plant propagation center that would provide for locally obtained native plant materials and other compatible plant materials for use in revegetating disturbed areas and would monitor and take appropriate action to ensure the success of such efforts.

- Rehabilitate habitat, where feasible, in streams that historically supported or appear capable of supporting steelhead trout runs. For example, remove or modify structures such as culverts and impoundments that restrict upstream or downstream movement by trout.

- Convene a workshop of persons knowledgable about habitat restoration and revegetation in the Study Region and Project Area to develop habitat-specific and area-specific guidelines for habitat restoration, revegetation, and landscaping compatible with native biota and addressing the sometimes conflicting objectives of aesthetics, fire retardation, erosion control, wildlife habitat enhancement, and restoration of the native flora in disturbed areas. Incorporate these guidelines as appropriate into planning documents and permit conditions.

REFERENCES

Newman, J. R. 1980. Air Pollutants and Their Effects on Wildlife with Particular Reference to the House Wren. In: Effects of Air Pollutants on Mediterranean and Temperate Forest Ecosystems. June 22-27, 1980.

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ERT, 1984b. Proposed Celero/All American and Getty Pipeline Projects Draft EIR/EIS Prepared for California State Lands Commission and Bureau of Land Managment, U.S. Department of The Interior. State Clearing House No. 83110902.

6.7 SOCIOECONOMICS

This chapter identifies increases in tri-county employment due to projects identified under three cumulative scenarios. Associated housing, public service, and public finance impacts associated with this increased employment are also to be identified and detailed. The impacts of this development upon land use conversion are discussed for subareas within the tri-county area. These discussions are followed by a section outlining mitigation measures for both unavoidable significant impacts and avoidable significant impacts identified for cumulative projects.

In order to provide more guidance for policymakers, three cumulative socioeconomic cases have been created. These cases consist of all oil-related projects, including the Union and Exxon projects as well as the additional installation area study platforms. Oil-related development includes platform construction and operation, drilling activities, seismic testing, oil and gas processing facilities, pipelines, and support facilities for the transportation of oil and for construction of offshore projects. The second case consists only of non-oil-related projects. The third case combines oil-related and non-oil-related projects into a "total" cumulative development.

As stated in the previous chapter and in Technical Appendix K, a consistent methodology has been used throughout this report. The analysis is a modified economic base approach and employs estimates of project employment and local expenditures to generate direct support and indirect employment for the tri-county region. These estimates are then translated into housing market impacts based upon a gravity model that takes into account the location of the various projects, employee salary levels, and housing market area characteristics. Net new households are assumed to generate both public service and public finance impacts. These impacts are determined by applying service area-specific per capita or per household multipliers to determine changes in public service demands and public revenue and cost impacts.

Cumulative project impacts have been determined by comparing the additional employment and expenditures generated by these projects with a baseline forecast of economic activity in the tri-county area. This method is the same procedure that was undertaken to determine project impacts. Essentially, employment and expenditures associated with the projects were first used to determine total employment due to the projects. This increase in employment was then overlaid on the baseline forecast of growth in the tri-county region. Differences between the baseline forecast plus the cumulative projects and the baseline forecast itself are defined as impacts due to the cumulative projects. Incremental public service demands and consequent public finance impacts were determined from these employment forecasts. A detailed discussion of the methodology can be found in Chapter 1 of Technical Appendix K. Additional employment and expenditure detail can be found in Technical Appendix K.

6.7.1 Significance Criteria

The significance criteria identified in Chapter 5.7.1 and employed in the determination of significant project impacts and significant Area Study impacts were also used to determine cumulative project impact significance. Whereas, the project and Area Study developments would generate relatively few significant adverse impacts, except for those services such as water that are already in critical situations, the cumulative scenario projects would induce much greater impacts both adverse and beneficial, upon the tri-county area. The employment impacts of these projects are outlined below.

6.7.2 Growth Impacts

Cumulative growth impacts are defined as increases in tri-county employment induced by the cumulative projects. The list of projects included in the cumulative assessment is discussed in Section 6.0 of this report. Table 6.7-1 includes a summarized list of these projects, separated into oil-related and non-oil-related categories, combined with their expected direct employment during operations for 1986, 1990, 1995, and the year 2000. Further detail on the direct support employment and local support employment associated with each of these projects is incorporated in Technical Appendix K. The total employment (direct, direct support, and local support) induced by these cumulative projects is presented in Tables 6.7-2 and 6.7-3 for both the construction phase and the operations phase of these projects under each scenario.

The most important point to note from Table 6.7-1 is the extremely high percentage of total direct employment represented by non-oil-related projects. By 1990, the planned Hyatt Hotel and Santa Barbara Shores development, as well as University Exchange Corporation development, and increases total non-oil-related direct employment to 2,058 persons, 57 percent of the total cumulative projects' direct employment of 3,065. The non-oil-related share grows to 72 percent of the total in 1995 and to 74 percent by the year 2000. Clearly, the non-oil-related development projects represent the major share of cumulative employment growth impacts. These projects represent the largest share of public service-related impacts for particular subareas within the tri-county region. Since the majority of these non-oil-related projects are located close to one another along the South Coast of Santa Barbara County, it can be expected that this particular area could be facing some dramatic changes in public service demand and housing demands during the next 15 years.

Table 6.7.2 and 6.7.3 provide aggregate estimates of construction phase employment and operations phase employment, respectively. The construction phase employment is divided into three major categories: oil-related projects, non-oil-related projects, and total projects. The oil-related construction project employment is further divided into offshore and onshore components. Construction activity is defined as installation and hook-up for platforms as well as the construction of onshore facilities and pipelines. For the non-oil-related projects, construction is defined as the site development and the construction phases of the structures. Monthly estimates of construction employment are provided in the Socioeconomics Technical

Table 6.7-1

CUMULATIVE IMPACTS
DIRECT EMPLOYMENT BY PROJECT AND YEAR

	1986	1990	1995	2000
OIL-RELATED PROJECTS				
Oil-Offshore (including drilling and production)				
Lease Sales 40-95		(no direct employment for these activities)		
State Lease Sales		(no direct employment for these activities)		
Seismic				
Exxon-Santa Ynez Unit		84	120	156
Texaco-Harvest, Chevron-Hermosa, & Hidalgo	312	331	191	191
Arco-Coal Oil Pt.		42	32	32
Chevron-Gail		166	54	54
Southern Santa Maria Basin platforms		120	200	160
Northern Santa Maria Basin platforms		80	120	120
Cities Service 0409		166	54	54
Union 2579			13	13
Oil On-Shore				
ARCO Ellwood		6	6	6
POPCO		12	12	12
Consolidated Pipeline		4	4	4
Exxon-Las Flores		26	26	26
Gaviota Phase 2		53	53	53
Getty Supply/Crew Bare	6	27	22	19
ARCO-Eagle Canyon Gas		53	53	53
New Cons MT/TF	56	56	56	56
City Services processing facility		13	13	13
NOMECO-VAFB	68	60	60	60
Union-VAFB		60	60	60
Union Project				
Off-Shore	13	57	57	57
On-Shore	6	19	19	19
Santa Maria Area Study				
Off-Shore		57	38	88
On-Shore		55	55	55
TOTAL OIL-RELATED PROJECTS	461	1547	1318	1361
NON-OIL-RELATED PROJECTS				
Hyatt		500	500	500
Raytheon (5-7)			728	1091
Santa Barbara Shores		500	500	500
Refugio Park expansion			(no employment impact)	
Gaviota Park expansion			(no employment impact)	
University Exchange Corp.	353	1058	1763	1763
TOTAL NON-OIL-RELATED PROJECTS	353	2058	3491	3854
TOTAL CUMULATIVE PROJECTS	814	3605	4809	5215

Source: General Research Corp.

Table 6.7-2

CONSTRUCTION PHASE EMPLOYMENT
CUMULATIVE PROJECTS

	Oil-Related-Projects		Non-Oil-Related Projects	Total Cumulative Projects
Year	Offshore	Onshore		
1985	694	1,412	100	2,206
1986	631	1,472	100	2,203
1987	1,037	1,596	525	3,158
1988	843	687	525	2,055
1989	839	28	100	967
1990	751	-	100	851
1991	347	-	100	447

* Peak month taken as annual value.
Source: GRC forecasts.

Table 6.7-3

OPERATIONS PHASE EMPLOYMENT
CUMULATIVE PROJECTS[A]

	South Coast/Santa Barbara County	North County/Santa Barbara County	Ventura County	San Luis Obispo County	Total Region
OIL-RELATED PROJECT					
Year 1990	1,347	2,482	2,529	435	6,793
Year 2000	1,032	2,219	1,601	399	5,251
NON-OIL-RELATED PROJECTS					
Year 1990	3,512	514	199	0	4,225
Year 2000	6,940	1,111	398	0	8,449
TOTAL CUMULATIVE PROJECTS					
Year 1990	4,859	2,995	2,729	435	11,018
Year 2000	7,972	3,330	1,999	399	13,700

[A] Total employment includes: direct, direct support, and local support by place of residence.

Appendix K. Table 6.7.2 provides peak employment for each year. The average number of workers for offshore platform construction is 397. It is estimated that 90 percent of these workers will live in the Study Area; 50 percent in Ventura, 15 percent in the South Coast of Santa Barbara County, 20 percent in the North Santa Barbara County, 5 percent in the San Luis Obispo County. A much smaller percentage of these construction workers will actually come from the Study Area. Approximately 14 percent will come from Ventura County and 7.3 percent from North Santa Barbara County, .5 percent from South Santa Barbara County, and 1.5 percent from San Luis Obispo County. The average number of local workers required is only 114, the maximum is 300.

Construction of the non-oil-related projects would be undertaken entirely by local construction workers. Construction of the Hyatt project and Santa Barbara Shores could occur in 1987 and 1988; whereas, the Raytheon and University Exchange projects are expected to extend into the mid 1990s.

Table 6.7.3 provides estimates of the operations phase employment for the three cumulative projects cases. This employment is presented by place of residence. In presenting employment by place of residence, it becomes clear where public service and physical impacts could be generated by these projects. Clearly, the major impacts of non-oil-related projects are on the South Coast of Santa Barbara County and to a much lesser extent in the North County of Santa Barbara County. Ventura County and San Luis Obispo County could experience relatively few impacts from these non-oil-related projects. The impacts of oil-related projects are much more dispersed. The North County portion of Santa Barbara County as well as Ventura County could be much more dramatically impacted than the South Coast of Santa Barbara County and San Luis Obispo County. The impact from oil-related projects also peaks much earlier than the employment impacts from non-oil-related projects. This pattern reflects the fact that oil projects production would be peaking in the early 1990s; whereas, non-oil-related projects employment would steadily increase through the late 1980s into the mid late 1990s. During the early 1990s, employment from non-oil-related projects would surpass those of oil-related projects. By the year 2000, the total employment impact of non-oil-related projects (direct, direct support, and local) would represent 62 percent of the total cumulative projects employment.

Whereas, the cumulative project-induced growth in population represents only 2 percent of the expected incremental population growth in Ventura County in 1990, the cumulative projects-induced population in Santa Barbara County represents 19 percent of the projected baseline incremental growth in 1990. San Luis Obispo County would be impacted to only a minor extent by the cumulative projects -- 0.6 percent addition to the 1990 baseline growth and 0.2 percent increment to the year 2000 baseline growth in population. Clearly, the South Coast of Santa Barbara County would experience increased development pressures beyond projected baseline increases primarily as a result of the non-oil-related cumulative projects in the Goleta area. The public service and fiscal impacts of these developments are outlined in subsequent sections.

Since many of the proposed projects included in Table 6.7-1 are not yet fully defined we have had to estimate both construction and operation employment and expenditures in some instances. The assumptions underlying these estimates are provided in Technical Appendix K. Basically, the approach was to utilize whatever available information existed for these projects, to check that information against comparable projects to insure consistency in employment and expenditure estimates, and, where no information was available to use existing Project Description information to substitute for proposed projects. For instance, platforms and onshore facilities that were not fully defined by existing environmental or other documents were assumed to be similar in nature to Union project components. Platform Irene costs and employment data were used for undefined platform projects.

6.7.3 Housing Impacts

Housing impacts for the construction activities associated with the cumulative project scenarios are discussed in the temporary housing impacts section, whereas operations phase housing impacts are discussed in the permanent housing impacts section.

6.7.3.0 Temporary Housing

Non-oil projects are not expected to impact temporary housing since construction workers would be local residents. The following discussion therefore centers on oil projects induced impacts.

As discussed in the previous chapter, it is expected that less than 10 percent of the onshore construction workers and less than 2 percent of the offshore construction workers would require temporary housing in the tri-county area. This finding is based upon the experience of large construction projects in the area including Diablo Canyon Nuclear Power Plant, Vandenberg AFB, and Platform Hondo. The majority of offshore construction workers would commute in and out of the region. Onshore construction workers who are entering from outside the tri-county area are likely to commute on a weekly basis.

The majority of the demand for temporary housing in the tri-county area would come from immigrate workers involved with the construction of onshore facilities. Only a small portion of the demand for temporary housing would come from offshore construction workers since the overwhelming majority of these workers would be either local residents or would live aboard barges during the installation of the platforms and pipelines.

Temporary housing consist of short-term rentals, motels, private facilities, and public camp grounds. The greatest demand for these temporary accommodations would occur between July 1985 and July 1988 given current construction schedules. During this period, an average of 215 onshore workers would require temporary accommodations of some sort. A peak of 338 workers demanding temporary housing would occur in the early months of 1987.

Chapter 3 of the Socioeconomics Technical Appendix K provides a detailed breakdown of temporary housing requirements by month given the current project schedules. These temporary housing demands are further disaggregated by four temporary housing categories and by four subareas (Lompoc, Santa Maria, South San Luis Obispo, and the South Coast of Santa Barbara County). In early 1988, it is estimated that 15 motel units could be occupied by non-local construction workers hired to work on the Lompoc Dehydration Facility. This is a short-term but Class II significant impact. The construction of pipelines from Gaviota to Kern County would result in a significant impact upon rental units and motels in the Santa Maria area during 1985 and in 1987. The impact to the number (35 units) of motel units would be exceeded for three months in the summer in 1985. Although most offshore workers will not need housing onshore, it is also expected that there would be an additional demand for 10-15 rental units in the Santa Maria area by persons working on platform installation.

There would be no significant impacts on temporary housing in Southern San Luis Obispo County, although there would be a short-term adverse impact on rental units during the expansion of the Santa Maria Refinery (Class III).

There could be long-term significant impacts on rental housing in the South Coast area of Santa Barbara County beginning in September 1985 and continuing through 1987. A peak of 45 rental units will be required in early 1987 during onshore oil-related activities. Offshore workers would generate and additional demand for up to ten rental units. This is considered a Class II impact.

Impacts associated with temporary housing impacts in Ventura County would be insignificant since they would be primarily generated by offshore construction activity and would be spread over several housing market areas.

6.7.3.1 Permanent Housing Impacts

Table 6.7-4 provides estimates of new permanent housing required for the project types within the cumulative scenario. It also includes estimates of the number of these houses that would be needed by low- and moderate-income households in 1990 in the case of oil-related development and the year 2000 for non-oil-related development, since these are peak impact periods for each cumulative scenario.

Additional household demands induced by the total cumulative projects represent 15 percent of the total new housing demand (baseline plus cumulative projects) in Santa Barbara County, 2 percent of the new housing demand in Ventura County, and 0.5 percent in San Luis Obispo County. The areas most severely impacted in Santa Barbara County would be the unincorporated area of the South Coast (35 percent of the incremental growth due to cumulative projects), City of Santa Barbara (17 percent of the incremental growth due to cumulative projects), Santa Ynez housing market area (18 percent of the cumulative growth attributable to cumulative projects), and the Lompoc and Carpinteria housing market areas (with 12 percent to 14 percent of new housing demand being attributable to cumulative projects). In Ventura County, the City of San Buenaventura would have the largest increment due to the cumulative projects (5 percent). Oxnard, Port Hueneme, and Camarillo each would have between 2 percent and 4 percent of their incremental growth being induced by cumulative projects. Clearly, housing in both the South Coast and North County areas of Lompoc and Santa Ynez would be significantly impacted by cumulative development projects.

Table 6.7-4

NEW PERMANENT HOUSING REQUIREMENTS
CUMULATIVE PROJECTS

		Cumulative Change After 1984								
		Oil-Related Projects			Non-Oil-Related Projects			Total Cumulative Projects		
	Existing Housing 1984	1990	2000	Low-Moderate Income Housing Required 1990	1990	2000	Low-Moderate Income Housing Required 2000	1990	2000	Low-Moderate Income Housing Required 2000
Santa Barbara Co.	116,089	931	845	425	1,026	1,959	808	1,957	2,803	1,195
South Coast										
Santa Barbara City	33,659	68	54	27	222	418	167	290	472	189
Carpinteria	4,159	8	6	3	25	48	19	33	54	22
Unincorporated	30,531	193	154	77	629	1,183	473	822	1,338	535
Lompoc HMA										
Lompoc City	10,065	119	113	59	27	56	28	146	169	84
Lompoc Valley	3,692	185	176	92	42	87	44	227	263	131
Santa Ynez HMA	5,969	146	139	73	33	68	34	178	207	104
Santa Maria HMA	16,234	66	63	33	15	31	15	81	94	47
Guadalupe	1,103	7	6	4	1	3	1	8	9	4
Unincorporated	8,754	139	132	56	31	65	26	170	197	79
Ventura County	104,372	399	269	160	52	99	40	451	367	147
City of Camarillo	16,125	89	60	36	12	22	9	100	82	33
City of Oxnard	43,771	186	125	75	24	46	18	210	171	68
City of Port Hueneme	6,729	11	8	4	1	3	1	13	10	4
San Buenaventura	34,207	102	69	41	13	25	10	116	94	37
Study Area Unincorporated	3,540	11	7	4	1	3	1	12	10	4
San Luis Obispo County	33,962	67	62	33	0	0	0	67	62	31
City of Arroyo Grande	4,896	14	13	7	0	0	0	14	13	6
Grover City	3,931	9	8	5	0	0	0	9	3	4
City of Pismo Beach	2,977	5	5	3	0	0	0	5	5	3
City of San Luis Obispo	13,670	12	11	6	0	0	0	12	11	5
Study Area Unincorporated	8,488	27	25	13	0	0	0	26	25	12
Study Area Total		1,396	1,175	617	1,075	2,058	848	3,065	3,233	1,374

Source: GRC Forecasts

These housing impacts would be further exacerbated by increases in the demand for low- and moderate-income housing.

The oil-related projects by themselves would generate Class II impacts in all areas of Santa Barbara County except for Guadalupe and Carpinteria. Class II impacts would also be generated for Ventura County housing markets in Camarillo, Oxnard, and San Buenaventura. No San Luis Obispo County housing market areas would be significantly impacted.

Induced demand for permanent housing from non-oil-related projects would further exacerbate the problems in Santa Barbara County and to a lesser extent Ventura County. In and of themselves, the non-oil-related cumulative projects could generate Class II impacts for all Santa Barbara County housing market areas with the exception of Guadalupe. Oxnard and San Buenaventura housing market areas in Ventura County would also be significantly impacted.

The impact of the total cumulative project scenario would most strongly affect the South Coast of Santa Barbara County owing to the combination of oil-related and non-oil-related developments in this area. Low and moderate housing impacts for the total growth scenario are provided for the year 2000 in Table 6.7-4 since total impacts for the South Coast area of Santa Barbara County would reach a maximum at this point in time.

6.7.4 Public Service Impacts

Induced growth from cumulative projects is reflected in the increasing number of tri-county households and would be accompanied by commensurate increases in the demand for public services beyond the demand levels expected to occur through normal growth. This section outlines the impact of those increases.

The discussion of public service impacts is divided into three sections, one for each county. These sections are further subdivided into water demand, waste water, solid waste, police and fire protection, and school impacts. Electricity and natural gas demand for cumulative projects and for new households induced by cumulative project developments could easily be met by existing utility systems, although transmission and distribution systems would have to be upgraded to provide service to some areas served by undersized connection to existing natural gas systems or utility grid. Both Southern California Edison Company's electricity system in Ventura and Santa Barbara counties and PG&E's electricity system in San Luis Obispo County and northern Santa Barbara County have adequate capacity to meet expected demands for this area. The same can be said for PG&E and Southern California Gas gas supply systems.

6.7.4.0 Santa Barbara County Public Service Impacts

WATER DEMAND IMPACTS

Table 6.7-5 presents estimates of water demand increases induced by cumulative projects under the three scenarios. Provision of 1984 demand estimates and existing supply estimates allows for comparison of the relative

Table 6.7-5

WATER DEMAND IMPACTS
CUMULATIVE PROJECTS
(acre/ft per year)

Service Area	Existing Supply	1984 Demand	Oil-Related Projects 1990	Oil-Related Projects 2000	Non-Oil-Related Projects 1990	Non-Oil-Related Projects 2000	Total Cumulative Projects 1990	Total Cumulative Projects 2000
Santa Barbara County:								
South Coast Unincorporated and City of Carpenteria	26,360	24,080	228	183	682	1,300	910	1,483
City of Santa Barbara	16,900	15,100	51	40	137	265	188	305
Lompoc Valley and City of Lompoc	24,000	24,000	229	221	36	76	265	297
Santa Ynez	18,000	9,216	128	119	27	58	156	177
Santa Maria Area:	110,000							
Santa Maria-Orcutt		99,000	109	106	20	44	129	149
City of Santa Maria		10,123	52	55	8	17	60	72
City of Guadalupe		743	4	2	1	0	5	2
Ventura County:								
City of Camarillo	13,406	6,121	99	66	10	19	108	85
City of Port Hueneme	4,300	3,700	9	6	1	2	10	8
City of Oxnard	25,696	18,073	205	143	12	24	217	167
City of San Buenaventura	25,500	23,000	152	104	12	23	164	127
San Luis Obispo County:								
City of San Luis Obispo	12,848	11,730	9	8	0	0	9	8
Grover City	2,500	1,545	2	2	0	0	2	2
City of Arroyo Grande	3,952	2,580	2	2	0	0	2	2
City of Pismo Beach	2,000	1,330	3	3	0	0	3	3

Sources: General Research Corporation;
Personal communication with district personnel, November 1984; and
Study of Groundwater in Arroyo Grande, Department of Water Resources, June 1979.

magnitude of these water demand increases. In and of themselves, the impact of water demand increases caused by the cumulative oil projects could exceed existing supplies in only one area, Lompoc Valley and the City of Lompoc.

When the cumulative water consumption impacts are added to baseline projections, existing supplies could be surpassed in many of the communities throughout the tri-county area. Significant impacts would occur in Santa Barbara County South Coast unincorporated and City of Carpinteria areas. Santa Maria/Orcutt, the City of Santa Maria, and the city of Guadalupe by 1990, and in the City of Santa Barbara by the year 2000 under the oil-related projects scenario. Separately the non-oil-related projects could create significant impacts in the same communities by 1990.

WASTE WATER IMPACTS

Table 6.7-6 presents estimates of projected waste water generated by cumulative project scenarios for 1990-2000. Under the oil-related projects scenario Santa Barbara County existing capacities in the Santa Ynez system and Santa Maria/Orcutt system could be exceeded by 1990 by the cumulative projects-generated demand. The Lompoc Valley system could be significantly impacted by the year 2000. However, cumulative projects demand alone would not exceed the existing capacity levels.

Waste generated by non-oil projects could create significant impacts along the South Coast by 1990 and in the City of Santa Barbara by the year 2000. The total cumulative projects could create significant impacts in all Santa Barbara County areas, with the exception of Guadalupe and the City of Santa Maria.

SOLID WASTE IMPACTS

Impacts from cumulative projects upon solid waste disposal facilities can be divided into two separate categories. First is the solid waste generated by the projects, both onshore and offshore, and that generated by growth resulting from the projects. The impacts of additional solid wastes generated by growth relating to world projects could be significant in those areas were landfill capacity has or will soon be needed. These areas include Foxen Canyon, Santa Maria, and Santa Barbara County. Foxen Canyon is expected to reach capacity by 1989, whereas Santa Maria is expected to reach capacity by 1994.

With regard to offshore project waste, it has been estimated that 5 to 10 percent of the muds and cuttings become contaminated with oil. Currently these oily wastes are processed at the platforms and contaminated materials are stored and periodically shipped to Port Hueneme. From there, they are transported to Casmalia in Santa Barbara County or to the McKittrick site in Kern County. Waste materials from onshore facilities (e.g., Stretford solution, treatable oil, glycol solution) are collected at individual onshore sites and shipped to Casmalia or McKittrick.

Table 6.7-6

WASTE WATER IMPACTS
CUMULATIVE PROJECTS
(millions of gallons per day)

Service Area	Existing Capacity	1984 Wastewater Generation	Oil-Related Projects 1990	Oil-Related Projects 2000	Non-Oil-Related Projects 1990	Non-Oil-Related Projects 2000	Total Cumulative Projects 1990	Total Cumulative Projects 2000
Santa Barbara County:								
South Coast Unincorporated	10.75	6.25	.073	.059	.231	.438	.304	.497
City of Carpenteria	2	1.6	.005	.004	.011	.021	.016	.025
City of Santa Barbara	11	8	.022	.017	.063	.122	.085	.139
Santa Ynez	1.2	1.07	.043	.040	.009	.020	.052	.060
Lompoc Valley	5.4	3.72	.057	.055	.011	.023	.068	.078
City of Lompoc	5	3.6	.041	.038	.009	.018	.049	.056
City of Santa Maria	7.8	5.2	.026	.026	.005	.010	.031	.036
Santa Maria/Orcutt	2.4	1.4	.038	.037	.008	.017	.047	.054
City of Guadalupe	1	0.4	.002	.002	.0004	.0009	.002	.003
Ventura County:								
City of Camarillo	6	3.5	.029	.020	.003	.006	.033	.026
City of Port Hueneme & City of Oxnard	22.6	19	.072	.049	.007	.014	.079	.062
City of San Buenaventura	14	7.2	.037	.025	.004	.007	.040	.032
San Luis Obispo County:								
City of San Luis Obispo	5.1	4	.006	.005	0	0	.006	.005
Grover City & City of Arroyo Grande	3	2.5	.006	.006	0	0	.006	.006
City of Pismo Beach	1.2	0.92	.001	.001	0	0	.001	.001

Source: General Research Corporation.

The quantities of contaminated material generated by the cumulative oil projects would not strain the capacity of the Casmalia site. If, however, offshore oil projects are required to dispose of all drill cuttings onshore, there would be a significant impact on traffic and upon the existing disposal sites, as well as traffic increases.

The non-oil-related cumulative projects could result in additional pressure on the Foxen Canyon and Santa Maria landfill sites. Because of the lack of substantial remaining capacity in these sites, this increase must be considered a significant (Class I) impact. Most of the solid waste generated by the non-oil-related projects would go to the Tajiguas landfill although the amounts are not large enough to generate a significant impact (Class II).

POLICE AND FIRE PROTECTION IMPACTS

The impact of the cumulative projects upon the demand for police services would be small. Santa Barbara County would have to add four additional police personnel by 1990, and a fifth by the year 2000, due to cumulative projects. Two are induced by oil projects and the remainder by non-oil-projects. The City of Santa Barbara would have to add two employees by 1990, and a third by the year 2000, due entirely to the non-oil projects (Class II impacts).

These impacts represent an increase in total costs of approximately $250,000 by 1990 and $330,000 by the year 2000 (in 1984 dollars) for Santa Barbara County. The City of Santa Barbara would face increases of approximately $110,000 by 1990 and $170,000 by the year 2000. The increases for other Santa Barbara County jurisdictions would be very small. They are presented in detail in Technical Appendix K.

Twenty-seven percent of the increase to the year 2000 would be associated with capital costs attributable to the expansion of jail facilities. Given that the total cumulative projects eventually have a net fiscal benefit for the County of Santa Barbara, the increases in public protection expenditures are not considered significant. In the case of the City of Santa Barbara, where a net fiscal shortfall of some $14,000 is expected by the year 1990 (see Fiscal Impacts section following), the impact of the increase in police protection costs is considered to be adverse but not significant (Class III) because of the absolute dollar levels.

It is expected that six (three due to oil projects) new fire personnel could be required by 1990 in Santa Barbara County because of cumulative projects. This impact would increase to seven (five due to oil projects) new employees by the year 2000 due to non-oil projects (Class II impacts). The City of Santa Barbara would require one additional fire employee in 1990, and a second by the year 2000. In 1990, the costs associated with this County increase in demand would reach approximately $560,000 per year. By the year 2000, the annual cost increase would have fallen to $360,000 per year. The cost increase to the City of Santa Barbara is $140,000 by 1990, declining slightly to approximately $110,000 by the year 2000. The oil-related and non-oil related costs are proportional to employment increases.

It is important to note that, in addition to the cost figures for fire protection discussed above, there could be a need for a new fire station on the Gaviota coast that will cost approximately $550,000. The impact upon the County is not considered significant because of the net fiscal benefit of the cumulative projects. Since the net fiscal shortfall to the City of Santa Barbara is small, these impacts are considered adverse but not significant.

SCHOOL IMPACTS

In 1990 the total cumulative projects could generate increased Santa Barbara County school enrollments of approximately 720 students. Non-oil-related projects could increase enrollments to a total of 314 and oil-related project enrollments by 406. All but three small districts would be significantly impacted in the Santa Barbara County. The largest increases could occur in the Lompoc district and Santa Maria districts for oil-related projects, and in the South Coast districts around Goleta and Santa Barbara for the non-oil-related projects. District by district enrollment increases can be found in the Socioeconomics Technical Appendix K.

6.7.4.1 Ventura County Public Service Impacts

WATER DEMAND IMPACTS

Table 6.7-5 presents water demand increases induced by cumulative projects under the three cumulative scenarios. The 1984 demand estimate and existing supply estimate allows for comparison of the relative magnitude of these water demand increases. The impact of water demand increases caused by the cumulative projects would not exceed existing Ventura County supplies. The increase in demands does represent more than 0.1 percent of the existing supply in Ventura County communities; hence significant impacts would be generated by cumulative oil projects by 1990 in Oxnard and San Buenaventura, and by the year 2000 in Port Hueneme. The non-oil projects, while generating smaller increases in demand would create significant impacts in the same cities by the year 2000.

WASTE WATER IMPACTS

Table 6.7-6 presents estimates of projected waste water generated by the cumulative project scenarios for the year 1990-2000. The City of Port Hueneme and City of Oxnard systems could be significantly impacted by 1990. This impact would be pushed to a (Class I) significant level by oil-related projects.

SOLID WASTE IMPACTS

The cumulative projects could generate significant impacts upon the Santa Clara landfill in Ventura County due to the small remaining capacity of that facility. Without cumulative growth, it is expected to reach capacity by 1987. Cumulative project-related growth, particularly oil projects-related growth, could exacerbate this potential problem.

POLICE AND FIRE PROTECTION IMPACTS

Cumulative project-induced demand for additional police services could generate an increase of one police person in the City of Oxnard and one in the City of San Buenaventura (Class II impact). In 1990, the costs associated with this increase are approximately $59,000, declining to slightly over $44,000 by the year 2000 in the City of Oxnard. The increased cost to the City of San Buenaventura is $35,000 in 1990, declining to $26,000 per year in the year 2000. The majority of this impact is due to oil-project-related growth.

One additional fire person would be required by the City of Oxnard in 1990 and one-half additional fire person by 1990 in the City of San Buenaventura. This Class II impact would result in a $55,000 increase in annual costs for the City of Oxnard by 1990 and approximately a $38,000 increase in costs for the City of San Buenaventura in that same year. Detailed estimates of cost increases are provided in Technical Appendix K. Again, the impacts are due to oil-project-related growth.

SCHOOL IMPACTS

All Ventura County school districts within the Study Area would be significantly impacted by cumulative project growth. Approximately 90 percent of the increased enrollment is due to oil project-induced development in Ventura County. The Oxnard High School District would receive the largest enrollment increase of 55 students in 1990. Forty-nine of these students would be induced by the oil-related project growth. A detailed allocation of 240 additional enrollments in 1990 is provided in the Socioeconomics Technical Appendix K.

6.7.4.2 San Luis Obispo County Public Service Impacts

WATER DEMAND IMPACTS

Table 6.7-5 presents water demand increases induced by cumulative projects under the three cumulative scenarios. Provision of 1984 demand and existing supply estimate allows for comparison of the relative magnitude of these water demand increases. In and of themselves, the impact of water demand increases caused by the cumulative oil projects would not exceed existing supplies in San Luis Obispo County.

When the cumulative water consumption impacts are added to baseline projections, San Luis Obispo County available supplies are surpassed in the City of San Luis Obispo by 1990. No measurable impacts would occur for non-oil projects in San Luis Obispo County.

WASTE WATER IMPACTS

Table 6.7-6 provides estimates of waste water gemerated by cumulative projects. Capacity levels would be exceeded in the City of San Luis Obispo and the City of Arroyo Grande by 1995. Consequently, increments added by the cumulative oil projects in particular must be considered significant for these two cities. Non-oil projects would generate no measurable impact.

SOLID WASTE IMPACTS

There would be no significant impacts upon the solid waste disposal site in San Luis Obispo County related to either the oil-related projects or the non-oil-related cumulative projects (or both combined).

POLICE AND FIRE PROTECTION IMPACTS

It is not expected that the cumulative projects would generate sufficient increased demand for police and fire services to warrant the addition of staff from these projects alone. There would be small increases in costs estimated with the cumulative projects, but the net fiscal benefit of these projects would cause the cost increases to be classified as adverse but insignificant. Technical Appendix K details these cost increases.

SCHOOL IMPACTS

The Lucia Mar School District in San Luis Obispo County would be significantly impacted by oil-related project cumulative growth. Twenty-three total students in San Luis coast district of Lucia Mar district could be added in 1990 due to oil-related growth. No additional students would be added non-oil-related project growth. The Socioeconomics Technical Appendix K provides additional detail on these enrollment increases.

6.7.5 Public Finance Impact

Summary public finance impacts are provided for each county in Tables 6.7-7 through 6.7-9. Each table contains information for the year 1990 and the year 2000 for each of the three cases. The year 1985 was not included because very few of the cumulative projects are assumed to begin until after that year. Detailed revenue and cost tables are provided in Technical Appendix K. These tables divide revenue impacts into property tax, sales tax, transient occupancy tax, and other revenue components. The detailed expenditure impact projections provide a breakdown for general governmental expenses, public protection expenses, public works expenses, amortized capital, and other expenditures. The reader is encouraged to examine Technical Appendix K if more detail is required.

In Santa Barbara County, all cities are expected to receive net revenue benefits from the cumulative projects, except for the City of Guadalupe and the City of Santa Barbara. Guadalupe is expected to have an approximate $1,200 shortfall annually by the year 1990. This shortfall would increase to $1,500 by the year 2000. Approximately $1,000 of the shortfall would be due to oil-related cumulative projects. By 1990, the City of Santa Barbara would likely experience a $1,400 revenue shortfall. This shortfall would increase to $21,500 per year by the year 2000. Oil-related projects would generate a

Table 6.7-7

CUMULATIVE FISCAL IMPACTS
SANTA BARBARA COUNTY
(1984 dollars)

	Revenue and Cost Impact Summary					
	Year 1990			Year 2000		
Government Entities	Revenue Impact	Cost Impact	Net Revenue	Revenue Impact	Cost Impact	Net Revenue
OIL-RELATED PROJECTS						
Northern County Cities						
Santa Maria	$ 176,053	$ 143,185	$ 32,867	$ 164,161	$ 137,852	$ 26,308
Lompoc	143,408	106,257	37,151	128,822	98,970	29,852
Guadalupe	5,059	6,147	(1,088)	4,754	5,847	(1,093)
South Coast Cities						
Santa Barbara	210,262	208,979	1,283	162,538	162,460	78
Carpinteria	39,984	20,642	19,343	29,978	15,778	14,200
Santa Barbara County	5,570,550	1,619,098	3,951,452	5,222,834	1,453,712	3,769,122
NON-OIL-RELATED PROJECTS						
Northern County Cities						
Santa Maria	$ 33,554	$ 27,981	$ 5,573	$ 72,533	$ 59,373	$ 13,160
Lompoc	27,842	22,536	5,306	60,907	47,741	13,167
Guadalupe	1,049	1,254	(205)	2,223	2,653	(430)
Southern Caost Cities						
Santa Barbara	574,844	589,328	(14,484)	1,121,916	1,142,816	(20,900)
Carpinteria	82,913	41,898	41,015	171,895	84,686	87,209
Santa Barbara County	2,502,900	1,800,364	702,536	4,575,408	3,477,452	1,097,956
TOTAL CUMULATIVE PROJECTS						
Northern County Cities						
Santa Maria	$ 209,301	$ 177,166	$ 38,135	$ 236,109	$ 197,226	$ 38,883
Lompoc	171,395	128,794	42,601	190,006	146,710	43,296
Guadalupe	6,096	7,401	(1,305)	6,954	8,501	(1,547)
South Coast Cities						
Santa Barbara	784,626	798,307	(13,681)	1,283,771	1,305,276	(21,506)
Carpinteria	123,069	62,539	60,529	202,117	100,464	101,653
Santa Barbara County	8,074,123	3,419,462	4,654,662	9,799,353	4,931,165	4,868,189

Note: Oil and Non-Oil project figures may not add due to rounding.

Table 6.7-8

CUMULATIVE FISCAL IMPACTS
VENTURA COUNTY
(1984 dollars)

Revenue and Cost Impact Summary

Jurisdiction	Year 1990 Revenue Impact	Year 1990 Cost Impact	Year 1990 Net Revenue	Year 2000 Revenue Impact	Year 2000 Cost Impact	Year 2000 Net Revenue
OIL-RELATED PROJECTS						
Ventura County	$ 954,290	$ 972,418	$ (18,128)	$ 638,044	$ 656,866	$ (18,822)
Camarillo City	171,819	167,538	4,282	111,771	109,306	2,465
Port Hueneme City	34,936	31,039	3,898	22,127	19,721	2,406
Oxnard City	744,430	680,292	64,138	490,086	450,953	39,133
Ventura City	371,829	351,711	20,119	244,612	232,379	12,232
NON-OIL-RELATED PROJECTS						
Ventura County	$ 97,254	$ 95,072	$ 2,182	$ 188,341	$ 183,939	$ 4,402
Camarillo City	16,411	16,076	335	32,231	31,530	701
Port Hueneme City	2,861	2,553	308	5,752	5,124	627
Oxnard City	52,728	47,958	4,771	105,754	95,918	9,836
Ventura City	30,525	29,009	1,516	60,430	57,306	3,125
TOTAL CUMULATIVE PROJECTS						
Ventura County	$1,051,544	$1,067,490	$ (15,945)	$ 826,385	$ 840,805	$ (14,420)
Camarillo City	188,231	183,614	4,616	144,003	140,837	3,166
Port Hueneme City	37,798	33,592	4,206	27,879	24,845	3,034
Oxnard City	797,158	728,249	68,909	595,840	546,871	48,969
Ventura City	402,354	380,719	21,634	305,042	289,685	15,357

Table 6.7-9

CUMULATIVE FISCAL IMPACTS
SAN LUIS OBISPO COUNTY
(1984 dollars)

Jurisdiction	Revenue and Cost Impact Summary: Year 1990 Revenue Impact	Year 1990 Cost Impact	Year 1990 Net Revenue	Year 2000 Revenue Impact	Year 2000 Cost Impact	Year 2000 Net Revenue
OIL-RELATED PROJECTS						
San Luis Obispo County	$ 345,296	$ 108,382	$ 236,914	$ 336,567	$ 100,027	$ 236,539
San Luis Obispo City	45,093	34,489	10,605	41,218	31,551	9,667
City of Arroyo Grande	32,349	24,975	7,374	29,758	23,001	6,757
Grover City	10,990	10,178	813	10,118	9,374	744
City of Pismo Beach	24,872	21,263	3,609	22,842	19,586	3,256
NON-OIL-RELATED PROJECTS						
None						
TOTAL CUMULATIVE PROJECTS						
San Luis Obispo County	$ 345,296	$ 108,382	$ 236,914	$ 336,567	$ 100,027	$ 236,539
San Luis Obispo City	45,093	34,489	10,605	41,218	31,551	9,667
City of Arroyo Grande	32,349	24,975	7,374	29,758	23,001	6,757
Grover City	10,990	10,178	813	10,118	9,374	744
City of Pismo Beach	24,872	21,263	3,609	22,842	19,586	3,256

net fiscal benefit, but these modest benefits would be cancelled by shortfalls generated by the non-oil-related projects. Ventura County jurisdictions all would receive net fiscal benefits from both oil- and non-oil developments with the exception of Ventura County which would experience an $18,000 annual shortfall due to oil-project induced growth. The shortfall would be only partially offset by non-oil project benefits. San Luis Obispo County municipalities and San Luis Obispo County are expected to receive revenue benefits from the cumulative projects.

6.7.6 Land Use Impacts

Two types of impacts are addressed in this section: 1) direct impacts on the land use character of the affected areas (primarily Santa Barbara County coastal region) due to industrial expansion; and 2) indirect regional land use impacts as a result of cumulative project-induced increases in residential, commercial, and industrial acreage requirements. Methodological details can be found in Technical Appendix K.

6.7.6.0 Direct Impacts

Land use impacts due to multiple project development would be Class I (significant and unavoidable) because of the large acreage requirements for industrial uses beyond those in existing governmental comprehensive plans. In addition to more intensive industrial development on existing industrially designated property, conversion of rural, agricultural lands to industrial uses would occur. Projected industrial land requirements would be highest for the North County, South Coast, and City of Santa Maria areas in Santa Barbara County. By the year 2000, 218 additional acres of land would be used for industrial purposes in the Santa Barbara South Coast unincorporated area, and 334 acres would be added in the North County. Available industrial acreage that would be added in the Santa Maria and Guadalupe areas (excluding Vandenberg AFB and coastal zone) would be approximately 637 acres (baseline and cumulative), of which 52 percent is projected for use by this cumulative impact scenario. (Adjustment must be made for Vandenberg AFB so 52 percent is probably too high.) Even though the North County may have enough industrially zoned land available, it is not clear what types of industrial uses will be developed. Much of the available land is designated for very light industrial park-type uses and would not be suitable for heavier oil-related industry. This is the case in the Lompoc Valley, which has 40 acres of undeveloped industrial park land, but only 4 acres of general industry property. The overall industry projection for this area is 41 acres (baseline and cumulative) which indicates a potential lack of suitable industrial land.

In Ventura County, industrial acreage needs are highest in Oxnard (389 additional acres, cumulative and baseline, by the year 2000) and San Buenaventura (225 acres in 1990).

San Luis Obispo County areas of highest projected industrial development are the City of San Luis Obispo (157 acres in 2000) and the unincorporated county lands (317 acres in 2000).

Because of these projections, the overall character of portions of the tri-county area may be adversely affected. This situation is especially probable in the Santa Barbara County South Coast area where the existing recreational and agricultural environment may be altered to a more industrial setting. The rural, agricultural character in the North County may also be threatened as a result of the increased industrial activity.

6.7.6.1 Indirect Impacts

The greatest impacts would be found in the Santa Barbara County South Coast area where 1,851 housing units, or 349.3 acres, would be required to accommodate the cumulative scenario in the year 2000. The South Coast is an area where growth constraints are of greatest concern because of the existing water hookup moratorium in Goleta. [Chevron Technical Appendix M: Socioeconomics, p. 5-74, based on 14,800 potential residential units, Area Planning Council, 1983: Table 1]) Of approximately 4,200 acres of residential land available on the South Coast in 1980, the cumulative projects would use 12 percent by 2000. This impact may be adverse but not significant, without considering growth constraints.

Peak year residential requirements would occur in 1990 for Ventura County (455 units; 69.7 acres) with the highest acreage requirements in the City of Oxnard (212 units and 27.2 acres total). Residential requirements would decrease in 1995 and slightly increase by the year 2000. While available acreage is uncertain, these numbers do not likely represent a significant impact.

No significant indirect impacts are projected for San Luis Obispo County.

6.7.7 Energy Use Impacts

Expected oil and natural gas production from the cumulative projects is provided in the description of the cumulative projects. There would be a net energy benefit associated with these projects. Although there would be increases in electricity consumption, particularly the use of grid power to equipment on the project platforms, it is an adverse impact with respect to electricity demand. The proposal to utilize grid power would increase the absolute demands put upon the existing power systems, thereby potentially pushing construction schedules forward for new generating capacity. Given the magnitude of these projects, these impacts are felt to be adverse but insignificant.

6.7.8 Mitigation Measures for Cumulative Socioeconomic Impacts

Mitigation measures for cumulative impacts will be discussed in total rather than separately for oil-related and non-oil-related projects. This approach is taken because, to a great extent, the Class I and Class II impacts associated with the projects overlap and mitigation measures are assumed to be effective, whether the impact is caused by oil-related or non-oil-related project.

The development of a monitoring system is mentioned under several issues. The Santa Barbara County Department of Regional Programs is preparing the plans for such a program. The system would involve oil companies (and other developers, presumably) submitting quarterly data on employment and expenditures (by location) for their projects. These data would allow comparison with "threshold" data established for key issue areas. More accurate mitigation assessments could be made using this system.

6.7.8.0 Class I -- Unavoidable Significant Impacts

Water Use

Increases in water demand induced by the cumulative project scenario would further strain already over-committed supply or remaining available supply in all jurisdictions of Santa Barbara County with the exception of Lompoc and Lompoc Valley. Similar impacts would occur in the cities of Oxnard, Camarillo, and San Buenaventura in Ventura County, and in the city of San Luis Obispo in San Luis Obispo County. These impacts can be partially mitigated by individual applicant contribution to salt removal or other local water reclamation programs. Similarly, funds could be provided to promote water conservation within affected areas.

Land Use

Conversion of agricultural land to industrial uses in the South Coast of Santa Barbara County and to a limited extent in the North County near Lompoc is inconsistent with local land use plans, particularly the Local Coastal Plan for the South Coast of Santa Barbara County. There is no reasonable mitigation for the change in use of a particular parcel, except to place limits on conversion plans.

6.7.8.1 Class II - Significant but Mitigable Impacts

Temporary Housing

Increased demand for rental units and motel rooms in the cities of Lompoc and Santa Maria, and in the South Coast of Santa Barbara County may negatively impact temporary housing markets in these areas. Demand for 10 to 40 rental units in Lompoc, 30 to 40 rental units in Santa Maria, and up to 45 rental units in the South Coast of Santa Barbara County would place upward pressure on rental unit prices in these areas. Increased demand for 10 to 15 motel rooms in Lompoc, 20-130 motel rooms in Santa Maria, and up to 106 motel rooms in the South Coast of Santa Barbara County may interfere with non-oil-project demand for these rooms. There is not sufficient information to determine if this increased demand for motel rooms will have a net negative impact on the County from an economic standpoint, however. Mitigations for these impacts include participation in a monitoring program that will act to serve as an early warning for these increases in demand. Additional mitigation measures include hiring of local workers who would not demand this temporary housing, Applicant participation in training programs for local workers, the encouragement of contractors to utilize local workers where possible, coordination with local Building Trades council to promote the use of local workers, and avoidance of construction during space shuttle launches to minimize the loss of tourist revenue during construction periods.

Permanent Housing

An increased demand for over 600 additional low to moderately priced housing units and rentals in the Study Area is associated with cumulative project development. Mitigation for this impact will include participation in the monitoring program that will allow for better public response to such increases in demand, and to provide assistance in low-income housing development. This assistance could take the form of low-interest mortgage pool contributions by Applicants or the provision of monies to a fund to encourage development of low income units as part of larger housing developments.

Police Protection

Cumulative project-related growth would generate demand for additional police and fire staff as well as the need to construct and operate a new fire station along the Gaviota coast. These increased service demands would affect Santa Barbara County and the cities of Oxnard, San Buenaventura, Lompoc, and Santa Barbara, in the case of police staff. Increases in fire department staff would be needed in the Santa Barbara County Fire Department, as well as the cities of Oxnard and Santa Barbara. Partial mitigation for these impacts could be accomplished by requiring oil companies and non-oil developers to contribute to a fund to assist affected public agencies with increased expenditures incurred because of these projects.

Waste Water

The waste water from cumulative project-related growth could exacerbate the capacity constraints existing in treatment plants within ten sanitation districts throughout the tri-county area. Partial mitigation of this impact could be accomplished by acquiring project developers to participate in the monitoring program to provide early warning for such increases and to contribute to public service improvement funds in relation to their project induced impacts.

Solid Waste

Cumulative project-related growth could increase solid waste disposal to sites which have reached capacity or will shortly reach capacity. This is the case for Foxen Canyon and Santa Maria in Santa Barbara County and the Santa Clara site in Ventura County. Partial mitigation could be accomplished by contributing land and/or the dollars for the development and expansion of landfills in these counties.

Public Schools

Twenty districts throughout the tri-county area could experience significant enrollment increases due to cumulative oil- and non-oil-related projects. Partial mitigation of this impact would be supported by the local oil tax initiatives, participation in a monitoring program that would allow public entities early warning of impending problems, and the provision of a public service capital improvement fund that could be directed towards the provision of new classrooms and the hiring of new staff.

Public Finance

Ventura and Santa Barbara Counties and the City of Guadalupe could experience net revenue shortfalls due to cumulative project growth. Partial mitigation of these shortfalls could be achieved by requiring the applicants for these projects to participate in the monitoring program to allow local governments a better assessment of the local burden of the projects. Additional mitigation could be obtained by requiring project developers to contribute to a public service capital improvement fund that would reduce fiscal burden on these entities.

Land Use

The lack of available land to accommodate commercial growth under the existing Santa Barbara County Land Use Element in the Goleta area could be mitigated by using only industrially zoned land for commercial uses. Land near Santa Barbara Airport designated "airport/commerce" could be rezone for commercial use.

Changes in the character of coastal area from recreational/agricultural to industrial could be partially mitigated by increasing the consolidation of facilities in areas not widely used public viewing areas.

6.7.8.2 Class IV - Beneficial Impacts

In addition to these adverse impacts, there are a number of beneficial impacts from the cumulative projects. Employment would be increased by an average of 114 local jobs due to offshore construction, by an average of 845 workers for onshore construction activities, and by approximately 5,000 direct, 1,680 direct-support, and 7,500 local support workers during the operations phase of the projects. This increase in employment is associated with 100 million dollars in local construction labor expenditures, and 320 million dollars in local annual wages. In addition, over 4.5 million dollars per year would be added to Santa Barbara County's General Fund.

Since oil from the oil-related cumulative projects would offset a portion of U.S. oil imports, national security interests would benefit. Federal oil revenues from these projects would also supplement other federal revenue sources and to a certain extent offset the federal deficit.

6.8 CULTURAL RESOURCES

6.8.1 The Effects of Cumulative Scenarios on Cultural Resources and Their Significance

The cumulative effects of industrial, commercial, and residential growth could have an adverse, long-term effect (Class II) on cultural resources in Santa Barbara County. Oil and non-oil related construction activities are likely to damage onshore prehistoric, historic, and architecture sites, Native American ancestral and spiritual sites, and native flora and fauna. Increased development and accessibility to culturally sensitive areas can increase disturbances and vandalism. Adverse (Class I) impacts may also occur due to the damage or destruction of previously unknown buried sites during construction.

Since impacts to cultural resources are site-specific, it is not possible to identify specific impacts due to cumulative development. Nevertheless, areas of known cultural sensitivity would include the vicinities of all properties listed on, or nominated for federal, state and local resource listings (e.g., La Purisima Mission), known prehistoric and historic archeological sites inventoried at the UCSB Regional Archeological Clearinghouse, and topographical areas which are likely to have been used as bases, camps or day use locations, as described in Sections 4.8.2.1. Offshore, cultural resources are likely to be located in the vicinity of known ports, wharves and landings, submerged landforms and in seas where the level of nautical activity was high. MMS requirements concerning avoidance of offshore cultural resources make direct, adverse impacts unlikely in Federal waters although indirect, Class III impacts may occur. In State waters, however, local Class II impacts could occur to cultural resources since avoidance is not stipulated as in Federal waters.

Overall, the Union and Exxon projects would account for a relatively small proportion of potential impacts to cultural resources caused by cumulative development.

6.8.2 Mitigation Measures for Cumulative Impacts

Cumulative impacts can be partially mitigated through designing projects based on site records searches and archaeological surveys which identify cultural resources. Similarly, accurate surveys should guide project redesign, and data salvage programs. Public education about local prehistory, history, and archaeological research will encourage support for appropriate mitigations.

A comprehensive countywide cultural resource data base would permit more effective evaluation of proposed projects. The consistency and enforcement of legislation, ordinances, and countywide procedures regarding cultural and ethnographic resources, impact assessments, Native American consultation and monitoring, and data sharing could be improved.

A county-wide commission or committee could be established to help initiate and monitor the implementation of these mitigation measures and to review the adequacy of mitigation programs for current and future oil and non-oil-related projects. The committee should include archeologists, historians, Native Americans, developers, including representatives of oil companies and other involved, concerned groups.

Significant impacts to potential offshore cultural resources are best mitigated by avoidance. Relocating to avoid the resource (e.g. shipwrecks) or data recovery are also possible mitigations.

Developers, including oil companies can play a special role in mitigating long-term oil and non-oil-related impacts. Individually or jointly, developers could fund education programs for the general public to increase their awareness and support of cultural resources. A consortium of companies could negotiate a joint mitigation program with local Chumash Indians to enhance cultural persistence. For example, the funding of data repositories, curation facilities, and teaching laboratories would enhance the Indian communities' control over and preservation of ancestral cultural remains.

6.9 AESTHETIC RESOURCES

The potential aesthetic impacts of the cumulative development scenario and associated mitigation measures, are discussed below for the three components of aesthetic resources: 1) onshore noise and vibration; 2) visual resources; and 3) odors and smoke. Because noise and visual impacts are measured according to the sensitive receptors identified in the baseline, the effects of cumulative development with respect to these same Project Area locations are discussed below. In addition, the cumulative development would have broader impacts at sensitive receptors that have not been specifically identified or evaluated.

6.9.1 Onshore Noise and Vibration

The cumulative development scenario would not impact the Project Area receptors in terms of onshore noise and vibration since none of the projects included in this scenario are in proximity to the specific areas identified as sensitive receptor sites (i.e., residential and wildlife habitats) for the proposed project. Assuming worst case, that all of the cumulative projects take place at once, construction noise levels may increase temporarily, particularly near such sensitive receptors as residential areas, schools, hotels, etc. Helicopter and crew/supply boat traffic associated with offshore oil development will increase significantly, and the resulting noise may have Class II impacts at undetermined locations. In particular, the estimated number of helicopter round trips per day out of Santa Barbara Airport (54) represents a doubling in traffic. Consequently, the frequency of annoying helicopter noise, particularly over Goleta Beach will increase, even though the impacts associated with each flight will result in short-time, concentrated level changes similar to those described for the project. The cumulative noise impacts of both helicopters and boats may not exceed the significance criteria CNEL level of 60-65 dba. Overall, the Union and Exxon projects would contribute a small proportion of the overall noise and vibration caused by cumulative development.

6.9.2 Visual Resources

Pertinent cumulative impacts include onshore and offshore oil exploration and non-oil-related development activities described in the cumulative scenarios within view of sensitive receptors. Specifically, Chevron's Platform Hidalgo and two of the Southern Santa Maria Basin Area Study platforms would be visible to the southwest along the coastline from Surf to Civilian Beach. These platforms, in combination with the Union and Exxon platforms and two of the Central Santa Maria Basin Area Study platforms within view of the sensitive Project Area public use areas and the Southern Pacific Railroad, would produce highly significant, long-term impacts (Class I). The Cities Service platform, visible at a distance from the same sensitive receptors, would have a negligible impact on visual quality. Platforms located in the south section of the northern Area Study probably would not be visible due to distance and the orientation of the coast.

The Cities Service processing facilities near Union's Santa Maria Refinery may be within views of Highway 1; however, their cumulative effect on visual quality cannot be determined until the site is known.

The incremental increase in air traffic attributable to further development would not represent a noticeable lowering of visual quality. Aircraft trips are frequent occurrences over some areas (e.g., Goleta State Beach) near Santa Barbara Airport. In other areas (e.g., Santa Maria Airport) no sensitive public use areas or travel routes are likely to be affected due to flight corridors.

Assessing cumulative impacts and non-oil-related projects in the County of Santa Barbara using available approaches to visual analyses (i.e., those within view of Union's elements and a logical sequence of views) does not address the degree to which the public's perception of the Santa Barbara coastline and inland areas may change as a result of the proposed Union and Exxon projects, elements of the Area Study, and other oil- and non-oil-related projects.

Overall, oil development poses the principal threat to visual quality in the area. The public may perceive the Coast and inland agricultural areas as becoming increasingly industrialized, particularly given the proliferation of offshore platforms along the Southern and Central Coast. Onshore oil development, in many cases, will be unobtrusive due to siting and screening (e.g., the Lompoc Dehydration Facility and development in Flores Canyon). Moreover, the public's visual perception of the coastal area will be affected by current oil development and that proposed for the future. In time there will be no stretch of coastline from Point Sal south that will not be exposed to views of offshore platforms. Elements of the proposed Union/Exxon projects and Area Studies described in this report, would have little bearing on cumulative visual impacts of oil and non-oil development on a national and regional perception of the county.

6.9.3 Odors and Smoke

The emissions from additional sources under the cumulative scenarios would generally occur in the southern portion of Santa Barbara County and would not occur near the project facilities in the northern part of the County. Thus there would be no increases in levels of odorous pollutants nor would there be significant reductions in visibility from smoke in the region. The Union and Exxon projects would contribute a small proportion of the odors and smoke resulting from cumulative development.

6.9.4 Mitigation Measures Applicable to Cumulative Scenarios

Helicopter noise associated with cumulative development can be reduced through strict adherence to preferred routes which avoid sensitive areas and to professional flying techniques which minimize blade flap. These measures should be combined with an airport/operator monitoring program. A detailed study of helicopter noise relative to specific sensitive local receptors (e.g., Goleta Beach) would suggest possible route adjustments. A tri-county study of long-range helicopter use and mitigation options, resulting in a local Letter of Agreement between counties (e.g., Santa Barbara Noise Abatement Council), airports, helicopter operators and the FAA would be particularly appropriate. Boat noise can be reduced by establishing routing and operational restrictions such as reducing idling time, routing away from sensitive receptors as quickly as possible and restricting hours of operation.

The cumulative visual impacts of offshore oil development, where significant, could not be fully mitigated due to the number of platforms and related support activities. The degree to which the platforms are conspicuous could be reduced by painting them blue-grey but the impact would remain significant and long-term. As noted in Section 6.8-2, this mitigation is consistent with applicable rules and regulations, but would not be feasible for all platforms for safety reasons (See VTSS discussion, Technical Appendix M, Addendum A).

6.10 OTHER USES

Other uses on which the cumulative impacts of the oil and non-oil projects under development or planned for the Study Region have been estimated include: commercial fishing, kelp harvest and mariculture, recreation uses, onshore traffic, military activities, and commercial shipping.

6.10.1 Commercial Fishing, Kelp Harvest, and Mariculture

6.10.1.0 Effects of Cumulative Scenarios and Their Significance

OVERVIEW

Cumulative effects that are likely to be greater than those for the individual projects could occur for drag, set gear, drift gill net, and possibly purse seine fishing. Some effects could be felt by fishermen who use several gear types, e.g., those equipped for both set gear and drift fishing. Increased support vessel and tanker traffic increases the potential for interference with all types of fishing and damage to fishing gear, particularly set gear and drift gill nets. In particular, boat traffic through nearshore waters could increase substantially in the vicinity of Ellwood and/or Gaviota. Effects of increased vessel traffic would most likely be insignificant for all but set gear fishing, or would be significant but mitigable (Class II) for damage to the kelp canopy. In most cases covered here, the relative contribution of the proposed projects to the cumulative impacts is small and proportionate to the limited extent of the offshore components proposed. Exceptions are noted below.

EFFECTS ON SET GEAR FISHING

Set gear fishing would be affected by many of the oil development projects being considered in this analysis, particularly including platforms from various State Lease Sales such as the ARCO Coal Oil Point Project. The set gear disruptions related to vessel traffic associated with a full-scale Gaviota marine terminal, supply and crew base in the Alternative Cumulative Scenario would be long-term and affect at least 10 percent of the set gear fishermen in this area of extraordinary importance to the regional fishery (see Public Hearing Testimony on Point Arguello Field EIR/S). Impacts on the set gear fishery and kelp harvest at Gaviota could range from Class I (regional) for the full-scale marine terminal and supply base proposal to Class III for the scaled-down terminal without supply base. Pre-emption effects of construction aspects of cumulative development on set gear fishing could be of short-term local significance, but would be expected to remain Class III at the regional scale.

EFFECTS ON DRAG FISHING

Draggers based in Port San Luis or Morro Bay could face additive area pre-emptions from oil development projects in both Central and Northern Santa Maria Basin, and to a lesser extent in the Southern Santa Maria Basin where they occasionally fish along with the Santa Barbara fleet. For example, concurrent construction of Northern and Central Santa Maria Basin platforms in productive tow areas could simultaneously pre-empt more than 5 percent of their productive fishing area, and would be increasingly likely to affect shrimp as well as finfish dragging as development occurs further north (see Figure 4.0-2 in Appendix J).

Drag fishing by the Santa Barbara fleet would be affected by the Exxon Santa Ynez Unit development, ARCO Coal Oil Point Project, Southern Santa Maria Basin development, Platform Gail, the Point Arguello state lease, and possibly exploratory activities (depending on specific location). For example, concurrent construction of the proposed Chevron and Texaco Point Arguello field project platforms and Platforms Sacate and Pescado A/B2 for the Exxon Santa Ynez Unit development could exclude dragging from about 22 percent of the rockfish grounds available in the Point Arguello Field Study Region (See Appendix N, Part 1 of the Point Arguello Field EIR/S). Exclusion from halibut dragging grounds was estimated in that document to range from 7 to 22 percent. Thus, short-term impacts on dragging could be regionally significant (Class II).

Long-term cumulative effects on drag fishing would range from significant to insignificant depending on the areas excluded by operational structures and anchor scars, which would generally be small. If long-lasting, problematic bottom alterations (e.g., anchor scars or pipeline snags) are left in several productive tow areas, or if platforms are placed in clusters that preclude dragging in between, or if platforms are placed near submarine canyon heads, significant long-term pre-emptions could result. The proportionate drag fishing impact of the proposed projects (combined) is expected to be relatively higher than the impacts of many other combinations of platforms because of the less than 3 miles separating the proposed Union and Exxon platforms.

EFFECTS ON PURSE SEINING AND/OR DRIFT GILL NETTING

Concurrent construction of platforms for several of the projects, along with exploratory activities (drilling plus seismic testing), could have up to Class I impacts on purse seining in the short term but only if these activities were to make fish unavailable for harvest through exclusion of fishing areas or through the types of noise and disturbance which divers report causes schools of fish to disperse or sound. Experimental observation and documentation, such as the research presently being conducted in the Santa Barbara Channel, may help remove present uncertainty about the existence and geographic extent of this type of impact.

Clusters of platforms, such as that for the proposed projects and Area Study, could have up to Class I are pre-emption impacts on drift gill netting. However, aspects of this type of fishing (e.g., for shark), and the fishery may have the flexibility to absorb the foreseeable area pre-emptions.

EFFECTS ON KELP HARVEST

Construction impacts of a full-scale Getty terminal and crew and supply base at Gaviota (Alternative Scenario) would likely be Class I in the short term. Long-term effects would be related to permanent habitat damage, support vessel traffic, and presence of the supply pier. Impacts would probably remain Class I because the terminal activities could interfere with kelp harvesting and supply boat traffic would eliminate several acres of kelp canopy. Increased support vessel traffic from Ellwood and/or Gaviota would further reduce the kelp surface canopy unless narrow, common designated vessel corridors are established and their use strictly enforced. Impacts could be as high as Class II, but with mitigation could be Class III.

EFFECTS ON MARICULTURE

Cumulative effects of the development scenarios on mariculture operations are expected to be beneficial but insignificant. The presence of more offshore structures (platforms and piers) could benefit the industry if they can be used for mariculture operations. These could become significant only if the mariculture industry becomes limited by the lack of availability of such sites, which is unlikely.

OIL SPILL EFFECTS

Increasing oil production and marine transportation of crude oil in the Study Region would substantially increase the likelihood of a large oil spill to the point where a major spill could be expected in the scenario, timeframe. Such a large spill could have Class I impacts on at least some, if not all, types of commercial fishing. Based on the information cited in Technical Appendix M, any of the study Region's fisheries would be vulnerable to additive cumulative risk of pre-emption by spilled oil.

6.10.1.1 Mitigation Measures

The measures discussed in Section 5.10.1 to mitigate impacts of the proposed projects, alternatives and Area Development on commercial fishing and kelp harvest are also applicable to mitigate cumulative impacts. A measure with particular applicability to cumulative effects is the phasing of multiple project construction and operations activities to avoid overlapping pre-emption of important fishing grounds. For example, steps could be taken to approve two rather than three platforms on OCS-P 0440 and -P 0441 at any one time. Agencies could also limit the number of simultaneously operating platforms to reduce the expectation of a major oil spill to less than one in 10,000 years annual probability. The MMS has indicated that their agency cannot execute this last measure. Thus, it could be up to other participating permitting/oversight agencies to determine its ultimate feasibility.

6.10.2 Recreation

6.10.2.0 Recreation

Several negative impacts on recreation in the tri-county area can be attributed to the cumulative projects, although these are not expected to be significant (Class I).

The only negative impact noted for the current Union project was the potential for access to Ocean Beach County Park to be restricted for up to one week, or for up to three weeks if the pipeline were located south of the Santa Ynez River, as in one alternative. This restricted access would occur during construction phases of the current project only.

Cumulative new construction or construction to achieve modifications or expansions of onshore facilities, as summarized in Table 6.0-1, is not expected to significantly displace park and recreation facilities based upon what is known about the location of facilities existing and planned, and based upon the extent of recreational facilities existing in the tri-county area as a whole. Oil and non-oil development could negatively impact recreation possibilities and the recreation experience along the Gaviota coast. For example, conflicting uses may be apparent in the Ellwood area (assuming ARCo's expansion and the adjacent golf course and Hyatt Hotel) and the Gaviota area (assuming activities at the Texaco Marine Terminal/Supply Base, Chevron PAGS/PAGS, and the Refugio and El Capitan recreation areas are in full operation.

Construction-related impacts on opportunities for use of campground space are expected to be adverse but insignificant (Class III). A maximum of 37 spaces will be required in the Santa Maria Area, and 33 in the South Coast area will be required for the oil-related cumulative projects (see Socioeconomics Technical Appendix Section 3.4.2 for more detail). Non-oil projects do not measurably impact campground demand. This represents less than 5 percent of campground spaces in each area and is consequently a Class III impact.

A further negative impact on recreation, at least in any park and recreation areas that are under helicopter flight paths, will be expected due to construction and operations of the cumulative projects as a result of helicopter noise and increased traffic. Table 6.10.2-1 shows the number of helicopter round trips per day by airport expected from the cumulative projects during construction and operations. This impact may be considered to be adverse, especially with respect to the daily number of trips from Santa Barbara Airport shown in the table. This increased use is not significant as it does not pre-empt use of recreational areas. The recreational experience may be negatively affected due to noise, however (see Noise Technical Appendix).

The relatively minor effect on recreation expected is also partly due to the small proportion of the increase in the population in the area that can be attributed to the cumulative projects studied. Table 6.10.2-2 illustrates this point. For example:

- In San Luis Obispo County the percentage of population increase over time due to the cumulative projects is approximately 0.1 percent.

- In Santa Barbara County as a whole, this proportion of population increase due to the cumulative projects ranges from 1.8 percent in 1990 to 2.2 percent in the year 2000.

- In Ventura County as a whole, the percentage of population increase due to the cumulative projects is 0.2 percent in the 1990, dropping to approximately 0.1 percent in 1995 and the year 2000.

Table 6.10.2-1

ESTIMATED HELICOPTER FLIGHTS PER DAY BY AIRPORT CUMULATIVE IMPACTS*

Airport	Year							
	1985	1986	1987	1988	1989	1990	1991	1992
Santa Maria		7	7	11	15	20	18	16
Santa Barbara	4	12	23	39	36	54	50	48
Ventura			4	4	4	4	2	2
San Luis Obispo	—	—	—	4	12	16	14	12
Total	4	19	34	58	67	94	84	78

* Estimated based upon Union and Exxon project information; dispersion to the various airports is based upon platform locations.

Source: ADL estimates

Table 6.10.2-2

PERCENTAGE OF POPULATION INCREASE DUE TO CUMULATIVE PROJECTS STUDIED

County/Area	YEAR 1990	1995	2000
San Luis Obispo County	.1	.1	.1
San Luis Obispo City	.1	.1	.1
Arroyo Grande	.3	.2	.2
Grover City	.2	.2	.2
Pismo Beach	.2	.2	.1
Study Area Unincorporated	.2	.2	.2
Santa Barbara County	1.8	2.1	2.2
North County Subtotal	1.7	1.6	1.5
Lompoc City	1.6	1.5	1.5
Lompoc Valley	5.2	4.4	3.8
Santa Maria City	.6	.5	.6
Orcutt	1.7	1.6	1.5
Guadalupe	.5	.5	.5
Santa Ynez	3.4	3.2	3.1
South Coast Subtotal	1.8	2.7	2.9
Santa Barbara City	1.1	1.6	1.7
Carpinteria	1.0	1.2	1.3
Unincorporated	2.6	3.8	4.1
Ventura County	.2	.1	.1
Camarillo	--	--	--
Oxnard	.5	.3	.3
Port Hueneme	.2	.1	.1
Ventura	.4	.3	.3
Study Area Unincorporated	.3	.2	.2

Source: Arthur D. Little, Inc. analysis of GRC Inc. projections for this study (see Socioeconomics Technical Appendix).

It is true that within some specific areas noted in Table 6.10.2-2, a slightly higher proportion of population increase over time will be due to the cumulative projects. However, this proportion is not viewed as significantly adverse with regard to recreational activities in relation to the general expansion in the Study Area population that is expected to occur regardless of the cumulative projects. Clearly recreational areas within the tri-county area will become more crowded due to normal growth and the cumulative projects will marginally add to this crowding. The overall recreational experience may therefore be reduced by increased use of facilities and/or crowding associated with both oil and non-oil projects.

Finally, a major oil spill could have Class I impacts on the use of shoreline beach park facilities in the event that a major spill reached landfall and affected several beach park areas. The southern Santa Maria Basin platforms and patterns in the Santa Barbara Channel as well as exploratory vessels pose the greatest risk for recreation areas from a purely locational standpoint.

6.10.2.1 Sportsfishing

Due to both oil and non-oil cumulative projects' development, vessel traffic is expected to increase greatly over the scenario timeframe. This increase will be especially true in the area of Port Hueneme. It is expected that this increase will negatively but not significantly affect party boat fishing activities.

As is the case for commercial fisheries, increasing oil production as well as the transportation of crude oil in the Study Region will increase substantially the probability of a large oil spill. Based on Technical Appendix E, it can be seen that a variety of sportsfishing species will be vulnerable to the added cumulative risk of pre-emption by spilled oil. A large spill may have Class I impacts, therefore, at least on a temporary basis, with regard to the party boat segment of the sportsfishing industry, and in regard to opportunities for surf casting if such a spill reached landfall extensively along the coast.

6.10.2.2 Tourism

It is expected that a temporary negative effect on tourism may be experienced in the areas of Lompoc and Santa Maria due to the need for temporary housing for construction workers. However, based upon the information presented above in Section 5.7 regarding temporary housing needs, this effect is not expected to significantly affect tourism in the tri-county Study Region.

In the event a major spill were to reach landfall, negative effects on tourism related to decrease in opportunities for beach use would be expected. However, this effect is not expected to be significant unless a spill of large magnitude were to occur.

6.10.3 Traffic

6.10.3.0 Onshore Traffic

The proposed project is only one of a series of developments within Santa Barbara County, Ventura County, and San Luis Obispo County that will generate traffic. Table 6.10.3-1 lists the projects considered in this analysis and indicates the location at which the cumulative impacts are likely to fall. Only those areas that will be affected are considered. Impact areas are identified for the construction and operation phases of each cumulative project.

The discussion is based on impact areas. Traffic impacts are considered in turn at each of the four impact areas listed in Table 6.10.3-1. Note that the Gaviota Area has not been designated a project impact area. The cumulative projects will increase traffic in the area, but the proposed development of an overpass (on Highway 101) would alleviate increased traffic congestion. The analysis techniques and importance criteria applied here are those applied in Section 5.10.3.

GOLETA AREA

This area is included because of the use of Ellwood Pier and Santa Barbara Airport by Exxon. Individual traffic studies (EIRs) were prepared for most of the projects relevant to this area. Attention in those documents is directed toward Hollister Avenue, Storke/Glen Annie Road, Los Carneros Road, Fairview Avenue, and other Goleta streets and intersections. Most of the cumulative projects in this area are non-oil projects.

For the six non-oil projects listed in Table 6.10.3-1, the combined additional peak hour traffic is approximately 5,309 vph. This increase is a very important impact to the streets and intersections in Goleta that are now near capacity. The traffic analysis in the Hyatt EIR concluded that the change in LOS from 1986 base plus Hyatt development to cumulative development in the p.m. peak hour for the Winchester Canyon/Calle Real/U.S 101 (northbound) Off-Ramp would be from A to D; for the Hollister/Storke intersection, the change would be from D to E [ESA, 1984]. In the Los Carneros and Raytheon EIRs, a cumulative analysis was done showing that all the intersections considered would operate at E or F service levels [EIPC, 1984] (see Tables 6.10.3-2 and 6.10.3-3). All these impacts are Class II.

Exxon's Project Shamrock would add traffic to the Santa Barbara Airport (nine peak hour trips during construction) and the Ellwood/Hollister Area (137 peak hour trips during construction). This is a significant addition to an already adverse condition in 1986 and beyond. The ARCo Coal Oil Point Project will add significantly to this situation with construction starting in mid-1986. In addition, many other offshore oil projects will impact the Goleta Area near Santa Barbara Airport and the Ellwood Pier. The 13 offshore project categories shown in Table 6.10.3-1 will generate 29 platforms and up to eight exploratory drilling rigs at any one time. However, the construction will not all happen at the same time, as shown in Figure 6.10.3-1. With the assumption that the 29 platforms are Irene-like in crew schedules, and that all crew changes are made through the Santa Barbara Airport (a worst-case

Table 6.10.3-1

CUMULATIVE PROJECTS AND TRAFFIC IMPACT AREAS

	Impact Areas 1	2	3	4
Non-Oil				
• Hollister Business Park	X			
• Raytheon Corporation	X			
• Los Carneros Community	X			
• Hyatt Resort/Motel	X			
• Santa Barbara Shores	X			
• University Exchange Corp	X			
Oil - Offshore				
• Activity due to Lease Sales 40-95		X		X
• Activity/State Tidelands Lease Sales		X		X
• Activity/Future Lease Sales		X		X
• Seismic Profiling Activity	X	X		
• Exxon SYU	X	X		
• Texaco/Harvest	X	X		
• Chevron/Hidalgo	X	X		
• ARCO Coal Oil Point	X	X		
• Chevron/Gail	X	X		
• Southern S.M. Basin		X		X
• Northern S.M. Basin		X		X
• Cities Services Lease - P 0489		X		X
• Union State Tidewater - PBC 2879		X		X
Oil - Onshore				
• Expansion ARCO/Ellwood	X			
• Expansion POPCO				
• Los Angeles Pipeline				
• Celeron/Getty Pipelines				
• Exxon-Los Flores Canyon				
• Gaviota Facility (ph2)				
• Getty Supply/Crew Base				
• New Consol. Marine Term./Tank Farm				
• Cities Service Processing Facility			X	
• NOMECO Oil Development Vandenberg AFB				X
• Union Oil Development Vandenberg AFB				X

1 = Goleta area streets and intersections
2 = Port Hueneme area streets and intersections
3 = Street and intersections near Santa Maria Refinery
4 = Streets and intersections near Santa Maria/Orcutt

Table 6.10.3-2

PROJECTED INTERSECTION SERVICE LEVELS[1] AND VOLUME/CAPACITY (V/C RATIOS)

Intersection	Existing		With Raytheon Detailed Development Plan		With Raytheon Specific Development Plan		With Cumulative	
Storke/101 NB Ramps	E	(N/A)	E	(N/A)	E	(N/A)	E	(N/A)
Storke/101 SB Ramps	E	(N/A)	E	(N/A)	E	(N/A)	E	(N/A)
HollisterStorke	C/D	(0.79)	C/D	(0.79)	D	(0.84)	F	(1.09)
Hollister/ Los Carneros (W)	C/D	(0.79)	C/D	(0.77)	C/D	(0.81)	E	(0.94)
Hollister/ Los Carneros (E)	C/D	(0.80)	B	(0.63)	B	(0.66)	E	(0.92)
Hollister/Fairview	D/F	(1.01)	E/F	(1.01)	F	(1.04)	F	(1.27)
Los Carneros/ 101 SB Ramps	B	(0.61)	B	(0.67)	E/F	(0.99)	F	(1.83)
Los Carneros/ 101 NB Ramps	A	(0.54)	A	(0.56)	B/C	(0.69)	F	(1.15)

1 Source: EIP Corp. Projections reflect existing street network plus completion of the Los Carneros Road realignment plus coordinated traffic signals along Los Carneros Road.

Table 6.10.3-3

PROJECTS TO BE DEVELOPED IN THE VICINITY OF RAYTHEON[1]

Map No.	Name	Land Use	Size		Daily Trip Rate	Daily Trips	P.M. Peak Hour %	P.M. Peak Hour Trips
1	Raytheon Company	Ind./Office	3,100	emp.	2.5/emp.	7,750	20%	1,550 [2]
2	University Exchange	Light Ind./R&D	961,000	S.F.	9.1/1,000	8,750	20%	1,750
3	Los Carneros Community	Light Ind./R&D	345,000	S.F.	9.1/1,000	3,140	20%	630
		Residential	235	D.U.	6/D.U.	1,410	10%	140
4	Santa Barbara Business Park	Office/Retail	190,000	S.F.	30/1,000	5,700	12%	680
5	Goleta Service Center	Light Industrial	34,790	S.F.	9.1/1,000	320	20%	65
6	Vacant Fedmart	Light Ind./R&D	50,000	S.F.	9.1/1,000	460	20%	90
7	Los Carneros Service Center	Light Ind./Office	45,600	S.F.	10.5/1,000	480	17%	80
8	Glen Annie--Phase II	Residential	737	D.U.	6/D.U.	4,420	10%	440
9	Castilian Drive Industrial	Light Ind./R&D	65,000	S.F.	9.1/1,000	590	20%	120
10	Motor - Hotel	Motel	150	U.	10/U.	1,500	7%	105
11	Nexxus	Warehouse	72,500	S.F.	5/1,000	360	25%	90
12	Coats Condominiums	Residential	40	D.U.	6/D.U.	240	10%	25
13	K-Mart	Retail	43,000	S.F.	50/1,000	2,150	10%	215
14	Delco	Light Ind./Office	55,000	S.F.	10.5/1,000	580	17%	100
15	Lindmar Building	Light Ind./R&D	48,000	S.F.	9.1/1,000	440	20%	85
16	Cleuet Building	Light Ind./R&D	84,500	S.F.	9.1/1,000	770	20%	155
17	Hollister Industrial Park	Light Ind./R&D	291,000	S.F.	9.1/1,000	2,650	20%	530
18	The Grove	Residential	220	D.U.	6/D.U.	1,320	10%	130
19	Municipal Airport	(Passenger Growth)			--	3,800	--	570
20	Santa Barbara Research Center	Light Ind./R&D	200,000	S.F.	9.1/1,000	1,820	20%	365
					TOTALS	48,650		7,915

1 Source: Santa Barbara County.

2 These figures would be reduced to account for existing Raytheon employees being relocated to the new project.

scenario), the impact here in 1990 would be expected to be 240 peak hour trips. This impact to the already congested intersections (LOS D/E) in the area is very significant. Hence, all evidence points to cumulative traffic impacts in the Goleta area that are very important and will cause severe congestion and long traffic delays (beyond LOS F for intersections). These impacts may be mitigated although limited funding available for roadway and intersection improvements may only allow partial mitigation (Class I).

In addition, the Hyatt EIR states that if cumulative development traffic were added to the existing traffic volumes, signal warrants are met for the following four intersections: 1) Winchester Canyon/Calle Real/U.S. 101 northbound off-ramp, 2) Hollister Avenue/Calle Real/U.S. 101 northbound on-ramp, 3) Hollister/U.S. 101 southbound ramps, and 4) Hollister/Hotel-ARCo plant access road [ESA, 1984]. This analysis, however, does not contain oil-related projects. A planned improvement of Hollister Avenue would upgrade this road to a four-lane road from Glen Annie to just west of Pebble Beach (at Ellwood School), and traffic signals would be installed at Pacific Oaks Road, Entrance Road, and Pebble Beach Road [ESA, 1984]. Current County Department of Transportation plans include a realignment of western end of Hollister Avenue to tie into the western end of Cathedral Oaks Road [ESA, 1984]. A specific alignment has not yet been identified yet; however, the east end of Hollister Avenue would probably be realigned to the existing Chevron Station for a cross over to U.S. 101. A new bridge with a relocated diamond interchange may also be necessary [ESA 1984]. No specific schedule for this improvement has been established [ESA, 1984].

PORT HUENEME AREA

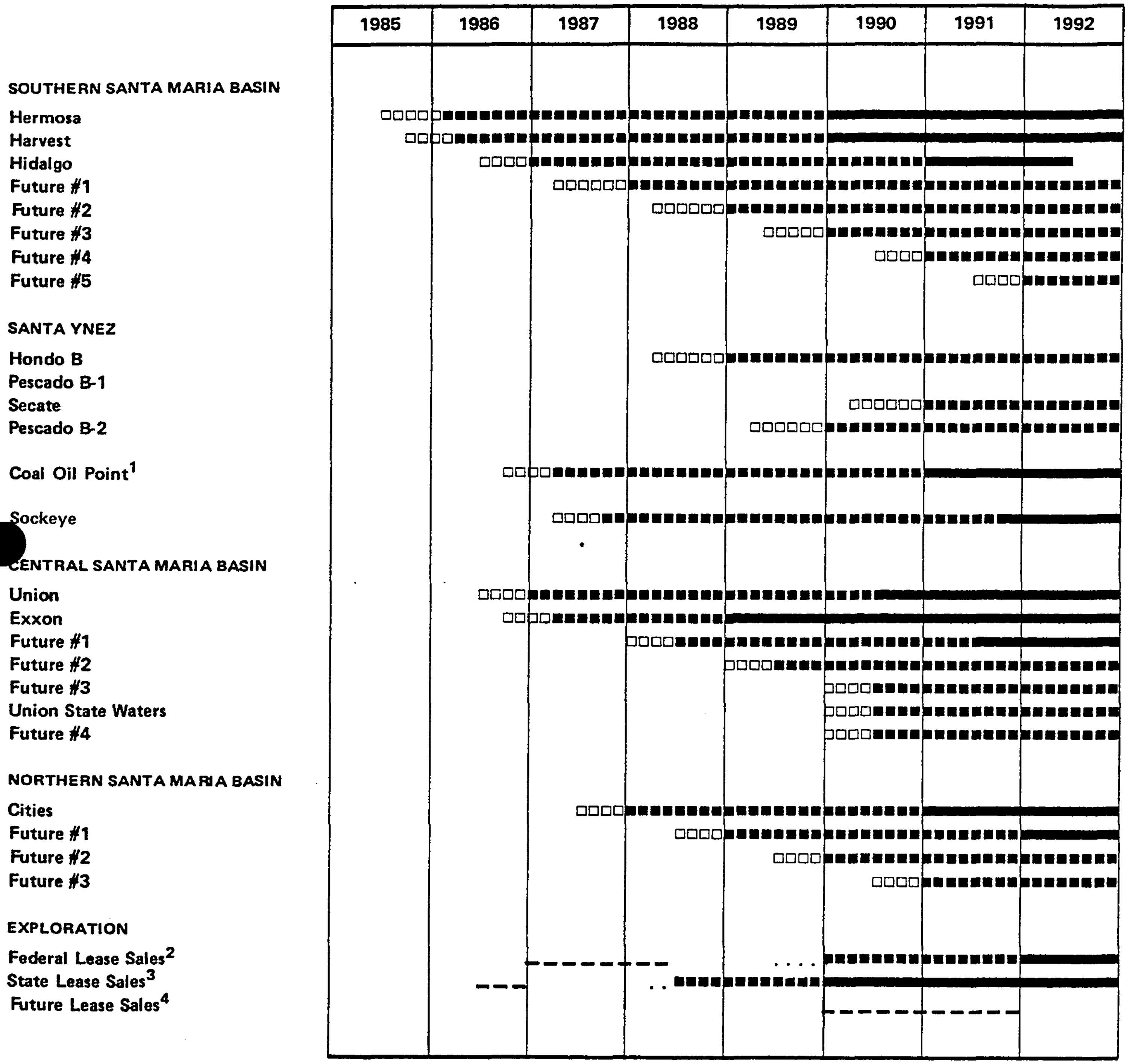
Port Hueneme is presently the major supply boat base for offshore exploration, development, and production activities. The harbor is shared with the U.S. Navy and is heavily used. It is not uncommon to observe boats moored two and three abreast because of the limited space available. Until other facilities are developed, such as Texaco's Gaviota Supply Base, the port will continue to be the major offshore support base for the South Coast. Both delivery trucks and boat personnel vehicles reach the harbor by traveling on arterials in the cities of Port Hueneme and Oxnard.

All of the offshore oil-related cumulative projects are likely to impact traffic levels in the Port Hueneme area. This situation will occur until such time as the alternative supply base is operational. It is difficult, however, to estimate the actual traffic levels because of the poorly defined nature of the cumulative projects. It is expected though that the cumulative project traffic would be distributed throughout the day and not exhibit peaking during normal a.m. and p.m. peak traffic flows, since crew schedules for the Platforms do not conform to normal traffic schedules.

If it is assumed that Port Hueneme is used only for supply boats serving the platforms and not for crew transport, as is the case with the Union and Exxon projects, then one supply boat per week can be expected to serve each platform. Using the assumptions outlined in the methodology, the 29 platforms and eight exploratory rigs can be expected to generate 58 peak hour trips once a week if all boats were to go out the same day. Because of the frequency and

FIGURE 6.10.3- 1

SCHEDULE OF OFFSHORE DEVELOPMENTS FOR CUMULATIVE IMPACTS



1. Two platforms complexes
2. Leases 48, 68, 53, 73, 80; eight rigs, two platforms
3. Two rigs, two platforms
4. Four rigs

KEY:

- □□□ = Installation
- ■■■ = Development Drilling
- ▬▬ = Production Only
- — — = Exploration
- . . . = Uncertainty

Arthur D. Little, Inc.

duration, and because alternate routes to Port Hueneme are available, this impact could be locally adverse, but unlikely to be significant, and is therefore Class III.

However, if the port is used for crew transport, the impact would be more important, but could be mitigated by scheduling boat arrivals and departures to avoid normal peak hour traffic periods. Workers could also be bused or helicoptered to the harbor from outlying areas. Heavy use of helicopters for crew transport to the platforms would, however, shift the impact to the airports, such as the Santa Barbara Airport where there is already a traffic and parking problem. Hence, the impacts fluctuate between different sites (Port Hueneme, Oxnard Airport, Santa Barbara Airport, Ellwood Pier, Gaviota, etc.) depending on the relative intensity of use at each.

Note, though, that these offshore oil projects are presently scheduled for different years, and most of them will be installed or on line by 1990, when the full impact of the above analysis will be felt (see Figure 6.10.3-3.) The impacts on the Port Hueneme area can at worst warrant a Class II rating, because of the uncertain nature of the projects.

SANTA MARIA REFINERY AREA

This area is included because the Cities Service Processing Facility is proposed to be built somewhere near the Santa Maria Refinery. This processing facility is assumed to be about the same size as Union's Lompoc Dehydration Facility, which has a maximum impact during a seven-month construction period of 108 peak hour trips, and an operational impact of 11 peak hour trips. Construction of this facility will start after the construction at the Santa Maria Refinery (scheduled to start in August 1985 and continue for one year). Since the impacts from the Santa Maria Refinery of 193 peak hour trips are adverse but insignificant, the Cities Service facility should also induce Class III impacts to this area.

SANTA MARIA/ORCUTT AREA

Northern Basin offshore oil projects and the Cities Service could impact the Santa Maria Airport. These additional four platforms added to the Project and Area Study will have a maximum impact in 1990, with two construction/ installation platform schedules, and six drilling platform schedules. Again assuming Irene-like platforms, this increase amounts to 152 peak hour trips impacting the Santa Maria Airport in 1990. Lakeview Road would have a change in LOS from C to D. The intersections leading into the airport, such as Lakeview and Orcutt Expressway, would incur heavy congestion during the peak hours. This may be further exacerbated by exploratory drilling activity in the Northern Basin. Since the impact can be mitigated by using other airports and by scheduling during non-peak hours, the impact is Class II.

Two onshore oil projects, NOMECO and Union Oil Development Projects on Vandenberg AFB will induce traffic-related impacts on County Highway S20 and State Highway 1 below Orcutt. Up to two drilling rigs could be operating simultaneously during the first ten years of development for each project [Dames & Moore, 1984]. The maximum impact will occur in 1993 for NOMECO with 33 total average truck round trips per day and 32 total average vehicle round trips per day [Dames & Moore, 1984]. It is assumed that the Union Oil Project should produce similar numbers as NOMECO. The total number of peak hour trips for both projects in 1993 will be 64, and for 1990 it will be 52. This impact will not change the current LOS of A on these highways, and the impact is insignificant (Class III).

6.10.3.1 Boat Traffic

Under a worst-case scenario (Exxon assumptions of: four crew boats/day and four supply boats/week during installation; two crew boats/day and one supply boat/day during drilling; and one crew boat/day and two supply boats/week during production) cumulative boat traffic will peak in 1990 at 82 trips/day. Impacts upon the Port Hueneme area are adverse but not significant since traffic will be displaced to Gaviota/Ellwood and the Avila area in San Luis Obispo County during the late 80s and early 90s.

6.10.3.2 Helicopter Traffic

Table 6.10.2-1 above detailed a number of helicopter round trips per day expected from the Santa Maria, Santa Barbara, Ventura County, and San Luis Obispo airports due to cumulative development. The year 1990 represents a peak year in the total number of helicopter round trips from the airports combined, estimated at 94. This year is also estimated to be a peak year for flights from each of the individual airports, as follows:

- Santa Maria: 20 round trips/day
- Santa Barbara: 54 round trips/day
- Ventura County: 4 round trips/day
- San Luis Obispo: 16 round trips/day

This increase in helicopter activity -- especially at Santa Maria, San Luis Obispo, and Santa Barbara airports -- will result in increased demands for parking, and will be significant (Class II) with respect to Santa Barbara Airport, already congested. Increasing parking at the airport has already been suggested as a mitigation measure for onshore traffic congestion due to the cumulative projects development.

The possibility of obtaining an approved flight corridor from Lompoc Airport through Vandenberg AFB airspace would conceivably shift helicopter traffic from Santa Maria and Santa Barbara Airports to Lompoc Airport.

Addendum D to Technical Appendix M further discusses helicopter traffic from the standpoint of safety.

6.10.4 Military Activities

Cumulative project activities are not expected to significantly affect military activities. However, military activities will affect many offshore oil-related activities, in both the construction and the operational phases of these oil-related projects. The designated warning area W-532 off Point Arguello, an area encompassing about 10,000 acres of ocean, and scheduling of military activities on the sea and in the air above the ocean within the warning area coordinated by the Pacific Missile Test Center at Point Mugu may also raise use conflicts. Further, as has been discussed earlier, there are two restricted air space areas off the coast, the use of which is scheduled and coordinated by the Western Space and Missile Center located at Vandenberg AFB. The fact that platform sites are within the Space Shuttle Launch and Recovery Area, as well as the Oribitor Training Area, and beneath the Space Shuttle Recovery Overflight Path will require that projects comply with orders from the Commander of the Western Space and Missile Center for the clearing of nonessential personnel in hazard corridors established during pertinent military activities and the sheltering of essential personnel in facilities capable of providing protection from potential fragment and blast impacts due to space shuttle launches and recovery activities. The Systems Safety Technical Appendix describes these potential hazards in more detail.

During construction of the pipeline through Vandenberg AFB, two adverse, although not significant, impacts have been identified:

- Increased usage of the 13th Street Gate to Vandenberg AFB, and

- Construction in the right-of-way itself through the Base.

Finally, it should be noted that preliminary correspondence from responsible Air Force officials indicates that they wish only one right-of-way to be established through the Base. That right-of-way is to pertain to all cumulative oil development projects under way. Therefore, the cumulative projects will need to be coordinated so that future oil-related development within the Base is restricted to the right-of-way established during the current project.

6.10.5 Commercial Shipping

Particularly during construction of the oil-related projects, crew boat and supply boat trips will peak during construction at approximately 82 daily in 1990. Based on the planned expansion of the VTSS, it is not expected that this level of activity will present a significant adverse impact on commercial shipping traffic in the area. The issue is more fully discussed in the Systems Safety Technical Appendix.

6.10.6 Mitigation Measures

The impacts associated with the proposed and cumulative projects are amenable to mitigation through several means. Some of these mitigation measures would be fully effective while others would only reduce but not eliminate adverse or important impacts. Most of those suggested below could be implemented by the project proponents and, if done, would impose no financial burden on public agencies. Also, some of the measures may cost little or nothing to implement.

Currently the County of Santa Barbara assesses a fee of $1,000 per peak-hour trip generated by a project. Peak-hour trips relevant to this fee are those associated with project operational activity rather than construction activity.

The suggested mitigation measures include:

<u>Vehicular Traffic</u>

- Street improvements for the Goleta Area. A variety of street improvements including widening for extra lanes, signals, road alignments, additional turning lanes, restriping, and other physical modifications to the streets and intersections are outlined in many EIRs [Hyatt, Raytheon, etc.] and are certainly needed to alleviate the congestion problems due to cumulative development.

- Increased Airport Parking. Parking areas are presently in short supply at the Santa Barbara Airport. The use of a portion of those spaces that are available by offshore workers causes inconvenience to other airport users. Additional areas within the airport grounds could be paved and set aside for long-term parking. Otherwise, outlying parking areas could be used with workmen then bused to the airport. In either case, the impact on airport users could be eliminated.

- Staggered Timing of Construction Work Shifts. The greatest number of trips generated by the project occur during the construction phase. Traffic congestion impacts during this period would be reduced or eliminated if workmen were not on the highways during peak hours. This would be accomplished if the daily work shifts began at 7:00 or 7:30 a.m. or earlier and end prior to 4:00 p.m. or after 5:30 or 6:00 p.m.

- Busing of Offshore Workers. Busing of all offshore workers from outlying parking areas to the staging areas (Santa Barbara and Santa Maria Airports, Ellwood Pier, etc.) would greatly reduce the adverse impacts of project-related vehicles on the areas streets, intersections, and parking areas.

- Scheduling of Offshore Crew Changes at Midday. The Santa Barbara Airport is in the midst of an area currently experiencing critical peak-hour traffic flow problems. These problems are unlikely to improve because of limitations on maintenance and capital budgets with Santa Barbara County government. It is important that crew shift changes via helicopter at the airport not impose additional peak hour trips. It was assumed in the 14 day shifts, it should be possible to move them during the midday. Other areas (Santa Maria Airport, Ellwood Pier, etc.) would also greatly benefit from this mitigation.

- Scheduling of Truck Trips at Non-peak Hours. Truck transport should occur during periods of light traffic; school bus hours and commuter traffic periods (peak hours) should be avoided. It this is adopted at all projects as assumed in this analysis, then traffic congestion, reduction in normal traffic speeds, and risk of traffic accidents will be significantly minimized.

- Development of Carpool/Vanpool Program. Carpools and vanpools could significantly reduce employee commute traffic, especially for the potentially large number of long distance commute trips. A well publicized program of employee matching that would encompass cumulative projects could significantly reduce peak hour traffic.

- Encouragement of Transit Ridership. The Transit District should consider possible route and/or schedule modifications to better serve the project areas. To complement such modifications, the projects in coordination with adjacent developments could provide sufficient areas for bus stops and shelters, especially in the Goleta area. New employers could also make transit information available to employees and obtain monthly transit passes for on-site sale to employees.

- Encouragement of Pedestrian and Bicycle Traffic. Include sidewalks in site improvements to allow and encourage pedestrians. Provide bicycle racks and shower facilities to promote bicycling and running to and from work.

- Enforcement of Staggering the Crew and Supply Transport Sites. Because of the many offshore cumulative projects, transport of crew and supplies could be spread out to different sites (Port Hueneme, Santa Barbara Airport, Ellwood, Gaviota, etc.) to lessen the impacts that can occur at one or more heavily used sites. Use of many sites for one project could also be advantageous to commuting workers.

<u>Helicopter Traffic</u>

- Establish private helicopter pads (e.g., on Union or other property) to handle crew traffic to platforms. This may be difficult due to coastal zone and safety regulations.

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6.11 SYSTEM SAFETY AND RELIABILITY

This analysis is mostly qualitative by necessity. Although risks have been evaluated for some specific projects or project elements, many others have not been addressed or fully defined. A formal quantitative assessment of cumulative safety impacts must, therefore, await the completion of future investigations. Details of the analyses discussed are given in Section 11 of Appendix M.

6.11.1 Cumulative Safety-related Impacts

6.11.1.0 Offshore Structures

The risks of major oil spills or sour gas discharges involving mobile drilling rigs or fixed production platforms increase with increasing levels of offshore activity. The platforms and rigs considered in this cumulative Base Scenario will, therefore, pose a substantially increased risk of such events in the offshore Santa Barbara/Santa Maria Basin areas vis-à-vis the current situation.

The 29 new offshore platforms are expected to be associated with an estimated 1,500 oil and/or gas wells. Based on the statistics presented in Addendum E of Technical Appendix M, and assuming a five-year period for each well to be operating on natural flow and, therefore, at risk of blowout, a conservative estimate is that these new platforms will experience three blowouts during their collective lifetime, with only a one-in-five chance that any will result in oil spillage. This impact represents about twice the number of blowout-related spills estimated for the existing platforms in the cumulative study region.

The mobile rig activity is expected to involve an average of four units through the 1991 time period, and to decrease substantially thereafter. Based on the statistical data related to the risks of major oil spillage from blowouts occurring on such rigs, as presented in Section 11 of Appendix M, the oil spill risks associated with exploratory drilling operations in U.S. waters are considered to be minimal in comparison to the risks described above for the development and production wells.

Addendum E and Section 3 of Technical Appendix M present a cumulative probability distribution for the spill volumes associated with blowout events. As indicated there, spills of the order of 10,000 barrels or more would be expected to occur in about 30 percent of all blowouts from oil-producing wells, based on a conservative analysis of expected spill volumes.

For the Base Scenario, there is the risk of a major spill due to tanker operations during loading at the expanded OS&T operations or during the related transits of the loaded tankers in the Santa Barbara Channel area. Such events are classified as unlikely, although the impact of such events would be severe. Spills during ship loading operations or during transits of ships for the expanded Getty marine terminal at Gaviota, under the Alternative Scenario, have been estimated to be likely, but most spills would be expected to be less than 500 barrels.

The probabilities associated with non-blowout-related spills from platforms are higher, but maximum spill volumes are typically less than for blowouts. Using data from Section 3 of Technical Appendix M, and assuming that all 29 new platforms are essentially similar to those proposed for the project results in an estimate of 23 oil spills over a 25-year period. Most of these should involve no more than a few hundred barrels of oil. The largest envisionable spill would be on the order of several thousand barrels, and would be an unlikely event involving total platform collapse. Overall, considering the different platform-related oil spill events, including blowouts, and their probabilities of occurrence, it is estimated that spills of the order of 10,000 barrels or more would occur in about 3 percent of oil spill accidents involving 100 or more barrels.

About one-half of the platforms will be located within the Pacific Missile Range operated by the Pacific Missile Test Center at Point Mugu and the Western Test Range operated by Vandenberg AFB, although most, if not all, of the others will be within impact limit lines or the risk contours as established by the Range. As estimated in Addendum C to Technical Appendix M, individual platforms in the Point Arguello Field will have an annual probability of about two chances in a million of being impacted by military and space vehicle fragments. This same rate may reasonably and conservatively be applied to all of the platforms in the region. As a reasonable estimate, therefore, the overall rate of impact by military and space vehicle fragments to any of the 29 new platforms in this region is estimated to be on the order of 60 chances in a million per year, thus warranting its classification as a rare event. Since platforms would be secured and wells shut-in during launches, impacts should mostly be minor.

6.11.1.1 Pipelines

Although total spillage volumes from pipeline failures are frequently far less than the inventory within any ruptured or otherwise leaking pipeline, subsea oil pipelines pose some risks of significant oil spills at sea. Each scenario requires installation of several new offshore oil pipelines and, therefore, would contribute to an increased overall risk of oil spills in the Santa Barbara/Santa Maria Basin region. It is estimated that both the Base Scenario and the Alternative would require an estimated 80 miles of consolidated subsea pipelines and 120 miles of interplatform pipelines. Based on pipeline failure rates presented in Section 2, it is estimated that over an anticipated survival life of 25 years, there is a one-in-ten chance of a major oil spill from a consolidated oil pipeline, and a one-in-two chance of a minor spill from an interplatform oil pipeline.

Onshore crude oil pipelines also pose risks of oil spillage, but consequences in most locations are rarely a severe threat to human life or the environment. The Base Scenario requires installation of several new onshore pipelines for produced wet oil, as well as several new pipelines between proposed processing facilities and consolidated pipeline transportation systems and connections with the Getty marine terminals (Alternative). The Alternative Scenario increases the risk of a spill from an onshore oil pipeline by requiring additional segments from the Santa Ynez Unit to the treatment facility at Corral Canyon. However, by eliminating Exxon's proposed

OS&T, the overall probability of a major oil spill at sea would be reduced. The Alternative Scenario requires the greatest increase in onshore oil pipeline mileage and eliminates the increased possibility of major spills from oil tankers at the OS&T, but increases the spill risks at the Getty marine terminal.

Sourgas discharges from pipelines situated near populated areas may have severe consequences under certain conditions. Both the Base Scenario and the Alternative Scenario would increase such risks by requiring additional transportation of sour gas to new or consolidated processing facilities. It is estimated that a major release of gas is likely over the 25-year service life of the pipelines.

6.11.1.2 Processing Facilities

Oil- and gas-processing facilities pose risks associated with discharge of gas or oil. The Base Scenario involves construction of such facilities at Lompoc, Gaviota, and Eagle Canyon, expansion of several other facilities, with additional oil treatment on board Exxon's OS&T vessel. The Alternative Scenario would also have a facility operating at Corral Canyon and a further expansion at the Popco facility. As an overall approximation, the cumulative facility risks to the public are on the likely/unlikely borderline and could have severe consequences.

6.11.1.3 Transportation of Products

Marine terminals for crude oil must include storage and transfer of large quantities of oil to bulk carriers. They therefore pose direct and indirect threats of oil spills. Direct threats are due to the presence of large oil storage tanks and associated transfer systems at shoreside locations. Indirect threats result from the frequent port calls of oil tankers, which are potentially vulnerable to marine casualties in ports or in transit that may result in major oil spillage. Additionally, they themselves pose risks to platforms and drilling rigs by collision and to pipelines via anchor dragging. These risks are considered to be unlikely; however, the consequences could be major.

The safety hazards associated with new gas processing and LPG/NGL storage and transportation facilities are comparable for the Base Scenario and the Alternative Scenario. Given the risks identified in the Point Arguello Field EIR/EIS for the Gaviota facility, it is evident that the necessary tens of thousands of yearly LPG and NGL shipments by truck from the various gas processing facilities would pose a significant safety risk to the public. The cumulative risks of such shipments is estimated to be more than four times the risks associated with the peak operation levels of the proposed Gaviota facility. These risk levels are considered likely, and the consequences severe.

An alternative transportation method would be an LPG pipeline to a central distribution location. If such a pipeline were constructed to the Los Angeles area, it is estimated that it would experience about ten spill accidents over a 25-year lifetime, with perhaps one major spill occurrence. The overall public risks would likely be considerably less than for truck transportation.

These risks of gas processing by-products will be in addition to the transportation risks associated with liquid oxygen shipments to Vandenberg AFB and with various types of hazardous waste shipments to Casmalia, both of which utilize the South Coast Route 101 corridor. Transportation of waste materials which could include (depending upon the gas processing procedures) sulphur slurry, spent caustic, gas treatment purge liquids, sludge, and untreated oil, and of liquid oxygen fuels along this route is likely to increase over the next few years. However, the public risks due to the transportation of gas by-products would remain as the most important source of public risk from the cumulative development.

6.11.2 Mitigating Measures

There may be benefits in investigating further alternatives designed to reduce the risks associated with the large-scale transportation of flammable gases and gas by-products, as well as the risks of oil spills. Most of the mitigation measures presented in Section 5.11 for the proposed project would also be applicable to the various operations and facilities considered in the cumulative scenarios. Additional measures applicable to the cumulative development include:

- Minimize the number and length of offshore oil pipelines -- Subsea oil pipelines represent one of the safest methods of transporting crude oil to shore. Nevertheless, because of the possibility of significant oil spillage in the marine environment, pipeline exposures and risks may be reduced by minimizing subsea pipeline lengths. Although this measure may result in a greater total length of onshore oil pipelines, the consequences of oil spillage on land would generally be less than those associated with spills in water. At specific locations along onshore routes, however, such as the crossings of wetlands and sensitive habitats, the environmental consequences of oil spills could be significant.

- Minimize number and length of onshore gas pipelines, particularly those conveying sourgas -- Produced natural gas poses a fire and explosion risk. If hydrogen sulfide is present, discharges may also pose a toxicological hazard to exposed populations. It is therefore advantageous to minimize the amount of gas pipeline that passes by or through populated areas. This measure suggests that offshore routes should be preferred over land routes in most cases.

- Further consolidate oil- and gas-processing facilities -- The total overall risks associated with several oil- and/or gas-processing facilities are apt to be more than those associated with a larger number of smaller such facilities of total equivalent capacity. It follows that there may be advantages to the consolidation of such facilities, particularly at sites distant from densely populated areas. Such further consolidation may have adverse effects, however, in other environmental areas, such as air quality, socioeconomics, aesthetic resources, etc.

- Use pipelines, railroads, or tankships to transport LPG and NGL -- The proposed projects will produce large amounts of LPG and NGL by-products that will be transported to consumers, mostly via tank trucks and trailers. Alternative transportation modes should be considered.

- Develop Risk Management Plan -- In order to effectively manage the overall risks associated with the cumulative projects and to allow reasoned trade-offs between these projects and between environmental risks and public safety, it is recommended that a risk management plan be developed collectively by all of the involved regulatory agencies. Such a plan would provide a template to permit day-to-day risk management as well as long-term planning for risk improvements and coordination of the goals of different county organizations and federal and state agencies.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The term "major irreversible and irretrievable commitment of resources" refers to the irretrievable physical commitment of a resource, resulting from the actions proposed under this plan. Under the proposed plan, the primary commitment involves the extraction of crude oil and natural gas, virtually all of which will be removed from the Santa Barbara area, to be used as fuels and chemical feedstocks.

The second commitment of resources involves the consumption of fossil fuels to provide energy for project construction and operation. These fuels will be provided in the form of diesel fuel, jet fuel, gasoline, and natural gas. Some of these fuels will be consumed outside the Project Area for electrical power generation for the needs of the platforms and onshore oil dehydration facilities.

Additional energy will be required to manufacture steel for platforms and drilling pipe, assemble platform structures onshore, and manufacture turbines and other machinery. Finally, refining of the produced petroleum and use of the natural gas as chemical feedstock will require energy consumption at the point of use. No attempt was made to quantify any of these indirect energy uses, because they will occur outside the Project Area and because they are difficult to measure due to broad range, scope, etc.

The proposed development will also consume an undetermined quantity of mineral resources, such as iron, chromium, and processing chemicals. Much of the steel used in the project can be recycled after the platforms are decommissioned, but an appreciable percentage will essentially be permanently consumed.

While the project will result in some temporary loss of resources, the oil and gas extraction and the energy consumption will be the major irreversible and irretrievable losses. Extraction of petroleum resources from the Central Santa Maria Basin as part of these projects would not be expected to preclude extraction of other submarine mineral deposits in the area, should deposits be identified.

Other losses or commitments of resources such as degradation in air quality, habitat loss at the facility sites, damage to hard-bottom benthos communities, groundwater withdrawals, and changes in the aesthetic environment may continue for the life of the project. In all of these examples, restoration is possible.

VIII. LONG-TERM VERSUS SHORT-TERM USES OF THE ENVIRONMENT

The proposed projects would represent a short-term gain by providing for some of the nation's energy requirements. The projects are consistent with the objectives of federal and state energy policies in reducing America's dependence on foreign oil and vulnerability to supply interruptions. Such a reduction in the reliance on foreign oil is certain to have national security benefits. However, the projects will lead to the following effects on long-term use of the environment:

- The oil and gas resources used and extracted by the project will not be available for use at a future time.
- Certain onshore or offshore cultural resource sites may be altered or removed as part of the project mitigation plan.
- Benthic communities around the production platforms and their related pipelines will remain altered for an unknown period of time after facilities are removed.
- Construction of the onshore pipelines will result in losses of and disruption to environmentally sensitive habitats that could take a long time to reestablish. Mitigations would reduce recovery time.
- Construction of the onshore oil dehydration facility will result in losses of habitat that will not recover until the facility has been shut down and removed.
- During the lifetime of the projects, state and federal ambient air quality standards could be exceeded due to routine flaring of hydrocarbons and plant upsets. These exceedances could impact both the public as well as environmentally sensitive habitats in the vicinity of the project sites.

Other impacts from the proposed projects are expected to be short-term and are not expected to significantly affect long-term productivity. However, the proposed projects could affect long-term usage of the local resources through: (1) damage to offshore cultural resources through barge anchorage; (2) damage to biological or other resources due to oil spills and resultant exposure to oil; and (3) damage to terrestrial biota due to fumigations from processing facility upsets.

IX. UNAVOIDABLE ADVERSE IMPACTS OF THE PROPOSED PROJECT AND ALTERNATIVES

The unavoidable adverse impacts of the proposed project are listed in the Class I, significant impact, summary tables. These are located in the Executive Summary at the front of this document. Some unavoidable adverse impacts are not significant. These have been included in the Class III, insignificant impact, tables in the Executive Summary.

X. GROWTH-INDUCING IMPACTS OF THE PROPOSED PROJECTS

The effects of the proposed Union project, proposed Exxon project and their alternatives upon regional growth are examined in detail in the socioeconomics chapter (Section 5.7). Generally, these growth related effects are directly attributable to both projects and lead to an increase in employment local expenditures. Businesses providing direct goods and services (including labor) for the projects will provide a minor contribution to overall regional growth. Businesses providing goods and services to these "direct support" businesses, as well as businesses providing goods and services for local employees, will also benefit from these projects and may consequently add to regional growth, although to a very limited extent.

In and of themselves, the Union and Exxon projects provide little "growth inducement" in terms of water demand, the need for new schools, police protection, and waste water treatment requirements in the Tri-County area. Realization of the projects however, would remove impediments to growth in a number of ways. Approval of either of the projects may establish a precedent with regard to local policies affecting future projects. For example, modification of County land use plans and the provisional zoning changes for the Union project could conceivably lead to additional industrial development in the Lompoc area. Amendments to local planning and zoning ordinances can be prepared in such a way as to only allow the stated development on the particular parcel chosen for the facilities. Clearly, future modifications to local land use and zoning ordinances could be made that would alter the character of local areas and potentially contribute to regional growth, but this project alone is not seen as setting a precedent for future industrialization of areas adjacent to project components (or elsewhere throughout the Tri-County area due to both its scale and location). This point is bolstered by the fact that local and state policies require consolidation and collocation of energy facilities in order to avoid the undesired proliferation of such facilities.

Cumulative impact assessment presents a more realistic evaluation of what may actually occur, although the growth implied by the cumulative analysis cannot be attributed, except in small part, to the Union or Exxon projects (see Section 5.7 Socieconomics).

As the first development project proposed in the Central Santa Maria Basin, Union was required by the MMS to design its pipeline to shore to accomodate potential future development in the area. Based on current knowledge of the geology of the area, the MMS determined that a 100,000 BPD pipeline would serve the needs of future developers in the Central Basin. Installation of this project component, in particular, has the potential for inducing new growth in the North County area by virtue of pipeline availability. Once approved, these consolidated oil and gas pipelines will most likely be the only method of crude shipment in this particular area.

Construction of this pipeline with potential unused capacity therefore removes impediments to development of additional nearby oil resources in federal water. See area offshore and onshore study discussion, Section 2.10).

With respect to onshore facilities, the consolidated pipeline to shore removes obstacles for the development of new facilities to process and ultimately transport this production. These include: expansion of the dehydration facility, installation of a new gas processing facility and construction of a new onshore pipeline to an approved transportation system exiting Santa Barbara County. Exxon has recently submitted an application to the County of Santa Barbara for a pipeline exiting Lompoc. A general analysis of growth related impacts of hypothetical onshore and offshore Area Study facilities is included for each issue area in this document.

While approval of the Union Project alone removes impediments to growth onshore, the permitting of Exxon's Project Shamrock would more likely necessitate expanded or additional onshore processing and oil transportation facilities. Since Exxon did not have detailed plans for the onshore treatment and transportation of their production during the preparation of this EIS/EIR. Several options available to Exxon have been identified in Section 2.1.5 of the Project Description. Exxon's offshore alternative however, would not require additional facilities onshore and production could be accommodated at Chevron's approved Gaviota Facility. Briefly, these onshore options are:

1) Commingling of Exxon's production with Union's and shipment from the Lompoc Facility to the Santa Maria Refinery until 1988 (in this case, both existing and proposed pipelines would have sufficient capacity and no additional modifications would be necessary at the refinery); after 1988 however, equipment modifications would be necessary, as well as the installation of new pipelines due to increased producition.

2) Potential Modification of Union's Lompoc Facility to accomodate Exxon's peak production and installation of a pipeline from Lompoc either to a northern tie-in with the Celeron Pipeline at the proposed Sisquoc Pump Station or with a southern route to Gaviota for use of either the Texaco Marine Terminal, the Southern California Pipeline System or Celeron Pipelines.

The potential environmental and socioeconomic impacts associated with Option 2 have been generally analyzed within each discipline area in this document under the onshore Area Study Scenario for.

In effect, approval of Exxon's project Shamrock would provide reason for development of the onshore Area Study facilities. This would involve an actual need for expansion of the dehydration facility (to accommodate Exxon's production) and a new onshore pipeline to an approved transportation system exiting Santa Barbara County. Although Exxon has proposed to reinject gas production until the year 2000, a new gas facility may eventually be needed to process the gas.

In sum, approval of the current projects initiates or establishes a need for the hypothetical facilities proposed under the Offshore and Onshore Area Study scenarios. Approval of Union's consolidated pipeline to shore assists in or encourages hypothetical Area Study development in the Central Santa Maria Basin by providing a means to shore. Approval of Exxon's Project Shamrock goes one step further, by necessitating new facilities onshore. Potential indirect effects of Area Study related growth include increased pressure to expand public service systems which currently constrain growth (e.g., water supply, wastewater treatment).

Since the oil and gas produced by the Union and Exxon projects will be transported out of the area, there will be little growth inducement from actual project-related production activities. However, exploration and drilling activities associated with the projects and subsequent Area Study development will lead to a substantial amount of new geotechnical data offshore. Oil and gas resouce fields will be further delineated and structures within the Central Basin will become less obscure with continued drilling. This new knowledge, in turn, could lead to further pressures on development of nearby State Tidelands.

It is important to remember that while these projects alone will do little to induce growth, but they will remove some impediments to future developments (and the growth associated with these developments).

SUPPLEMENTAL INFORMATION

10.1 Mitigating Pipeline Routes

10.2 Additional Air Quality Analysis

10.1 DISCUSSION OF MITIGATING PIPELINE ROUTES

In their Application to the County of Santa Barbara, Union presented two pipeline routes for evaluation in the EIS/EIR. For both pipeline routes it was determined that the chance of an onshore oil spill was unlikely during the lifetime of the project. Section 10.1.8 on System Safety discuses oil spills further. However, in the event of an oil spill, both the proposed (Northern) and alternate (Southern) pipeline routes could have impacted the Santa Ynez River estuary which is used by rare and endangered species. In order to avoid the estuary, the Southern Mitigated Pipeline Route, discussed in the Draft EIS/EIR was developed. This route places the pipeline on the other side of Highway 246 completely out of the estuary, and is shown in Figure 10.1-1.

Union Oil, upon reviewing the document, proposed a mitigated northern route that moved the pipeline north away from the estuary. This route would follow Terra Road on the north side. Union also has proposed to build berms and catch basins in strategic locations to help contain the oil and keep it from entering the estuary in the event of a pipeline rupture. Union Oil has provided detail strip maps of this Northern Mitigated Route, which is also shown in Figure 10.1-1. This Northern Mitigated Route #1 was again modified in consultation with the USFWS, Vandenberg AFB, the JRP and Union Oil (May, 1985). These modifications are incorporated as Northern Mitigated Route #2 as shown in Figure 10.1-1. The USFWS has identified the Northern Mitigated Route #2 as a "reasonable and precedent alternative" in their Biological Opinion on this project. A copy of their Opinion is attached to this Final EIS/EIR.

Three other pipeline realignments that have been evaluated include moving the pipeline into the firebreak on Vandenberg AFB property north of Santa Lucia Canyon as shown on Figure 10.1-1, a realignment by San Antonio Creek and a realignment near the Orcutt Pump Station which are both shown in Figure 10.1-2. The USFWS has identified the San Antonio Creek realignment as a "reasonable and prudent alternative" in their Opinion.

10.1.1 Engineering Considerations

Table 10.1-1 provides a summary of some of the general information on each of the two mitigated pipeline routes. Each route is discussed separately below.

Union is proposing to use a Supervisory Control and Data Acquisition System (SCADA) to monitor the oil pipeline for leaks. This system measures the volume of oil entering the pipeline at the platform and compares that volume with the measured volume arriving at the Lompoc Dehydration Facility. If these values do not compare (i.e., a leak exists) then an alarm sounds, warning the operators at both the platform and the Lompoc facility. The operator at the Lompoc facility is given a few minutes to react to the warning, and then must either shutdown or override the system. If no action is taken, and the volumes continue to disagree, then the SCADA system will automatically shutdown the pipeline system and close all the block valves. The accuracy of the SCADA system is estimated to be one-tenth of 1 percent of the throughput. The SCADA system is designed to detect leaks over both short and long periods of time. The short detection time (approximately 15 minutes) is used to detect larger leaks (greater than 1 barrel/min), and the long detection time (approximately 2 hours) is used to detect smaller leaks (0.5 barrels/min-1.0 barrels/min). It would be possible to have a small leak (less than 0.5 barrels/min) that could go undetected by the SCADA system. Such a small leak would not be a surface spill, but would saturate the surrounding soil and migrate in the path of least resistance. For a large pipeline rupture the oil would be blown to the surface and would move above ground as an oil slick. Therefore, it is necessary to evaluate both large and small spills from pipelines since the mechanisms of travel could be quite different. Each of these types of spills are discussed below.

Large Oil Spills from a Pipeline Rupture

For this type of oil spill it is assumed that the pipeline is completely ruptured and the spilled oil would move above ground as an oil slick.

For this analysis it has been assumed that the time required to shutdown the pipelines in the event of a major rupture would be ten minutes. This represents a very worst case assumption and under normal response conditions the pipeline would shutdown in a matter of minutes. The spill from the pipeline would include the static volume of the line between block/check valves, plus the amount of oil pumped through the line over the ten minute period. The assumed pumping rates for Union, Union plus Exxon, and the Area Study are given below. A large spill of this type of oil would move very slowly in the direction of the downhill grade, and would only slightly penetrate into the soil.

Small Leaks in the Pipeline

This type of oil spill is more likely to occur and can result from corrosion, weld failure, or flange leak. For this analysis it was assumed that the pipeline could leak up to 30 barrels/hour for 12 hours before the leak was detected either by visual detection of oil on the ground, or by the pipeline operator detecting a constant hourly differential reading in the SCADA system totalizer. For this type of oil leak, the total undetected spill could be as large as 360 barrels.

With this type of leak, the oil would not come directly to the surface, but would penetrate the soil and move in the direction of least resistance causing saturating the soil as it went. This type of leak would result in an area of soil around the rupture becoming saturated with oil, resulting in a black spot on the surface that could be visually detected.

Case	Pumping Rate (bbls/min)	Total Oil Pumped Before Shutdown (bbls)[1]
Union only	14	140
Union & Exxon	28	280
Area Study	70	700

[1]Assumes ten minutes of pumping.

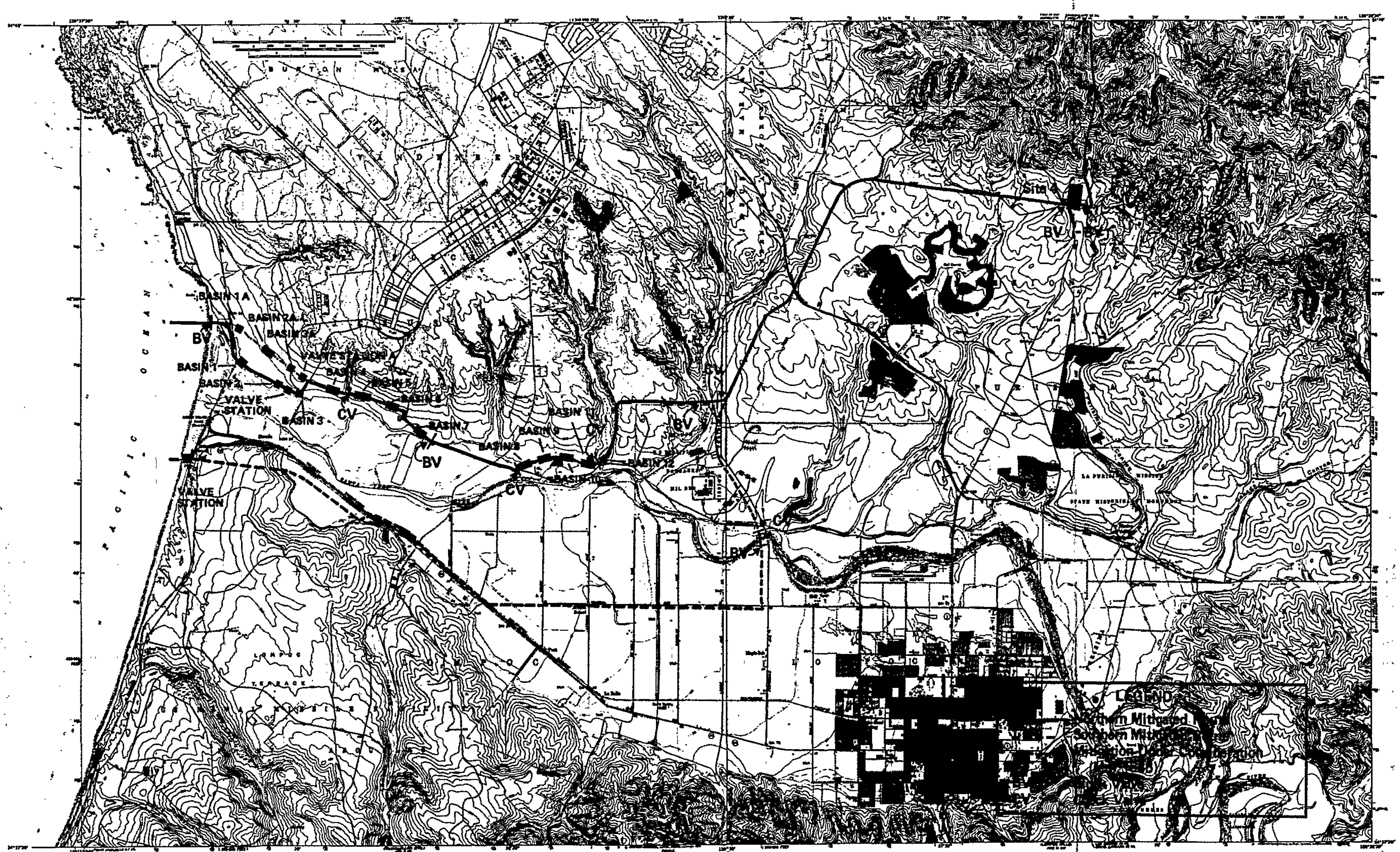


FIGURE 10.1-1 PROPOSED ONSHORE PIPELINE ROUTES TO LOMPOC DEHYDRATION FACILITY AT SITE 4

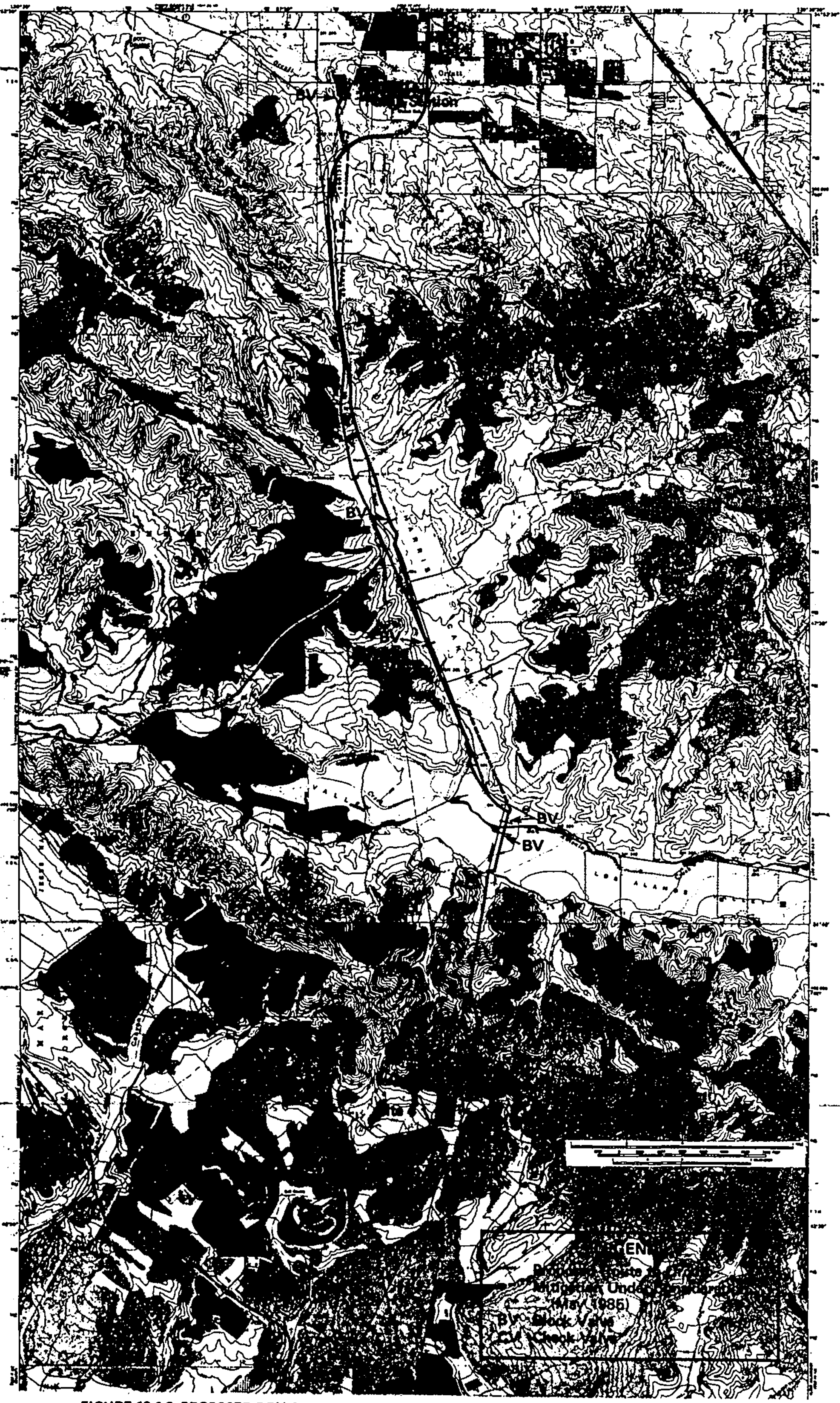


FIGURE 10.1-2 PROPOSED DRY OIL PIPELINE FROM LOMPOC DEHYDRATION FACILITY TO ORCUTT

Table 10.1-1

GENERAL PIPELINE ROUTE DATA

ITEM DESCRIPTION	LANDFALL TO SANTA LUCIA CANYON		
	NORTHERN MITIGATED ROUTES		SOUTHERN MITIGATED ROUTE
	#1	#2	
Length (miles)	7.3	7.1	9.1
Railroad Crossings	1	1	2
Public Road Crossings	6	6	8
Space Shuttle Haul Road Crossings	1	1	3
Santa Ynez River Crossings	0	0	1
Miles on Vandenberg AFB	7.3	7.1	3.4
Miles in 100-Year Floodplain	1.1	1.1	7.1
Proposed Number of Block/Check Valves	3/3	3/3	2/1
Burial Depth of Pipelines (feet)	3	3	5-10
Temporary Right-of-way (feet)	50	100	50-150
Acreage of Sensitive Vegetation Disturbed	37	32	23
Archaeological Sites	8	8	3

10.1.1.1 Northern Mitigated Pipeline Route #1

The landfall of this pipeline route is approximately 0.8 miles north of the Santa Ynez River mouth. The route then runs primarily east on the north edge of Terra Road, to Oak Canyon. For this mitigated route, Union is proposing to install three block valves, three check valves, and a network of berms and containment basins to contain the oil in the event of an oil spill. The location of the valves and containment dikes/berms are shown in in Figure 10.1-1.

Table 10.1-2 provides some general data on the catch basins that are proposed for the Northern Mitigated Pipeline Route. These basins have been numbered from 1 to 12 starting at the landfall and moving east. Union is proposing to use three different types of basins.

Type 1 - This type is designed as a catch basin and would require that the area just north of Terra Road be excavated as shown in the Figure 10.1-3. Union is proposing to install six of these basins along the pipeline route. All of these are being proposed in areas where the topography on the north side of the road is relatively level. The basins are placed at the bottom of hills so that if the pipeline ruptures the oil would flow into the catch basin.

Type 2 - This type is designed as a bermed basin and would require that one-foot berms be constructed parallel to Terra Road on the south side and the above road crown be built across Terra Road at strategic locations. Union is proposing to build five of these basins in areas where topography on the north side of the road would require extensive excavation to construct a Type 1 basin. This type of containment system is shown in Figure 10.1-4.

Type 3 - This type of basin is similar to Type 2 except that it uses the natural terrain on the north side of Terra Road as a berm and would require that a three-foot berm on the south side of Terra Road be constructed. Union is proposing to use only one basin of this type, and the containment system is shown in Figure 10.1-5.

For all the basin types it was assumed that the effective volume of the basin would be 90 percent of the total available volume. This assumption was made to account for potential loss of volume due to erosion of the berms and dikes, and sedimentary buildup in the catch basins.

The basin volumes present in Table 10.1-2 are based on the assumption presented above as well as the total Area Study throughput volume of 100,000 barrels of wet oil per day.

Some additional mitigation measures that could be used for stabilizing the dikes and basins include:

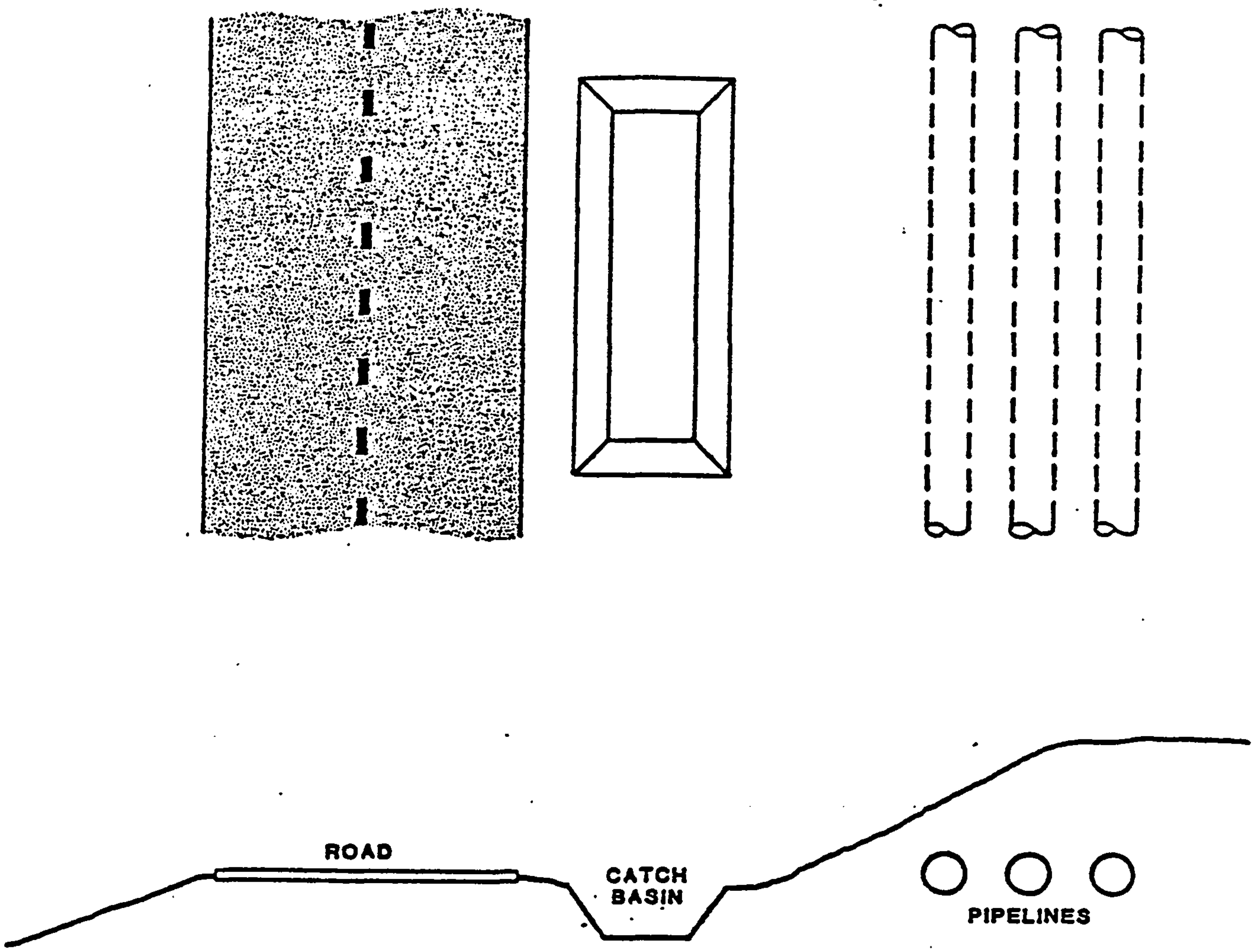
(1) Cover all the dirt berms with a layer of grout or concrete to help Prevent erosion.

Table 10.1-2

NORTHERN MITIGATED ROUTE
CATCH BASIN DATA

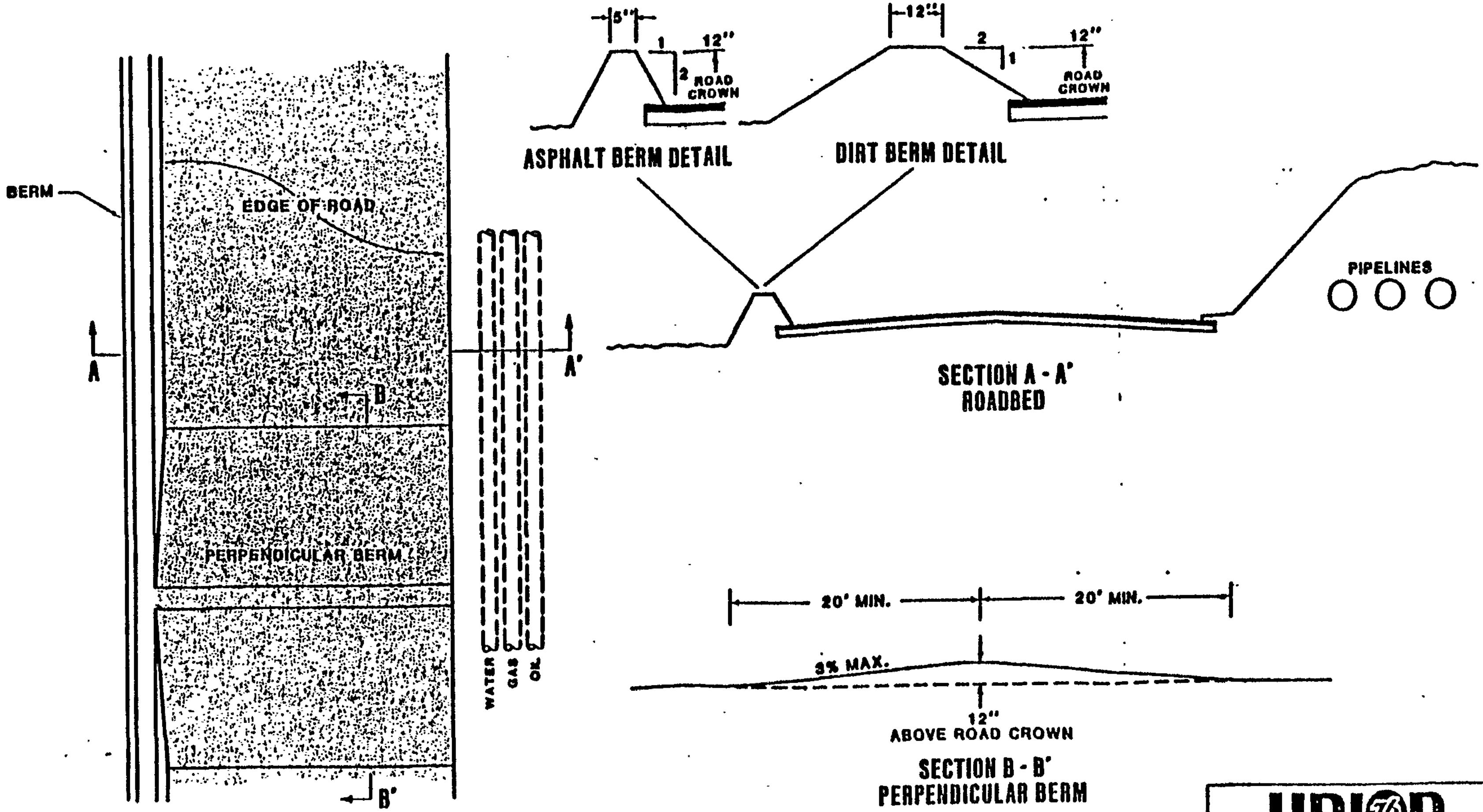
BASIN NUMBER	BASIN LOCATION[1]	BASIN TYPE[2]	REQUIRED BASIN[3] VOLUME (bbls)	TOTAL BASIN VOLUME (bbls)	SPILL VOLUMES (bbls) TOTAL POTENTIAL SPILL (STATIC AND PUMPED LOSSES) STATIC	UNION	UNION AND EXXON	AREA STUDY
1	43	One	2,482	2,750	1,782	1,922	2,062	2,482
2	73	One	1,413	1,570	713	853	993	1,413
3	83	One	1,475	1,640	775	915	1,055	1,475
4	111	Two	1,552	1,720	852	992	1,132	1,552
5	121	Two	2,443	2,700	1,743	1,883	2,023	2,443
6	146	Two	1,281	1,420	581	721	861	1,281
7	176	One	2,056	2,280	1,256	1,496	1,636	2,056
8	230	Dike	3,276	3,640	2,576	2,716	2,856	3,276
9	248	One	2,346	2,600	1,646	1,786	1,926	2,346
10	252	Two	1,707	1,900	1,007	1,147	1,287	1,707
11	265	Two	1,223	1,360	523	663	803	1,223
12	281	One	1,862	2,070	1,162	1,302	1,442	1,862

1 Basin Location is the route survey distance shown on Drawing 14C-10141,2,3. Basins are ordered from Landfall to San Lucia Canyon.
2 See attached drawings for basins type details.
3 Required volumes are 90 percent of total volume.
4 Union peak production, (14 bbls/min); U&E - Union & Exxon peak production, *28 bbls/mikn); AS - Area Study, (70 bbls/min).



TYPE 1

FIGURE 10.1-3	
CATCH BASIN DETAILS	
DRN BY: JCR	4/15/85
APP BY: RCH	NO SCALE



TYPE 2

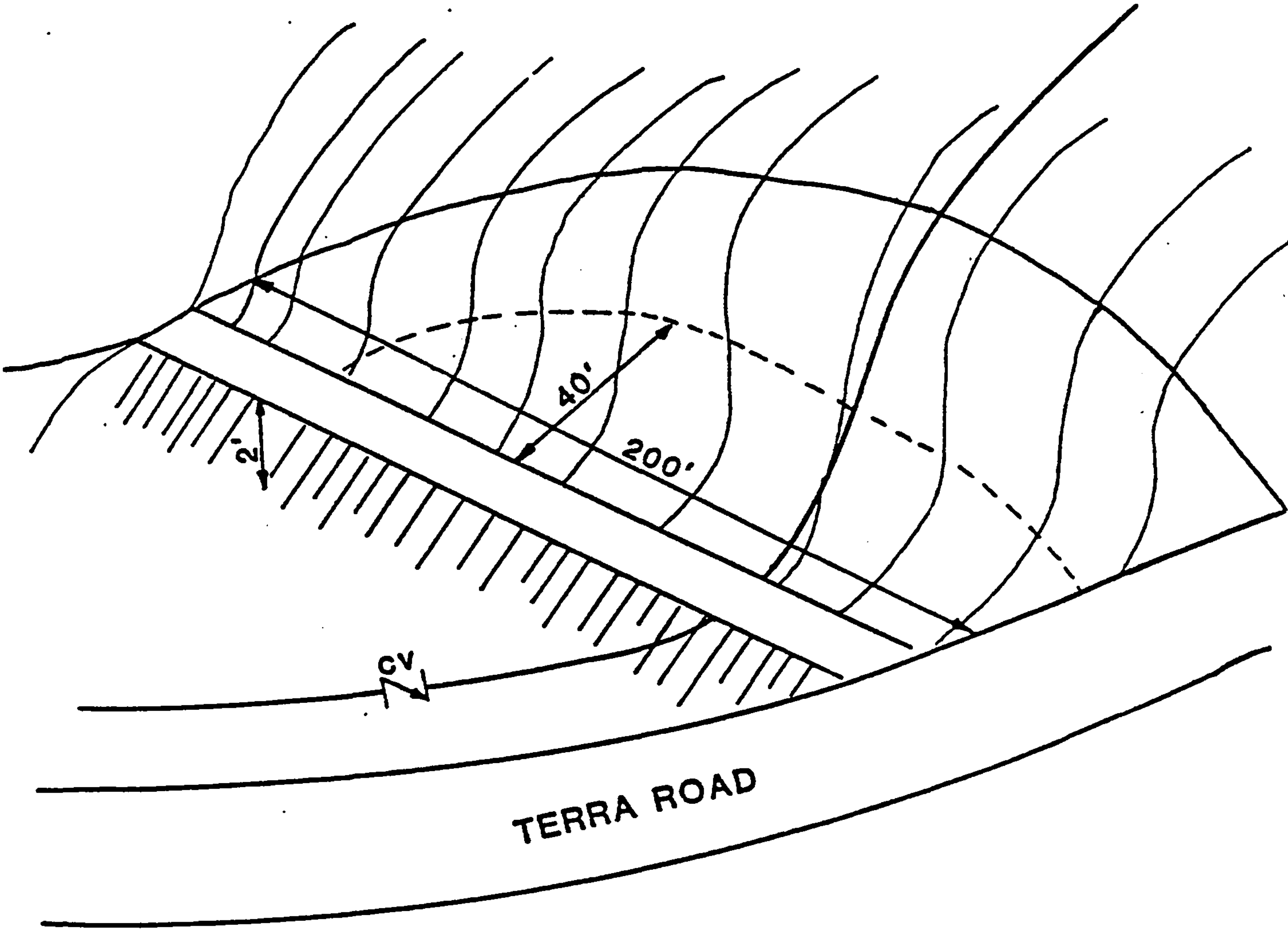
UNION 76

BERM DETAILS

FIGURE 10.1-4

FIGURE 10.1-5

DIKE DETAIL 3



(2) Revegetate the catch basins and dirt berms. A maintenance program would be required for the first few years to assure that revegetation measures are successful and the newly established plants are effective in erosion control.

The Northern Mitigated Pipeline Route #1 would use Terra Road as part of the construction right-of-way (ROW) and the road would serve as the access road for the pipeline after construction. Therefore, only an additional 50 feet of ROW would be required for construction. The dirt for building the berms would come from the dirt displaced by the pipelines and the material excavated in building the catch basins. No additional cut and fill should be required.

10.1.1.2 Northern Mitigated Pipeline Route #2 (May 1985)

This minor realignment (approximately 1 mile long) was agreed to by Union Oil and USFWS. This mitigative realignment will result in a larger buffer zone between the Santa Ynez River estuary and the pipeline route. This realignment is shown in Figure 10.1-1 and results in the pipeline being moved approximately 1,000 feet further from the estuary. This route would be combined with the remainder of the Northern Mitigated Pipeline Route #1 and would use the same type of catch basins described for Route #1. With this route, Terra Road would be moved further north along side the pipeline route and the existing Terra Road removed.

10.1.1.3 Southern Mitigated Pipeline Route

This pipeline route proceeds inland from a landfall at Surf, south of the Santa Ynez River estuary, crossing the Santa Ynez River at the Floradale Avenue Bridge. It follows Santa Lucia Canyon Road through the property of the Lompoc Federal Correctional Institution. For this route two block valves and one check valve are proposed. The first block valve would be at the valve station located at the Surf electrical substation just west of highway 246. The other two valves would be located on either side of the Santa Ynez River crossing. This route passes mainly through agricultural fields and is in the 100-year floodplain for the majority of its length. The route is shown in Figure 10.1-1.

One of the major issues associated with the southern route is the potential damage of the pipelines due to scour from flooding. During the 1969 flood, which was a 50-year flood, scour up to 8 feet was observed in the vicinity of the pipeline route. Under extreme flood conditions it is possible that the scour could rupture the pipeline, resulting in an oil spill. This would most likely occur during the winter months when 95 percent of the area's rainfall occurs. If this were to occur, then the oil would mix with the flood water and move out to sea with the water. In order to help mitigate this problem the pipeline should be buried 3 to 4 feet below the scour depth. This would require the trenches to be up to 12 feet deep. The increased trench depth would slightly increase both the required ROW and the construction time for the pipelines. This deeper burial depth would also eliminate the chance of the pipelines being damaged by agricultural farming equipment which has a maximum digging depth of 3 to 4 feet.

Table 10.1-3 presents the expected spill volumes for the Mitigated Southern Pipeline Route assuming that the pipeline has two block valves and one check valve. The longest span of pipeline without valves is through the agricultural fields from the valve station to the southern edge of the Santa Ynez River crossing. This portion of the line (7.2 miles) is mostly in the 100-year floodplain on flat terrain. Since the terrain is relatively flat pumping loss plus a static volume of about 800 barrels is the only concern, because once the valves at either end of this stretch close, the rest of the static volume should not drain.

The spill volumes shown for the Santa Ynez River crossing are based on the use of a drilled crossing which represents the greatest distance between valves on either side of the river. The longer span distance is required for this type of crossing since the pipe has limits on its allowable angular deflection and in order to go 50 feet below the river bed a span of at least 1,000 feet would be needed. With trenching and spanning, the distance would be around 350-400 feet.

This route does have some engineering construction concerns that would have to be addressed prior to construction. The first one is that Union is currently planning to use a beach pull method for installing the offshore pipelines. With this method the lines are fabricated onshore and then pulled offshore by a pull barge with bouys attached. This requires an area on the beach of 600 feet by 100 feet. The Surf landfall could provide up to 500 feet of length, but would require the sand dunes to be leveled for the construction period. This loss of 100 feet would lengthen the construction period slightly. If this is still unacceptable to Union, another option that could be explored would be to do the beach pull method for most of the offshore pipeline from the northern landfall and only do the Surf zone portion from the Surf landfall.

There also exists some areas of unstable soil and landslide potential on the east side of the hill just east of Surf. Special construction and revegetation plans would need to be developed for this portion of the pipeline route. For the portion through the agricultural fields the line would need to be buried to 5-10 feet to protect against scour due to flooding. The major construction issue for the southern route is the crossing of the Santa Ynez River. Here there are three options that are available to Union and they include:

Trenching,

Spanning, and

Drilled crossing.

Each of these methods is discussed below. It should be noted that all these methods are technically feasible, but their environmental impacts are quite different as is their relative cost.

TRENCHING

With this method a trench would have to be dug across the river. The pipelines would have to be buried to a depth of approximately 40 feet to avoid scour effects. Since the soil in the river is silty sand the ROW would need

Table 10.1-3

SPILL VOLUMES FROM SOUTHERN MITIGATED PIPELINE ROUTE

SECTION NUMBER	LOCATION	LENGTH OF PIPELINE BETWEEN VALVES	SPILL VOLUMES (bbls)				COMMENTS
			STATIC	TOTAL POTENTIAL SPILL (STATIC + PUMPED LOSSES)[1,2]			
				U	U&E	AS	
1	Valve station to top of hill south of Highway 246	4,000 ft	1,549	1,689	1,829	2,249	This oil would drain down the hill toward the landfall. This assumes a break on the west side of the railroad tracks near the beach.
2	Top of hill south of 246 to southside of Santa Ynez River	37,960 ft	14,705	915	1,055	1,475	Since this terrain is mostly flats only the static volume from the hill south of 246 would drain once the valves were shut.
3	Santa Ynez River crossing	1,000 ft	387	527	667	1,087	These volumes assume that the drilled crossing method is used, which will require a crossing length of at least 1,000 feet. With a trenched or spanned crossing the length between valves could be reduced to approximately 350-400 feet.
4	North side of Santa Ynez River to Santa Lucia Canyon	7,200 ft	2,789	2,929	3,069	3,489	

[1] Assumes pumping for ten minutes before pipeline is shut down.
[2] U - Union peak production, (14 bbls/min); U&E - Union & Exxon peak production, (28 bbls/min); AS - Area Study, (70 bbls/min).

to be 250-300 feet wide. This large ROW requirement is due to the low stability of the river sand and therefore, the banks on either side of the trench must have gradual inclines to prevent cavity in. The trench itself would need to be approximately 150-200 feet wide at the top to allow for equipment and men to work in the trench. Depending on the amount of water found in the river, various well points would have to be placed both upstream and downstream of the trench to provide for dewatering. This method of construction would lead to significant impacts to the riparian habitat in the vicinity of the crossing. This method of construction could require three to eight weeks to install the pipeline and would involve a considerable amount of labor and heavy construction equipment. An alternative to direct trenching would be the use of a drag line to dig a trench across the river. This method is applicable when there exists underground aquifers that move very slowly. In this method the water is not removed from the river but is left in and a trench is dug by dragging a large scoop or pan across the river. Once the desired depth is reached the pipelines are layed in the water-filled trench and then the soil is placed over the pipeline. This method of trenching is normally used on larger rivers and is less labor intensive than conventional trenching and does not require the use of well pointing.

Whether or not this method of trenching would be applicable for this river crossing would require additional analysis and some preconstruction borring samples in the area of the crossing. It is estimated that this method of crossing the river would be more expensive than spanning, but less than a drilled crossing.

SPANNING

With this option, the pipelines would be either suspended from the Floradale Bridge on the downstream side, or suspended on a separate structure. With the bridge crossing the pipelines would be placed on an outrigger off the main boxes of the bridge. In order to reduce visual impacts and vandalism the lines could be covered on the top and outside with sheetmetal that would be painted a concrete color. A structural analysis of the Floradale Bridge was conducted to determine if the bridge would be capable of supporting the three pipelines plus the weight of the supporting outrigger. The data used for this analysis is given in Table 10.1-4. The design for supporting the pipelines is shown in Figure 10.1-6.

The analysis was based on the as-built plans provided by the County of Santa Barbara. The analysis showed that the bridge would support the new pipelines with the supports mounted adjacent to the bridge piers. This would result in pipe spans of approximately 90 feet. Given this span, additional steel pipe supports were assumed to support the pipe. It was assumed that this additional weight would be approximately 100 pounds per linear foot. The analysis assumed the use of wide flange beams for the pipeline support during construction which would last approximately two to four weeks. A portion of the overhang would have to be removed and then later replaced. Labor for this would be minimal and primarily consist of metalworkers. Traffic on the bridge would be partially disrupted during the construction period.

Table 10.1-4

UNION OIL PROJECT PIPELINE DATA

ITEM	DATA
1. Oil Pipeline	
Outer Diameter (in)	20
Wall Thickness (in)	0.625
Steel Grade	APL 5LX52
Welding	Electric Resistance
Weight Full (lbs/ft)	265.4
2. Gas and Water Pipelines	
Outer Diameter (in)	10-3/4"
Wall Thickness	0.365
Steel Grade	APL 5LX52
Welding	Electric Resistance
Weight Full (lbs/ft)	49.5/each
3. River Data	
Minimum Burial Depth (ft)	40.0
River Width	250 feet
Soil Type	Silty Sand
Water Source	Underground wells

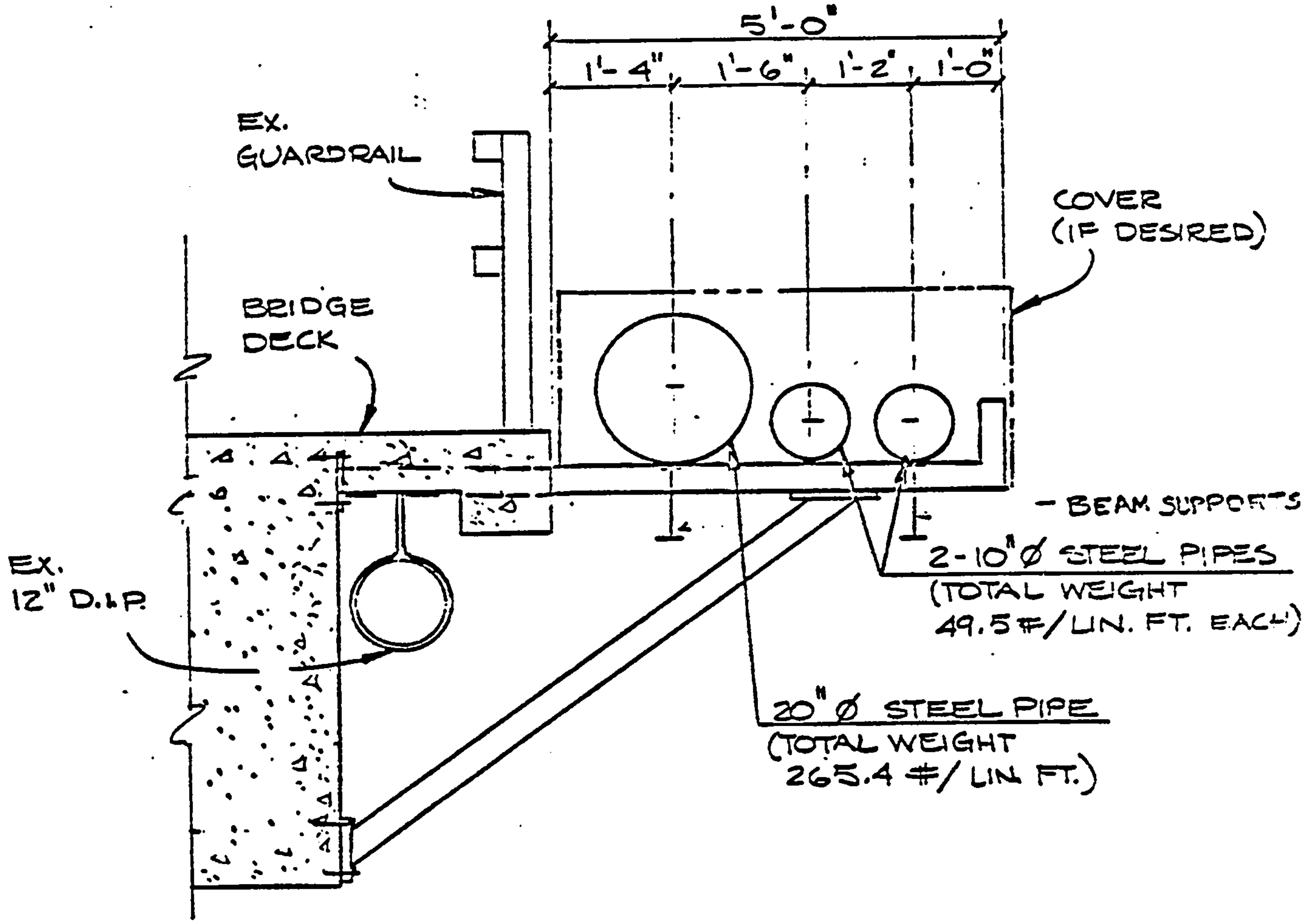


FIGURE 10.1-6

PROPOSED FLORADALE
BRIDGE OIL PIPELINE

FOR ARTHUR D. LITTLE, INC.
4-29-85 W.O. 606

DRILLED CROSSINGS

With this type of river crossing a hole is drilled horizontally underneath the river and then the pipelines are placed in the hole. For this project two drilled crossings would be required. The first would be for the 20" oil pipeline, the second would be for the two 10'' pipelines. It has been estimated that the drilled crossing would be over a 1,000 foot span. This distance is required in order to keep the bends in the 20" pipeline below its allowable stress. With this method the holes would be drilled from the south side of the river, and then the pipelines would be pulled back through the hole. An area of 100' x 100' would be required for the drilling operation. The steps in drilling would include:

(1) Drill pilot hole
(2) Run wash pipe
(3) Ream hold once or twice
(4) Pull pipe string back through hole
(5) Fill hole with drilling mud.

For the 20" pipeline, the hole drilled would be 32" to 34" in diameter, for the two 10" pipelines a diameter of 30"-32" would be needed. This method would require use of water for preparation of the drilling muds (approximately 100 bbls per day). The waste muds would have to be disposed of either by hauling to a landfill or by spreading and mixing with the local soil in the vicinity of the crossing. The muds used are fresh water based and would not contain any diesel fuel oils.

The pipelines to be pulled back through the holes would be prefabricated on the north side of the river. Prior to being pulled through the hole the lines would be hydrotested and coated with a thin epoxy layer. The estimated construction time for this option would be three to five weeks with a crew of five persons working on the drilling operations. The scheduled timing would be approximately two days to set-up the drilling rig, five days to drill each hole, four days to ream the holes, and three days to clean-up followed by two days for breakdown of the equipment.

Prior to selecting this option for crossing the river several boring samples would have to be taken and some engineering analysis would have to be conducted in order to confirm the suitability of this option.

10.1.1.4 Santa Lucia Canyon to Site #4 Realignment

This realignment, as discussed in the EIS/EIR, assumes that the pipeline is moved into an existing fire break on Vandenberg AFB. For this stretch of the route, the pipeline would need to be burried to a minimum depth of 5 feet in order to allow the fire break to be maintained and used effectively during a fire.

10.1.1.5 Site #4 to Orcutt Pump Station

San Antonio Creek Realignment

This realignment is shown in Figure 10-1-2. A portion of this realignment was recommended and discussed as a mitigation measure in the draft EIS/EIR. This portion was the area just around the creek crossing where the pipeline was moved to the east of the Route 1 bridge crossing. Figure 10.1-2 shows the location of the four recommended block valves for the Lompoc to Orcutt pipeline. These valves would limit the potential size of an oil spill locations in the vicinity of San Antonio Creek to a maximum of approximately 1,365 barrels of oil from a complete rupture of the pipeline south of the creek. By placing the block valve back 500 feet from the creek edge, this oil, given the terrain, would not reach the creek.

The oil would flow over a fairly even area of approximately 4,000 feet^2. The block valve on the north side of the river should be placed approximately 300 feet from the creek edge. This will allow sufficient distance to prevent oil from getting into the creek. Both these distances would be sufficient to keep small short-term leaks that penetrate the soil from reaching the creek. This is discussed further in the Onshore Water Resources section. These distances would allow for approximtely 500 barrels of oil to drain into the creek based on a complete rupture which is highly unlikely.

Union is proposing to use thick wall pipe and coating as well as an independent cathodic protection system for the stream crossing. Use of this cathodic protection system is recommended between block valves one and four. An additional recommended mitigation measure is to install the communication cable 1 to 2 feet above the pipeline for the full length of Harris Canyon. (The top of the Parissima Hills to the divide substation.) This measure would help protect the pipeline from third party damage since the cable would be struck before the pipeline not only alerting the third party, but also shutting down the pipeline.

Orcutt Pump Station Realignment

This realignment is shown in Figure 10.1-2 and was recommended by Union Oil to avoid crossing both roadways and drainages in the area of Orcutt Creek.

10.1.2 Onshore Geology

Only those sections of the Northern and Southern Mitigated Routes (proposed in March, 1985) not previously described in Technical Appendix A are discussed in this report. The reader is referred to Sections 1.0 to 1.5 of Technical Appendix A for general background and baseline information. Environmental consequences, mitigation measures, geologic impacts and cumulative impacts associated with the portions of the alignments not previously discussed in Technical Appendix A are included in this supplement. Generally, very few new constraints or impacts have been identified. The baseline information for this study was obtained from Technical Appendix A.

10.1.2.1 Pipeline Route #1

EXISTING SETTING

Physiography and Geomorphology

From the landfall, 1.4 miles (4.3 kilometers) north of Surf, the Northern Mitigated Route traverses east across a 400 foot (122 meters) wide gently sloping sand beach. Geologic processes of surf runup and wind erosion and deposition are very active in this reach. Just to the south along the beach are several extensive longitudinal sand dunes reaching heights of 40 feet (12.4 meters). The corridor from the beach area skirts east and then south around these old but active north and northwest trending dunes. The relatively low relief surface east of the beach to the toe of Burton Mesa is a portion of the alluviated Lompoc Valley estuary. This area has been elevated and abandoned with regard to future alluviation by the Santa Ynez River. Just north of the landfall a low sea cliff is actively being degraded by wave action. Teritary Age bedrock, terrace and alluvial deposits are well exposed in this near vertical cliff face.

The alignment turns south where it crosses the Southern Pacific Railroad tracks, about 1,700 feet (530 meters) east of the coastline. Here the corridor slowly rises in elevation above the flat valley floor onto an older marine terrace perched along the lower south- and west-facing slopes of Burton Mesa. This poorly defined terrace surface extends eastward to the first major deeply incised south flowing drainage on the mesa slope which is about 2,500 feet (775 meters) east of the proposed valve station.

The terrace surface in this area is of very low relief, smooth and has a gentle south-facing slope of less than 10 degrees. Surface geologic processes of wind and water erosion or deposition are repressed and are not considered excessive. Stream channels are poorly defined and little natural or man-made incision has developed. Vegetation presently controls the erosion of sand by wind which once was actively depositing and eroding sands over this surface.

From the valve station, the alignment turns eastward and parallels Terra Road. The corridor continues eastward immediately to the north of Terra Road gaining very little elevation, to the Vandenberg AFB dog training facility. At this location the alignment turns south and southeast downslope to the Lompoc Valley floor where it intersects that portion of the corridor previously described in Technical Appendix A, Section 1.7.6.1. The route along this reach remains on the lower slopes of Burton Mesa about 75 to 100 feet (23 to 30 meters) above the Santa Ynez River floodplain. This gentle south-facing slope of the mesa is generally smooth and well rounded with very little stream incision or excessive erosion. No evidence of slope instability has been identified along this section of the route on the slope face.

Approximately 2,000 feet (620 meters) east of 35th Street a deep arroyo will be crossed by a bridge structure. This south-facing drainage has deeply incised the slope area. The intermittent drainage has eroded a channel about 50 feet (15 meters) deep with near vertical slopes. The channel is about 200 feet (60 meters) across at the top. The floor is relatively flat, alluviated and 75 feet (23 meters) wide. Stratified bedrock is exposed nearly continuously along the channel walls in the vicinity of the crossing. Jointing and fracturing in the relatively hard bedrock has caused some degradation of the slopes in the form of rock falls and translational slab or pop-out failures. Channel enlargement appears locally to be a very slow process and deposition rather than erosion apparently is occurring.

Stratigraphy

The alignment from the landfall to the railroad tracks will traverse a section underlain by mostly recent sands which are both water and wind deposited. These units range from loose to medium dense, fine to medium grained, well-graded sands typical of beach deposits.

East of the railroad tracks to the first main arroyo (bridge crossing), the slopes are underlain by a thin cover of marine terrace deposits which are poorly lithified and stratified. The terrace deposits consist of sand and silty sands of Pleistocene Age. These materials vary from loose to medium dense and are very susceptible to erosion on exposed nonvegetated surfaces.

Orcutt Sand of Middle Pleistocene Age underlies the corridor slope area eastward of the bridge crossing and past the dog training center to the Lompoc Valley floor. This is a continental marine sedimentary unit consisting of poorly stratified sandstone, siltstone and pebbly sandstone. The formation is lightly cemented and is susceptible to erosion by concentrated water flow.

The entire Burton Mesa surface and slopes are underlain at shallow depth by the Miocene Age Monterey formation. It is exposed at two locations along this portion of the corridor between the landfall and Santa Ynez floodplains. Rock crops out on the west side of 35th Street near the intersection of Terra Road and at the bridge crossing. The bedrock is composed of interbedded shale, siliceous shale and siltstone that is moderately well to well cemented and thinly bedded. Bedding, jointing and fracturing are well developed.

Structure

Burton Mesa is underlain by a broad, shallow east-plunging, east-west trending anticline known locally as the Burton Mesa Anticline. The alignment traverses along the south flank of the fold, as seen in the south-dipping beds exposed in the Monterey formation at several locations on the slope. Bedding generally dips between 6 and 10 degrees to the south on the slope area in the vicinity of the proposed corridor.

The bedrock is moderately well jointed and fractured. These features are well exposed in the arroyo areas and generally parallel the channels and dip at high angles. These discontinuities are probably related to pressure release of the exposed bedrock along the arroyo walls.

No known or mapped faults trend towards or intersect the alignment between the landfall and Site 4. The closest mapped fault is the Lompoc-Solvang Fault located adjacent to the south side of the Lompoc Valley 3 miles (4.8 kilometers) to the south of the alignment. This fault is not considered a seismic hazard to the pipeline as proposed.

Seismicity

Figures 1.4.1-1 and 1.4.1-2 (Technical Appendix A) show the location and magnitude of historic earthquakes in the vicinity of the pipeline corridor. Figure 1.4.1-1 shows that the earthquakes in proximity to the alignment are small events of magnitude less than 4.

Geotechnical Conditions

Between the landfall and the Santa Ynez floodplain the corridor will traverse mostly cohesionless deposits of sand, silty sand and sandy silts. The sands may be in a loose to medium dense condition within the depths of burial of the pipeline. The bearing capacity and settlement characteristics of soils encountered along the pipeline alignment are very good and are not subject to collapse or expansion upon wetting. Sandy materials of this nature on shallow slopes (e.g., less than 25 degrees) are not susceptible to gross unstable slope conditions. Their loose consistency does make them prone to erosion from concentrated water flow and/or wind. Natural vegetation in the area has helped retard the erosion processes.

Where the pipeline crosses the first main canyon a span structure is planned. The bedrock on either side of the channel can be expected to perform well with regard to foundation piers and associated tie-back structures. The bedrock immediately adjacent to the canyon walls is susceptible to rock falls and large pop-out slab failures. Such failures are due to stream undercutting which results in channel enlargement, widening and depening.

Bedding attitudes measured in local exposures indicate that slopes underlain at the surface or at shallow depths are not subject to major bedding plane or cross-bedding plane sliding. Bedding dips southward at about the same angle as do the slopes (e.g., 6 to 10 degrees) and therefore slip plane failures are considered remote. Similarly, the rock has a high enough strength integrity to preclude cross-bedding failures. No landslides have been identified in the region between landfall and the point where the alignment reaches the Santa Ynez River floodplain.

The potential for liquefaction is low in the area between the landfall and Santa Ynez River floodplain. The generally medium dense soils, cemented bedrock and moderate to great depth to groundwater minimize the likelihood of seismically-induced failures.

ENVIRONMENTAL CONSEQUENCES AND MITIGATION

Introduction - Methodology

See Section 2.1.1 of Technical Appendix A.

Faults

See Section 2.1.1 of Technical Appendix A.

Seismicity

See Section 2.1.3 of Technical Appendix A.

Onshore Slope Instability

Slopes along the Pipeline Route between the landfall and the Santa Ynez River floodplain are expected to remain grossly stable regardless of the propose pipeline construction. No landslides or landslide-prone terrain exist along this section. Rock falls and large pop-out failures are expected to continue at a very low rate on the steep canyon walls of the first major canyon crossing. Such failures will be nature-induced. If large slabs of rock were to break free in the vicinity of the span foundation piers and weaken their integrity, a span failure is possible. The impacts of potential slope instability are considered significant but mitigable (Class II) in design.

Mitigation Measures

Potential minor slope failures are possible at the bridge crossing in the first major canyon. The steep slopes on either side of the canyon will need to be geotechnically investigated to mitigate potential slope instability problems. The investigation should include detailed geologic mapping, subsurface investigation, laboratory testing and analysis with subsequent recommendations for repair and design criteria. Mitigative measures could include: stabilizing the slope by lowering the slope ratio; removing large blocks of rock susceptible to failure; and establishing bridge footings far enough back from the slope face to preclude a failure. Spill prevention measures such as pressure sensors and shut off valves at critical locations could be considered.

Tsunami

See Section 2.1.8 of Technical Appendix A.

Uplift and Subsidence

See Section 2.1.9 of Technical Appendix A.

Erosion and Scour

See Section 2.1.10 of Technical Appendix A.

Mineral Resources

See Section 2.1.12 of Technical Appendix A.

IMPACTS OF THE PROJECT ON THE GEOLOGIC ENVIRONMENT

Pipeline Construction and Maintenance

See Section 2.2.2.4 of Technical Appendix A.

The only adverse geologic impact of project activities along the pipeline section between the landfall and the Santa Ynez River floodplain is associated with man-induced erosion on slopes underlain by loose cohesionless soils. Such impacts are discussed in Section 2.2.2.4.2, Impacts of the Pipeline, Technical Appendix A. Trench excavations are planned to follow the contour of the land and would be buried to a depth of 5 feet (1.5 meters). After placement of the pipeline, the trenches would be backfilled to the original grade and proper drainage and plant cover reestablished.

Erosion on slopes as a result of trenching can be minimized and stopped by normally accepted engineering practices. This includes properly compacting the trench backfill, reestablishing the surface drainage and not allowing water to pond above or concentrate and flow freely over slope surfaces. On sloping surfaces, low longitudinal graded berms can be constructed subparallel to the slope trend to intercept surface concentrated runoff and divert flow back to sheet wash drainage or into improved drainage facilities. A deep rooted, drought-resistant plant cover could be established on all denuded areas. If gullying does commence after completion of the trenching operation, regrading and surface drainage improvements should be implemented. Periodic inspection of all pipeline corridors is necessary, especially after periods of heavy rain, to confirm pipeline integrity and erosional conditions. If the above practices are followed, impacts would be Class II.

10.1.2.2 Northern Mitigated Pipeline Route #2

The short realignment that is associated with Route #2 would not have any different impacts than those discussed for Route #1. The realignment distance is too small to distinguish any change from that associated with Route #1.

10.1.2.3 Southern Mitigated Pipeline Route

EXISTING SETTING

Physiography and Geomorphology

From the landfall near Surf the Southern Mitigated Route traverses eastward over a 500 foot (153 meters) wide sandy beach of generally low to moderate relief. Large longitudinal sand dunes lying parallel to the shore line are actively being eroded and deposited in this area. These dunes change their shape and size constantly due to strong northwesterly winds. The Southern Pacific Railroad tracks have been constructed on the back beach area upon an artificial fill which acts as a barrier for otherwise eastward blowing sands.

East of the tracks the alignment rises at a moderate rate as it crosses Highway 246 onto the Lompoc Terrace. This west-facing slope is gentle, relatively smooth and gains about 200 feet (61 meters) of elevation over a distance of 1 mile (1.6 kilometer). Lompoc Terrace is an uplifted structural platform surrounded by low to moderate slopes and is locally incised by youthful drainages. The pipeline corridor traverses the northernmost extent of the terrace which terminates at the south edge of the Lompoc Valley. The terrain on the terrace surface is of low relief and densely covered by low brush and grass. The alignment parallels an existing overhead power line and buried water line. Natural erosion on this surface has been minimal. However, excessive deep gullying has been taking place locally along the buried water line backfill. This was due to improper drainage practices and/or poorly compacted backfill.

A 700 foot (214 meters) long and 175 foot (48 meters) high east-facing slope is traversed by the route as it descends the Lompoc Terrace. This slope forms a very large amphitheater-shaped bowl and has a slightly irregular or hummocky surface. Aerial photographs indicate that the entire bowl area may represent an ancient landslide of major size. This was not readily evident in the field. However, in the high road cut adjacent to Highway 246 and next to the bowl, a thick section of colluvium landslide debris is exposed. This debris could be associated with the apparent landslide in the slope area of the corridor. Exposure of the soils in the bowl area suggests a deep colluvial cover that may be creep affected.

This apparent landslide is one of several others that were identified along the northern limits of Lompoc Terrace. Whether they are bedding plane failures or translational failures across bedding is not evident. Due to their size and subdued outward appearance, they are considered ancient landslides that probably moved during a much wetter climatic period. Such a period existed in the coastal areas of California at the end of the Wisconsin Ice Age about 17,000 to 20,000 years before present. Conceivably, these particular features could be of that vintage. Presently, they appear to be in a stable condition and the possibility of reactivation is not likely, at least on a grand scale.

At the toe of the slope, the alignment continues east-southeast across the floor of Lompoc Valley along its southern margin. The valley floor is very flat and smooth and has been cultivated extensively. This low relief surface is a result of alluviation and plaination by the Santa Ynez River. The river has carved the broad channel of Lompoc Valley as the region was uplifted. Burton Mesa on the north side of the valley and Lompoc Terrace to the south represent the structurally uplifted highlands.

At a point about 12,000 feet (3,660 meters) east of the coastline the alignment merges with the previously characterized corridor. From this location eastward to Site 4 a thorough description of the alignment can be found in Section 1.7.6.1 and 1.7.7.2 of Technical Appendix A.

Stratigraphy

The coastal beach area at the landfall is covered with water and wind deposited sands. The sands are fine to medium grained, loose and unconsolidated. The thickness of the recent sand deposit is unknown. The landfall area is close to the intersection of a bedrock wave cut platform and the incised Santa Ynez River channel, both of which are buried by the beach sands and/or alluvium. The depth of bedrock could underlie the surface as little as 10 feet (3 meters) or as much as 100 feet (30 meters) or more within the corridor area of the beach.

As the alignment crosses the highway and trends east, the Pleistocene Age Orcutt Sand will be encountered across the Lompoc Terrace. These massive sand, silty sand and gravelly sand beds are well exposed in the road cut of Highway 246 just to the north of the alignment. Loose, disturbed sandy soils estimated to be up to 5 feet (1.5 meters) in thickness overlie the Orcutt Unit. The Orcutt Sands are poorly bedded, lightly cemented and are very susceptible to erosion by concentrated water flow on exposed slopes.

Well-bedded and cemented Miocene Age Monterey Shale underlies the Orcutt Sand within the Lompoc Terrace. The Monterey is also well exposed in the Highway 246 road cut opposite the alignment. The depth to the Monterey bedrock appears to shallow toward the east and may be only a few feet below the surface near the location where the corridor starts to descend into the Lompoc Valley. A manmade cut (quarry?) was excavated into the southern limits of the bowl-shaped slope through which the alignment will traverse. The Monterey Shale is exposed in this excavation and has only a thin overlying soil mantle.

The descending slope into Lompoc Valley is overlain with what appears to be a thick colluvial cover which consists of a medium brown clayey silt that locally contains gravel. These materials appeared disturbed and possibly creep-affected. Erosion (gullying) is very evident locally along the backfill of the existing buried water line. This water line lies near the proposed alignment. A question remains as to whether or not landslide debris underlies this slope area.

At the toe of the bowl-shaped slope the corridor will continue eastward over a thick section of river alluvium. At the surface this alluvium has been disturbed by cultivation activities, but generally consists of unconsolidated combinations of silt and sand with minor gravel fractions. From the valley floor to Site 4 the stratigraphy has previously been characterized in Section 1.7.6.1 and 1.7.7.2 of Technical Appendix A.

Structure

From Surf and eastward the alignment will traverse over the north flank of the east-west trending Santa Rita Syncline which parallels the Santa Ynez River Valley. Bedding expressed in the pre-Quaternary Age bedrock generally dips to the south in the area of Lompoc Terrace near the alignment. The Monterey Shale exposed in the Highway 246 road cut indicates that near the surface the bedrock is contorted and undulatory and does not totally conform to the regional south dip inferred from the mapped syncline. In most cases bedding is very shallow dipping, very fractured and jointed. A few minor shears were noted in the road cut.

Bedding in the overlying Orcutt Sand is indistinct, since the unit is fairly massive in character. In general, bedding dips at very shallow angles toward the west. The alluvium on the valley floor, east of Lompoc Terrace, is judged to be lying near horizontal, since it is of recent age and has not been structurally deformed.

No mapped or known faults are crossed by the route. The closest mapped fault is the Lompoc-Solvang Fault located about 3 miles (4.8 kilometers) south of Surf. This fault is not considered active and therefore does not constitute a seismic hazard.

Seismicity

Figures 1.4.1-1 and 1.4.1-2 of Technical Appendix A show the locations and magnitudes of historic earthquakes in the vicinity of the pipeline corridor to Site 4. A general discussion of large earthquakes is given in Section 1.4.1. Figure 1.4.1-1 shows that the earthquakes in proximity to the corridor are small events of magnitudes less than 4.

Geotechnical Conditions

Near the landfall at Surf the beach sands are loose, making them susceptible to erosion by wind and wave action. Shallow groundwater in this area may cause them to be susceptible to liquefaction.

On the Lompoc Terrace surface, the soil mantle is composed of loose to slightly cemented fine to medium grained sand. These materials are susceptible to erosion and gullying from concentrated water flow. Natural vegetation presently appears to control the erosion rate on this surface.

On the east side of the Lompoc Terrace where the alignment descends into the Lompoc Valley, a possible landslide area may be crossed. The morphology of the feature was discussed in the preceeding section under Physiography and Geomorphology. Based on its outward appearance and existing slope ratio (e.g., 2:1 to 3:1 horizontal to vertical), even if it is a major slide, it appears stable and is probably not susceptible to reactivation under the present climatic conditions. The stability of the mass has not been analyzed.

The Lompoc Valley floor is underlain by unconsolidated combinations of sand and silt with some gravel. This deposit is expected to be in a loose to medium dense condition and when combined with shallow depth to groundwater may be susceptible to liquefaction. These materials should not be highly prone to collapse or expansion upon wetting. Erosion and scour may occur in this area, especially within the active flood plains. See Onshore Water Resources, Section 10.1.3, for additional discussion.

The reader is referred to other geotechnical conditions along the alignment eastward of the intersection of 13th Street and Highway 246 in Section 1.7.6.1 and 1.7.7.2 of Technical Appendix A.

ENVIRONMENTAL CONSEQUENCES AND MITIGATIVE MEASURES

Introduction - Methodology

See Section 2.1.1 of Technical Appendix A.

Faults

See Section 2.1.2 of Technical Appendix A.

Seismicity

See Section 2.1.3 of Technical Appendix A.

Onshore Slope Stability and Liquefaction Potential

One major possible landslide exists on the alignment at a location about 4,800 feet (1,464 meters) east of the coastline. The limits or stability of this possible slide have not been delineated or analyzed. Based on a field reconnaissance of the area, the feature appears old and reactivation on a grand scale does not appear likely. If climatic conditions were to become drastically wetter, or if water is introduced in large quantities into the possible slide mass, movement might occur. Such movements of a few feet could rupture the pipelines and release hydrocarbons into the biosphere. The impacts of potential slope instability are considered significant but mitigatable (Class II) in design.

A liquefaction potential exists in areas underlain by low density, loose (unconsolidated) silty and sandy soils where shallow groundwater exists. The beach area between the landfall at Surf and the relatively flat alluviated Lompoc Valley floor are two areas where such conditions exist. To date, no liquefaction has been reported in the region. Also, no site-specific studies have been made to determine the liquefaction potential. In the event of a major nearby earthquake, strong ground shaking conceivably could produce liquefaction and/or lateral spreading, which could cause pipeline rupture, resulting in the release of hydrocarbons into the biosphere. The impact of potential liquefaction or lateral spreading are considered significant but mitigable (Class II) by design.

Mitigation Measures

The nature of the possible landslide area located about 4,800 feet (1,464 meters) east of the coastline can be characterized by a geologic investigation which might include: geologic mapping, aerial photographic analyses and a subsurface investigation. If the feature is found to be a landslide, then a slope stability analysis can be performed by laboratory testing of samples obtained from within the slide mass to determine a factor-of-safety. A factor-of-safety of 1.5 or greater indicates the slide is stable and reactivation is unlikely. A factor-of-safety of less than 1.5 would suggest the slide mass should be stabilized, avoided or removed. Stabilization can be accomplished in several ways, including buttressing, lowering the slope angle and dewatering.

The potential for liquefaction can be determined by field drilling and sampling, laboratory testing and analysis. If liquefaction is possible in the low lying areas, consideration should be given to either designing the pipe structure to withstand the stress or developing a method to relieve the sudden buildup of pore water pressure in the underlying soils.

Tsunami

Section 2.1.8 of Technical Appendix A.

Uplift and Subsidence

See Section 2.1.9 of Technical Appendix A.

Erosion and Scour

See Section 2.1.10 of Technical Appendix A.

Mineral Resources

See Section 2.1.12 of Technical Appendix A.

GEOLOGIC IMPACTS OF THE PROJECT ON THE GEOLOGIC ENVIRONMENT

Pipeline Construction and Maintenance

See Section 2.2.2.4 of Technical Appendix A and section regarding Impacts of Project Components for the Northern Mitigated Route in this supplemental report.

A Class II impact has been identified associated with man-induced erosional conditions on slopes.

10.1.2.4 Santa Lucia Canyon to Site #4

As is shown in Figure 5.1-1 of the EIS/EIR, this realignment has no potential increased impacts as a result of geological constraints over the proposed route.

10.1.2.5 Site #4 to Orcutt Pump Station

San Antonio Creek Realignment

The proposed realignment of the dry oil line to upstream of the Highway 1 crossing of San Antonio Creek does not present any different or new impacts, hazards or constraint from a geologic perspective and does not avoid any previously existing problems. See Section 5.1.2.3 of the EIS/EIR for discussion.

The realignment north of San Antonio Creek suggested by Union in May 1985 is shown in Figure 10.1-2 and passes through an area of suspected landslides just north of San Antonio Creek. These slides are shown in Figure 5.1-2 of the EIS/EIR. These slides are relatively small features and should be amenable to design mitigations, if the pipeline corridor were to be routed through this area.

Orcutt Pump Station Realignment

This realignment as shown in Figure 10.1-2 passes through an area that is prone to scour and errosion. Special design considerations would need to be developed to assure that the pipelines would not be affected by either scour or errosion. The design considerations would be in determining a suitable depth of burial through this area.

10.1.3 Onshore Water Resources

This supplemental discussion considers two major and one minor realignment of the proposed and alternative pipeline corridors from landfall to Santa Lucia Canyon and two realignments of the dry oil line from Site #4 to the Orcutt Pump Station.

The discussion here will focus on several points: 1) the differences between the routes previously analyzed and the realignments proposed; 2) additional discussion of the flood hazard posed by the Santa Ynez River for the previously analyzed southern alternative; and 3) characterization of the flow regime of San Antonio Creek, as input to discussion of the effectiveness of realigning the Lompoc-Orcutt dry oil pipeline to a position east of State Route 1, as a spill containment mitigation.

10.1.3.1 Northern Mitigated Pipeline Route #1

EXISTING SETTING

The surface water baseline environmental conditions are discussed in Section 4.3.1 of the Union EIS/EIR and in Section 1.1 of Technical Appendix C. The locations of drainages in the Project Area are shown in Figures 4.3-1 and 4.3-2 of the Union EIS/EIR. Characteristics of these drainages are presented in Table 4.3-1.

All drainages listed in these exhibits are crossed by the mitigated route, though the crossings of drainages 1-1 and 1-2 are slightly upslope of the previous crossing points.

Groundwater baseline conditions are discussed in Section 4.3.1 of the EIS/EIR and in Section 2.2 of Technical Appendix C.

ENVIRONMENTAL CONSEQUENCES

Impacts to surface water resources associated with construction, normal operations and abandonment have been characterized as Class III for drainages 1-1 and 1-2 with regard to streamflow, sediment loadings, and water quality. The mitigated route would not introduce any additional sources for impacts, though the location of impacts would change from relatively close to the estuary and flood plain to locations further upslope and beyond existing roads. This will have a tendency to further reduce the potential for adverse impacts to surface water resources. In addition, spanning drainage 1-2, as opposed to the previously proposed trenched crossing, would likely reduce potentially adverse construction-related impacts at this location. Impact classifications remain as before with respect to surface water resources.

Impacts to groundwater from construction are related to water requirements for dust control and hydrotesting. There would be no change in construction impact as a result of the realignment of the northern route. The pipelines are not expected to require water during normal operations. The realignments also cause no change to potential impacts related to abandonment.

The significant changes of impacts resulting from realignment of the northern route and additional design features proposed by Union concern the fate of spills of pipeline fluids. The design features include three types of catch basins to be placed at topographic low points in the segment from landfall to east of 13th Street, and the construction or reconstruction of berms along this same stretch. A detailed description of the basins and berms is included in Section 10.1.1 of this supplement. Analysis of the basin capacities indicates that some of the basins appear inadequate to contain the full contents of spills which could occur. If these basins are redesigned to have adequate capacity and if berms are constructed and maintained in accordance with guidelines suggested in the Terrestrial Biology sections of this addendum material, the impacts to surface water if the largest anticipated spill at full Area Study production, 700 bbl spill, (calculated assuming that block valves are placed on this stretch as proposed by Union) reached the ground surface would be reduced to insignificance because the spill would not be able to reach the estuary. Previous analysis suggested that impacts to surface water as a result of a spill in the vicinity of the Santa Ynez River estuary would be potentially Class I.

In addition, estimates of maximum hand distance of an underground spill of the same magnitude were made, assuming only a 3-foot depth of oil affected and maximum migration of emulsion in the subsurface. A depth of three feet was selected based on the presence of frequent clay lens in soils in this area. Maximum migration assumes that oil migrates to residual saturation levels and moves primarily toward the estuary. These assumptions are considered to constitute a reasonable worst-case both in terms of spill volumes and migration pattern. Estimated maximum travel distance is about 500 feet. The closest approach of the proposed route to the estuary (i.e., the Least Tern nesting area) is about 500 feet. Impacts are considered potentially Class I.

Maximum worst-case subsurface travel distances of spills associated with Union only and Union-plus-Exxon production were estimated to be 240 and 340 feet, respectively. Potential impacts to the estuary are considered Class III for either alignment.

Impacts of spills on groundwater quality would be insignificant on the section of the line from landfall to approximately the Vandenberg AFB dog training facility, because of the lack of existing users and the increased depth to groundwater compared to the previously proposed alignment. In addition, placement of the route further upslope reduces the likelihood of migration of free oil or dissolved oil fractions to points of discharge close to the estuary. In the section of the realigned route that is in the 100-year flood plain, depths to groundwater are likely to be similar to the previous alignment, though distances from existing wells (as noted in Miller [1976] and USGS [1982] are greater. Impacts are considered potentially significant but less so by comparison to the previous alignment. Specifically, placing the line further from existing wells suggests that it would take a larger spill to cause significant degradation of water quality in an existing well, compared to the previous alignment. Therefore, though the impact is still potentially Class I, the likelihood of occurrence is reduced, because of the lower probability of occurrence of larger spills.

Placement of the lines to the north of Terra Road in this section also reduces the likelihood that any scouring or flooding would result in exposure or damage to the lines. During floods of the Santa Ynez River scour hazards exist in areas just downstream of roads which are oriented across the flow [Corps of Engineers, 1970]. By taking advantage of the road as a berm against inundation in the event of moderate flows, and by placing the line upstream of the road in the event of large flows, scour hazards can be avoided.

10.1.3.2 Northern Mitigated Pipeline Route #2

This minor realignment north of the Santa Ynez River estuary would reduce further the chances of oil from a pipeline rupture impacting the estuary. The environmental consequences of this realignment would be similar to that for the Northern Mitigated Pipeline Route #1. This realignment, however, does reduce the chance of an underground spill reaching the Least Tern nesting area as highly unlikely and therefore, the impacts can be considered insignificant.

10.1.3.3 Southern Mitigated Pipeline Route

EXISTING SETTING

Regional and Project Area baseline environmental conditions are discussed in Section 4.3 of the Union EIS/EIR and in Sections 1.1 and 2.2 of Technical Appendix C. Figures 4.3-1 and 4.3-2 show surface water drainages and resources in the Project Area. Table 4.3-1 summarizes characteristics of drainages crossed by all pipeline corridors under consideration. The Southern Mitigated Route differs from the Southern Alternative Route by avoidance of drainage 2-1, an arm connecting to the Santa Ynez River estuary near Ocean Beach Park.

The mitigated route traverses up the Lompoc Terrace, descending the Terrace about 4000 feet east of Surf. At the base of this slope, the route enters the flood plain, in an area which is at least partially protected from high flood velocities by the railroad embankment, lying to the north. The route then crosses Highway 246 and the railroad, to regain the previously considered alternative.

The Terrace does not have any defined drainages in the vicinity of the mitigated route, either on the gentle slopes toward Surf or the steeper eastern slope. One drainage crossing is eliminated by the realignment: drainage crossing 2-1. An additional crossing is required. At the location where the route crosses Highway 246 and the SP Railroad tracks, a flood control drainage ditch, which lies south of the highway, must be crossed. This ditch carries runoff from Lompoc Canyon to the Santa Ynez River and drains an area of approximately 3000 acres, somewhat less than the area drained by the same channel at drainage crossing 2-1 of the original alternative alignment.

ENVIRONMENTAL CONSEQUENCES

Impacts of construction activities on streamflow, sediment loading and water quality on the realigned portions of the southern route are considered Class III, and less significant when compared to the previous alignment, which was routed both in and adjacent to the Santa Ynez River estuary. Impacts of normal operations and abandonment would also be Class III.

Impacts to groundwater from construction relate to water requirements for dust control and hydrotesting. Impacts of abandonment relate to water needed for dust control, if lines were removed. There are no changes to impacts of construction, normal operations and abandonment associated with the realigned southern route, when compared to the previously analyzed southern alternative.

Impacts of spills of pipeline fluids on surface water quality were considered potentially Class I for that portion of the original route in and adjacent to the estuary. Realignment of the route places the highway and railroad embankments between the pipelines and the estuary, and places the lines over a mile from the estuary at closest approach. The impacts are considered Class III along all realigned sections except at the crossing of the Lompoc Canyon flood control ditch, where impacts of a spill are still potentially Class I.

Impacts to groundwater quality of spills are Class III on the section of the realignment from landfall to the foot of the Lompoc Terrace because of lack of existing use and great depth to groundwater. From here to just beyond the crossing of the Santa Ynez River, impacts are potentially Class I because of shallow depth to groundwater and existing use of groundwater for irrigation. Compared to the original southern alignment, the length of line where impacts are potentially Class I is reduced by about one mile, and areas in or adjacent to the estuary are avoided completely.

Some additional discussion on the nature of the flood damage which has been associated with major flood events of the Santa Ynez River is included here as a refinement to previous discussions. The discussion is derived primarily from the report prepared by the U.S. Army Corps of Engineers [1970] in cooperation with the Santa Barbara County Flood Control District.

The January 1969 flood was considered a 50-year event for the river. This flood and the subsequent flood in February 1969 caused extensive erosion to the banks of the main channel of the river, destroyed the Floradale Bridge and a replacement bridge erected between the two floods, and caused scour of up to 6-8 feet in some places in the vicinity of the bridge. Observations indicated that generic locations especially susceptible to scour and erosion are on the immediate downstream side of roads oriented perpendicular to the direction of flow of flood waters. These roads, if at all elevated above the surrounding terrain, act as dams and induce erosion on the downstream side of the road. Roads oriented parallel to flood flows can act as dikes in certain cases.

The area in the vicinity of the Floradale Bridge has historically experienced significant damage during major floods.

Placement of pipelines to depths of 3 feet in the flood plain would likely not be deep enough to avoid exposure and potential rupture as a result of scour accompanying floods which can be expected to occur during the life of the project. Impacts are considered potentially Class I.

MITIGATION MEASURES

To avoid potential impacts of scour, particularly as associated with roads, the pipeline could be placed on the upstream (east) side of roads oriented perpendicular to flood flows (i.e., Floradale Avenue). To take advantage of the tendency of parallel-oriented roads to act as dikes, the pipelines could be placed on the south side of Central Avenue.

Together with provisions discussed elsewhere in this supplement for crossing the Santa Ynez River, the potential hazard of flooding to the pipeline integrity would be greatly reduced. Impacts of a spill would still be potentially Class I to water resources, but the likelihood of occurrence would be greatly reduced.

10.1.3.4 Santa Lucia Canyon to Site #4

This realignment does not produce different impacts from those described in Section 5.3 of this document for the Proposed Pipeline Route.

10.1.3.4 Site #4 to Orcutt Pump Station

San Antonio Creek Realignment

The particular mitigation of interest here is the suggestion of moving the route to the upstream side of the Highway 1 crossing of San Antonio Creek. This would permit the use of the bridge for spill containment and protection of Barka Slough in the event of a spill in the streambed.

A crossing has been suggested several hundred feet upstream of the bridge. The creek bed in this area is incised 8-10', with oversteepened, nearly vertical banks along the majority of this section. There are some areas of fill on the south bank, where it appears concrete and other debris has been deposited. If construction were to occur in areas of oversteepened banks, these banks should be reconstructed to limit the possibility that flow could concentrate in the notch which would be required in trenching. Fill areas are currently less than vertical, but could still constitute areas of concentrated flow and erosion if not reconstructed.

In an effort to design spill containment measures that would be effective in the flow regime of San Antonio Creek, a flow duration curve for the creek has been constructed (Figure 10.1-7) using data from a gaging station maintained by the USGS just downstream of the proposed crossing from 1941-1955. The curve is based on daily flow data. Mitigations could include simple booms, to be placed directly across the streambed between bridge piers in the event spills occurred during times of no flow, and fabric curtains which or specially-designed dams to act as simple retainers of floating oil during periods of low and moderate flow. For flood flows, notification procedures similar to those suggested for the Santa Ynez River could be instituted to permit draining or displacement of dry oil in anticipation of severe flooding events. By reference to Figure 10.1-7, booms curtains or dams would be effective mitigations for about 95 percent or more of the flows that occur on the creek (flows up to about 10 cubic feet per second). Draining of the line would account for a very small percentage of total flow, but would address the extreme, and therefore most destructive, events.

Spill volumes at San Antonio Creek have been calculated as 170 bbl for the project and 495 bbl for the Area Study, assuming that static volume and a volume of pumped oil equal to 10 minutes of flow escape the line. To estimate spread of these volumes, a formula presented in CONCAWE (1981) was used. Assuming a depth to groundwater of 20 feet, a spill area at the surface of 1000 ft^2, and a course to medium sand, maximum spread of oil as a free phase is estimated to be less than 700 feet for the Area Study spill. This value also assumes a ratio of length to width of 10:1. For the project and making similar assumptions, spill travel distance would be about 130 feet.

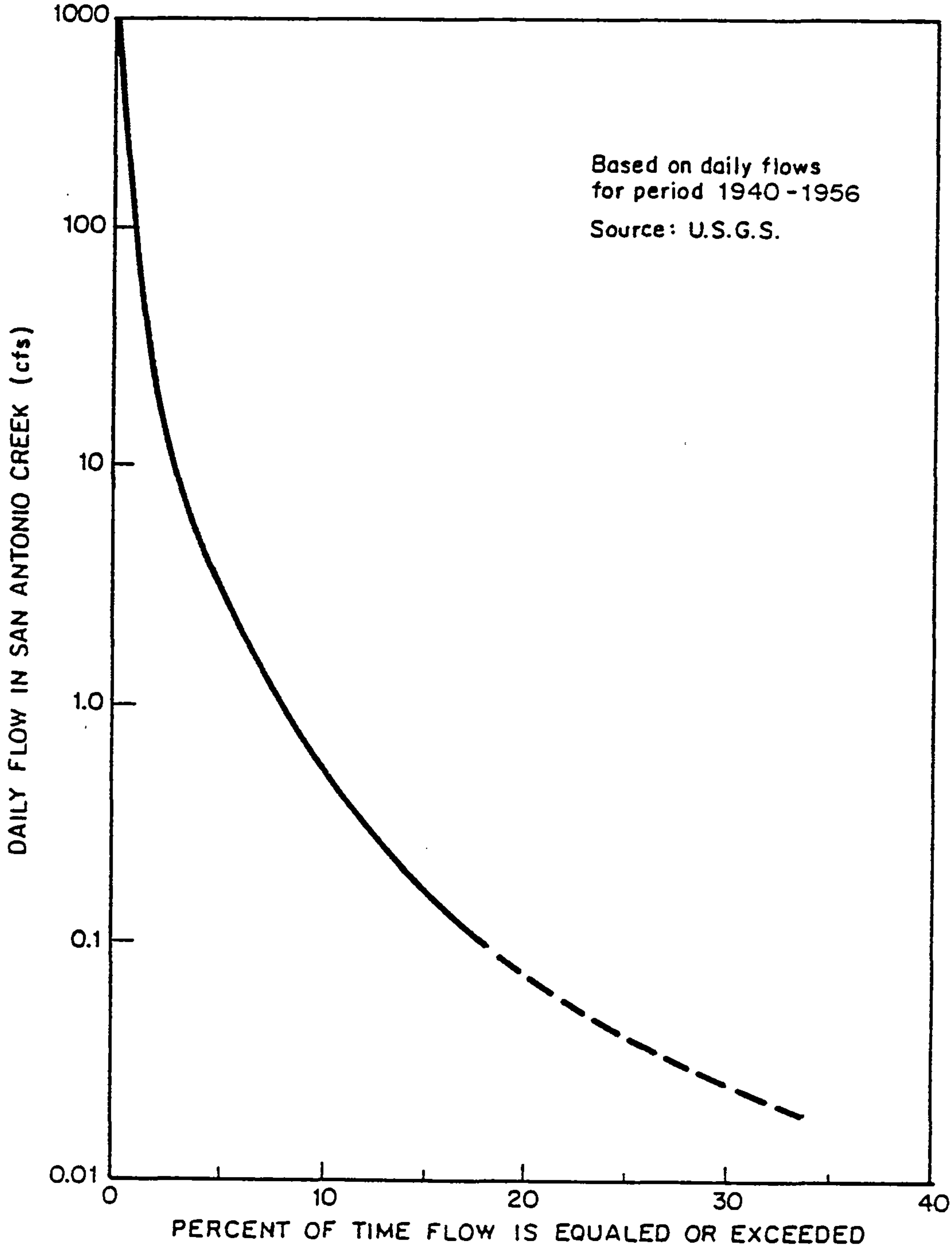


FIGURE 10.1-7 **FLOW-DURATION CURVE FOR SAN ANTONIO CREEK, HARRIS STATION**

Orcutt Pump Station Realignment

This minor realignment does avoid the crossing of four drainages and two drainages would be crossed at different sites than for the proposed route. This realignment would eliminate the potential for impacts from construction and possible oil spills at these drainages and reduce the possibility that Orcutt Creek would be adversely affected by sedimentation and oil spill effects.

10.1.4 Terrestrial and Freshwater Biology

10.1.4.1 Northern Mitigated Pipeline Route #1

INTRODUCTION

This section discusses: (1) existing conditions along Northern Mitigated Pipeline Route #1 where these differ from those described for this part of the proposed route in Section 4.1.1.1 of Technical Appendix F and (2) potential impacts associated with the realignments, valves and containment basins. Northern Mitigated Pipeline Route #1 is shown in Figure 10.1-1.

EXISTING CONDITIONS

Vegetation

The vegetation types crossed by Northern Mitigated Pipeline Route #1 are the same as those crossed by the proposed route from landfall to Santa Lucia Canyon. They include Coastal Strand, Coastal Scrub, Annual Grassland, Coastal Dune Scrub, Coast Live Oak Woodland, Burton Mesa Chaparral, Riparian Woodland and Freshwater Marsh. These vegetation types are described in Sections 2.1 and 4.1.1.0 of Technical Appendix F. The realigned segments cross larger areas of Coastal Scrub and smaller areas of Annual Grassland compared to the proposed route. A comparison of acres of vegetation found within the rights-of-way of the proposed route and Northern Mitigated Pipeline Route #1 is given below under Impacts and Mitigations.

Wildlife

Wildlife habitat types along or near Northern Mitigated Pipeline Route #1 include coastal beach and foredune, coastal scrub, grassland, chaparral, oak woodland, coastal salt marsh, riparian woodland, freshwater marsh, agricultural and other modified habitats. A detailed description of the distribution of these habitats within the Study Region and some of the characteristic wildlife species found in them is presented in Section 2.2 of Technical Appendix F. Detailed information concerning Northern Mitigated Pipeline Route #1 follows.

Along the north side of the Santa Ynez River mouth, the pipeline route has been realigned to the north side of Terra Road, decreasing the width of the right-of-way and the area of wildlife habitat that would be removed. This segment passes through grassland and coastal scrub habitats which support relatively abundant and widespread wildlife species as well as a number of raptors, such as Northern Harrier, Black-shouldered Kite, Red-tailed Hawk and

American Kestrel. The most significant bird species utilizing these habitats on a regular basis are foraging Northern Harriers, which nest in the Santa Ynez River mouth area, and possibly, migrant or wintering Burrowing Owls in the more open, grassy sections.

The Santa Ynez River estuary downslope from this segment is a very rich area supporting large numbers of grebes, cormorants, herons, waterfowl, shorebirds, gulls and terns (see Section 2.5.2 of Technical Appendix F.)

Further inland the pipeline route crosses agricultural fields near 13th Street. These areas do not regularly support any wildlife species of concern with the exception of foraging Northern Harriers.

East of the water treatment plant (east of 13th Street) the pipeline corridor passes near a regionally sensitive willow-dominated riparian woodland. Field censuses in April 1985 determined that these riparian woodlands support a rich assemblage of species, including regionally declining birds such as Tree Swallow, Warbling Vireo, Yellow Warbler, and Wilson's Warbler, all of which breed here. It is also likely that Swainson's Thrush, Yellow-breasted Chat, and, possibly, Blue Grosbeak, nest in these riparian woodlands. Further late spring censuses would be needed to verify the present status of these three riparian dependent nesting bird species.

Much of the remainder of this route crosses oak woodland, coastal scrub, chaparral and grassland habitats which have been affected by fuel management and grazing activities. Just east of Oak Canyon the pipeline route enters and follows for more than two miles an existing cleared firebreak, minimizing disturbance to wildlife.

Aside from the regionally sensitive riparian woodlands along the Santa Ynez River, the habitats crossed by Northern Mitigated Pipeline Route #1 support relatively numerous and widespread species such as: Pacific Treefrog, Western Fence Lizard, Southern Alligator Lizard, Side-blotched Lizard, Gopher Snake, Common Kingsnake, Western Rattlesnake, Botta's Pocket Gopher, California Vole, Dusky-footed Woodrat, Deer Mouse, Desert Cottontail, Black-tailed Jackrabbit, California Ground Squirrel, Coyote, Badger, Raccoon, Mule Deer, Red-tailed Hawk, American Kestrel, California Quail, Anna's Hummingbird, Common Flicker, Scrub Jay, Bushtit, House and Bewick's Wrens, California Thrasher, Yellow-rumped Warbler (winter only), Rufous-sided and Brown towhees, White-crowned Sparrow (winter only), Brewer's Blackbird, Western Meadowlark, House Finch and Lesser Goldfinch (See Sections 2.2.2-2.2.5 and Appendix 1-3 of Technical Appendix F).

Although the only regionally rare wildlife habitat present near Northern Mitigated Pipeline Route #1 is the willow-dominated Riparian woodlands situated along the northern edge of the Santa Ynez River west of 13th Street there are a number of regionally rare wildlife habitats downslope from this route. These include the extensive riparian woodlands, salt and freshwater marshes and vernal wetlands of the Santa Ynez River estuary. These habitats have the potential of harboring a number of regionally sensitive wildlife species (see Sections 2.2, 2.4.2.0, 2.4.2.1, and 2.5.2.0 of Technical Appendix F).

Aquatic Habitats and Biota

Aquatic habitats crossed by and located in the vicinity of the Northern Mitigated Pipeline Route are the same as those of the proposed route. They include those of the drainages of Oak Canyon, Santa Lucia Canyon and the Santa Ynez River and estuary. These habitats and their biotas are discussed in Section 4.1.1.0 of Technical Appendix F. This route is within the 100-year floodplain of the Santa Ynez River for about one mile in the vicinity of its intersection with 13th Street.

Areas and Species of Special Importance

In addition to the areas and species of special importance discussed in Section 4.1.1.0 of Technical Appendix F, spring surveys have confirmed the presence of several additional species of importance.

Black-flowered Figwort, a federal candidate plant tentatively identified during fall surveys, occurs in scattered sites in Coastal Sage Scrub and Coastal Dune Scrub. Colonies of Annual Curly-leaved Monardella (listed by the California Native Plant Society) were located in open flats in Burton Mesa Chaparral in the vicinity of Oak Canyon.

Several regionally rare and declining birds were found during spring surveys to breed along the Santa Ynez River and near the estuary. A nesting pair of Black-shouldered Kites was sighted near the mouth of the Santa Ynez River. Breeding birds located along the Santa Ynez River from the estuary upstream to Oak Canyon include: Tree Swallow, Swainson's Thrush, Warbling Vireo, Yellow Warbler, Wilson's Warbler and Yellow-breasted Chat. A California Least Tern (federally- and state-listed as endangered) was sighted at the mouth of the Santa Ynez River.

IMPACTS AND MITIGATIONS

Northern Mitigated Pipeline Route #1 is approximately 7.3 miles long and construction along this route would result in the partial or complete removal of about 66 acres of vegetation and wildlife habitat, of which 56 percent (37 acres) is composed of native types (see Table 10.1.4-1). These figures assume a right-of-way width of 50 feet for the section of the route on the north edge of Terra Road and 100 feet elsewhere. Removal of Coastal Strand, Coastal Scrub, Riparian Woodland and Freshwater Marsh habitats constitutes locally to regionally significant, Class II impacts. Removal of Burton Mesa Chaparral and Coast Live Oak Woodland is considered Class I, locally significant. Other construction-related impacts for this section of pipeline route would not differ substantially from those discussed in Technical Appendix F.

Union Oil Company has proposed, in addition to realigning portions of the proposed route, to construct a series of containment basins and add three block valves and three check valves between landfall and Oak Canyon as a means of reducing the likelihood of oil spill impacts to sensitive habitats and species of the Santa Ynez River and estuary. The effects of these mitigations have been analyzed with special emphasis given to the California Least Tern, a

Table 10.1.4-1

COMPARISON OF ESTIMATES OF VEGETATION/LAND COVER TYPES (ACRES) WITHIN RIGHTS-OF-WAY OF THE NORTHERN (#1) AND SOUTHERN MITIGATED PIPELINE ROUTES

Vegetation/Land Cover Types (in acres)	1. Northern Mitigated Pipeline Route #1	2. Southern Mitigated Pipeline Route
Coastal Strand	0.8	2.3
Coastal Scrub	19.8	16.2
Burton Mesa Chaparral (with scattered oak trees)	1.8	2.3
Coast Live Oak Woodland	1.6	0.0
Riparian Woodland	0.2	0.9
Freshwater Marsh	0.2	0.1
Annual Grassland	12.7	1.1
Agricultural Land	8.5	59.7
Cleared/unvegetated	19.8	0.0
Planted trees/ruderal	0.0	11.5
Roads/railroad tracks	1.4	0.9
Totals	66.0	95.0
Percent Native Vegetation	56.0	24.0
Percent Other Land Cover	44.0	76.0
Length of Route (in miles)	7.3	9.1

Source:
1. Determined from measurements of field-checked vegetation strip maps provided with Union's application (October 1983). Assumes a 50-foot right-of-way adjacent to Terra road and a 100-foot right-of-way elsewhere.
2. Determined from measurements of field-checked vegetation strip maps provided with Union's application (October 1983) and field-checked analysis of vegetation/land cover types as shown in color air photographs (scale approx. 1:24,000) flown 29 March 1983. Assumes a 50-foot right-of way adjacent to Central Avenue and a 100-foot right-of-way elsewhere.

federal- and state-listed endangered species. The results of this analysis are that onshore oil spill impacts to Least Terns and other sensitive habitats and species of the Santa Ynez River and estuary should be considered Class II, regionally to locally significant, rather than Class I. The details of this analysis are presented below under Rare Species.

Rare Species

The classification of potential impacts from onshore oil spills has been changed for some rare species as a result of mitigations associated with Northern Mitigated Pipeline Route #1. These species are:

Tidewater goby - Class I, regionally significant changed to
Class II, regionally significant

Red-legged Frog - Class I, regionally significant changed to
Class II, regionally significant

Northern Harrier - Class II to Class I, regionally to locally significant
changed to Class II, locally significant

California Least Tern - Class I, regionally significant to
Class II, regionally significant

These changes in classification do not apply to potential impacts from offshore oil spills. Offshore oil spill classifications remain the same as those presented in Technical Appendix F and Section 5.6 of the EIS/EIR.

The following discussion presents details of the analysis on which the changes in classifications listed above are based.

Impacts to California Least Terns

Although Northern Mitigated Pipeline Route #1 passes within about 500 feet of the area used for nesting by Least Terns, noise and human presence associated with construction activities are not expected to affect these birds, since Union Oil Company has agreed, as a condition of the Coastal Commission's finding that the proposed pipeline route is consistent with the California Coastal Act, to construct this section of the pipeline between November and March, when terns are not present in the area. An additional mitigation required by the Coastal Commission is that accelerated erosion and sedimentation of the Santa Ynez River estuary be controlled so that estuarine species, including those used as a food source by Least Terns, will not be affected.

The potential for impacts to Least Terns from oil spills has been reevaluated with regard to Northern Mitigated Pipeline Route #1. Factors considered in this reevaluation include the new location of the pipeline route, the system of berms and containment basins, and the series of three check valves and three block valves proposed by Union Oil.

Northern Mitigated Pipeline Route #1 is located on the north edge of Terra Road in the vicinity of the Santa Ynez River estuary. This realignment moves the route closer to the estuary for some sections and further from the estuary in other sections, compared to the original preferred route. The location of the route on the north side of and adjacent to Terra Road would permit the road to be used for movement of construction machinery and would thus reduce the width of the right-of-way required for pipeline construction. Reducing this width would reduce the potential for accelerated erosion and sedimentation of the habitats of the Santa Ynez River estuary. An additional mitigation required by the Coastal Commission for a finding of consistency is: "All cut and fill areas along the pipeline route will be regraded to match the existing contours and revegetated with native plant species." A further suggestion is that all cleared areas, including berms and containment basins, be revegetated with native plant species. This measure would serve as an aid to erosion control and would help to maintain the physical integrity of the berms and basins. A maintenance and revegetation plan for the berms, basins and dikes should be prepared and reviewed prior to the start-up of the construction period.

Engineering drawings (see Figures 10.2, 10.3 and 10.4) and statistics provided by Union Oil show that most of the containment basins have been designed to hold substantially more oil than the static volume of the section of pipeline that could drain in the event of a break or leak in addition to the pumped oil that would flow from the western end of the break until the line is shut down or the block valves are activated. It is recommended that the capacity of those basins that would not accommodate substantially more than the maximum drained and pumped oil volume be increased. With this mitigation, the likelihood that spilled oil would reach the Santa Ynez River estuary is significantly reduced from that of the originally proposed pipeline route, providing that the berms and containment basins are maintained at the required height and capacity throughout the period of Union Oil and other Area Study production, estimated at 30 years.

Some of the berms and dikes would be constructed of dirt and these could be worn down over time as a result of natural erosive processes such as rainfall. Similar processes could cause the basins to fill in over the long term. Revegetation of the berms, dikes and basins would protect them from erosive forces and would not significantly alter their ability to function in the manner prescribed. It is recommended that Union develop a revegetation plan for this area that utilizes locally obtained native plant species. Also, it is suggested that Union Oil prepare a maintenance plan for the berms and containment basins to cover the life of the project, and that provisions be made for periodic monitoring of the condition of these structures by the staff of Vandenberg AFB's Environmental Planning Branch.

Potential impacts to Least Terns resulting from a leak in the gas line are not considered to be different from those discussed in Technical Appendix F.

10.1.4.2 Northern Mitigated Pipeline Route #2

INTRODUCTION

Northern Mitigated Pipeline Route #2 (NMPR #2) consists of a realigned section of Northern Mitigated Pipeline Route #1. This realigned section is located near landfall and is about 1 mile long. The realignment would move the route to the north and upslope about 500 to 1,000 feet from the present location of Terra Road. NMPR #2 is shown in Figure 10.1. Field studies were conducted on this realignment in June of 1985. This section discusses existing conditions based on field surveys and examination of color air photographs (scale approximately 1:24,000) and impacts and mitigations for Northern Mitigated Pipeline Route #2.

EXISTING CONDITIONS

The vegetation of NMPR #2 consists of Annual Grassland and Coastal Scrub communities. Annual Grassland predominates toward landfall, with Coastal Scrub more abundant inland, especially in the vicinity of the Surf Bridge. These communities are similar in species composition to those described for the proposed pipeline route in Section 4.1.1.0 of Technical Appendix F. One distinguishing feature of NMPR #2 is that introduced Ice Plant forms a dominant component of the vegetation along much of the realignment, especially towards landfall. No state- or federally-listed or candidate threatened or endangered plant species were found along this route, nor were any regionally endemic plant species found here.

Wildlife habitat types crossed by NMPR #2 include grassland and Coastal Scrub. The species found here are expected to be similar to the relatively abundant and widespread species found in similar habitats along Northern Mitigated Pipeline Route #1, described in Section 10.1.4.1. No state- or federally-listed or candidate threatened or endangered wildlife species are expected along this route. The regionally rare Northern Harrier and Black-shouldered Kite nest in the vicinity of the Santa Ynez River estuary and probably forage occasionally in the area crossed by NMPR #2. The habitats along NMPR #2 are of the type utilized by the regionally rare Burrowing Owl, which has been seen on Vandenberg AFB, although not in the vicinity of NMPR #2. The regionally rare Badger wasd located along NMPR #2 during June, 1985 field surveys.

No aquatic habitats are crossed by NMPR #2.

IMPACTS AND MITIGATIONS

Northern Mitigated Pipeline Route #2 is a realignment that would move the pipeline route approximately 800 feet further north from the nesting area of the federally-listed as endangered California Least Tern and other sensitive habitats and species of the Santa Ynez River mouth. This would substantially reduce the likelihood that either accelerated erosion or sedimentation from construction, or oil from onshore pipeline leaks or spills, would affect the Santa Ynez River estuary. As a condition of using NMPR #2, Vandenberg AFB will require that Terra Road be relocated upslope to follow the pipeline route and that the existing Terra Road be removed, recontoured and revegetated with locally obtained native plants. This action would reduce noise and human presence in the vicinity of the estuary below existing levels and would restore native plant communities and wildlife habitat in areas that currently do not support them. Both of these are regarded as Class IV (beneficial) impacts. The relocation of Terra Road would allow inspection of this section of the route by vehicle using an established roadway.

Construction of the pipeline using NMPR #2 would require the use of a 100-foot wide right-of-way, compared to the 50-foot right-of-way that would be required for this section of Northern Mitigated Pipeline Route #1. Therefore, twice as much vegetation and wildlife habitat would be removed for a given length of route. However, Northern Mitigated Pipeline Route #2 is slightly shorter than Northern Mitigated Pipeline Route #1, so the total acreage removed would be somewhat less than twice that required for the comparable section of Northern Mitigated Pipeline Route #1. There would be no changes in the number of drainages crossed as a result of using NMPR #2.

Block valves, berms and containment basins would be installed along NMPR #2, although no site-specific plans have been presented showing their locations or capacities.

Use of NMPR #2 also would reduce the likelihood of impacts to sensitive species from a toxic gas leak in the vicinity of the Santa Ynez River estuary.

No impact classifications would change from those discussed for Northern Mitigated Pipeline Route #1 (see Section 10.1.4.1).

Additional potential mitigations include the same actions as those suggested for Northern Mitigated Pipeline Route #1. These include conditions required by the Coastal Commission's finding of consistency and the development of a berm and basin maintenance plan and a revegetation plan prior to the commencement of construction. It is also proposed that the possible need to install monitors for hydrogen sulfide be anticipated and that junction boxes and communication links be installed at appropriate locations during pipeline construction. Installation of sensing devices would be required only in the event that the gas turns sour.

Loss of individual Badgers can be mitigated by trapping Badgers whose burrows are located within the pipeline right-of-way prior to the commencement of construction and releasing the trapped animals in similar habitat that currently lacks Badgers. Trapping should be carried out by California Department of Fish and Game mammal trappers.

10.1.4.3 Southern Mitigated Pipeline Route

INTRODUCTION

The Southern Mitigated Pipeline Route was developed by consulting biologists and staff of Arthur D. Little as a means of mitigating potential impacts from construction and oil spills that could result from installation and operation of the onshore pipeline. It is identical to part of the Mitigating Realignment discussed in Section 6.2.1.1 and shown in Figure 6.1 of Technical Appendix F. The Southern Mitigated Pipeline Route is shown in Figure 10.1-1 of this section.

This section discusses (1) existing conditions along the Southern Mitigated Pipeline Route where this route differs from the alternate pipeline route and (2) potential impacts associated with the Southern Mitigated Pipeline Route.

EXISTING CONDITIONS

Vegetation

Vegetation and land cover types crossed by this route include Coastal Strand, Coastal Scrub, agricultural land, Annual Grassland, Freshwater Marsh, Riparian Woodland, Burton Mesa Chaparral, planted trees and ruderal vegetation. These types are described for the Study Region in Section 2.1 of Technical Appendix F.

Section I: Landfall to Agricultural Field

From landfall one-half mile south of the Santa Ynez River mouth this route proceeds east across a low hill for just over a mile to a large agricultural field south of Highway 246. The route ascends the gradual west-facing slope of the hill, which crests at about 210 feet elevation, then descends the steeper east-facing slope. A utility pole line crosses the hill and field to the east near the Southern Mitigated Pipeline Route.

Near landfall this route passes through Coastal Strand dominated by Red and Yellow Sand Verbenas, Beachbur and Sea Rocket on dunes toward the ocean. The inland dunes here have been heavily disturbed by activities associated with the installation and maintenance of the Southern Pacific Railroad tracks and Surf Station. Weedy species such as Ice Plant, Crystalline Ice Plant, European Beach Grass and Sickle Grass dominate the inland dunes.

To the east the route passes through Coastal Bluff Scrub and then Coastal Dune Scrub as it ascends the small hill. Coastal Bluff Scrub at the base of the hill is dominated by Coast Goldenbush, Giant Coreopsis and Coyote Brush. Black-flowered Figwort (a federal candidate species) is scattered within this vegetation.

Coastal Dune Scrub gradually replaces Coastal Bluff Scrub on the higher part of the slope. The former is dominated by low shrubs of Coastal Bush Lupine, Mock Heather, California Sagebrush and Seacliff Buckwheat. Many native annual herbs are found in the understory, including Small-fruited Seaside Amsinckia (*Amsinckia spectabilis* var. *microcarpa*, a regional endemic), two species of spineflower (*Chorizanthe diffusa* and *C. angustifolia*, the latter a regional endemic), Sky Lupine (*Lupinus nanus*) and Coastal Phacelia (*Phacelia ramosissima*). Black-flowered Figwort is scattered throughout this vegetation. The vegetation of the west-facing slope is largely undisturbed.

Near the hilltop a few young individuals of Surf Thistle (a federal candidate species) were found growing near the base of a utility pole (outside of the pipeline right-of-way). Weedy species such as Rip-gut Grass, Foxtail Fescue, Wild Radish and Tumble Mustard (*Brassica geniculata*) are abundant along the pole line maintenance road and in other disturbed areas.

The crest of the hill forms a broad knoll of clay soil covered in part with Annual Grassland. Common species include Wild Oats, Soft Chess and Yellow Bur-clover. Small depressions where water accumulates include species characteristic of moist areas, such as rushes (*Juncus* spp.), Brass Buttons (*Cotula coronopifolia*) and Blue-eyed Grass (*Sisyrinchium bellum*). Native herbs found in this grassland include Goldfields (*Lasthenia chrysostoma*) and Brodiaea (*Dichelostemma pulchellum*).

The vegetation of the east-facing slope is disturbed, with greater disturbance toward the bottom of the slope. Annual grassland with scattered shrubs of Coastal Dune Scrub species dominates this slope. At the base of this slope Black-flowered Figwort plants are scattered among the shrubs.

Section II: Agricultural Field to Junction with Alternate Pipeline Route

The Southern Mitigated Pipeline Route traverses a plowed but presently unplanted agricultural field south of Highway 246. At the eastern end of the field this route turns north and crosses a flood control ditch (an extension of Drainage 2-1) dominated by California Tule and containing a few Arroyo Willows. On the raised banks of the ditch are shrubs of gooseberry (*Ribes* sp.) and Coyote Brush with Black-flowered Figwort plants growing among them.

The route continues north across Highway 246 and the Southern Pacific Railroad tracks into a field that appears to have been cultivated in the past. The vegetation of this field at present consists of a mixture of Annual Grassland and Coastal Dune Scrub species, including Rip-gut Grass, Wild Radish, Wild Rye and Coyote Brush. In this field the route turns southeast and extends through similar vegetation for about two-tenths of a mile. The route continues southeast through scattered stands of Arroyo Willow, then crosses an agricultural field planted with barley just west of 13th Street. Southeast of 13th Street this route crosses agricultural fields to a point about half a mile west of Union Sugar Avenue where it joins the alternate pipeline route.

Section III: Junction with Alternate Pipeline Route to Santa Lucia Canyon

From the junction with the alternate pipeline route to the north side of the Santa Ynez River the Southern Mitigated Pipeline Route is identical to the alternate pipeline route to Site #4. The vegetation of this segment of the route is discussed in Section 4.1.1.2 of Technical Appendix F.

North of the Santa Ynez River this route trends northwest on the west side of and parallel to Santa Lucia Canyon Road,then north on the east side of and parallel to Santa Lucia Canyon Road until it intersects the proposed pipeline route to Site #4 on Union Fee property. For most of this section the route crosses Lompoc Federal Correctional Institution property and therefore was not accessible on foot during field surveys.

On the north side of the Santa Ynez River this route parallels the road on the west side and passes through mowed ruderal vegetation and patches of Ice Plant. To the north, the road is lined with Blue Gum (Eucalyptus globulus) trees. (If the edge of the road is considered to be the border of the right-of-way, then these trees would be located within the right-of-way. If the route were shifted about 20 feet to the west these trees would be avoided.) Near the main entrance to the Lompoc FCI the route crosses landscaped grounds with grass and scattered trees. The route crosses Santa Lucia Canyon Road near Oakridge Road and continues northwest on the east side of the road. For a short distance the route passes through landscaped vegetation. About one-tenth mile north of the landscaped area the route curves and proceeds due north. From this point north to the northern boundary of the Lompoc FCI the vegetation of the pipeline route is composed of Burton Mesa Chaparral that has been mowed at frequent intervals for fire safety. Some chaparral shrubs and Coast Live Oak trees remain and are within the pipeline route right-of-way. The vegetation of this roadside area includes various weedy grasses and herbs.

This route continues north on the east side of Santa Lucia Canyon Road onto Union Fee property. The vegetation here is a mixture of grassland and Burton Mesa Chaparral species with some planted eucalyptus trees. The trees are located outside of the pipeline right-of-way. Grassland areas contain a diverse assemblage of native annual and perennial herbs as well as a variety of introduced weedy species. Native species found here include Scarlet Bugler (Penstemon centranthifolius), White Layia (Layia glandulosa), Blochman's Larkspur (Delphinium parryi ssp. blochmaniae, a regional endemic), California Spineflower (Chorizanthe californica) and Purple Owl's Clover (Orthocarpus purpurascens). Common introduced species include Rip-gut Grass and Broad-leaf Filaree (Erodium botrys). North of this area the Southern Mitigated Pipeline Route reaches the proposed route to Site #4.

Wildlife

Wildlife habitat types along or near the Southern Mitigated Pipeline Route include: coastal beach and foredune, coastal scrub, chaparral, oak woodland, grassland, freshwater marsh, riparian woodland, agricultural and other modified habitats. Detailed descriptions of the distribution of these habitats within the Study Region and their characteristic wildlife species can be found in Section 2.2 of Technical Appendix F. Detailed information concerning the Southern Mitigated Pipeline Route follows.

After crossing Highway 246 near Surf the pipeline route follows for about 0.5 mile an existing utility line corridor. This portion of the route passes through coastal dune scrub and scattered grasslands. These habitats do not regularly support any rare species of wildlife. Some of the more common breeding birds include: Red-tailed Hawk, American Kestrel, Anna's and Costa's Hummingbirds, Bewick's Wren, California Thrasher, Wrentit, Brown Towhee, Song Sparrow, White-crowned Sparrow, and House Finch. This area does provide important foraging habitat for a number of raptors such as Red-tailed Hawk, American Kestrel, and the regionally rare Black-shouldered Kite and Northern Harrier. The most common reptiles observed or expected are Western Fence Lizard, Side-blotched Lizard, Gopher Snake, and Western Rattlesnake. Common land mammals include the Deer Mouse, Heermann's Kangaroo Rat, Botta's Pocket Gopher and Coyote. The Badger is the only regionally rare wildlife species observed along this portion of the route.

To the east, the route crosses an agricultural field south of Highway 246. Such a habitat is virtually devoid of reptiles, amphibians and land mammals. A number of widespread bird species like the Red-tailed Hawk, American Kestrel, Cliff and Barn swallows, Common Crow, Eurasian Starling, Red-winged and Brewer's blackbirds, Western Meadowlark, House Finch, and Lesser and American goldfinches are expected to use this modified habitat. The regionally rare Northern Harrier may forage in this habitat, however, this species is more common in areas closer to the Santa Ynez River mouth.

Of more interest to wildlife is the flood control channel that is an extension of Drainage 2-1 with an extensive growth of tules that is located between Highway 246 and the agricultural field. This channel is of sufficient size and quality to support the regionally rare Red-legged Frog. Field censuses during April 1985 failed to locate Red-legged Frogs at the point where the pipeline would cross this drainage. A number of fairly common breeding birds, such as American Coot, Cliff and Barn swallows, Marsh Wren, Common Yellowthroat, Song Sparrow, Red-winged Blackbird, and House Finch, were observed or expected in the tules that fill this channel. These tules may also support breeding Virginia Rails and migrant or wintering American Bitterns.

North of Highway 246 the pipeline passes through a roadside ditch that contains a small stand of recently trimmed willows. These willows are not expected to support any regionally rare riparian-dependent nesting birds. The realigned route then crosses the railroad tracks and enters a large open field dominated by Coyote Brush and grasses. From here the pipeline route parallels Highway 246 until it crosses 13th Street where it begins to diverge east across agricultural fields. About 0.5 mile west of Union Sugar Avenue the mitigated pipeline route joins the alternate route. From this point to the north side of the Santa Ynez River the Southern Mitigated Pipeline Route is the same as the alternate route to Site #4.

The habitats located along this segment of the pipeline route and along Central and Floradale Avenues support no rare wildlife species except the Red-legged Frog. A survey in late April 1985 located Red-legged Frogs in a small cattail marsh (Drainage 2-3) situated along Central Avenue 0.3 miles east of its junction with Artesia Avenue.

Characteristic bird species found in the agricultural fields along this segment include those listed above for agricultural fields as well as Killdeer, Horned Lark, Water Pipit (winter only), and White-crowned Sparrow (winter only). In general, agricultural fields are frequented by a relatively large number of birds (see Section 2.2 of Technical Appendix F) and, with the exception of foraging raptor species, most species are relatively numerous and widespread. Black-shouldered Kites are known to use this area regularly for hunting but are not expected to nest here.

North of the Santa Ynez River crossing this route follows Santa Lucia Canyon Road through the Lompoc Federal Correctional Institution and joins the proposed route to Site #4 at the latter's intersection with Santa Lucia Canyon Road.

The mitigated route along Santa Lucia Canyon Road from the Santa Ynez River crossing to its junction with the proposed route to Site 4 is an area largely characterized by planted eucalyptus, mowed grassland, and roadside iceplant. These disturbed habitats are frequented by relatively common widespread species such as Western Fence Lizard, Southern Alligator Lizard, Gopher Snake, Botta's Pocket Gopher, California Ground Squirrel, California Vole, Skunks, Coyote, Killdeer, Savannah Sparrow, Horned Lark, Western Meadowlark, Eurasian Starling, Red-winged and Brewer's blackbirds, Common Crow, and House Finch. Breeding Cassin's Kingbirds are the only species of local interest which are expected here.

Aquatic Habitats and Biota

Drainages crossed by the Southern Mitigated Pipeline Route are the same as those crossed by the alternate route from landfall to Santa Lucia Canyon. These are discussed in Section 4.1.1.2 of Technical Appendix F. One major difference between these routes is that the alternate route crosses salt marsh habitat on the border of the Santa Ynez River estuary, while the Southern Mitigated Pipeline Route is located further to the south, no closer than one-forth mile to the edge of the estuary, and is separated from it by intervening roads and topographic features. The Southern Mitigated Pipeline Route passes through the southern part of the 100-year floodplain of the Santa Ynez River for a distance of about seven miles from the agricultural field east of landfall to the north side of the Santa Ynez River.

Spring sampling for this project included sampling the fauna of the Santa Ynez River at the Floradale Avenue bridge. The stream was found to support a depauperate fauna consisting of a few species that are characteristic of shallow warm water stream habitats. The low number of species found is probably a result of high water temperatures and possibly eutrophic conditions that are a result of the influence of the Lompoc Sewage Treatment Plant, which is located directly upstream from this site.

Areas and Species of Special Importance

The Southern Mitigated Pipeline Route crosses a small area of disturbed Coastal Strand vegetation near landfall and a small area of disturbed Burton Mesa Chaparral near its intersection with the proposed route. It crosses Riparian Woodland at the Santa Ynez River and two small disturbed Freshwater Marsh habitats, one along Central Avenue and one in a flood control ditch.

Recent field surveys of those sections of the Southern Mitigated Pipeline Route that differ from the alternate route and spring surveys for rare plants, birds and amphibians located several species of concern along or near this route.

Three plant species that are federal candidates for listing were found within or near the right-of-way. Black-flowered Figwort is scattered to locally common in Coastal Dune Scrub vegetation within the right-of-way on the hill east of the dunes and on the border of the flood control ditch (an extension of Drainage 2-1) at the east end of the agricultural field south of Highway 246. Surf Thistle (two immature individuals) was found at the base of a utility pole on the crest of the hill east of the dunes. These plants are outside of the right-of-way. Shagbark Manzanita grows in disturbed Burton Mesa Chaparral along Santa Lucia Canyon Road within the pipeline right-of-way.

The regionally rare Red-legged Frog was found during an April census in a small cattail marsh (Drainage 2-3) along Central Avenue, 0.3 mile east of its intersection with Artesia Avenue.

Several regionally rare birds were found to be breeding in Riparian Woodland habitats along the Santa Ynez River in the vicinity of the Floradale Avenue bridge. A pair of Black-shouldered Kites and one to several pairs of Swainson's Thrushes, Warbling Vireos, Yellow Warblers and Wilson's Warblers were located during spring surveys. Black-shouldered Kites and Northern Harriers are expected to forage occasionally within the agricultural fields and grasslands along this route.

IMPACTS AND MITIGATIONS

The Southern Mitigated Pipeline Route is about 9.1 miles long and construction along this route would result in the partial or complete removal of about 95 acres of vegetation and wildlife habitat, of which 24 percent (23 acres) is composed of native types (see Table 10.1.4-1). These figures assume a right-of-way width of 100 feet, except along Central Avenue, where the width was assumed to be 50 feet. Removal of Coastal Strand, Coastal Scrub, Riparian Woodland and Freshwater Marsh habitats constitutes locally to regionally significant Class II impacts. Removal of Burton Mesa Chaparral is considered to be a Class I, locally significant impact. Within the right-of-way there are 426 trees, including 276 oak stems and 96 eucalyptus trees. All of the eucalyptus and some of the oak stems could be avoided by minor realignments or by narrowing the corridor for a short distance along Santa Lucia Canyon Road. Construction of the pipeline using this route would not affect the habitats and species of the Santa Ynez River estuary. Other construction-related impacts to wildlife from noise and human presence would be similar to those discussed in Technical Appendix F.

Oil spill impacts for this route are considered Class II, locally to regionally significant, depending upon the size of the spill. For the alternate pipeline route, which passes through the border of the Santa Ynez River estuary, oil spill impacts are considered Class I, locally to regionally significant. Mitigating features that have been proposed for the Southern Mitigated Pipeline Route to reduce the likelihood of oil spill impacts include the use of block and check valves, burying the pipeline deeper (5 to 10 feet) within high-risk portions of the 100 year floodplain and several alternate methods of crossing the Santa Ynez River at the Floradale Avenue bridge. The effects of these mitigations were analyzed with special emphasis given to the California Least Tern, a federal- and state-listed endangered species. The details of this analysis are presented below under Rare Species.

Rare Species

Compared with the original Southern Alternative Pipeline Route, the Southern Mitigated Pipeline Route would affect fewer rare species. No Class I impacts to rare species are anticipated if the Southern Mitigated Pipeline Route is used with the mitigating features discussed above. Rare species potentially affected by this route include:

Black-flowered Figwort

Construction - Class II, locally significant
Oil spills - Class II, locally significant

Shagbark Manzanita

Construction - Class II, locally significant
Oil spills - Class II, locally significant

Red-legged Frog

Construction - Class II, locally significant
Oil spills - Class II, locally significant

Tidewater goby

Construction - Class II, locally to regionally significant
Oil spills - Class II, locally to regionally significant

Black-shouldered Kite

Construction - Class II, locally significant

California Least Tern

Oil spills - Class II, locally to regionally significant

Swainson's Thrush

Construction - Class II, locally significant

Warbling Vireo

Construction - Class II, locally significant

Yellow Warbler

Construction - Class II, locally significant

Wilson's Warbler

Construction - Class II, locally significant

The following discussion presents details of the analysis on which the above impact classifications are partly based.

Impacts to California Least Terns

The California Least Tern is a federally- and state-listed endangered species that nests and feeds in the Santa Ynez River estuary. An important post-breeding dispersal site is located at the mouth of the estuary.

Construction of the pipeline using the Southern Mitigated Pipeline Route would not result in adverse impacts to Least Terns because the route passes no closer than one-half mile to the area used by the terns.

The possibility that Least Terns could be affected by oil spills from the Southern Mitigated Pipeline Route has been investigated. Questions have been raised since (1) the Southern Mitigated Pipeline Route passes through the southern part of the 100-year floodplain of the Santa Ynez River and (2) this route crosses the Santa Ynez River at the Floradale Avenue bridge.

The route passes through the southern part of the 100-year floodplain for most of its length from a point approximately one mile east of landfall to the north side of the Santa Ynez River. During the 1969 flood, which was considered to be a 50-year flood, most of this area was under water and scouring to a depth of about eight feet occurred in some sites. This indicates that there is a possibility that under worst-case conditions a severe flood could result in a major rupture of the pipeline. If this were to occur without warning and without any preventative measures being taken, pumped oil would spill from the western end of the break at a rate of from 14 barrels per minute (Union's production) to 70 barrels per minute (maximum Area Study production) until the line were shut down. Shutdown can be accomplished within ten minutes or less of determination that a break has occurred, and monitoring equipment at the Lompoc Dehydration Facility would be capable of detecting a major break within a few minutes. In addition to oil pumped out of the line, some oil could drain from the section east of the break. The amount that would drain would depend upon local topography and the location of the break relative to the nearest valve. Since this area of the floodplain is more or less flat and a block valve would be located on the south side of the Santa Ynez River crossing site, it is unlikely that oil would drain from this section of pipeline.

Preventative measures could be taken that would reduce the likelihood of a flood-caused oil spill. Burying the pipeline at a depth greater than the proposed three-foot depth would decrease the likelihood that the line would be exposed as a result of scour by flood waters.

The probability of a rupture of the pipeline as a result of flooding is unknown, however, the probability of a 100-year flood is 1 percent per year and of a 50-year flood, 2 percent per year.

Another factor to be considered is that Least Terns are present in the vicinity of the Santa Ynez River estuary from late April to early September, whereas over 95 percent of annual rainfall occurs from the beginning of November until the end of April. It is therefore unlikely that terns would be present during flood conditions. However, if large amounts of oil were to be deposited in the estuary during a flood, this could result in subsequent effects on estuarine biota that could reduce the food supply available to terns during the following year.

Since the Southern Mitigated Pipeline Route crosses the Santa Ynez River at the Floradale Avenue bridge, the possibility of impacts to Least Terns from oil spilled as a result of a pipeline break at this point also has been considered. Three methods of crossing the river have been investigated: (1) trenching, (2) spanning and (3) a drilled crossing. These methods are discussed in detail in Section 10.1.1, Engineering Considerations. Construction using any of these three methods would not affect Least Terns, since the crossing site is more than five miles upstream from the area used by these birds. Oil spilled at the crossing site would affect Least Terns only if it were to travel five miles downstream to the estuary.

The calculated probability of an oil spill of 100 barrels or more for a 1-mile segment of the pipeline in the vicinity of the Santa Ynez River crossing is one chance in 2000 years; for a spill of 1000 barrels or more, it is one chance in 20,000 years. These probabilities are independent of the method used to cross the river. In addition to calculated probabilities, the following information is presented for consideration.

Trenching (burying the pipeline in an excavated ditch) or a drilled crossing would effectively eliminate the possibility of pipeline damage from vandalism or from vehicular accidents. Either of these methods could be used to place the pipeline deep enough (40 feet or more) so that scouring during flood conditions would not expose the pipeline. (The local environmental effects of construction associated with trenching would be significant, whereas those of a drilled crossing would be insignificant.) Spanning the river, either by suspending the pipeline from the bridge or from a separate suspension structure, would expose the pipeline to damage from vandalism, unless special means were taken to protect it. Suspending the pipeline from the bridge would expose it to damage from vehicular accidents. If a break in the pipeline occurred at the bridge, the largest spill that would be expected under worst-case conditions would be 350 barrels if valves are located on both sides of the river crossing. Without valves in these locations the spill could be larger.

On the basis of calculated probabilities and additional information presented above, it is considered unlikely that an oil spill at the Floradale Avenue bridge crossing would affect Least Terns five miles downstream. The potential effects to terns if oil were to reach the estuary are discussed in Technical Appendix F.

10.1.4.4 Proposed Pipeline Route From Santa Lucia Canyon to Site #4

INTRODUCTION

The Mitigating Realignment discussed in Section 6.2.1.1 of Technical Appendix F includes a section of about 2.7 miles located north of the crossing of Santa Lucia Canyon Road. Along this stretch the realignment would place the pipeline in an existing cleared firebreak on the eastern border of Vandenberg AFB. This firebreak is located adjacent to and just west of the proposed pipeline route. This section discusses existing conditions and impacts for this realigned segment based on additional field studies and analyses that were performed after the Draft EIS/EIR was issued.

EXISTING CONDITIONS

The firebreak is bordered to the east and west by Burton Mesa Chaparral for most of its length. Small areas of Oak Woodland and wetland vegetation associated with springs occur on the borders in a few sites. The firebreak is cleared on a regular, although not annual, basis so no large shrubs are present within it. The firebreak vegetation consists of a dense growth of annual and perennial grasses and herbaceous plants, including a variety of both native and introduced species. Young shrubs of some chaparral species are present as well. Common introduced species include Rip-gut Grass, Broad-leaf Filaree and Veldt Grass. Natives include Purple Owl's Clover, Small-flowered Lupine (Lupinus bicolor), White Layia, several species of spineflower, Fern Phacelia, Gilia (Gilia angelensis), Baby Blue-eyes (Nemophila menziesii) and San Luis Obispo Wallflower (Erysimum suffrutescens var. grandifolium), the latter a regional endemic and CNPS-listed species.

Two drainages (1-9 and 1-10) traverse the firebreak. These wetland habitats support plants characteristic of moist sites, including sedges, rushes and Common Monkeyflower (Mimulus guttatus).

The firebreak is used by wildlife species found in the adjacent Burton Mesa Chaparral. Characteristic birds include: California Quail, Greater Roadrunner, Anna's Hummingbird, Bewick's Wren, Wrentit, California Thrasher, Golden-crowned and White-crowned sparrows (winter only), Rufous-sided and Brown towhees, House Finch and Lesser Goldfinch. No rare wildlife or bird species are expected to occur within the firebreak. The drainages that cross the firebreak are not of sufficient size or quality to support significant aquatic faunas.

IMPACTS AND MITIGATIONS

The section of the proposed route that would be moved into the firebreak by this realignment is about 2.7 miles long. Use of this realignment would substantially reduce the amount of native vegetation and wildlife habitat that would be adversely affected by construction, compared to the amount affected if the proposed route were used. Using the firebreak would eliminate the need to remove about 32 acres of native vegetation, including about 27 acres of Burton Mesa Chaparral, three acres of Annual Grassland, one acre of Coastal Scrub and 0.6 acre of Coast Live Oak Woodland. No trees would need to be removed along this segment if the firebreak were used, compared to about 300 trees that would be removed if the proposed route were used. After construction the firebreak would be cleared of most vegetation, as it is under existing conditions.

10.1.4.5 Proposed Pipeline Route From Site #4 To Orcutt

SAN ANTONIO CREEK VICINITY REALIGNMENT

The Mitigating Realignment discussed in Section 6.2.1.1 of Technical Appendix F includes a segment about one mile long in the vicinity of the San Antonio Creek crossing. This realignment is shown in Figure 10.1-2. The proposed route is located to the west of Highway 1 in this area. The realignment would place the route several hundred feet east of Highway 1 so that the crossing of San Antonio Creek would be at a greater distance from Barka Slough and the Highway 1 bridge could be used as a support structure for a boom to be placed in the creekbed in the event of an oil spill.

The new crossing location of San Antonio Creek was examined during spring surveys to assess the condition of biological resources and determine if these would be adversely affected by the use of this area as a crossing site. At the mitigated crossing site San Antonio Creek appears to have been channelized or cleared of vegetation in the recent past. The vegetation is composed mainly of weedy species and low, shrubby willows and wildlife habitat quality is poor. This section of the creek receives runoff from nearby agricultural operations. Stream sampling during spring surveys revealed a depauperate fauna composed of very few species. The creek is dry through most of the year along this section. No rare species were noted, nor are any expected to occur, at or in the vicinity of the mitigated crossing site. The classification of impacts of construction would remain the same as presented in Technical Appendix F and Section 5.6 of the EIS/EIR. For vegetation these are considered Class III and for wildlife and aquatic habitats and species, Class III to Class II, regionally significant.

Additional mitigation presented by Union Oil Company for the San Antonio Creek to Harris Canyon drainage crossings include the use of thicker, factory-coated pipe and a special cathodic protection system. Union Oil Company has agreed to place block valves in locations recommended in the mitigation sections of Technical Appendix F and the EIS/EIR. Also, Union Oil has proposed a realignment that would eliminate the need for three crossings of the Harris Canyon drainage, a tributary to San Antonio Creek.

The additional realignment suggested by Union Oil is described in Section 10.1.1.3 and shown in Figure 10.1. This change would place the route in a cultivated vineyard adjacent to and on the east side of Highway 1 and Graciosa Road for a length of approximately 1 mile. This realignment would eliminate the potential for construction impacts at drainages 1-20, 1-21 and 1-22, and would reduce the likelihood that spilled oil from a pipeline leak or break along this section would reach San Antonio Creek and the sensitive habitats and species of Barka Slough.

Other impacts for this section of the route would not be significantly different from those previously discussed. No changes in impact classifications to sensitive species would occur as a result of the mitigations discussed above; since these are currently Class II, locally to regionally significant.

No additional field studies on the Union-proposed realignment are recommended, since the area crossed is a vineyard where no sensitive habitats or species are expected to occur. Also, this vineyard has been visually observed from Graciosa Road several times during previous field investigations.

The conclusion reached is that construction of the pipeline across San Antonio Creek at the mitigated crossing site would not affect significant biological resources, so long as construction is completed during the dry season and downstream sedimentation is controlled.

ORCUTT PUMP STATION REALIGNMENT

Introduction

This realignment would relocate a 2.1 mile segment of the proposed route that extends from the Divide Substation north to the vicinity of the Orcutt Pump Station. From the Divide Substation north to the point where the proposed route would cross Highway 135 (near its intersection with Highway 1 at Orcutt) the route would be moved to the east so that it passes from about 100 to about 600 feet east of Graciosa Road. North of the Highway 135 crossing site at Orcutt, the realignment would place the route about 400 feet west of the proposed route for a length of about 1000 feet.

Existing Conditions

The realigned route passes through Oak Savannah, dry-farmed agricultural land, grazed Annaul Grassland and Coastal Scrub vegetation and wildlife habitats. These communities and habitats are discussed for the Study Region in Sections 2.1 and 2.2 of Technical Appendix F. Descriptions of these habitats and communications as they occur along the realignment are included here.

From the Divide Substation north, the realigned route passes through Oak Savannah for about 0.5 mile. This vegetation consists of widely spaced Coast Live Oak trees (single-trunked) with an understory of grassland species. Typical grasses include Slender Wild Oat (Avena barbata), Soft Chess (Bromus mollis), Rip-gut Grass (Bromus diandrus) and fescue (Festuca sp.). Herbaceous plants include both native and introduced species, such as Bicolored Lupine (Lupinus bicolor), Filaree (Erodium botrys), Croton (Croton californicus) and Smooth Cat's Ear (Hypochoeris glabra). Several tree-sized Mexican Elderberry (Sambucus mexicana) plants occur along the realigned route in this area.

Grazed Annual Grassland with a few small patches of Coastal Dune Scrub is found along the mitigated route from the northern edge of a dry-farmed field north to the Highway 135 crossing site, a distance of about one mile. (The field is located just north of the Oak Savannah vegetation found north of the Divide Substation.) This grassland has been heavily grazed and was in a dormant condition during the time of the field survey (June, 1985). Grasses and herbs consist mainly of introduced species. Small areas of Coastal Dune Scrub found within the grassland are dominated by Mock Heather and Coyote Brush.

Several ephermal drainages pass through the grassland area north of the field. Clumps of grazed willows, an occasional Black Cottonwood (Populus trichocarpa) and several Coast Live Oak trees grow along the edges of the drainage channels. The mitigated route would cross one branch of one of these drainages (1-38). At the crossing site, the channel is entrenched about ten feet and the bed is more or less barren. The sides of the channel are relatively steep and there is evidence of recent erosion of the sandy banks. No riparian or other wetland plants occur at the crossing site. An existing oil pipeline crosses at this site; it is suspended without supports across the drainage.

North of the Highway 135 crossing the realignment passes through heavily grazed Coastal Sage Scrub dominated by Coyote Brush shrubs with an understory of grassland species, most of which are introduced annuals. In this area the realigned route crosses drainage 1-41 in a site that is in a different location but biologically similar to the crossing site of the proposed route.

The wildlife habitats crossed by the realignment include oak savannah, agricultural land, and grazed grassland and Coastal Scrub. These habitats support relatively numerous and widespread species of amphibians, reptiles, mammals and birds. Examples of reptiles and amphibians found here include Pacific Treefrog, Western Fence Lizard, Southern Alligator Lizard, Side-blotched Lizard, Gopher Snake, Common Kingsnake and Western Rattlesnake. Common mammals include Botta's Pocket Gopher, California Vole, Deer Mouse, Desert Cottontail, Black-tailed Jackrabbit, California Ground Squirrel, Coyote, Raccoon and Mule-deer. The regionally declining Badger occurs within the pipeline right-of-way. Characteristic birds include Red-tailed and Red-shouldered hawks, American Kestrel, Anna's Hummingbird, Brown Towhee, Brewer's and Red-winged blackbirds, Eurasian Starling, Western Meadowlark, House Finch, Lark Sparrow and Lesser Goldfinch. The regionally declining Yellow Warbler breeds in Riparian Woodland similar to that found near the realignment. (See also Sections 2.2.2 - 2.2.5 and Appendices 1-3 of Technical Appendix F.)

No federally- or state-listed endangered or threatened plant or animal species, or federal candidate species, were located along the realignment, nor are any expected to occur. Burrows and other field signs of the regionally rare Badger were sighted within the right-of-way during field surveys.

Impacts and Mitigations

The proposed route from the Divide Substation north to the Orcutt Pump Station is located in the vicinity of Graciosa Road. Union Oil Company has stated that a 50-foot wide right-of-way would be required for this route because the existing road would be used for access and movement of construction vehicles. Realigning the route to the east would place it in an area where there is no existing access road. Therefore, it is assumed that a 100-foot right-of-way would be required for the realigned section.

Use of the mitigated route would require the removal or disturbance of about six acres of Oak Savannah, 4.6 acres of agricultural land, 12 acres of grazed Annual Grassland and three acres of Coastal Scrub. The removal of native vegetation and wildlife habitat is considered a Class II, locally significant impact for each type that would be affected. Mitigation for Annual Grassland and Coastal Scrub would consist of revegetating those areas after construction, as discussed in Technical Appendix F. Mitigation for Oak Savannah would require that the removal of Coast Live Oak trees be avoided by narrowing the right-of-way for short sections. The trees within the right-of-way are spaced no closer than about 50 feet apart, so narrowing the corridor to 40 feet (which Union Oil Company has proposed for other sections) should eliminate the need to remove trees. An additional mitigation is that trenching within the root zone of the trees should not be permitted. Most roots can be avoided if trenching does not extend beneath the canopy of any of the trees.

This realignment would cross four fewer drainages than the proposed route for this segment. In addition, two drainages would be crossed at different sites than for the proposed route. Four intermittent and ephemeral drainages (1-36, 1-37, 1-39 and 1-40) crossed by the proposed route, including one classified as biologically significant (1-36), would not be crossed by the realigned route. This would eliminate the potential for impacts from construction and possible oil spills at these drainages and reduce the possibility that Orcutt Creek (these drainages are tributary to Orcutt Creek) would be adversely affected by sedimentation and oil spill effects. The Yellow Warbler, a regionally declining bird, breeds in the vicinity of these drainages, so the realignment would reduce the possibility of effects to this species in these locations.

Two ephemeral drainages (1-38, 1-41) would be crossed at different sites on the realigned route, compared with those of the proposed route. Drainage 1-38 would be crossed upstream from the proposed route crossing. At the proposed route crossing this drainage is characterized by willows and other wetland vegetation and provides potential breeding habitat for the regionally declining Yellow Warbler. At the realigned crossing site, this drainage is devoid of riparian species. A minor reduction (less than one-tenth of an acre) in overall area of Riparian Woodland removed would be one result of using the realigned crossing site. At drainage 1-41, the realigned crossing site is not significantly different, in terms of biological characteristics, from that of the proposed route.

10.1.5 Cultural Resources

Two mitigating pipeline routes (the Northern Mitigated Route #1 and Southern Mitigated Route, respectively) have been proposed to minimize environmental impacts from landfall to Santa Lucia Canyon. The Northern Mitigated Route #2 is a slight realignment near landfall. Two additional realignments -- the San Antonio Creek realignment and the Orcutt realignment -- occur along the Lompoc to Orcutt pipeline corridor. Field surface reconnaissance along these realignments was conducted to identify prehistoric, historic and Native American ethnographic sites. The surveys were conducted by the Arthur D. Little field archaeologist, trained assistants and Native American monitors in accordance with the methodology described in Section 4.8.2.0 of the EIS/EIR. No subsurface testing, boundary definition or significance testing were performed. The results of the surveys are discussed below and the Northern and Southern Mitigated Routes are summarized in Table 10.5-1.

10.1.5.1 Northern Mitigated Pipeline Route #1

The pipeline right-of-way contains some of the same sites as the right-of-way of the preferred route. As noted in Table 10.5-1. SBa-1888 and SBa-687 are within the right-of-way of the Northern Mitigated Pipeline Route #1. In addition, this right-of-way contains parts of the three sites not in the original route (SBa-1131, SBa-913, and SBa-1917) and may also include part of SBa-1146 or SBa-1889 and part of SBa-1891.

The Northern Mitigated Route #1 will avoid four sites: SBa-912, SBa-1890, SBa-1909, and SBa-914. These sites were in the right-of-way of the proposed route.

10.1.5.2 Northern Mitigated Pipeline Route #2

This realignment misses SBa-1131 and SBa-1889 or SBa-1146. Two new site areas, however, fall within the right-of-way. Isolate 7 may be a prehistoric site or part of a site; no shovel pit testing occurred at this location to confirm the presence or absence of a site. A previously recorded prehistoric site, SBa-1762, is estimated to be within or immediately adjacent to the right-of-way. This site, however, was not located during the Arthur D. Little survey.

10.1.5.3 Southern Mitigated Pipeline Route

The Southern Mitigated Route right-of-way impacts three new sites (SBa-931, SBA-932 and SBA-1860) in addition to SBa-219, the historic village of Lompoc. The Southern Mitigated Route avoids SBa-1895.

10.1.5.4 Comparison of Impacts of Northern and Southern Mitigated Routes

Site comparison of impacts resulting from pipeline construction, therefore, involves comparison of the routes from the coast to a point north of SBa-1860, at Santa Lucia Canyon.

The Southern Mitigated Route contains three sites which have been tentatively identified as prehistoric villages. All three sites extend beyond both edges of the right-of-way and will therefore be impacted by project construction. Site SBa-1860 will also be impacted unless the roadcut for Floradale Avenue is not widened.

The Northern Mitigated Route #1, will result in impacts to SBa-913, SBa-1917, and SBa-1891, all residential bases or camps and SBa-1131, a potential site. Sites SBa-1888 and SBa-687 extend through approximately half of the right-of-way and may be impacted. Site SBa-1889 or SBa-1146 may also be impacted by pipeline construction. These three sites are probably the remains of residential bases or camps. The Northern Mitigated Pipeline Route #2 appears to have similar impacts to the Northern Mitigated Pipeline Route #1. Although it misses SBa-1131 and SBa-1889 or SBa-1146, impacts may occur to SBa-1762 and Isolate 7. Overall, the entire area from Terra Road pas the alignments probably contains buried flakes, campsites and other prehistoric cultural deposits.

As presently designed, it appears that the Southern Mitigated Route will result in greater impacts to cultural resources than the Northern Mitigated Route #1.

10.1.5.5 Mitigation of Impacts of Mitigated Routes

In most cases, it will be possible to modify either mitigation route in order to avoid most cultural resources. Site SBa-1891 along the northern route may be difficult to avoid because of its large size. On the southern route, site SBa-219 may also be difficult to avoid. It is probable that test excavations can locate corridors through both sites where a minimum of intact cultural deposits are present.

Table 10.5-1

ARCHAEOLOGICAL SITES AND ISOLATES IN THE AREAS OF THE TWO MITIGATED ROUTES FROM LANDFALL TO SANTA LUCIA CANYON

NORTHERN MITIGATED ROUTE #1		SOUTHERN MITIGATED ROUTE	
Archaeological Site	Tentative Site Type	Archaeological Site	Tentative Site Type
SBa-1888*	Base or camp	SBa-931	Village and camp
SBa-1131	Possible site	SBa-932	Village or base
SBa-1889 or SBa-1146*	Base or camp	SBa-219*	Village
SBa-913	Base or camp		
SBA-1917	Base or camp		
SBA-1891*	Base or camp		
SBa-687*	Base or camp		
Isolate X-2*	Isolate		

*Site Isolate discussed in Technical Appendix G of EIS/EIR

MITIGATION OF THE NORTHERN MITIGATED ROUTE #1

(1) Subsurface testing should be conducted in order to determine if SBa-1888 can be avoided by moving the centerline of the right-of-way a maximum of 50 feet to the north.

(2) Testing at SBa-1131 should be done to determine whether any intact archaeological deposit exists.

(3) The area north of the road adjacent to SBa-1889 should be tested to determine whether intact site deposits are present. If they are, it may be possible to move the right-of-way around the northern edge of SBa-1889.

(4) In the area of SBa-913 and SBa-1917, the pipeline could be moved to the south where the slope is steeper and no evidence of sites was found during surveys of original preferred route. It is also possible that testing of the proposed route would indicate that these sites are located north of the zone which will be disturbed.

(5) Subsurface testing should be done along the route where it passes through SBa-1891 to determine whether intact deposits are present. If intact deposits are found, further testing should be conducted in order to locate a zone where impacts will be minimal.

MITIGATION OF THE NORTHERN MITIGATED ROUTE #2

(1) Because this entire area is highly sensitive, subsurface testing should be conducted to identify the least sensitive corridor. This would include boundary definition in the vicinity of Isolate 7 and the estimated location of SBa-1762.

MITIGATION OF THE SOUTHERN MITIGATED ROUTE

The mitigation route recommended on pages 139 and 140 of Technical Appendix G outlines the major changes which are necessary to mitigate the impacts of the Southern Mitigated Route.

(1) The corridor should be moved south outside the boundaries of SBa-931 and SBa-932.

(2) The route should be designed to avoid the intact areas of SBa-219. At SBa-219, filled marsh areas possibly can be located and used as corridors for the pipeline.

(3) At SBa-1860, if possible, the pipelines should be laid within the existing roadcut. If not possible, the route should connect with the northern mitigation route south of the site and go around the site.

10.1.5.6 San Antonio Creek Realignment

No cultural resources sites or isolates were identified along this realignment. This realignment is preferable to the original proposed route because it is further from the historic Harris Ranch site.

10.1.5.7 Orcutt Realignment

The right-of-way of this realignment passes through a historic site (Historic Site #1). Historic cultural materials found at this site suggest that it may be the town of Graciosa. As noted in Technical Appendix G, the location of this town is presently unknown.

MITIGATION OF ORCUTT REALIGNMENT

(1) The corridor should be moved 50 meters to the west toward the original pipeline route. No cultural materials were found in this vicinity.

(2) If the corridor cannot be moved, boundary definition and sampling should occur at the site and the cultural materials should be analized by an historical archaeologist.

10.1.6 Aesthetic Resources

10.1.6.1 Visual Resources

The visual impacts associated with pipeline installation have been described in Section 3.4.1.1. No aspects of normal pipeline operation would be visible. When abandoned, the pipelines would be sealed and left underground; no disturbance of soil and vegetation would occur at that time.

NORTHERN MITIGATED PIPELINE ROUTE #1

Long-term impacts of low significance would occur for certain views from 35th Street, Terra Road and Ocean Beach County Park. No impacts would occur on views from Civilian Beach. These would be due to the 1-acre gravel pad for the valve station at the foot of 35th Street. Reducing the size of the pad and using dark gravel would reduce the visual impact of the valve station site to negligible levels (Class II impact).

Long-term impacts on some views from Terra Road and 35th Street would occur due to the potential erosion of the four earthen catch basins, and the pipelines, where exposed to view at the drainage 1/2 mile east of the proposed valve station. Using jute meshing to stabilize the banks of the containment basins would help in revegetating the exposed soil surfaces, fully mitigating their impact (Class II). Although painting the pipelines earthtones would miminize the degree of contrast with their surroundings, they would remain visible (Class I impact).

The graded and cleared pipeline right-of-way would have short-term impacts of low significance on views from 35th Street, Terra Road and the Southern Pacific Railroad. The proposed site restoration measures would reduce the visual impacts noted to a level of insignificance within five years. Further mitigation is not possible, and the short-term impacts would be Class I.

SOUTHERN MITIGATION ROUTE

Where the route runs down the moderately steep slope (20 percent) near the turnoff from Highway 246 to Ocean Beach County Park, there is the potential for erosional scarring. The use of jute meshing to stabilize the slopes is recommended, as are other measures which would promote rapid revegetation (see Terrestrial and Freshwater Biology, Technical Appendix F). However, since the expected visual impacts would not be significant (Class III), these measures are not required.

No visual impacts would occur to views from SPRR or Central Avenue. At the Lompoc-Casmalia crossing, visual impacts would remain adverse but insignificant (Class III).

OTHER REALIGNMENTS

The Northern Mitigated Route #2 shown in Figure 10.1-1 would result in a new visible scar that would be visible from Terra Road during construction. This would become insignificant at 2-5 years once the old Terra Road was revegetated since the new pipeline route would also become the new Terra Road.

There are no visual impacts associated with the realignment by the San Antonio Creek or the Orcutt Pump Station.

10.1.6.2 Onshore Noise and Vibration

Northern Mitigating Pipeline Route

The realignments proposed as part of the mitigating pipeline route will have no impact in terms of onshore noise and vibration. The realignments do not pass in close proximity to any known sensitive receptors.

Southern Mitigating Pipeline Route

The Southern Mitigating Pipeline Route passes in close proximity to the Federal Correctional Institution residential complex. During pipeline construction, the impacts in this vicinity are likely to be significant and adverse, (Class II), lasting for several weeks at varying levels. No other impacts are attributed to the proposed Southern Mitigating Pipeline Route.

Comparison of Mitigating Pipeline Routes

From the perspective of onshore noise and vibration, the Northern Mitigating Pipeline Route is preferable since it is associated with no impacts. The southern route, on the other hand, would have short-term but significant adverse impacts at the Federal Correctional Institution residential complex.

Mitigations

As noted in Section 5.9.1.2 it is difficult to effectively mitigate pipeline construction noise. The effects, however, will be transitory, disappearing when installation in the area has been completed.

10.1.7 Socioeconomics

As stated in previous sections, the Northern Mitigated Pipeline Route is situated in close proximity to the proposed northern route. The pipeline length is essentially equivalent and the terrain conditions are consistent. The mitigated route is adjacent to Terra Road until it reaches the Vandenberg AFB dog training facility where it turns south and intersects the proposed the proposed northern route corridor.

Given the similar topography and pipeline length of the mitigated northern route when compared to the northern route the cost of the alternative is expected to be similar to the cost of the northern pipeline route. For this reason the employment, housing, public service and public finance impacts will be indistinguishable from those identified for the northern route.

Land use impacts will also be consistent. There will, however, be slightly more disruption of traffic on Terra Road during construction of the mitigated route. This is not considered significant.

The southern mitigated pipeline route is proximate to the southern alternative pipeline route. It diverges substantially only north of the Santa Ynez River where it follows Santa Lucia Canyon Road until it intersects the northern pipeline route (the endpoint of the southern mitigated pipeline route). This divergence brings the proposed pipeline in closer proximity to housing for the U.S. disciplinary facility.

This alignment is not so substantially different from other alignments as to cause measurably different socioeconomic (i.e., employment, housing, public service and public finance) impacts.

Land use impacts are consistent with those listed for the southern alternative route. Short-term disruption during construction is the most notable impact, although it is not significant. There are some areas that suffer increased exposure to potential public hazard, but the probability of release is still very remote. The areas are noted in the following section on System Safety.

10.1.8 System Safety

The proposed northern mitigative pipeline route is essentially identical to the basic proposed northern route in terms of length, expected spill/release frequency, and proximity to populated areas. Reductions in the potential oil spill consequences of this route as compared to the proposed northern route have been discussed in Sections 10.1.3 and 10.1.4.

The proposed southern mitigative pipeline route is slightly longer than either the original mitigative northern routes as well as the alternate southern route and, therefore, has slightly higher expected spill/release frequencies. The frequencies for both mitigative routes are:

		Northern	Southern
Oil -	100 bbl	Once per 170 years	Once per 140 years
-	1,000 bbl	Once per 1,700 years	Once per 1,400 years
Gas -	6 kg/s	Once per 50 years	Once per 45 years
-	60 kg/s	Once per 500 years	Once per 450 years

In terms of potential consequences of these releases, the southern route is less likely to impact any portion of Vandenberg AFB than the northern route, however, several areas would have an increased exposure potential. These are:

- Buildings on the U.S. Naval Missile Facility to the south of the pipeline
- Artesia School
- Maple School
- the outskirts of Lompoc city
- Portions of the disciplinary barracks

With the exception of the last location, these areas are also potentially at risk from the alternate pipeline as discussed on page 8.5 of Technical Appendix M. Probabilities of releases near any one of these locations are still quite remote and would require the wind to be blowing in a particular direction and the gas cloud to be ignited before there could be any adverse impacts. The realignment in the firebreak along the northern route will require the pipelines to be buried approximately eight feet below grade. This deep burial is required to prevent damage to the pipelines due to firebreak maintenance and fire control.

Small leaks were only predicted to have flammable hazards for a maximum of 850 feet from the pipeline. Per the discussion in Section 2 of the Technical Appendix M, ruptures represent only 10 percent of all releases and their effects are limited to within one mile of the pipeline if there is a vapor cloud and an explosion, and significantly less if there is just a vapor cloud. Toxic hazards persist for less than 500 feet, even under very stable weather conditions. The Artesia School is the only location which could be adversely affected by the toxic portion of a release.

The minor additional realignments on both the Northern Mitigated Route and San Antonio Creek realignments would not effect the system safety impacts. The oil spill probabilities for the San Antonio Creek crossing, and Lompoc to Orcutt pipeline are given below.

Spill Size	Pipeline Probability	Creek Probability
100 bbls	Once per 60 years	Once per 4,100 years
1,000 bbls	Once per 600 years	--

10.2 ADDITIONAL PHOTOCHEMICAL MODELING RUNS

10.2.1 INTRODUCTION

As shown in the Draft EIS/EIR significant ozone impacts (i.e., exceedance of the Federal ozone standard of 12 pphm) were predicted with Trajectory 6 and its derivatives (Trajectories 6B for Area Study analysis and 6C for cumulative analysis) by all development scenarios (Union, Union plus Exxon, Area Study and cumulative). These Federal standard exceedances were still predicted to occur with the mitigation measures proposed in the Technical Appendix (Section 12 for the Union and Exxon facilities, Section 14 for the Area Study facilities and Section 15 for the full cumulative scenario).

This document discusses the ozone impacts predicted by the photochemical trajectory model TRACE for additional mitigation measures proposed for the project and Area Study facilities (both onshore and offshore). These mitigation measures are beyond those already analyzed in Technical Appendix B. Table 1-1 lists the additional mitigation measures that have been adopted for the additional TRACE runs. The table identifies all of the emission sources for the project and Area Study platforms for each run with the new mitigation measures.

10.2.2 OZONE IMPACTS OF FURTHER MITIGATION OF PROJECT EMISSIONS

As mentioned in Section 12.6 of the Technical Appendix, the mitigation measures to reduce NO_x emissions from the project facilities include: use of low NO_x burners at the Lompoc Dehydration Facility; and the scheduled testing of standby generators when there is no flaring and when no supply boat is present.

With the above mitigation measures for Platform Irene and the Lompoc Dehydration Facility, the mitigated onshore peak of 12.03 pphm would still slightly exceed the Federal standard (Table 12-9 of Technical Appendix). A further mitigation for Platform Irene would be to use an electric cement pump (i.e., eliminate its emissions on run 1). Table 2-1 and Figure 2-1 present the modeling results for the future baseline, unmitigated emissions, mitigated emissions (as discussed in the Technical Appendix) and those with the proposed further mitigation. As shown in the Table 2-1, the additional use of an electric cement pump would be sufficient to bring the onshore peak (11.61 pphm) below the Federal standard.

For the combined Union plus Exxon scenario, the mitigation measures recommended in the Technical Appendix succeeed in only reducing the onshore peak from 15.31 pphm (with the unmitigated emissions from Platform Irene, Platform Shamrock, and the Lompoc Dehydration Facility) to 12.58 pphm (Table 12-10 of Technical Appendix). To reduce this mitigated peak below the Federal standard, three further mitigation cases were analyzed.

In the first case (run 2 of Table 1-1), the cement pump on Platform Irene and the power tong on Platform Shamrock were assumed to be electric. Modeling results for this case are summarized in Table 2-2 and plotted in Figure 2-2. As shown in the table, the elimination of emissions from these two equipment items would result in an onshore peak of 12.16 pphm which would be slightly higher than the Federal standard.

Table 2-1

MITIGATED OZONE IMPACTS OF UNION PROJECT FACILITIES ON TRAJECTORY NUMBER 6

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.01	--
Mitigated	8.00	0.01
Further Mitigation	7.70	0.31

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.12	--
Mitigated	10.18	-0.06
Further Mitigation	10.41	-0.29

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	12.28	--
Mitigated	12.03	0.25
Further Mitigation	11.61	0.67

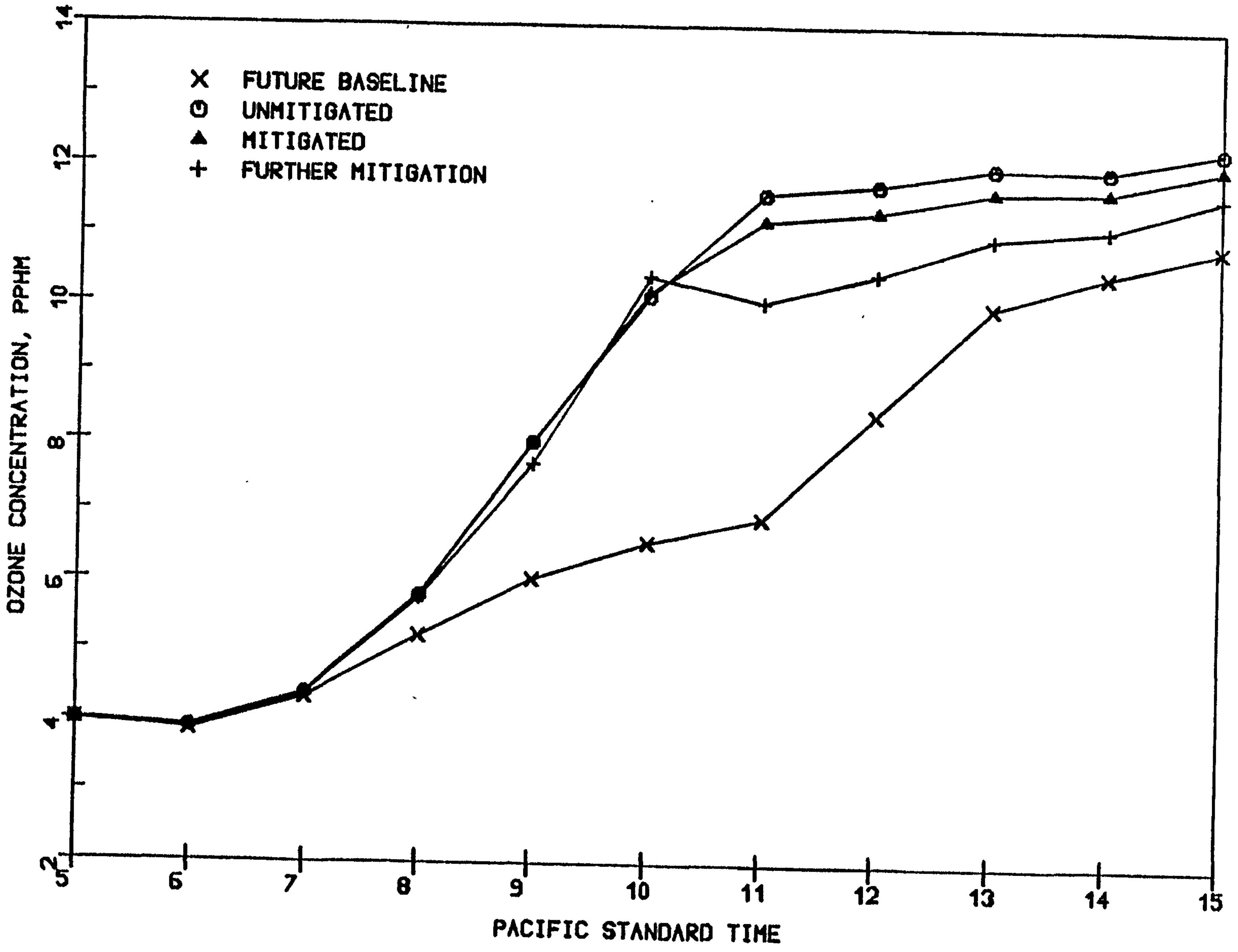


Figure 2-1.

MITIGATED OZONE IMPACTS OF UNION FACILITIES ON TRAJECTORY 6

Table 2-2

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY NUMBER 6

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	7.92	--
Mitigated	8.03	-0.11
Further Mitigation	8.20	-0.28

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	9.95	--
Mitigated	10.80	-0.85
Further Mitigation	10.54	-0.59

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	15.31	--
Mitigated	12.58	2.73
Further Mitigation	12.16	3.16

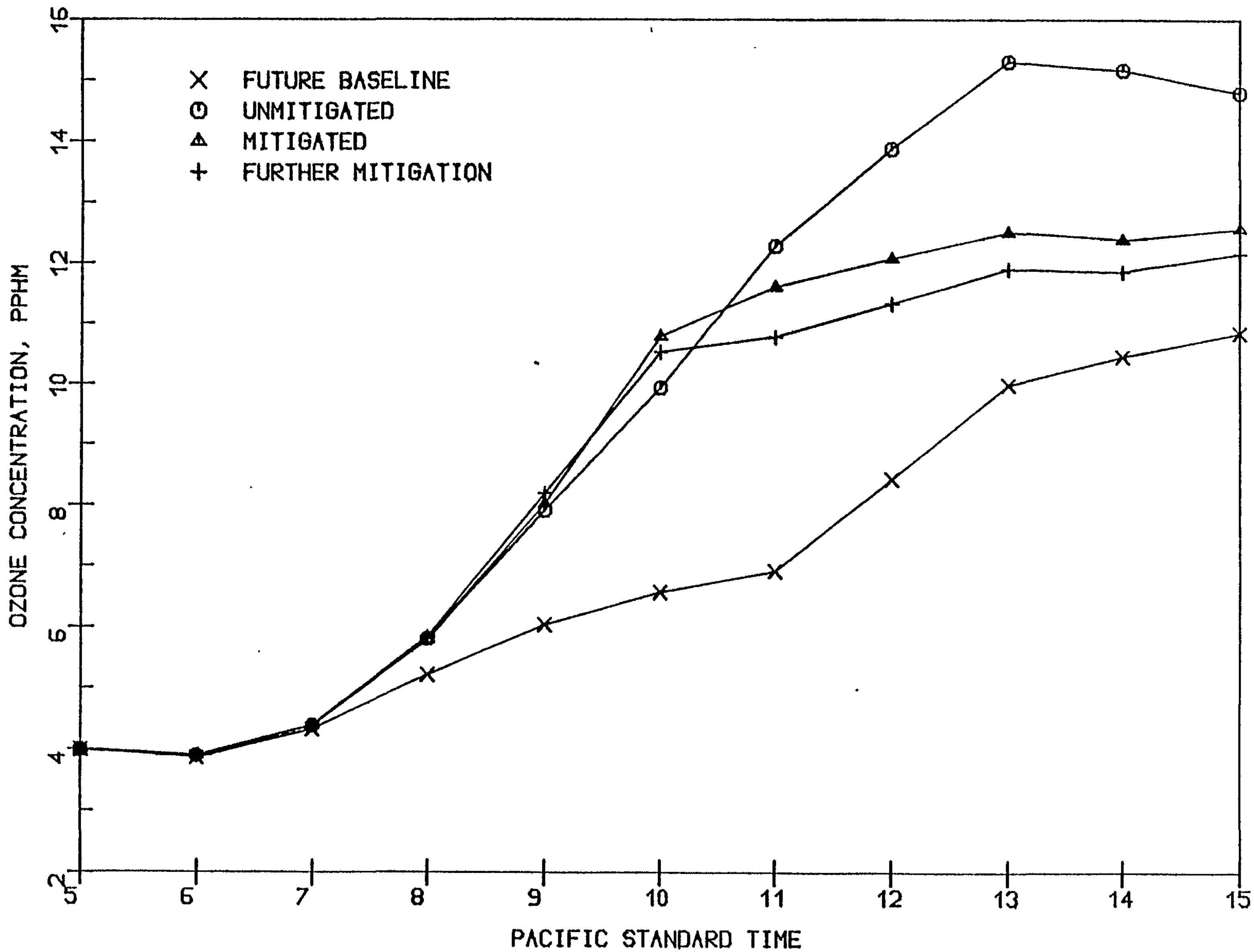


Figure 2-2.

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

Another case (run 5 of Table 1-1) assumes that Platform Irene would use an electric cement pump and an electric crane (the other crane is diesel-powered), and two cranes (one large and one small) on Platform Shamrock would also be electric. As shown in Table 2-3 and Figure 2-3, these further mitigation measures would be sufficient to bring the onshore peak below the Federal standard. The onshore peak was predicted to be 11.91 pphm with these further mitigation measures.

In a final case for the projects (run 6), the cement pump on Platform Irene was assumed to be electric and the supply boat idling at Platform Irene was eliminated. Since Platform Irene and Platform Shamrock would be close to each other, they could share a single supply boat. This boat was assumed to be idling at Platform Shamrock while Platform Irene was flaring in the model simulation. Modeling results are presented in Table 2-4 and Figure 2-4. This table shows that the onshore peak (11.99 pphm) would be slightly below the Federal standard.

It is noted that, while some of these mitigation measures succeed in reducing the onshore peak to a level below the Federal standard, they could not mitigate the state standard exceedances predicted near the shoreline.

10.2.3. OZONE IMPACTS OF FURTHER MITIGATION OF AREA STUDY EMISSIONS

As shown in Section 14.11 of the Technical Appendix, the mitigation measures suggested for the project and Area Study facilities include: scheduled tresting of standby generators when no supply boat is present, use of low NO_x burners at the Lompoc Oil and Gas facilities, and elimination of offshore power generation of Platform P-0427 through the use of power cables to shore. With these mitigation measures, the predicted onshore peak (14.16 pphm) would still be above the Federal standard by 2.16 pphm (see Table 14-81 in Technical Appendix). To reduce this onshore peak below the Federal standard, four additional mitigation cases were analyzed.

In the first case for the Area Study (run 3), one of the two cranes on Platform Irene and P-0427 was assumed to be electric and Platform Shamrock would also use two electric cranes (one large and one small). As shown in Table 3-1 and Figure 3-1, these further mitigation measures would not be sufficient since an onshore peak of 13.32 pphm was predicted.

The second Area Study case (run 4) is similar to run 3 with the additional elimination of flaring on both Platform Irene and P-0427 platforms to determine the effects on the impacts. Table 3-2 and Figure 3-2 show that the onshore peak (12.78 pphm) would still exceed the Federal standard. Compared to the first case, elimination of flaring emissions on Platform Irene and P-0427 would bring about a reduction of 0.54 pphm in the onshore ozone peak.

In run 7 it is assured that for the Area Study one of two cranes on Platform Irene, P-0441 and P-0427 would be electric, and Platform Shamrock would use two electric cranes (one large and one small). In addition, it was also assumed that Platform Irene and Platform Shamrock would share a supply boat, and P-0441 and P-0427 would share another boat. This boat sharing would result in eliminating the boat idling emissions at Platform Irene and P-0441. As shown in Table 3-3 and Figure 3-3, the onshore peak (11.92 pphm) would be below the Federal standard.

Table 2-3

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY NUMBER 6

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	7.92	--
Mitigated	8.03	-0.11
Further Mitigation	8.13	-0.21

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	9.95	--
Mitigated	10.80	-0.85
Further Mitigation	10.44	-0.49

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	15.31	--
Mitigated	12.58	2.73
Further Mitigation	11.91	3.40

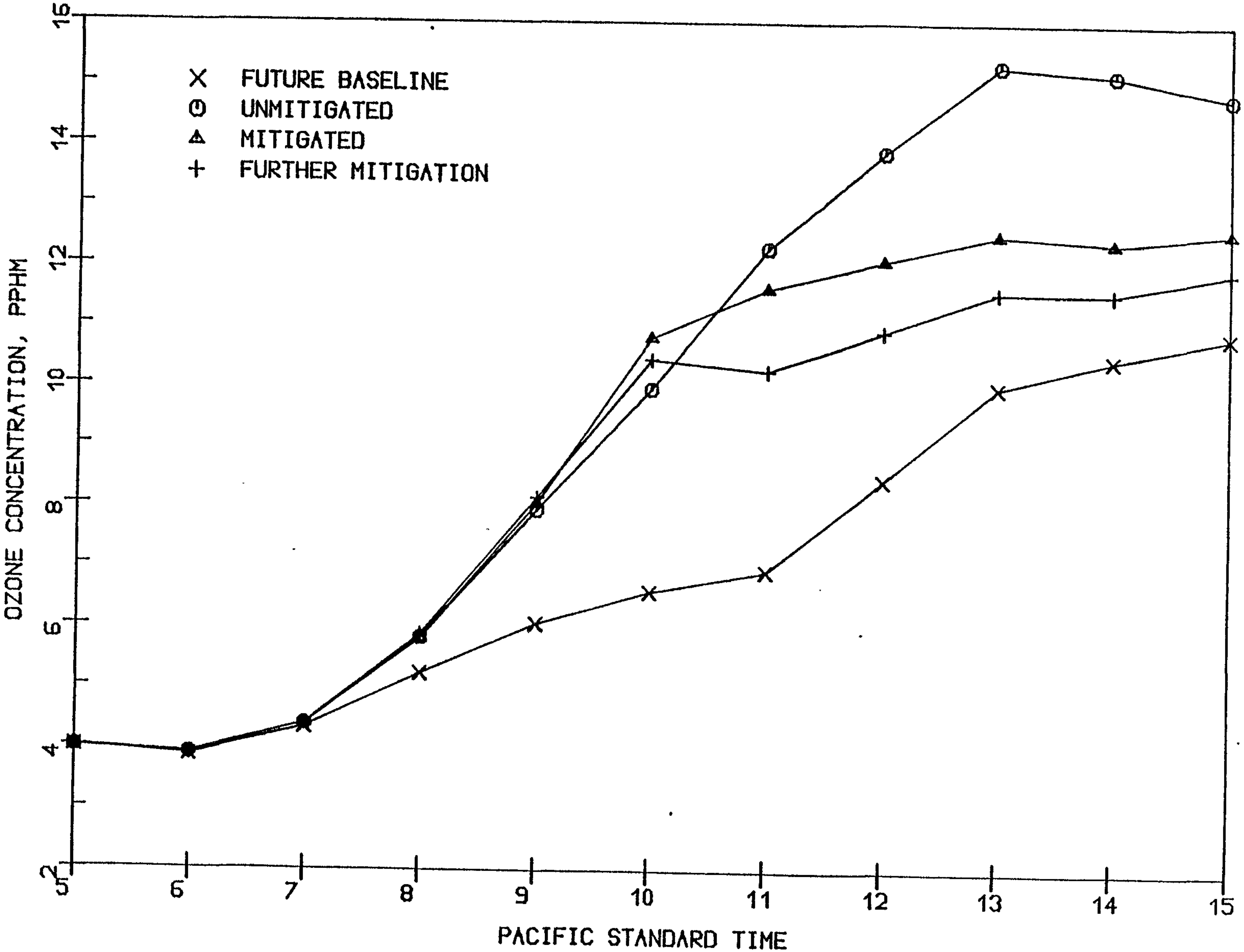


Figure 2-3.

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

Table 2-4

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY NUMBER 6

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	7.92	--
Mitigated	8.03	-0.11
Further Mitigation	8.21	-0.29

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	9.95	--
Mitigated	10.80	-0.85
Further Mitigation	10.23	-0.28

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	15.31	--
Mitigated	12.58	2.73
Further Mitigation	11.99	3.32

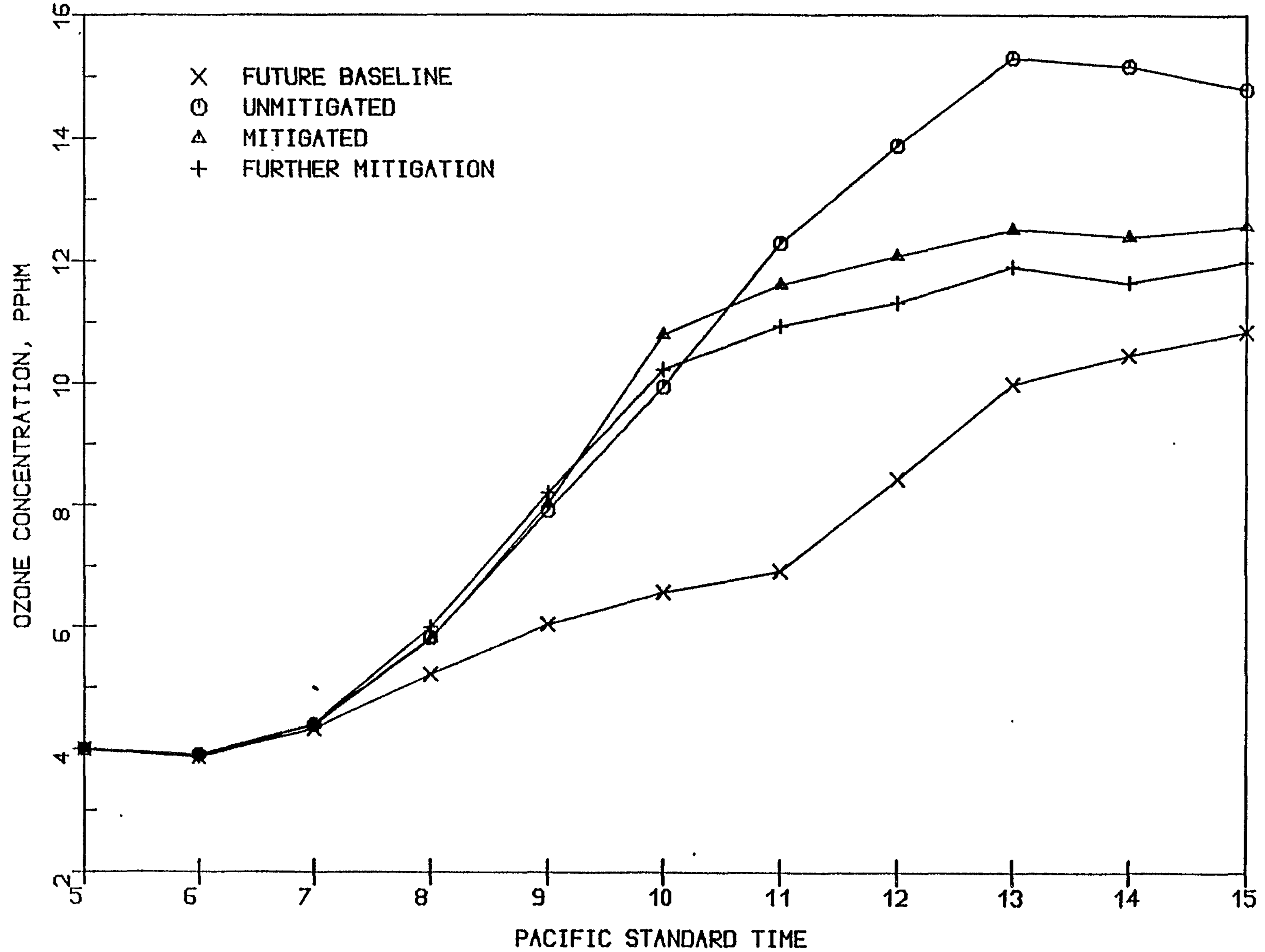


Figure 2-4.

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

Table 3-1

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY NUMBER 6B

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.23	--
Mitigated	8.22	0.01
Further Mitigation	8.05	0.18

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.91	--
Mitigated	10.69	0.22
Further Mitigation	10.38	0.53

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	16.21	--
Mitigated	14.16	2.05
Further Mitigation	13.32	2.89

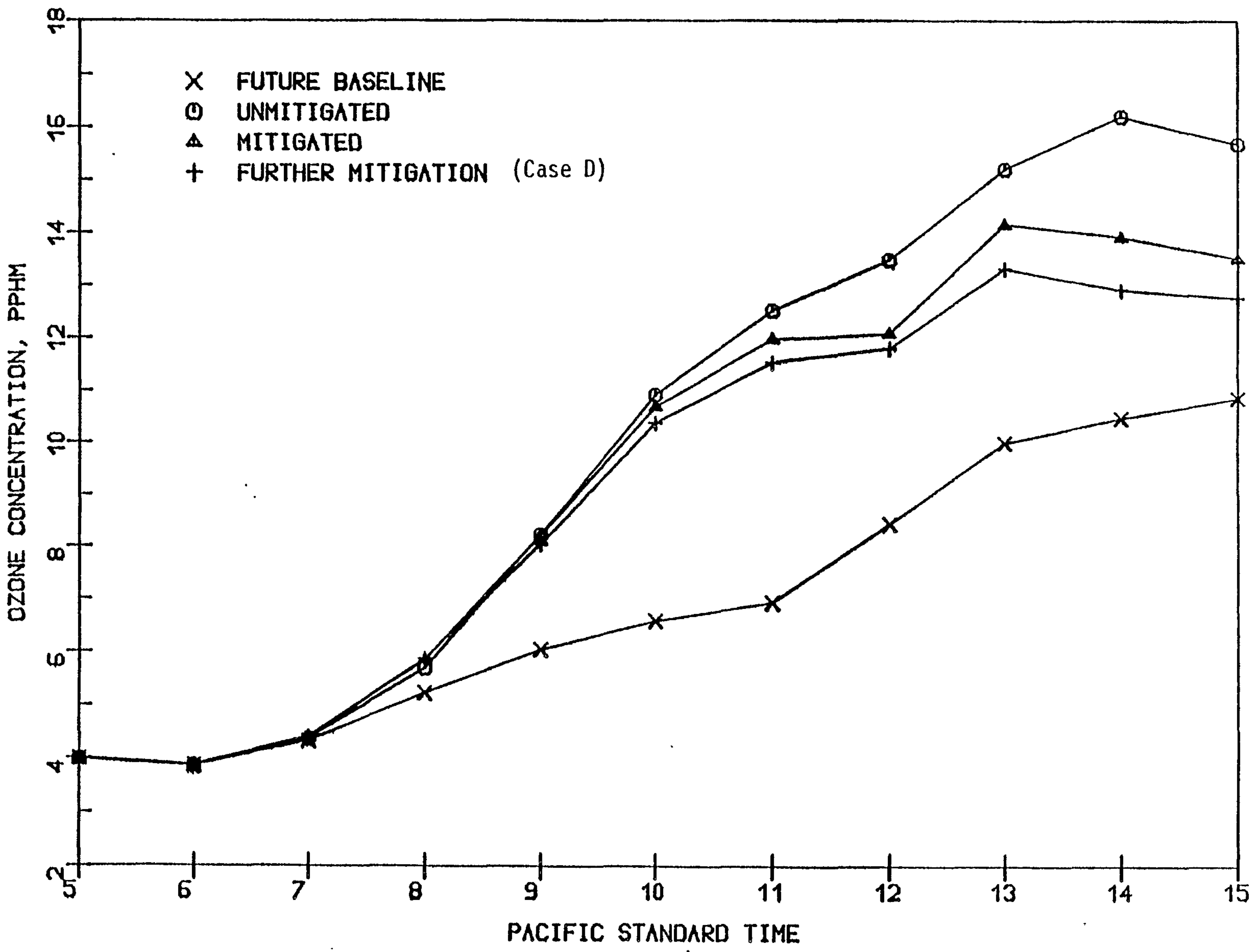


Figure 3-1.

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

The last Area Study case (run 8) is similar to run 7 with the additional use of selective catalytic reduction (SCR) or thermal de-nox at the Lompoc gas plant to reduce NO_x emissions by 80 percent from the boilers. As shown in Table 3-4 and Figure 3-4, this additional mitigation measure would further reduce the onshore peak (11.58 pphm with NO_x reduction and 11.92 pphm without).

Compared to the future baseline ozone values, all of the above further mitigation cases would not eliminate the state standard exceedances predicted for the region.

10.2.4 EFFECTS OF STANDBY GENERATORS

A number of TRACE runs were carried out to determine the effects of testing standby generators during the time that idling supply boats were present. These runs are numbers 10 through 17 of Table 1-1. They include project and Area Study scenarios which are modifications of runs through 8 with standby generator turned on. The peak ozone concentration for runs 10 through 17 are all greater than the federal standard, ranging from 12.36 pphm to 14.36 pphm.

Hourly plots for these runs are given in Figures 4-1 through 4-9. The results of these runs indicate that the federal standard will be exceeded unless mitigation measures are implemented that include the elimination of the testing of standby generators while boats are present.

10.2.5 OZONE IMPACTS OF CUMULATIVE BASELINE SOURCES AND PROPOSED MITIGATION

The Federal ozone standard of 12 pphm was predicted to be exceeded with Trajectories 6C and 7C1 by the full cumulative emissions (Union, Exxon, Area Study and other non-project). For both of these trajectories, the TRACE model was used to predict the maximum impacts contributed by the non-project sources (i.e., cumulative baseline sources). Given the result of the full cumulative impacts, the cumulative baseline results would allow one to determine the net incremental impacts of the proposed project and Area Study emissions.

10.2.5.1 Trajectory 6C

Table 4-1 and Figure 4-1 compare the modeling results obtained with Trajectory 6C for the future baseline, cumulative baseline, full cumulative and mitigated full cumulative scenarios. The mitigated full cumulative scenario incorporates all mitigations proposed for the Area Study (runs 8). As shown in the table, the cumulative baseline emissions were predicted to cause an increase of 1.52 pphm in the onshore ozone peak of the future baseline. The 17.21 pphm onshore peak of the full cumulative case can therefore be largely attributed to the emissions from the project (Union and Exxon) and Area Study facilities. With the mitigation measures proposed for both onshore and offshore facilities, this peak would decrease by 4.83 pphm (from 17.21 pphm to 12.38 pphm). Thus the mitigated ozone peak would be slightly above the Federal ozone standard. For this 12.38 pphm peak the major contributors would be the unmitigated future cumulative sources. As these additional facilities are reviewed for permitting, mitigation measures will be required to achieve the standards.

10.2.5.2 Trajectory 7C1

Modeling results for Trajectory 7C1 are presented in Table 4-2 and plotted in Figure 4-2. From this table, it can be concluded that the cumulative baseline sources are principally responsible for all ozone increases predicted overwater, at the shoreline and onshore. These emissions were predicted to increase the future baseline onshore peak by 4.40 pphm. Thus, emissions from the project and Area Study facilities would only contribute a small function to the 12.40 pphm onshore peak.

10.2.6 SUMMARY OF MITIGATION ANALYSIS

10.2.6.1 Project Mitigations

For the Union and Exxon projects there were two mitigation runs identified on Table 1-1 in which the predicted levels were below the federal standard (runs 5 and 6). Run 1 was under the federal standard, but it included only the Union project. Therefore the mitigation measures identified in runs 5 and 6 should form the basis for evaluating the projects. The main difference in the two runs involves the use of cranes. For run 5, in which the NO_x emission are lower, the predicted ozone level is 0.08 pphm lower. This mitigation assumes that at each platform during the drilling/production phase one of the two cranes would be electric. In run 6 it was assumed that both cranes would be diesel driven.

10.2.6.2 Area Study Mitigations

For the Area Study scenario, runs 7 and 8 would result in levels below the federal standard. Therefore mitigation measures that are identified in Table 1-1 for runs 7 and 8 would be required to achieve the standard. The difference in the two mitigation strategies is that for run 7 additional NO_x reduction would occur at the hypothetical Area Study gas plant by use of SCR or thermal de-nox on the boilers.

Table 3-2

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY NUMBER 6B

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.23	--
Mitigated	8.22	0.01
Further Mitigation	8.03	0.20

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.91	--
Mitigated	10.69	0.22
Further Mitigation	10.04	0.87

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	16.21	--
Mitigated	14.16	2.05
Further Mitigation	12.78	3.43

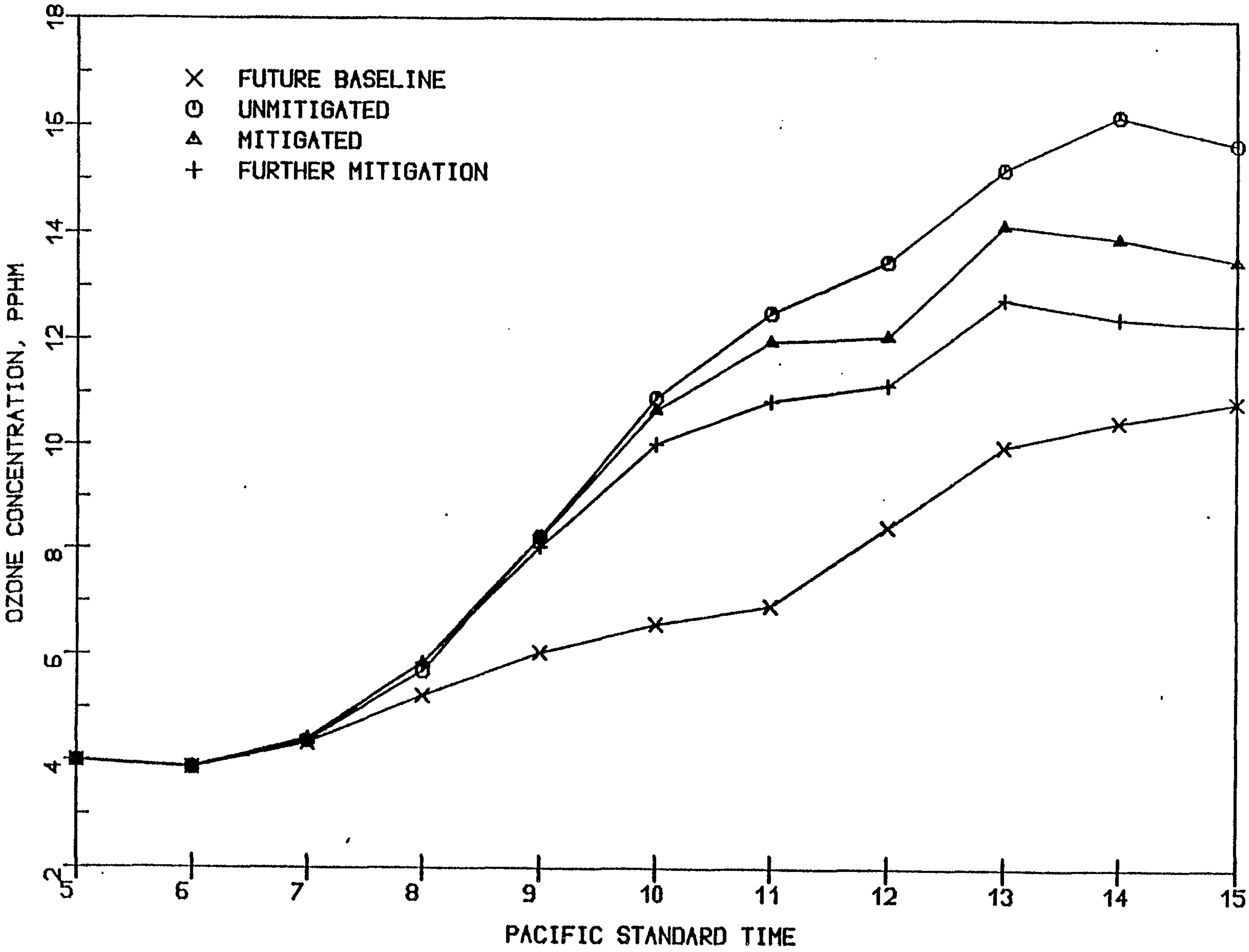


Figure 3-2.

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

Table 3-3

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY NUMBER 6B

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.23	--
Mitigated	8.22	0.01
Further Mitigation	8.09	0.14

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.91	--
Mitigated	10.69	0.22
Further Mitigation	9.32	1.59

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	16.21	--
Mitigated	14.16	2.05
Further Mitigation	11.92	4.29

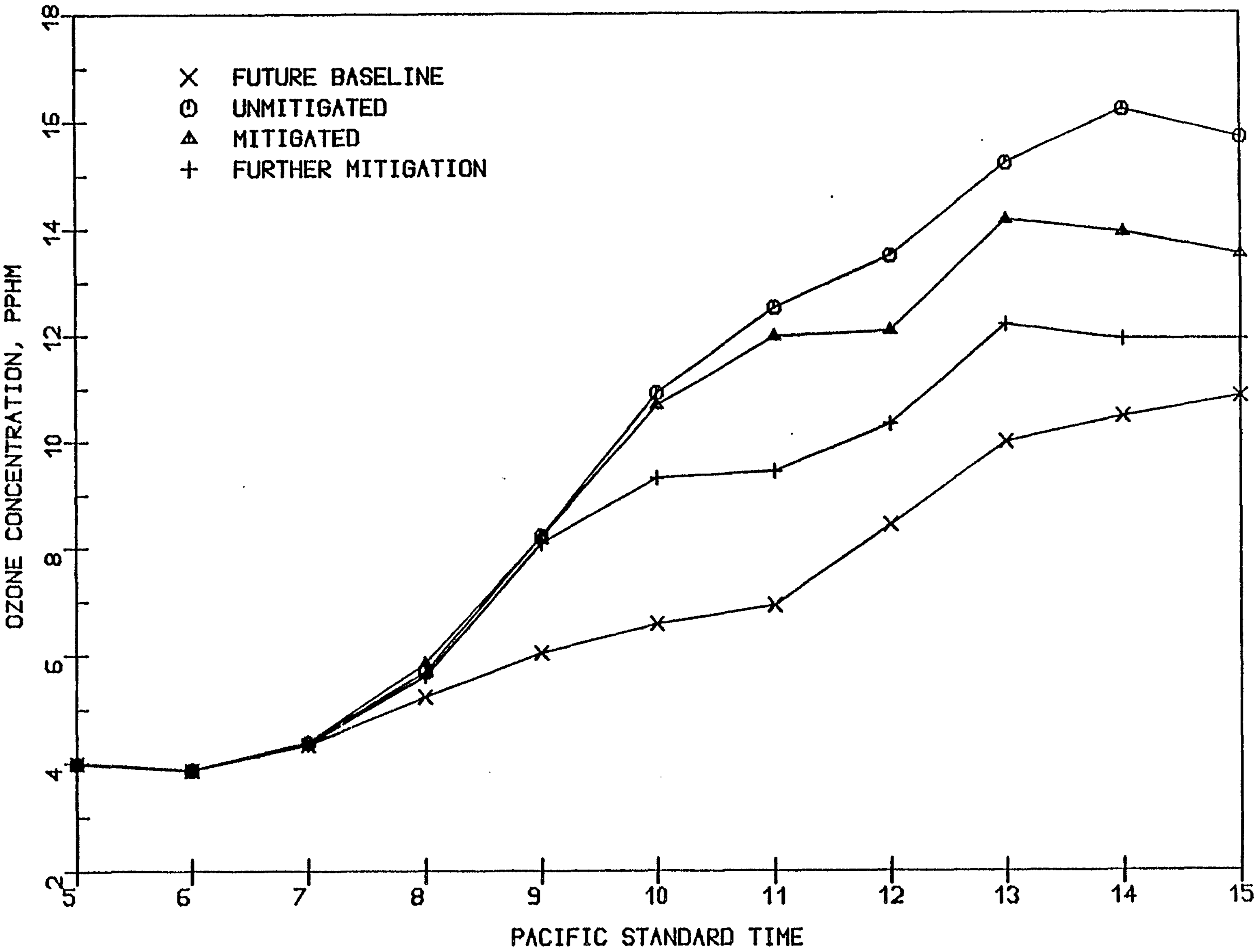


Figure 3-3.

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

Table 3-4

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY NUMBER 6B

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.23	--
Mitigated	8.22	0.01
Further Mitigation	8.09	0.14

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.91	--
Mitigated	10.69	0.22
Further Mitigation	9.32	1.59

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	16.21	--
Mitigated	14.16	2.05
Further Mitigation	11.58	4.63

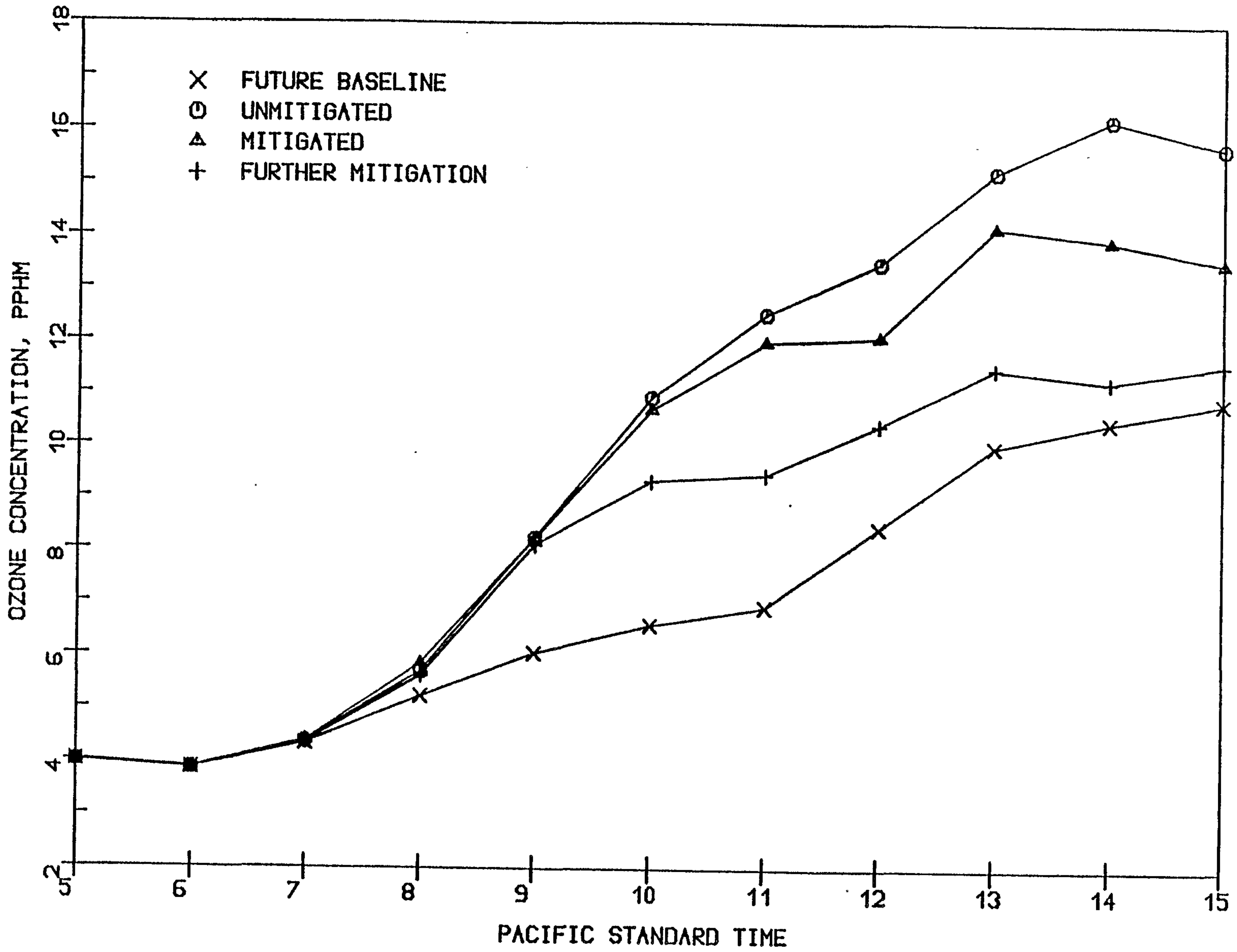


Figure 3-4.

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

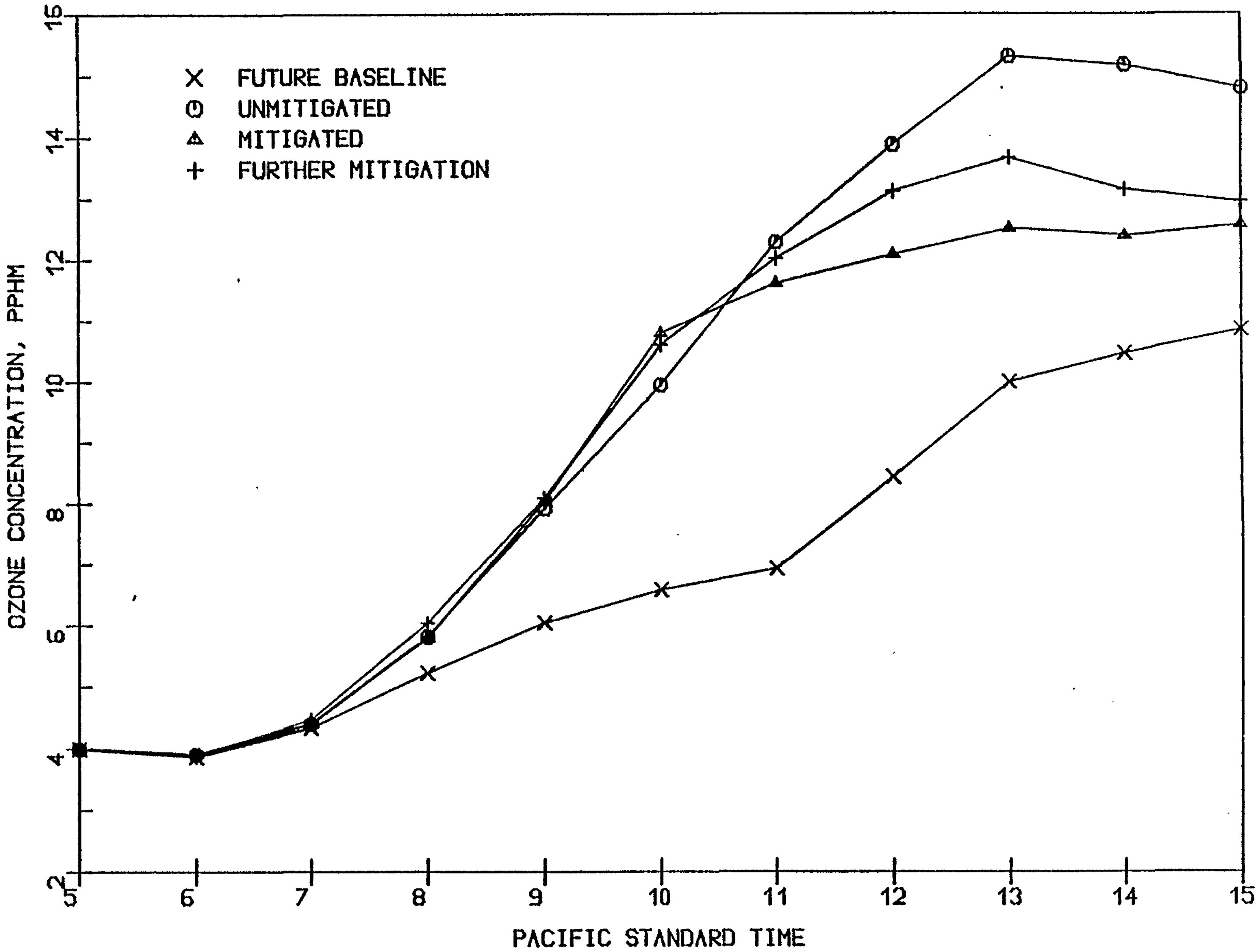


FIGURE 4.1 Run 9

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

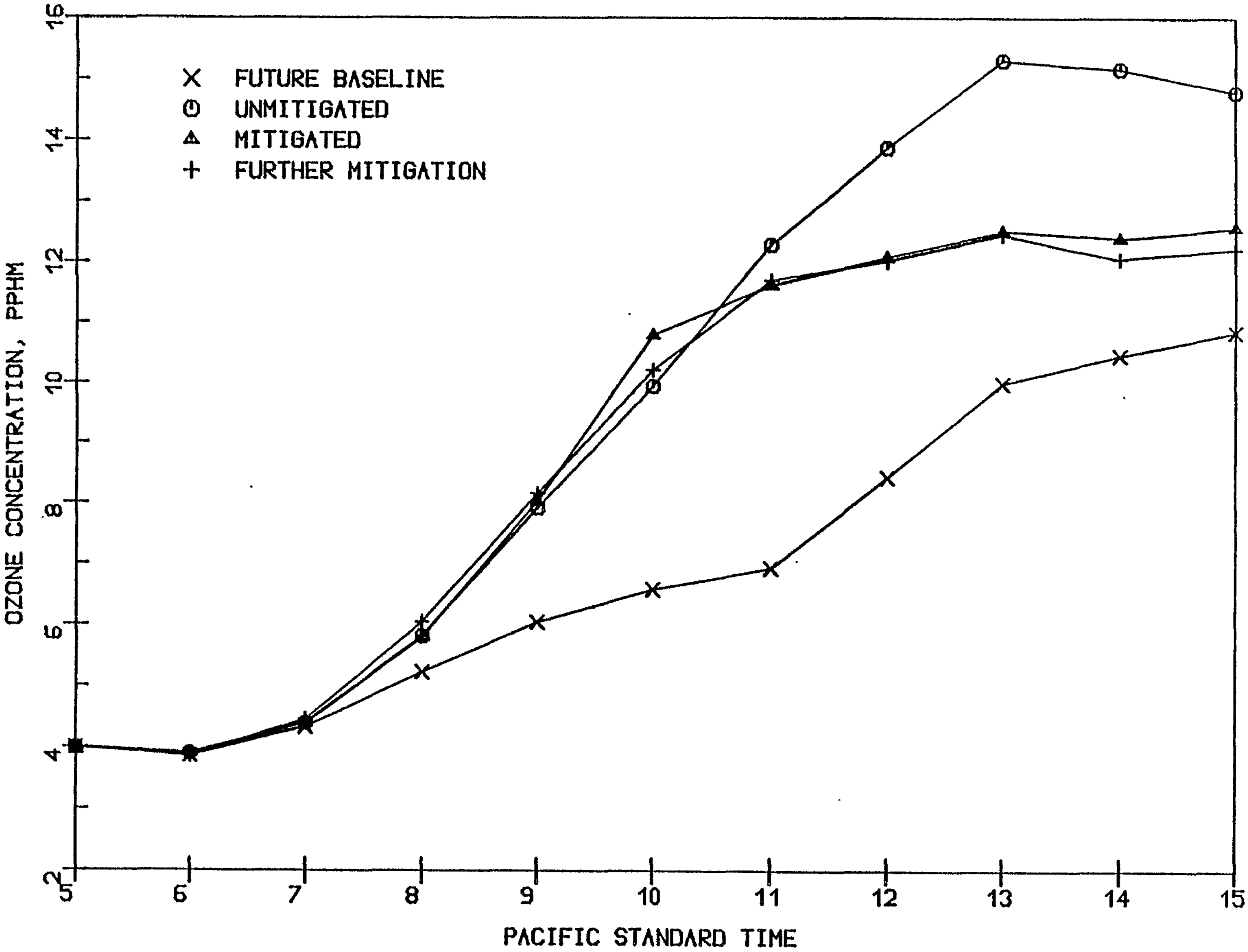


FIGURE 4.2 Run 10

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

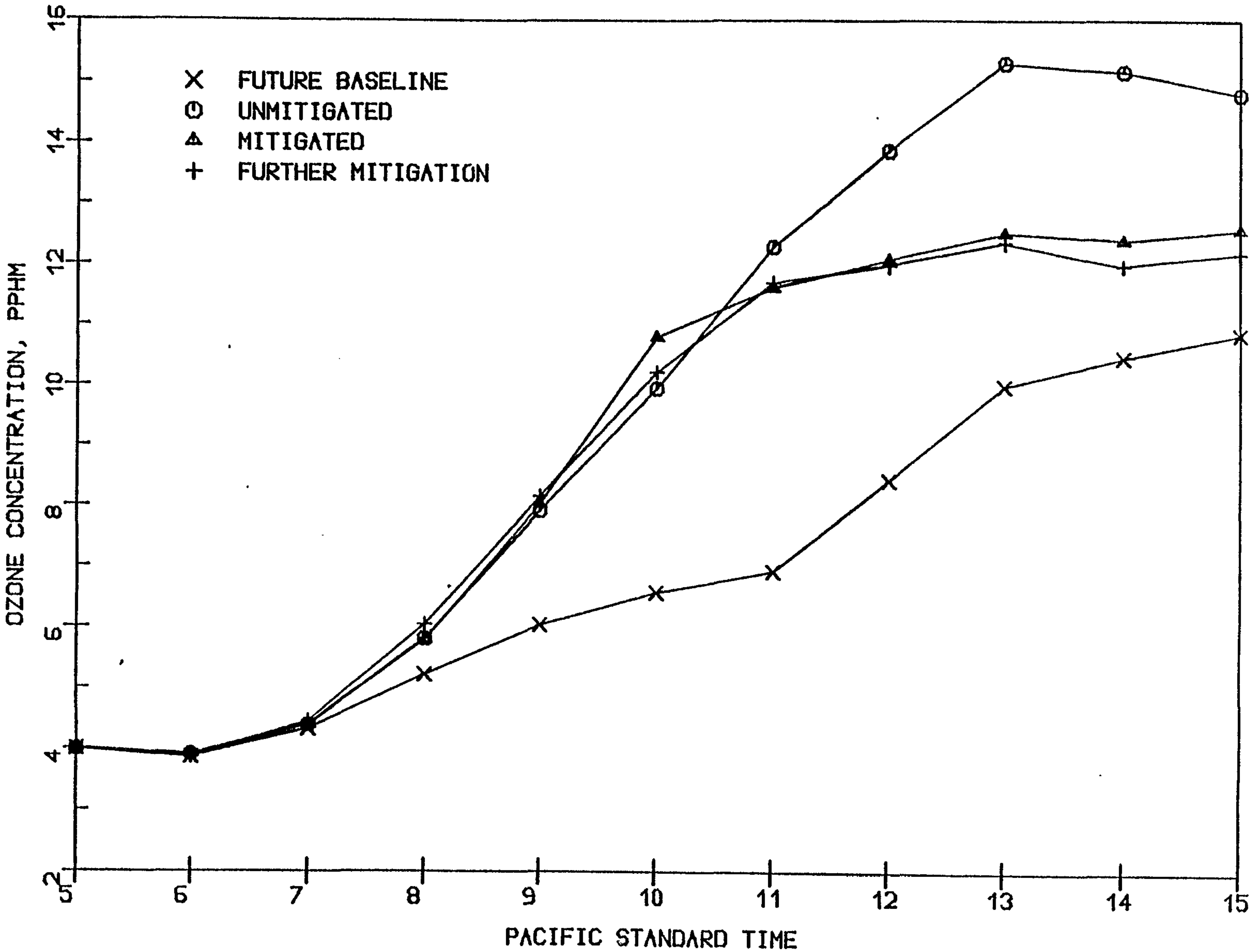


FIGURE 4.3 Run 11

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

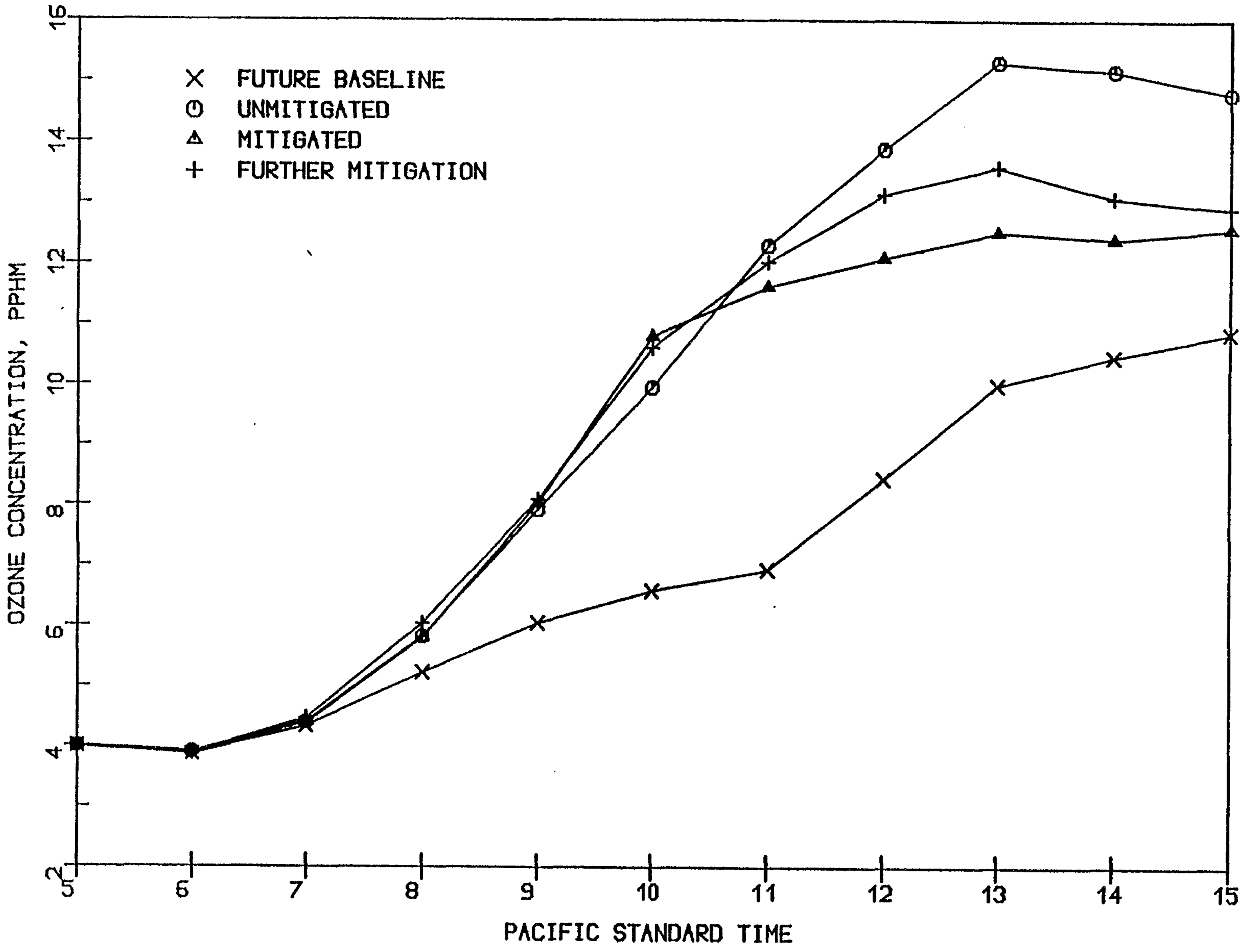


FIGURE 4.4 Run 12

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

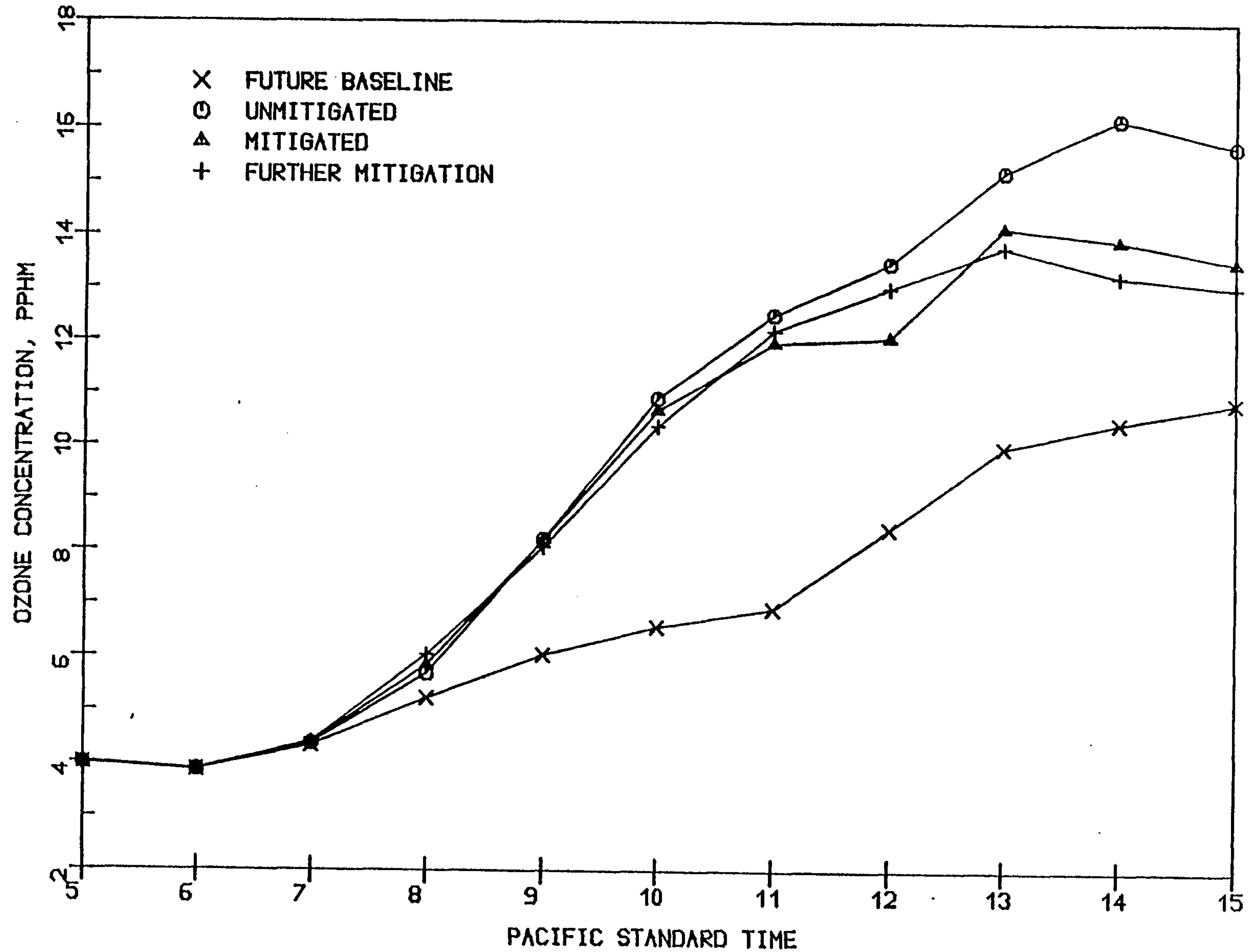


FIGURE 4.5 Run 13

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

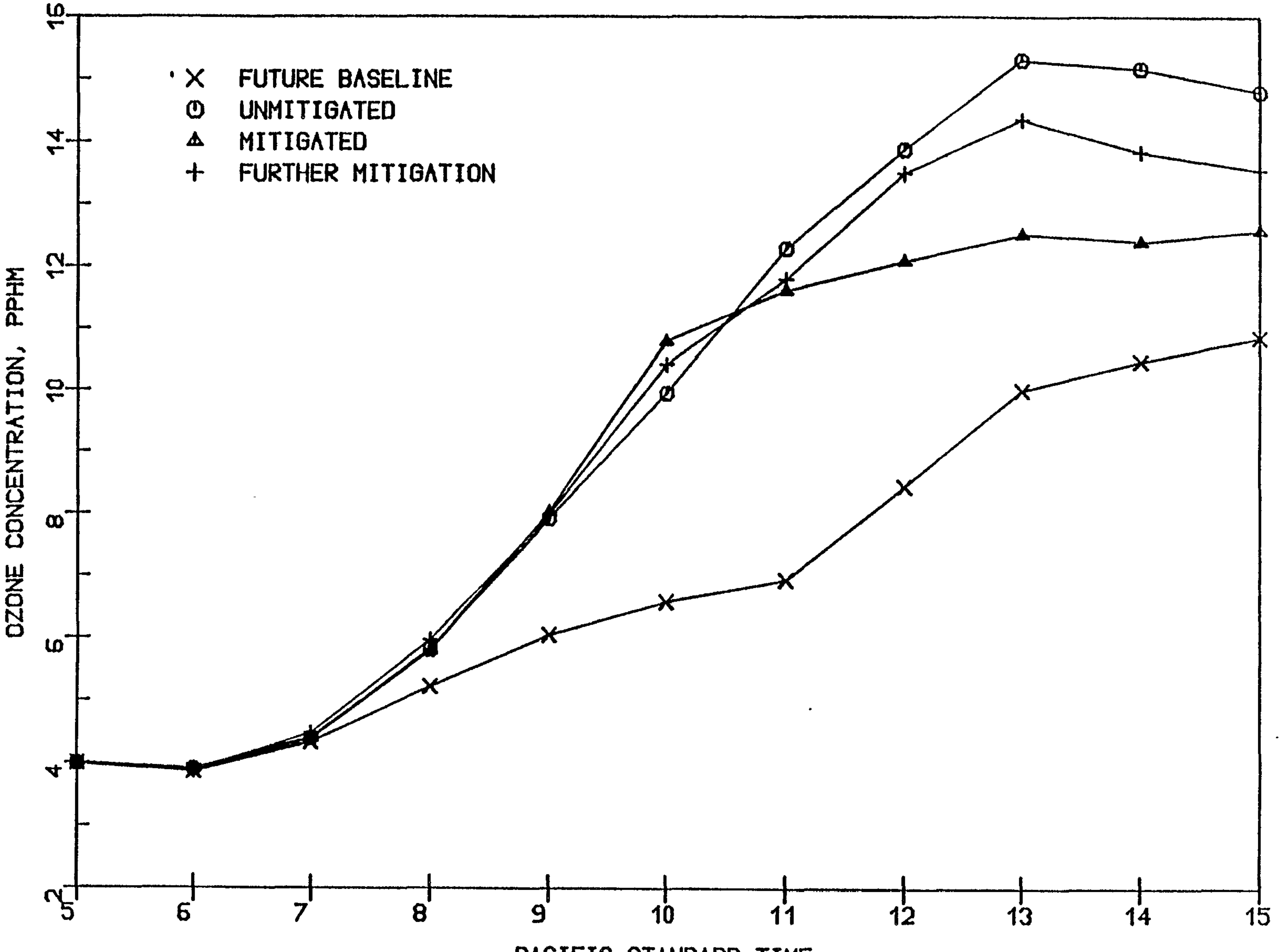


FIGURE 4.6 Run 14

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

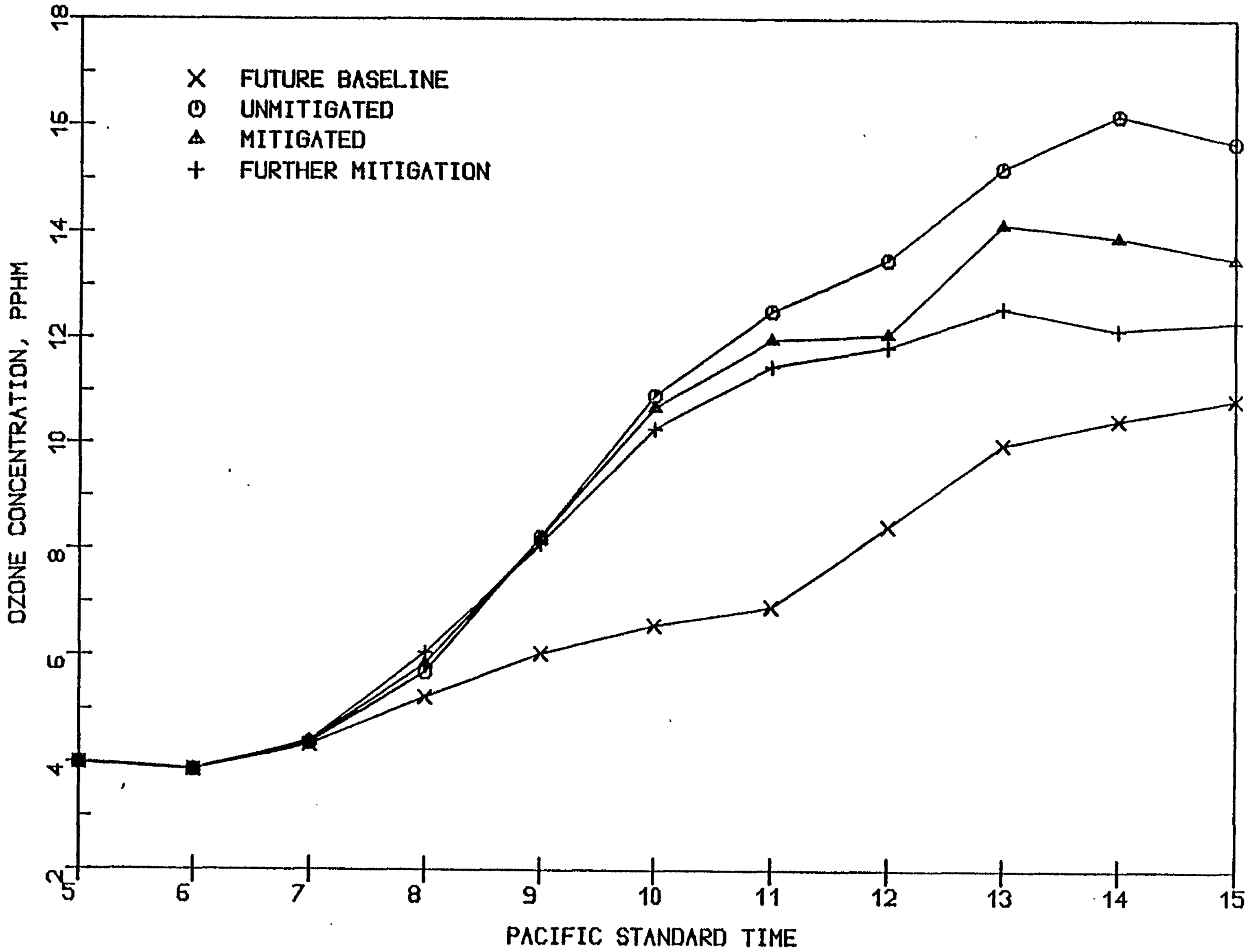


FIGURE 4.7 Run 15

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

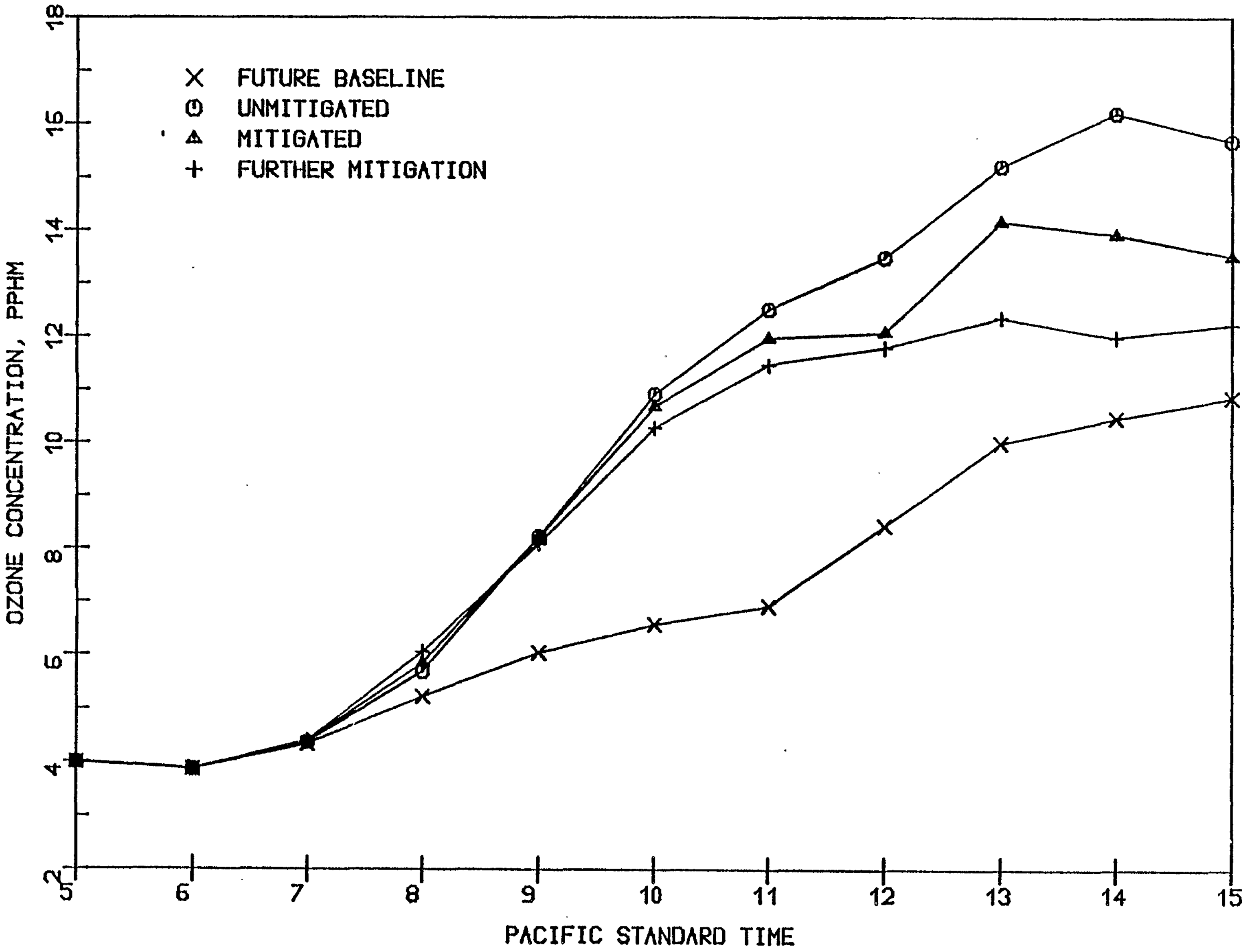


FIGURE 4.8 Run 16

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

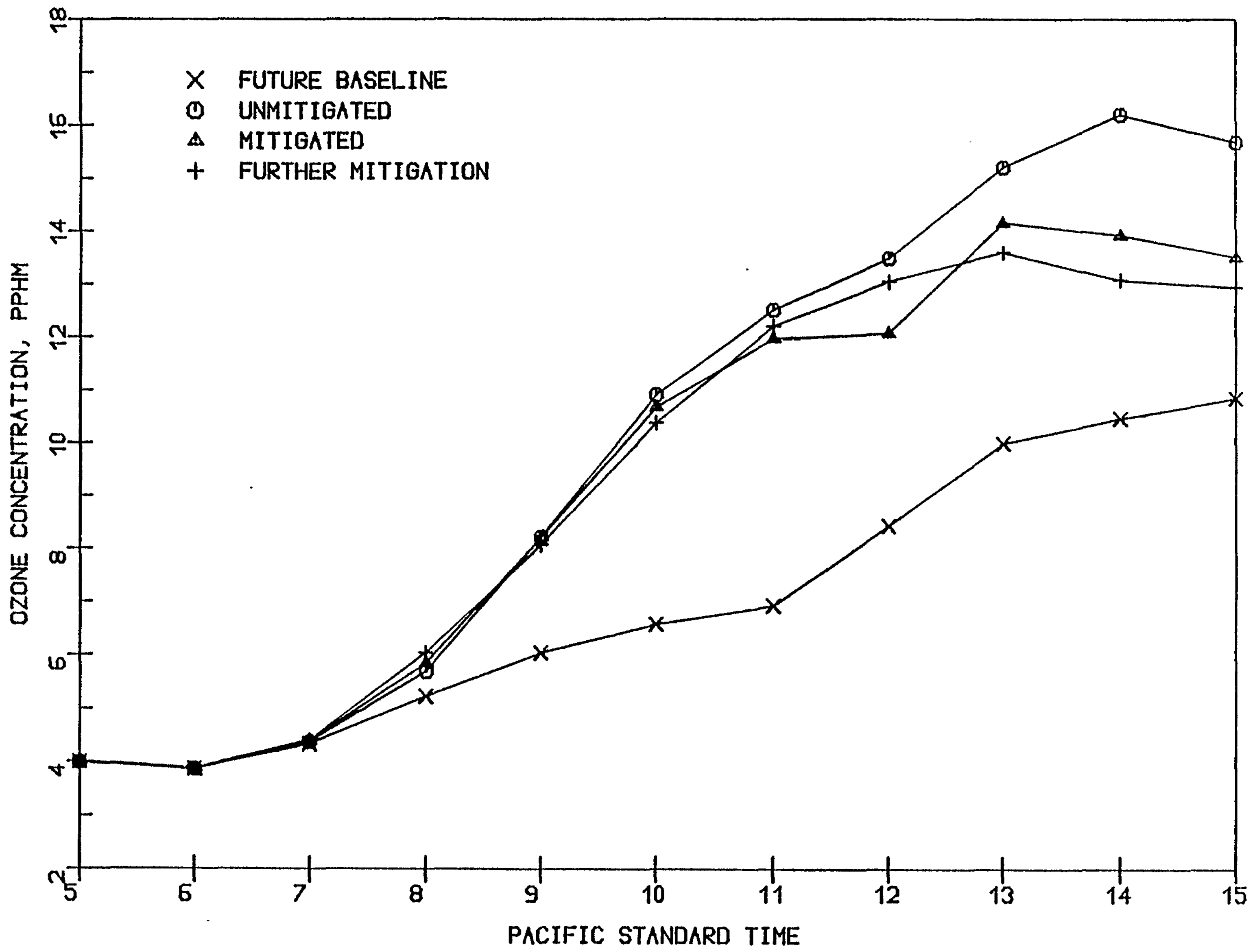


FIGURE 4.9 Run 17

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

Table 5-1

PREDICTED OZONE IMPACTS OF CUMULATIVE FACILITIES ON TRAJECTORY NUMBER 6C

a. Peak Overwater Impacts

Source	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	5.85	--
Cumulative Baseline	9.26	3.41
Full Cumulative	9.19	3.34
Mitigated Full Cumulative	9.38	3.53

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	6.58	--
Cumulative Baseline	10.33	3.78
Full Cumulative	12.67	6.12
Mitigated Full Cumulative	10.95	4.40

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	10.22	--
Cumulative Baseline	11.74	1.52
Full Cumulative	17.21	6.99
Mitigated Full Cumulative	12.38	2.16

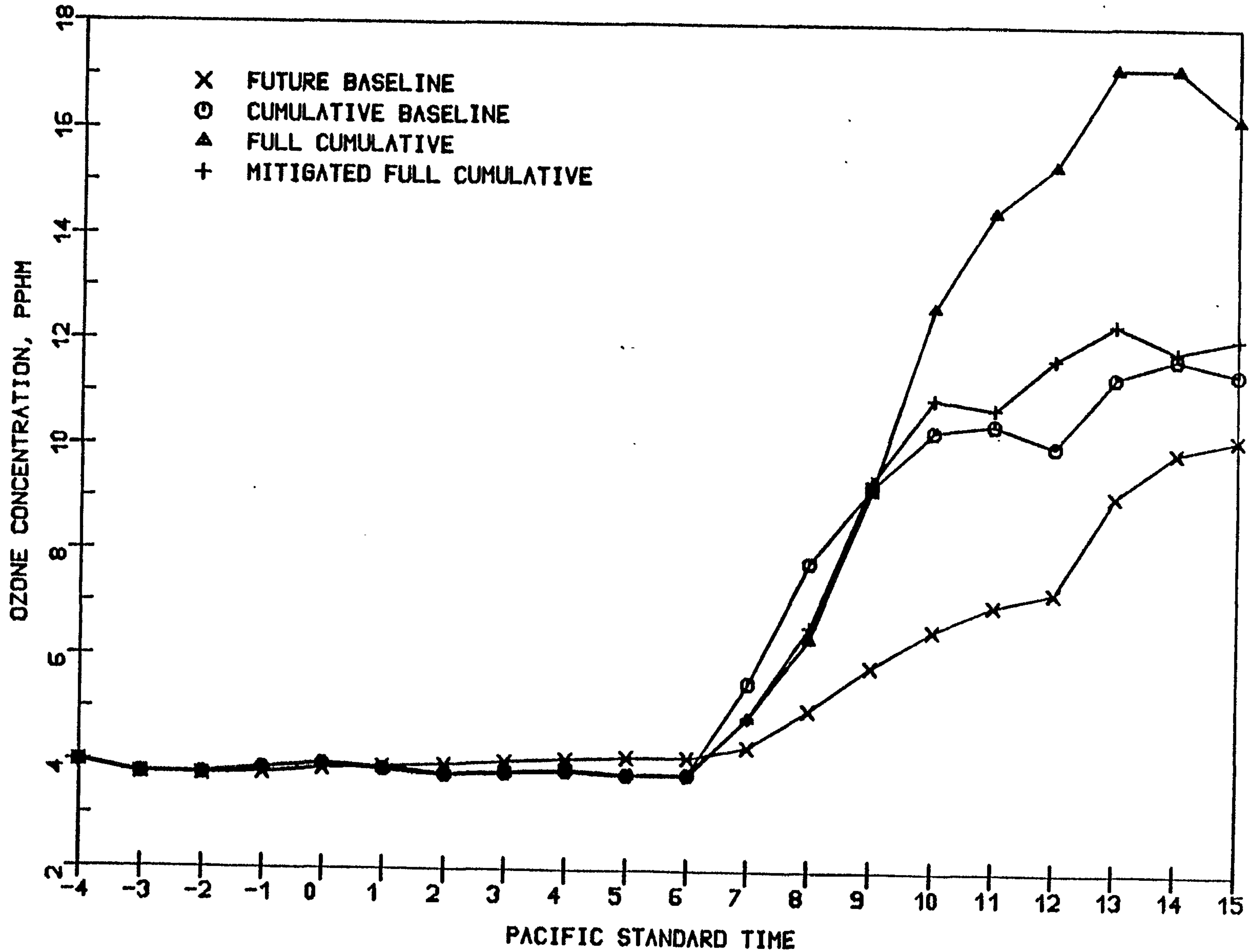


FIGURE 5-1

CUMULATIVE IMPACTS ON TRAJECTORY 6C

Table 5-2

PREDICTED OZONE IMPACTS OF CUMULATIVE FACILITIES ON TRAJECTORY NUMBER 7C1

a. Peak Overwater Impacts

Source	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	8.29	--
Cumulative Baseline	13.23	4.94
Full Cumulative	13.40	5.11

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	7.64	--
Cumulative Baseline	13.20	5.56
Full Cumulative	13.38	5.74

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	7.49	--
Cumulative Baseline	11.89	4.40
Full Cumulative	12.40	4.91

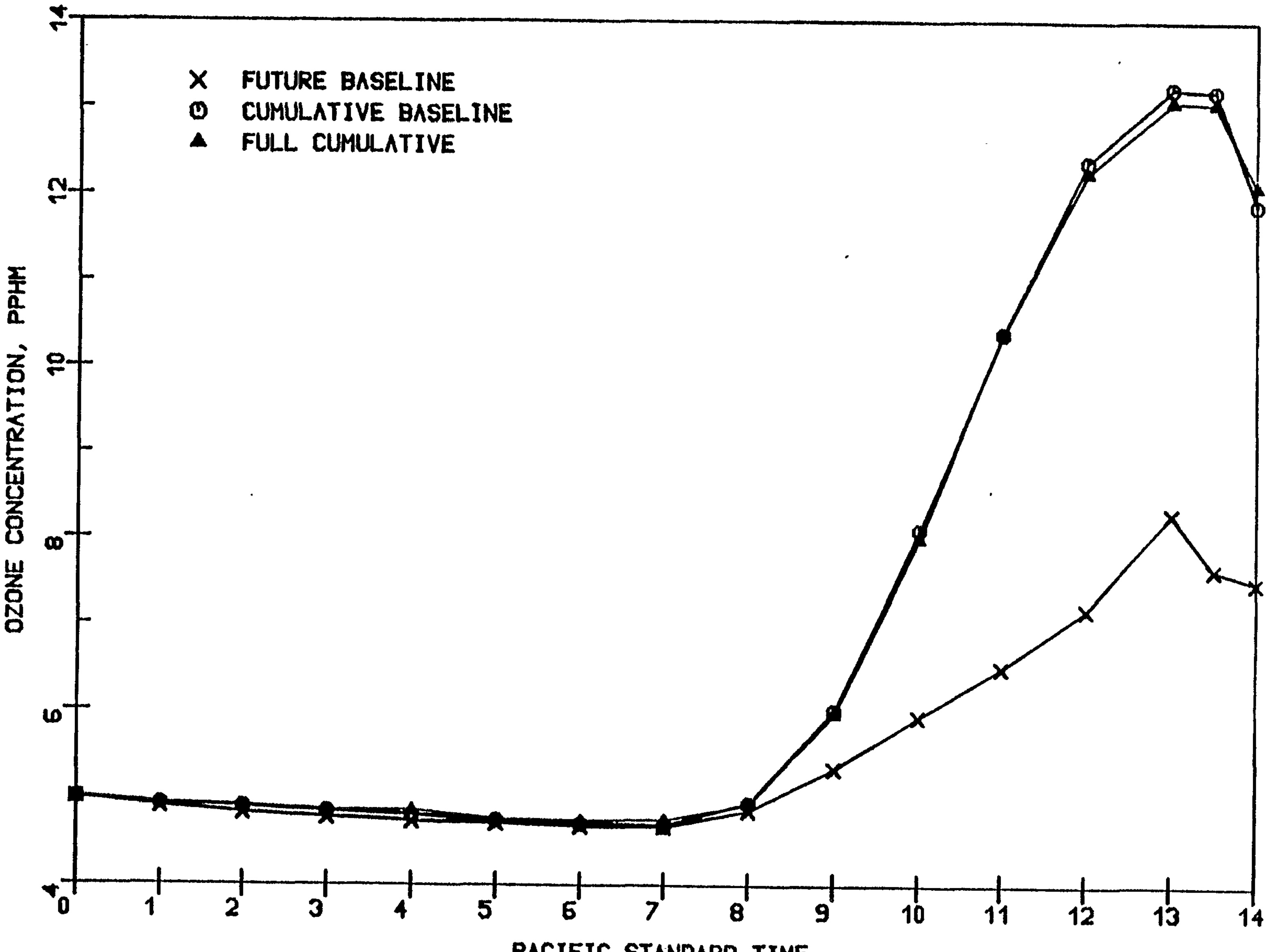


FIGURE 5.2

CUMULATIVE IMPACTS ON TRAJECTORY 7C1

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

1.

PLATFORM IRENE	MITIGATION
2 Cranes (diesel)	• Electric cement pump at Platform Irene
1 Cement Pump (electric)	• Onshore ozone concentration 11.6 pphm
1 Logging Unit (diesel)	
1 Supply Boat (idle)	
1 Flare (1/2 hour) (.1mmscf)	
1 Flare Pilot	

2.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
2 Cranes (diesel)	2 Large Cranes (diesel)	• Electric cement pump at Platform Irene
1 Cement Pump (electric)	1 Small Crane (diesel)	• Electric power tong at Platform Shamrock
1 Logging Unit (diesel)	1 Supply Boat (idle)	• No testing of emergency generators during flaring or when a supply boat is at the platform
1 Supply Boat (idle)	1 Power Tong (electric)	• Onshore ozone concentration 12.16 pphm
1 Flare (1/2 hour)(.1mmscf)	1 Flare Pilot	
1 Flare Pilot		

3.

PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (diesel)	1 Large Crane (diesel)	1 Crane (diesel)	1 Crane (diesel)	• Grid power for OCS-P 0427
1 Supply Boat (idle)	1 Small Crane (diesel)	1 Flare Pilot	1 Flare (1/2 hour) (.1mmscf)	• No testing of emergency generators during flaring, or when a supply boat is at the platform
1 Flare (1/2 hour)(.1mmscf)	1 Supply Boat (idle)		1 Supply Boat (idle)	• Onshore ozone concentration 13.3 pphm
1 Flare Pilot	1 Flare Pilot		1 Flare Pilot	

4.

PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (diesel)	1 Large Crane (diesel)	1 Crane (diesel)	1 Crane (diesel)	• Grid power for OCS-P 0427
1 Supply Boat (idle)	1 Small Crane (diesel)	1 Flare Pilot	1 Supply Boat (idle)	• No testing of emergency generators during flaring, or when a supply boat is at the platform
1 Flare Pilot	1 Supply Boat (idle)		1 Flare Pilot	• Onshore ozone concentration 12.78 pphm
	1 Flare Pilot			

5.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel)	1 Large Crane (electric)	• Electric cement pump at Platform Irene
1 Crane (electric)	1 Large Crane (diesel)	• Eectric crane at Platform Irene
1 Logging Unit (diesel)	1 Power Tong (diesel)	• 2 electric cranes at Platform Shamrock
1 Supply Boat (idle)	1 Flare Pilot	• No testing of emergency generators during flaring, or when a supply boat is at the platform
1 Cement Unit (electric)	1 Supply Boat (idle)	• Onshore ozone concentration 11.91 pphm
1 Flare (1/2 hour)(.1mmscf)	1 Small Crane (electric)	
1 Flare Pilot		

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

6.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
2 Cranes (diesel) 1 Logging Unit (diesel) 1 Cement Unit (electric) 1 Flare (1/2 hour)(.1mmscf) 1 Flare Pilot	2 Large Cranes (diesel) 1 Small Crane (diesel) 1 Supply Boat (idle) 1 Power Tong (diesel) 1 Flare Pilot	• Electric cement pump at Platform Irene • Shared supply boat for Platforms Shamrock and Irene • No testing of emergency generators during flaring, or when a supply boat is at the platform • Onshore ozone concentration 11.99 pphm

7.

PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle)	1 Crane (electric) 1 Flare Pilot 1 Flare (1/2 hour)(.1 mmscf)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • 2 electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring or when a supply boat is at the platform • Onshore ozone concentration 11.92 pphm

8.

PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour)(.1mmscf) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle)	1 Crane (electric) 1 Flare (1/2 hour)(.1 mmscf) 1 Flare Pilot	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring or when a supply boat is at the platform • SCR or Thermal deNOx on boilers at Area Study Gas Plant • Onshore ozone concentration 11.58 pphm

9.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel) 1 Crane (electric) 1 Logging Unit (diesel) 1 Cement Unit (electric) 1 Flare (1/2 hour)(.1mmscf) 1 Flare Pilot	1 Large Crane (electric) 1 Large Crane (diesel) 1 Power Tong (diesel) 1 Flare Pilot 1 Supply Boat (idle) 1 Small Crane (electric) 1 Large Generator Testing (diesel)	• Electric cement pump at Platform Irene • Electric crane at Platform Irene • 2 electric cranes at Platform Shamrock • No testing of emergency generators during flaring • Shared supply boat between Shamrock and Irene • Onshore ozone concentration 13.67 pphm

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

10.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel)	1 Large Crane (electric)	• Electric cement pump at Platform Irene
1 Crane (electric)	1 Large Crane (diesel)	• Electric crane at Platform Irene
1 Logging Unit (diesel)	1 Power Tong (diesel)	• 2 electric cranes at Platform Shamrock
1 Cement Unit (electric)	1 Flare Pilot	• No testing of emergency generators during flaring
1 Flare (1/2 hour)(.1mmscf)	1 Supply Boat (idle)	• Shared supply boat between Shamrock and Irene
1 Flare Pilot	1 Small Crane (electric)	• Exxon uses small Irene-like standby generator
	1 Small Irene-like Generator (diesel)	• Onshore ozone concentration 12.46 pphm

11.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel)	1 Large Crane (electric)	• Electric cement pump at Platform Irene
1 Crane (electric)	1 Large Crane (diesel)	• Electric crane at Platform Irene
1 Logging Unit (diesel)	1 Power Tong (diesel)	• 2 electric cranes at Platform Shamrock
1 Cement Unit (electric)	1 Flare Pilot	• No testing of emergency generators during flaring
1 Flare (1/2 hour)(.1mmscf)	1 Supply Boat (idle)	• Shared supply boat between Shamrock and Irene
1 Flare Pilot	1 Small Crane (electric)	• Exxon uses small Irene-like standby generator
	1 Small Irene-like Generator (diesel)	• SCR or Thermal deNOx on boilers at Lompoc Dehydration Facility
		• Onshore ozone concentration 12.36 pphm

12.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel)	1 Large Crane (electric)	• Electric cement pump at Platform Irene
1 Crane (electric)	1 Large Crane (diesel)	• Electric crane at Platform Irene
1 Logging Unit (diesel)	1 Power Tong (diesel)	• 2 electric cranes at Platform Shamrock
1 Cement Unit (electric)	1 Flare Pilot	• No testing of emergency generators during flaring
1 Flare (1/2 hour)(.1mmscf)	1 Supply Boat (idle)	• Shared supply boat between Shamrock and Irene
1 Flare Pilot	1 Small Crane (electric)	• SCR or Thermal deNOx on boilers at Lompoc Dehydration Facility
	1 Large Generator Testing (diesel)	• Onshore ozone concentration 13.59 pphm

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

13. PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Large Generator Testing (diesel)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Testing Generator (diesel)	1 Crane (electric) 1 Flare Pilot 1 Flare (1/2 hour)(.1 mmscf)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • 2 electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring • SCR or Thermal deNOx at Gas Plant in Lompoc • Onshore ozone concentration 13.79 pphm

14. PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel) 1 Crane (electric) 1 Logging Unit (diesel) 1 Cement Unit (electric) 1 Flare Pilot Testing Generator (diesel)	1 Large Crane (electric) 1 Large Crane (diesel) 1 Power Tong (diesel) 1 Flare Pilot 1 Supply Boat (idle) 1 Small Crane (electric) 1 Flare (1/2 hr)(.23 mmscf)	• Electric cement pump at Platform Irene • Electric crane at Platform Irene • 2 electric cranes at Platform Shamrock • No testing of emergency generators during flaring • Shared supply boat between Shamrock and Irene • Onshore ozone concentration 14.36 pphm

15. PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Small Generator Testing (diesel)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Testing Generator (diesel)	1 Crane (electric) 1 Flare Pilot 1 Flare (1/2 hour)(.1 mmscf)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • 2 electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring • SCR or Thermal deNOx at Gas Plant in Lompoc • Exxon uses small Irene-like standby generator • Onshore ozone concentration 12.59 pphm

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

16. PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour)(.1mmscf) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Small Generator Testing (diesel)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Testing Generator (diesel)	1 Crane (electric) 1 Flare Pilot 1 Flare (1/2 hour)(.1 mmscfs)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • 2 electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring • SCR or Thermal deNOx on oil dehydration facility • Exxon uses small Irene-like standby generator • Onshore ozone concentration 12.36 pphm

17. PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Large Generator Testing (diesel)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Testing Generator (diesel)	1 Crane (electric) 1 Flare Pilot 1 Flare (1/2 hour)(.1 mmscf)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • 2 electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring • SCR or Thermal deNOx on oil dehydration facility • Onshore ozone concentration 13.60 pphm

BIOLOGICAL OPINION

- U.S. Fish and Wildlife Service
- National Marine Fisheries Service

United States
Department of the Interior

Fish and Wildlife Service
Lloyd 500 Building, Suite 1692
500 N.E. Multnomah Street
Portland, Oregon 97232

In Reply Refer To: AFA-SE 1-6-85-F-34   Your Reference:

June 21, 1985

Memorandum

To: Director, Minerals Management Service
Reston, Virginia

From: Assistant Regional Director-Federal Assistance, Region 1,
Portland, Oregon (AFA-SE)

Subject: Formal Endangered Species Consultation -- Offshore Oil/Gas Development and Production in the Santa Maria Basin Offshore of Point Pedernales, Santa Barbara County, California

Consultation under Section 7 of the Endangered Species Act of 1973 (ESA) as amended, was requested by the Minerals Management Service (MMS) on April 4, 1985, and formally initiated on April 10, 1985. At issue are the effects of the proposed and projected OCS oil and gas development and production in the central Santa Maria Basin of Point Pedernales, and the interdependent/ interrelated development on the following federally listed species: southern sea otter (SSO) (Enhydra lutris nereis), California brown pelican (CBP) (Pelecanus occidentalis californicus), American peregrine falcon (APF) (Falco peregrinus anatum), light-footed clapper rail (LFCR) (Rallus longirostris levipes), California least tern (CLT) (Sterna antillarum browni), unarmored threespine stickleback (UTS) (Gasterosteus aculeatus williamsoni), saltmarsh bird's beak (SMBB) (Cordylanthus maritimus maritimus), California condor (CC) (Gymnogyps californianus), and the Bald eagle (BE) (Haliaeetus leucocephalus). Based on review of the Biological Assessment (BA) and draft EIS/EIR, we have determined that the CC and the BE will not be affected by the project. Therefore, they will not be discussed further in this Biological Opinion.

To expedite the formal consultation process, analysis of the effects on candidate species listed in a Fish and Wildlife Service (FWS) species request response letter, dated December 13, 1984, are to be handled separately as informal consultation.

Threatened or endangered marine mammals which may be affected by the project, excluding the sea otter, are under the jurisdiction of the National Marine Fisheries Service (NMFS) and, therefore, are not considered in this consultation. Formal consultation with NMFS regarding the effects of the subject project on these marine mammals may be required.

This Biological Opinion is based on information such as: Biological Assessment for Threatened and Endangered Species of the Central Santa Maria Basin from Proposed Oil and Gas Development and Production Offshore Point Pedernales, Santa Barbara County, California, and Public Draft, Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study EIS/EIR, Technical Appendices E, F, M, March 18, 1985, data in our FWS files, and other pertinent information from various experts.

For the scope of this Biological Opinion, the preferred, or northern route, as originally described in materials presented to us at the initiation of consultation, is evaluated. The alternative, or southern route, as originally proposed, is not herein evaluated since Union Oil rejects this route as infeasible. A realignment of the northern pipeline route proposed by Union Oil after initiation of consultation is evaluated in this Opinion.

BIOLOGICAL OPINION

It is our biological opinion that the subject project is likely to jeopardize the continued existence of the California least tern and the unarmored threespine stickleback. It is our further biological opinion that the subject action is not likely to jeopardize the continued existence of the southern sea otter, California brown pelican, American peregrine falcon, light-footed clapper rail, or saltmarsh bird's beak.

DESCRIPTION OF THE PROPOSED ACTION

This Opinion is for the entire project area of the central Santa Maria Basin and includes construction of 2 offshore platforms now and the addition of 4 hypothetical platforms in the future. Union Oil has filed application to install one offshore oil and gas drilling and production platform on OCS P-0441, and is proposing to transport the oil and gas production to a new offshore dehydration facility near Lompoc, California. The dry oil would then be sent via new and existing pipelines to the Union Oil Santa Maria Refinery for processing. The gas would go via existing pipelines to the Union Oil Battles Gas Plant for processing. See Figures 1 and 2 for project features.

The main elements of the Union proposal are:

> Platform Irene, a 72-slot drilling and production platform on lease OCS P-0441, will be a steel-jacketed platform standing in 243 feet of water.
>
> One subsea power cable and associated substation at Surf, California to provide electrical power to Platform Irene.

Three subsea pipelines—1 wet oil, 1 gas, and 1 produced water return—between Platform Irene and a landfall near Surf on Vandenberg Air Force Base (VAFB).

Continuing pipelines from the landfall to a new oil and gas separation facility north of Lompoc.

A new oil and gas dehydration facility north of Lompoc on Union property where the wet oil will be heated and separated into dry oil (sent to Orcutt) and produced water (returned to Platform Irene).

A new dry oil pipeline from the Lompoc facility north to the existing Orcutt Pump Station.

Modifications to the existing Orcutt Pump Station to allow the handling of the crude oil from OCS P-0441.

Use of an existing pipeline to convey dry oil from Orcutt to the existing Santa Maria Refinery.

Modification to Santa Maria Refinery to allow the handling of crude oil from OCS P-0441.

Use of an existing pipeline to transmit gas from Lompoc to the existing Battles Gas Plant.

Use of the existing Battles Gas Plant to process the gas from OCS P-0441, with liquefied gas by-products being delivered to customers by tank truck and the sales gas being sent out by pipeline.

During the development of the draft EIS/EIR it was determined that, in the event of an oil spill, both the proposed (northern) and alternate (southern) pipeline routes could impact the Santa Ynez River estuary. In order to mitigate impacts to the estuary from installation and operation of the onshore pipeline, consultants from A.D. Little developed an alternate pipeline route to the south that placed the pipeline route on the other side of Highway 246 completely out of the estuary. Union Oil, upon reviewing the document, proposed a realignment of the preferred route that placed the pipeline further to the north, slightly higher in the basin and further away from the estuary.

Exxon has also proposed offshore facilities for drilling and production on OCS P-0440.

The main elements of the project are:

The Project Shamrock platform, a 60-slot production and drilling facility on lease OCS P-0440, will be a steel-jacketed platform standing in 277 feet of water. Wet oil and gas will be separated on the Project Shamrock platform, with the wet oil being sent by pipeline to Platform Irene and the gas compressed and reinjected into the oil reservoir until the year 2,000 at which time the gas will be recovered.

Two subsea pipelines--1 wet oil and 1 gas--between the Project Shamrock platform and Platform Irene.

Exxon has not submitted plans covering the onshore portion of their project. Any onshore components required for the Exxon project will be covered by a separate application and would likely be subject to a separate endangered species consultation.

The consolidated pipelines from Platform Irene will be trenched and buried to a depth of 3 to 6 feet through the surf zone and will come ashore approximately 1/2 mile north of the Santa Ynez River. Either a barge pull or beach pull method will be used to install these offshore pipelines.

The onshore pipelines will be installed using conventional land pipelaying methods and equipment and will be buried with a minimum cover of 3 feet, except at stream crossings where the line will be buried to a depth of 5 feet below the stream bottom.

Two valve sites are to be installed for the onshore section of pipelines. One valve site will be located approximately 7,100 feet easterly from the beach on VAFB property. This one acre site, will contain block valves on each pipeline with all valves located 3 feet above grade. One valve on each pipeline will have "automatic shut-in" capability by responding to a signal from the pipeline surveillance system, platform, or processing facility. The second valve site will be located within the final 50-foot pipeline right-of-way. A single manually operated valve will be installed in each pipeline. Prefabricated concrete valve boxes will be used to house each valve.

All pipelines will be designed, fabricated, installed, tested, operated, and inspected in accordance with all applicable state and Federal regulations. All pipelines will be protected from external corrosion by a protective coating which will be supplemented for offshore pipelines with sacrificial anode type cathodic protection. (The sacrificial anode will react with corrosive elements before they can corrode the pipeline itself.) Onshore pipelines will be protected by a cathodic protection system.

All produced oil from the 2 platforms will be comingled at Platform Irene via an interplatform pipeline and shipped ashore through a consolidated 20-inch pipeline to the Lompoc facility. Gas produced from Platform Irene will be compressed, dehydrated, and transported via a 10-inch pipeline to Lompoc. At this point, the gas will either be used as fuel for the Lompoc facility or be treated for shipment to the existing Battles Gas Plant. Gas produced from Platform Shamrock will be compressed, dehydrated, and then reinjected to help maintain reservoir productivity. Water separated from the crude oil at the Lompoc facility will be routed into a produced water system for removal of traces of oil before being shipped back to Platform Irene via a 10-inch pipeline for ultimate discharge into the ocean.

Pipeline quality oil will be shipped from the Lompoc dehydration facility north to the Santa Maria Refinery. There are existing pipelines the entire distance; however, because of small pipeline size, Union Oil proposes to install 11.5 miles of 10-inch pipe to transport OCS production from Lompoc to the Orcutt Pumping Station. At Orcutt, the OCS crude will be mixed with Lompoc and Orcutt lighter crude and transported via an existing 8-inch pipeline to the Santa Maria Refinery.

The site of the proposed Lompoc Dehydration Facility is just north of the City of Lompoc. The proposed facility will receive the wet oil (i.e. crude oil and water) produced at Platform Irene and dehydrate the oil to 3 percent or less water. During this dehydration process any dissolved gas in the crude oil will be removed so that the crude oil will be acceptable as a feedstock to the Santa Maria Refinery. The water that is removed from the incoming crude oil will be treated to make it suitable for ocean disposal. The gas production from Platform Irene will also be received at the proposed Lompoc (Oil) Dehydration Facility, scrubbed to remove any hydrocarbon condensate, and then reintroduced into the Lompoc to Battles Gas Plant pipeline along with any excess gas recovered from the crude oil. The facility will be designed to treat 36,000 bbl. per day oil and 36,000 bbl. per day of produced water.

The existing Santa Maria Refinery is about 8 miles north of the City of Guadalupe in southwestern San Luis Obispo County. The refinery is used to upgrade low gravity crude oils by coking so the oil can be further refined at the Union Rodeo Refinery which is located in the San Francisco Bay Area. Some limited semirefined products, such as gas oils, are shipped to the Union Los Angeles Refinery by tanker from the Avila Marine Terminal.

To process 20,000 bbl. of OCS crude, minor modifications will be made only to the Santa Maria processing capabilities and not to throughput capacity. No modifications or operating changes will be made to the pipeline system from the Santa Maria Refinery to the San Francisco Refinery.

The existing Battles Gas Plant is east of Highway 101 near Betteravia. It receives gas from all of the Santa Maria area oil fields including Lompoc. The primary function of the plant is to remove hydrocarbon liquids and impurities from the incoming natural gas stream before the gas is returned to the oil field for fuel or sold to the Southern California Gas Company. No modifications to the Battles Plant will be required to treat natural gas from Platform Irene.

To develop the oil field, an additional 4 platforms could be installed as shown in Figure 3. These hypothetical platforms are proposed to use subsea pipelines to move their oil and gas to the industry lines from Platform Irene to the Lompoc Dehydration Facility. The hypothetical platforms are assumed to tie into other platforms which, in turn, tie into Platform Irene or the hypothetical platform will tie into Platform Irene directly.

MMS has estimated the total resources to be 135 million barrels of oil and 135 billion standard cubic feet of gas. With present plans 1 new platform will be brought on-line each year starting in 1987, with the final platform producing in 1990.

SPECIES ACCOUNTS

In prior formal consultations with your agency, Bureau of Land Management, (BLM) and U.S. Geological Survey (GS) dealing with OCS oil and gas lease sales, we have summarized the biology/ecology of the California brown pelican, American peregrine falcon, light-footed clapper rail, and saltmarsh bird's beak. Please refer to our Biological Opinions on OCS Lease Sales No. 53 (FWS/OES, BLM/GS 80-1, dated September 18, 1980), No. 68 (FWS/OES, BLM/GS 81-1, dated April 29, 1981), No. 73 (FWS/OES, MMS 83-2, dated June 8, 1983), and No. 80 (AFA-SE 1-1-83-F-21, dated September 30, 1983), for information on these species. Additional and pertinent recent information appears in the Biological Assessment.

Southern Sea Otter

Recent information regarding SSO warrants a revision of the species accounts from past Opinions. On January 14, 1977, the SSO was listed as "threatened" under the Endangered Species Act (42 Federal Register 2965-2968). The primary reasons for designating the SSO as threatened were the small population size, reduced range, and vulnerability to oil spills from tanker accidents. The Southern Sea Otter Recovery Plan, approved by the Director of the FWS in 1982, identifies and sets priorities for research and management actions necessary to recover and restore the population to a secure status. The plan sets forth, as a primary goal, the establishment of one or more breeding colonies to reduce the threats to the species from offshore oil/gas activities.

The historic range of sea otters extended from the northern Japanese archipelago along the Aleutian Island chain and the Alaskan Peninsula following along the Pacific coast of North America to Mexico. The lucrative SSO fur trade caused excessive exploitation and severe reduction of the population during the 18th and 19th centuries. Prior to exploitation of the otters by commercial fur hunters, the California population was about 16,000 (California Department of Fish and Game (CDFG) 1976). Subsequent to cessation of commercial harvest, the only surviving SSO south of Alaska existed off central California. The remnant population in California was suspected to number as few as 30-50 animals (CDFG 1976). With the passage of the International Fur Seal Treaty (1911), commercial hunting pressures were eliminated and the SSO range and numbers slowly expanded. After cessation of commercial harvesting, the population increased at a rate of approximately 4 to 5 percent per year from 1914 until the mid-1970's (Kenyon 1969, CDFG 1976, Estes and Jameson 1983, Bonnell et al. 1983). The highest estimate of the SSO population in recent times was in 1976 with 1,789 animals (CDFG 1976). Since then, surveys conducted by the FWS and CDFG have not detected a significant increase in population size.

The results of the most recent counts are:

Aerial Survey - June 1984 = 1,203 otters
Shore-based Survey - June 1984 = 1,304 otters
May 1985 = 1,361 otters

The current SSO range encompasses roughly 220 miles of coastline along central California extending south to the mouth of the Santa Maria River in San Luis Obispo County and north to Ano Nuevo in Santa Cruz County.

The distribution of otters changes seasonally. The center portion of the range between Monterey and Cayucos usually consists primarily of females with and without pups, recently weaned pups, and immature females. The number of mature males in the center portion of the range increases during the summer-fall breeding season. Pupping occurs year round but peaks in winter-spring.

The young nonbreeding males congregate at the north and south peripheries of the range. Most breeding males return to these peripheral male groups during the winter-spring. The number of male otters in the center of the range peaks from July through October. The seasonal segregations are not absolute, some males may be found in the center portion of the range from April through December and occasionally throughout the year.

In 1980, the southernmost group, then centered about Pismo Beach, numbered around 160 individuals. Since 1983, otters have concentrated further north to the Morro Bay area (up to 40 counted in Morro Bay in April 1985). In 1984, CDFG observed 28 otters between Pismo Pier and Point Sal and 4 between Point Sal and Point Conception (Ron Jameson pers. comm.). Five otters were observed between Pismo Beach and the Santa Maria River and 2 between the Santa Maria River and Point Conception during 1985. The distribution and abundance of otters south of Point Sal is variable. Those found south of Point Sal are believed to be nomadic, subdominant males. With current information we do not fully understand how these animals presently contribute to the overall dynamics of the population. However, as breeding males to the north are lost, these nomadic males may serve as replacements.

Local distribution of otters depends on weather conditions, coastal physiognomy, and the seasonal availabilty of kelp. Otters raft in kelp beds which tend to break up the wave action and act as an anchor. They wrap the kelp fronds around their middle and thus tether themselves to one spot. Severe weather tends to disperse individuals rafting in unprotected areas. During severe weather conditions mothers and pups in particular (Sandegren et al. 1973, Reidman 1984) seek out much of the kelp and reduce the rafting areas available. At that time, the SSO distribution pattern becomes relatively clumped reflecting the availability of the remaining kelp beds and protected harbors and coves.

Range expansion to the south has oscillated over the past few years and has not shown strong tendencies to move beyond the Point Sal/Santa Maria River area. Infrequently otters are sighted as far north as Cape Mendocino and as far south as Malibu. These sightings do not, in our opinion, represent significant emigration and indicate that the current lack of population growth is not due to excessive emigration from the established population.

The birth rate of otters in California is consistent with that of the Alaskan subspecies which is healthy and increasing in number (Estes 1981, Estes and Jameson 1983). The proportion of pups in the population tends to increase in spring following the winter-spring peak pupping season (Estes and Jameson 1983). Estimates from the spring 1985 California population survey (which coincides with the end of the peak pupping period) predict 21 pups per 100 population, and based on past surveys an average of 15-16 pups per 100 population is predicted during the rest of the year. The current lack of growth, therefore, is attributed to an increase in mortality.

The CDFG suggested that the level of accidental take in gill and trammel nets during the last decade probably contributed significantly to the lack of SSO population growth and range expansion. The number killed in gill and trammel nets roughly equals the anticipated annual increase in the population (Wendell et al. 1985). This rate of loss means that at least 4 to 5 percent of the population drowns in nets each year. Continuation of this level of mortality seriously threatens the recovery of the SSO and could result in its reclassification to endangered status. Legislation (Senate Bill 89) was introduced to the California Legislature on December 20, 1984 to ban permanently the use of entangling fishing nets (with mesh size greater than 3-1/2 inches) within the 15-fathom depth curve throughout SSO range. The bill was signed by the Governor on May 24, 1985.

Implementation of set net restrictions should significantly reduce the number of otters drowned in gill and trammel nets. With the elimination of this source of mortality, we anticipate the SSO population will renew its former growth rate of about 5 percent per year. Over the life of the project, based on past distribution data between 1911 and 1970, we anticipate that SSO range may expand to the south at an average rate of 1.8 miles per year (CDFG 1976, FWS 1982). By the end of the project, this rate of expansion would result in the southern boundary of the population near Government Point, Santa Barbara County.

Conversely, if implementation of gill and trammel net restriction does not substantially reduce the mortality rate, we must assume that some intrinsic factor, such as limited food resources, may be inhibiting the growth rate. This scenario is less likely to be true at the ends of the range where the population does not exhibit the characteristics of a population at carrying capacity (e.g. proportion of time spent foraging) (Estes et al. 1982, Estes unpubl. ms.). However, in the center of the range where the population has long been established, food may be a limiting factor (Ames et al. 1983). If some density-dependent factor is limiting SSO population growth, then a reduced growth rate can be expected over the life of the project. Range expansion may occur, however, with or without an increase in population size. In the last 10 years, for example, the population has not increased in number, yet the southern limit of the range has fluctuated.

Recent Biological Opinions (1-1-83-F-21, and 1-1-84-F-7) state that the proposed oil and gas development increasingly aggravates the current threat posed by existing offshore oil and gas activities and tanker traffic to the California least tern, light-footed clapper rail, and brown pelican. A similar situation is developing regarding the southern sea otter. This was first noted in our Biological Opinion (1-1-84-F-22) on the Point Arguello Area Study.

Our Biological Opinion on Lease Sale 53 determined that a significant oil spill risk to the sea otter population would occur with maximum development of the Santa Maria subarea (based on the projected oil reserves and production volumes as presented in the draft EIS for Lease Sale 53). It is noteworthy that subsequent oil finds in the southern portion of the Santa Maria subarea (Point Arugello field) far exceeded the projected reservoir.

California Least Tern

Though presented in previous Opinions, our analysis warrants inclusion and repetition of this account. Once widespread and common along the central and southern California coast, to the extent of being described as numberless on the beaches of Los Angeles County (McCormick 1899, as cited in Bent 1921), the CLT population declined to a known low point of between 623 and 763 breeding pairs around 1973 (Bender 1974). The loss of nesting and breeding season feeding habitats, as a result of human activities, is largely responsible for the decline. Since then, because of a variety of management efforts (particularly nesting and foraging area protection) made possible by its designation as an endangered species, the CLT has steadily increased in abundance to an estimated California breeding population of about 966 pairs in 1984. This species has been on both the State of California and Federal endangered species lists since 1970. The number of terns nesting in Baja California, Republic of Mexico, is uncertain though small nesting sites have been noted over the years, some as recently as 1982.

These migratory birds usually arrive in California from Central and South America by late April and complete their breeding cycle by the end of August. The somewhat discontinuous breeding range of the CLT in the United States extends from the Mexican border to San Francisco Bay with the majority of birds nesting in southern California. Unfrequented sandy beaches close to estuaries and coastal embayments have traditionally served as nesting sites for the least tern. Human use of beaches for recreational, residential, and industrial development has severely diminished the availability of suitable least tern nesting areas. In recent years, many non-beach sandy surfaces in coastal areas have been successfully utilized by least terns for nesting (Massey and Atwood 1979, 1980, 1981a, 1981b, 1982, 1983).

While breeding, least terns feed almost exclusively on small fish captured in shallow, nearshore areas, estuaries, and river mouths (Collins et al. 1979, Massey and Atwood 1981a, Atwood and Minsky 1983); generally, most foraging activity occurs within two miles of the nesting sites (Atwood and Minsky 1983). After their eggs hatch, breeding adults catch and deliver small fish to the flightless young. Young fledge at about 20 days of age, but continue to be fed and remain dependent upon their parents for food until becoming efficient foragers themselves.

Following fledging, birds abandon the ternery and disperse to other feeding and roosting habitats. This period of post-breeding dispersal is an important interlude during which fledgings must learn fishing skills in preparation for the rigors of southward migration. During this time, freshwater habitats, lagoons, and estuaries provide important foraging and roosting areas for family groups and small flocks (Massey and Atwood 1982, 1983). These areas are characterized by (1) suitable food resources, (2) proximity to active breeding colonies, and (3) relatively protected loafing and resting areas (California Least Tern Recovery Plan 1983 Revision).

Annual CLT nest site censuses conducted for the CDFG have revealed five nesting localities along the north coast of Santa Barbara County and the southwestern coast of San Luis Obispo County at different times over the last decade. These colonies -- Oso Flaco Lake, Guadalupe Dunes, the mouth of San Antonio Creek, Purisima Point, and the Santa Ynez River mouth -- comprise approximately five percent of the United States population and represent the only currently active nesting areas between Ventura County and San Francisco Bay. The Purisima Point and San Antonio Creek sites are further unique in that these colonies probably represent the most natural, undisturbed nesting sites in California (Atwood 1984). Unlike many CLT breeding sites in southern California, colonies located on VAFB (San Antonio Creek, Purisimo Point, and the Santa Ynez River colonies) are relatively easily protected from unauthorized human disturbances by virtue of military security regulations and restrictions.

Since thorough census efforts began, the five nesting sites have totaled: 1978 - about 33 pairs; 1979 - about 59 pairs; 1980 - about 53 pairs; 1981 - 59 pairs; 1982 - about 40 pairs; 1983 - 44 pairs; 1984 - about 48 pairs. It is still too early for 1985 census results.

Reproductive success is closely related to the availability of undisturbed nest sites and nearby waters with adequate supplies of appropriately sized fishes. Nesting success at these 5 sites has recently been low. Atwood and Kelly (1984) documented poor food supplies as the primary factor for nesting failures in 1982; whereas, Atwood (1984) found heavy coyote (Canis latran) predation as the primary cause of failures in 1984.

Unarmored Threespine Stickleback

The UTS is native to the larger streams along the southern California coast, from the Santa Maria River on the north to the Santa Ana River on the south. Historically UTS occurred in the lower reaches of the Los Angeles, San Gabriel, Santa Ana, Santa Clara, and Santa Maria Rivers, and in San Antonio Creek. Today the UTS is found native only in the headwaters and one small tributary of the Santa Clara River in Los Angeles County and in San Antonio Creek. Relocated populations are now present in Honda and Shuman Creek at VAFB and in San Felipe Creek which drains into the Salton Sea. The population in San Antonio Creek occurs in the perennial segment between Barka Slough and the Pacific Ocean (Irwin and Soltz 1982); however, a small population of UTS has recently been found in a perennial pool near Los Alamos, upstream from Barka Slough (PLUS 1984).

Prime stickleback habitat consists of quiet, weedy pools that are connected to a source of running water (Baskin 1974). Three critical elements of such habitat appear to be (1) moderate pond depth and size, (2) the presence of abundant aquatic vegetation, and (3) continuous flows of good quality water. Irwin and Soltz (1982) found that while some reproduction occurs throughout the year in San Antonio Creek, the highest levels of recruitment occur during the months of May through September. Peak spawning activity is thought to occur during May, June, and July.

The survival of the UTS is threatened by agricultural, industrial, and municipal water pollution; channelization and the other habitat modifications associated with urbanization; hybridization with G. a. microcephalus; the introduction of competing and predatory species; and streamflow alterations caused by water diversions and groundwater pumping (Unarmored Threespine Stickleback Recovery Plan 1983 Revision).

The UTS was listed as endangered in 1970 (35 Federal Register 16047). The reach of San Antonio Creek between Barka Slough and the Pacific Ocean has been proposed as critical habitat (45 Federal Register 76012). Further information about the status and biology of this endangered fish is contained in the Unarmored Threespine Stickleback Recovery Plan (FWS 1983). That plan also describes the actions needed to protect this fish and recover it to a nonendangered status.

EFFECTS OF THE PROPOSED ACTION

Oil spills from the subject project constitute the greatest threat to listed species. Occasional, accidental discharges of hydrocarbons during routine operations are typically limited to discharges of quantities less than 1 bbl. of crude oil and have resulted in less than 20 bbl. of oil being discharged to the ocean between 1975 and 1981. Due to the infrequency and low amounts of these accidental discharges, they do not represent significant threat to endangered species.

Catastrophic spills may result from a well blowout, vessel collisions, pipeline breaks, operational errors, etc. (vessel groungings, scuttlings). Such events do represent a significant threat to listed species.

Oil Spills From Offshore Platforms. A particular concern during well drilling and production is blowout -- an uncontrolled discharge of oil and/or gas from a drill hole. A blowout can occur from failure to contain the reservoir pressure due to equipment failure, human error, or unpredicted geopressure conditions. Such an event occurred in 1969 in the Santa Barbara Channel and led to the largest blowout-related oil spill to date on the United States OCS. Since that date changes resulting from increased regulatory requirements, as well as improvements in training programs, equipment, and operating practices, have greatly reduced the probability of a recurrence of that particular type of event.

Oil spills might also occur from process and storage systems on the platforms, from a variety of causes: (Criticality/frequency estimates provided by MMS)

--Seismic events, high energy vessel collisions, marine casualties, or spontaneous structural failure events could lead to failure of oil-containing vessels, such as the oil-water production separators which will normally be about 1/3 full of oil on a dry oil basis with natural gas in the vapor space. (Criticality - minor; frequency - unlikely.)

--Maloperation or mechanical failure of oil pipeline pig launchers on the platforms or the pig received on Platform Irene would release wet oil at the pipeline pumping capacity until the system could be isolated. (Criticality - minor; frequency - rare for extended releases from launchers, unlikely for extended releases from receivers.)

--External impacts on the 2 platforms that might cause partial or total destruction of the platform were identified as ship-platform collisions, aborted space missions, aircraft accidents, and seismic events. If complete structural collapse of a platform were to occur, it is expected that the subsurface safety valves would prevent blowouts from the wells. Nevertheless, oil will be lost from ruptured production well casing/tubing, oil-containing vessels and tanks, and from broken pipelines or risers. The latter would provide the major sources of oil loss and the loss of either platform would result in a relatively large spill. (Criticality - major for Platform Irene, because the spill would include the contents of the Shamrock to Irene pipeline, but medium for the Shamrock platform; frequency - rare for each.)

Offshore Pipeline Spills. Important failure modes for offshore pipelines are external corrosion, external impact, mechanical defects, natural hazards, internal corrosion, and operating errors. Andersen and Misund (1983) indicated that third external impact and external corrosion are the most significant causes of pipeline failure. They also found that failure rates decrease with increasing pipeline diameter and increase with increasing age of pipeline. For this project a higher rate is used for the smaller pipelines (12 inches or less) than for the larger pipelines. Further details are provided in Section 2.3 of Technical Appendix M of the draft EIR/EIS.

Union proposes a Supervisory Control and Data Acquisition System (SCADA) to monitor the oil pipeline for leaks. This system measures the volume of oil entering the pipeline at the platform and compares that volume with the measured volume arriving at the Lompoc Dehydration Facility. If these values do not compare (i.e., a leak exists) an alarm sounds, warning the operators at both the platform and the Lompoc facility. The operator at the Lompoc facility is given a few minutes to react to the warning, and then must either shutdown or override the system. If no action is taken, and the volumes continue to disagree, then a SCADA system will automatically shutdown the pipeline system and close all the block valves. The accuracy of the SCADA system is estimated to be one-tenth of 1 percent of the throughput.

In the event of an oil pipeline rupture (as discussed in Section 3.2 of Technical Appendix M), there will be due to the continued pumping of oil until the break has been detected and all the pipeline pumps shut down. Because of the length of the pipeline from the platforms to Lompoc, which will delay the onset of flow discrepancy alarms, and the need for Lompoc to request the platform to shut down , a reasonable reaction time will be around 10 minutes. The loss due to pumping is much less than the inventory lost after pumping has stopped, hence minor variations in response will not appreciably affect the total quantity lost.

Once pumping has stopped, ocean water will intrude into the broken pipeline sections and expel oil. If the pipeline were completely horizontal and the line were completely severed, the loss would equal the total inventory in the subsea segments. However, any rise in the pipeline across the sea bed will lead to an "intrusion trap" where lighter-than-water oil becomes trapped above water and prevents further oil release. As the project pipelines rise gradually from the Project Shamrock platform to Platform Irene and then to landfall, the extent of loss will depend greatly on the location of the rupture. Thus, the maximum loss from a near shore break in the subsea pipeline connecting Platform Irene to Lompoc is assumed to be 18,000 bbl. of dry oil (major criticality) with lesser volumes for breaks elsewhere in this line. The corresponding spill from the interplatform oil pipeline from Shamrock to Irene was assumed to be 1,250 bbl. (medium criticality).

If, instead of a rupture, a sizeable leak occurs (a 2-inch diameter hole), the initial release rate would be significantly lower and only 250 to 350 bbl. of dry oil would be released in the first 10 minutes (medium criticality). However, without early repair the pipeline would slowly lose more oil, estimated at up to dry oil for the line from Irene to shore and up to 1,250 bbl. interplatform line (both medium criticality).

In the event of a small leak, historical data suggest that the spillage would be no more than 100 bbl. of dry oil (minor criticality).

Overall Offshore Oil Spill Hazards. Two oil spill risk analyses were completed for the purpose of analyzing the impacts of catastrophic offshore oil spills - the A.D. Little (ADL) analysis and the MMS analysis. Both models include a prediction of the number of spills that are likely to occur throughout the life of the project, the trajectory of oil slicks from a number of offshore launch points, and compute the probabilistic landfall at preselected coastal targets. The ADL model tracks a spill for 5 days while the MMS model tracks a spill for 3, 10, and 30 days. Details of these models and the data sources used as input are discussed in Technical Appendix M of the draft EIR/EIS. Table 1 shows the representative spill volumes and the frequencies of shoreline contact for various spill accidents. This table shows that oil spills of up to a few hundred barrels may arise from a variety of causes, but the larger spills will be almost entirely caused by well blowouts. Figure 4 shows the size distribution of offshore oil spills. Four curves are shown on Figure 4 . Two of these represent the spill distributions for the Union Oil project which may occur from location 1 or location 2 as shown on Figure 5 ; the upper curve is for the early years while the platforms are at risk from blowouts, and the lower curve is for the later years when production blowout spills have been rendered impossible due to insufficient downhole pressure. The third curve shows the spill distribution for the Exxon Project from the Shamrock platform or the pipeline to Irene. The overall spill frequency for both projects, for spills of 100 bbl. or more, is once every 55 years during the period when production blowouts are possible, and once every 90 years afterwards. (Because of relatively low pressures in the Point Pedernales Reservoir, it is estimated that oil well blowouts will be possible only for the first year of production from any one well.)

In addition to predicting the probability of spill occurrence, probable trajectory of specified oil spill scenarios were modeled using a Monte Carlo technique and the probability of landfall determined (hereforth referred to as the conditional probabilities. Details of the Monte Carlo technique and the data sources used as input are discussed in Addendum D, Technical Appendix M of the draft EIS/EIR. For the purpose of risk analysis, the results of both the MMS and ADL models were in sufficient agreement that no significant differences resulted from the independent use of either model. The likelihood of shoreline contact at various coastal locations by season for each developed spill location is given in developed Addendum D, Technical Appendix M. With the exception of spills close to shore, the conditional contact probabilities are quite small. These probabilities are summarized in Table 2 which shows, for each spill location, the total estimated likelihood of shoreline contact. For spills originating at the platforms, the resulting estimates are approximately 10 to 15 percent. For spills along the pipelines close to shoreline, the likelihood of contact is nearly 30 to 50 percent, most of which is due to contact at the nearest point onshore.

According to the ADL analysis the potential for spills increases substantially as the number of platforms in the Area is increased from 2 to 6. The overall likelihood of a large (greater than about 1,000 bbl.) oil spill is estimated to increase from about 4 percent to greater than 10 percent for the Area Study development. Figure 6 displays the overall likelihood of a spill occurring and contacting various land segments during a 25-year period. As can be seen, the total chance of a spill occurring and contacting shore is roughly 25 percent. Estimates of conditional probabilities that an oil spill will contact a certain target area within given time periods are presented in tables found in Appendix M of the draft EIS/EIR.

Onshore Oil Spills. Despite different environments for subsea and onshore pipelines, the failure modes and frequencies for onshore pipelines are similar to those for offshore pipelines. It is assumed that the time to detect a major leak and to activate isolation valves is 10 minutes. In the event of a complete break in the oil pipeline, losses would be due to continued pumping, compressibility losses and, in the worst case, the drainage of the entire volume contained between isolation valves.

The SCADA system, is designed to detect leaks over both short and long periods of time. With this system, it would be possible to have a small leak (less than 0.5 bbl./min.) that could go undetected by SCADA. Such a leak would likely be sub-surface and would saturate the surrounding soil and migrate in the path of least resistance. This type of oil spill is likely to occur from corrosion, weld failure, or flange leak.

For the portion of the line between the landfall and Lompoc, Union has proposed one remotely operated isolation valve at a valve station located 7,100 ft. east of landfall. If no other valves are installed along this portion of the pipeline, a pipeline break east of the valve station could result in the complete drawdown of the contents of approximately 11 miles of pipeline. In the later years of the project, production will likely be an oil emulsion containing up to 50 % water and throughput, at that time, will be at or near pipeline design capacity of 36,000 B/D. For this worst case scenario, the total spill volume is estimated to be 20,400 bbl. of wet oil. The smaller diameter oil pipeline from Lompoc to Orcutt has no remotely operated isolation valves. With no valves, up to three miles of the line could drain in the event of rupture.

Oil spills onshore could also arise from incidents at the onshore processing facilities, principally due to rupture of oil-containing vessels, or mal-operation or malfunction of oil pipeline pig receivers and launchers.

The analysis indicates the following spill size distribution:

Spill Location	Spill Size (bbl.)	Frequency
Onshore oil pipelines (landfall to Lompoc)	100 or more	Once in 170 years (unlikely)
	1,000 or more	Once in 1,700 years (unlikely)
	10,000 or more	Once in 2,200 years (unlikely)
Lompoc facility	100 or more	Once in 1,800 years (unlikely)
	1,000 or more	Once in 2,800 years (unlikely)
	50,000 or more	Once in 25,000 years (rare)
Onshore oil pipelines (Lompoc to Orcutt)	100 or more	Once in 56 years (likely)
	900 or more	Once in 560 years (unlikely)
	1,800 or more	Once in 1,100 years (unlikely)
Orcutt facility	100 or more	Once in 100,000 years (rare)

Southern Sea Otter

Development and production of the Central Santa Maria Basin area is the second unit development plan resulting from Lease Sale 53. Development plans for leases northward toward Morro Bay are expected to occur in the near future. The draft EIS (Lease Sale 53) makes it clear that if maximum development proceeds as projected, a jeopardizing situation for the sea otter may result from future actions. Based on comments and recommendations in our Biological Opinions (for Lease Sales 53 and 73), tracts from the northern end of the Santa Maria subarea closest to the range of the sea otter, and the nearshore tracts north of San Antonio Creek pose the greatest threat to the sea otter. However, all development in the proposed action area is presently about 15 miles south of the areas of greatest concern. However, if range expansion occurs as we hope, the following table depicts future events.

Predicted Range Expansion Over the Life of the Project

Project life (5-year intervals)	Increase in range to the south (1.8 miles/yr.) and approximate geographical boundary	
5	9 mi	Lions Head
10	18 mi	Santa Ynez River
15	27 mi	Point Pedernales
20	36 mi	Espada Bluff
25	45 mi	Government Point, just east of Point Conception

Based on historical distribution data, dense kelp habitat supports an average of approximately 12 otters per square mile (CDFG 1976), while sandy areas with little or no kelp supports only 2 otters per square mile. Without precise characterization of the substrate types along the California coast (especially within 15 fathoms, the area most heavily used by SSO), we cannot confidently predict the number of otters that habitat south of the Santa Maria River can support, nor the relative densities that may eventually be found (and potentially affected by an oil spill).

Due to the long-term nature of this OCS oil and gas development project and the anticipated expansion of the SSO range and numbers, it is not unreasonable to conclude that prior to the cessation of this project, otters will utilize habitat within or near the project area. If this occurs, it is likely that range expansion will also occur to the north and the population as a whole will increase.

Impacts from construction of platform and pipelines are not likely to affect SSO because of the remoteness of these activities from the present distribution. Furthermore, it is not likely that the SSO range will expand into these areas before or during the period of construction.

Disturbances from platform construction and drilling will occur at a depth beyond which the SSO forage and, therefore, are not expected to reduce the habitat quality of areas into which the SSO is expected to expand. However, uncertainty exists regarding the potential bioaccumulation of toxic heavy metals that are components of drilling muds that will be discharged beneath the platforms. This may affect SSO should they discover and forage at platforms. Otters are infrequently observed in waters deeper than the normal range of 15-20 fathoms. Thus it is not unreasonable to expect that SSO could appear at platforms.

The Oceano outfall from the existing Santa Maria refinery is located in the area occuped by the southern peripheral group of SSO. Impacts from the Oceano outfall are unknown. Discharged toxicants are expected to be adequately diluted to avoid impacts; however, no data are available and monitoring is not proposed to determine the extent of bioaccumulation. We assume that if discharge of toxicants through the Oceano outfall increases due to this project, a permit from Environmental Protection Agency will be required and interagency endangered species consultation will be conducted.

Sea otters are more vulnerable to oil contamination than most other marine mammals because of their high metabolic rate and dependence on dense fur rather than blubber for insulation (Siniff et al. 1982). Direct contact with oil will mat the coat and decrease natural insulation against temperature loss, resulting in hypothermia and possible death. Constant grooming to remove oil and repair the insulating quality of the coat could result in the direct ingestion of toxic petroleum products. Little is known about the effects of oil ingestion specifically by sea otters.

Operation of platforms and pipelines is not expected to affect SSO. The draft EIS/EIR predicts that the probability of a spill occurring and contacting the present SSO range is zero. The only probable impact will occur in the area south of the SSO range to Gaviota. According to the draft EIS/EIR and Biological Assessment, assuming the project area build-out scenario occurs, the total chance of a spill occurring and contacting shore (between the Santa Maria River and Gaviota) is roughly 16 percent. Conditional probabilities indicate that the Point Arguello area is the most probable landfall site. The existing distribution and abundance of otters in this area is variable. If a spill occurs early in project construction, less than 10 otters will likely be randomly distributed throughout the area of Point Sal to Point Conception. However, if the spill occurs in later years, the number of SSO potentially affected could be greater and will depend on the rate of range expansion and local densities.

Therefore, if a spill occurs and contacts Point Arguello twenty or more years after the project begins, for example, the SSO population may be affected. According to our range predictions, the later in the project a spill occurs the higher the likelihood that otters may be affected. The population should expand to the Santa Ynez River within 10-15 years and Point Arguello 15-20 years after initiation of this project. Therefore, if a spill occurs and contacts these areas during this time, the SSO population would probably be affected.

The sources of oil spills--platforms and pipelines--differ in their spill probabilities. Platform spills pose less of a risk to otters and/or the nearshore community than do pipeline spills. The chance of a platform blowout during the lifetime of Platforms Shamrock and Irene is only 3-5 percent. If a blowout were to occur, the probability is only 2-3 percent that the spill would be greater than 1,000 bbl. Twenty-three small platform spills are predicted for the entire OCS area. Most such spills will release less than 10 bbl. of oil and an extremely small chance that greater than 100 bbl. will be released. The most likely platform accidents which last only 1 minute may occur at a frequency of 0.17 spills per year, or about one every 6 years. Oil spill cleanup and oil recovery at platforms is enhanced by the rapid discovery of spills and the short response time due to onsite containment and recovery equipment. The risk to the current SSO population from platform spills is negligible; the risks as the population expands remain low.

Pipelines offer a higher risk for spills than platforms. The spill source with the greatest risk to potential SSO range expansion is the pipeline from Platform Irene to shore (Surf). The predicted pipeline failure rate between Platform Irene and landfall is 0.049 per year or 1.25 spills over the life of the project. In the event of a spill along the pipeline there is a 44 percent chance of oil contacting land. Over the life of the project, pipelines may be responsible for 0.216 spills of up to 1,000 bbl., 0.126 spills of 1,000-10,000 bbl., and 0.09 spills of greater than 10,000 bbl. Pipeline spills of 100 bbl. released 2 miles from the pipeline landfall could drift to a size of 1.4 sq. miles and potentially inflict heavy damage (cover 65 percent of the intertidal zone) on 0.125 miles of coastline and moderate damage (cover 25-64 percent of the intertidal zone) to 0.375 miles of coast. A pipeline spill of 8,400 bbl. between Platform Irene and shore (5.13 miles from landfall) could drift to a size of 47.5 sq. miles and cause heavy damage to 31.25 miles of coastline. The expected landfall for a spill occurring along this pipeline is Point Arguello. The highest probability and corresponding season for a spill contacting Point Arguello is 52 percent for a spill occurring during the summer.

Although the potential damage from a spill along a pipeline could be substantial, it is unlikely that a spill will occur and affect either the SSO or its habitat that its continued existence would be jeopardized.

An interrelated aspect of this proposal is the shipment of crude oil and refined by-products by ocean tanker through SSO range. No increased tanker traffic from the Avila terminal will result from this action (Brewer, pers. comm.). No information was provided regarding the magnitude of increased tanker traffic from San Francisco Bay terminals. If the Union/Exxon proposal results in an increased volume of oil shipped through SSO range, it will increase the risk of oil spills threatening SSO. At some point such threats are likely to jeopardize SSO.

California Least Tern

Construction activities associated with the subject project near the mouth of the Santa Ynez River could disrupt CLT nesting along the river, impact foraging activities in nearby offshore waters, and preclude the use of the Santa Ynez River estuary as a post-fledging dispersal site. However, we understand that

Union Oil has agreed, as a condition of the Coastal Commission finding that the proposed pipeline route is consistent with the California Coastal Act, to construct this section of the pipeline between November and March, when terns are not present in the area. It is also understood that Union Oil, as also required by the Coastal Commission, will control the accelerated erosion and sedimentation of the Santa Ynez River estuary, so that estuarine species including those used as a food source by the CLT, will not be affected.

A rupture of the gas pipeline or a gas release from the valve station along the 1-mile segment near the Santa Ynez River mouth could impact tern activity in the estuary. Toxic hazards to CLT, resulting from a gas release, would only pose a problem if the gas contained hydrogen sulfide (H2S-called sourgas) and was released at a time when terns were present (spring/summer). Sourgas is highly toxic to birds, 100 to 300 ppm resulting in rapid death. Current estimates are that no project gas will be sour during at least the first five years of production. The probability of a pipeline spill near the tern colony is once in 625 years, or 5 percent during the life of the project (25 years). If lethal levels of sourgas reach the tern colony, it could be extirpated.

The CLT could also be affected by a small to large oil spill originating from an onshore pipeline rupture near the Santa Ynez estuary, or by a large off-shore spill that comes nearshore between the mouth of the Santa Maria River and Surf. The adverse impacts of oil spills on the CLT could be manifested in various ways: (1) direct oil contact with the nesting site at the Santa Ynez mouth by an onshore pipeline rupture; (2) direct contact with floating oil while diving for food in the estuary or in nearshore waters; (3) reduced egg hatchability and increased chick mortality through direct contact with oil or indirect contact from the oil-fouled plumage of incubating or brooding adults; (4) nest or colony abandonment from oil contamination of nesting or feeding habitat; (5) lethal and sublethal effects from consuming polluted prey and preening fouled plumage; and (6) loss of prey species.

With only 1 block valve, an onshore oil spill originating just east of the valve station, adjacent to the CLT nesting site in the Santa Ynez River estuary, could result in the emptying of approximately 20,000 bbl. of oil into the Santa Ynez estuary.

Oil spilled into the estuary could accumulate. During most of the year the mouth of the Santa Ynez River is closed and flushing occurs only seasonally during periods of high runoff.

An oil spill that impacts the Santa Ynez estuary would be of particular significance to the CLT as the result of the potential loss of the area as a nesting site and as a post-breeding dispersal area. The estuary area provides important loafing, roosting, foraging, and bathing habitat for the CLT.

During the post-breeding period, the Santa Ynez estuary becomes vitally important to the Vandenberg colonies (San Antonion Creek, Purisima Point, and the Santa Ynez River) as an area for fledgings to learn necessary fishing skills prior to migration southward. After juveniles are capable of sustained flight, family groups of terns nesting at Purisima Point disperse to the Santa Ynez River mouth located 5.8 miles south of the colony, (Atwood and Massey 1983).

Given the dependence of the Vandenberg colonies in Santa Barbara County on the Santa Ynez River mouth, the draft California Least Tern Recovery Plan (1983 revision) identifies the need to protect this nesting and important post-breeding dispersal area from detrimental land or water use changes for the survival and recovery of the species. The Santa Ynez River mouth is recognized in the Recovery Plan as 1 of less than 20 known post-breeding dispersal sites in California with 20-25 nesting and feeding adults and fledgings regularly noted.

Suitable nesting sites without an appropriate nearby feeding or post-breeding dispersal area, or vice versa, would result in elimination of the Vandenberg nesting colonies. The next closest nesting sites are about 24 miles to the north at Oso Flaco Lake and about 85 miles to the south at the mouth of Santa Clara River. Given the widespread lack of alternate nesting sites throughout its range, the limited capacity of existing sites to support more nesting pairs, and the multitude of threats facing most other colonies, it is likely that most of the terns displaced from the Vandenberg colonies would eventually, along with their progeny, be lost to the breeding population.

In terms of the entire U.S. breeding population, a secure colony site(s) at Vanderberg is very important. With the exception of the Oso Flaco Lake and Santa Maria River colonies in San Luis Obispo County, the Vandenberg colonies represent the only known CLT colonies between Ventura County and San Francisco Bay.

While the annual contribution to fledging success of any one colony is subject to fluctuation, the essential factor influencing CLT survival is that alternate nest sites remain available in the event that other colonies fail. Protecting only a few, large CLT nesting colonies would not provide for their behavioral/ecological requirements (that of dispersed low density nesting scattered over many, large areas) and would expose them to potentially disastrous nesting failure resulting from a few localized disturbances. The loss of CLT nesting colonies in a major coastal ecosystem would appreciably diminish the reproductive potential of the CLT, and heighten the vulnerability to disturbance at other nesting colonies, further contributing to its decline.

One action of paramount concern regarding CLT and other marsh dependent species is the destruction of El Estero Marsh near Ensenada, Mexico. Increased oil/gas development in offshore waters of California has created an economic incentive for the construction of platform fabrication yards along the west coast. Currently the partial construction of a platform yard in El Estero Marsh has impacted important habitat for CLT, LFCR and SMBB. We believe the primary incentive for the El Estero construction is attributable, in part, to the proposed action.

Unarmored Threespine Stickleback

UTS could be impacted by increased sediment loads carried downstream to Barka Slough as a result of pipeline installation across San Antonio Creek or any of its tributaries. Increased sedimentation and turbidity interfere with feeding and spawning activities and affect respiration. Sediments could cover nesting sites and decrease the availability of food items. UTS are sight feeders; prolonged periods of high turbidity would likely reduce feeding and reproductive potential. These impacts can be reduced by installing the pipeline under San Antonio Creek and its tributaries during the dry season (Aug. 15-Nov. 1) when there is little or no surface flow at the crossing sites.

The greatest potential impact of the project to the UTS would occur from an oil spill that enters the San Antonio Creek drainage. The amount of damage that an oil spill would cause would depend upon the magnitude of the spill, the degree to which it is contained, flow conditions in San Antonio Creek and its tributaries, and weather conditions at the time.

A major oil spill that reaches Barka Slough, approximately 1 mile downstream from the proposed pipeline route crossing, would be particularly devastating to the UTS because the viable population in San Antonio Creek would be vulnerable. In the extreme case, a large oil spill could cause a complete fish kill along the entire reach of San Antonio Creek from Barka Slough to its mouth. A major spill into San Antonio Creek would be devastating even if it did not produce a complete fish kill as oil would adhere to or penetrate the stream channel substrates altering the physical character of the habitat, impacting stickleback nesting sites and other aquatic organisms, some of which are prey items for the fish. Further habitat disruption would undoubtedly occur as a result of cleanup activities.

Large oil spills and spills that occur during periods of high streamflow would be most likely to reach Barka Slough. The probability of a 100 to 900 bbl. spill occurring in the San Antonio Creek basin is once in 100 years, or a 25 percent chance over the life of the project (25 years). For a spill of 1,000 bbl. or more, the probable occurrence is 1 in 1,000 years, or a 3 percent chance over the life of the project.

As with oil spills in the Santa Ynez basin, spills in the San Antonio Creek basin will likely proceed toward sensitive UTS habitats (i.e. Barka Slough). With the extreme consequences of such an impact to UTS even a low probability spill such as 3 percent (1000 bbl. or more) is a substantial risk to the species.

The San Antonio Creek population is 1 of only 2 native populations of UTS, and the distribution of each of these populations is restricted to relatively short stream reaches. Loss of the San Antonio Creek population would likely jeopardize the continued existence and recovery of this species.

California Brown Pelican

California brown pelicans (CBP) could be impacted by oil spills that reach the lagoon of the Santa Ynez River or the beach habitat along the coast within the oil spill risk zone. Small numbers of CBP could also be impacted by an onshore spill that reaches the lagoon of the Santa Ynez River. Adult and immature birds during the non-breeding season will be more vulnerable to oil spills because they are widely dispersed. However, because of wide dispersal, oil spills from this field would probably not be as detrimental as spills near a breeding colony during the breeding season. Because Anacapa, the nearest breeding colony, is ninety miles from the project area, an oil spill from this field is not likely to have a significant impact upon a CBP breeding colony. Our Biological Opinion (1-1-84-F-7) expands on the ways oil spills may affect CBP.

CBP will likely be drawn to platforms by a combination of factors related to improved feeding opportunities. Platform spills, even minor spills, may cause problems if CBP inadvertently dive or swim into an oil slick near a platform.

Light-footed Clapper Rail

The onshore facilities are not proposed in or near LFCR habitat. Oil spills from the subject project in the offshore zone represent the only threat to the LFCR. Please refer to our Biological Opinion (1-1-84-F-7) for an assessment of the ways in which oil spills could physically affect the LFCR.

Carpinteria Marsh is the only location supporting a rail population (14 breeding individuals in 1983) close to the project. Census figures for 1985 reported 284 breeding individuals using 14 marshes in southern California (Santa Barbara, Ventura, Orange, and San Diego Counties). Carpinteria Marsh is the northernmost LFCR population and only three other marshes had a greater number of birds. The Revised Draft Recovery Plan for LFCR states the recovery objective of at least 800 pairs (1,600 breeding birds) on 10,000 acres of preserved wetland habitat in at least 20 marshes. If an oil spill entered Carpenteria marsh, impacts to the clapper rail could be devastating.

Such an impact could significantly affect the species survival and recovery. Because the oil spill model predicts a very low conditional probability of a spill contacting clapper rail habitat (less than 0.5 percent) the LFCR will probably not be adversely affected by the subject project.

Completion of the El Estero platform yard will contribute to the possible extinction of LFCR, currently at its lowest population level since its classification as endangered.

Salt Marsh Bird's Beak

The onshore facilities are not proposed in or near SMBB habitat. Oil spills from the subject project in the offshore zone would probably represent the only threat to the SMBB. Please refer to our Biological Opinion (1-1-84-F-7) for assessment of the way oil spill could physically affect the SMBB.

The populations of this species at Carpinteria Marsh, Santa Clara River mouth, or Ormond Beach are probably the only locations that could be affected by a spill. The oil spill risk model predicts a very low conditional probability (less than 0.5 percent) of an oil spill impacting known habitat.

American Peregrine Falcon

The primary threat to the APF would be the reduction of prey availability in the event that the Santa Ynez River estuary and coastal strand were impacted by development. Also, if an oil spill occurred and peregrine prey species became oiled, falcons could become impacted by: (1) lethal or sublethal effects of ingestion of oil from contaminated prey; (2) reduced egg viability if oiled from contaminated plumage of adults; and (3) increased adult mortality due to flight impairment caused by oiling from contact with contaminated prey. Oiled shorebirds and seabirds would be easy prey for peregrines, thus increasing the chance of oiling.

CUMULATIVE EFFECTS

Cumulative effects are those effects of future State or private actions which are reasonably certain to occur prior to completion of the Federal action subject to consultation. An action is reasonably certain to occur if it requires the approval of local resource or land use agencies and such agencies have essentially approved the action. Those activities not requiring approval of local agencies or governments must be essentially ready to proceed.

Effects specific to sea otters include illegal take and increased contamination of SSO habitat. Other than incidental take in fishermen gill and trammel nets (recently prohibited within SSO habitat by State legislation), some SSO are shot. Limited existing data are inadequate to estimate the total loss of otters attributable to illegal shooting. Data from beach-cast carcass salvage efforts do not indicate that illegal shooting is significantly affecting the population.

Information from the State Mussel Watch Program indicates elevated levels of heavy metals and pesticides within the SSO range (the Monterey Bay area). The levels of contaminants found in mussel tissues are sufficient to reduce and impair growth and reproduction in certain species. It is not known if present levels are directly or indirectly harmful to SSO. The FWS is presently working to resolve this potential problem.

Biological Opinion

In accordance with the foregoing impact analysis, it is our biological opinion that the subject project is likely to jeopardize the continued existence of the California least tern and unarmored threespine stickleback. However, we believe the propoal is not likely to jeopardize the sea otter, brown pelican, peregrine falcon, light-footed clapper rail or salt marsh bird's beak.

The 1978 amendments to the Endangered Species Act include a mandate that "reasonable and prudent alternatives" be suggested when a Biological Opinion indicates jeopardy to a listed species. "Reasonable and prudent alternatives" refer to alternative courses of action open to the Federal agency with respect to an activity or program that are technically capable of being implemented and consistent with the intended primary purpose of the activity or program.

During the May 16, 1985 meeting with representatives of the FWS, CDFG, MMS, VAFG, Santa Barbara County, Union Oil, and A.D. Little, several alternative means were explored for reducing the potential of an oil spill entering the San Antonio Creek drainage and reaching Barka Slough. We believe that if the Union proposal is modified as follows, the project could be undertaken. without jeopardizing the continued existence of the unarmored threespine stickleback. We, therefore, believe the following ten modifications represent a reasonable and prudent alternative:

1. Four remotely-controlled block valves should be placed in the Lompoc to Orcutt pipeline. The locations of these block valves are as follows: one valve approximately 500 feet south of San Antonio Creek; a second valve approximately 300 feet north of San Antonio Creek, a third valve approximately 1,000 feet north of Drainage Number 26 as shown in Figure 5.6.2 in draft EIS/EIR (Union Oil Strip Map 17C 104 Mile Post 319); and a fourth valve approximately 900 feet north of Drainage Number 29 (Union Oil Strip Map 17C 105 Mile Post 420).

The southernmost valve would limit the potential size of an oil spill located in the vicinity of San Antonio Creek to a maximum of approximately 1,365 bbl. from a complete rupture of the pipeline south of the creek. By placing the first block valve 500 feet from the creek edge, this oil, given the terrain, would not reach the creek. The oil would flow over a fairly level area of approximately 4,000 sq. feet. Placing the second valve 300 feet north of the creek should allow sufficient distance to prevent oil from getting into the creek. The placement of these 2 valves would be sufficient to keep small short-term leaks that penetrate the soil from reaching San Antonio Creek. Only a complete rupture of the pipeline between these valves, a highly unlikely event, would allow oil to drain into the creek. The placement of the 2 more northern valves in the specified locations will limit the size of a major rupture to an 800-bbl. spill that would likely not reach Barka Slough.

2. Realign the pipeline, where it crosses San Antonio Creek, east approximately 200 to 300 feet away from portions of the Harris Creek drainage as illustrated in Figure 7.

This pipeline route would avoid unnecessary stream crossings and allow more time to implement emergency measures in the event of an oil spill.

3. Bury the pipeline across all San Antonio Creek drainages. Work should only be performed between August 15 and November 1. If dewatering is necessary, removed water will be filtered through a sediment trap before returning it to the streambed below the crossing site.

This would limit construction activity impacts to the least sensitive period of the UTS life cycle and avoid the rainy season.

4. An independent cathodic protection rectifier system should be installed between the first and fourth block valves.

An independent cathodic protection system will allow for close monitoring of any changes in current usage, separate from the rest of the pipeline for early detection of corrosion problems along this critical portion of the pipeline route.

5. Heavier wall pipe (.375-inch wall thickness) should be used between the first and second block valves.

Heavier wall pipe will be less susceptible to breaking, cracking, or corrosion.

6. The pipeline will be buried a minimum of 5 feet below flow line across all perennial and intermittent stream crossings in San Antonio Creek Basin. An annual survey and report will be provided to VAFB to verify the depth of the pipe relative to the flow line of each stream.

The deeper depth of pipeline placement will allow greater protection from scour activity of flooding events.

7. Seventy millimeter thick coating of polyproplene material should be used on the pipeline from the first to second block valve.

8. The communication cable on the Lompoc to Orcutt pipeline route between Mile Posts 123 and 465 (Union Oil Strip Map 17c) shall be burried from 1.5 to 2.0 feet directly above the 10-inch line.

9. A contingency plan for rescuing and holding unarmored threespine sticklebacks and rehabilitating habitat in San Antonio Creek in the event of an oil spill is to be completed in a form acceptable to VAFB and the FWS prior to initiating pipeline construction in San Antonio Creek Basin.

10. As identified in the contingency plan, materials required to confine an oil spill and to conduct a fish rescue operation in San Antonio Creek are acquired by Union Oil and stored at a designated site in Orcutt for use in the event of an oil spill.

During the May 31, 1985 meeting with representatives of the FWS, MMS, Santa Barbara County, A.D. Little, and Union Oil, several means were agreed for reducing the potential of a pipeline oil spill or gas leak entering the Santa Ynez River estuary.

Likewise, we believe that if the proposal is modified as follows, the project could be undertaken without jeopardizing the continued existence of the CLT. We, therefore, suggest the following modifications as reasonable and prudent:

1. Three remotely-controlled block valves and three check vales be placed between landfall and Oak Canyon as shown in Figure 8.

2. Realign the pipeline route near landfall between the railroad track and 35th Street as shown in Figure 8.

3. A network of berms and containment basins large enough to contain the total potential spill volume as presented in Table 10.1-2 of the draft EIS/EIR under the column of Required Basin Volume (bbl).

4. Berms and containment basins should be revegetated with native plant speices and a maintenance and revegetation plan for the berms, basins and dikes prepared by Union Oil and approved by VAFB, FWS, and CDFG prior to pipeline construction.

5. Install H2S wiring and telemetry at the two most western block valve sites, Valve Station A, and at one additional site midway between the railroad and 35th Street. Sourgas sensors will be installed when H2S concentrations reach 50 grams per 100 standard cubic feet, in the line.

Incidental Take

Section 9 of the Endangered Species Act prohibits any taking, killing, harassment, or harming of listed animal species without special exemption. Endangered plant species (SMBB) are subject to less restrictive provisions regarding take that do not apply in this instance. Under the terms of Section 7(b)(4)(iii) and 7(o)(2) of the Act, taking that is incidental to, and not a purpose of, the agency action is not considered a taking within the terms of the Act, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

As the SSO population grows into and beyond the project area, the chances of an impacting oil spill increase. However, the effects of the loss of a few individuals from a larger population will be proportionately small compared to the loss of the same number of individuals at this time from the present population. We feel that the potential for a major offshore spill occuring and contacting shore where SSO exist is low based on project locations and the current state of technology. This is reflected in the oil spill risk assessment. However, oil spill containment efforts may or may not be effective. Obviously should a catastrophic spill (platform, pipeline, vessel, etc.) occur sending oil into nearshore habitats occupied by otters, it is likely that all SSO coming into contact with oil will be lost. Clean-up capabilities are not sufficiently advanced to offer more than scant hope for mitigation of adverse effects on SSO. Administrative processes, such as reinitiation of consultation, will not address such an emergency situation. Based on the current status of the SSO population, we have determined that taking of SSO incidental to this agency action will not be allowed.

The foregoing reasonable and prudent alternatives to remove jeopardy to CLT, if implemented successfully by the applicant, will eliminate the possibility for incidental take of this species. In our view, relocation of the pipeline and installation of block valves and containment basins will prevent spilled petroleum or by-products from polluting CLT habitats. Therefore, incidental take of CLT is not authorized by this Opinion.

UTSS may be lost during pipeline stream crossings in the San Antonio Creek drainage. Despite construction during low flow periods (August 15-November 1) individual UTSS may be lost during trenching, dewatering or other construction. Loss of a few individuals along localized reaches of the streams will not seriously affect the UTSS species as a whole. Therefore, this Opinion authorizes take of no more than 10 individual UTSS in connection with the proposed activities.

Brown pelicans may be incidentally lost by errant contact with oil slicks either near platforms or in nearshore environs. Assuming due deligence in routine production operations and rapid and consciencious spill response, very few CBP are likely to be lost as a result of this action. This Opinion therefore authorizes incidental take of no more than five CBP.

Based on our analysis of impacts to LFCR and APF and the results and predictions of your oil spill risk assessment, no incidental take of these species is expected. Therefore, LFCR and APF may not be taken incidental to the proposed activities.

To minimize or avoid such incidental take we specify the following reasonable and prudent measures: (1) MMS should require that existing oil spill contingency plans be designed to assure protection of the most sensitive/critical individuals and habitats (e.g. nesting sites, foraging areas, etc.) of listed species vulnerable to the proposed project. To this end, MMS should require as a minimum, a) maps of environmentally sensitive areas including endnagered species habitat be included in all spill contingency plans, and b) FWS and CDFG be notified immediately in the event of a spill from platforms or pipelines; (2) efforts should be made to rescue and hold UTS during pipeline construction across San Antonio Creek. If possible, a barrier should be installed immediately upstream of the construction site to prevent movement of fish into the construction zone. A precontruction effort to collect UTS from the work site and temporarily hold them for later release should be coordinated with local CDFG personnel. Beyond compliance with the reasonable and prudent alternatives to remove jeopardy to listed species, we have no other measures to offer to minimize incidental take.

We believe the following terms and conditions are necessary to implement the foregoing measures: (1) if specified levels of incidental take for any listed species are achieved or exceeded, MMS shall require that the causitive action of such take cease immediately, and shall reinitiate consultation with our Service to reevaluate the incidental take impacts; (2) MMS shall immediately telephone the Office of Sea Otter Coordination if incidental take of SSO occurs as a result of the project, and prepare a written report which shall include the date, location, and circumstances surrounding the taking and the disposition of the individual(s) taken. Written and telephone reports should be directed to Project Leader, U.S. Fish and Wildlife Service, Office of Sea Otter Coordination, 2800 Cottage Way, Room E-1818, Sacramento, California 95825 (916) 484-4904; (3) MMS will communicate to FWS information on the inspection program and project operations, as they relate to incidental take. Specifically, if information is revealed during inspections that increased potential for incidental take exists, FWS is to be notified for advice on remedial actions; (4) any reamains of listed species taken as a result of this action should be deposited with our Law Enforcement Division (213) 436-1183.

Conservation Recommendations

In furtherance of the purposes of the ESA, Sections 2(c) and 7(a)(1) which directs Federal agencies to use their authorities to carry out programs for the protection, conservation, and recovery of listed species, we recommend that MMS implement several actions. Future plans for development and production will undoubtedly be forthcoming from the project area and elsewhere. These recommendations may, if implemented, significantly reduce the risks that future oil development and production pose to endangered species.

1) Continue to assist FWS by evaluating oil spill risks at potential sea otter translocation sites where establishment of a second breeding colony of otters is being considered; and

2) Expand the current MMS study, "Population Status of California Sea Otters" by conducting field studies to determine the demographics of the southern peripheral otter group (male and female) in order to evaluate how potential spills from development of the central Santa Maria Basin and adjacent areas may affect this group and how this may affect the demography of the entire population. This will require additional funding for specific focus on the southern peripheral group. This is essentially Tasks 3.16 and 3.17 in the SSO Recovery Plan.

3) MMS should require that Oil Spill Contingency Plans include specific provisions for rapid deployment of spill containment equipment in the areas listed below. These areas are grouped according to habitat areas inhabitat by one or more of the following groups of species.

<u>Light-footed Clapper Rail, California Least Tern, Salt Marsh Bird's-beak</u>

<u>San Luis Obispo County</u> - Pismo Beach, Nipomo Dunes

<u>Santa Barbara County</u> - Goleta Slough, Carpinteria Marsh, Santa Maria River, San Antonio Creek, Santa Ynez River, Purisima Point

<u>Ventura County</u> - Ventura River, Santa Clara River, Mugu Lagoon, Ormond Beach, McGarth Beach State Park

<u>Los Angeles County</u> - Venice Beach, Playa del Rey, Los Angeles-Long Beach Harbor, San Gabried River, Cerritos Wetlands

<u>Orange County</u> - Anaheim Bay, Bolsa Chica, Huntington Beach State Park, Santa Ana River, Newport Bay

<u>San Diego County</u> - San Mateo Creek, Aliso Creek, Santa Margarita River, Buena Vista Lagoon, Agua Hedionda Lagoon, Batiquitos Lagoon, San Elijo Lagoon, San Dieguito Lagoon, Los Penasquitos Lagoon, Mission Bay, San Diego Bay, Tijuana River

To help accomplish the above, an oil spill containment equipment base should be established in San Diego County.

<u>California Brown Pelican, American Peregrine Falcon, Southern Sea Otter</u>

Santa Barbara Channel area, Anacapa Island, Scorpion Rock, Santa Barbara Island, San Nicolas Island

4) Subsequent leasing and development plans could be designed and authorized in such a way as to provide the maximum feasible conservation of the species until such time as recovery for each species in the project area has advanced to a point that offshore development, production and related activities (e.g. tanker traffic) will not be significant. This is consistent with the policies and procedures set forth in the Secretary's recently released draft proposed Five-year OSC oil and gas leasing program which calls for consultation and early resolution of conflicts with affected federal agencies and others during the preleasing stage. The FWS would be pleased to cooperate with MMS on developing such strategy, including providing specific input to development of the Five-year leasing schedule and identification of sensitive areas in each lease area.

5) MMS should include as part of future Area Studies, information on expected incremental increases in oil volume shipped via tanker/barge resulting from development of that Area. Information is needed on departure points, destinations, volumes and routes. Data sources may include production companies (Union, Exxon, etc.), tanker companies, ports and regulatory agencies.

We request that this formal consultation remain open past release of this Biological Opinion so that further consultation can take place. In particular we are concerned that a number of project concepts have been discussed and approved during consultation meetings but are not yet planned in sufficient detail. It is important that further consultation continue with regard to 1) the location, number and design of block valves on the Lompoc to Orcutt pipeline; 2) the design and location of block valves on the landfall to Lompoc reach of pipe; 3) the final realignment of the pipeline route between the railroad and 35th street (landfall to Lompoc pipe); and 4) final design specifications of the berms and containment basins along the railraod and 35th Street reach of pipe. Thus we request these specific details as well as acceptance in writing by the applicant of all modifications proposed as reasonable alternatives. Also we request that MMS and VAFB incorporate in its Record of Decision acceptance of our reasonable and prudent alternatives to remove jeopardy and reduce incidental take. Further, to avoid repetition in future consultations, we request MMS to include in the ROD a statement as to which Conservation Recommendations of this Opinion are of the ROD to our Service within 30 days after it is rendered.

If you have any comments or questions, please address them to Nancy Kaufman (FTS 796-4270 or (714) 643-4270) regarding all listed species except sea otters, and Mr. Skip Ladd (FTS 468-4904 or (916) 484-4904) regarding sea otters.

attachments

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Table 1

EXAMPLES OF OFFSHORE OIL SPILL HAZARDS

Accidental Events	Spill Volume (bbl)	Frequency of Contacting Coastline*
Blowout	1,000 - 10,000[1] (medium to major)[2]	Once in 4,100 years (unlikely)[2]
	10,000 - 100,000 (major) (unlikely)	Once in 5,700 years
	100,000 or more (severe)	Once in 11,000 years (rare)
Separator Rupture	120 (minor)	Once in 48,000 years (rare)
Pig Receiver (10 min.)	140 (minor)	Once in 83,000 years (rare)
Platform Irene Collapse	2,500 (major)	Once in 910,000 years (rare)
Oil Pipeline Rupture-Midway to Shore	8,400 (major)	Once in 16,000 years (rare)
Interplatform Pipeline Rupture	up to 1,250 (medium)	Once in 45,000 years (rare)
Spill from Marine Traffic Precautionary Zone	----	Three percent of all spills are expected to reach land

* Roughly 80 to 90 percent of the time that landfall occurs, it will contact an environmentally sensitive area (as defined in Section 4.5).

** Typical sizes of oil tankers in this area have capacities in the range of 300,000 to 500,000 bbl. distributed in up to 10 tanks. Most marine casualties would involve spills from 1 to 2 tanks, or typically, a total of 30,000 to 100,000 bbl. Other than for collisions with platforms, marine traffic casualties are not considered part of the Union or Exxon projects, but are included in the cumulative assessment.

1 42,000 to 420,000 gallons.

2 See Table 5.11-1 of draft EIS/EIR for definition of frequency and criticality classifications.

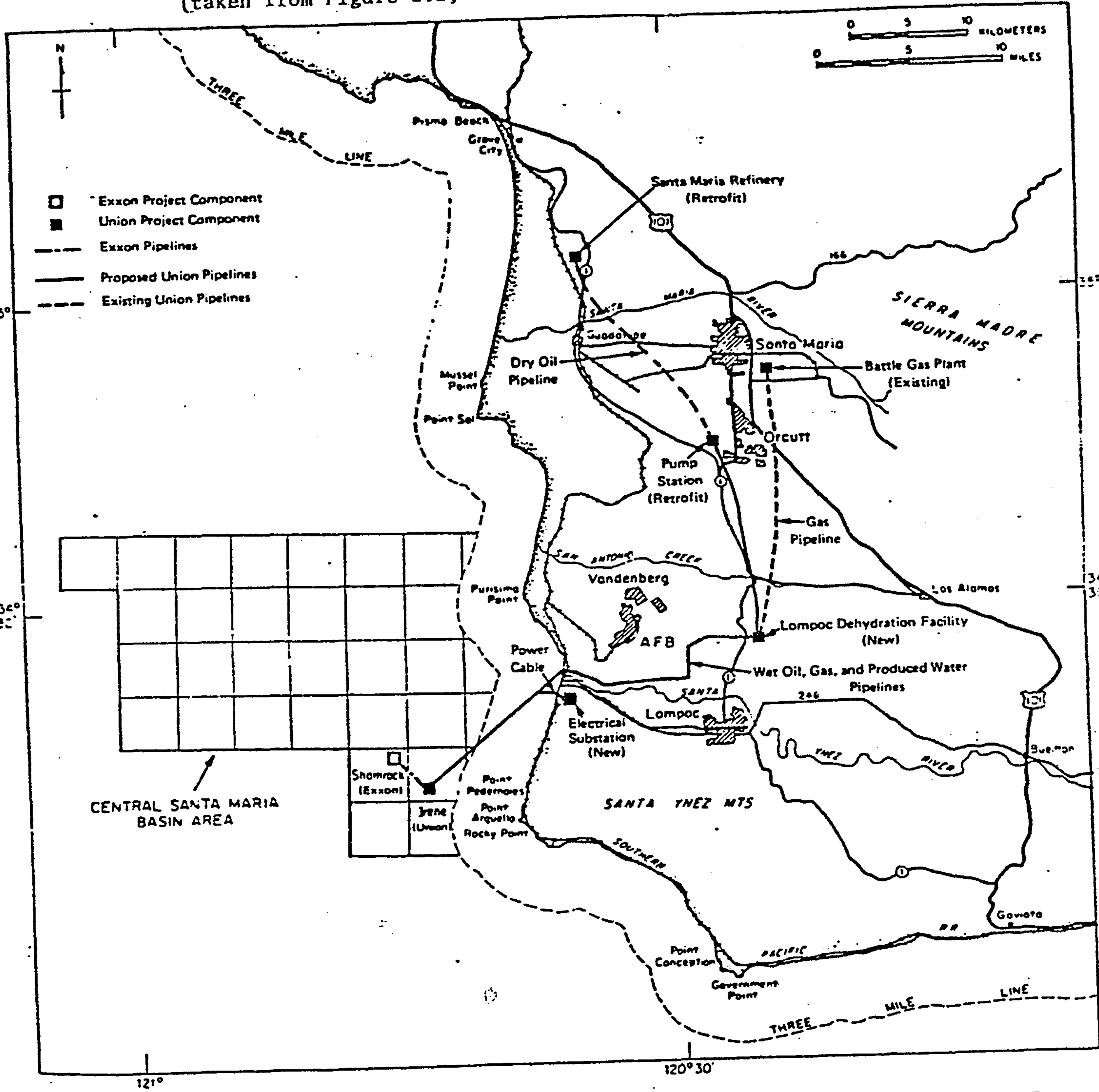
Table 2

CONDITIONAL SHORELINE CONTACT PROBABILITIES
A.D. LITTLE MODEL

Spill Location	Conditional Probability of Landfall: Overall	Conditional Probability of Landfall: At Environmentally Sensitive Locations*
1. Platform Irene	0.11	0.09
2. Pipeline from Irene to Shore	0.44	0.41
3. Pipeline from Shamrock to Hermosa	0.09	0.07
4. Platform Hermosa	0.11	0.10
5. Precautionary Area	0.03	0.03
6. Future Platform (location assumed)	0.17	0.17
7. Shamrock Platform	0.15	0.09
8. Pipeline from Hermosa to Point Conception	0.29	0.28

FIGURE 1

MAP OF PROPOSED UNION OIL/EXXON PROJECTS
(taken from Figure 1.2, Technical Appendix M, draft EIS/EIR)



Arthur D. Little, Inc.

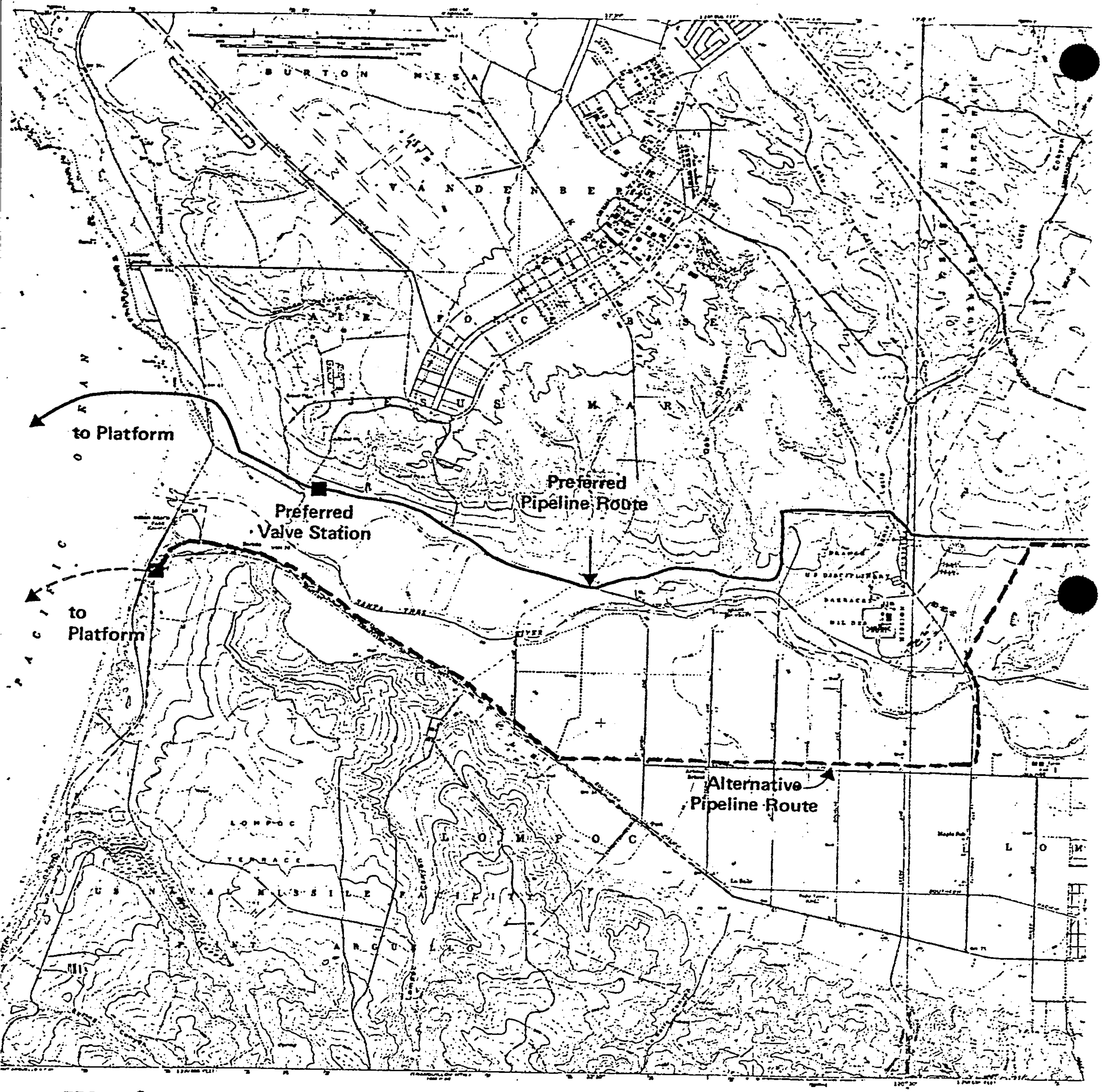


FIGURE 2 . The Preferred and Alternative Pipeline Routes Through the Santa Ynez Valley (adapted from Figure 3.2-2 of the draft EIS/EIR)

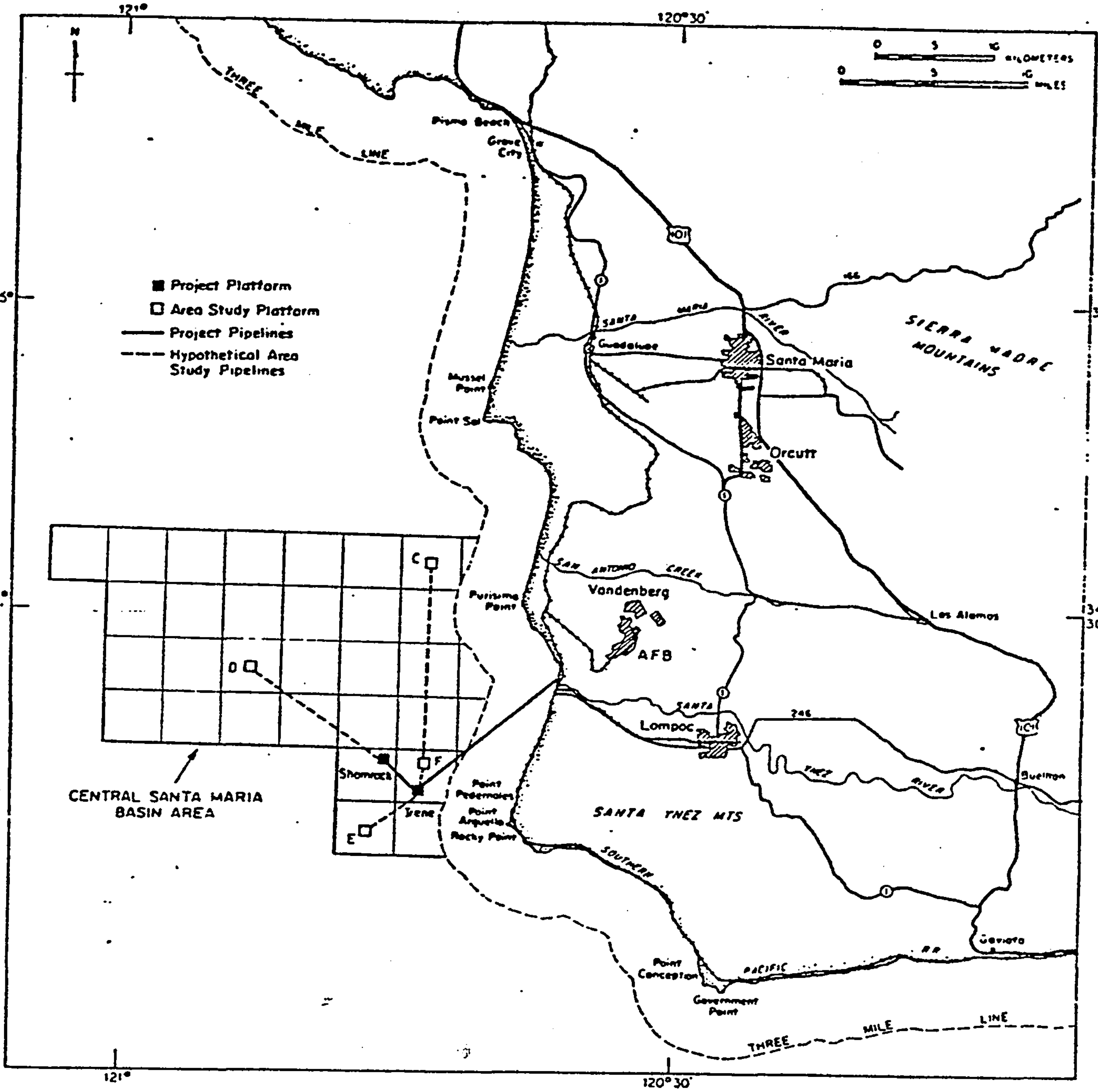


FIGURE 3. PROJECT PLATFORMS AND AREA STUDY PLATFORMS.
(taken from Figure 9.1, Technical Appendix M, draft EIS/EIR)

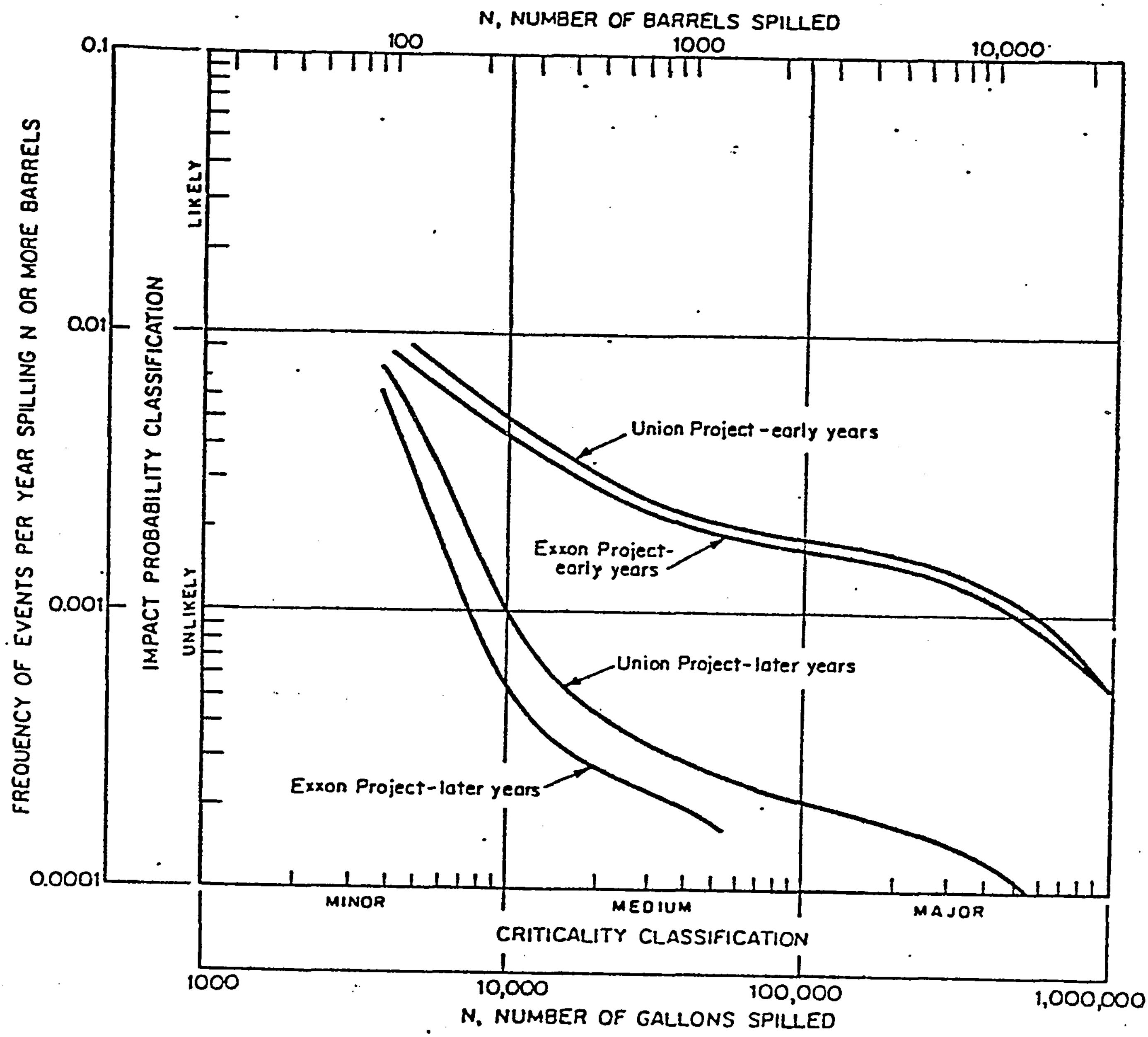


FIGURE 4 DISTRIBUTION OF OIL SPILLS - OFFSHORE
(taken from Figure 5-1, Technical Appendix M, draft EIS/EIR)

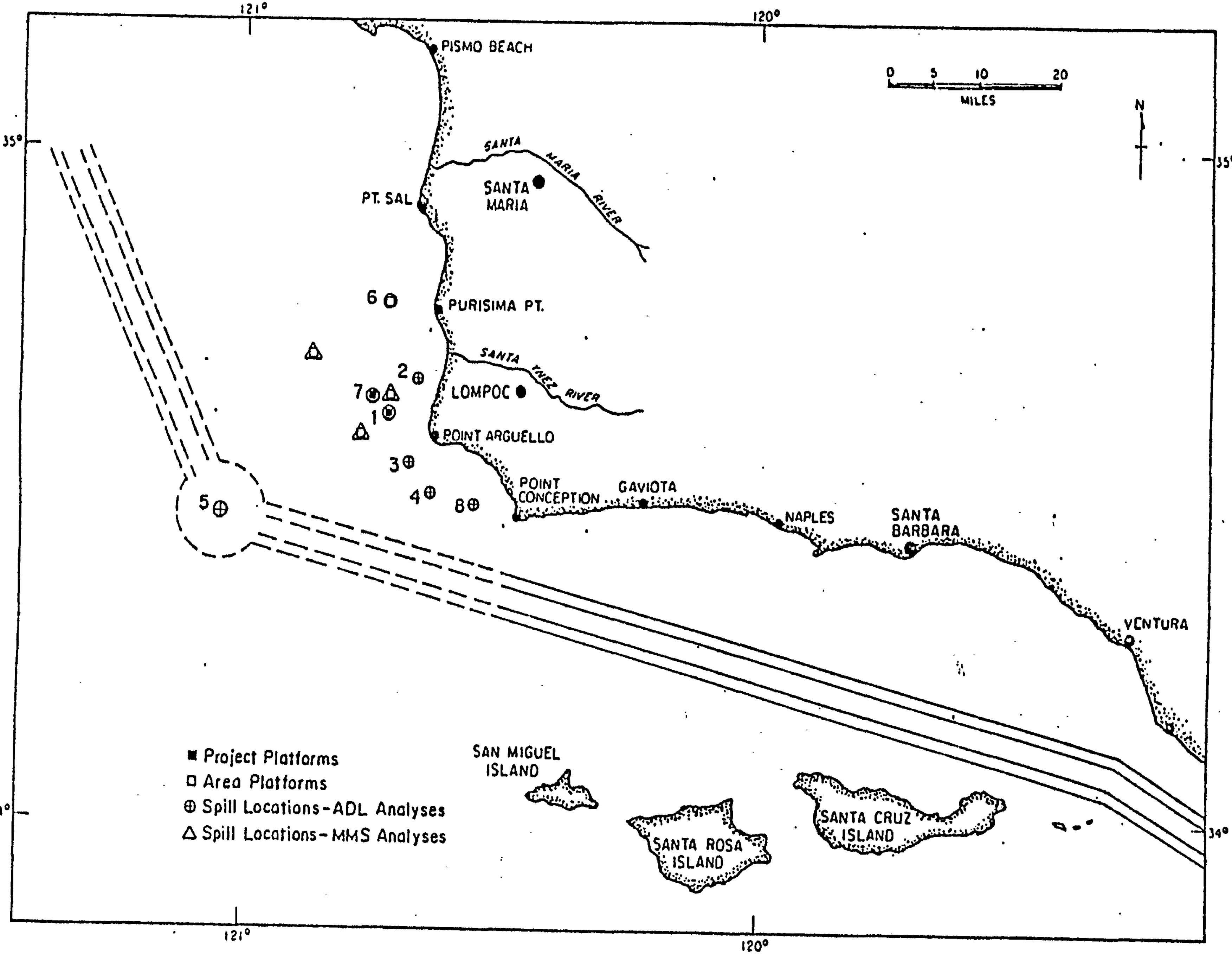
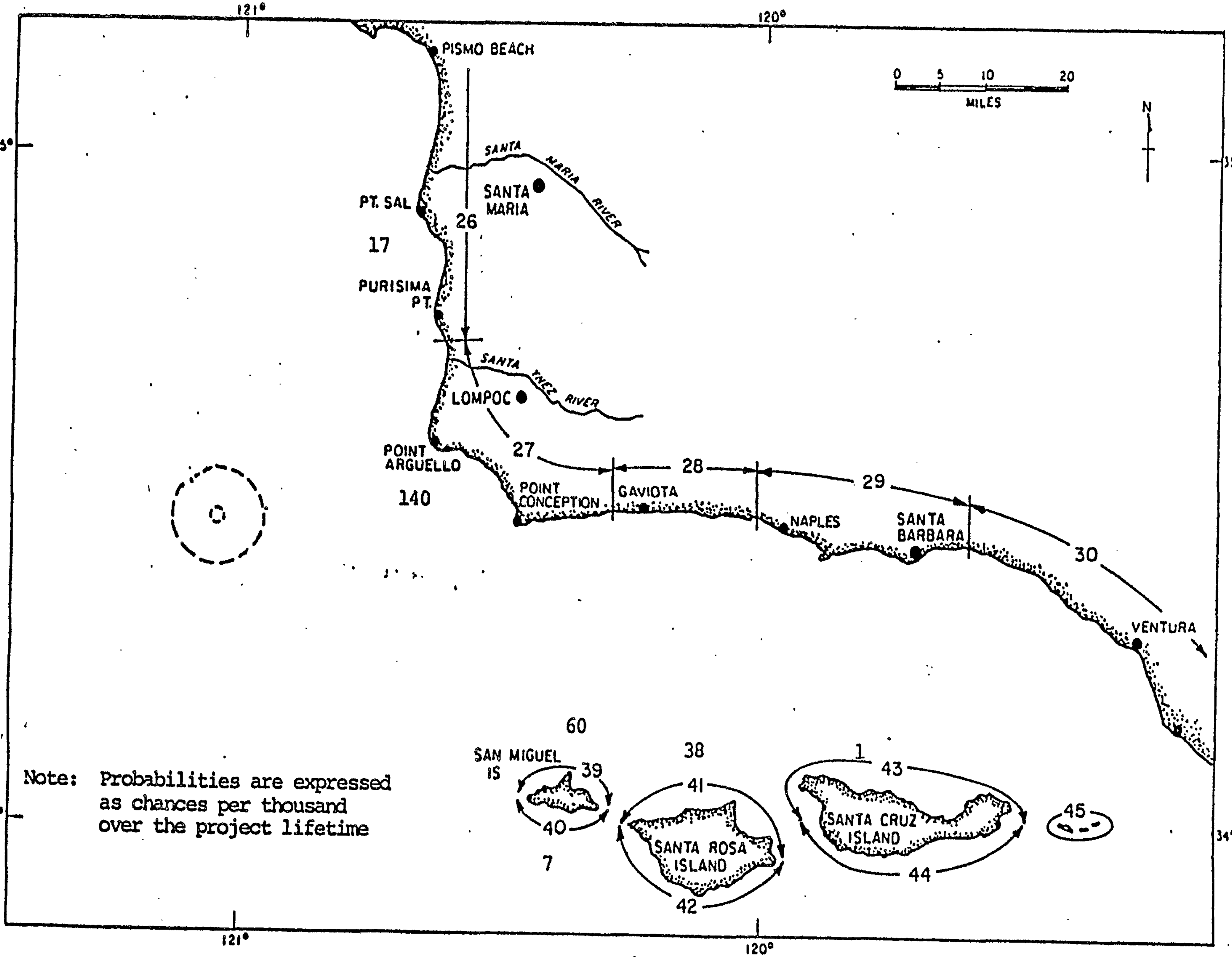


FIGURE 5 OIL SPILL LOCATIONS SELECTED FOR ANALYSIS
(taken from Figure 4-2, Technical Appendix M, draft EIS/EIR)



Note: Probabilities are expressed as chances per thousand over the project lifetime

FIGURE 6

PROBABILITIES OF CONTACTING LAND SEGMENTS (AS DEFINED BY MMS) DURING A 25-YEAR PERIOD AS A RESULT OF AREA STUDY DEVELOPMENT SPILLS (adapted from Figure 5.11-6, draft EIS/EIR)

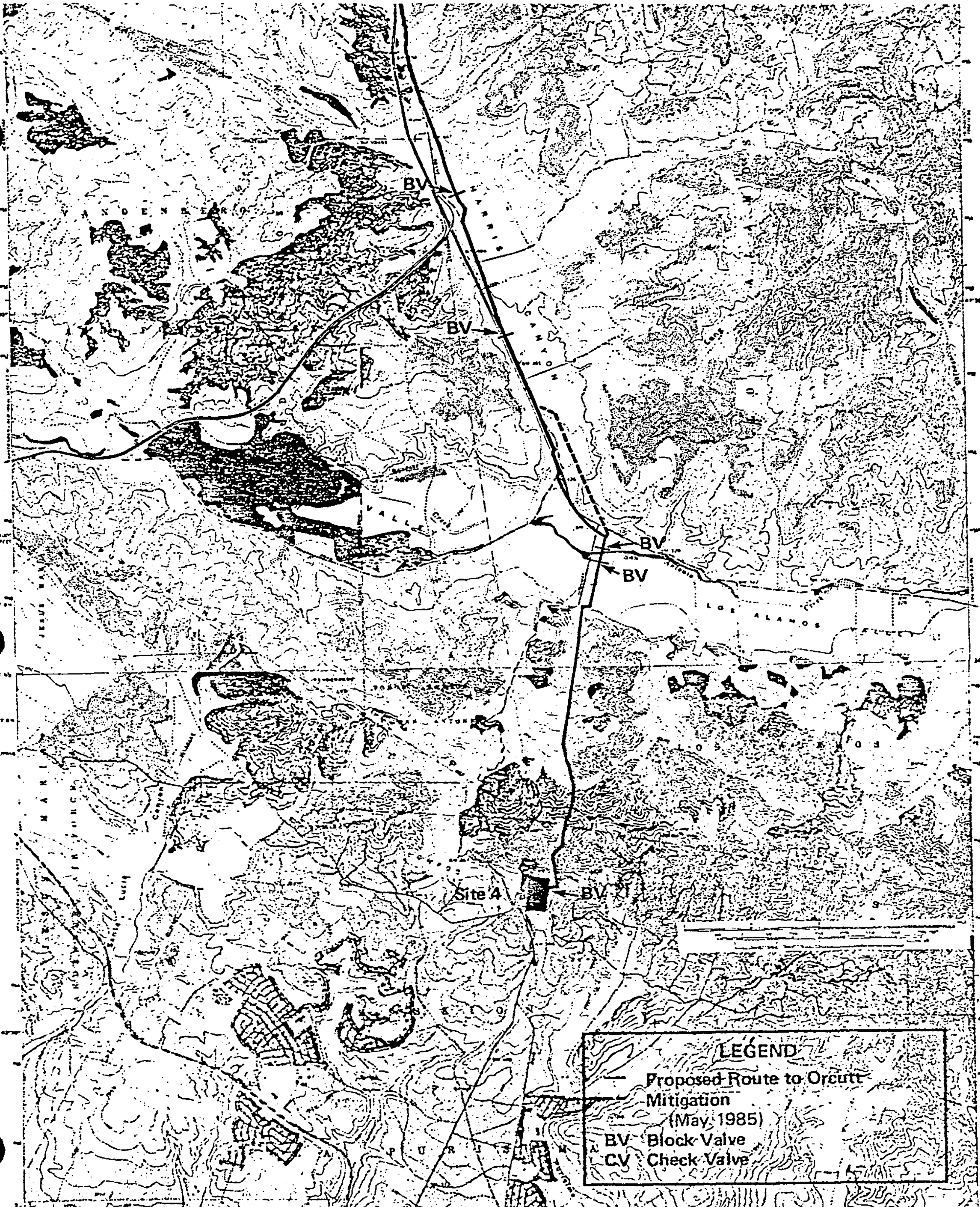


FIGURE 7. PROPOSED DRY OIL PIPELINE FROM LOMPOC DEHYDRATION FACILITY TO ORCUTT

(adapted from Figure 10.1-2, draft EIS/EIR)

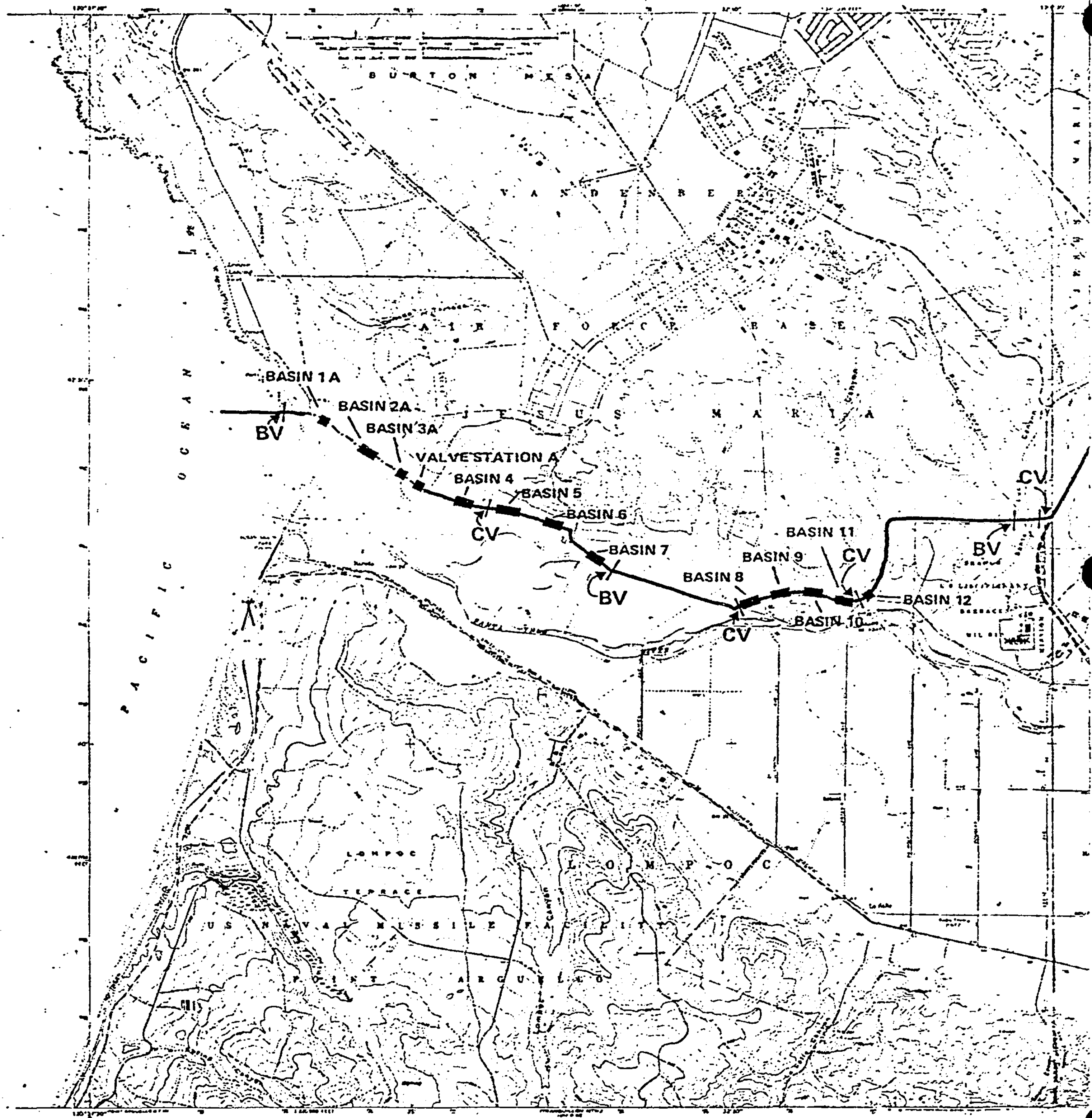


FIGURE 8. Realigned Pipeline Route Through the Santa Ynez Valley with Locations for Mitigative Block (BV) and Check Valves (CV).
(adapted from Figure 10.1-1, draft EIS/EIR)

Endangered Species Act

Section 7 Consultation - Biological Opinion

AGENCY: Minerals Management Service

ACTIVITY: Operations pertaining to the development and production of oil and gas from the central Santa Maria Basin-offshore Point Pedernales, Santa Barbara County, California.

CONSULTATION CONDUCTED BY: National Marine Fisheries Service

DATE OF ISSUANCE: JUN 21 1985.

BACKGROUND: On April 15, 1985, the Minerals Management Service (MMS) requested initiation of formal consultation on a plan for proposed oil and gas development and production activities in the central Santa Maria Basin, offshore California. The purpose of this consultation is to consider impacts of the proposed activities on endangered whales and threatened and endangered sea turtles. In addition, we have incorporated information made available during our June 5, 1985 conference with MMS concerning the Guadalupe fur seal, a species proposed for listing as a "threatened" species, into an Appendix to this Opinion.

The NMFS considered impacts to threatened and endangered species due to oil and gas leasing and exploration activities within the central Santa Maria Basin in Biological Opinions issued September 17, 1980 for Lease Sale 53 and on August 9, 1983 for Lease Sale 73. A complete, updated review of listed species biology and potential impacts due to development and production activities was included in the Biological Opinions issued for the Santa Ynez Unit (SYU) on March 7, 1984, and the Point Arguello Field on May 31, 1984. The conclusions reached in those opinions remain valid, and where appropriate, discussions from those opinions are incorporated in this opinion by reference

(NMFS 1984 a,b). This opinion also includes new information made available since June, 1984.

This opinion is based on information acquired through consultation with MMS, Pacific OCS Region Office, information contained in the Biological Assessment (MMS, 1985) and the Draft Environmental Impact Statement/Report (DEIS/EIR) prepared for the project, a review of published and unpublished literature, and through discussions with NMFS staff and marine mammal biologists affiliated with other organizations.

PROPOSED ACTIVITY: Union Oil and Exxon USA have proposed to initiate development and production activities associated with two platforms on two adjacent leased tracts within the Central Santa Maria Basin (CSMB), offshore California. Because MMS anticipates development and production activities within the basin expanding over the next ten years, MMS has requested that this analysis consider an expanded offshore study area to include four additional platforms. Therefore, the area considered in this Biological Opinion covers the entire 29 Federal lease CSMB area. The anticipated proposed activity includes up to six platforms and their associated pipelines. MMS estimates that between 88 and 268 wells will be drilled from these projected platforms.

The proposed activity is described in the Biological Assessment for the Proposed Development and Production Offshore Point Pedernales, Santa Barbara County (MMS 1985). The Point Pedernales Field lies in Federal waters three to five miles west of Point Pedernales. The field is structurally part of the offshore extension of the Santa Maria Basin which was originally opened for exploration with blocks leased in Lease Sale 53 in 1981. The proposed activity includes at least two subprojects, one to be operated by Union Oil and another by Exxon. The Union project includes placement of one offshore drilling platform, the placement of a 20 inch, 100,000 barrel per day capacity wet oil pipeline, a 10-3/4 inch gas line, and a 10-3/4 inch produced water return from Platform Irene to a landfall near Surf on Vandenberg Air Force Base. The Exxon project includes placement of one offshore drilling platform, and one pipeline each for wet oil and gas between platforms Shamrock and Irene. In the event of expanded development, this analysis assumes that the oil and gas extracted from the potential four other platforms would be piped to Platform Irene for consolidation into the pipeline to shore at Surf.

MMS calculates the total resource estimate of the field to be 135 million barrels of oil and 135 MMSCFD of gas. Construction of proposed facilities is scheduled to begin in late 1985. Production is proposed to begin in January 1986 and is anticipated to last 20-25 years.

When production has ended the wells will be plugged, equipment dismantled and decks transported to shore or sent to an offshore disposal site. Jacket legs will be cut off below the mudline and transported to an approved disposal site. Pipelines will be plugged and left in place.

Clean Seas has proposed to the MMS (letter of 19 March 1985) that they intend to station a 180 foot Oil Spill Response Vessel (OSRV) and a 40-45 foot response boat in the Arguello Field. These vessels will have a full time (24 hour) crew and will be equipped with state of the art equipment. Their purpose will be to respond to any spills or potential spills associated with projects in the immediate area.

Status of Species Considered in this Opinion

Common Name	Scientific Name	Status
Gray whale	Eschrichtius robustus	Endangered
Right whale	Eubalaena glacialis	Endangered
Blue whale	Balaenoptera musculus	Endangered
Fin whale	B. physalus	Endangered
Sei whale	B. borealis	Endangered
Humpback whale	Megaptera novaeangliae	Endangered
Sperm whale	Physeter catodon	Endangered
Green sea turtle	Chelonia mydas	Endangered
Leatherback sea turtle	Dermochelys coriacea	Endangered
Pacific Ridley sea turtle	Lepidochelys olivacea	Endangered
Loggerhead sea turtle	Caretta caretta	Threatened

BIOLOGICAL INFORMATION: Information pertaining to the population levels and trends, migration patterns, and behavior of the seven cetacean and four sea turtle species listed as endangered or threatened is contained in the Biological Opinions issued for the development and production activities of the SYU on March 7, 1984 (NMFS 1984 a) and of the Point Arguello Field on May 31, 1984 (NMFS 1984 b). That information is incorporated herein by reference.

Several additional studies concerning the population status and behavior of the gray whale have become available since the above opinions were issued. The findings of these studies augment and further support the information and conclusions included in the above opinions; their findings provide further refinements to our understanding of gray whale biology. These reports include Dohl et al. (1983), Mate and Harvey (1984), NMFS (1984 c), Poole (1984), Reilly (1984), and Rugh (1984). The information included in these reports is incorporated herein by reference.

Additional information concerning the status, distribution, and behavior of the endangered cetaceans considered by this opinion is contained in the recent NMFS Status Reviews. The information contained in the NMFS (1984 d-h) Status Reviews for Right, Blue, Fin, Sei, and Humpback whales, respectively, is incorporated in this opinion by reference.

ASSESSMENT OF IMPACTS: Potential impacts to endangered whales and threatened and endangered sea turtles from the proposed development and production of the 32 lease areas offshore Point Pedernales include: (1) noise associated with drilling and production platforms, crew boats and helicopters, (2) contact with spilled oil, (3) collisions with associated vessels, and (4) facility abandonment. Many of these potential impacts were discussed in the Biological Opinion issued for the exploration phase of OCS Lease Sale 53. The potential impacts to listed species due specifically to development and production were discussed in detail within the Biological Opinions for the SYU and the Point Arguello Field. Those discussions remain valid and are incorporated herein by reference. The findings of several pertinent or recently published studies not discussed in previous opinions and the assessment of potential impacts specific to this subject project are included below.

Impacts from noise: Based on the information presented in the previous consultations (NMFS 1984 a,b) and new information presented in the scientific literature (Dahlheim et al., 1984; Moore and Ljungblad, 1984), we have determined that many of the sounds produced by development and production related activities are within the frequency range of sounds produced by and, therefore, assumed to be heard by those endangered mysticetes likely to occur in the region. Impacts due to noise from this project are expected to be similar to those for the Point Arguello field because oil will be piped ashore for transport and treatment rather than (as for the SYU project) treated at an offshore facility. Due to its nearshore migratory pathway, the gray whale is the species most likely to be affected by noises associated with placement of pipelines and platforms for drilling and extraction. Potential impacts are expected to be similar to those projected for Point Arguello field because whales are likely to concentrate in nearshore waters prior to passing offshore Point Arguello and Point Conception. The evidence collected to date indicates that gray whales may respond to the most intense of these sounds by short term changes in swimming speed, altered surface behavior, and small deflections in course, resuming normal course and speed after passing the source (Malme, *et al.*, 1983; Miles, in lit.).

Other whale species are present only in low numbers in the project area. Their distribution is primarily offshore, well outside of the project area. While low frequency noise is propagated over long distances and may be detected by whales, it is likely to be below levels that would elicit a response. Points Conception and Arguello and the northern Channel Islands would serve to restrict the transmittal of most sound into the Santa Barbara Channel and the Southern California Bight region. However, we would expect some sounds from this project to be heard by whales to the north of the project area. We expect that the populations of these whale species are not likely to be affected by sounds associated with production and development activities because most individuals are found farther offshore and those few individuals within the project area would be present only for short periods as they migrate to feeding or breeding areas elsewhere.

Impacts from oil spills: Oil spills could occur as a result of accidental spills from platforms, pipeline leakage or breaks, or well blowouts as a result of this project. Chronic small spills are expected to occur as a result of accidental spills of diesel fuel or lubricating oil from platforms. Such spills dissipate quickly and are not likely to result in a substantial increase over the amount of oil leaking into the water from natural oil seeps. These types of spills are not likely to present a threat to the survival of any of the species considered in this opinion.

The MMS estimates a 30 percent chance for one or more spills larger than 1,000 bbls and a 14 percent chance for one or more spills of 10,000 bbls or greater to occur as a result of the proposed actions for the entire study area (MMS 1985 Appendix 2, Table 1). These estimates represent spills from platforms and subsea pipelines and are based solely on oil spill accident rates and oil resource volume estimates. Oil spill trajectory simulations prepared by A. D. Little and MMS for the project area show that if a spill occurs, conditional probabilities for a "hit" to land segments range from 2-43 percent for nearby coastal sections, 1-18 percent for San Miguel Island, and 0.3-13.0 percent for Santa Rosa Island, depending on the location and season of the spill (MMS 1985). As it is likely that most of any spilled oil would remain in the immediate offshore area, a large portion of the gray whale population could come into contact with a spill should one occur during the migratory seasons.

In general, the conclusions of previous biological opinions (NMFS 1984 a,b) for similar development and production projects and of research completed to date (St. Aubin _et al._, 1984; St. Aubin _et at._, 1985) indicate that whales may avoid contact with spilled oil, are likely to suffer minor impacts if they contact oil spills, and are likely to recover from those effects. The fact that no marine mammal mortalities were reported during the Ixtoc spill (Hooper 1981) or the 1969 Santa Barbara spill (Brownell 1971) supports these conclusions. In some cases, conclusions have been based on calculations and theories that are presently unverified and we believe that they should be interpreted conservatively.

Impacts of facility abandonment: Sounds associated with the dismantlement and removal of platforms are likely to be similar to those associated with platform construction and placement. These sounds are likely to be within the frequency range of those assumed to be heard by the listed cetaceans considered by this opinion. However, these activities are expected to last only a few months. Should abandonment occur during the gray whale migration period, individual whales could respond to the most intense of these sounds by short term alteration in swimming speed and direction. If the presence of platforms and associated activities resulted in some degree of alteration in the route used by migrating gray whales, platform abandonment would encourage reoccupation of historic routes.

CUMULATIVE EFFECTS: We are concerned that the cumulative effects of the expanding development and production related activities along the California coast and, in particular, those areas adjacent to and within the Point Arguello/Conception transition zone, may eventually exceed those threshold levels which could lead to abandonment of important habitat or interfere with the recovery of populations of endangered and threatened species. Continued OCS expansion could eventually result in alteration of migratory routes with an unknown effect on gray whale physiology or reproductive behavior. At present we are unable to predict what those threshold levels might be. The continued recovery of gray whale populations and the movement of humpback whales into the Gulf of Farallons (an area having high levels of vessel traffic) suggest that current levels of development and vessel traffic are below thresholds that may exist.

The NMFS will monitor OCS activities and review new information concerning listed species for indications of cumulative impacts. The MMS's studies program should provide information that may help to identify such long term impacts.

CONCLUSION:

Cetaceans other than gray whales

Based on the above information, our prior assessments of impacts (NMFS 1984 a,b), the wide distributions and broad migration corridors of the North Pacific populations of blue, fin, sei, humpback, and sperm whales, and the fact that only a small portion of any population is likely to be in the project area, the NMFS concludes that the proposed activities associated with oil and gas development and production in the 29 Federal lease area in the CSMB offshore Point Pedernales are not likely to jeopardize the continued existence of these species.

The North Pacific right whale population is so small that adverse impacts to even a few individuals or modification of important habitat could jeopardize the continued existence of the population. These facts led us to conclude that oil leasing and exploration of historical feeding grounds in Alaska could interfere with the recovery of the population and ultimately jeopardize its continued existence. In contrast to Alaska, no historically important habitat exists off California and right whales were never abundant off the west coast. Sightings of right whales off California are so infrequent that the probability of a right whale being affected by noise or spilled oil resulting from development and production in this project area is extremely low. Therefore, we conclude that proposed activities are not likely to jeopardize the continued existence of the right whale. As discussed above, we think the MMS must expand consideration of the cumulative effects of all OCS activities to ensure that collectively they are not likely to jeopardize the continued existence of the right whale.

Gray whales

The gray whale population is likely to experience impacts from noise and spilled oil from development and production related activities. While we are unable to predict the thresholds at which recovery or the continued existence of the population may be influenced, we conclude that the potential impacts from this project are not likely to jeopardize the gray whale population as it migrates along the California coast.

Noise: Our conclusion regarding the impacts of noise on gray whales is based on the recovery of the gray whale population concurrent with increased OCS activities (including in situ development and production activities), increasing vessel traffic off the California coast, the results of MMS funded studies on the effects of noise on marine mammals, and a review of the best scientific information available concerning gray whale acoustics, normal behavior and response to test sounds associated with development and production. We emphasize that this conclusion is limited to the effects of OCS development and production in the 29 Federal lease CSMB areas offshore Point Pedernales and may not be applicable to other regions with different geographic features and gray whale distribution and abundance.

Oilspills: Our conclusions regarding the effect of spilled oil on gray whales is based on the results of MMS-funded and other studies on the effect of oil on marine mammals, the presence of numerous natural oil seeps offshore California, the low probability of a spill from a production well, and the fact that no mortality of large cetaceans was attributed to the production related 1969 Santa Barbara spill and the Ixtoc spill in the Gulf of Mexico. The stationing of the new 180 foot dedicated OSRV and 40 foot fast response boat should improve response time to any spills that may occur and should reduce the potential for impact to gray whales and other endangered species.

Cumulative effects: In view of the relatively restricted migration patterns of gray whales, and the extensive OCS development that is scheduled to take place within the range of the gray whale in the next five years, we are concerned that the cumulative effects of these activities may have adverse effects on the gray whale population. We believe that MMS must consider the cumulative effects of proposed actions upon listed species to make determinations required by Section 7 of the ESA. We recommend that consideration of cumulative effects not only examine activities for the entire western coast, but also, should emphasize regionally distinct areas, such as the north western Santa Barbara Channel region, in particular. Consultation for individual fields cannot address adequately the cumulative impact of intensive development within or adjacent to a geographical region that may serve as a focal reference point (such as the Point Arguello/Conception transition zone) for large numbers of migrating gray whales.

Since information on the cumulative effects on the gray whale from OCS activities throughout its range is sparse, we are unable to identify a threshold of OCS activities that would result in significant impacts to the gray whale population. We believe that sufficient information is available to conclude that current levels of exploration, development, and production are below these critical thresholds. We expect that impacts associated with the proposed activities also will be below these thresholds, but this does not release involved agencies from their responsibility to continue to investigate cumulative effects from all OCS activities, including those offshore Canada and Mexico, to ensure that, collectively, they are not likely to jeopardize the continued existence of the gray whale population.

Sea turtles

The NMFS concludes that these activities are not likely to jeopardize the continued existence of any listed sea turtle population because most individuals generally are distributed in warm tropical or subtropical waters far to the south of the project area. Only a few individuals have been encountered in the colder temperate waters off California; these are probably vagrants at the extreme northern limits of their ranges.

RECOMMENDATIONS: The recommendations made in the Biological Opinions for the SYU (NMFS 1984 a) and Point Arguello field (NMFS 1984 b) relating to listed species remain valid and are incorporated herein by reference. Two of these recommendations that warrant particular attention are repeated below.

We recommend that the MMS utilize their studies program for research and development of improved oil spill containment equipment. As stated in the DEIS for the SYU (Exxon 1982) the current state of the art equipment "should be effective in seas less than two feet, but will probably not at all be effective in seas of six feet or greater." Sea state information provided by the MMS (1985) indicates that at the Platform Irene location typical wave height (conditions encountered 50 percent of the time) is 4.1 feet, does not exceed 7.9 feet 99 percent of the time, and is typically 16.4 feet during storm conditions (considered as one year extreme). As the best available equipment is likely to be either marginally effective or ineffective in the project area during considerable periods of time, we recommend that the MMS, Clean Seas, and the various oil companies proposing development in this region coordinate the development of equipment that will effectively contain oil spills under the conditions likely to be encountered during an oil spill. Development and deployment of more effective equipment may reduce the risk of an oil spill contacting endangered or threatened species and their habitats.

We also recommend that the MMS initiate discussions with the NMFS concerning the cumulative impact to endangered and threatened species associated with the development and production activities proposed for the entire Central and Southern California region. Such discussions may provide a more accurate understanding of potential impacts to endangered species as they move through the region than by the evaluation of small scale, site specific plans.

Reinitiation of consultation: Consultation must be reinitiated if (1) new information reveals additional impacts of the identified activity not considered in this opinion that may affect listed species or their habitat, (2) the proposed activities are modified in a manner not considered herein, or (3) a new species (other than the Guadalupe fur seal, see Appendix) is listed or critical habitat is designated that may be affected by the proposed activity. The NMFS suggests that the agencies involved in this consultation continue to discuss the information concerning future OCS activities so that, if needed, consultation can be reinitiated in a timely manner. This in no way would preclude any involved agency from making an independent determination of the need for reinitiating consultation.

STATEMENT REGARDING INCIDENTAL TAKING PURSUANT TO SECTION 7(b)(4) OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED

Section 7(b)(4) of the ESA requires that when an agency action is found to be consistent with Section 7(a)(2) the NMFS will issue a statement specifying the impact of incidental taking of endangered species, providing reasonable and prudent measures that are necessary to minimize impacts, and setting forth the terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

No sea turtle mortality has been reported incidental to OCS activities off California, and we do not anticipate any mortalities incidental to the proposed activity. As a condition of this statement, if a sea turtle is killed as a result of an interaction with activities associated with development and production, the incident must be reported to the Director, Southwest Region, NMFS as soon after the taking as possible, and the Southwest Region will cooperate with the Pacific OCS Region MMS in the review of the incident to determine the need for developing mitigation measures and assess any need for reinitiating consultation.

Any marine mammal population listed pursuant to the ESA is considered depleted under the Marine Mammal Protection Act of 1972 (MMPA). According to Section 17 of the ESA, no provision of the ESA is to take precedence over a more restrictive, conflicting provision of the MMPA. The MMPA is more restrictive than the ESA because the MMPA prohibits taking from depleted stocks except for scientific research. Therefore, Section 7(b)(4) of the ESA is not applicable to endangered whale populations and no statement specifying impact is provided.

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Appendix

Potential Impacts on the Guadalupe Fur Seal

BACKGROUND: On November 21, 1983, the NMFS received a petition to list the Guadalupe fur seal, Arctocephalus townsendi, as an endangered species. On February 8, 1984, notice was published in the Federal Register that the petition presented substantial information indicating the petitioned action may be warranted. The NMFS conducted a status review to determine if the petitioned action was warranted. Based on this review, the NMFS published a notice on January 3, 1985, in the Federal Register of a proposed rule to list the Guadalupe fur seal as a threatened species. The NMFS anticipates that the decision process concerning this proposal will be completed by fall, 1985.

Section 7(a)(4) of the ESA requires Federal agencies to confer with the NMFS on agency actions likely to jeopardize the continued existence of any species proposed for listing. Early consideration of the species through conferences could provide for protection from any potential impacts of a proposed project and potentially eliminate the need to reinitiate consultation should the species be subsequently listed. This appendix and the information exchanged during our June 5, 1985, conference is appended to the Biological Opinion for the proposed project to satisfy agency requirements concerning a proposed species pursuant to the ESA. Any recommended protective measures offered in this Appendix are contingent upon listing of the species.

BIOLOGICAL INFORMATION: The following information is compiled from the NMFS Status Review (Seagars 1984) and the various published and unpublished reports referenced both within the Status Review and the proposed rule to list the species published in the Federal Register (40[2]:294-296). These documents are incorporated into this Appendix by reference.

The distribution of Guadalupe fur seals prior to their exploitation is not well known. However, it is likely that the species may have ranged approximately from 18oN (Revillagigedo Islands - located about 300 miles south of Baja California, Mexico) to 37oN (Monterey Bay, California). Breeding likely occurred in the California Channel Islands from San Miguel Island south to Guadalupe, the San Benitos and Cedros Islands, and perhaps as far south as Socorro Island (one of the Revillagigedo Islands). The species does not currently breed in the Southern California Bight. All breeding activity and virtually the entire population currently is found on or near Guadalupe Island (256 km west of Baja California, Mexico) during the breeding season. The breeding season is from early May to July (possibly to early August). A few juveniles and an occasional adult have been observed to haul out each year during the summer months on San Miguel Island since 1968 (Antonelis and DeLong pers. comm.). The Guadalupe fur seals sighted at this location are believed to be either in the process of recolonization or vagrant individuals at the northernmost portion of their range; other individuals have been reported from San Nicolas and San Clemente Islands and a few widely scattered pelagic locations. Estimates of pre-exploitation population size range from 20,000 to 200,000 animals. As the literature is grossly inadequate with regard to pre-exploitation levels, a sound estimate of the pre-exploitation population size cannot be made. However, it is likely that at the minimum the pre-exploitation population included at least 30,000 fur seals, based both on the size of the assumed habitat (accommodating 20,000 at Guadalupe Island and

10,000 elsewhere) and on the large numbers reported to be taken by 19th century sealing vessels. Although there are considerable limitations associated with the survey techniques employed throughout recent years, the data indicate that the population is growing. A thorough foot census of the east side of Guadalupe Island conducted jointly by Mexico and U.S. scientists counted 1,597 *A. townsendi* in early August 1984. There is no indication that *A. townsendi* occurs in any abundance throughout the remainder of its historic range. Therefore, the 1984 count of about 1,600 animals is the best available scientific data and can be used as a valid estimate of the current minimum population size.

Pelagic observations of the Guadalupe fur seals in U.S. waters include only three records. All of these were in the outer waters of the Southern California Bight at least 70 km south of the project area during the winter months. No further specific information is available describing the species pelagic distribution, feeding areas, or prey species.

Impact from oil spills. Kooyman, Gentry, and McAllister (1976) described the response of northern fur seals to contact with spilled oil. These results are applicable to the Guadalupe fur seal as the thick pelage of all fur seals constitutes the principal element of their thermoregulatory mechanism, a system that carefully regulates heat loss to the cold, surrounding environment. The authors found that a light oiling of about 30 percent of the pelt surface resulted in a 1.5 fold increase in the metabolic rate of fur seals in water. While the study could not verify that death would inevitably follow such contact, it did predict that the health of oiled individuals was in serious jeopardy because the stress of greatly increased metabolic rates generally leads to death by disease or starvation.

There is virtually no information available concerning at-sea distribution of Guadalupe fur seals. We believe that the few individuals present offshore Southern California are most likely to occur south of the project area, such as around haulouts on the far Channel Islands and over the offshore ridges and continental slope. Because there is only a low probability of a spill occurring and reaching southern California pelagic regions where fur seals might be present, it is unlikely that there will be a significant impact to the Guadalupe fur seal due to an oil spill associated with the proposed project.

Impacts due to haulout disturbance. In the event that an oil spill contacts San Miguel Island, clean-up efforts may be directed to both nearshore and onshore regions. Pinnipeds respond to human presence on haulout sites by immediate departure from the vicinity. Prolonged or intensive disturbance can result in abandonment of the site. Disturbance during the period when Guadalupe fur seals would likely be present (May-August) could result in disturbance to a few individuals and perhaps abandonment of the site.

The conditional probability of an oil spill from this project contacting San Miguel Island during this season is between .002-.008 (MMS 1985). Because of this low conditional probability, and the likelihood that oil will be either naturally or anthropogenically dispersed enroute to the island, it is unlikely that there will be significant clean-up related disturbance to Guadalupe fur seals hauled out at San Miguel Island.

CONCLUSIONS: We conclude that the proposed activities are not likely to jeopardize the continued existence of the Guadalupe fur seal because the majority of the population is located on or near Guadalupe Island, only a few non-breeding individuals occur in the Southern California Bight, and the chances that they would be contacted or otherwise disturbed by an oil spill are very low.

RECOMMENDATIONS: We recommend that the MMS utilize their studies program for research and development of improved oil spill containment equipment. As the best available equipment is likely to be ineffective much of the time around San Miguel Island (NMFS 1984 b, and this Opinion), where Guadalupe fur seals are known to be present, the MMS, Clean Seas, and the various oil companies proposing development in this region should coordinate in the development of equipment that will effectively contain oil spills under the conditions likely to be encountered. Development and deployment of effective equipment could reduce the risk of an oil spill contacting Guadalupe fur seals and their habitat.

To further protect Guadalupe fur seals from contact with spilled oil, we recommend that the MMS evaluate the benefits of locating additional oil spill containment equipment closer to Guadalupe fur seal haulout areas. The proposed location of a new OSRV and fast response boat associated with the Point Arguello field project area could help to stop a spill from reaching San Miguel Island. In addition, caching of additional containment equipment at a location on one of the more western of the Channel Islands could shorten the time required to respond to spills in the area and reduce the chance for contact with Guadalupe fur seals on or adjacent to their haulout areas.

LIST OF ABBREVIATIONS/GLOSSARY

AFY	Acre-feet/year
Aliphatic	Organic compounds with an open-chain structure.
Alluvium	Clay, silt, sand, gravel, or similar materials deposited by running water.
Anoxic	A lower than normal level of oxygen, insufficient oxygen to support organisms otherwise present.
Anticline	An arch of stratified rock.
APCD	Air Pollution Control District.
API Index	American Petroleum Institute index, a measure of the specific gravity of hydrocarbons.
AQAP	Air Quality Attainment Plan
AQIA	Air Quality Impact Analysis
Aquifer	A water-bearing layer of permeable rock.
Aromatic	Organic compounds whose structure includes at least one benzene ring.
Avifauna	Birds.
Baseline	The set of conditions against which change is to be measured or described.
Bathymetric	Relating to measurement of water depths in oceans, seas, and lakes.
B/D	Barrels per day. One barrel equals 42 gallons of liquid.
Benthic	Relating to or occurring at the bottom of a body of water, including the ocean.
Berm	A narrow shelf, path, or ledge typically at the top or bottom of a slope.
Biota	Living things.

Blind Ram	A device for preventing or controlling blowout during drilling.
Boiler Blowdown Water	Water from a steam drum which contains impurities that have to be removed periodically.
CARB	California Air Resources Board.
Cathodic Protection	Coatings or devices used to prevent corrosion.
CDF&G	California Department of Fish and Game.
CEQA	California Environmental Quality Act.
Cetaceans	Aquatic mammals such as whales, dolphins, porpoises.
Chalcedony	A type of quartz.
Chert	A flint-like rock consisting mostly of quartz.
CO	Carbon monoxide.
CNEL	Community Noise Equivalent Level.
Cobbles	Round stones.
Cogeneration	Simultaneous use of a processing facility to generate electricity.
Copepods	A type of microscopic water animal with a thin shell, often comprising much of the animal plankton.
CZO	Coastal Zoning Ordinance.
dB	Decibel, a unit that expresses the relative intensity of sound.
dBA	Decibel on a weighted scale.
Debitage	Debris.
Demersal	Associated with bottom of a body of water.
Depauperate	Below normal development.
DOI	Department of the Interior.
Drilling Muds	Special liquid used to cool drill bit, remove cuttings from drill face to surface and control pressures encountered in drilling.

Echinoderms	Symmetrically shaped marine animals such as starfish and sea urchins.
Ecotone	A transition area between two adjacent ecological communities.
ESH or ESHA	Environmentally Sensitive Habitat Area. These are areas designated for protection by the Local Coastal Plan.
Ethnographic	Having to do with the study of the history or traditions of a particular group of people.
Fathom	A unit used to measure the depth of waters; 1 fathom equals 6 feet.
Gastropods	A type of mollusk with a one-piece shell; for example, snails, abalone.
Geomorphology	A service dealing with land and submarine relief features.
Glycol	A type of alcohol.
gpd	Gallons per day.
Guying	Bracing.
Gyre	Water moving in a circle.
Heavy Metals	Certain potentially toxic metals such as barium (Ba), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni), silver (Ag), and zinc (Zn).
Indurated	Hardened.
Interstitial Water	The water included between sediment particles.
Invertebrate	Animals that lack a spinal column.
Kill Line	Pipeline through which heavy mud can be pumped to control pressure in a well.
km	Kilometer, a measure of distance equal to about six-tenths of a mile.
LCP	Local Coastal Plan.
LDN	Day/Night Sound Level.

LEQ	Equivalent Sound Level.
Lithic	Related to or made of stone.
m	Meter, 39 inches.
Macroepifaunal	Organisms large enough to be seen with the naked eye that attach to exposed surfaces.
mg/kg	Milligrams per kilogram.
Mg/L	Milligrams per liter, a measure of the weight (in milligrams) of dissolved material or gas in a volume (liter) of liquid.
Midden Sites	Refuse heaps, used in an archaeological context.
MLLW	Mean lower low water.
MMBtu	Millions of British thermal units; a Btu is a measure of the amount of heat required to raise the temperature of a pound of water 1°F.
MMS	Minerals Management Service.
MMSCF/D	Millions of standard cubic feet per day. A unit used to describe amount of gas.
Nekton	Free-swimming aquatic animals; e.g., whales, fish, squid.
NAAQS	National Ambient Air Quality Standards.
NEPA	National Environmental Policy Act.
NMFS	National Marine Fisheries Service.
NOMECO	Northern Michigan Energy Corporation.
NSR	New Source Review.
OCS	Outer Continental Shelf.
pH	A measure of water acidity or alkalinity.
Pinnipeds	Mammals such as seals, walruses, and sea lions.
Plankton	Tiny floating or swimming animal and plant life carried by the currents in a body of water.

ppt	Parts per thousand.
PSD	Prevention of Significant Deterioration.
Psig	The gauge value of pressure in pounds per square inch.
Raptors	Birds of prey such as eagles, hawks, falcons, vultures.
Rig	Device used to drill a well.
Rill	A very small brook.
Riparian	Associated with a river bank or the shores of a lake or tidewater.
ROV	Remotely Operated Vehicle.
SALM	Single anchor leg mooring.
Satellite Platform	An oil production platform which has its production transported to another platform or common collecting pipelines.
Sedge	Type of wetland plant.
Sessile	Not free to move about.
Sour Gas	Gas extracted from the earth prior to treatment for removal of impurities such as sulfur compounds.
Spud	Term used to indicate beginning of drilling.
Stratigraphy	Origin, distribution, composition of layers of earth, rock.
Syncline	A trough formed by two strata of rocks.
Tail Gas	Gas exciting from a production process.
Tectonic	Related to deformations of the earth's crust.
Thermocline	A layer in which temperature drops at least 1°C for every meter of depth.
Tidewater Gobies	Small fish, under consideration for Federal Protection under the Endangered Species Act in 1984.
TSP	Total suspended particulates.

Turbidite	Material that has moved down the sleep slope at the end of a continental shelf.
ug/m^3	Microgram per cubic meter.
Upset	Equipment malfunction.
Vernal Pool	Recently formed pool, usually temporary.
VOC	Volatile organic compound.
VTSS	Vessel Traffic Separation Scheme.

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- Milton Love, Ph.D., Idthyologist - Reviewer, Fisheries

California Institute of Technology

- Wheeler North, Ph.D., Algologist - Reviewer, Kelp

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- Charles Woodhouse, Ph.D., Zoologist - Reviewer, Marine Mammals
- Dennis Power, Ph.D., Zoologist - Reviewer, All Marine Communities

Consultant

- Charles Menzie, Ph.D., Environmental Scientist - Reviewer, Marine Biology and Water Quality

Terrestrial and Freshwater Biology

- Ann Howald, Biologist, Principal Author

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- Wayne Ferren, Plant Ecologist, Botanical Resources
- Scott Cooper, Ph.D., Aquatic Biologist
- Paul Lehman, Ornithologist
- Kelly Steele, Botanist

Santa Barbara Museum of Natural History

- Paul Collins, Vertebrate Biologist, Wildlife Resources

University of North Carolina

- Kathryn Saterson, Biologist

Commercial Fishing

Arthur D. Little

- Charles Cooper, Biologist, Principal Author

General Research Corporation

- David Sanini, Economic Specialist

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Consultants

- Marshall Payne, Onshore and Offshore Geology
- Jan Rietman, Offshore Geophysist Data Review and Synthesis

GEOFON

- Alex Khan, Geotechnical Engineering
- Allen Blodgett, Geotechnical Engineering

Surface Water and Groundwater

Arthur D. Little, Inc.

- Janice Green, Onshore Spill Impacts
- David Langseth, Groundwater Hydrology
- Peter Mattison, Geologist

Consultant

- Charles Wasserman, Surface Water Hydrology

Paleontology

Consultant

- Robert Gray, Ph.D., Paleontologist

PROJECT DESCRIPTION AND PROJECT ALTERNATIVES

John Peirson, Chemical Engineer, Arthur D. Little Coordinator

Arthur D. Little

- Stanley Dale, Chemical Engineer
- Peter Stickles, Chemical Engineer

SOCIOECONOMICS/OTHER USES

Craig Tyler, Economist/Planner, Arthur D. Little Coordinator

General Research Corporation

- Ned Dodson, Ph.D., Economist, Team Leader
- Michael Collins, Ph.D., Operations Research, Modeling Specialist
- Harry Fox, Economic Analyst, Demography
- Vicki Hill, Planner/Environmental Specialist
- Kimberly Schizas, Planner/Environmental Specialist

SYSTEM SAFETY AND RELIABILITY

Ashok S. Kalelkar, Ph.D., Mechanical Engineering, Arthur D. Little
Coordinator

Arthur D. Little

- Peter Athens, Mechanical Engineer, Deputy Coordinator, Onshore Systems
- Gordon Sellers, Ph.D., Deputy Coordinator, Offshore Systems
- Lisa Bendixen, Applied Mathematics, Risk Analysis
- Stanley Dale, Chemical Engineer, System Safety Safety and Reliability
- Kumkum Dilwali, Engineer, Oil Spill Analysis
- John Hagopian, Chemical Engineer, Risk Analysis
- Gerald Laroque, Mathematician, Oil Spill Analysis
- Krishna Mudan, Ph.D., Mechanical Engineering, Risk Analysis
- John Peirson, Chemical Engineer, System Safety Description

PRELIMINARY
LIST OF PERMITS/APPROVALS
UNION AND EXXON PROJECTS

1. SANTA BARBARA COUNTY

AIR POLLUTION CONTROL DISTRICT

Authority to construct for onshore facilities that are emission sources.

Permit to operate for onshore facilities that are emission sources.

DEPARTMENT OF PUBLIC WORKS

Grading permit for approval of final grading and drainage plans for onshore pipelines and facility sites.

Building permit for onshore facilities.

TRANSPORTATION DEPARTMENT

Encroachment permit for work in County road rights-of-way.

RESOURCE MANAGEMENT DEPARTMENT

Final development plan approval and land use permit for onshore facilities and pipelines outside of Vandenberg AFB and the coastal zone.

Comprehensive Plan Amendment, to add a Petroleum Resource Industry Overlay for the Lompoc site.

Rezone application to change 22.5 acres of the Union fee property from unlimited agriculture zoning designation (U) to general industry (M2).

Conditional Use Permit for pipeline crossings in Environmentally Sensitive Habitat areas, substation, transmission line, and the alternative landfall.

Coastal Development Permit for onshore facilities in the Coastal Zone.

Landscaping Plan approval.

COUNTY FIRE DEPARTMENT

Approval of fire protection and energy response plans.

2. COUNTY OF SAN LUIS OBISPO

AIR POLLUTION CONTROL DISTRICT

Authority to construct.

Permit to operate (modification to existing permit)

PUBLIC WORKS DEPARTMENT

Building and grading permits for Santa Maria refinery modifications.

PLANNING DEPARTMENT

Construction permit for Santa Maria Refinery modifications.

Final development plan approval for Santa Maria Refinery modifications.

3. STATE OF CALIFORNIA

COASTAL COMMISSION

Coastal development permit for segment of offshore pipelines and cables between the 3-mile line and the mean high tide line.

Consistency determination for facilities in federal waters.

Consistency certification for facilities on Vandenberg AFB.

STATE LANDS COMMISSION

Right-of-way lease for segment of the offshore pipelines and cable between the 3-mile line and the mean high tide line.

DEPARTMENT OF FISH AND GAME

Stream alteration agreement for pipeline crossings.

DEPARTMENT OF TRANSPORTATION

Encroachment permit, for work in State right-of-way.

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

Permits for trenches over 5 feet deep, during pipeline construction.

REGIONAL WATER QUALITY CONTROL BOARD (CENTRAL REGION)

NPDES permit.

Waste discharge requirements for pipeline trenching in State waters and for onshore grading and construction activities which may affect surface water quality (may require separate permit or only review of local permit).

4. FEDERAL

MINERALS MANAGEMENT SERVICE

Approval of the Development and Production Plans (separate DPPs have been filed for Platform Irene and Project Shamrock).

Issuance of right of use and easement for segment of offshore pipelines from Project Shamrock Platform to Platform Irene.

Approval of offshore pipelines, as appropriate, under OCS Order No. 9.

Approval of Application for Permit to Drill each well on the platforms.

Design verification by the Certified Verification Agent.

> NOTE: Design Verification Plan, Fabrication Verification Plan, and Installation Verification Plan are all subject to MMS approval pursuant to OCS Order No. 8.

Approval of Oil Spill Contingency Plan submitted per requirements of OCS Order No. 7.

Approval of Critical Operations and Curtailment Plan submitted per requirements of OCS Order No. 2.

Approval of Platform Shelter Worthiness and Evacuation Plans for hazardous missile launches from Vandenberg AFB.

VANDENBERG AIR FORCE BASE

Easement for onshore pipeline located on Vandenberg AFB.

ENVIRONMENTAL PROTECTION AGENCY

National Pollutant Discharge Elimination System (NPDES) permit for facilities inland from 3 miles. (For Santa Barbara County, this approval will be eliminated upon EPA approval of Santa Barbara APCDs NSR/PSD rule 205.C.)

FEDERAL AVIATION ADMINISTRATION

Airspace authorization for operation of a helideck at the platforms.

FEDERAL COMMUNICATIONS COMMISSION

Licenses for operation of communications facilities between the platforms and shore.

U.S. ARMY CORPS OF ENGINEERS

Permit to perform work in or affecting navigable waters of the United States (per Section 10 of Rives and Harbors Act of March 3, 1899). This permit is required for installation of offshore platforms and pipelines.

Section 404 permit for dredging and ocean dumping of dredge material.

Platform and pipeline structures.

U.S. COAST GUARD

Approval of aids to navigation.

Certificate of Financial Responsibility to accommodate requirements of the Oil Spill Contingency Fund.

Continuous Notice of platform and pipeline installation activity.

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Dick Gillen
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Minerals Management Service

RECORD OF DECISION

Prepared pursuant to Title 40 CFR Part 1505

Following Preparation of
"Union Oil Project/Exxon Project Shamrock and
Central Santa Maria Basin Area Study EIS/EIR"

U.S. Department of the Interior
Minerals Management Service
Pacific Outer Continental Shelf Region
Office of Field Operations

August 5, 1985

Union Oil Company of California
Attention: Mr. Richard S. Gillen
P. O. Box 6176
Ventura, California 93006

Re: Development and Production Plan--
Platform Irene, Point Pedernales
Field

Gentlemen:

Union Oil Company of California's Point Pedernales Field Development and Production Plan, which provides for the installation of Platform Irene on OCS-P 0441, with associated pipelines, a power cable and electrical substation, and an onshore treatment facility, was deemed submitted pursuant to 30 CFR 250.34 on September 4, 1984. An in-depth environmental review of Union's Plan was performed, with the Minerals Management Service and State of California jointly preparing an Environmental Impact Statement/Environmental Impact Report covering development activities in the central Santa Maria Basin, including this project. An in-depth technical review of the Plan was also undertaken, resulting in our conclusion that the Plan is based on sound engineering and scientific principles. On January 22, 1985, the California Coastal Commission concurred with Union's consistency certification which states that the proposed activities will be conducted in a manner consistent with California's Coastal Management Program.

Accordingly, since the Plan is technically and environmentally sound, Union's Development and Production Plan is hereby approved, subject to the following conditions:

- Union shall meet the requirements detailed in our September 7, 1984 letter, subject: Requirements for Platform Installation and Commencement of Operations.

- With respect to installation procedures, Union shall:

  i. Submit an Operations Curtailment Plan which lists conditions weather and other constraints) under which pipe-laying operations will not proceed.

  ii. Submit detailed anchoring plans; the corridors for anchor placement during installation procedures shall be selected to minimize impacts to any hard bottom features and cultural resources to the maximum extent possible.

iii. Conduct post-installation geophysical surveying over the area of operation and submit a side scan sonar mosaic with survey results.

The remaining conditions of approval are based on various environmental impact mitigation measures identified in the aforementioned EIS/EIR and adopted by the MMS after a feasibility review.

1. a. Union shall replace one of the proposed diesel cranes on Platform Irene with an electric crane.

b. Union shall replace the proposed diesel dual pump cementing unit with an electric/diesel unit. Use of diesel power for this unit shall be confined to emergency situations and logged at the platform.

c. Union shall not test emergency generators during flaring episodes or when a supply boat is idling in the vicinity of the platform. Testing of the generators shall be logged at the platform.

2. Union shall instruct the oil spill cooperative Clean Seas, Inc. to modify the co-op's oil spill contingency plan by providing a more detailed analysis of how the Santa Ynez River mouth could be protected in the event of a spill.

3. Union shall install mechanical interlocks and associated instrumentation on the platform to reduce the probability of a pig launcher/receiver-related oil spill. Platform personnel shall be trained with respect to correct operating procedures and instrumentation monitoring in connection with the pig launchers/receivers.

4. a. Union shall give the MMS-approved fisheries training program, developed in connection with Lease Sale No. 53, to all offshore personnel associated with this project.

b. Union support vessels shall adhere to the established vessel traffic corridors.

This approval takes into account the project changes that have occurred since the DPP was deemed submitted, which are detailed in Union's July 15, 1985 letter to this office.

We commend Union for its willingness to work closely with us during review of the Point Pedernales Field project and its efforts leading to prompt and efficient development of this vital national resource in a manner which takes into consideration the Nation's energy needs while assuring protection of the environment.

Sincerely

Thomas W. Dunaway
Regional Supervisor
Office of Field Operations

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August 5, 19..

Exxon Company, U.S.A.
Attention: Mr. Donald E. Cornett
P. O. Box 5025
Thousand Oaks, California 91359-5025

Re: Development and Production Plan--
Platform Independence,
Point Pedernales Field

Gentlemen:

Exxon Company, U.S.A.'s Point Pedernales Field Development and Production Plan, which provides for the installation of Platform Independence on OCS-P 0440, with associated subsea oil and gas pipelines, and a power cable leading to Union Oil Company of California's separately proposed platform on OCS-P 0441, was deemed submitted pursuant to 30 CFR 250.34 on October 22, 1984. An in-depth environmental review of Exxon's Plan was performed, with the Minerals Management Service and State of California jointly preparing an Environmental Impact Statement/Environmental Impact Report covering development activities in the central Santa Maria Basin, including this project. An in-depth technical review of the Plan was also undertaken, resulting in our conclusion that the Plan is based on sound engineering and scientific principles. On March 12, 19.., the California Coastal Commission concurred with Exxon's consistency certification which states that the proposed activities will be conducted in a manner consistent with California's Coastal Management Program.

Accordingly, since the Plan is technically and environmentally sound, Exxon's Development and Production Plan is hereby approved, subject to the following conditions:

- Exxon shall submit a pipeline application and any additional corresponding information specified by the MMS.

- Exxon shall meet the requirements detailed in our forthcoming letter, subject: Requirements for Platform Installation and Commencement of Operations.

- With respect to installation procedures, Exxon shall:

1. Submit an Operations Curtailment Plan which lists conditions (weather and other constraints) under which pipe-laying operations will not proceed.

ii. Submit detailed anchoring plans; the corridors for anchors placement during installation procedures shall be selected to minimize impacts to hard bottom features and cultural resources to the maximum extent possible.

iii. Conduct post-installation geophysical surveying over the area of operation and submit a side scan sonar mosaic with survey results.

The remaining conditions of approval are based on various environmental impact mitigation measures identified in the aforementioned EIS/EIR and adopted by the MMS after a feasibility review.

1. a. Exxon shall replace the two proposed diesel cranes with electric cranes.

b. Exxon shall not test emergency generators during flaring episodes on when a supply boat is idling in the vicinity of the platform. Testing of the generators shall be logged at the platform.

2. Exxon shall use a white color scheme for the platform.

3. Exxon shall install mechanical interlocks and associated instrumentation on the platform to reduce the probability of a pig launcher/receiver-related oil spill. Platform personnel shall be trained with respect to correct operating procedures and instrumentation monitoring in connection with the pig launchers/receivers.

4. Exxon shall give the MMS-approved fisheries training program, developed in connection with Lease Sale No. 53, to all offshore personnel associated with this project.

This decision takes into account the project changes that have occurred since the revised DPP was filed, which are detailed in Exxon's July 24, 1985 letter to this office.

We commend Exxon for its willingness to work closely with us during review of the Point Pedernales Field project and its efforts leading to prompt and efficient development of this vital national resource in a manner which takes into consideration the Nation's energy needs while assuring protection of the environment.

Sincerely,

Thomas W. Dunaway
Regional Supervisor
Office of Field Operations

bcc: FILE: Pt. Pedernales Field, OCS-P 0438/0440, DPP Corres.
Chron
RS/OL&E

DS/SR
Chief/[illegible]
PO Chron

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RECORD OF DECISION

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RECORD OF DECISION

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I. INTRODUCTION

This Record of Decision is a Federal document written to inform Federal decision-makers and the public of: 1) the salient points of two proposed Development and Production Plans (DPPs) which were evaluated in an EIS/EIR, entitled "Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study EIS/EIR", and 2) the decisions which will made by the MMS concerning the DPPs and how they relate to the EIS/EIR. The two DPPs are: Exxon's DPP for Leases OCS-P 0437, P 0438, P 0440 and P 0441 and Union's DPP for Lease OCS-P 0441.

The Record of Decision is written in accordance with 40 CFR Section 1505.2 of tne Council on Environmental Quality (CEQ) regulations which mandates that agencies rendering decisions on projects for which an EIS was completed prepare a concise public record of decision.

Title 40 CFR Section 1505.2 of the CEQ explains that this record shall:

"(a) State what the decision was.

"(b) Identify all alternatives considered by the agency in reaching its decision, specifying the alternative or alternatives which were considered to be environmentally preferable. An agency may discuss preferences among alternatives based on relevant factors including economic and technical considerations and agency statutory missions. An agency shall identify and discuss all such factors including any essential considerations of national policy which were balanced by the agency in making its decision and state how those considerations entered into its decision.

"(c) State whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation."

Minerals Management Service, as the lead Federal agency, and County of Santa Barbara, as the lead State agency, in cooperation with the California Secretary of Environmental Affairs, the California Coastal Commission, and the California State Lands Commission, completed the EIS/EIR for the Point Pedernales area in June 1985. The EIS/EIR describes and evaluates (1) Union's and and Exxon's proposed OCS oil and gas development of the Point Pedernales Field located in the offshore southern Santa Maria Basin, off Santa Barbara County, California; (2) the related oil and gas processing facilities proposed at Lompoc, Santa Maria, and Battles; and (3) a future estimate of Santa Maria Basin development.

Exxon's DPP for Leases OCS-P 0437, P 0438, P 0440, and P 0441 includes proposed installation of Platform Independence and a subsea pipeline and power cable to Union's Platform Irene. Exxon's project was initially designated the Shamrock Project. Union's DPP for Lease OCS-P 0441 includes proposed installation of Platform Irene and a system of consolidated offshore and onshore pipelines to carry oil and gas onshore to Lompoc and then northward to Battles and Santa Maria.

Because of the potential for additional development in the Santa Maria Basin area over the next 10 years, the EIS/EIR also includes of an Area Study. The Area Study was designed by the MMS to: 1) provide an evaluation of potential cumulative impacts related to possible oil and gas development in the area, 2) facilitate coordination among all involved permitting and planning agencies, and 3) to provide the public and agency reviewers and decision-makers a perspective on the future development which may occur in the Santa Maria Basin and the options available for handling this production onshore. The Area Study considered the potential development of up to six platforms (two proposed and four hypothetical).

Other than the specific facilities proposed by the Union and Exxon DPPs, the EIS/EIR's hypothetical additional development and production evaluated in the Area Study do not represent any specific proposed project. Any future Area Study platforms will be subject to a separate National Environmental Policy Act (NEPA) analysis if and when they are actually proposed.

II. PROJECT DESCRIPTION

A. Project Components

The Exxon DPP includes these components:

- one eight-leg, 60-slot drilling and production platform (Platform Independence);
- two subsea pipelines -- one emulsion and one gas -- between Independence and Irene; and
- one subsea power cable between Independence and Irene.

The Union DPP involves the following components:

- one eight-leg, 72-slot drilling and production platform (Platform Irene);
- three subsea consolidated pipe in... -- oil, gas and produced water return -- between Irene and the existing onshore Union Lompoc oilfield faclities;
- one power cable between Irene and an electrical substation onshore;
- dehydration system, to be installed at the existing onshore Union Lompoc facilities;
- a dry oil pipeline, to be installed in the existing right-of-way between Lompoc and Orcutt; and
- limited refinery modifications at Union's Santa Maria Refinery, to allow processing of the sulfur and gas components of the oil.

B. Platforms

Both Platforms Irene and Independence will be 8-legged, steel jacketed, bottom-founded platforms. Both platforms will be anchored to the sea floor and to the subsea strata by pilings driven 250 to 300 feet deep. A schematic of platform locations and related pipelines is shown on Figure 1. General platform information for both DPPs is listed on Table 1.

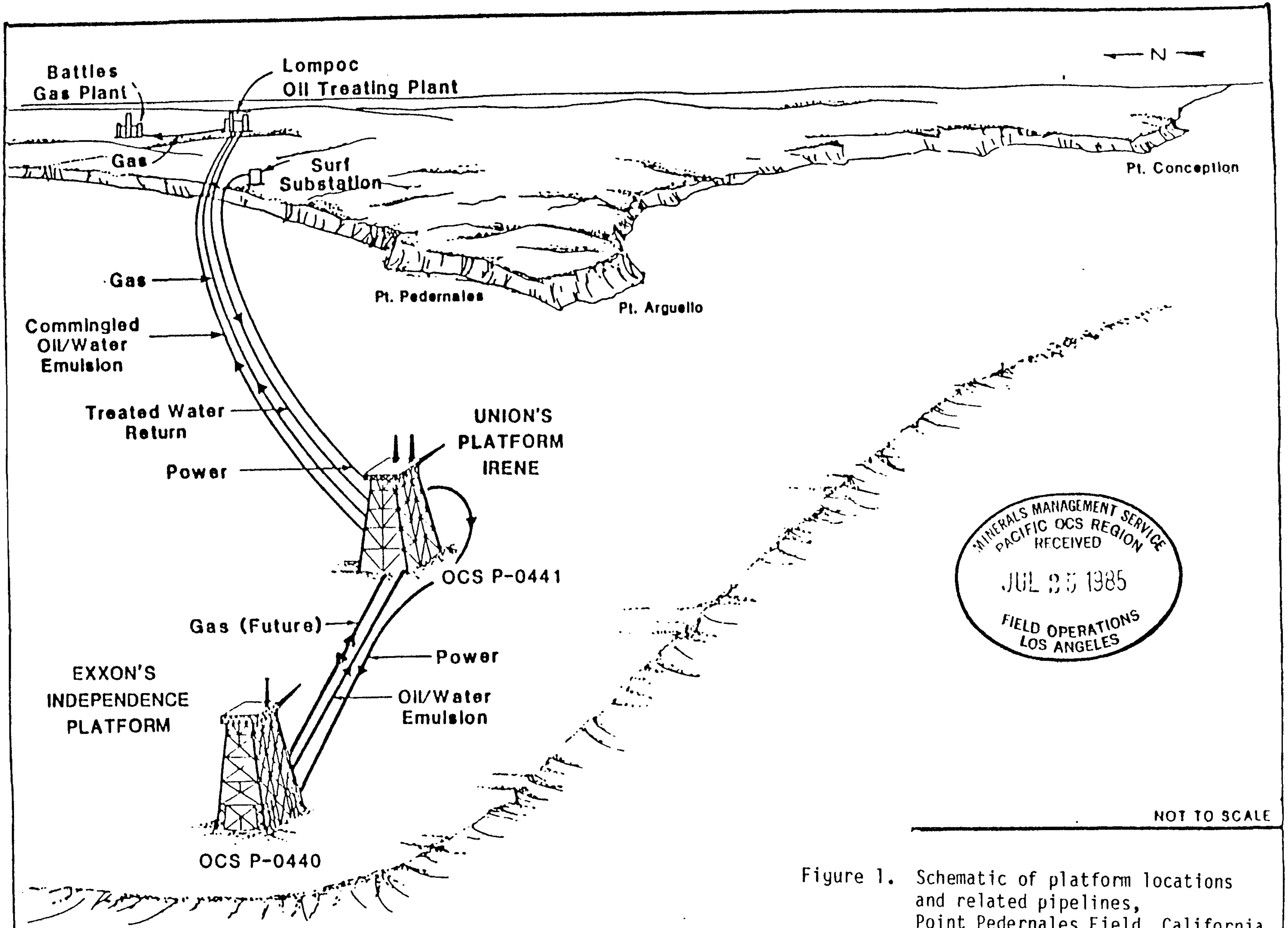

Figure 1. Schematic of platform locations and related pipelines, Point Pedernales Field, California

Rev. 2
6/20/85

Table 1

General Platform Information

Description	Platform Independence	Platform Irene
OCS Lease No.	OCS-P 0440	OCS-P 0441
UTM Zone 10 Coordinates	X = 705,775 m Y = 3,834,225 m	X = 708,200 m Y = 3,831,985 m
Water Depth	277 ft/84 m	242 ft/74 m
Well Slots	60	72
Wells to be Drilled	45	43
Peak Production		
° dry oil (B/D)	20,000 in 1988	15,000 in 1987
° gas (MMSCF/D)	45 in 1995	13 in 1994

The platforms' design, fabrication, construction, installation, inspection and operation will be in conformance with all pertinent rules and regulations of the Pacific OCS Region, and those of MMS and DOI. This will include an independent verification agent, pursuant to Pacific OCS Region Order No. 8. Appropriate American Petroleum Institute (API) standards and other industry standards will also be followed.

The platforms are designed to withstand maximum credible seismic conditions and 100-year storm conditions expected off Point Pedernales, as well as wind and wave conditions which may be experienced during the platforms' transport to the installation site, across any given ocean. Fabrication and construction of the platforms (jackets, decks and components) will take place at marine yards outside the southern California area. Platform jackets will be towed to the installation sites on barges, launched, and anchored to the sea floor with driven pilings. Production and drilling decks and components will then be installed on the jackets. Once all the equipment modules have been installed, each platform will undergo hookup and commissioning prior to beginning the actual drilling activities.

Aids to navigation will consist of quick-flashing, Coast Guard-approved 5-mile white lights and a Coast Guard-approved 2-mile fog horn. Flare booms and all derricks will be illuminated for aviation safety with a combination of steady and flashing red lights. Heliport perimeters will be outlined with lights plus one flashing amber beacon. All marine aids to navigation will meet Coast Guard regulations for Class A structures.

Corrosion of the platforms and their equipment will be controlled by use of corrosion-resistant coatings on all topside structures. Sacrificial anode systems will be used to prevent corrosion on submerged equipment. Internal coatings to prevent corrosion will be applied to selected piping, vessels and tanks. Corrosion inhibitors will also be used during the lifetime of the platforms.

Crew-based support activities for the platforms will involve transporting personnel via helicopter from Goleta (Santa Barbara Airport) to and from the platforms. This will necessitate approximately four round-trips per day for the two platforms. Supply-based activities for the platforms will involve boat trips originating from Port Hueneme.

C. Drilling

Drilling operations encompass actual drilling, setting and cementing of casing, and installation of production tubing in each well. Drilling activities will be conducted in compliance with Pacific OCS Region Order No. 2 and/or approved Field Drilling Rules, the Environmental Protection Agency's (EPA) NPDES permit requirements for discharge of muds and cuttings, and established industry standards. Each individual production well drilled will have an Application for Permit to Drill (APD) approved by the MMS Santa Maria District Supervisor.

Project drilling operations will encompass a total of approximately 5 to 6 years, at which time the drilling derricks and rigs will be removed.

Major safety components of the drilling operations are: proper mud system design to control well pressure, lubricate the drill pipe and drill bit, and convey cuttings to the derrick floor; use of the blowout preventer (BOP) system, which seals the well in the event of an emergency and prevents oil from escaping into the marine environment; proper casing design; and use of a diverter system, which would divert the flow of shallow gas in unlikely emergency situations.

In compliance with Pacific Region Order No. 2, a Critical Operations and Curtailment Plan (COCP) for each project has been submitted The COCP identifies and describes those operations likely to be conducted which are critical, and under what circumstances or conditions these same critical operations will be curtailed.

D. Production

Once a development well is drilled and completed, production activities on the platform will begin. Production activities include the producing of reservoir fluids, primary separation of these fluids, processing of produced water, and transfer of fluids into pipelines.

These activities will be conducted in accordance with Pacific OCS Orders, other Federal regulations, and industry standards. MMS will continuously monitor all production activities and ensure compliance with regulations and requirements throughout the life of the project.

Platforms Independence and Irene will contain production facilities consisting of well-bay manifolds; production, test and cleanup separators; oil-handling systems; produced water-handling systems; and gas-handling systems. Figure 2 shows a flow diagram of a representative platform production facility.

Platform utilities will include systems for use of electric power and fuel gas, water desalination, waste water treatment, air compression, cooling of sea water, and chemical injection. Stand-by power on both platforms will be provided by diesel-powered generators. Diesel fuel will be used for power generation during initial platform startup, until fuel gas becomes available from production wells, or in emergency situations.

Safety-related components of the production systems on each platform will include control and monitoring systems, surface-controlled subsurface safety valves on wellheads, emergency shut-down valves and other devices, a gas blanketing and vapor recovery system, an emergency flare, and a deck drainage/sump system.

Platform Independence includes facilities for initial separation of produced fluids into oil/water emulsion and gas phases, a pump for oil shipment to Platform Irene, facilities for compression and dehydration of gas, facilities for reinjection of the gas back into the reservoir or for gas lift, and facilities for pipelining of the gas to Platform Irene for commingling and transport to shore. Utility systems will involve a subsea power cable from Platform Irene; seven diesel engines (three cranes, a standby generator for production, a stand-by generator for drilling, and two firewater pumps); a sea water distillation unit, and a sewage treatment unit.

Wellhead valves and manifolds will enable each well to be routed to production, test, or cleanup separators. A gas-lift manifold with connections to the individual well casing will also be included in the Platform Independence facilities. Gas and emulsion deliveries from Platform Independence will be metered with metering equipment and procedures in accordance with recognized industry practices and specifications. The platform's wet oil metering system will be hooked up to a comparator and leak detection counter on Platform Irene, to ensure early detection of system leaks.

Platform Irene includes facilities for initial separation of produced fluids into oil/water emulsion and gas phases, for water treatment, for compression

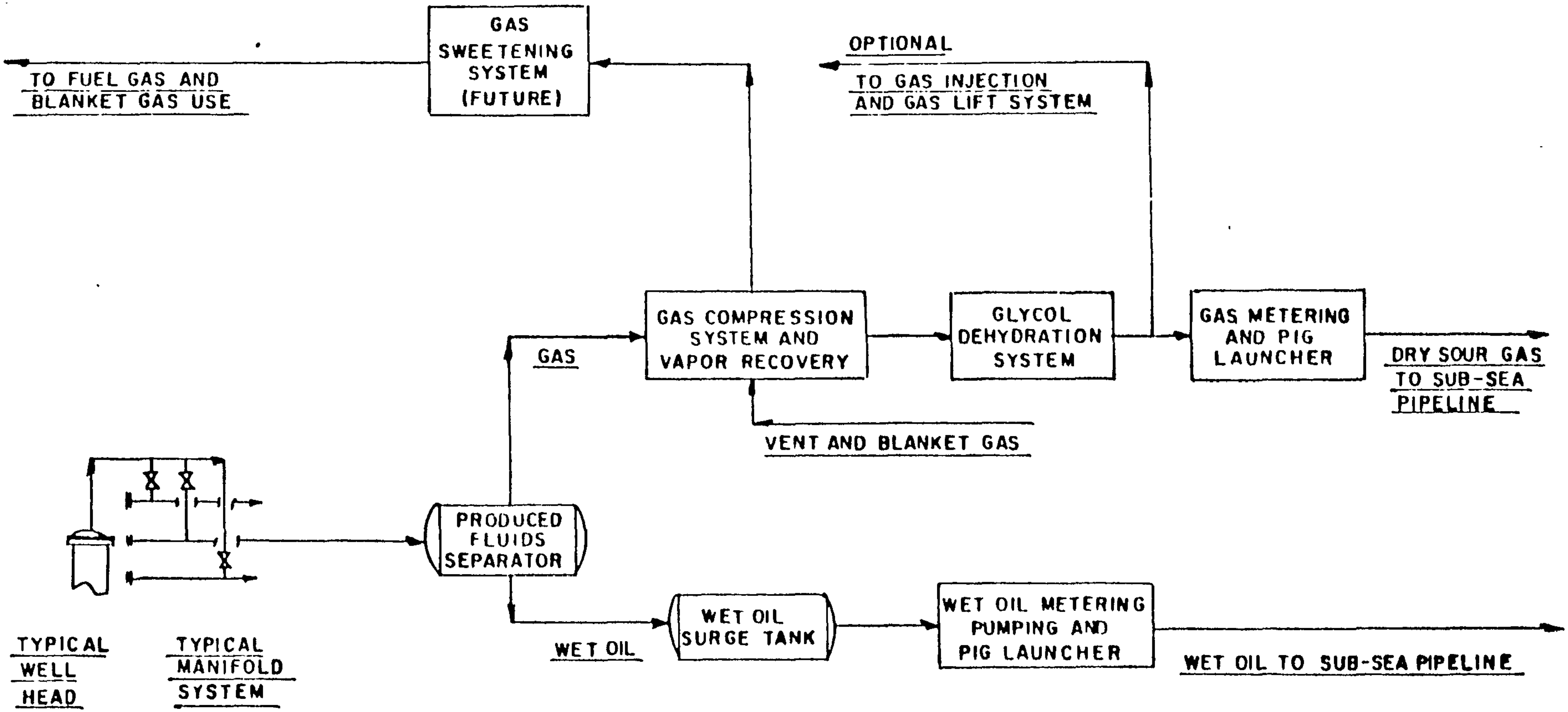

Figure 2

Flow diagram of platform production facility and dehydration of the gas, and for pipelining of hydrocarbons to shore. Utility systems will involve a subsea power cable extending from Platform Irene to the onshore local electrical grid system, two 200-kW auxiliary generators at the platform for emergency power, six diesel engines (on two cranes, a logging unit, a cementing unit, and two emergency generators), a sea water-distillation unit, and a sewage treatment unit.

All pressure vessels, surge tanks, and other processing equipment, operating at or near atmospheric pressure, will be connected to a gas blanketing and vapor recovery header system which maintains a slignt positive pressure on the system. As gas is released from processed fluids or forced out of vessels and tanks as they are filled, it is compressed by vapor recovery compressors and flows into the gas sales system. As fluids are withdrawn from vessels and tanks, blanket gas is made with sweet gas from the platform fuel gas system. This type of gas blanketing and vapor recovery reduces explosion hazards by eliminating oxygen intake, and eliminates volatile organic compound (VOC) emissions normally associated with atmospheric tanks and vessels, enabling the recovery of fuel that would otherwise be lost.

All vapor safety relief valves vent into a closed flare header system which gathers the emergency releases and routes them through a scrubber to a flare burner.

All decks will be solid plate steel and will have a minimum 6-inch-high curb around the perimeter to prevent any overflow into the ocean. Spray shields will be included where necessary to prevent hydrocarbon spray from entering the ocean.

All drainage from platform decks will go to a water tank where entrained solids will drop out and free oil will float to the surface. Water from this tank, together with any oil, will then flow into a corrugated plate interceptor where oil will be separated out and returned to a hydrocarbon sump tank. This oil will then be pumped into the emulsion system or into a holding tank. Clean water from the corrugated plate interceptor will be discharged to the ocean through a disposal caisson. All drainage that may contain oil will be piped directly to the hydrocarbon sump tank.

Washed cuttings and oil-free sediments from the waste tank will gravitate to the skim pile for ocean discharge in accordance with NPDES permit conditions.

E. Platform Safety Features

Safety systems are classed as devices and practices that safeguard personnel, the environment and equipment. The systems relate specifically to good design practices, personnel training, and operational and emergency procedures. Safety features that are proposed for the two platforms include:

- fire detection and firefighting systems
- navigation aids
- corrosion control programs
- Hydrogen Sulfide Contingency Plans
- emergency power and lighting systems
- communications facilities
- personnel escape and lifesaving equipment
- Oil Spill Contingency Plans

Reliable fire detection and firefighting water systems will be installed on both platforms. Each will use a combination of electric- and diesel-drive fire water pumps. The firefighting water system includes hose reel stations, monitor nozzles, and deluge systems appropriately located about the platform.

Additional firefighting systems to be installed include fixed fire protection systems for gas turbine generators and portable fire extinguishers strategically located on the platform.

Fire detection systems will make extensive use of smoke and flame detectors to provide early warning in the event of any fire. Push-button fire stations will be located about the platform for use by platform personnel.

Hydrogen sulfide contingency plans for both platforms were developed by Exxon and Union in accordance with Pacific OCS Order 2 and MMS Standard GSS-OCS-1, "Safety Requirements for Drilling Operations in a Hydrogen Sulfide Environment." The H_2S Contingency Plan for each platform is a detailed emergency plan to be followed when encountering geologic formations that may contain H_2S. The platforms will be equipped with self-contained breathing apparatus for all work crews and supervisors. Spare air bottles with refill capability will also be available. Hydrogen sulfide sensors and alarms will be located at the intake for the air ventilation system and in other processing areas where localized concentrations of H_2S can possibly occur. In these areas H_2S sensors will have both visible and audible alarms set to activate when a level of 10 ppm is reached.

Emergency power lighting, communications equipment, hazard detection systems, personnel quarters, controls and minor utility systems will be provided by an uninterruptable, battery power supply system. Battery-powered emergency lighting units will be installed in several areas of the platform to illuminate critical escape routes or facility backstart work areas. Battery chargers and battery systems will be provided for aids to navigation, communications, general alarm systems, generator startings, electrical switchgear control, and control and monitoring systems.

Communications facilities proposed for the platforms involve intra-platform hardwired speakers and handsets, and portable radios for operational communication. For external communications with crew coats, supply boats, helicopters, shore bases, and so forth, there will be a wide-area radio system for both platforms, as well as a microwave system to provide telephone service and circuits for the pipeline leak detection system and onshore emergency shutdown system.

Personnel escape and lifesaving equipment onboard each platform involve Coast Guard-approved escape capsules or lifeboats, plus an adequate number of life preservers, life floats, ring life buoys, first aid kits, litters, and other lifesaving appliances as required by Coast Guard regulation 33 CFR Section 144. The Oil Spill Contingency Plan prepared by Exxon and Union for each platform has been developed to specify appropriate measures that will be taken in the event of an oil spill and to identify personnel and equipment available to implement spill containment and cleanup procedures. Basic procedure for handling an accidental spill is to immediately ensure personnel safety, stop the pollutant flow, initiate containment and cleanup procedures, and contact designated company personnel and government agencies. Equipment and procedures developed for handling of accidental oil spills are state-of-the-art level for spill containment and control.

Initial spill response activity will be conducted by the co-op vessel Mr. Clean III. The primary source of assistance is this industry-sponsored spill containment boat and the cooperative, Clean Seas, Inc.

F. Pipelines

All oil and gas produced from the two platforms will be commingled at Platform Irene by way of an interplatform pipeline from Independence to Irene.

TABLE 2. Offshore Pipeline Design Specifications, Point Pedernales Field, California

Pipelines	Internal Diameter	Length (mi/km)	Design Throughput	Operating Pressure
Independence to Irene	10" (emulsion) 6" (gas)	2.5 mi/4 km	35,000 BPD emulsion 60 MMSCFD gas	1500 psig
Irene to Landfall	16" (emulsion) 8" (gas) 8" (produced water return)	9.2 mi/14.7 km	100,000 BPD emulsion 40 MMSCFD gas 30,000 BPD produced water	2160 psig

The products will then be shipped onshore through a consolidated subsea pipeline from Irene to landfall and then to Union's processing facility at Lompoc (Figure 3). The pipeline system will be designed and fabricated in accordance with all applicable Federal, API, ANSI, ASME and ASTM standards and specifications. Table 2 details design data for the pipeline.

The entire pipeline will be protected from external corrosion by polyethylene protective coating augmented with cathodic protection, in the form of sacrificial anodes.

Irene's three subsea pipelines will be installed using the pull barge method. Three lengths of pre-coated pipe will be pulled off a barge (anchored outside the surf zone) and into the water toward the platform. The three sections will be joined together by divers using spool pieces. Buoys will be attached to the pipeline bundle to minimize drag. Each weld will be X-rayed; if the weld is acceptable, joint material will be applied to ensure homogeneous coating. The pipeline bundle will be laid in the designated right-of-way (200 feet wide) using precision navigation systems.

The pipeline bundle will terminate 30 to 50 feet from the preinstalled pipeline risers on Platform Irene. Divers will set spools using a template to connect the pipelines to the risers.

Pipeline laying operations through the nearshore and surf zone will be accomplished again by the pull barge, with the concrete-coated pipelines being tied into the onshore pipeline system. Once the pipelines are in their intended permanent location, they will be water-flooded for stabilization and their marker buoys released. The pipelines will be buried through the surf zone (shore to 4,000 feet offshore) by divers using hand-held air jets. This will bury the lines to a depth of 3 to 6 feet.

After the offshore pipelaying operations are completed, a side scan sonar survey will be conducted to verify that the pipeline was not damaged, that it is positioned properly on the ocean floor, and that the ocean floor has not been significantly altered by the operation.

After the offshore pipelines have been installed, the power cable to the platform will be laid in the same right-of-way for most of the route. At 4,000 feet from shore, the cable will depart from the pipeline route and go due east to a landfall at Surf.

Every subsea pipeline will have an automatic block valve on each platform in accordance with the Pacific OCS Order No. 9. Each line will have a remotely operated block valve at the landfall. In addition, the onshore oil line will have three remotely-controlled block valves and three check valves located between landfall and Oak Canyon. These lines will also be equipped with relief valves located at the Lompoc facility to prevent overpressuring from expansion of static liquid or excessive pump pressure.

Upon completion of pipeline installation each individual line will be hydrotested with water to a prescribed pressure. This pressure will be maintained for 24 hours in order to test the integrity of the lines. The hydrotest will meet or exceed all applicable codes or regulations governing the project.

Throughout the lifetime of the pipelines, corrosion inhibitors, pipeline pigs and instrumented pigs will be used to ensure that the pipelines remain free of potentially troublesome deposits. Corrosion products will require pigging the gasline. The oil pipeline will be pigged weekly. The pipelines will be inspected at least once a week by air surveillance for small oil leaks; a yearly side scan sonar survey will provide hard-copy external inspection of the pipeline.

The leak detection and metering system will monitor the volume of oil entering the pipelines at the two platforms with the deliveries onshore. If a volume difference is detected, an alarm will sound and the pipeline system will automatically shut down. The system will have an accuracy of approximately 0.01 percent of the throughput. The system will be temperature compensated.

G. Oil and Gas Processing Facility

The proposed Lompoc Dehydration Facility will be located within the Lompoc Oil Field on a 99-acre parcel of land. Approximately 22 acres will be rezoned for this facility, though Union currently plans to develop only 13 acres for this facility. The land is part of more than 9,000 contiguous acres which Union owns.

The proposed Lompoc Dehydration Facility's primary function will be to receive the wet oil from Platform Irene and to dehydrate the oil to 3 percent or less water. During this dehydration process any dissolved gas in the crude oil will be removed so that the crude oil will be acceptable as a feedstock to the Santa Maria Refinery.

Gas production from Platform Irene will also be received at the Lompoc Facility, scrubbed to remove any hydrocarbon condensate, and then reintroduced into the Lompoc-to-Battles Gas Plant pipeline along with any excess gas recovered from the crude oil.

The Lompoc Dehydration Facility will be designed to incorporate a recovered natural gas system, a flash gas system, vapor recovery systems, blanket gas system, control systems for pressure vessels, a produced water treatment system, and a caustic scrubber system for H_2S.

The oil recovered at the Lompoc Dehydration Facility will be pipelined to the Santa Maria Refinery. Very few solids are expected to be produced from the Monterey Formation-derived oil. Tank cleaning will occur at 5-year or longer intervals. Tank bottom sediments are expected to amount to 200 barrels per year. These deposits will be collected and disposed of at an approved dump site.

Crude oil produced from the Point Pedernales Field is expected to have a gravity of approximately 16 degrees API and a relatively high viscosity. The oil will be sent to the Santa Maria Refinery which will handle up to an additional 20,000 BPD of dry oil.

The products pipelined out of the Lompoc Dehydration Facility will include:

- Treated produced water (to be returned to Platform Irene for offshore discharge).
- Dehydrated, condensate free gas (to be piped to Union's Battles facility).
- Pipeline-quality oil (to be pipelined to Union's Santa Maria Refinery).

III. PROJECT ALTERNATIVES AND THEIR EVALUATION

Title 40 CFR Section 1505.2(b) requires that, in cases where an EIS has been prepared, the Record of Decision (ROD) identifies all alternatives that were considered, and must "specify the alternative or alternatives which were considered to be environmentally preferable." The "environmentally preferable alternative" is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which protects, perserves and enhances historic, cultural and natural resources. The "agency's preferred alternative" is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors.

Extensive consideration was given to various project alternatives during the MMS review of the proposed Point Pedernales Field DPPs. Project alternatives were initially evaluated as part of the NEPA process (Section 1502.14) and CEQA process (Section 15126(d)) during the writing of the EIS/EIR. Environmental and operational advantages and disadvantages were evaluated for each proposed alternative in terms of project benefits and adequacy. The "environmentally preferable alternative" and the "agency's preferred alternative" are identified as the "proposed action."

Major project alternatives which were evaluated during the review of this project included:

1. The proposed action.
2. No project alternative.
3. Union onshore and offshore pipeline and power cable alternative

routes.

4. Exxon offshore pipeline alternative route (Independence to Hermosa).

5. Union onshore dehydration alternative site location.

1. The Proposed Action.

Evaluation:

Potentially significant impacts due to the proposed action were identified in the areas of air quality, marine water resources, marine biology, aesthetic resources and commercial fishing. The EIS/EIR thoroughly analyzed these impacts; several mitigation measures were identified which could reduce or avoid each impact. These potential impacts and their mitigation measures are described in detail in Chapter IV.

MMS Action:

Adopt with mitigations specified in Chapter IV.

Discussion:

Approval of the "proposed action" with mitigation would cause the least damage to the biological and physical environment, while still providing for prompt and efficient development of OCS oil and gas resources. Since all potentially significant impacts can be mitigated to insignificance, the "proposed action" has been determined to be environmentally acceptable, and therefore the environmentally preferred alternative. The "agency's preferred alternative" is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors. Based on the analysis contained in the EIS/EIR for the Union and Exxon projects, the MMS has identified the "proposed action" with the mitigations specified in this Record of Decision, as our "agency's preferred alternative."

2. No Project Alternative

Evaluation:

This alternative removes the proposed development of Platforms Irene and Independence and their associated facilities from consideration while assuming the continuation of presently permitted activities of operators in the Santa Maria Basin. Although eliminating all the potential impacts associated with the proposed action, impacts within the area could still result from existing oil and gas operations and from other OCS exploration and development projects, potential State Tidelands developments, and activities resulting from future OCS Lease Sales in the area.

Changes to the physical, biological and socioeconomic resources over the next 25 to 30 years without the proposed action due to future OCS development and production could still occur.

Selection of the no project alternative could cause the United States continued dependence upon imported oil and gas. Adverse environmental impacts could result from continued and possibly increased production of other domestic resources (i.e., coal, uranium, geothermal) in order to supplement existing energy sources.

Several adverse or beneficial impacts associated with this alternative may occur: existing environmental conditions within the project area would be maintained; potential adverse impacts associated with the proposed development would not occur; beneficial employment would be prevented; beneficial economic impacts to public utilities, to local, state and Federal agency general funds, and to private industries would be prevented;

California energy policies would not be furthered; Federal energy policies would not be furthered; federal trade deficit would increase; national security would be compromised because of greater dependency on foreign energy sources; petroleum prices would be increased for consumers; and frequency of foreign oil tankering would be increased and would therefore increase the potential for oil pollution.

MMS Action:

No action.

Discussion:

Although this alternative, by definition, does not impose any significant physical or biological impacts on the environment, it was not identified as the "environmentally preferred alternative" since it does not fullfill the direction provided in Section 101 of the NEPA which directs agencies to " . . . use all practical means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs and resources to the end that the Nation may . . . attain the widest range of beneficial uses of the environment . . . and . . . approach the maximum attainable recycling of depletable resources . . . ."

Selection of this alternative would also not be in keeping with MMS's statutory mandate under the OCS Lands Act of 1953 and the OCSLA Amendments of 1978 which promulgate the expeditious leasing and development of mineral resources on the OCS. The EIS/EIR has concluded that, with mitigation, all potential environmental impacts of the "proposed action" can be mitigated to insignificance. The no project alternative is therefore rejected as unjustified.

3. <u>Union Onshore and Offshore Pipeline and Power Cable Alternative Routes</u>.

Evaluation:

Analysis of alternative Union onshore and offshore pipeline routes concluded that the alternative routes, considering mitigation, were not environmentally preferable to the proposed route, with mitigation. Because the selection of the Union landfall north or south of the Santa Ynez River posed different potential impacts, both onshore and offshore impacts were discussed jointly. Some of the adverse and beneficial potential impacts of this alternative include: onshore segments of the pipeline alternative alignment are subject, in localized areas, to erosion and gully advance past the pipeline, with the possibility of slope failure; some onshore segments of the pipeline alternative alignments may introduce potential additional constraints on pipeline design due to crossing of the Lompoc terrace and descent to the river plain in the vicinity of a number of old landslides; onshore pipelines alternative alignments cross an exposure of Quaternary terrace deposits between Santa Lucia Canyon and Highway 1; and increased likelihood for potential impacts on paleontological resources for the route.

One of the main disadvantages of the alternate route is that a crossing of the Santa Ynez River would be required. Depending on the method selected for crossing the river and depending on construction-related sedimentation, the following could result. Additional scour could occur due to high water exerting lateral forces directly on the pipe if the pipe was trenched. Increased impacts to terrestial biology could result if a drilled crossing was utilized. For all alternate onshore pipeline routes, potential impacts were predicted to be locally significant at several identified drainages due to estimated average annual sediment losses exceeding 20 percent.

Potential impacts on groundwater by an oil spill caused by pipeline rupture on the alternative route could be significant, greater than for the preferred route, due to the area having a shallow water table, which is used in this area for irrigation and for community supply well fields. Potential impacts could be locally significant, with both short-term and long-term effects. A pipeline rupture at the southern Union pipeline route's crossing of the Santa Ynez River approximately 10 km upstream from the ocean could cause significant impacts to the estuary and to onshore water resources. A worst-case onshore spill of up to 20,000 barrels is estimated to be possible.

Alternative offshore route for the power cable could increase the resuspended sediments by 14 percent during trenching operations for cable burials. This could create adverse but insignificant impacts. Increased construction impacts on subtidal rocky "reef" habitats could occur with the alternative southern route.

There is an increased likelihood of the need for blasting with resulting (marine biology impacts) because of proximity of rock to the beach surface and presence of a subtidal "reef" near the alternative landfall. Selection of the alternative would decrease the threat of potential impacts to the least tern breeding site near Santa Ynez River mouth because of increased distance between pipeline construction operations and the breeding site. An additional drainage crossing at a biologically sensitive area could cause more potential adverse impacts. In addition, the loss of 135 acres of vegetation and wildlife habitats, 72 percent of which is made up of native types, could cause regionally significant impacts.

This alternative could also cause increased adverse socioeconomic impacts to the Mission Hills residential community, Artesia School, and Maple School due to temporary noise impacts.

MMS Action:

No action.

Discussion:

Selection of this alternative was rejected due to the increased levels of potential impacts identified relative to the proposed action.

4. Exxon Offshore Pipeline Alternative Route

Evaluation:

Potentially significant impacts identified with this alternative include: potentially significant potential geohazard constraints due to liquefaction or other soil failure; local and potentially regionally significant impacts to approximately 20 hard bottom features from the construction-related crushing and/or displacement of benthic organsims and substrates with long recovery times along the route; increased risk of oil spills estimated at seven times greater than the proposed route due to the longer pipeline distance. The likelihood of a given spill reaching San Miguel Island is estimated to be 1.5 to 2 times greater with this alternative; potentially significant air quality impacts could occur to onshore ozone levels in the Santa Ynez Valley resulting in regionally significant impacts to vegetation as well; and larger trawl fishing areas could be preempted by construction activities with this alternative, resulting in short-term significant impacts.

MMS Action:

No action.

Discussion:

Selection of this alternative could produce higher potentially significant impacts than the proposed action. The major sources of increased potential impacts are the longer pipeline route (impacts to marine biology) and necessary platform equipment changes (impacts to onshore air quality). In addition to being environmentally not preferable, this alternative may not be the best economically, considering that the Point Pedernales Field will be operated under a unit agreement.

5. Union Oil Onshore Dehydration Alternative Site Location

Evaluation:

Alternative site locations for this facility are thoroughly evaluated in the EIS/EIR and in Santa Barbara County's staff report. The primary alternative site discussed was Site #8. Site #8 was identified as the best alternative to the proposed Site #4 for the following reasons: it is a previously disturbed area; it has low potential of archaeology, flora, and fauna conflicts; it has minimal grading requirements; it has room for facility expansion for consolidation; it provides access to existing Lompoc-to-Orcutt pipeline right-of-way; it has access to existing public road; and it has access to existing power and water service.

The EIS/EIR determined the proposed site #4 as the overall environmentally preferred site. Site #8 was determined to be environmentally acceptable.

MMS Action:

No Action.

Discussion:

Although considered in detail in the EIS/EIR, selection of the site for Union processing facility is not a MMS decision. Tha appropriate site will be selected by the Santa Barbara County Board of Supervisors.

IV. STATEMENT OF DECISION

A. Implementation of Mitigation

Based on the analysis contained in the EIS/EIR for the Union and Exxon DPPs, the MMS has identified the proposed action with the foregoing mitigations in this ROD as the environmentally preferred alternative, and the agency's preferable alternative as well.

In issuing this Record of Decision, the MMS believes that all practicable means to avoid or minimize environmental impacts from the alternative selected have been adopted. Mitigation measures determined to be inappropriate are addressed below, along with those appropriate measures which have been adopted.

The MMS considers its rules and regulations for OCS oil and gas activities to be a vital part of all operations proposed and conducted on the OCS. OCS lease agreements have many stipulations attached which already serve to minimize potentially adverse environmental impacts. Many mitigation measures which will be identified in the following discussions are in fact already a part of established regulations, and so are repetitious. In the interests of positive action for the MMS to respond to these issues, we are adopting many mitigation measures which already are a part of MMS regulations.

Over the 20-year-plus lifetime of the Point Pedernales Field Development, MMS will be reviewing, inspecting and monitoring all operations. The MMS will require Union and Exxon to incorporate state-of-the-art modifications in to their operations as updated equipment and techniques become available over the lifetime of the projects. The MMS would expect Union and Exxon themselves to also propose such modifications of operations.

Every future modification required by MMS and every future modification proposed by Union or Exxon and approved by MMS would necessarily provide environmental protection at a level equal to or better than that of the mitigation measures included in this Record of Decision.

B. Project-Related Impacts and Mitigation - Union OCS-P 0441 DPP

GEOLOGY

No significant offshore impacts identified; no mitigation necessary above that provided by MMS's current regulations and requirements.

AIR QUALITY

Impact No. 1

Exceedances of Federal ozone standard in Santa Ynez Valley possible due to emissions from Platform Irene.

Mitigation Identified

- Option A: Replace one diesel crane with electric crane and replace proposed diesel cement pumps with electric/diesel pumps. Use of diesel side of Platform Irene is to be confined to emergency situations; avoid testing of emergency standby generators during flaring episodes at Platform Irene or when a supply boat is idling in the proximity of the platform.

- Option B: Replace proposed diesel cement pumps with electric/diesel pumps. Use of diesel side to be confined to emergency situations, and avoid testing of emergency standby generators during flaring episodes at Platform Irene or when a supply boat is idling in its proximity. Allow Only one idling supply boat in the proximity of Platform Irene during development or production.

MMS Action

Adopt Option A.

Discussion

Union will be required to replace one proposed diesel crane with an electric crane on Platform Irene. Union will be required to replace the proposed diesel cementing unit with electric/diesel cementing unit. Use of diesel power is to be confined to emergency situations. Such use will be logged at the platform and reviewed by visiting MMS inspectors. Union will be required to avoid testing of emergency generators during flaring episodes or when a supply boat is in the proximity of Platform Irene. Such use will be logged at the platform and those logs reviewed by MMS inspectors.

MARINE WATER RESOURCES

Impact No. 2

Alteration of sediment texture and chemistry (for example, increased barium, decreased dissolved oxygen) is possible around platforms from discharge of drill cuttings. Extent and degree of impacts are uncertain.

Mitigation Identified

Institute monitoring program for impacts; if necessary, barge cuttings for onshore disposal. Could shunt discharge at higher point (nearer sea level) for greater dispersion.

MMS Action

Adopt as discussed.

Discussion

MMS has committed to funding a rigorous, long-term monitoring program that will monitor platform discharges (i.e., drilling muds and cuttings), collect and analyze sediment samples, and determine impacts on biological communities. This program, which was initiated in FY 84 and is continuing in FY 85, is conducted under the auspices of the MMS Studies Program. This is a long-term program which will monitor impacts from platform discharges at several locations in the Santa Maria Basin, including sites on or near both soft and hard bottom substrates. Specific sites to be monitored have not been determined as yet since the procurement for this aspect of the program is competitive, and a contractor has not yet been selected. Both Platform Irene and Independence sites are candidates for the monitoring effort. MMS believes the results from this program can be extrapolated to platform sites elsewhere in the Santa Maria Basin. If elevated levels of pollutants are found in the sediments or animal tissues subsequent to commencement of drilling, MMS will consult with recognized experts to determine the significance of these levels. If these levels are determined to be unacceptable, MMS will take corrective action which may include barging the discharges to another site, or restricting discharge mode or components.

Union's and Exxon's compliance with the discharge and monitoring requirements of the NPDES permits will ensure that all discharged materials will have a minimal adverse environmental impact and will not cause unreasonable degradation of the marine environment.

Impact No. 3

Alteration of sediment texture and chemistry (for example, increased barium and chromium) in radius of several kilometers around platforms from discharge of drill muds. Extent and degree of impacts are uncertain.

Mitigation Identified

Institute monitoring program for impacts; if necessary barge muds for on-shore or deep water disposal. Could discharge at greater height for more dispersion. Restrict use of problematic/toxic additives (for example, emulsion breakers and biocides).

MMS Action

Adopt.

Discussion

See discussion for Impact No. 2 above.

Impact No. 4

Alteration of sediment chemistry (for example, increased zinc, iron, arsenic, chromium, hydrocarbons) in radius of several kilometers around platforms from discharge of formation water. Extent and degree of impacts are uncertain.

Mitigation Identified

Institute monitoring program for impacts; if necessary, could treat (for example, via activated sludge) formation water at Lompoc prior to discharge or reinject into subsurface formation. Could discharge at greater height for more dispersion.

MMS Action

Adopt.

Discussion

See discussion for Impact No. 2, above. The analyses presented in the EIS/EIR, and available published information on the ecological effects of produced water discharges, do not support the need for the identified mitigation. Impacts to the benthic environment due to produced water discharges are not expected to be significant since the discharge plume will be buoyant, dispersion of the plume should occur rapidly, and the discharge will be regulated under an NPDES permit. The MMS will review results of the MMS Monitoring Program to determine the potential significance of produced water discharges.

MARINE BIOLOGY

Impact No. 5

Damage to local benthos and fish due to discharge deposition near platforms.

Mitigation Identified

Pre-operational survey of sublethal pathology in benthic organisms, continue during operations; as necessary further restrict discharge mode, mud components, disposal sites.

MMS Action

No action at this time.

Discussion

The MMS believes that a commitment to surveys of sublethal pathology in benthic organisms is premature and not fully supported by existing information. The MMS will review results of its long-term monitoring program to determine if predicted levels of pollutants in sediments or animal tissues are in fact observed and support the need for additional work (i.e., sublethal pathological monitoring). This determination will be made in consultation with recognized experts.

Impact No. 6

Loss of habitat upon removal of platforms.

Mitigation Identified

Create or maintain similar habitats.

MMS Action

No action at this time.

Discussion

MMS regulations currently require operators to remove the platform and clear the site unless MMS determines other action is more appropriate. Since abandonment procedures would not be considered for 20 to 25 years, no action is deemed appropriate at this time. It must be recognized that MMS must act in accordance with the applicable rules and regulations in existence at that time. MMS anticipates that when abandonment procedures are being considered, MMS will consult with state and local agencies and commercial fishing interests to determine if removal is appropriate at this location.

AESTHETIC RESOURCES

Impact No. 7

Direct impact from offshore platforms on ocean views due to platforms southwest of Ocean Beach area.

Mitigation Identified

Paint platforms a light blue-gray.

Action

No action.

Discussion

After reviewing comments and upon advice from the U.S. Coast Guard, MMS has determined that the platforms should be painted white rather than the light blue-gray proposed due to navigational safety reasons. White is also preferable to orange or yellow when considering visual impacts. MMS believes that the mitigation identified cannot be fully adopted due to overriding safety considerations.

C. Accident-Related Impacts and Mitigation - Union OCS-P 0441 DPP

MARINE WATER QUALITY

Impact No. 8

Surface oil slicks, tar balls, contamination of sediment and other adverse water quality changes (lowering of dissolved oxygen, addition of potentially toxic chemicals, decrease in light transmittance) due to unlikely major oil spill.

Mitigation Identified

Rapid and efficient spill cleanup.

MMS Action

Adopt.

Discussion

Current MMS regulations require Union and Exxon to submit Oil Spill Contingency Plans (OSCPs) as part of their respective DPPs for review and approval prior to the commencement of any field operations. These submitted OSCPs are undergoing a thorough review by the MMS. During this review, the MMS consults with other agencies and the operators to ensure that the plans contain the information and response strategies necessary to efficiently respond to an unlikely oil spill. Plans determined to be deficient in either response strategy or cleanup capability must be modified and reevaluated before approval will be granted. In addition, MMS regulations require that Union's and Exxon's OSCPs be reviewed annually and updated as necessary to ensure that the response strategies and equipment utilized remain state-of-the-art.

The MMS fully recognizes the intent of the mitigation identified above, and considers it to be consistent with MMS goals. Decisions with respect to each of the mitigation measures identified above will be reached as our OSCP review process progresses. The MMS will continue to provide direction to lessees in order to achieve the best feasible response to an oil spill.

MARINE BIOLOGY

Impact No. 9

Mortality and disturbance of seabirds and/or mammals due to unlikely major oil spill and cleanup activities.

Mitigation Identified

Achieve adequate response time at key locations; selective use of dispersants for oil.

MMS Action

Adopt.

Discussion

Current MMS rules and regulations already provide the identified mitigation. The appropriate response to an oil spill involves implementing state-ofthe-art techniques that will have the least adverse impact on the environment. Mechanical cleanup methods are the most desireable.

Chemical agents, however, may be the only alternative if weather and sea conditions make mechanical cleanup inefficient (for example, if a sensitive shoreline or species is threatened).

The use of chemical dispersants is controlled by Federal regulations and requires case-by-case approval. Chemical dispersants may not be applied to an oil spill unless approval has been obtained from the Federal On-Scene Coordinator (OSC). Under the provisions of Subpart H of the National Contingency Plan, the OSC, with the concurrence of the Environmental Production Agency (EPA) representative to the Regional Response Team (RRT) and in consultation with the State of California, may authorize the use of dispersants and other chemicals that are on EPA's list of approved dispersants. As of July 1985, only one dispersant (Corexit 9527) is approved for use in California. If the oil has moved into or threatens State waters, concurrence of both the EPA representative and the State of California representative on the RRT is required. If the appropriate dispersant to be used for that type of spilled oil is not included on the California list of approved dispersants, the OSC, in conjunction with the EPA representative on the RRT, must consult with the EPA Administrator or his/her designee before authorizing its use on a case-by-case basis (40 CFR Section 300.81, 47 FR 31180, July 16, 1982).

Impact No. 10

Damage to subtidal ecology due to unlikely major oil spill.

Mitigation Identified

Avoid use of chemical dispersants unless absolutely necessary.

MMS Action

Adopt.

Discussion

Use of chemical dispersants is carefully controlled by Federal regulations and requires case-by-case approval. Chemical dispersants cannot be applied to an oil spill until approval has been obtained from the Federal OSC.

Appropriateness of use of a chemical dispersant in a given situation, such as an oil spill threatening a nearshore environment, will be carefully evaluated by the RRT. The RRT will call upon scientific specialists for counsel and advice. The potential benefits of applying the dispersant will be carefully weighed against many aspects, such as:

- sensitivity of the subtidal ecologic system;
- oceanographic conditions;
- type of spilled oil involved;
- any other pertinent environmental factors.

The RRT's decision process is structured so that approval of dispersant use is given only when such use is absolutely necessary.

TERRESTRIAL BIOLOGY

Impact No. 11

An unlikely offshore oil spill reaches the coastline. Adverse impacts may occur to vegetation, wildlife and aquatic habitats and biota, including ten or more rare species.

Mitigation Identified

Develop site-specific cleanup and containment plans (i.e., use of temporary barriers to protect Santa Ynez River estuary).

MMS Action

Adopt.

Discussion

Several methods of containing oil spills and protecting sensitive areas are presented in Union's Oil Spill Contingency Plans (OSCP). In addition, the "Clean Seas, Inc." co-op has an OSCP, which identifies methods for protecting sensitive areas such as shoreline diversion booming, shoreline exclusion booming, and boom deployment with shore attachment. Any or all of these methods would be employed in the event of an oil spill threatening the Santa Ynez River. The MMS agrees that a section should be added to the Clean Seas OSCP, in order to provide an analysis of how the river mouth could be protected in the event of an oil spill. MMS will require Union to instruct Clean Seas, Inc. to modify its OSCP accordingly.

COMMERCIAL FISHING

Impact No. 12

Preemption of harvest in any of various productive fishing grounds by unlikely major oil spill.

Mitigation Identified

Minimize oil spill response time at key locations, avoid use of chemical dispersants, compensate affected parties for lost revenue.

MMS Action

Adopt.

Discussion

Discussions concerning oil spill response and use of dispersants are the same as for Impact Number 9 above. Compensation of persons injured by an oil spill are spelled out in Title III of the OCS Lands Act Amendments of 1978. Under Title III, claims are made against an owner, operator or guarantor of an OCS facility causing the spill or against an Offshore Oil Pollution Compensation Fund to be administered by the Secretary of Transportation. This fund provides compensation for any person suffering direct or actual injury caused by the discharge of oil from an offshore facility or vessel. Where such owners and operators cannot be identified as responsible for an oil spill, or are unable to provide adequate compensation, the Offshore Oil Pollution Compensation Fund may be used to provide such compensation.

Claims for economic losses that arise out of, or directly resulting from, oil pollution incidents may generally be asserted against an owner, operator or guarantor, or against the fund by any claimant for damages and removal costs. A U.S. claimant (who owns or leases property so damaged or who utilizes a natural resource involved) may file for injury to or destruction of real or personal property, loss of use of real or personal property, and loss of use of natural resources.

Upon payment of compensation for economic loss compensable under Title III the fund becomes subrogated to all rights, claims, and causes of action of the claimant.

MMS will expeditiously process any claims against the Fund which are submitted to MMS.

AESTHETIC RESOURCES

Impact No. 13

Direct impact on scenic quality, particularly of beach areas, due to unlikely major oil spill.

Mitigation Identified

Measures recommended to prevent or contain oil spills such as additional instrumentation and installation of additional valves.

MMS Action

Adopt.

Discussion

The MMS will require Union to install pig launcher/receiver mechanical interlocks and appropriate instrumentation on Platform Irene to reduce the potential of a spill occurring. The MMS will require Union to train platform personnel on correct operating procedures and instrumentation monitoring.

MARINE BIOLOGY

Impact No. 14

Damage to marine mammal(s) due to unlikely collision with support vessels.

Mitigation Identified

Reporting requirements, restrictions of vessel movements.

MMS Action

Adopt.

Discussion

The MMS-approved Sale 53 fisheries and wildlife training program, which will be given to all offshore personnel associated with the Point Pedernales DPPs, is designed to familiarize personnel with the types of marine mammals which may be present in the area, with potential sources of impact from oil and gas activities, and with avoidance procedures. The MMS will require Union to adhere to established vessel traffic corridors, which are a part of a voluntary compliance program monitored by the oil and gas industry and commercial fishing industry. This program also minimizes conflict with marine mammals since it restricts vessel traffic in near-shore waters.

The Endangered Species Consultations and the resultant Biological Opinions from National Marine Fisheries Service and U.S. Fish and Wildlife Service address damage to marine mammals by collisions with vessels as "incidental take". Refer to these Opinions and the discussions in these documents for other requirements designed to minimize damage to marine mammals from this type of accident.

COMMERCIAL FISHING

Impact No. 15

Damage to commercial fishing gear and/or vessels due to collision with and/or hangup on oil and gas crewboats, pipelines or debris.

Mitigation Identified

In addition to MMS requirements, ensure timely full compensation for losses.

MMS Action

Adopt.

Discussion

To reduce the potential for damage to fishing gear and/or vessels from this type of accident:

(a) The MMS-approved Sale 53 fisheries and wildllife training program will be given to all personnel associated with this project. This program familiarizes personnel with fishing activities, potential sources of conflict, and avoidance procedures.

(b) MMS will require a smooth pipeline design to be used by Union. MMS will also require Union to conduct an annual external video survey of the line so that MMS may monitor the integrity of the line and ensure that it is maintained in a manner that does not obstruct fishing activities.

(c) MMS will monitor installation procedures and will require Union to comply with its Operations Curtailment Plan (which describes weather conditions under which Union would curtail installation activities) to ensure the pipelines are installed properly and to reduce the likelihood of impact from anchor scarring of the sea floor.

(d) In accordance with OCS Orders, MMS will require Union to mark all equipment which could present a hazard to fishing if lost overboard so that ownership may be verified in the event of conflict. Union will also be required to either remove debris accidentally lost overboard or demonstrate that the debris does not pose a hazard to fishing (i.e., is buried). If it should subsequently be identified as a hazard, Union is liable for any damages and would be required to remove it. If Union is physically unable to remove the equipment, the coordinates will be given to the U.S. Coast Guard and Fisheries Liaison Office.

(e) MMS will require Union to contribute to the Fishemen's Contingency Fund. This fund reimburses fishermen for damaged or lost gear when no responsible party can be identified.

(f) Should the MMS be notified of incidents of gear damage or conflict by fishermen, other agencies or operators, MMS will notify the proper parties and will participate as necessary to ensure the conflict is resolved in a timely manner.

SYSTEM SAFETY AND RELIABILITY

Impact No. 16

Accidents which have the potential to cause environmental impacts and public hazards: Release of oil or produced water due to mechanical defects.

Mitigation Identified

Installation of additional instrumentation (oil-in-water analyzers).

MMS Action

No action.

Discussion

After reviewing the available options MMS has concluded that oil-in-water analyzers will not be appropriate for the Point Pedernales Field platforms. The analyzers have a record of poor performance when used in a similar type of application. Inquiries indicated that the analyzers consistently gave anomalously high oil-in-water readings because of water turbidity, color, air bubbles, and other parameters that cause reflection or refraction of the light used in the instrument. The high frequency of "false alarms" that are predicted make the instrument ineffective for this particular application. In compliance with the NPDES permit requirements, any violations by Union of permit requirements will result in written warnings, an MMS order to shut-in, and/or civil penalties.

The MMS is currently consulting with EPA on existing monitoring procedures and the likely implementation of testing/monitoring techniques that will verify compliance with applicable NPDES requirements. The MMS has determined that the most effective way to ensure compliance is through the use of its inspection and enforcement program.

Impact No. 17

Accidents which have the potential to cause environmental impacts and public hazards: pig receiver/launcher spill of pipelined oil.

Mitigation Identified

Improve instrumentation/control.

MMS Action

Adopt.

Discussion

The MMS will require Union to install mechanical interlocks and appropriate instrumentation on the proposed platform to reduce the potential of a pig launcher/receiver-related oil spill. The MMS will require Union to train platform personnel on correct operating procedures and instrumentation monitoring. The MMS will require Union to test each pig launcher/receiver on a monthly basis. The MMS will at least annually inspect and functiontest, with assistance from Union, each pig launcher/receiver and its related equipment and instrumentation to ensure satisfactory performance.

Impact No. 18

Accidents which have the potential to cause environmental impacts and public hazards: subsea pipeline break or large leak.

Mitigation Identified

Install subsea block valves.

MMS Action

No action.

Discussion

MMS has thoroughly considered requiring the installation of subsea block valves during its review of the Point Pedernales Field pipeline system.

MMS has concluded that subsea valves will not be required for the proposed offshore portion of the pipeline system after weighing the following related impacts and conclusions.

- The valves would increase the potential for a leak occurrence.
- The valve housing would add to the potential for fishing net and gear fouling.
- The potential benefits that the valves provide in the event of a pipeline leak will in many portions of the pipeline be a redundancy of the protection that is provided naturally due to the sea floor contours that the pipeline will traverse.

The MMS maintains that proper design is the best deterrence to pipeline leaks. The Point Pedernales Field pipeline system has been designed to meet or exceed all applicable MMS requirements. The pipeline installation will be closely monitored to ensure that the field practices employed do not result in any detriment to the integrity of the pipeline.

To minimize the potential volume of an oil spill resulting from a pipeline leak, the MMS is requiring Union, as operator of the consolidated pipeline, to design, install, and maintain a pipeline leak detection system that provides the maximum sensitivity and reliability that is feasibly possible. The system of leak detection that will be used consists of three different leak detection methods:

1. Over-short accounting, to detect very small leaks by continuously integrating the difference between system-wide inflow and outflow.
2. Volumetric balance with line pack correction, to detect small to moderate leaks by reconciling inflow and outflow against inventory changes system wide.
3. Pressure profiling, to detect larger leaks by monitoring pressure changes along the lines system wide, and additional pressure profiling on the laterals to detect smaller leaks.

This system will allow for the early detection of an unlikely pipeline leak or break. If a leak is detected, Union will initiate its pre-planned response to minimize the volume of the spill while simultaneously activating containment and cleanup procedures.

D. Project-related Impacts and Mitigation - Exxon OCS-P 0437, P 0438, P 0440, and P 0441 DPP

GEOLOGY

No significant impacts identified, no mitigation required beyond MMS's current regulations.

AIR QUALITY

Impact No. 1

Exceedances of Federal ozone standards in Santa Ynez due to emissions from

Platform Independence.

Mitigation Measures

- Option A. Replace two (2) diesel cranes with electric cranes, and avoid testing of emergency standby generators during flaring episodes at either platform or when a supply boat is idling in the proximity of Platform Independence.

  or

- Option B. Avoid testing of emergency standby generators during flaring episodes at either platform or when a supply boat is idling in the proximity of either platform. Exxon will have only one idling supply boat in the proximity of Platform Independence during development or production.

MMS Action

Adopt Option A.

Discussion

The MMS will require Exxon to replace two proposed diesel cranes with electric cranes on Platform Independence. The MMS will require Exxon to avoid testing of emergency generators during flaring episodes or when a supply boat is idling in the proximity of Platform Independence.

MARINE WATER RESOURCES

Impact No. 2: Union OCS-P 0441, mitigation identified for Impact No. 2 applies; adopt.

Impact No. 3: Union OCS-P 0441, mitigation identified for Impact No. 3 applies; adopt.

Impact No. 4: Union OCS-P 0441, mitigation identified for Impact No. 4 applies; adopt.

MARINE BIOLOGY

Impact No. 5: Union OCS-P 0441, mitigation identified for Impact No. 5 applies; no action.

Impact No. 6: Union OCS-P 0441, mitigation identified for Impact No. 6 applies; no action at this time.

COMMERCIAL FISHING

Impact No. 7

Preemption of harvest in productive rockfish and sole tow area by construction of Platform Independence.

Mitigation Identified

Minimize extent of offshore construction southwest of site; establish notification procedures and preferred schedule with Fisheries Liaison Office; prevent, locate, and remove construction scars.

MMS Action

Adopt.

Discussion

The MMS will meet with the Fisheries Liaison Office and Exxon to establish a preferred schedule for installation. The MMS will require Exxon to develop and submit an anchoring plan for platform installation and associated vessel anchoring that will minimize construction activities near the submarine canyon head southwest of the proposed platform site. Once a schedule and anchoring plan is established and approved by MMS, Exxon will be required to notify potentially affected fishermen through the Fisheries Liaison Office. MMS will require Exxon to conduct a post-installation side scan sonar survey in the vicinity of the submarine canyon head to locate debris or anchor scars that could interfere with commercial trawlers.

If significant debris or bottom scarring is detected, Exxon will be required to remove the debris, and to smooth (as feasible) any anchor scars.

AESTHETIC RESOURCES

Impact No. 8: Union OCS-P 0441, mitigation identified for Impact No. 7 applies; no action.

E. Accident-related Impacts and Mitigation - Exxon OCS-P 0347, P 0348, P 0440, and P 0441 DPP

Impact No. 9: Union OCS-P 0441, mitigation identified for Impact No. 8 applies; adopt.

Impact No. 10: Union OCS-P 0441, mitigation identified for Impact No. 9 applies; adopt.

Impact No. 11: Union OCS-P 0441, mitigation identified for Impact No. 10 applies; adopt.

Impact No. 12: Union OCS-P 0441, mitigation identified for Impact No. 11 applies; adopt.

Impact No. 13: Union OCS-P 0441, mitigation identified for Impact No. 12 applies; adopt.

Impact No. 14: Union OCS-P 0441, mitigation identified for Impact No. 13 applies; adopt.

Impact No. 15: Union OCS-P 0441, mitigation identified for Impact No. 14 applies; adopt.

Impact No. 16: Union OCS-P 0441, mitigation identified for Impact No. 15 applies, adopt.

Impact No. 17: Union OCS-P 0441, mitigation identified for Impact No. 16 applies; no action.

Impact No. 18: Union OCS-P 0441, mitigation identified for Impact No. 17 applies; adopt.

Impact No. 19: Union OCS-P 0441, mitigation identified for Impact No. 18 applies, no action.

The MMS will have a continuing responsibility for reviewing, inspecting, and monitoring all operations in the development of the Point Pedernales Field. During the 20-year-plus lifetime, Exxon and Union will submit modifications to their approved projects. Every proposed modification approved by MMS will provide environmental and safety protection at a level equal to or better than that of the mitigation measures included in this Record of Decision.

V. SUMMARY OF EIS/EIR AREA STUDY

The Central Santa Maria Basin EIS/EIR involved an Area Study designed by the MMS to 1) provide an evaluation of potential cumulative impacts related to possible oil and gas development in the area, 2) facilitate coordination among all involved permitting and planning agencies, and 3) to provide the public, agency reviewers, and decision-makers a perspective on the future development which may occur in the Santa Maria Basin and the options available for handling this production onshore.

The six-platform scenario evaluated in the EIS/EIR identified potentially significant impacts for the areas of geology, air quality, marine water resources, marine biology, aesthetic resources, and commercial fishing. Several potential mitigation measures were described which could reduce and/or eliminate these potential impact. The MMS's decision to mitigate potential impacts of the two proposed projects (Platforms Irene and Independence) has been stated in the preceding pages. Decisions to implement mitigations identified for Area Study platforms will be made if and when the platforms are actually proposed. At that time the MMS will reexamine the mitigation measures identified in the EIS/EIR and determine their appropriateness on a case-by-case basis as a method to avoid potentially significant impacts. If the identified mitigations are determined to be inappropriate, the MMS will conduct additional analysis of mitigation mesaures specific to the proposed project as part of the NEPA review process.

Consultation under Section 7 of the Endangered Species Act of 1973 (ESA), as amended, was formally conducted with the National Marine Fisheries Service (NMFS) and U. S. Fish and Wildlife Service (USFWS) for the Area Study. Due to potentially related onshore impacts the consultations were conducted as a joint effort with the Vandenberg Air Force Base (VAFB).

Formal consultation with NMFS considered potential impacts to the following threatened and endangered species: gray whale, right whale, blue whale, fin whale, sei whale, humpback whale, sperm whale, green sea turtle, leatherback sea turtle, Pacific Ridley sea turtle, and loggerhead sea turtle. As with the USFWS, an informal consultation was conducted for candidate and proposed species. No jeopardy Opinion was issued by NMFS.

Formal consultation with USFWS considered potential impacts to the following threatened or endangered species: southern sea otter, California brown pelican, American peregrine falcon, light-footed clapper rail, California least tern, unarmored threespine stickleback, saltmarsh bird's beak, California condor, and the bald eagle. Candidate species were considered separately in an informal consultation. A jeopardy Opinion was issued by the USFWS for the California least tern and the unarmored threespine stickleback. Reasonable and prudent alternatives to remove jeopardy are discussed in the following pages.

The resulting Biological Opinions from the USFWS and NMFS apply to both Union's Platform Irene and Exxon's Platform independence, as well as any future platforms within the Area Study.

A. Biological Opinion From National Marine Fisheries Service (NMFS)

a. NMFS Recommendation:

MMS utilize studies program for research and development of improved oil spill containment equipment.

MMS Response:

This recommendation will be forwarded to the MMS OCS Technology Assessment and Research Program whose responsibility encompasses this area of research. This research program has already funded some studies in the area of oil spill cleanup and containment.

b. NMFS Recommendation:

MMS initiates discussion with the NMFS concerning the cumulative impact to endangered and threatened species associated with the development and production activities proposed for the entire central and southern California region.

MMS Response:

MMS will engage NMFS in discussions on the possibilities of developing an interagency agreement to possibly fund a long-term gray whale study. This potentially may prove useful to both agencies in monitoring the gray whale population in and outside of areas undergoing OCS oil and gas exploration, development and production activities.

B. Biological Opinion From U. S. Fish and Wildlife Service (USFWS)

a. USFWS reasonable and prudent alternatives to remove jeopardy to the unarmored threespine stickleback.

1. Four remotely-controlled block valves should be placed in the Lompoc to Orcutt pipeline. The locations of these block valves are as follows: one valve approximately 500 feet south of San Antonio Creek; a second valve approximately 300 feet north of San Antonio Creek; and a third valve approximately 1,000 feet north of Drainage Number 26 as shown in Figure 5.6.2 in draft EIS/EIR (Union Oil Strip Map 17C 105 Mile Post 420).

2. Realign the pipeline, where it crosses San Antonio Creek east

approximately 200 to 300 feet away from portions of the Harris Creek drainage as illustrated in the [EIS/EIR's] Figure 7.

3. Bury the pipeline across all San Antonio Creek drainages. Work should only be performed between August 15 and November 1. If dewatering is necessary, removed water will be filtered through a sediment trap before return.

4. An independent cathodic protection rectifier system should be installed between the first and fourth block valve.

5. Heavier wall pipe (.375-inch wall thickness) should be used between the first and fourth block valve.

6. The pipeline will be buried a minimum of 5 feet below flow line across all perennial and intermittent stream crossings in San Antonio Creek Basin. An annual survey and report will be provided to Vandenberg Air Force Base (VAFB) to verify the depth of the pipe relative to the flow line of each stream.

7. Seventy millimeter thick coating of polypropylene material should be used on the pipeline from the first to second block valve.

8. The communication cable on the Lompoc to Orcutt pipeline route between Mile Posts 123 and 465 (Union Oil Strip Map 17c) shall be buried from 1.5 to 2.0 feet directly above the 10-inch line.

9. A contingency plan for rescuing and holding unarmored threespine sticklebacks and rehabilitating habitat in San Antonio Creek in the event of an oil spill is to be completed in a form acceptable to VAFB and the USFWS prior to initiating pipeline construction in San Antonio Creek Basin.

10. As identified in the contingency plan, materials required to confine

an oil spill and to conduct a fish rescue operation in San Antonio Creek are acquired by Union and stored at a designated site in Orcutt for use in the event of an oil spill.

MMS Response:

We agree with these reasonable and prudent alternatives. However, the MMS has no authority to require or to enforce these conditions. The responsible Federal agency is the Army Corps of Engineers. MMS staff has been in close coordination with staff of the Corps throughout this consultation. Corps staff have advised MMS and USFWS that they will require the above stipulations designed to remove jeopardy to the unarmored threespine sticklebacks as conditions of their approval for the pipeline construction. MMS has forwarded a copy of the Service's request for a commitment to these condition to the Corps. A letter from Union committing to all of these alternatives (above) is attached to this Record of Decision.

b. USFWS reasonable and prudent alternatives to remove jeopardy to the California least tern

1. Three remotely-controlled block valves and three check valves are to be placed between landfall and Oak Canyon as shown in the [EIS/EIR's] Figure 8.
2. Realign the pipeline route near landfall between the railroad track and 35th Street as shown in [the EIS/EIR's] Figure 8.
3. A network of berms and containment basins large enough to contain the total potential spill volume as presented in Table 10.1-2 of the EIS/EIR under the column of Required Basin Volume (bbl).
4. Berms and containment basins should be revegetated with native plant species and a maintenance and revegetation plan for the berms, basins

and dikes prepared by Union and approved by VAFB, USFWS, and California Department of Fish and Game (CDFG) prior to pipeline construction.

5. Install H_2S wiring and telemetry at the two most western block valve sites, Valve station A, and at one additional site midway between the railroad and 35th Street. Sour gas sensors will be installed when H_2S concentrations reach 50 grams per 100 standard cubic feet, in the line.

MMS Response:

We agree with the reasonable and prudent alternatives. However, as mentioned above, MMS has no authority to condition onshore segments of this pipeline. The responsible Federal agency is VAFB. Our staff has been working closely with VAFB throughout the joint consultation for this project. We have been advised by VAFB staff that all of the stipulations to remove jeopardy and minimize incidental take will be conditions of Union's pipeline right-of-way approval. MMS has forwarded the USFWS request for a commitment to these alternatives to VAFB. A letter from Union committing to all of these alternatives (above) is attached to this Record of Decision.

c. USFWS reasonable and prudent measures to minimize indicidental take

1. MMS should require that existing oil spill contingency plans be designed to assure protection of the most sensitive/critical individuals and habitats (e.g., nesting sites, foraging areas, etc.) of listed species vulnerable to the proposed project. To this end, MMS should require as a minimum, a) maps of environmentally sensitive areas including endangered species habitat be included in all spill contingency plans, and b) USFWS and CDFG be notified immediately in the event of a spill from platforms or pipelines.

MMS Response:

MMS has given USFWS copies of the Oil Spill Contingency Plans (OSCPs) for this area of review. These plans already do provide maps of environmentally sensitive areas, including endangered species habitat. Review of OSCPs is an ongoing process over the life of the project. MMS requires that an approved OSCP be on file prior to commencing operations and that all OSCPs be reviewed and updated annually thereafter. MMS is in the process of reviewing the OSCPs for these DPPs in light of the mitigations identified for this project. USFWS will be given another opportunity to review and comment on any changes to the OSCP.

The Oil Spill Contingency Plans provide logistical details of how USFWS and CDFG will be notified in the event of a spill.

2. Efforts should be made to rescue and hold unarmored threespine stickleback (UTS) during pipeline construction across San Antonio Creek. If possible, a barrier should be installed immediately upstream of the construction site to prevent movement of fish into the construction zone. A preconstruction effort to collect UTS from the work site and temporarily hold them for later release should be coordinated with local CDFG personnel.

MMS Response:

As previously discussed, the authority to require and enforce mitigation onshore rests with the Corps of Engineers and/or VAFB. Since this particular mitigation involves the Corps' 404 permit, it has been forwarded to the Corps for action.

d. USFWS terms and conditions to minimize incidental take

1. If specified levels of incidental take for any listed species are achieved

or exceeded, MMS shall require that the causative action of such take cease immediately, and shall reinitiate consultation with USFWS to reevaluate the incidental take impacts.

MMS Response:

The MMS will comply with the above terms and conditions by notifying USFWS of project-related incidents which result in the incidental taking of species considered in this Opinion, and will document the event as specified.

2. MMS shall immediately telephone the Office of Sea Otter Coordination if incidental take of Southern Sea Otters (SSO) occurs as a result of the project, and prepare a written report which shall include the date, location and circumstances surrounding the taking and disposition of the individual(s) taken. Written and telephone reports should be directed to Project Leader, U.S. Fish and Wildlife Service, Office of Sea Otter Coordination, 2800 Cottage Way, Room E-1818, Sacramento, California 95825 (916) 484-4904.

MMS Response:

The MMS will comply with the above terms and conditions as discussed above.

3. MMS shall communicate to USFWS information on the inspection program and project operations, as they relate to incidental take. Specifically, if information is revealed during inspections that increased potential for incidental take exists, USFWS is to be notified for advice on remedial actions.

MMS Response:

The MMS and USFWS have initiated such a program designed to encourage good communications and working relations between the agencies and to familiarize each agency with the programs/missions/concerns of the other agency. This is anticipated to be an ongoing program.

4. Any remains of listed species taken as a result of this action should be deposited with the USFWS Law Enforcement Division (213) 436-1183.

MMS Response:

If observed as a part of the MMS ongoing inspection program, or if notified by a lessee, the public, etc., of the presence of dead or injured individuals, MMS will immediately notify CDFG of the locations of such individuals. Since MMS does not have personnel offshore with the proper expertise to physically retrieve such animals, MMS will rely upon assistance from the USFWS, CDFG and/or NMFS for the actual retrieval. MMS will provide these resource agencies with additional assistance as required in the recovery operations.

e. USFWS conservation recommendations

1. Continue to assist USFWS by evaluating oil spill risks at potential sea otter translocation sites where establishment of a second breeding colony of otters is being considered.

MMS Response:

The MMS will continue to provide advice to the USFWS concerning the risk of oil spills at potential sea otter translocation sites. This advice will be provided to USFWS to assist the USFWS in better understanding the potential source of OCS oil and gas development and the areas that could be affected by an oil spill.

Additionally, MMS will continue to work with USFWS in the review of the work done by USFWS contractors in the development of oil spill risk models.

2. Expand the current MMS study "Population Status of California Sea Otters" by conducting field studies to determine the demographies of the southern peripheral otter group (male and female) in order to evaluate how potential spills from development of the central Santa Maria Basin and adjacent areas may affect this group and how this may affect the entire population. This will require additional funding for specific focus on the southern peripheral group. This is essentially Tasks 3.16 and 3.17 in the SSO Recovery Plan.

MMS Response

Dr. Siniff and the University of Minnesota are presently under contract by the MMS to conduct the study, "Population Status of the California Sea Otters". They are contracted to model the entire California sea otter population. This would include the group referred to as the southern peripheral otter group. To construct this model Dr. Siniff is using all data on the California sea otter made available to him by the USFWS and the CDFG. In addition Dr. Siniff will utilize data collected from radio-tagged animals that he is presently monitoring, and 55 animals to be tagged in the near future. One of the outputs of this model is an estimate of how the loss of one or more otters in any part of its range will affect the entire population.

MMS believes that this model as presently designed will address USFWS concerns, and needs no further modification.

3. MMS should require that Oil Spill Contingency Plans include specific provisions for rapid deployment of spill containment equipment in the areas listed below. These areas are grouped according to habitat areas inhabited by one or more of the following groups of species.

Light-footed clapper rail, California least tern, salt marsh bird's-beak.

San Luis Obispo County - Pismo Beach, Nipomo Dunes

Santa Barbara County - Goleta Slough, Carpinteria Marsh, Santa Maria River, San Antonio Creek, Santa Ynez River, Purisima Point.

Ventura County - Ventura River, Santa Clara River, Mugu Lagoon, Ormond Beach, McGrath State Park

Los Angeles County - Venice Beach, Playa del Rey, Los Angeles-Long Beach Harbor, San Gabriel River, Cerritos Wetlands

Orange County - Anaheim Bay, Bolsa Chica, Huntington Beach State Park, Santa Ana River, Newport Bay

San Diego County - San Mateo Creek, Aliso Creek, Santa Margarita River, Buena Vista Lagoon, Agua Hedionda Lagoon, Bataquitos Lagoon, San Elijo Lagoon, San Dieguito Lagoon, Los Penasquitos Lagoon, Mission Bay, San Diego Bay, Tijuana River

To help accomplish the above, an oil spill containment equipment base should be established in San Diego County.

California brown pelican, American peregrine falcon, southern sea otter

Santa Barbara Channel area, Anacapa Island, Scorpion Rock, Santa Barbara Island, San Nicolas Island.

MMS Response

Oil spill response capabilities for sensitive areas (which include those containing endangered and threatened species) are addressed in Oil Spill Contingency Plans for Platforms Irene and Independence. We do not believe that an expansion of these specific plans to include areas south of Santa Barbara County is justified.

4. Subsequent leasing and development plans could be designed and authorized in such a way as to provide the maximum feasible conservation of the species until such time as recovery for each species in the project area has

advanced to a point that [impacts from] offshore development, production and related activities (i.e., tanker traffic) will not be significant. This is consistent with the policies and procedures set forth in the Secretary's recently released draft proposed five-year OCS oil and gas leasing program which calls for consultation and early resolution of conflicts with affected Federal agencies and others during the preleasing stage. The USFWS would be pleased to cooperate with MMS on developing such strategy, including providing specific input to development of the five-year leasing schedule and identification of sensitive areas in each lease area.

MMS Response

Consideration of a phasing strategy would violate the statutory mandates of MMS under the Outer Continental Shelf Lands Act of 1953 and the OCSLA Amendments of 1978, which promulgate prompt and efficient leasing and development of mineral resources of the OCS.

5. MMS should include, as part of future Area Studies, information on expected incremental increases in oil volume shipped via tanker/barge resulting from development at that Area. Information is needed on departure points, destinations, volumes and routes. Data sources may include [oil] companies (Union, Exxon, etc.), tanker companies, and ports and regulatory agencies.

MMS Response

To the extent feasible, analysis of tanker/barge oil transportation will be attempted on a generic level in future EIS/EIRs. However, we believe that the additional analysis requested by USFWS is neither warranted nor appropriate. In our opinion, projection of specific volumes of oil, destination points, and departure points over the California coast for a 30- to 50-year period is highly conjectural. Such projections would have no scientific use whatsoever.

f. <u>USFWS further consultation</u>

Request: USFWS requests that formal consultation remain open past release of the Biological Opinion so that further consultation can take place.

MMS Response:

The MMS disagrees that continuation of formal consultation past release of the Biological Opinion is necessary or justified. We consider formal consultation concluded with the receipt of the USFWS Biological Opinion.

VI. SUMMARY OF EIS/EIR CUMULATIVE IMPACTS

"Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR 1508.7)

The intent of the cumulative analysis was to provide planners and decision-makers with a projected level of potentially adverse and beneficial environmental impacts which are considered reasonably foreseeable. It is the option of the responsible agency to determine how this information will be employed.

Potentially significant cumulative impacts within the jurisdiction of the MMS were identified in the areas of geology, air quality, marine water resources, marine biology, asthetic resources, commercial fishing and kelp harvest. The MMS acknowledges that the potential for significant cumulative impacts exists and MMS will continue to monitor closely those activities which may cause such impacts. In addition, all new OCS development projects will be subject to a NEPA review process which requires a re-assessment of potential cumulative impacts.

VII. CONCLUSIONS

Development of the Point Pedernales Field is a major undertaking on the part of both industry and government. Much effort has been expended to date; these efforts will continue as the project proceeds.

The Minerals Management Service has evaluated mitigation measures and project alternatives proposed in the EIS/EIR for protection of the environment. In our deliberations, consideration was given to many factors, including environmental protection and economic feasibility. We have adopted those measures found to be appropriate and will issue conditions of project approval based on the various measures requiring special actior :' the operators.

I have found that the Union and Exxon projects, when conducted in accordance with existing MMS legal requirements and combined with conditions of approval resulting from the aforementioned mitigation measures, can proceed in an environmentally sound manner while providing benefits associated with production from the Point Pedernales Field, including the strengthening of national security as the United States moves toward energy independence, revenue for government, and employment opportunities.

Thomas W. Dunaway 8/5/85

Thomas W. Dunaway
Regional Supervisor
Office of Field Operations
Pacific OCS Region

Date

Based on my review of this Record of Decision, I concur with the findings and decisions outlined and committed to herein.

William E. Grant 8/5/85

William E. Grant
Regional Director
Pacific OCS Region

Date

ATTACHMENT

Union's Correspondence Regarding Point Pedernales

Biological Opinions

Union 76 Division: Western Region
James E. Nowinski
Union Oil Company of California
911 Wilshire Boulevard #1519
Los Angeles, California 90017
(213) 977-6874

ES-189

union 76

Los Angeles, CA
July 15, 1985

U. S. Department of the Interior
Minerals Management Service
Pacific OCS Region
1340 West 6th Street
Los Angeles, California
ATTN: Bill Grant

Dear Mr. Grant:

At the request of the U. S. Fish and Wildlife Service in their Formal Consultation -- "Offshore Oil/Gas Development and Production in the Santa Maria Basin Offshore of Point Pedernales, Santa Barbara County, California," Union Oil Company is committed to compliance with the ten reasonable and prudent alternatives identified in order for this project to be undertaken without jeopardizing the continued existence of the unarmored threespine stickleback. These ten alternatives were developed jointly by Union Oil and the Fish and Wildlife Service as an effective method to remove jeopardy and reduce incidental take. If you have any questions, or require additional information, please call Jim Anderson at (213) 977-6863.

Sincerely,

James E. Nowinski

James E. Nowinski, Superintendent
Engineering and Services

JOA/dkl

Union Oil and Gas Di... ...
Union Oil Company of California
1857 Knoll Drive
P O Box 6176, Ventura, California 93006
Telephone (805) 65...

UNION 76

d S Gillen
...shore Construction Manager

2 July 1985

Minerals Management Service
1340 West Sixth Street, Suite 200
Los Angeles, CA 90017

Attn: Mr. Thomas W. Dunaway

Gentlemen:

RE: Fish and Wildlife Service
Endangered Species
Consultation

The referenced document pertaining to the pipeline system from Platform Irene to the Lompoc dehydration facility lists, on page 27, five modifications to the pipeline system which will allow the project to be undertaken without jeopardizing the continued existance of the California Least Tern.

Union agrees to comply with all of the five modifications listed.

Yours very truly,

R.S. Gillen

RSG/dh
0046d

RESPONSES TO COMMENTS

UNION OIL PROJECT/EXXON PROJECT SHAMROCK AND
CENTRAL SANTA MARIA BASIN AREA STUDY EIS/EIR

This document contains copies of all comments on the Union/Exxon Draft EIS/EIR (received by Santa Barbara County on or before May 5, 1985). The agencies and the consultants have responded to all comments, and these responses are also contained in this document.

NOTICE OF UPCOMING PUBLIC HEARINGS ON THE PROJECT.

Certification of the EIS/EIR by Santa Barbara County	Monday June 17, 1985 6:00 PM, City Council Chambers Lompoc City Hall
Presentation of Staff Recommendations to Planning Commission	Thursday, June 27, 1985 9:30 AM, City Council Chambers Lompoc City Hall
Continuation of Planning Commission Hearing	Tuesday, July 2, 1985 9:30 AM, City Council Chambers Lompoc City Hall
Continuation of Planning Commission Hearing	Tuesday, July 9, 1985 9:30 AM, City Council Chambers Lompoc City Hall (if necessary)
Presentation of Recommendations to Board of Supervisors	Monday, July 22, 1985 Board of Supervisors Hearing Room.
	Monday, August 5, 1985 Board of Supervisors Hearing Room.

The Final EIS/EIR will be available following certification so that the Final document package can contain all information developed during the certification hearing. Release of the Final EIS/EIR is scheduled for June 24, 1985.

The above dates for the Board of Supervisors are tentative and should be confirmed through the Santa Barbara County Energy Division.

Copies of all documents prepared as part of the environmental review of this project are available through the Santa Barbara County Energy Division, 1226 Anacapa Street, second floor, Santa Barbara, CA 93101, 805/963-3434.

RESPONSE TO COMMENTS

Table of Contents

INTRODUCTION

This Response to Comments volume has been prepared as part of the public review process for the Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study EIS/EIR.

1.1 SUMMARY OF COMMENTS

On March 18, 1985 the Public Draft was issued for the EIS/EIR. Copies were made available to interested citizens, government agencies, and private organizations. Subsequently, on April 17, there was a public hearing in Lompoc at which there was an opportunity for statements and comments to be presented. In addition to the public testimony at these hearings, readers of the document were asked to provide any written comments to the County by May 6, 1985.

The purpose of this volume is to provide written responses to the letters and public hearing comments which have been received regarding the public draft. By issuing this response volume in advance of the certification hearing, there will be an opportunity for the public to review the responses to the comments in advance of that hearing.

1.2 HOW TO USE THIS DOCUMENT

The first part of this document is organized in accordance with the major categories of comments which were received. This organization of the commenting agencies is as follows:

- Federal agency comments
- State agency comments
- Local agency comments
- Private organizations/individual comments
- Comments received during the April 17, 1985 Public Hearing that are not reflected in the written comments
- Union Oil comments
- Exxon comments

1.2.1 Comments

For each of these sections, the first information presented is a listing of the comment letters submitted. Each comment letter follows in its entirety.

An alpha numeric identification code has been developed to provide the reader with a ready indication of the comments which are being responded to in each letter. For example, in the letter from Friends of the Sea Otter, the first comment is identified by the code FSO-1. The identification code appears in the right margin of the letters.

1.2.2 Responses

Each letter is followed by a series of responses. The responses are organized to indicate each individual organization or author who submitted a letter and each response is keyed to the appropriate identification code in the comment letter.

Each response provides two key items of information. The first is the "essence" of the response which will appear in the EIS/EIR Main Document or the Technical Appendices. This response will provide a succinct presentation of the content of the answer. The second item references (where needed) specific chapter and section in the Main Document or appropriate Technical Appendix that includes a more detailed response.

1.2.3 Additional Information

This Response to Comments volume also includes (in Chapter X) additional information regarding the analysis for the EIS/EIR. This additional information is included to provide detail on work completed subsequent to the issuance of the Public Draft on March 18. This additional work includes the following areas:

- Pipeline realignments -- discussion of the Northern and Southern Mitigated Pipeline Routes for the onshore pipeline from landfall to the Lompoc Dehydration Facility.

- Air Quality -- results of additional modeling runs for ozone impacts. The supplemental information also discusses two minor readjustments that have been agreed to by Union Oil and U.S. Fish and Wildlife. The first realignment is near the Santa Ynez River estuary and the second is by the San Antonio Creek crossing.

1.3 RELATIONSHIP OF THIS RESPONSE TO COMMENTS VOLUME TO THE FINAL EIS/EIR DOCUMENT AND TECHNICAL APPENDICES

This Response to Comments volume has been prepared to provide the public with a working report which summarizes and references the responses that are being prepared in the Final EIS/EIR Main Document. This Response to Comments Document also contains the Technical Appendices Addendum pages that will contain all required changes to the appendices.

On June 25th the Final revised pages for the EIS/EIR will be available.

By providing Responses to Comments in this format, all information necessary to certify the Final EIS/EIR will be available for the certification hearing to satisfy CEQA. Only after certification will the Main Document Addendum be printed and distributed, thereby avoiding the necessity for further addenda. At this time, the FEIS/EIR will be filed with EPA to satisfy NEPA requirements.

II. COMMENTS SUBMITTED BY FEDERAL AGENCIES AND RESPONSES

UNITED STATES COAST GUARD (CG)

Lou Visco

JC

US Department of Transportation
United States Coast Guard

Commander
Eleventh Coast Guard District

Union Bank Bldg. → Janice Yonekura
400 Oceangate
Long Beach, CA 90822
Staff Symbol: mes
(213) 590-2301

16465
19 Apr 85

Ms. Diane Guzman
Resource Management Department
County of Santa Barbara
1226 Anacapa Street
Santa Barbara, CA 93101

Re: Union/Exxon and Central Santa Maria Basin Area Study Draft EIS/EIR

Dear Ms. Guzman:

My staff has reviewed this draft EIR/EIS and submits the attached comments.

Sincerely,

EDWARD V. GRACE
Captain, U.S. Coast Guard
Chief, Marine Safety Division
By direction of the District Commander

Encl: (1) Comments to Various Technical Appendices

Copy: W. Grant, MMS

RECEIVED
APR 23 1985
S. B. COUNTY
RESOURCE MGT. DEPT.

2.1.2

APPENDIX N

Section	Comment	
3.6.2	The treatment of BLEVEs does not adequately describe the potential consequences of such a catastrophic event. While there have been no BLEVEs in the U.S. in recent years, the potential still exists, especially in areas where firefighting water supplies are minimal. Referring to a BLEVE as a spill (Table 3-31) hardly seems appropriate. A BLEVE could, however, be considered a very short-lived release.	CG-1
4.2.6	Again, these tables and section understate the seriousness of a BLEVE. Fireballs several hundred feet in diameter are not uncommon. Most occur when the tank is one-half to three-quarters full. Pieces of the container are generally propelled as far as one-half mile.	CG-2
	According to the NFPA, a BLEVE can occur quite rapidly. In one study of uninsulated above ground tanks ranging in size from 1000-30,000 gallons, 59 percent ruptured within 15 minutes or less, while the range was eight to 30 minutes. Insulated tanks offer better protection. However, data is scarce. Reference: **Fire Protection Handbook, 14th Edition**, NFPA, 1976.	CG-3
5.5.4	Most all LP gas containers are subject to BLEVEs. The tanks on cargo trucks are not generally insulated, but are built to DOT and ASME specifications. Truck transportation of LPG does pose a significant risk other than toxic effects of a release. Due to the probable lack of adequate water in the event of a LPG truck accident and fire, the probability of a BLEVE is significantly increased.	CG-4
6.1	The oil industry has proposed a new full-time oil spill standby vessel in the Arguello Field. This vessel will take the place of "first line of defense" equipment and respond to all spills. It will have a rapid response boat attached designed to rapidly respond to small spills in the area.	CG-5
7.1	The extension of the existing vessel traffic separation scheme by the Coast Guard has been approved by the Intergovernmental Maritime Organization (IMO). The change will extend the traffic system about 18 miles to the west and should go into effect in 1986. We don't believe this measure will "significantly reduce frequency of oil spills" as stated. It will reduce the risk of vessel collisions and allisions of vessels with platforms. Since there have not been spills in this area resulting from either type of event, this measure can only reduce the risk.	CG-6
7.5 Page 7-12	The tests of the Clean Seas vessel were accomplished in August of 1984. The vessels are outfitted with equipment based upon the results of that test.	CG-7

Enclosure (1)

Clean Seas does not have a response staff per se, with the exception of those persons who operate equipment, the manager CG-8 and a small clerical staff. It relies primarily on the member company to provide personnel to fill the recommended staff positions. There are also persons from other member companies who are experts in their field and can be called upon. Location of this staff in Santa Barbara probably makes little difference on a large spill.

Information needed in spill plans for aid in dispersant use CG-9 decisions covers a broad spectrum of topics. Most important, however, is information on oil characteristics and its susceptibility to being dispersed. This includes data on weathering as well as dispersant performance. Preplanning for dispersant use should also include information on when and where not to use dispersants.

Consolidation of the best portions of company oil spill plans CG-10 into the Clean Seas plan would seem to make more sense than each company trying to perfect its plan. Any spill that results in coastal impacts will undoubtedly be large enough that Clean Seas will be involved from the beginning. Oil spill plans should be prepared to benefit the users, not the regulatory agencies.

2.1.3

Care should be taken to ensure oil spill plans are functional CG-11 documents rather than voluminous books written for the benefit of regulatory agencies.

Training of response personnel is probably the key to effective CG-12 response once adequate equipment is on scene and weather conditions are such that a response effort can be made.

7.7.1 The proposed Risk Management Plans (RMP) sound like another CG-13 large plan, expensive to prepare, that sits on the shelf someplace gathering dust. As outlined, the RMP appears to consolidate in one document or series of documents a number of procedures, plans and policies that are already in effect. This appears duplicative and unnecessary.

7.7.2 The regulator's RMP is also an unnecessary paperwork exercise CG-14 that has little apparent value.

APPENDIX D

5.4.2.3 According to CGD11 records of oil spills during the period 1977-1984, there have been a total of 145 barrels of crude oil CG-15 spilled associated with offshore oil and gas operations in Southern California waters. The estimate of 72 barrels/million barrels produced seems high. Since there have been many significant safety measures taken in the U.S. offshore since the early 1970s, it would seem that more recent statistics than 1966-1975 are available and should be used when conducting this analysis.

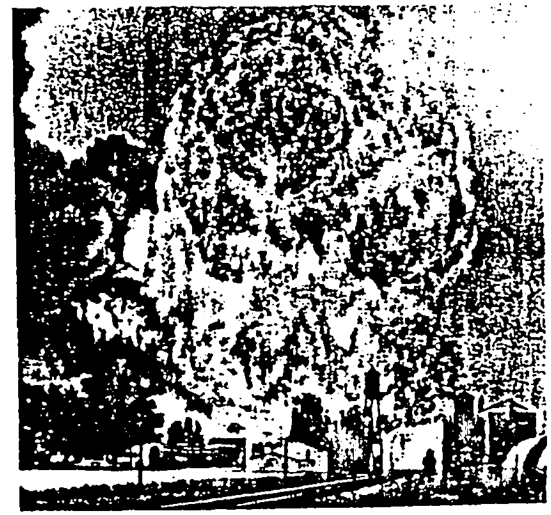

Fig. 3-4B. The fireball formed in a BLEVE involving LP-Gas railroad tank cars at Crescent City, Ill., on June 21, 1970. The elevated water tank at lower right is a point of reference in visualizing the tremendous dimensions of the fireball. (Anderson, Watseka, Ill.)

APPENDIX H CG-16

Page H-28 The discussion on dispersants is dated and not apparently based on the most recent version of the National Contingency Plan. The most recent version encourages preplanning/preapproval of the use of dispersants and does not state a preference toward use. The state of California plan does have statements about preferred use - primarily because that is the law in California.

Tables H-2 and H-3 are well out of date. CG-17

APPENDIX K

This volume does not address the impact on fire protection services currently being discussed. Most of the major projects in Santa Barbara County have a maritime aspect to them. Mitigation measures call for a maritime firefighting capability. CG-18

Mitigation measures described for onshore facilities propose "company firefighters" in lieu of county facilities for the onshore facilities. It appears that fire protection is being addressed in a piecemeal way and not being looked at systematically by the preparers of these documents. CG-19

EIR

2.1.2.3 and 2.1.3.3	See comments for Table 5.11-4 and Appendix N.	CG-20
5.9.2 and Table 5.9-3	Due to the distance offshore of the platforms, their color will have little impact on their visibility to persons on shore. However, their color will have a significant impact on their visibility to mariners at sea. For this reason, the platforms should be painted in such a way to enhance their visibility to the mariner so as to reduce the risk of allisions. Platforms are currently being painted white with yellow trim (cranes, stairways, etc.). This color scheme represents a significant compromise, as the best colors from a safety point of view are orange or red.	CG-21
5.11.3.4	In the event of a large spill requiring the "third level of response", we expect resources of the federal government (USCG and USN) and industry equipment outside the local area would be on scene within 24-48 hours of the spill. It is unlikely that 24 hours would go by before these equipments were called out.	CG-22
Table 5.11-4	Due to recent improvements made in the response concept for this area, this table is completely out of date.	CG-23
5.11.3.6 and 5.11.6 and 5.11.7	See comments for Appendix N.	CG-24

RESPONSES TO U.S. COAST GUARD COMMENTS

CG-1 Section 3 of Technical Appendix M is intended to provide estimates of the quantities of oil or gas products associated with the potential accident events specified in Section 2. The consequences are evaluated in Section 4, with BLEVEs specifically discussed in subsections 4.2.5 and 4.2.6.

A more appropriate title to Table 3-31 of Technical Appendix M has been used in the Final Report.

CG-2 We disagree that the seriousness of BLEVEs is understated. Indeed, we show a fireball diameter of 380 feet for a BLEVE involving one of the larger highway tank vehicles. Additionally, we estimate fatalities within a radius of 570 feet and serious injuries within a radius of 810 feet. These distances, which were computed using a state-of-the-art analytical procedure for evaluation of thermal radiation from fireballs, are less than the hazard zones associated with some historical BLEVE events, but it must be appreciated that the tank vehicles of interest have a capacity that is smaller than those associated with typical railroad tankcars and stationary storage tanks.

It is anticipated that tank trucks would be essentially full while in transit.

CG-3 Comment noted and agreed with. Our analysis also included consideration of whether a small release through a fitting, when ignited, could lead to a BLEVE. We concluded that it could not.

CG-4 Our analyses of gas by-product transportation considered the risks to the public from potential pool fires, vapor cloud fires, vapor cloud explosions, and BLEVEs. Toxic effects are not a problem for LPG. It should be noted that BLEVEs do not have the most severe consequences of a tank truck accident. As indicated in Table 4-17, the event with the highest potential public risk is an unconfined vapor cloud explosion.

CG-5 We noted and accounted for this proposed oil spill response vessel in Section 6.1 of the EIS/EIR and in Addendum H of Technical Appendix M.

CG-6 The references to this mitigation measure in both the EIS/EIR and in Technical Appendix M have been changed to reflect these comments. The extension of the vessel traffic separation scheme has been given preliminary approval by the IMO, and will be presented to the Full Committee of the IMO for final approval within the next few months. The extension of the VTSS will reduce the likelihood of vessel collisions and vessel-platform collisions and will thereby reduce the likelihood (frequency) of oil spills from such collisions.

CG-7 We have modified Technical Appendix M to reflect these developments.

CG-8 We have modified Technical Appendix M to reflect these comments.

CG-9 The operators' spill response plans include information on the advantages of dispersant use, but do not discuss potential harmful effects or disadvantages of their application in the Santa Barbara Channel . Santa Maria Basin areas.

CG-10 These comments have merit. Nevertheless, the key points are that Union Oil and Exxon, in accordance with current regulations, have submitted individual response plans for review and consideration by the MMS. A reasonable approach is to consider consolidation of the better portions of these plans into the Clean Seas plan.

CG-11 Comment noted. The additional recommendations to the plans are in areas where: 1) there was indication of inadequate preplanning, or 2) more information or detail was deemed necessary to ensure functionality and/or usefulness of a plan as a source of necessary data during emergencies.

CG-12 Comment noted. Any written plan is useless if response personnel do not have the skills or knowledge to take appropriate action. Union and Exxon have indicated they will provide training and periodically conduct training exercises in the presence of regulatory personnel.

CG-13 The focus of the Risk Management Plan (RMP) is on the overall long-term safety of oil company operations and its effects on the community and its environment. Whereas most current procedures, plans, and policies concentrate on prevention and mitigation of oil spills, a comprehensive RMP with an assigned staff for its implementation and maintenance, would consider such spills as one of many threats to public safety and to the environment. Integration of individual and disparate plans and policies would generally improve overall efficiency and may help identify important areas that need further attention. Thus, a properly implemented RMP would form the basis of a dynamic safety management plan which could consider and act on safety requirements and needs on a continual long.term basis.

CG-14 The regulator's RMP would involve the development and implementation of a plan coordinating the interests and responsibilities of each of the federal, state and local governmental agencies in their efforts to manage the safety-related risks of the proposed projects. Such a plan would have considerable merit.

CG-15 The historical oil spill value (cited on page 5.4-18 of the DEIS/DEIR) of 72 barrels per million barrels of oil produced was based on data for the California OCS during the period 1966-1965. The U.S. Coast Guard is correct in saying that if more recent data are used (especially excluding the Santa Barbara oil spill of 1969) the expected spillage rate is lower: 145 barrels of crude per <u>total</u> in the 1977-1984 period according to their records. We note that other agencies and researchers cite different figures, and that each individual study seldom identifies all reported spills. One large spill would drastically change the low spillage rate values given for the more recent time period. A reasonable statement relating to the number such spills expected in OCS waters is the expectation of one spill of 1,000 barrels or more per one billion barrels produced. Note that the proposed project is expected to produce about 0.3 billion barrels over its 20-year production period. Thus, it is not unreasonable to expect a 1,000 barrel spill in this period.

Additional discussion of spill probabilities may be found in Chapter 3 of the DEIS/DEIR, and in Technical Appendicies E and M. We do not believe the data cited by the U.S. Coast Guard provides a sufficient basis for any change in the DEIS/DEIR impact significance classification for oil spills.

CG-16 The National Contingency Plan has indeed been modified and no longer specifically discourages the use of chemical agents for oil spill removal. Dispersants that have been placed on a list of "accepted" agents by the EPA may be authorized for use by a Federal On-Scene Coordinator (OSC) "with the concurrence of the EPA representative to the Regional Response Team and in consultation with the states." Those agents not on the accepted list require decisions by the Administrator of the EPA or his/her designee on a case-by-case basis. None of the language of 40 CFR 300.81 Subpart H specifically encourages "preapproval of the use of dispersants" prior to the actual occurrence of an oil spill. However, it is stated that each Federal OSC, where practical, should prepare a local contingency plan.

Discussion on page H-28 of Technical Appendix M has been modified to reflect changes in the National Contingency Plan, but the ultimate conclusions of the discussion remain intact, these essentially being.

1. An informed and correct decision with respect to dispersant use by federal and state officials requires consideration of several important factors.

2. The subject contingency plans provide relatively limited data and information concerning the potential negative aspects of dispersant use in the region of concern.

3. Response time is usually limited in the aftermath of a spill if shorelines are to be protected, and

4. There is merit in our recommendation that "the contingency plans be supplemented with an unbiased and preferably independent review of the potential disadvantages of dispersant use in the region of interest," thus providing the Federal OSC a better basis upon which to make a decision.

CG-17 The information given in Tables H-2 and H-3 was extracted from the oil spill contingency plan prepared by Union Oil for Platform Irene, dated February 1984.

The organizations addressed in the tables are continually adding to and upgrading their stocks of equipment and supplies for response to oil spills. The key point to inclusion of the tables in Addendum H is simply to demonstrate that significant resources are and will continue to be available for this purpose.

CG-18 & 19 Maritime firefighting capability (or lack thereof) is an issue that must be addressed by local officials. Platforms, crew boats and supply boats currently have on-board firefighting capability. As the number of offshore projects increases, the need for fire boats and enhanced on-board firefighting capability (perhaps on local Coast Guard vessels) should be discussed by Tri-County staff and Coast Guard officials, however, the MMS and U.S. Coast Guard are the appropriate governing agencies with respect to OCS fire fighting capability.

CG-20 Comment noted. These sections have been revised to reflect the new plans for oil spill response equipment in the Central Santa Maria Basin.

CG-21 Painting platforms blue-grey will not lessen the significance of the Class I impact, but will lessen their visibility. From the perspective of visual quality, painting platforms white is certainly preferable to red or orange.

CG-22 Comment noted. Appropriate changes have been made in EIS/EIR and in Technical Appendix M.

CG-23 At the time of its preparation, Table 5.11-4 reflected the intentions of Union Oil and Exxon to provide oil spill response equipment onboard their respective offshore platforms. A footnote explained that deployment of a new spill response vessel "may reduce the need for certain equipment and supplies listed above ..."

The complement of equipment and supplies which will be on the new vessel has not been finalized however, the supplies and capabilities of the equipment listed in Table 5.11-4 will be equaled or exceeded on the new vessel.

CG-24 See responses to comments CG-1 through CG-14 which address comments in Technical Appendix M.

DEPARTMENT OF THE AIR FORCE (AF)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 4392D AEROSPACE SUPPORT GROUP (SAC)
VANDENBERG AIR FORCE BASE, CALIFORNIA 93437

29 APR 1985

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RECEIVED
COUNTY OF SANTA BARBARA
MAY 01 1985
RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Mr William E. Grant
Regional Director
Minerals Management Service
United States Department of the Interior
Pacific OCS Region
1350 West Sixth Street
Los Angeles, CA 90017

Dear Mr Grant

Attached are our comments on the Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study EIS/EIR

No total incompatibility of either pipeline route with current or anticipated military missions or operations has been identified. However, there are potential conflicts between operations in support of the first Space Transportation System and pipeline construction that may require coordination of schedules. We will also need to carefully monitor construction so that vital communications links are not interrupted. AF-1

As you know, the Santa Ynez River, as well as the rich and varied ecosystems associated with it, are important base resources. We share the concerns of others that the proposed (or nothern) route, even with the recently proposed mitigations, represents a much greater threat to these critical habitats than does the mitigated southern route. However, if the concerns of the U.S. Fish and Wildlife Service under the Endangered Species Act can be satisfied, we anticipate that other mitigations can be incorporated during easement negotiations to satisfy our concerns. AF-2

After the Final EIS/R is published, I recommend that our staffs work closely together to ensure that consistent decisions are made.

Sincerely

JOE L. MONTGOMERY, Colonel, USAF
Commander

1 Atch
Comments

cc: Resource Management Dept.,
Energy Division (Ms Yonekura)
Minerals Management Service
(Mr Brewer)
1 STRAD/CC
HQ SAC/DEPV (Dr Stirts)

Peace .... is our Profession

Comments on Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study EIS/EIR

Portions of the document not specifically commented upon were not reviewed by Vandenberg AFB personnel.

EXECUTIVE SUMMARY

P. E-2: Since produced water originates from the formation and not the ocean, it cannot be discharged "back into" the ocean. AF-3

P. E-6, E-15: How are air quality violations tolerated? AF-4

How will recent ideas on realignments of alternatives be incorporated into public disucssion of the project? Specifically, Union Oil has proposed a realignment of the "proposed" route, and all the data regarding the Santa Ynez river crossing are not yet collected. In short, it does not appear that alternatives were adequately scoped early in the project, and now, all the data will not be before the public since fieldwork is still in progress. AF-5

Use of base firebreaks for the pipeline route, subject to certain conditions, appears to be a feasible mitigation. AF-6

What are the objective criteria for determination of Class I, II, III, and IV? AF-7

Chapter 4
Pgs 4-17 to 4.2-21

AF-8

Should be sure that data in table 4.2-9 are based on complete (daily) monitoring. The frequency of occurrences is an indicator of air quality. However the magnitudes of the concentrations is also important whether the standard is violated or not. If the concentration is generally close to the standard an increase may cause additional violations. Saying that the standards are violated only infrequently still means that at present the area is not in compliance with the laws.

It is generally inappropriate to use source monitoring stations to characterize ambient air quality. See 4.2-20 and Technical Appendix B 3-27. AF-9

P. 4.2-20: "Inert" is incorrect terminology, particularly for NO_2 and SO_2. Dispersion models assume such pollutants are conservative over shorter averaging periods. Also see Technical Appendix B. AF-10

AF-11

P. 4.2-26: "Particulate" is an adjective; particles or particulate matter are nouns. Also "aerosol" is the term a for two-phase system of solid or liquid particulate matter suspended in a gas (air). This comment is offered to suggest that there is a laxness and lack of attention to detail throughout at least this part of the EIS/R. Also applies to Technical Appendix B. (T.A.B.)

P. 4.2-26, first paragraph, last sentence: Prove contention or delete; AF-12
also in T.A.B.

P. 4.2-26, second paragraph: Suggest "lead-containing particles" or AF-13
"environmental lead in this area", also in T.A.B.

P. 4.2-26, third para: There are standard procedures for estimating AF-14
background concentrations of pollutants. Those methods should be documented and used; also in T.A.B.

P. 4-2, mid-page: What is the technical basis for the sulfide AF-15
concentration in flare gas? Also in T.A.B.

Chapter 5, Environmental Consequences and Mitigation Measures
P. 5.2-23: AF-16

Seem to be implying that if the pollutant level is already at or near the standard it doesn't make much difference how high the concentrations get. In some of the moedeled cases the ozone concentration goes from just barely exceeding a standard to exceeding it by 25 to 50%. This also implies that violations would probably occur more frequently. This modeling is only an indicator of the expected impact of the projects. Modeling of photochemical pollution is very difficult and the model results can only be expected to give a general idea of what is to be expected. In this case, under some circumstances, the model shows that large increases in ozone concentrations may occur. The worst violations occur for trajectory 6 which passes over Vandenberg and "probably occurs 5 - 10 times per year".

2.2.3

"American Indian" is preferred to Native American. AF-17

Sites eligible to NRHP must be able to yield (or have yielded) important information, not just information. The analysis is based on the assumption that all impacted sites are eligible; that is okay for analysis, but it should be stated that they may not all be significant (eligible). AF-18

Confusion exists between avoidance/mitigation and testing/mitigation. AF-19

Also only impacts to NRHP eligible sites require mitigation. AF-20

Salvage (data recovery) must be guided by a defendable (and SHPO coordinated) research design. AF-21

TECHNICAL APPENDIX A
(Comments based on preliminary draft, pages may not correspond now)

Address freshwater aquifers more fully - water table height, depth. AF-22

What is liquefaction probability during an unusual pressure circumstance (i.e. earthquake) - proximity to Santa Ynez river? AF-23

P. 113: Project this discussion of liquefaction onshore. AF-24

P. 119: Hydrocarbon withdrawal combined with water table lowering by age may cause subsidence. AF-25

P. 121: Sketchy and incomplete discussion. AF-26

P. 128: Streams, river underground where pipeline will be. AF-27

P. 52-100: Why spend 50 pages on seismic factors without just listing variables and probability analysis of earthquake damage? AF-28

P. 133: Check liquefaction. AF-29

P. 135: More areas of expansive soils than are vaguely identified. I would also more strongly research collapsable soil with future economies of pipeline maintenance in mind. AF-30

P. 137: Bentonite uses? AF-31

P. 157: If clay at 0-17 m offshore by platform Irene, why such a small (clay) amount on land? AF-32

Repeatedly say "no mapped or known faults that tread through or towards" and then tell of a fault location close (i.e. 50 m away). AF-33

P. 203: Does not address water flow towards table - surface undersection (across the pipeline). AF-34

Limited clay zone near Burton Mesa - specify percent or acre feet. AF-35

P. 204: Third geotech env. - soils are <u>expected</u> to be what? More specific if this long a document. AF-36

P. 14: Reference indication of significant amounts clay (SAI) to geology where significant clay deposits are unmentioned. AF-37

P. 78: Is "Estimates not availble" (of chronic transpo impacts) any excuse. Predict impacts. AF-38

P. 116: Only one proposed spill protection is unsufficient. AF-39

P. 117: (c) Did not address mitigation route or worst case spill flowing downhill into Santa Ynez river. Resuspended sediments are not the only impacts. AF-40

P. 124: (c) Disagree - there is clay in this zone also. AF-41

P. 134: (2) Disagree refer to P. 117 comment. AF-42

P. 301: Be specific - mitigation or measures including rerouting pipeline from future pipelines to Irene or "special designs". AF-43

Mitigate effects of erosion which cause pipeline shifts, breaks or leaks. Address mitigation route as a bona fide alternative to mitigate AF-44 this problem.

How do you divert groundwater flow - en masse - around the pipeline that will hold for the life of the pipeline itself? AF-45

P. 308: Active and projected resource areas. AF-46

P. 309: Why mention time line so late in reading. Specifically say "40 year life cycle" or whatever the lifespan of this project is. AF-47

Cumulative impacts - erosion from changes in natural course of water table. AF-48

P. 2-33: Invalid argument; treatment of blowdown water may be economical, but mitigation of adverse impacts to groundwater is not governed by economics. AF-49

P. 2-35: Spill response plan for pipeline and facilities should be published and agreed upon before start of construction. AF-50

Disagree that proposed pipeline landfall area at Vandenberg AFB is not actively used for military or related uses. Uses may not be incompatible, however. AF-51

APPENDIX B, SECTION 3

P. 3-1 to 3-49: AF-52

2.2.4

From the second paragraph on page 3-1 to the beginning of Section 3.3 on page 3-49 repeats almost exactly Section 4.2 of the main volume. The only changed noticed was one paragraph that was moved (but not changed). Redundancy is a significant feature of the whole EIS/R.

P. 3-60: AF-53

Assume that traffic is spread equally from 0600 to 2000. Traffic is spread out less evenly - especially near towns where people are driving to and from work. AF-54

Assume that NO_x is emitted as 5% NO_2 without giving any basis for this assumption or stating whether or not it is important in the model results. AF-55

P. 3-80: Why were waste burning and wildfire categories ignored? These categories represent 25% of organic gas emissions, and about 60% of CO emissions for stationary sources in San Luis Obispo County. What are data for Santa Barbara County?

APPENDIX B, SECTION 4

P. 4-2: Why is compounding of boat impacts avoided? AF-56

P. 4-8: Why are boats assumed to be idling during the worst hour? AF-57

P. 4-30: Why do trucks travelling at 5 mph go only 1 mile during worst hour? AF-58

APPENDIX B, SECTION 7, & 8 AF-59

P. 7-30 and elsewhere: Seems to be saying that if the federal secondary TSP standard is presently exceeded, violating the primary standard merely adds to the magnitude of existing exceedance.

P. 7-61: Why will SO_2 and CO impacts be reduced by modifcations to Santa Maria Refiniery. AF-60

P. 8-2: While no standards are predicted to be violated, a large increase in ambient NO_2 concentration is predicted. AF-61

Stating the frequency of wind and stability conditions for which worst impacts occur is somewhat misleading as conditions close to the modeled conditions may also cause violations at a slightly lower level. AF-62

APPENDIX B, SECTIONS 12, 14, 18

P. 12-5: State that gas-fired equipment would be "almost sufficient" to offset Lompoc HS&P emissions. Data not presented to document. AF-63

P. 12-11: Suggest application of surfactant to reduce fugitive dust emissions. Does application of this chemical have any environmental impact of its own? Want to be sure that air polution problem's solution does not create another type of problem. AF-64

P. 14-106: Table 14-78 lists peak onshore O_3 concentration of 9.79 pphm, in the paper it is stated that peak would be 16-21. AF-65

Section 18 is not complete, is it? AF-66

TECHNICAL APPENDIX F - Terrestrial and Freshwater Biology AF-67

As shown in the EIS/R, the mitigative realignment would have much less affect on biological resources than the proposed or alternative routes. We agree with the conclusions brought forward in 6.2.1.1. and wholeheartedly endorse this mitigative realignment. AF-68

There are many biological problems associated with both the proposed and alternate routes in the EIS/R . Our major concerns are:

(1) Proposed route comes on shore in potential least tern nesting habitat.

(2) The Santa Ynez estuary is a post breeding dispersal area critical to least terns for feeding purposes just prior to the fall migration.

(3) An oil spill north of the Santa Ynez river would have an extremely detrimental effect on the estuary resulting in the possibility of putting the Vandenberg colony of least terns in a jeopardy situation.

(4) The construction noise occurring in the potential nesting areas of least terns could disrupt any nesting attempts unless done outside tern nesting season.

(5) Sedimentation could be disastrous to tidewater gobis and Unarmored Threespine Stickleback in the Santa Ynez river and San Antonio creek if the proper precautions to prevent sedimentation are not followed precisely.

(6) Alternate route loss of two acres of saltwater marsh is unacceptable when the habitat is so limited in this part of California.

If the proposed route is taken, we feel check valves should be installed AF-69 much closer than every two miles to avoid major spills in the Santa Ynez river.

AF-70

Low level helicopter flights are not acceptable to check pipeline route after construction. Checks should be made only on foot to avoid harassment of wildlife by helicopters.

AF-71

Revegetation with native plants is mentioned. Seed should be collected from surrounding area for planting in lieu of purchasing seed from unknown sources.

TECHNICAL APPENDIX G - Cultural Resources

P. 62, para 4, line 7: "Hauk" should be spelled Houk. AF-72

AF-73

2.2.5 P. 62, last line: The Henning House and other Lompoc Valley houses are examples of earlier farm structures. The Spanne house at the north end of Artesia was constructed CA 1930. This structure should not be confused with the historic Fabing - McKay - Spanne house located at 207 No. "L" St. in the city of Lompoc.

AF-74

P. 67, para 3: The "earth dam" is still visible just east of Graciosa Road near the intersection of Highways 1 and 135 and appears on the 360 foot contour of the USGS 7.5' 1959 Orcutt quadrangle.

AF-75

P. 24, para 6, sentence 2: Something is missing here; a "were" should be inserted before developed.

AF-76

P. 29, para 2: The southern portion of Vandenberg AFB was transferred to the Navy in 1957, the northern portion to the Air Force.

AF-77

P. 13, Tabe 2.2-1: Spanne and McKay house are probably one and the same.

P. 131, para 1, last sentence: Should read ..."give orientation AF-78 lectures.."; to whom? Suggest lectures be delivered to "construction crew including supervisors".

AF-79

P. 142, para 5, last sentence: Should include the Environmental Planning Branch at Vandenberg AFB. Also, what is Rosewater?

AF-80

P. 142, para 5, last sentence: Add "and to provide sufficient information for a determination of eligibility for inclusion in the National Register of Historic Places under 36 CFR 63."

Overall, this is an excellent appendix - impressive in its scope and detail as well as innovative approaches.

RESPONSES TO AIR FORCE COMMENTS

AF-1 Comment noted.

AF-2 Comment Noted.

AF-3 The word "back" has been deleted.

AF-4 Air quality standard violations will not be tolerated. Since the release of the DEIS/EIR, the Joint Review Panel agencies, consultants, County Air Pollution Control District representatives, and the U.S.E.P.A. have been working on additional mitigation measures to eliminate air quality standards violations. The results of these efforts are presented in Section 10.2 of this Response Document.

AF-5 The EIS/EIR throughout Chapter 5 contained preliminary analysis of the impacts of potentially mitigating, relatively minor realignments of the alternative (Southern) Union onshore pipeline segment from Surf to Lompoc, and of the San Antonio Creek crossing on the Lompoc to Orcutt segment. Union suggested additional relatively minor realignments to its proposed (Northern) segment between Surf and Lompoc in March 1985. Section 10.1 of this Response Document presents analysis for public review and discussion of each of the aforementioned realignments based on field work conducted in March and April 1985. Further, based on the results of the analysis and continued consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act, Section 10.1 of the Response Document identified further realignments of the proposed (Northern) Surf to Lompoc and Lompoc to Orcutt segments that would, if implemented, be expected to reduce potential impacts on the California Least Tern and Unarmored Threespined Stickleback to insignificance.

AF-6 Comment noted.

AF-7 The criteria for classifying impacts vary by discipline. These criteria are defined at the beginning of each major subsection of Chapter V of the EIS/EIR.

AF-8 We agree that the highest and second highest 1-hour average concentrations are the important indicators for attainment of the standards (Table 4.2-8). However, the frequencies of standard exceedences are also good indicators for characterizing air quality for a region. In modeling the impacts of the projects on ozone levels, we chose calibration days in which the monitored levels were high and were slightly below the standards.

AF-9 Source monitoring stations were not used for baseline levels. Page 4.2-20 of the EIS/EIR states that ambient air monitors that are near major sources generally will record higher levels than stations not influenced by the major sources.

AF-10 For convenience, NO2 and SO2 have been designated by EPA and other atencies as inert pollutants. The commenter should note that the ozone limiting method (OLM) was used to evaluate the 1-hour NO2 concentrations in the EIS/EIR. In the use of the TRACE photochemical model, NO, NO2 and CO were considered as reactive pollutants.

AF-11 There was a considerable amount of attention to detail in the EIS/EIR and Technical Appendix B, especially in areas that counted, such as the reporting of emissions, operating parameters and model results. A large number of permutations of scenarios were reported. The EIS/EIR was written in a very short time to convey information to the public so that the issues could be understood.

AF-12 This is the contention of the local APCD after examining the emissions inventory.

AF-13 Comment noted.

AF-14 The method that was adopted in the EIS/EIR was a standard procedure which is recommended by EPA.

AF-15 The sulfide concentration was based on expected levels for the Central Santa Maria Basin.

AF-16 An impact was considered significant if a standard exceedence was predicted regardless of the amount of exceedence. However, the EIS/EIR does differentiate the amount of those above the standards also. The commenter erroneously assumes that the exceedance for Trajectory 6 would occur 5-10 times per year because of the expected occurrence of the Trajectory of 5-10 times per year. This assumption would be true only if continuous sources were modeled. Since many of the larger sources are intermittent, the probability would be much lower. This is explained in detail on p. 5.2-21 of the EIS/EIR.

AF-17 Comment noted. Both terms are commonly used.

AF-18 Comment noted. Text has been changed.

AF-19 Comment noted. Text has been changed.

AF-20 Comment noted. Text has been changed.

AF-21 Comment noted. Text has been changed.

AF-22 A detailed discussion of groundwater, including location and extent of freshwater aquifers, is included as Section 2 of Technical Appendix C.

AF-23 According to the Seismic Safety and Safety Element of the Santa Barbara Comprehensive Plan (1979) problem rating for liquefaction of moderate has been identified for the Santa Ynez River Valley in the vicinity of the pipeline corridors. Until proven by testing and analysis, the area is susceptible to liquefaction. The "probability" of liquefaction depends on the probability of an earthquake with strong enough ground motions to produce liquefaction. No probability analyses have been performed for the Santa Ynez River area with regard to earthquake activity. During a geotechnical investigation for a particular structure or pipeline, the liquefaction potential is assessed. If there is a liquefaction potential, regardless of earthquake probability, recommendations will be made for the proper design of the structure to withstand the stress.

AF-24 The causes of liquefaction and susceptibility to liquefaction of different portions of the Onshore Area Study are addressed in Section 1.5.2.4 of Technical Appendix A. Site-specific liquefaction conditions and potential for each of the individual project components are discussed separately in Section 1.7 of Technical Appendix A, Onshore Site-Specific Facilities in the subsections describing Geotechnical Conditions.

AF-25 Comment noted. The discussion of subsidence potential on p. 119 addresses conditions offshore where drilling and production would occur.

AF-26 See response to comment AF-22.

AF-27 The question refers to the depth of burial of proposed pipelines across stream and river crossings. According to Terzaghi [1936] the depth of burial of a pipeline crossing an active channel should be 3 to 4 times the rise in river stage to avoid scour and erosion problems. This condition was addressed on p. 129, Section 1.5.2.3 of Technical Appendix A.

AF-28 The probability of earthquake damage is not usually assessed for these types of projects. It is assumed that there will be local or regional major earthquakes during the useful life of the project. The levels of damage depend on the magnitude of the event and epicentral-causitive fault distance. The particular structure is designed for the calculated ground motion at the site. The expected ground motions at the various planned facilities have been addressed in Section 2.1.3 of Technical Appendix A.

AF-29 The causes of liquefaction are addressed in Section 1.5.2.4 of Technical Appendix A with regard to the Area Study. Site-specific liquefaction conditions for each of the individual project components are discussed separately in Section 1.7 of Technical Appendix A, Onshore Site-Specific Facilities under Geotechnical Conditions.

AF-30 Expansive soils are primarily associated with the Rincon, Monterey and Sisquoc Formations in the Study Region (Santa Barbara County, 1979). These formations occur extensively in the Area Study, particularly in the Santa Ynez Mountains, but are very limited in occurrence in the Project Area.

The Seismic Safety and Safety Element (Santa Barbara County, 1979) identifies a few areas with high problem ratings with respect to expansive soils adjacent to the Project Area, specifically along Route 246, south and east of the southern alternative pipeline corridor, and east of the proposed corridor in the vicinity of the Lompoc Casmalia Road.

AF-31 The uses of bentonite are addressed on p. 135 (last paragraph) and on p. 136 (first paragraph) of Section 1.5.2.6, Other Mineral Resources of Technical Appendix A.

AF-32 The geologic environments at the platform site and in the onshore Study Region are distinctly different and cannot be directly compared.

AF-33 The discussions of fault locations are focused on the possibility of surface rupture because of fault displacement beneath proposed project facilities. While the particular reference cited in the comment could not be located, review of site discussions in the EIS/EIR and Technical Appendix A does not indicate any misstatements regarding proximity of faults to proposed facility sites.

AF-34 The question is believed to be oriented towards the infiltration of surface water into underlying groundwater. Water flowing over any unpaved surface will have a tendency to flow downward or laterally into the ground at a rate depending on the soils or rocks primary or secondary permeabilities. The pipelines and other planned structures cover a relatively small area as compared with the regional exposed natural ground surface. The infiltration area that will be masked by the new structures is very small and is considered insignificant. The pipelines themselves will not impede the flow of downward percolating groundwater and this does not constitute a geotechnical consideration.

AF-35 Soils which occur in the Project Area, and characteristics of these soils, are presented in Table 1.1-3 in Technical Appendix C. Soils which occur at particular drainage crossings along the various pipeline corridors are included in Table 1.1-1.

AF-36 The Orcutt Sand is a sedimentary bedrock unit that varies greatly both laterally and vertically in consistency, cementation and grain size. This is due to the deriviation of sediments, mode of deposition and degree of weathering. From a geotechnical standpoint regardless of the diverse lithology, grainsize or degree of induration of the unit, they will perform well for their intended use as foundation materials. In reference to their consistency (e.g., loose to dense), this depends on the degree of cementation or consolidation of the formation. Without actual laboratory testing of the unit from undisturbed samples, little more characterization can be made other than what is summarized in the third paragraph on p. 204 of Technical Appendix A.

AF-37 The paragraph on page 214 of Technical Appendix A does mention clay being present.

AF-38 Reference to this page could not be found, however chronic transport impacts are discussed in Appendix A under project impacts.

AF-39 Reference to this page could not be found, however their is multiple spill protection proposed for the Northern Mitigated Pipeline Route. See Supporting Information in Chapter X of this document.

AF-40 The mitigation routes are discussed in Chapter X of this document.

AF-41 Reference to this comment could not be found.

AF-42 Refer to Chapter X of this document for proposed mitigation.

AF-43 Future offshore pipelines to Irene from the area development scenario may cross seafloor channels where there is a possibility of erosion. As stated on p. 301, Section 2.1.10.5 (Mitigation Measures) of Technical Appendix A, either the pipelines should avoid the seafloor channels by rerouting or the pipeline should be designed to withstand erosion within the seafloor channels. Both of these approaches are mitigative measures and both are considered feasible.

AF-44 The mitigating southern alignment developed in the course of preparing these documents and the mitigating northern alignment proposed by Union are discussed in detail as alternatives to the proposed alignment in Section X of this Response to Comments Volume.

AF-45 At most locations, the pipelines will lie above the water table. Even in locations where the pipelines may be below the water table all or part of the time, the lines do not constitute a significant enough obstacle to groundwater movement to require diversion.

AF-46 The discussion in Section 2.1.12 acknowledges both active and potential resource areas. Mitigation measures discussed in 2.1.12.5 include avoidance of both active and potential resource areas.

AF-47 See the main report EIS/EIR Section 2, Project Description for full details of projected timing of development and operation of proposed facilities.

AF-48 Cumulative impacts, including erosion, diversion of water, and overdraft conditions are discussed in Sections 1.3 and 2.4 of Technical Appendix C.

AF-49 CEQA (Section 15012 of the State EIR Guidelines) permits inclusion of discussions of economics in Environmental Impact Reports, while requiring that major consideration be given to preventing environmental damage.

AF-50 Comment acknowledged. Preparation of an oil spill contingency plan for pipelines is recommended (Technical Appendix C, p. 2-45; EIS/EIR p. 5.3-12).

AF-51 Comment acknowledged.

AF-52 Appendix B contains information as backup to the main document. In some sections, such as Section 3, most of the material reported in the Appendix was utilized in the main document.

AF-53 Although traffic was spread equally for each segment from 0600 to 2000, the more important feature of disaggregating traffic by road segment was included in the modeling analysis. The refined use of hourly traffic by segment would generally not change the result significantly since even 1-hour average peak ozone levels are more dependent on diurnal variations.

AF-54 The assumption that 5 percent of the NO_x emission from vehicles is emitted as NO_2 was based on information supplied by EPA for an average mix of vehicles. This assumption can have an effect on the model runs if the traffic counts are high. It is difficult to estimate the magnitude of this effect because of the nonlinear nature of the photochemical reactions that are simulated by the model. However, the use of the 5 percent levels is considered to be the best estimate by EPA for vehicles, and the use of other values, especially in the calibration runs, may bias the entire set of runs erroneously.

AF-55 Waste burning and wildfire were not included in the emissions for the trajectories in San Luis Obispo because, as stated on page 3-79 of Technical Appendix B, there were "no burn" days and no major fires reported on the actual modeling days. It would therefore be erroneous to include these emissions on the calibration days. There were no burn days or major fires reported in Santa Barbara County for the calibration days.

AF-56 The compounding of emissions is avoided due to the non-overlap of platform installation.

AF-57 The boat emissions under cruise were treated as pseudo line sources by using four points distributed along the cruising path. Treating the boat emissions as a single point for the entire cruise period would not be correct.

AF-58 The emission factors for vehicles are dependent on their speed. It can be assumed that all construction vehicles at the site would travel no greater than 5 mph while moving back and forth. During any given hour of peak construction it can also be assumed that the total distance each vehicle would travel at the site would be no greater than 1 mile, given start and stop times.

AF-59 The statement on page 7-30 of the Technical Appendix indicates that violation of the primary standard by the projects would add to the magnitude of an already existing exceedance of the secondary standard.

AF-60 New equipment to be installed at the refinery will reduce these emissions. This is explained in Section 4.2.2.4 of the Technical Appendix and in the Project Description, Section 2.6 of the EIS/EIR.

AF-61 Although the increased annual average NO_2 concentration is large when compared with the background, the total concentration is still only 30 percent of the ambient air standard.

AF-62 The frequencies of wind and stability conditions that were reported for the worst case results include not only the conditions that were modeled for the peak concentrations, but they include all of the stability classes for a given wind direction that could lead to standard exceedances. The frequencies reported in the Technical Appendix are thus greater than those required for a single peak condition and can be considered as conservative upper estimates.

AF-63 The data presented on Table 12-1 of the Technical Appendix indicates that the offsets available in the Lompoc area would not be sufficient for the dehydration facility.

AF-64 It is mentioned in the EIS/EIR under the mitigation tables that the use of surfactants may cause impacts on surface water and vegetation. However, there are commercially available chemical inhibitors which have been designed to minimize these impacts. Some of these surfactants have been used to minimize wind erosion of particles at exposed beaches bordering drinking water reservoirs. It is assumed that the more environmentally acceptable dust inhibitor like water spraying would be used.

AF-65 Table 14-78 does not report ozone concentrations. Perhaps the commentor is referring to Table 14-70 which lists a peak ozone onshore impact of 9.79 pphm for trajectory 5B. The peak onshore impact of 16.21 pphm is predicted to occur for trajectory 6B (see Table 14-71).

AF-66 Section 18 was included to summarize the sensitivity of the TRACE photochemical model to a number of parameters. Additional runs were therefore carried out with different input parameters to determine the impacts of the parameter changes. The suggested changes and subsequent sensitivity runs evolved as a result of a number of meetings during the analysis with the reviewing agencies that are represented on the JRP. The Section was not intended to describe a thorough analysis of the sensitivity of the TRACE model to all combinations and permutations of the parameters; but it was included to inform the reader on the sensitivity to a few crucial parameters in question.

AF-67 Comment noted.

AF-68 These concerns are addressed in Technical Appendix F, and in Section XI, Additions to Technical Appendix F, and Section X, Supplemental Information.

AF-69 In Technical Appendix F, Section 6.4, installation of block or check valves at intervals of approximately one-half mile is identified as a measure to mitigate the effects of oil spills from the pipeline between landfall and Oak Canyon, where the proposed route parallels the Santa Ynez River. The Northern Mitigated Pipeline Route, presented as mitigation by Union Oil Company, includes (in addition to other features) three block valves and three check valves for this segment, approximately one valve per mile.

AF-70 Existing noise levels in the vicinity of the Santa Ynez River estuary are relatively high as a result of frequent train and air traffic. Therefore, one additional helicopter flight through the area every two weeks was determined to be a Class III impact. However, Vandenberg AFB has denied permission for the pipeline to be inspected by helicopter. Pipeline inspection by vehicle or on foot is the alternative recommended. The County may be able to enforce this condition.

AF-71 Comment noted. A similar statement is made in Technical Appendix F.

AF-72 Comment noted. Text has been changed.

AF-73 Comment noted. Text has been changed.

AF-74 Comment noted. Text has been changed.

AF-75 Comment noted. Text has been changed.

AF-76 Comment noted. Text has been changed.

AF-77 Comment noted. Text has been changed.

AF-78 Comment noted. Text has been changed.

AF-79 Comment noted. Text has been changed.

AF-80 Comment noted. Text has been changed.

UNITED STATES DEPARTMENT OF COMMERCE (DOC)

National Ocenaic and Atmospheric Administration

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

April 26, 1985 F/SWR33:JJS

MINERALS MANAGEMENT SERVICE
PACIFIC OCS REGION
RECEIVED
APR 30 1985
FIELD OPERATIONS
LOS ANGELES

NOTED-ADAMS

Mr. Thomas W. Dunaway
Regional Supervisor
Offshore Field Operations
Minerals Management Service
Pacific OCS Region
1340 West Sixth Street - Mail stop 150
Los Angeles, CA 90017

Dear Mr. Dunaway:

We have reviewed the joint Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Union Oil Project/Exxon Project Shamrock and central Santa Maria Basin Area Study.

DOC-1

In previous correspondence to your office dated October 19, and December 14, 1984 (enclosed) we provided written comments on the Union Oil Company and Exxon Environmental Reports for the same plans for development and production discussed in this draft EIS/EIR. The issues of concern which we identified in those previous comments have been thoroughly addressed in the joint EIS/EIR.

2.3.2

We will have no further comments at this time, but will continue to coordinate with you in monitoring future basin area developments and identifying additional specific concerns on a project-by-project basis.

Sincerely yours,

E.C. Fullerton
E.C. Fullerton
Regional Director

Enclosures

Southwest Region
300 South Ferry Street
Terminal Island, California 90731

October 19, 1984 F/SWR33:JJS
1503-06

Mr. Thomas W. Dunaway
Regional Supervisor
Offshore Field Operations
Minerals Management Service
Pacific OCS Region
1340 West Sixth Street - Mail Stop 150
Los Angeles, CA 90017

Dear Mr. Dunaway:

We have reviewed the Environmental Report for the Union Oil Company Development and Production Plan - OCS-P 0441, Point Pedernales Field. The proposed location of the production drilling platform is approximately five miles offshore Point Pedernales in 242 feet of water.

We note after reviewing the section on commercial fishing under "Affected Environment" that the data on fisheries in the vicinity of Tract P 0441 need to be updated if an accurate assessment of the impact of offshore development is to be made. Unpublished fisheries data by commercial catch block as recent as 1983 are available, upon request, from the California Department of Fish and Game.

The recent set of reports and technical appendices, prepared for your agency, dealing with the development of the entire Point Arguello field abutting Tract P 0441 provides a very thorough example of the level of information which should be included in the "Affected Environment" and "Environmental Consequences" sections concerning commercial fishing in the area. We recommend the discussion of commercial fishing activities in these sections in the final report concerning the Union Development and Production Plan for P 0441 be expanded accordingly.

Also, at the October 10, 1984, hearing of the California Coastal Commission, specific language was passed relating to the recent "Policy Statement on Conflicts Between the Commercial Fishing and Oil and Gas Industries" developed by Commission staff. A number of the policy issues addressed the topic of hydrocarbon exploration and development and potential means to protect marine resources and minimize impacts of oil and gas activities on commercial fishing. We recommend the efficacy of incorporating those measures into the offshore development process for the Point Pedernales Field be addressed in the joint State/Federal environmental review document covering development activities in the central Santa Maria Basin as referenced in your letter of transmittal.

As far as our concerns for the marine mammals and endangered species either transitting or inhabiting the area, we agree with the discussions presented and the conclusions drawn.

We will look forward to reviewing the draft environmental documents for the central Santa Maria Basin, including the Point Pedernales development, as soon as they become available.

Sincerely yours,

/S/

E.C. Fullerton
Regional Director

cc:
CDFG, Nitsos
FWS, Wolfe

2.3.3

Southwest Region
300 South Ferry Street
Terminal Island, California 90731

December 14, 1984

F/SWR33:JJS
1503-06

Mr. Thomas W. Dunaway
Regional Supervisor
Offshore Field Operations
Minerals Management Service
Pacific OCS Region
1340 West Sixth Street - Mail Stop 150
Los Angeles, CA 90017

Dear Mr. Dunaway:

We have reviewed the "Environmental Report" for the Exxon Company Development and Production Plan - OCS P-0438 and 0440, Shamrock Project, Point Pedernales Field. The proposed location of the production drilling platform is on the eastern portion of tract P-0440 in 285 feet of water.

We note that the sections on commercial fishing under both "Environmental Setting" and "Environmental Consequences" provide significantly more up-to-date and thorough discussions of both the fishery in the area and expected impacts than did the previous plan for development in the Pedernales Field prepared for tract P-0441 (Union Oil Company). We have no additional information to add in that regard.

Our major concern with the project lies not with the location or construction of the proposed drilling platform but with the pipeline options presented. As is stated in the text on page 2-46 of the "Environmental Report" the marine biological survey of the platform site and pipeline corridors indicates that there are hard-bottom habitats which would be impacted were the "Gaviota" pipeline option implemented. This would not be the case if the "Lompoc" alternative were chosen instead.

Since both of these pipeline options appear to have the potential to satisfy Exxon's requirements for production and development of project Shamrock, we recommend the "Lompoc" route be the option chosen. In addition to avoiding hard-bottom areas, the "Lompoc" alternative requires only two miles of pipeline be laid versus approximately thirteen for the "Gaviota" option which could minimize fisheries conflicts by reducing construction time and altering significantly less soft benthic habitat along the pipeline corridor.

Also, at the October 10, 1984, hearing of the California Coastal Commission, specific language was passed relating to the recent "Policy Statement on Conflicts Between the Commercial Fishing and Oil and Gas Industries" developed by Commission staff. A number of the policy issues addressed the topic of hydrocarbon exploration and development and potential means to protect marine resources and minimize impacts of oil and gas activities on commercial fishing. We recommend the efficacy of incorporating those measures into the offshore development process for the Point Pedernales Field be addressed in the joint State/Federal environmental review document covering development activities in the central Santa Maria Basin as referenced in your letter of transmittal.

As far as our concerns for the marine mammals and endangered species either transitting or inhabiting the area, we agree with the discussions presented and the conclusions drawn.

Sincerely yours,

/S/

E.C. Fullerton
Regional Director

cc:
Mitsos, CDFG
Wolfe, FWS

2.3.4

RESPONSE TO DEPARTMENT OF COMMERCE COMMENT

DOC-1	Comment noted.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)

United States Environmental Protection Agency

Regional Administrator
215 Fremont Street
San Francisco CA 94105

Arizona, California
Hawaii, Nevada
Pacific Islands

EPA

May 6, 1985

Mr. William Grant
Pacific OCS Region
Minerals Management Service
1340 West 6th Street
Los Angeles, California 90017

Attention: Ms. Donna Brewer

Dear Mr. Grant:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR) titled UNION OIL PROJECT/EXXON PROJECT SHAMROCK AND CENTRAL SANTA MARIA BASIN AREA STUDY EIS/EIR. The enclosed comments are provided in accordance with EPA's responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act (NEPA).

We have classified this DEIS/DEIR as Category EU-2, Environmentally Unsatisfactory-Insufficient Information (see the attached "Summary of Rating Definitions and Follow-Up Actions"). This rating is based on several key factors. The document shows significant potential increases in onshore ozone and sulfur dioxide levels resulting in violations of federal standards due to the two proposed platforms, the additional four potential platforms and the onshore facilities. Even more substantial ozone impacts are projected under the cumulative development scenario. There are a number of reasonable alternatives which have not been adequately explored, including the alternative of phased development.

2.4.2

There are major uncertainties regarding what levels of air quality control would be in effect. The EPA, the State of California and the local agencies all commented on the MMS proposed air regulations that emission control of outer continental shelf-related sources must be at least as stringent as that required in onshore nonattainment areas suffering the consequences of OCS developments. EPA is interested in working with MMS to assure such consistency.

The ozone violations shown using the TRACE screening model are alarming. EPA acknowledges the uncertainty inherent in the TRACE results. The Joint Interagency Modeling Study (JIMS), which addresses development in the Santa Barbara Channel, has proven to be a positive approach to resolution of modeling issues. This model may provide a good starting

1-18

point for resolution of the air quality issues in the Central Santa Maria Basin. We are willing to work with MMS and other concerned parties to reach mutual agreement on a more refined modeling approach and uses of the results.

EPA also has concerns relating to the uncertainties regarding marine discharges and marine biology. In particular, high concentrations of various heavy metals may result from deposition of drilling muds in sediments. Comprehensive monitoring programs are needed to determine what effects drill cuttings and fluids may have on the marine environment. A mitigation plan should be developed to reduce onshore impacts to sensitive species and their habitat from the pipeline corridor.

The classification and date of EPA's comments will be published in the Federal Register in accordance with our public disclosure responsibilities under Section 309 of the Clean Air Act. If the potentially unsatisfactory impacts are not corrected at the Final Environmental Impact Statement/Final Environmental Impact Report (FEIS/FEIR) stage, this proposed project may be recommended for referral to the Council on Environmental Quality (CEQ). In addition, 40 CFR 1504 and EPA's Section 309 responsibilities require us to notify the CEQ and the Director of MMS of our DEIS/DEIR rating. We are available to meet with you to discuss our concerns in detail. Please contact Mr. Rick Hoffmann, Federal Activities Branch, at (415) 974-8191 or FTS 454-8191.

Sincerely,

Judith E. Ayres

JUDITH E. AYRES
Regional Administrator

Enclosure (10 pages)

cc: Ms. Josephine S. Cooper, Assistant Administrator, Office of External Affairs, EPA
Mr. Paul A. Schuette, Office of Public Affairs, EPA
Mr. Allan Hirsch, Office of Federal Activities, EPA
Mr. A. Alan Hill, Council on Environmental Quality
Mr. William D. Bettenberg, Director, Minerals Management Service
Mr. Gordon Duffy, Secretary of Environmental Affairs, State of California
Mr. Wayne Harper, U.S. Fish and Wildlife Service, Laguna Niguel
Mr. Michael L. Fisher, Executive Director, California Coastal Commission
Ms. Janice Yonekura, Santa Barbara County Resource Management Department

2-18

(X)

U.S. EPA Comments on Draft EIS/EIR for Union/Exxon Projects and Central Santa Maria Basin Area Study EIS/EIR.

General Comments

EPA-1

1. This DEIS/DEIR is generally a well written, well organized overview of the proposed offshore and onshore projects. It is evident that a great deal of planning and coordination went into the preparation of the documents. The members of the Joint Review Panel (JRP) and the consultants should be commended on their various efforts.

   EPA is concerned about the adverse environmental consequences of the projects and the remaining unknown effects associated with the proposed development.

EPA-2

2. Minerals Management Service (MMS) and the JRP did not consider a phased development alternative for the two proposed platforms or the six potential platforms in the Central Santa Maria area. EPA believes that this should be an important consideration since the DEIS/DEIR forecasts the possibility of worsening air quality and other environmental effects as other platforms are developed. Also, important information will be available over the next several years which will be critical to decisions for this and adjacent areas. These developments include: studies and monitoring programs for marine biology and marine water quality, revisions to MMS's air quality regulations, and changes in onshore air quality plans and permitting decisions.

   EPA feels it is critical that the FEIS/FEIR discuss the feasibility of phasing development for this area, and describe what regulatory options may be available to MMS and other members of the JRP. Further discussion of this aspect is included in the following air quality comments.

2.4.3

Air Quality Comments

EPA-3

EPA is very concerned that the proposed projects will have serious environmental consequences. Our primary concern is the unmitigable (page E-31) predicted exceedances of federal ozone (O_3) and sulfur dioxide (SO_2) standards. The issue of predicted O_3 violations, though listed as a Class I unmitigable impact, is portrayed in a misleading fashion. It tends to attribute the predicted O_3 violations to "background" levels. However, EPA feels the Executive Summary should stress that O_3 concentrations would not be predicted to exceed National Ambient Air Quality Standards (NAAQS) without the proposed projects.

3-12

Several trajectories, resulting from the TRACE model, show the following results: The 1989/1990 O_3 exceedances, after mitigation, are predicted to occur at Santa Ynez, resulting from the proposed project sources (0.126 ppm, p. 5.2-38) and in 1992 from the area sources (0.142 ppm, p. 5.2-40). O_3 exceedances are also predicted at Santa Ynez, San Luis Obispo, and at Santa Barbara/Goleta resulting from the cumulative development scenario (0.172-0.181 ppm, p. 6.2-3). Predicted exceedances of California standards are even more numerous.

Because of the concerns described above and in the detailed comments below, EPA is willing to work with MMS and other JRP members to review any new alternative approaches or mitigation measures. If the potentially unsatisfactory impacts are not corrected at the FEIS/FEIR stage, this proposal may be recommended for referral to the Council on Environmental Quality.

The following are additional specific air quality comments:

EPA-4

1. According to the DEIS/DEIR, both the proposed projects and the related cumulative development will cause new violations. This is true not only in presently designated nonattainment areas, but in areas presently designated attainment. The projects would apparently cause new nonattainment areas.

   EPA-5

   The DEIS/DEIR fails to reconcile the proposed projects with an essential Clean Air Act (CAA) requirement for offsets of emissions (Section 173[1]). The CAA also requires that onshore areas account for new source growth in Air Quality Attainment Plans (AQAP) which show attainment of the NAAQS. The DEIS/DEIR shows that these projects cannot be reconciled with the present (1982) AQAP, the 1984 update AQAP, or the inventory to be the basis for the 1986 AQAP update. The DEIS/DEIR itself shows that these projects preempt the possibility of an onshore attainment plan which complies with the CAA. Development of such a plan is theoretically possible, but the DEIS/DEIR fails to even describe such a plan.

   EPA-6

   EPA's position in all outer continental shelf (OCS) oil and gas actions has been that CAA requirements pertaining to Parts C and D should be resolved, at least conceptually, in a credible manner prior to final approval of the EIS/EIR. The present DEIS/DEIR falls far short of that goal.

   EPA-7

   The DEIS/DEIR notes that when "Union/Exxon project emissions are included" in the consideration of AQAP consistency, "some means of reducing overall projected emissions must be developed" (emphasis added). EPA agrees, and suggests that those means will not be developed if the projects are allowed to proceed through the NEPA process as presently proposed.

4-12

The DEIS/DEIR indicates that the options might include: EPA-8

a. "modification of projects to reduce emissions" (p. 5.2-29),
b. "emissions offsets" (p. 5.2-29),
c. "industry consolidation" (p. 5.2-29),
d. "curtailment of other Union- or Exxon-owned emissions producing activities" (p. 5.2-29),
e. "purchase of available offsets" (Technical Appendix B, p. 14-16),
f. "find ways in which the oil and gas industry could cooperate to reduce overall emissions" (Technical Appendix B, p. 14-16), and/or
g. "phase out or stagger activity within the industry" (Technical Appendix B, p. 14-16).

EPA-9

This appears to be an excellent summary of the options for minimizing the impacts of these developments. Unfortunately, several are then eliminated from further consideration. NEPA requires that "all reasonable alternatives" are to be evaluated. In light of violations projected under the analyzed alternatives, EPA recommends that other alternatives be reviewed to determine if they would have less adverse impacts.

EPA-10

All the alternatives listed above should be considered as project and area development alternatives, and they should be treated as such in the Technical Appendices, the body of the FEIS/FEIR, the Executive Summary, and in designation of the Preferred Alternative. EPA recommends that the options pertaining to consolidation, phasing and pacing of OCS-related development should receive special consideration. All of the alternatives discussed in this FEIS/FEIR should contain appropriate mitigation options based on impact model projections.

2.4.4

EPA-11

Some of the alternatives are directed towards increased levels of emissions control at the individual sources. The EPA, the State of California and the local agencies all commented that emission control of OCS-related sources must be at least as stringent as that required in onshore nonattainment areas suffering the consequences of OCS developments. This was in response to the MMS's Advanced Notice of Proposed Rulemaking for revision of its air regulations, published January 8, 1985 (Hirsch to Bettenberg, April 8, 1985). To assure at least a Lowest Achievable Emission Rate (LAER) level of control, EPA is willing to work with the MMS, the State and the local agencies to develop LAER determinations for these facilities.

EPA-12

EPA acknowledges the uncertainty inherent in the TRACE results. However, it is not an acceptable course of action to simply discount the results and approve the project without resolution of the ozone consequences of the projects. The TRACE results must be the starting

5/12

point for development of such resolution. EPA will participate jointly to pursue development of a mutually agreeable modeling approach.

EPA-13

The JIMS study, which addresses development in the Santa Barbara Channel, has proven to be a positive approach to resolution of modeling issues. A calibrated model will be produced from JIMS in the next several months. Thus, the JIMS model may provide a good starting point for resolution of the modeling issues in the Central Santa Maria Basin.

EPA-14

2. Exceedances of the SO_2 1-hour California and 24-hour federal standards (p. 5.2-15) are predicted to occur in 1989/1990 near the Santa Maria refinery. Modeling indicates these exceedances would occur principally because of a neighboring coke plant, even without the refinery. The FEIS/FEIR should be revised to note that EPA has determined that this facility may be subject to the Prevention of Significant Deterioration (PSD) permit process.

EPA-15

3. The DEIS/DEIR shows that mitigated concentrations of SO_2 (518 ug/m^3 3-hour, 284 ug/m^3 24-hour, p. 14-125) resulting from the proposed dehydration facility north of Lompoc are predicted to exceed the applicable federal SO_2 PSD Class II increments of 512 ug/m^3 3-hour and 91 ug/m^3 24-hour. Mitigated concentrations (814 ug/m^3 1-hour and 310 ug/m^3 24-hour, p.14-127) from this facility are also predicted to exceed the California 1-hour and 24-hour SO_2 standards of 655 and 131 ug/m^3, respectively.

These 1-hour, 3-hour, and 24-hour predicted exceedances from the proposed gas processing facility should be listed in the Class I Impact Summary table on p. E-31, and discussed in Chapter V of the FEIS/FEIR.

EPA-16

4. On p. 5.2-16 in Table 5.2-3, the amount of PSD Class I and Class II increments remaining should be indicated, particularly in the federally-designated San Rafael Wilderness Area, which is located approximately 30 miles east of the oil and gas processing plant (p. 14-144). The FEIS/FEIR should also indicate the extent to which the remaining increments will be totally or partially consumed by the time the last OCS proposed project source permit applications are received.

EPA-17

5. It would be helpful if the FEIS/FEIR indicated what mitigation measures are available to reduce the potential impact on SO_2 concentrations (25,194 ug/m3) from the failure of the hydrogen sulfide removal system for the refinery gas at Santa Maria (p. 5.2-28). Even one failure in three to five years is potentially significant.

6/12

6. EPA feels that the discussion of traffic in Technical Appendix L should be expanded in the FEIS/FEIR to include a microscale carbon monoxide (CO) queuing analysis for highly congested intersections in the Goleta area. The FEIS/FEIR should also present areawide emissions of oxides of nitrogen (NO_x) and hydrocarbons resulting from traffic increases, increases in other secondary sources due to the proposed project, and cumulative developments. EPA-18

7. Total suspended particulate (TSP) and CO data are missing from Table 5.2-10, and should be added in the FEIS/FEIR. EPA-19

8. Because of air quality concerns noted in this section, EPA suggests that the FEIS/FEIR present and commit to an expanded alternatives analysis and mitigation package. The following measures should be considered: an expanded air quality monitoring program for the area, an extension of the current JIMS study to include the newly affected areas, and a commitment to an accelerated review of MMS's air quality regulations. EPA-20

NPDES Permit Comments

1. The DEIS/DEIR concludes in several sections that uptake of toxicants through the food web should not be a significant impact (pp. 5.5-48 and 5.5-50 of Appendix E). However, the DEIS/DEIR provides little basis for this conclusion. EPA-21

   We recommend that the FEIS/FEIR provide additional discussion of this subject, particularly with regard to the movement of toxicants up the food chain, including endangered species such as the sea otter and the least tern. Where possible, quantitative estimates should be included.

2.4.5

2. On page 35 of Appendix D, the DEIS/DEIR notes that increases or decreases of various metals would result from deposition of drilling muds in sediments. However, data are not provided for background levels of mercury (Hg), which tends to bioaccumulate. The DEIS/DEIR, in Table 5.4-16, provides concentration data for Hg and cadmium (Cd) from a "clean" barite mud mined from a bedded deposit. Barite from vein deposits can contain Hg or Cd concentrations of 10 ppm or more. (EPA is considering a requirement that only "clean" barite be discharged offshore. However, at present, any barite can be used.) High concentrations of Hg or Cd in muds would impact sediment concentrations. The FEIS/FEIR should discuss the possible increased concentrations of Hg and Cd resulting from these other muds. EPA-22

   In addition, even though lead (Pb) may not be found in high concentrations in drilling muds, it may be incorporated into the marine environment by drilling activities. The recent study conducted by NEKTON on hard bottom substrates for TEXACO showed that Pb, originating from pipe sealants, bioaccumulated in Patiria sp. (starfish) and Kelletia sp. (whelks). EPA-23

9/18

3. The DEIS/DEIR provides a calculated dilution factor of 3,600 for the produced water discharges using the computer program OUTPLM. Region 9 has used the program PLUME several times to estimate the dilution of produced water discharges. We typically calculate a dilution of approximately 100. Although the model OUTPLM differs from PLUME and includes an ocean current factor, the dilution factor of 3,600 still seems excessive. Normally, when PLUME generates a dilution factor of 100, OUTPLM (with an ocean current factor) would typically produce a dilution of 120. It appears that some significant corrections in the OUTPLM modeling need to be made. EPA-24

   After a dilution factor of 3,600 was calculated, the DEIS/DEIR stated that pollutants in the discharge will be diluted well below water quality standards in the mixing zone. However, since the dilution factor is in all likelihood excessive, the significance of the discharges may be understated.

   Since this is an important calculation and significant determination, EPA recommends that the OUTPLM model be run again and the significance be re-evaluated before MMS completes the FEIS/FEIR.

4. Region 9 has proposed a prohibition of chrome lignosulfonate as a drilling mud component in the preliminary draft general permit which was circulated in July 1984. There is a conflict in the DEIS/DEIR concerning Exxon's intent to use chrome lignosulfonate as a drilling mud component. On page 5.4-12 the DEIS/DEIR indicates that Exxon will not use this material, but on page 5.4-23 it indicates that no such commitment has been made. Union, on the other hand, has agreed not to use it. EPA recommends that the FEIS/FEIR clarify Exxon's use of chrome lignosulfonate. EPA-25

5. On page E-8, the DEIS/DEIR estimates that an area of 5 km radius could be impacted by each platform. Various estimates of the area affected per platform are given in the DEIS/DEIR such as 150 to 190 km^2/platform. This is more than a radius of 5 km. The FEIS/FEIR should clarify the basis for the 5 km radius. EPA-26

6. Appendix D notes the wide discrepancy between the experimental observations of cutting piles 5 meters high around Platforms Hilda and Hazel, and the Continental Shelf Associates predictions of cuttings piles 17 centimeters in height. The FEIS/FEIR should resolve this discrepancy between observed and calculated cutting piles. EPA-27

7. Field verification of the drilling mud dispersion model should be included as a component of future monitoring programs. EPA-28

8/18

8. The FEIS/FEIR should compare the area to be impacted by the project with the total size of the study area. This should also be done for the cumulative impacts analysis, in which effects of other platforms are included. In addition, the cumulative effects analysis should include discharges from exploratory operations. EPA-29

Marine Water Quality Comments

EPA-30

1. The description of potential Class II significant environmental impacts on marine water resources and marine biology recommended detailed and comprehensive monitoring programs to determine what effects drill cuttings and fluids may have on the marine environment. EPA concurs with this and recommends that the FEIS/FEIR describe in more detail how various monitoring program elements would be implemented. Greater experimental detail would be useful for topics including but not limited to sampling methodology, analytical protocols, station locations, quality assurance and quality control.

2. The FEIS/FEIR should explain why increased concentrations of copper, silver, zinc, and arsenic are found in the produced water that has been treated (Table 2.4-3). EPA-31

3. The DEIS/DEIR recommends (page 4.4-8) that additional data on oxygen consumption rates, for both waters and sediments, would be desirable (p. 4.4-8). EPA concurs with this statement and the FEIS/FEIR should present a monitoring program to obtain this information. EPA-32

2.4.6

4. The monitoring program objectives found on page 5.4-23 should be explained in more detail including citing rationale, null hypotheses to be tested, and recommended monitoring methods. EPA-33

5. Mercury should be added to Table 5.4-6, which lists contaminants for an effective mitigation monitoring program. EPA-34

6. The DEIS/DEIR reports that the pollutant concentrations in the sediment, suspended and settled, have not been adequately investigated (page 4.4-12). There is a lack of data on heavy metal concentrations in the sediments (Appendix D, page 65) and a lack of data on high quality petroleum hydrocarbon and chlorinated hydrocarbon concentrations (Appendix D, pp. 150-154) collected from the Santa Maria Basin region. These statements confirm the need for "baseline" and subsequent monitoring surveys which should be incorporated into the FEIS/FEIR. EPA-35

9/12

7. Several studies have shown oil and grease levels to be between 0.2 to 3.2 ppb in ambient seawater, whereas one study showed concentrations as high as 60.0 ppm in nearshore waters (pp. 4.4-11 and 4.4-12). Oil and grease concentrations in formation waters (20-30 ppm) are much higher than the average ambient seawater concentrations (Appendix D, Section 5.4, p. 43). EPA-36

The entire section on seawater concentrations of oil and grease and petroleum hydrocarbons should be expanded in the FEIS/FEIR to include tables, maps and other aids that show sample locations and pollutant concentrations in the project vicinity. EPA-37

Marine Biology Comments

EPA-38

1. The Santa Ynez River mouth wetland is described as an important habitat for most of the 160 species of seabirds identified in the study area between Point Buchon and Gaviota. The river mouth wetlands are also identified as a significant breeding ground for the least tern, an endangered species. EPA understands, from a recent visit to the pipeline site, that there are still significant unresolved concerns regarding the appropriate pipeline route and the adequacy of spill prevention measures in the event of a pipeline rupture. Because of the sensitive habitat involved, it is very important that this issue be satisfactorily resolved. The consultation with the U.S. Fish and Wildlife Service on Section 7 of the Endangered Species Act should be completed before the EIS/EIR is finalized.

2. Helicopter transportation of personnel and supplies is expected to be utilized extensively between Lompoc and Platforms Shamrock and Irene. Impacts to seabirds, particularly to those nesting and breeding on the wetlands and sand spits of the Santa Ynez River mouth, are expected to range between Class I and Class II. The FEIS/FEIR should present a detailed evaluation of potential mitigation measures which can be implemented to reduce the adverse impacts of helicopter traffic on seabirds, particularly during the breeding season. EPA-39

3. The three pipelines from Lompoc to Platform Irene are described on page 2-42 of the DEIS/DEIR as being buried through the surf zone of Ocean Beach at a depth of three to six feet. The DEIS/DEIR also identifies the beach area at the Santa Ynez River mouth as a "high energy" beach, subject to intensive wave action. The FEIS/FEIR should address the expected severity of the stresses on the pipelines in the surf zone or of the potential for pipeline ruptures during normal or unusual erosion/deposition processes. The FEIS/FEIR should also investigate the EPA-40

10/12

possible location of the pipeline landfall at more quiescent or protected locations in the area, such as Lompoc Landing or Canada Tortuga.

Onshore Water Quality Comments

1. On page 2-30 of Technical Appendix C, "Onshore Water," total usage of ground water during normal operation is listed as 0.6 acre feet/year (AFY), with 7.0 AFY potentially lost due to reduced infiltration. This water use is described as causing a Class I impact, due to the current severe overdraft of the Lompoc and Santa Maria basin aquifers. Additionally, 35.0 AFY of ground water is expected to be required for the proposed gas scrubber at Lompoc, which is considered to be a Class II impact in the DEIS/DEIR. EPA-41

   Since both projected water requirements are to be drawn from the same aquifer, the discrepancy between the significance levels associated with the two listed requirements should be rectified in the FEIS/FEIR. Additionally, the potential use of produced formation waters to satisfy water requirements of normal operations should be assessed in the FEIS/FEIR, including a discussion of treatment requirements.

2.4.7

11-18

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION*

Environmental Impact of the Action

LO—Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC—Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO—Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU—Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1—Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2—Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3—Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment

12-18

RESPONSES TO ENVIRONMENTAL PROTECTION AGENCY COMMENTS

EPA-1 Comment noted.

EPA-2 The draft EIS/EIR did look at different scheduling or phasing of the projects under the delay the project alternative, but it was dismissed as an overall alternative due to several factors. First, phasing as a full NEPA/CEQA alternative would not be keeping with the MMS timing requirements on lease development as set forth in the OCS Lands Act Admendments of 1978. Second, these two project platforms are essentially all electrically powered, and therefore their total air emissions would not be substantially reduced by phasing, except by allowing only one platform to operate at a time (i.e. phase them over a 30 year period). Although phasing as an overall alternative was not considered the document did consider phasing in individual issue areas as a mitigation measure for reducing environmental impacts. Some examples of these include, scheduling the construction of onshore pipelines in the fall (See Chapters V and VI) to avoid impacts on the Least Terns' breeding season, and high flow conditions on river and stream crossings. Phasing of multiple projects was identified as a potential mitigation measure in such areas as marine water quality, commercial fishing, and marine biology to avoid overlapping construction or operations impacts.

In the area of Air Quality phased development for the projects and area study would not offer advantages over the other identified mitigation measures. This is true for a number of reasons. First, the air quality problem is associated with peak one-hour ozone, and not overall yearly emissions. Therefore, if phasing was to reduce one-hour ozone levels, it would have to be to reduce or eliminate the overlap of peak one-hour emissions. Since these platforms use grid electric power for all their continuous sources, one can only look at reducing peak one-hour emissions from non-continuous and mobile sources such as boats, and/or helicopters. Mitigation measures have been identified in this document which could reduce peak-one hour emissions from the non-continuous sources such as cranes and cement pumps. However, the mobile sources will have the same peak one-hour emissions for the life of the projects, and therefore if one was to assume phasing, then the platforms would need to be installed with no overlap in drilling and/or production in order to avoid potential overlap of peak one hour emissions. This would mean installing only one platform every twenty to thirty years. Such an approach would not allow the resevoir to be developed to its maximum potential, and could result in the loss of recoverable resources.

Secondly, the other air quality mitigation measures identified for the project and area study platforms, which are discussed in Chapter X of this document would maintain the peak one-hour ozone levels below the Federal standard of 12 pphm if implemented.

For platforms that use turbine generators to produce their own power, the use of phasing during the drilling phase is much more applicable. It is during drilling that large amounts of power are needed. However, with the Union and Exxon projects the power needs are being met by use of an electrical power cable and therefore, their peak one-hour emissions for drilling activities do not significantly change for the production phase.

With the identified mitigation measures the peak one-hour emissions for drilling and production would be almost identical, thus making phasing during the drilling phase ineffective.

EPA-3 After a number of meetings and discussions with the appropriate regulatory agencies several additional mitigation measures have been suggested. The adjusted emissions have been modeled and the impacts have been presented in the Response to Comments Addendum.

EPA-4 See Response to Comment EPA-3.

EPA-5 The additional mitigation measures that are reported in the Response to Comments Addendum would result in peak concentrations that are below the federal ozone standard for both the projects and the Area Study sources. Thus if these mitigations are implemented the fully mitigated projects would be consistent with the updated Air Quality Attainment Plan, and offsets would not be needed to comply with the ozone standard.

EPA-6 The mitigation measures reported in the Response to Comments Addendum show that mitigation measures are available which would comply with Parts C and D of the Clean Air Act.

EPA-7 The EIS/EIR is an analytical document which has identified a number of feasible mitigation measures. If these were implemented there would be no exceedance of the federal one-hour ozone standard. These projects would then be consistent with the AQAP.

EPA-8/9 A discussion of additional mitigation measures which require modification of the projects to reduce emissions are included in the Addendum to the Response Documents. If implemented these additional measures show that the federal one-hour ozone standard would not be exceeded. It is the intent of MMS to fully exhaust mitigation measures which can be applied directly to the proposed projects. As viewed by the MMS, phased development may be appropriate as a last resort mitigation only when other options are unavailable.

EPA-10 A number of the mitigation options were considered in additional modeling runs. Some of the options resulted in no ozone standard exceedances while others showed standard exceedances remaining. These are reported in the EIS/EIR and in the Addendum to the Response Document. See Response to Comments EPA-2, 8 and 9.

EPA-11 Additional mitigation measures were considered in the Addendum to the Responses which could result in no exceedances of the federal ozone standard due to the project emissions if implemented. By the definition of EPA, many of these additional mitigation measures can be considered as LAER.

EPA-12/ 13 The TRACE model was calibrated before determining the project impacts. This calibration, especially for the key trajectory 6, resulted in differences of observed vs. predicted levels of less than 0.4 pphm. Therefore a reasonable degree of confidence can be assumed for the predicted project impacts. The results of the model were not discounted in the DEIS/DEIR. Additional mitigation measures have been identified, that if implemented, would not cause exceedances of the federal ozone standard.

EPA-14 In the FEIS/EIR mitigation measures were included for the neighboring coke plant. These additional mitigation measures would result in no exceedances of the federal SO_2 standards. The PSD permit process would be required if a net emission increase from the modified refinery would be greater than 40 tons per year for NO_2. The estimated net increase for the mitigated refinery is 29 tons per year. Thus it would not be subject to the PSD permit process.

EPA-15 The predicted standard exceedances that are indicated in the comment were due to emissions from a hypothetical gas plant for the Area Study. These exceedances were not due to emissions from the oil dehydration plant as proposed by Union. The standard exceedances from the hypothetical gas plant can be considered as Class II impacts because addition sulfur removal can be designed into this hypothetical plant. The Area Study onshore facility was only included as a planning tool for potential future projects.

EPA-16 The amounts of Class I and Class increments remaining have been added to Table 5.2-3. The increments contribution from the projects on the Class I. San Rafael Wilderness were immeasurably small.

EPA-17 This failure was considered a Class II impact because appropriate mitigation measures were proposed by the Applicant. The appropriate mitigation would be to reduce throughput at the refinery by 50% temporarily until the failing amine train can become operational. This would allow the other operating amine train to remove H_2S from the gas stream.

EPA-18 The proposed projects would result in less than 20 vehicles per hour increase at any intersection. Because this change is so small there would be no measurable effect on any congested intersections. The projects will not cause large increases of secondary growth in the region. Thus areawide emissions would not change significantly.

EPA-19 These numbers were less than 1 and were inadvertently left out of the table in the DEIS/DEIR. They have been inserted in the final.

EPA-20 Additional mitigation that could result in no exceedance of the Federal standards are identified in the Addendum to the Response to Comments. See Response to EPA-7. Commitment to a mitigation package is not appropriate to be made in the FEIS/EIR. This is not the intent of the Council on Environmental Quality (CEQ) Guidelines for implementing NEPA. The EIS/EIR is an analytical document not a decision document. The MMS will prepare a Record of Decision, 30-60 days following the filing of this document with EPA. The County of Santa Barbara Board of Supervisors will reach their decisions on the project on August 5.

EPA-21 Biomagnification (increase in tissue burden of toxicants with increase in trophic level) has been shown to be characteristic of organic toxicants but not of most metals [Mearns and Young, 1979; Mearns et. al., 1981; Young et. al, 1980; Schafer et. al., 1982]. The exception to the above statement is that organic, particularly methylated forms of some metals can biomagnify and are present at high concentration in high trophic level organisms.

Pelagic organisms would be less likely to accumulate toxicants since they are further from the source and the material and species are more transient. Resident benthic feeders would be most susceptible to such contamination [Nekton, 1984]. In any case, the program of monitoring and mitigation identified in Sections 5.4 and 5.5 of the EIS/EIR and Technical Appendix D would, if implemented, detect and mitigate bioaccumulation impacts to insignificance. References for the above discussion include:

Jenkins, K.D., D.A. Brown, and P. Oshida. 1982. Detoxification of metals in sea urchins. Pages 173-178 in W. Bascom (ed.), Coastal water research project biennial report for the years 1981-1982. Southern California Coastal Water Research Project. Long Beach, CA.

Mearns, A.J., and D.R. Young. 1979. Pollutant flow through marine food webs. Pages 107-117 in Proc. 2nd Pacific Northwest Technical Workshop, Washington Sea Grant Publication WSG-WO-79-1. University of Washington. Seattle, WA.

Mearns, A.J., D.R. Young, R.J. Olson, and H.A. Schafer. 1981. Trophic structure and the cesium-potassium ratio in pelagic ecosystems. Southern California Coastal Water Research Project biennial report for the years 1981-1982. Long Beach, CA.

Young, D.R., A.J. Mearns, T-K. Jan, T.C. Heesen, M.D. Moore, R.P. Eganhouse, G.P. Hershelman, and R.W. Gossett. 1980. Trophic structure and pollutant concentratios in marine ecosystems of Southern California. CalCOFI Rept. 21:197-206.

EPA-22 Vein deposits of barite, in comparison with "clean" bedded deposits, are known to often show elevated levels of lead, zinc, mercury, chromium, nickel, copper, cadmium and arsenic.* Some data on background levels of mercury were provided in the first section of Technical Appendix D including Tables 7-14 (seawater concentrations), 7-15 (seawater concentrations), 7-17 (mussels), and 7-28 (marine biota). Other data on mercury may be available, but it does appear that data on sediment cncentrations are indeed lacking. It is also appropriate to note that Union and Exxon will be limited by their NPDES permit to the discharge of EPA-approved or generic drill muds, the latter having specific limits on the amounts of mercury (1 ppm), cadmium (1 ppm), and other metals in the whole mud.

EPA-23 Information from the NEKTON study regarding concentrations of lead bioaccumulation in invertebrates was reported in Section 5.5 of the EIS/EIR.

EPA-24 Both the PLUME and OUTPLUME models have been run for Platform Irene's produced water outfall. As noted in Table 5.4-3, OUTPLUME predicts an initial dilution factor of 3,620 at the edge of the zone of initial dilution, predicted by OUTPLUM to be 94 meters away (down current). Results from PLUME reported by the EPA in their comment letter~~, and by Tareah~~ Hendricks (personal communication to Arthur D. Little, Inc., March 4, 1985), predict initial dilution ratios of about 120 ~~and 50-90, respectively~~. All correctly point out that PLUME does not take into account an increment to the dispersion associated with the movement of the ocean currents (i.e., PLUME assumes the discharge is into still water).

90-120 by agent

Our copy of the OUTPLUME model was obtained from the U.S. Environmental Protection Agency's laboratory in Corvallis, OR. The documentation that comes with the model includes a test case. This test case was used to insure that the copy of the model obtained (and mounted on our consultant's computer) worked properly. We are thus confident that the OUTPLUME model used worked properly.

There appear to be no directly pertinent data from field studies on produced water discharges which would clearly indicate which model was closer to the truth. However, there are several data points for drill muds discharges, summarized in Table 5.4-28 of Appendix D in the DEIS/DEIR. These data clearly indicate that a dilution factor of 3,620 at 94 meters (as predicted by OUTPLUME) not only reasonable, but perhaps conservative (i.e., low).

* See Symposium on Environmental Fate and Effects of Drilling Fluids and Cuttings, Proceedings, Vol. I (held at Lake Buena Vista, Florida, January 21-24, 1980); the following two papers in these Proceedings provide data on "dirty barite": (1) D.W. Nelson et al., "Plant Uptake of Toxic Metals Present in Drilling Fluids;" and (2) J.R. Kramer et al., "Occurrence and Solubility of Trace Metals in Barite for Ocean Drilling Operations."

It is noted that, although there may be some benefit from conducting model runs corresponding to some minimum initial dilution (i.e., with the assumption of low current velocities), there does not appear to be any justification for using the PLUME model. In fact, the use of the PLUME model for discharges in flowing conditions goes against the recommendations of EPS's Research Laboratory in Corvallis, OR.*

Finally, all of the above notwithstanding, if the initial dilution factor was as low as 100, it appears that water quality outside of this zone would, except possible for copper, meet applicable water quality standards set by the EPA. Table A shows the EPA criteria and the expected discharge concentrations after a 100-fold dilution.

Given the above, it does not appear that any changes could be applicable to the EIS/EIR conclusions regarding impacts of platform discharges on water quality even assuming the dilution factors indicated by use of the PLUME model.

* A.M. Teeter and D.J. Baumgartner, "Prediction of Initial Mixing for Municipal Ocean Discharges," Report CERL-043, U.S. Environmental Protection Agency, Corvallis Environmental Research Laboratory, Corvallis, OR, May 1979.

Table 5.4-28

DILUTION OF DISCHARGED DRILLING MUDS

Investigator	Reported Dilution
Ecomar (1978)	100,000:1 within 100 meter of discharge point; background levels reached within 200 meters
Ray and Meek (1980)[b]	500 - 6,000:1 within 3 meters of discharge point; 50,000 - 600,000:1 within 100 meters
Ayers et al. (1980a)[b]	1,000:1 within 40 meters of discharge point
Ayers et al. (1980b)[b]	100:1 in immediate vicinity of discharge point; 10,000:1 within 120 meters; background levels reached within a few hundred meters
Brandsma et al. (1980)[b]	100:1 at 10 seconds after discharge; 1,000:1 after one minute
Shinn et al. (1980)[b]	32:1 within 5 meters of discharge point; 64:1 within 96 meters
Zemel (1980)[b]	1,000:1 within 10 meters of discharge point

[a] From Dames and Moore, 1983a.
[b] In Proceedings of the Symposium: Research on environmental fate and effects of drilling fluids and cuttings, Lake Buena Vista, Florida, January 1980.

Table A

COMPARISON OF EPA CRITERIA WITH FORMATION WATER CONCENTRATIONS AFTER TREATMENT

Metal/Pollutant	Concentration, ug/L "After Treatment" Formation Water*	 EPA Criteria for Saltwater Aquatic Life**
Arsenic	3.3	63
Cadmium	0.2	12
Chromium (VI)	0.5 (total)	54 (VI)
Copper	2.5	2
Cyanide	0.1	0.57
Lead	1.0	8.6
Mercury	0.08	0.1
Nickel	0.8	7.1
Silver	0.2	2.5 (maximum)

* Includes a dilution factor of 100. Numbers taken directly from Union's submission.

EPA-25 A correction has been made to the text on page 5.4-23 to indicate Exxon's commitment not to use chrome-based lignosulfonates.

EPA-26 The 5 km radius is an estimate based on field measurements of observed differences in sediment quality. The 150-190 km^2 area is a hypothetical calculation reflecting the setting distance that particles discharged at the platform might travel. The latter number is not expected to represent accurately a zone of significant contamination.

EPA-27 It is not known why the cuttings piles beneath Platforms Hilda and Hazel are so much higher than is projected for Platforms Irene and Shamrock from the CSA model. Two speculative answers might be: (1) that Platforms Hilda and Hazel used deep shunts for the discharge of their drill muds and cuttings, and (2) that the assumptions in the CSA model (and thus the model outputs) are significantly in error.

EPA-28 Field verification of drilling muds dispersion models have been incorporated into the MMS Pacific OCS Region Phase II Monitoring Program that will be conducted by the MMS in the Santa Maria Basin and the Santa Barbara Channel.

EPA-29 Some discussion of the amount of ocean sediment area that may be impacted was presented in Sections 5.4 and 6.4 of the DEIS/DEIR, and in Technical Appendix D. As noted in the DEIS/DEIR these estimates of areas are quite uncertain, not only as to their absolute magnitude in km^2, but also as to the nature and severity of the adverse effects to be expected within them. Further, it is also difficult to define (other than by political or arbitrary rules) geographic bounds to the Study Area; should it be all areas within 5 kilometers of project components, the Central Santa Maria Basin, or the whole area between Long Beach and Morror Bay? The calculation of a percentage of area within this situation would yield a very uncertain number which could thus be misleading and would certainly not account for the increased significance of areas such as hard bottom areas or important fishing grounds.

EPA-30 Comment noted. However, it is believed that it is neither necessary nor appropriate to provide such detail in an EIS/EIR. The specific parameters to be measured, the sampling locations, frequency and total number of samples, the sampling and analytical methods, QA/QC protocols, and the methods of statistical analysis to be used (on the data generated) are best left to be negotiated between the permit-granting agencies (with appropriate review by other concerned agencies and groups) and the operators and/or the funding institutions and their contractors. (There is an up-coming procurement by MMS for some of the desired monitoring work. Because the procurement is competitive, some details of the desired monitoring program are being withheld so as not to preclude innovative technical proposals). Several of the involved agencies (e.g. MMS, EPA, Regional Water Quality Control Board) have their own monitoring progress and/or operator monitoring requirements. One way to coordinate all ongoing and future planned work to be sure that it meets all the needs identified in the EIS/EIR would be to create an interagency working groups which would, at a minimun, share information on their respective requirements, programs, future plans, and findings.

EPA-31 There were several errors in the "After Treatment" column of Table 2.4-3 of the DEIS/DIER. There will be no increases in the concentration of any pollutants because of the treatment. The Table is corrected in the FEIS/FEIR.

EPA-32 The MMS Pacific OCS Regional Monitoring Program is designed to measure dissolved oxygen in the water column. Oxygen demand measurements on the suspended and bottom sediments in the Project Area are also desirable. The monitoring program recommended in Section 5.4.5 also specifically calls for measurements of BOD and COD on platform discharges. As noted in response EPA-30 above, further details of the actual monitoring program to be conducted are not appropriate for inclusion in the EIS/EIR.

EPA-33 See response to EPA-30.

EPA-34 So done.

EPA-35 The need for the basine and monitoring surveys was clearly stated in Section 5.4.5 of the DEIS/DEIR. MMS currently has a Benthic Reconnaissance Survey contract with Scientific Applications, Inc. to measure levels of biota, trace metals, and hydrocarbons in sediments in the Santa Maria Basin. These samples have been collected and are being analyzed by the contractor.

EPA-36
EPA-37 The comment above is in error. The above study indicated [re. DeLappe et al., 1979] that reported seawater concentrations of 0.2 to 3.2 ppb (ug/liter) actually measured dissolved and particulate petroleum hydrocarbons, not oil and grease. The other study noted in the comment [Chambers Consultants and Planners, 1982] actually did measure oil and grease concentrations. These data are discussed in Technical Appendix D (pages 154-5; Table 8-3) and summarized on pages 4.4-11 and 4.4-12 of the DEIS/DEIR. It is believed that the available information has been adequately discussed in Technical Appendix D, and need not be repeated in the DEIS/DEIR. Expansion of this section of the DEIS/DEIR with additional tables and figures is considered unnecessary since existing material presented in the Appendix is already incorporated into the DEIS/DEIR by reference. The existing DEIS/DEIR discussion on pages 4.4-11 and 4.4-12 has been clarified by clearly indicating authorship of cited studies, referencing appropriate tables in Technical Appendix D and describing the differences between measurements of dissolved/particulate petroleum hydrocarbons and oil/grease.

EPA-38 Comment noted.

EPA-39 It is more likely that helicopter noise impacts on breeding seabirds at the Santa Ynez River mouth will be Class III, not Class II or Class I. This is because a proposed flight corridor through Vandenberg AFB has been denied, and field studies have shown that ambient noise levels at the estuary are sufficiently high so that helicopter flight disturbance would likely be of very short-term, if any, duration.

EPA-40 The burial depth of the pipelines through the surf zone at the proposed landfall is proposed to be three feet to six feet below the low low sand level. Union Oil is currently conducting sand profiling studies at the proposed landfall to locate the low low sand level. When the depth of burial is determined, it will be such that wave action and erosion/deposition processes will not cause problematic stress on the pipes. Should the southern alternative pipeline route be approved, a comparable profiling study would take place. Additional alternative landfall sites for this project were not examined in detail because none of the potential sites upon first level screening offered lower environmental impacts. Also the area available for landfall was limited by Vandenverg AFB activities.

EPA-41 The impacts of groundwater withdrawals due to normal operations have been changed to Class II.

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE (FWS)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
LAGUNA NIGUEL FIELD OFFICE
24000 Avila Road
Laguna Niguel, California 92677

May 7, 1985

Memorandum

To: Regional Director, Minerals Management Service
Pacific OCS Region, Los Angeles, CA
Attention: Donna Brewer

From: Project Leader, Laguna Niguel, CA

Subject: Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Draft EIS/EIR

The Fish and Wildlife Service (Service) has reviewed the draft EIS/EIR for the Union Oil Project/Exxon Project Shamrock and the Central Santa Maria Basin Area Study, commonly referred to as the Point Pedernales Project. We offer the following Ecological Services' comments.

2.5.2

FWS-1

Overall, we found the draft EIS/EIR to be comprehensive with good descriptions of the environment, impacts, and mitigation measures. Of the three alternatives presented, we can only endorse the mitigative realignment alternative which comes ashore at the old town of Surf and continues to Union Sugar Avenue before turning north to cross the Santa Ynez River at the Floradale Avenue bridge. This route is preferred since it avoids impacting the wetlands of the Santa Ynez River estuary and minimizes impacts to the Burton Mesa chaparral and portions of the coastal oak woodlands. In the event of an oil spill and/or sour gas leak, the likelihood of affecting riparian and estuarine fish and wildlife is significantly reduced, due to the pipeline setback from most of these sensitive habitats. This is particularly important for the breeding and foraging habitats of the federally endangered California least tern. This pipeline route can be further improved by shifting the line to the already disturbed habitat of a firebreak along the eastern boundary of Vandenberg Air Force Base north of the Santa Lucia Canyon area, rather than establishing a new route through the Burton Mesa chaparral.

FWS-2

The number of check and block valves proposed for the pipelines are inadequate. We suggest the placement of block valves at the landfall in Surf, on both sides of the Santa Ynez River and San Antonio Creek, and on the north side of Harris Canyon Creek. In addition, check valves are needed to protect the Bishop Pine Forest and the pipeline crossings at Davis and Graciosa Creeks and other minor stream crossings in the project area.

FWS-3

Associated with the valves, an onshore oil spill contingency plan must be developed on a site specific basis for all stream crossings, wetlands, and designated environmentally sensitive habitats in the pipeline right-of-way. These contingency plans should contain lists of stockpiled cleanup equipment and trained personnel, plans for their deployment, and the construction of containment dikes and ponds between valve stations which are capable of retaining the maximum oil and formation waterflows within the particular pipeline segment. These dikes and ponds should be located outside of sensitive biological areas.

FWS-4

An additional mitigation measure that should be included is a revegetation plan which includes: replacement of any live oak trees cut down on a four to one ratio; collection of seed stock of the native vegetation to be used in replanting of the pipeline routes; if necessary, a nursery to provide plant stock for revegetation of the chaparral and woodlands impacted along the pipeline route and at the Lompoc Dehydration Plant and Orcutt Pump Station; and a schedule for revegetation work and a monitoring plan to assure the success of revegetation efforts. The Service would like the opportunity to review the revegetation plan prior to construction.

FWS-5

We suggest that an independent biological team should do the monitoring of proposed mitigation measures. This team should also flag all sensitive areas in the pipeline corridor prior to construction in order to avoid unnecessary impacts to fish and wildlife resources.

If you should have any questions, please contact John Wolfe or me at FTS 796-4270.

Nancy Kaufman

cc: EPA, Reg. IX, San Francisco, CA
NMFS, Terminal Island, CA
USAF, Vandenberg AFB, CA
CDFG, MRR, Long Beach, CA
CDFG, Reg. 5, Long Beach, CA
Co. of Santa Barbara, CA (Attn: Janice S. Yonekura)

RESPONSES TO FISH AND WILDLIFE COMMENTS

FWS-1 Comment noted. Additional information on the southern and northern mitigated pipeline routes are contained in Section X of this Response to Comments Document.

FWS-2 The number of block valves associated with both the northern mitigated and southern mitigated pipeline route are sufficient to protect the environment from a major spill. Section X of this Response to Comments Document shows the location of the block/check valves proposed for all the onshore pipelines. For the southern mitigated route, these include a block valve at the valve station either at Surf with the electrical substation, or located at the bottom of the hill just east of Surf and south of Highway 246, a block valve and check valve on either side of the Santa Ynez River crossing. For the pipeline route from Lompoc to Orcutt, Union has committed to block valves on either side of the San Antonio Creek, one valve on the north side of Harris Canyon Creek, and one additional valve prior to the Orcutt Pump Station. Since the Bishop Pine Forest is only at the top of the Purisima Hills, any block or check valves would not serve useful purpose for limiting oil spills into the Forest. The EIS/EIR recommends a check valve on the east side of Davis Creek to prevent oil from draining down into the Creek. The west side is flat terrain and therefore, no valve is needed.

The location for the valves was chosen by the local topography and the spill volumes associated with full line spill between valves. These spill volumes were limited to a size that would prevent damage to sensitive biological habitat such as the Santa Ynez River estuary and San Antonio Creek.

FWS-3 Onshore oil spill contengency plans are required by the County of Santa Barbara for all oil treating and storage facilities. The draft EIS/EIR recommends that the operators be required to develop onshore oil pipeline spill contingency plans. These contingency plans would contain information on spill control equipment, procedures, personnel training and methods of deployment. Any dike or ponds used to contain oil would be detailed in the plans as to their construction and maintenance. Things such as inspection programs as well as revegetation plans would be part of this document. These plans will be available prior to the operation of the pipelines.

FWS-4 & FWS-5 Project-specific mitigations for sensitive plant communities, including Coast Live Oak Woodland and Burton Mesa Chaparral, are included in Section 6.2.1.2 of Technical Appendix F. The need for site-specific revegetation plans and monitoring is discussed in Section 6.2.1.0 of Technical Appendix F.

The Coast Live Oak trees found in Burton Mesa Chaparral grow in an unusual multi-trunked form. It isn't known whether or not these trees are a genetically distinct "race" differing from single-trunked trees found elsewhere. However, the prudent course in re-establishing these trees would be to use saplings grown from locally-obtained acorns, as suggested in Section 6.2.1.2 of Technical Appendix F.

DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS (COE)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2711
LOS ANGELES, CALIFORNIA 90053-2325

May 3, 1985

REPLY TO ATTENTION OF

MINERALS MANAGEMENT SERVICE
PACIFIC OCS REGION
RECEIVED
MAY 7 1985
Leasing and Enviro
LOS ANG

Office of the Chief
Environmental Resources Branch

Ms. Donna Brewer
Minerals Management Service
Pacific OCS Region
1340 W. Sixth Street
Los Angeles, California 90017

COE-1

Dear Ms. Brewer:

The Los Angeles District, U. S. Army Corps of Engineers has reviewed the joint Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study.

Our review of the EIS/EIR indicates that the proposed action and several of the alternatives would involve construction of facilities on Vandenberg Air Force Base. The Corps is the issuing agency for rights-of-entry and easements at Vandenberg; however, we can act only by directive from the Air Force. It is our understanding that negotiations with the Air Force are in progress regarding the authorization of an oil pipeline crossing and associated facilities at Vandenberg. The lead agencies or project proponents are not required to contact the Corps directly concerning rights-of-entry or easements.

2.6.2

The proposed pipelines leading from the outer continental shelf to shore will involve work in navigable waters, thereby requiring a Corps permit pursuant to Section 10 of the River and Harbor Act of 1899.

The proposed oil and gas platforms and onshore pipeline crossings (i.e., those crossings not involving navigable waters and their adjacent wetlands) are authorized under nationwide permits 33 CFR 330.5(a)(8) and (12), respectively, provided that the nationwide permittee complies with the special conditions found in 33 CFR 330.5(b). Please note that these special conditions require that the activity authorized under this nationwide permit will not jeopardize a threatened or endangered species as identified under the Endangered Species Act. Thus, it is imperative that the nationwide permittee comply with any requirements developed by the U. S. Fish and Wildlife Service during the Section 7 consultation process anticipated for this particular project in order for the nationwide permit to be considered valid. A determination by the project proponent that the requirements of the Section 7 consultation cannot be met will result in the need to apply for an individual permit to authorize the subject activity; however, you are reminded that processing of any individual permit application is also subject to the requirements of the Endangered Species Act.

In order to expedite the Corps permit process, it is suggestd that application for the Corps permit not be filed until the Record of Decision for the EIS/EIR is signed. Application for a permit at that time will ensure that the majority of issues or concerns regarding this project have been resolved, clearing the path for a rapid processing of the Corps permit application. If you have any questions regarding this matter, please contact Mr. Cliff Rader, Regulatory Branch, at (213) 688-5606.

Thank you for the opportunity to review and comment on this document.

Sincerely,

for Carl F. Enson
Chief, Planning Division

RESPONSES TO THE ARMY, CORPS OF ENGINEERS

COE-1 Comments noted. The Section 7 consultation process has been initiated and the Applicant has been involved along with the Agencies and consultant in carrying out the consultation.

III. COMMENTS SUBMITTED BY STATE AGENCIES AND RESPONSES

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION (OHP)

STATE OF CALIFORNIA—THE RESOURCES AGENCY
GEORGE DEUKMEJIAN, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
POST OFFICE BOX 2390
SACRAMENTO, CALIFORNIA 95811

RECEIVED
COUNTY OF SANTA BARBARA
APR 22 1985
RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

15 April 1985

ref: MMS 840626 A

Janice Yonekura,
Project Manager
Santa Barbara County Resource Management Dept.
123 East Anapamu Street
Santa Barbara, CA 93101

re: UNION OIL/EXXON SHAMROCK & CENTRAL SANTA MARIA BASIN PROJECT

Dear Ms. Yonekura:

We have received and read that materials you sent on the cultural resources analysis conducted for the project noted above.

You should be aware that because the proposed project will in part be conducted under the auspices of the Minerals Management Service, it must be considered as a "Federal Undertaking", as defined in 36 CFR 800.2(c). This requires that each archaeological property potentially subject to project or use related damage must be evaluated for possible listing in the National Register of Historic Places. Your determinations of significance and of effect to these properties should be sent to our office for review and concurrence before any final decisions regarding the project are made. OHP-1

3.1.2

According to the documentation sent us, it seems eleven prehistoric and ethnographic archaeological sites are within the project's impact area. The narrow gauge bed of the Pacific Coast Railroad is also within the proposed right of way. Included among offshore resources are four electronic anomolies located between the surf zone and about 250' depth. Three of these are suspected to be shipwrecks, otherwise unidentified. The historic Meherin Wharf, presumably located somewhere within the surf zone, has not been relocated. OHP-2

We understand that each proposed route has been given at least a cursory study. These will be resurveyed in more detail when a preferred route is decided upon. At that time additional study, including subsurface testing as needed, will be authorized. Cultural resources which prove to be significant will be avoided if possible, eliminating the need for mitigating measures. OHP-3

The major drawback with the information sent us is that it contained no maps or other illustrations depicting the project area relative to the potential area of impact. It would be useful to know where archaeological and historical resources are located in proximity to the project area. OHP-4

The next step in complying with Section 106 of the National Historic Preservation Act is to determine the significance (National Register eligibility) of each cultural property which may be effected by the project. Your determination, along with the supporting documemtation in the form of an archaeological report, should be submitted to us for review. OHP-5

If you have any questions, please call Nicholas Del Cioppo, State Archaeologist II, at (916) 322-4419.

Sincerely,

Kathryn Gualtieri

Kathryn Gualtieri
State Historic Preservation Officer

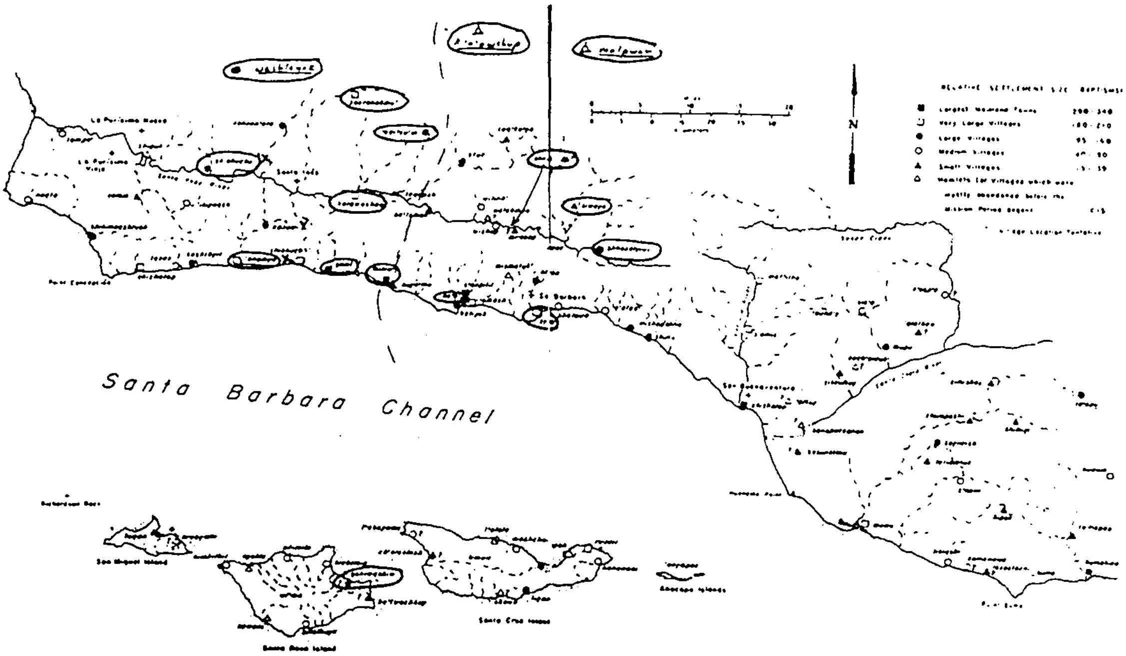

Figure 2. Chumash Settlements of the Channel Islands and Central Mainland Region

RESPONSES TO OFFICE OF HISTORIC PRESERVATION

OHP-1 In accordance with NEPA and CEQA, the EIS/EIR includes discussions of the cultural resources that may be affected in nearshore and onshore areas and potential measures to mitigate impacts on those resources. The EIS/EIR contains adequate representations of the cultural resources in the Project Area and the likely project-related effects on them. Thus, NEPA and CEQA are satisfied with respect to identifying project-related impacts on cultural resources and evaluating potential mitigation measures.

The issue of MMS consultations with the SHPO under section 106 of the National Historic Preservation Act (NHPA) regarding the effects of the project on resources listed or eligible for listing in the National Register is independent of the NEPA compliance process. The EIS/EIR assumes, for the purposes of impact assessment, that all cultural resources in the Project Area are "significant" under NEPA and that some resources will be adversely affected by certain aspects of the project.

Several authorities including the State of California, the County of Santa Barbara, and the Vandenberg AFB regulate installation and operation of onshore facilities associated with this project. Their requirements (CEQA for theformer two and NHPA for the latter) provide that potentially affected resources be evaluated prior to proceeding with the action and that appropriate mitigation will be developed in consultation with the SHPO. MMS has completed consultation under NHPA for the offshore portion of the project, the area within the scope of its responsibilities and jurisdiction.

In accordance with section 304 of the NHPA and section 9(a) of the Archaeological Resources Protection Act. MMS has withheld from the EIS/EIR the site-specific locations of the identified cultural resources. MMS determined that disclosure would create a risk of harm to the resources.

OHP-2 Comment noted.

OHP-3 Comment noted.

OHP-4 Site records and maps, which are proprietary information, have been forwarded to the OHP by the County of Santa Barbara.

OHP-5 See comment, OHP-1.

THE RESOURCES AGENCY OF CALIFORNIA (RA)

Resources Building
1416 Ninth Street
95814

(916) 445-5656

Department of Conservation
Department of Fish and Game
Department of Forestry
Department of Boating and Waterways
Department of Parks and Recreation
Department of Water Resources
California Conservation Corps

GEORGE DEUKMEJIAN
GOVERNOR OF
CALIFORNIA

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

Air Resources Board
California Coastal Commission
California Waste Management Board
Colorado River Board
Energy Resources Conservation
and Development Commission
San Francisco Bay Conservation
and Development Commission
State Coastal Conservancy
State Lands Commission
State Reclamation Board
State Water Resources Control
Board
Regional Water Quality
Control Boards

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COUNTY OF SANTA BARBARA

MAY 06 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Janice S. Yonekura
County of Santa Barbara
1226 Anacapa Street, Suite 4
Santa Barbara, CA 93101

Dear Ms. Yonekura:

The Resources Agency has reviewed the Draft EIR/EIS for the Exxon Project Shamrock/Union Platform Irene and Central Santa Maria Basin Study. This review was coordinated with the Departments of Conservation, Fish and Game, Parks and Recreation, Boating and Waterways and Water Resources.

3.2.2

The Department of Conservation comments on the possible need to establish field rules by the MMS to cover Drilling Order exceptions and on Division of Oil and Gas jurisdiction over possible on-shore injection wells. The Department also has comments on the adequacy of geologic information.

The Department of Fish and Game has extensive comments on the project, including concern over fisheries impacts, drill mud impacts, pipeline routing and mitigations, oil spills, and endangered species impacts.

Comments from the Department of Parks and Recreation note concerns with archeological sites near La Purisima Mission.

The Department of Water Resources presents a list of general guidelines to protect and monitor water resources.

Complete copies of all comment letters are attached. No other Resources Agency departments commented on the project. If you have any questions on our comments, please contact Dennis O'Bryant at (916) 322-5873.

Sincerely

Diane E. Shell

Diane E. Shell
Resources Agency OCS Coordinator

Enclosures

cc: Gordon Duffy, Secretary for Environmental Affairs
Dr. Gordon Snow, Assistant Secretary for Resources
Department of Conservation
Department of Fish & Game
Department of Parks & Recreation
Department of Water Resources

California

THE RESOURCES AGENCY OF CALIFORNIA

Memorandum

To : Dr. Gordon F. Snow
Assistant Secretary for Resources

Janice S. Yonekura
County of Santa Barbara
1226 Anacapa Street, Suite 4
Santa Barbara, CA 93101

Date : APR 23 1985

Subject: SCH #84062703 Union Oil Project/Exxon Proje Shamrock and Central Santa Maria Basin Area Study DEIR

From : Department of Conservation—Office of the Director

The Department of Conservation has reviewed the Draft EIR for the Proposed Union Oil Platform Irene and Exxon's Platform Shamrock Project. In a letter dated November 24, 1984, we submitted comments in response to the Exxon project. Since the DEIR now includes Union Oil's Platform Irene Project, our comments are applicable to both projects. We have reviewed the document for both geologic and technical drilling issues.

Drilling Issues

RA-1

3.2.3

Proposed casing programs may require an exception to OCS Drilling Order 2 because Exxon may request to use driven conductors at 300 feet in lieu of driven conductors at 98 feet and a second conductor between 300 to 500 feet. If sufficient geological and engineering information is available from past drilling to warrant such a change, field rules may be established by the MMS that would permit the drilling of development wells in accordance with the proposal. This procedure is similar to the State's field-rule procedure; therefore, our Division of Oil and Gas does not anticipate any problems if the available information indicates that abnormal conditions are not present.

RA-2

Water produced in conjunction with oil and gas will be separated on the platform and discharged into the ocean. Water disposal will be in conformance with the applicable NPDES permit. However, possible injection of produced water and refinery effluent is mentioned as a mitigation measure if ocean discharge becomes an unacceptable method of disposal. Therefore, the Division would become involved in waste-disposal operations if Exxon and/or Union decides in the future to use injection wells at onshore locations.

RA-3

Land subsidence does not appear to present a problem since it is reported that the producing zones are comprised of well indurated shales of the Monterey formation. Porosity in the Monterey is a result of fractures; therefore it is unlikely that compaction of the producing zone will occur. In addition, the folded nature of the producing beds and the resulting structural rigidity provide further reason to believe that land subsidence will not present a problem.

RA-4

As in the review of other documents, the Division has not had access to proprietary information furnished to the MMS and is therefore unable to provide a thorough geologic or engineering evaluation; we are confident, however, that development drilling and procedures will be carried out in accordance with OCS Orders.

Geologic Issues

RA-5

The EIS/EIR has adequately addressed pertinent geotechnical issues relative to preliminary design considerations. However, as noted in the EIS/EIR, detailed site-specific studies to determine final seismic design parameters have not yet been conducted. We recommend that when finalized, this information be made available for review and evaluation prior to final approval of the project.

If you have any questions, please contact me at (916) 322-5873.

Dennis J. O'Bryant

Dennis J. O'Bryant
Environmental Program Coordinator

cc: K. Henderson, Division of Oil and Gas, Santa Maria
R. Reid, Division of Oil and Gas, Sacramento
R. Streitz, Division of Mines and Geology, Sacramento
L. Jones, Division of Mines and Geology, Sacramento

0343C1

State of California The Resources Agency

Memorandum

To : Dennis O'Bryant
Environmental Coordinator
Department of Conservation
1416 Ninth Street, 13th Floor
Sacramento, CA 95814

Date April 26, 1985

From : Department of Fish and Game

Subject :

Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study Draft EIS/EIR. Offshore OCS and Santa Barbara County, SCH 84062703.

We have reviewed the Draft EIS/EIR and pertinent technical appendices for constructing two offshore platforms, onshore processing facilities and associated pipelines to produce, process and transport oil and gas. We also reviewed an area-wide study for the central Santa Maria Basin designed to assess cumulative impacts as a result of the site-specific development plan and the probable development plan for the basin. The document also describes alternatives for the development of the Union and Exxon projects.

RA-6

3.2.4 The proposed project would install: (a) two platforms, one by Union (platform Irene) in OCS P-0441 and one by Exxon (platform Shamrock) in OCS P-0440; (b) pipelines (oil, gas and power) from Exxon to Union and from Union to onshore processing facilities; (c) a power line from Surf to platform Irene; (d) a new oil and gas separating facility north of the City of Lompoc; and (e) would modify Union's existing Santa Maria Refinery. In addition to the proposed project, the document describes pipeline alternatives for: 1) the transportation of oil and gas from platform Shamrock to either platform Irene (Lompoc Option) or to pipeline facilities in the Point Arguello offshore area (Gaviota Option); 2) the transportation of oil, gas and produced water either to or from platform Irene to a Lompoc oil and gas separating facility; and 3) the location of the Lompoc oil and gas separating facility.

Included in the DEIR/EIS is a description of the anticipated total development of the central Santa Maria Basin Area. This calls for the installation of four additional platforms with oil and gas pipelines to either platform Irene or Shamrock or to other proposed platforms outside the central basin area. The document discusses and evaluates the cumulative impacts of the proposed total development.

The existing environmental conditions for Union Oil's proposed platform Irene, associated pipelines and onshore processing facilities are adequately described. The description for Exxon's platform site is somewhat generalized because the originally proposed site was abandoned and a new site chosen without completing a specific survey. Nevertheless, the description of

existing environmental conditions is adequate. In addition to project specific information, the document presents existing conditions in the central Santa Maria Basin area.

RA-7

The Department has concerns with respect to the following areas which may be impacted by the proposed projects and total basin development: These are 1) commercial fishing activities, 2) marine resources, 3) terrestrial habitats and resources, and 4) endangered species. Impacts could result from: 1) interference with fishing operations from platform and pipeline placement and from supply and crew vessel travel routes, 2) ocean disposal of drill muds and formation water, 3) oil spills, 4) onshore pipeline routes and construction activities, and 5) onshore processing facilities.

RA-8

The documented representation of both project-specific impacts and cumulative impacts of area-wide development include discussions of our concerns and are adequately portrayed. Mitigation measures for both scenarios were developed and if implemented would substantially reduce site-specific impacts and could reduce effects on the central basin development.

RA-9

Impacts to commercial fishing activities from the proposed project (two platforms and associated pipelines) are adequately described in section 5.10 of the document. Construction impacts could be significant; however, they will be short-term, with the exception of the permanent loss of fishing area from platform site. The potential for long-term significant loss could occur if there are major alterations to trawling grounds from pipeline placement and platform construction. These types of impacts can be mitigated by requiring post-construction surveys of pipeline and platform areas to identify and correct construction-caused impediments. Crew and supply vessel operations, from Ellwood and Port Hueneme, respectively, could also interfere with commercial fishing activities, especially drift and set gill net operations. This potential impact could be alleviated by imposing traffic corridors for crew and supply vessels. Increased crew vessel operations from Ellwood could also increase existing impacts to the kelp bed offshore of Ellwood. To prevent this loss a vessel corridor for use by all oil and gas support (crew and supply) vessels should be established through the kelp area.

RA-10

Cumulative impacts to commercial fishing activity and kelp beds would result from the increase in platform and pipeline construction and operation as well as crew and supply vessel operations. As outlined in Section 6.10.1.1, phased development of the central Santa Maria Basin and the OCS region within Ventura, Santa Barbara and San Luis Obispo counties could preclude overlapping pre-emption of fishing grounds. It could also reduce the frequency of crew and supply vessels operating through fishing grounds and kelp beds.

RA-11

The DEIS/EIR identifies mitigation measures (Tables 5.10.1-1 and 5.10.1-2) similar to those outlined above and others, which if implemented, could reduce potential project-specific, and area-wide impacts to commercial fishing and kelp beds. We recommend that these measures be included in permits issued for the proposed and subsequent projects.

RA-12

Impacts to marine resources and water quality could result from the discharge of drill muds, produced water, refinery discharges and oil spills. The DEIS/EIR discusses these impacts for both the project site and study area as well as for regional OCS development and production. If implemented, proposed measures could reduce impact at all levels.

RA-13

Spent drilling fluids will be discharged from each platform and produced water from the Lompoc dehydration facility will be discharged from platform Irene. The document portrays these discharges and potential impacts for both the project specific proposal and the potential area and region wide development and production operations. Some drilling fluids, based upon information currently available to the Department, may be acutely and chronically toxic to pelagic and benthic marine organisms. This may also be the case for produced waters. Because of the potential impact to marine resources from these discharges, we recommend that the mitigation measures outlined in the DEIS/EIR, Section 5.4.5., and Technical Appendix D be implemented. The Department would welcome the opportunity to work with the Environmental Protection Agency in developing a monitoring program and requirements for discharges from platform sites. We will have a direct input with the Regional Water Quality Control Board for discharge permits within State waters.

3.2.5

RA-14

With respect to impacts resulting from an oil spill, we note that an oil spill response and cleanup plan has been developed by Union and Exxon which appears to provide adequate response times and cleanup actions to protect marine resources and habitats. In this regard we also recommend that a permanent oiled-bird treatment center, under the direction of the Department, be established. Funding for the operation and maintenance of such a center should be provided as a part of this and other oil developments within the Santa Maria Basin OCS. The Department would be available to work with the oil and gas industry to implement the establishment of such a center.

The following comments address issues related to the inland portion of the project.

RA-15

1. Onshore Pipeline Route from landfall south of the mouth of Santa Ynez River to the dehydration facility: We do not concur with the proposed route that runs south of the Santa Ynez River because its path directly cuts through the Santa Ynez River estuary, nor with the alternative route north of the Santa Ynez River which has the potential of oil reaching the Santa Ynez River estuary. Another alternative, which is a

variation of the southern route with mitigative realignments as shown in dotted lines in Fig. 3.2-1, would substantially reduce impacts to sensitive terrestrial and freshwater habitats as well as minimizing the potential for oil reaching the Santa Ynez River estuary. Department wildlife biologist Jim Davis discussed this alternative in the on-site meeting on April 18, 1985 with the County staff, and we recommend that this alternative be thoroughly evaluated. Some of the potential negative impacts that should be taken into consideration, before this route can be accepted as the preferred alternative, are the following: (i) The pipeline will initially carry 84,000 gallons of oil per minute but would eventually carry 420,000 gallons of oil per minute. Rupture of this pipeline under the worst case scenario would not be contained and could result in adverse biological impacts to wetlands and wildlife for an extended period of time. Thus, spanning or drilling of the pipeline crossing the Santa Ynez River at Floradale Avenue should be given full consideration, (ii) placement of pipeline in the floodplain would call for examination for potential rupture due to high flows and scour, and (iii) risk of upset from landslide on the slope to the east of the landfall at the mouth of the Santa Ynez River.

RA-16

2. Revegetation of the pipeline route: Impacts to specialized habitats such as coastal beach and sand dune, riparian wetland, Bishop pine forest, oak woodland, and Burton mesa chaparral will require highly specialized revegetation techniques and subsequent monitoring. The selection of the southern route with mitigative realigments will considerably reduce these impacts when combined with methods outlined in the mitigation section. We recommend that all of these measures be carried out under the supervision of a trained biologist to ensure compliance with the specialized revegetation plans.

RA-17

3. Mitigation Measures: The 20,000 barrel per day start up could increase to 100,000 barrels per day in the future. Certain mitigation proposals seem based upon the startup production figures and these should be revised to offset the project's future increases. Also, the proposed Cumulative Mitigation Section reiterates material contained in several other oil and gas related documents we have reviewed in the past. The need to implement various programs mentioned therein is strong and immediate. We urge strong support for implementation of all such measures at the County level and express our continued support of those measures at the State level. We shall be glad to work in co-operation with the County of Santa Barbara and the oil industry to achieve speedy implementation of such programs.

RA-18

4. Endangered Species: We recommend that specific discussions be initiated with the Department of Fish and Game for the following State-listed rare or endangered species likely to be impacted by the Union Oil Pipeline project:

Plants: Cordylanthus rigidus ssp littoralis - State Endangered
(Seaside bird's-beak)
Eriodictyon capitatum (Lompoc yerba santa) - State Rare

Fish: Gasterosteus aculeatus williamsoni - State Endangered
(Unarmored threespine stickleback)

Birds: Pelecanus occidentalis californicus - State Endangered
(California Brown Pelican)

Falco peregrinus anatum - State Endangered
(American Peregrine Falcon)

Sterna albifrons browni
(California Least Tern) - State Endangered

We shall need additional information to determine the subspecies of savannah sparrow (Passerculus sandwichensis beldingi), and to confirm the absence of California black rail (Lateralus jamaicensis coturniculus). Furthermore, construction of the pipeline at the San Antonio Creek crossing should be at a time not only avoiding the rainy season, as stated in the potential mitigation column of Table 5.6-6 on page 5.6-24, but at a time when little or no stream flow is expected. This period on San Antonio Creek usually occurs during late summer and fall at the proposed crossing site. Flow during late spring or early summer may still be considerable and could cause sedimentation and turbidity problems that could adversely affect the endangered unarmored threespine stickleback in the downstream areas. The stickleback would be at the height of their spawning activity during this period and project-induced siltation and turbidity would be very detrimental.

If there are any questions regarding these comments, please contact Rolf Mall for matters dealing with the marine environment or Bruce Eliason for inland matters. Both are located at our Long Beach office, 245 W. Broadway, Suite 350, Long beach CA. 90802. Their phone numbers are (213) 590-5155 and (213) 590-5137 respectively.

Pete Bontadelli
for Jack C. Parnell
Director

3.2.6

State of California — The Resources Agency

Memorandum

To : Don. L. Blubaugh, Director
Department of Conservation
1416 Ninth Street, 13th Floor
Sacramento, CA 95814

Attention: Dennis O'Bryant
Environmental Coordinator

Date : APR 19 1985

File No.:

Subject: Union Oil Project/
Exxon Project
Shamrock and Central
Santa Maria Basin
Area Study
Environmental Impact
Statement and
Environmental Impact
Report
SCH 84062703
SBC 84-EIR-17
SLC-EIR 379

From : Department of Water Resources
Los Angeles, CA 90055

In accordance with your memorandum of November 20, 1984, the Department of Water Resources (DWR) has reviewed the subject projects, consisting of the following volumes:

Volumes 1 and 2, Public Draft; Technical Appendix K, Socioeconomics, Volumes 1 and 2; Technical Appendix A, Geology; Technical Appendix C, Onshore Water; and Technical Appendix F, Terrestrial and Freshwater Biology.

The report, dated March 18, 1985, was prepared for the County of Santa Barbara, U. S. Minerals Management Service, California State Lands Commission, and California Office of offshore Development.

Involved are the development of the Point Pedernales Oil and Gas Field, which is located in Federal waters about 3 to 5 miles west of Point Pedernales in the central Santa Maria Basin offshore Santa Barbara County, and the related processing of produced oil at facilities proposed near Lompoc, also in Santa Barbara County. Exploratory drilling extends under OCS-P 0440, -P 0441, -P 0438, and -P 0437. The Minerals Management Service has determined that the Point Pedernales Field will be developed as a unit.

The initial development of Point Pedernales Field will be carried out by Union Oil Company of California (Union Oil) and Exxon Company, U.S.A. (Exxon).

Union Oil

Union Oil, along with Gulf Oil Corporation and Superior Oil Company, acquired the exclusive right to explore, develop, and produce oil and gas reserves on Lease OCS-P 0441 as the result of OCS Lease Sale No. 53. This lease is located approximately 3 miles west of Point Pedernales. Union Oil has filed a Development and Production Plan (DPP) to develop Lease OCS-P 0441 and is proposing to ship the oil and gas production to a new onshore oil processing facility north of the City of Lompoc. The dry oil will then be shipped, via new and existing pipelines, to Union Oil's Santa Maria Refinery for processing. The gas will go via existing pipelines to Union Oil's Battles Gas Plant for processing.

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Department of Conservation
APR 24 1985

The main elements and appurtenances of the Union Oil project are summarized as follows:

- Platform Irene, a 72-slot drilling and production platform on Lease OCS-P 0441, will be a steel-jacketed platform standing in 243 feet of water. Gas and wet oil will be separated on the platform and sent to shore in separate pipelines. Produced water returned to Platform Irene by pipeline from the onshore dehydration facilities will be discharged back into the ocean.

Exxon

Exxon acquired the exclusive right to explore, develop, and produce oil and gas reserves on Leases OCS-P 0440 and -P 0438, which are also located just west of Point Pedernales. Exxon has filed DDP to develop these two leases, as well as -P 0437, which is owned by the Atlantic Richfield Company (ARCO), AMOCO, Elf, Champlin, and Aminoil. Exxon has not yet submitted an application to the county to cover the onshore portion of its project.

The main elements and appurtenances of Exxon's project are summarized as follows:

- The Project Shamrock platform, a 60-slot production and drilling facility on Lease OCS-P 0440, will be a steel-jacketed platform and stand in 277 feet of water. Wet oil and gas will be separated on the Project Shamrock platform, with the wet oil being sent by pipeline to Platform Irene and the gas compressed and reinjected into the oil reservoir until the year 2000, at which time the gas will be recovered.

3.2.7

Proposed Schedule Development

Peak production is estimated to be 20,000 barrels per day of oil and 13 million standard cubic feet per day (MMscfd) of gas from Platform Irene and 20,000 barrels per day of oil from the Project Shamrock platform. Because of the anticipated future development of the Central Santa Maria Basin, Union Oil is designing the pipelines from Platform Irene to the proposed Lompoc oil and gas separation facility for a peak capacity of 100,000 barrels per day of wet oil and 80 MMscfd of gas.

The construction phase for all the facilities proposed is scheduled to begin in late 1985. Platform Irene and the Project Shamrock platform and the subsea pipelines are proposed for installation in late 1985 through early 1986. The proposed Lompoc oil processing facility will be constructed beginning the last quarter of 1985 and should be complete by early 1986. Offshore drilling operations are proposed to begin in early 1986 and would extend through 1990. Production operations are anticipated to last 20-25 years.

DWR's Comments

The projects described in this report are similar to pending projects of ARCO, Shell, Chevron, Texaco, and others already reviewed by DWR for the same general area. Consequently, our comments are as follows:

RA-19

The State is concerned about the potential danger of contamination of the offshore and inland ground and surface water resources in the large area where oil and gas will be extracted, conveyed, and processed during the exploration and leases granted to these companies.

Strict and special measures must be taken among all companies to prevent the occurrence of accidents and damage to the environment due to their cumulative actions.

Consequently, we recommend the following general guidelines to protect and monitor the subsurface and surface water resources under the jurisdiction of the State, cities, and counties that will be affected by these projects:

1. In case of leaks of oil and other noxious substances, they must immediately be stored and contained within a safe location until rendered harmless.

2. Oil must be stored in a place designed to withstand earthquakes, floods, fires, and other natural disasters.

3. Adequate plans must be prepared in advance to deal with a disaster, natural or human.

4. Funds must be made available to deal with any spillage caused by natural or human events.

5. Records must be kept of all significant events. These records must be made available upon request.

6. Adequate hydrologic and geologic data on the surface and subsurface areas must be furnished by the applicant.

7. Design and construction of storage facilities must be under the supervision of a registered Civil Engineer.

For further information, you may wish to contact John Pariewski at 213-620-3951.

Sincerely,

Jerry Lederman for

Robert Y. D. Chun, Chief
Planning Branch
Southern District

State of California The Resources Agency of California

Memorandum

Date : April 22, 1985

To : Dennis O'Bryant
Environmental Coordinator
Department of Conservation

From : Department of Parks and Recreation

Subject: Union Oil Project/Exxon Project Shamrock and
Central Santa Maria Basin Study EIS/EIR
SCH #84062703

RA-20

The Department of Parks and Recreation has reviewed the subject document. We are pleased to see that the proposed alignment for the pipeline does not traverse La Purisima Mission State Historic Park or lie within the drainage upstream in Purisima Canyon.

Archeological sites associated with La Purisima Mission, but lying outside of the boundaries of the State Historic Park, are of extreme concern to us. The proposal to include this Department with other interested parties in the design of archeological mitigation programs is particularly welcome.

Our contact for this project is the supervisor, Environmental Review Section, P.O. Box 2390, Sacramento, CA 95811, telephone (916) 324-6421.

3.2.8

James M. Doyle, Assistant Chief
Resource Protection Division

cc: Garth Tanner
Central Coast Region
La Purisima Mission District
Gaviota District
Office of Historic Preservation
Cultural Heritage Section

JMD:BPorter:mb

RESPONSES TO RESOURCES AGENCY OF CALIFORNIA

RA-1 Comment noted.

RA-2 Comment noted. This will be added to the document that the Department of Conservation would be involved in any waste water reinjection program.

RA-3 Comment noted.

RA-4 Comment noted.

RA-5 Site-specific studies to determine appropriate seismic design parameters are required by MMS for offshore platforms as part of the Platform Verification Program, and would be conducted for each new platform proposed. MMS reviews these studies, as well as platform designs based on results of seismic design studies, as part of its oversight role with respect to offshore development.

RA-6 Comment noted.

RA-7 Comment Noted.

RA-8 Comment Noted.

RA-9 Comment Noted.

RA-10 Comment Noted.

RA-11 Comment Noted.

RA-12 Comment noted.

RA-13 Comments noted, especially the offer to assist in the development of a monitoring program. The third sentence of this comment implies acutely toxic drilling muds could be used at the platforms. The existing regulations, if followed, should clearly eliminate the use of such muds; there do remain concerns, however, about chronic toxicity.

RA-14 Comment noted.

RA-15 Both the Southern Mitigated Pipeline Route (presented as the Mitigating Realignment in Section 6.2.1.1 of Technical Appendix F) and the Northern Mitigated Pipeline Route (presented as a mitigation measure by Union Oil Company) have been evaluated at the same level of detail as the original proposed and alternate pipeline routes. Existing conditions, impacts and mitigations for the Southern and Northern Mitigated Pipeline routes are presented in Section X, Supplemental Information.

RA-16 Comment noted. The monitoring of revegetation efforts by a trained local biologist is a condition that will be considered and could be required by the Santa Barbara County Board of Supervisors during their public review of the project.

RA-17 Mitigation of oil spill impacts, including those anticipated from maximum Union Oil project production (20,000 barrels per day) and maximum Area Study production (100,000 barrels per day) is discussed in Section X, Supplemental Information. This information also contains a brief discussion of new minor realignment on the Northern Route that was agreed to by Union Oil and U.S. Fish and Wildlife.

A statement indicating the willingness of the California Department of Fish and Game to work in co-operation with the County of Santa Barbara and the oil industry in implementing mitigations for cumulative effects has been added to Section 7.0 of Technical Appendix F.

RA-18 Part I: Information on these species is provided in Technical Appendix F, Additions to Technical Appendix F (Section 11) and Supplemental Information (Section X). The 1984 amendments to the California Endangered Species Act (AB 3309) require that consultation take place between the California Department of Fish and Game and the state lead agency (Article 4, Section 2090). The lead agency for the Union Oil project is the County of Santa Barbara. Santa Barbara County has been in communication with the Department of Fish and Game.

Part II: Additional information on the status of the Savannah Sparrow and California Black Rail is found in Section XI, Additions to Technical Appendix F.

Part III: Comment noted. These factors were considered in developing the revised mitigation strategy discussed in Section X. Supplemental Information, under Southern Mitigated Pipeline Route. There is also a discussion of a new minor realignment on the Northern Route to further reduce the potential for impacts to the Santa Ynez estuary. This realignment was agreed to by U.S. Fish and Wildlife and Union Oil.

RA-19 It is recommended that an oil spill contingency plan be prepared for all onshore facilities, and approved by permitting agencies prior to operational use of the facilities. The points outlined here constitute useful guidelines for such a plan and for facility design which would minimize spill impacts.

RA-20 Comment noted.

CALIFORNIA COASTAL COMMISSION (CC)

State of California, George Deukmejian, *Governor*

California Coastal Commission
631 Howard Street, 4th Floor
San Francisco, California 94105
(415) 543-8555

Janice S. Yonekura
County of Santa Barbara
1226 Anacapa St., Suite 4
Santa Barbara, CA 93101

Dear Ms. Yonekura:

The following are Coastal Commission's comments on the Draft EIR/EIS for the Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study.

CC-1 This paragraph needs to be expanded to state that the policies of the Coastal Act of 1976 as amended would be in effect for the original permit jurisdiction area (mean high tide to 3 miles).

CC-2 The Exxon project was found consistent by the Coastal Commission on March 12, 1985. Please update this paragraph.

CC-3 Need to update this section by expanding the consistency discussion to include Shamrock status. It was found consistent by the Coastal Commission on March 1, 1985.

CC-4 Under the heading for Eagle Canyon is no longer being considered at this time in their project description. The Getty (Supply/Crew Base) is not being proposed by Texaco at this time.

CC-5 Figure 2.2.1 should be revised to depict the pipeline and power cable corridors.

CC-6 Although the anodes will be designed to eliminate snags, will there be other permanent protrusions on the pipelines or power cables that could cause snagging of fishing gear?

CC-7 Will the pipeline and power cable be located in the same corridor?

CC-8 Figure 2.9-1 should include the lease tracts, proposed platforms and pipelines which comprise the northern and southern Santa Maria Basin Area Study regions.

State of California, George Deukmejian, *Governor*

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CC-9 Include a brief description on the biota encountered during sampling, following the example on Pg. 4.5-10, Canyons, and 4.5-11, Alternate Pipeline Route Between Shamrock Platform and Platform Hermosa. Even though the information is in the appendix, the DEIR/S should include it as part of the description for the preferred alternative.

CC-10 The trolling information should indicate, citing information from DFG, and the fishermen, whether significant amounts of trolling occur in the Area Study tracts.

CC-11 For the gillnetting and swordfishing sections, the consultant should check with the gillnetters, in addition to DFG.

CC-12 This discussion should include information on the Newsletter for Fishermen and Offshore Operators, published monthly by the U.C. Marine Advisor in Santa Barbara. This Newsletter includes advance notice of proposed oil and gas projects throughout central and southern California, fishing patterns and seasons for these areas, and general information regarding oil/fisheries issues.

CC-13 The Coastal Commission imposes conditions designed to minimize impacts on the fishing industry. It has reached agreement with Union and Exxon during review of the DPPs for Platforms Irene and Shamrock on such mitigation measures. In addition to Sections 30231 and 30234, Sections 30230, 30255, 30703, 30001(d), and 30001.5, either directly or indirectly, protect commercial fisheries and related industries. Section 30230 requires protection of areas of special biological and economical significance, and that development sustain biological productivity for commercial and recreational purposes. Sections 30255 and 30703 establish commercial fishing as a priority use of the coastal zone which must be projected in ports and other coastal areas. Implementation of the policies in Sections 30234, 30255, and 30703 are dependent upon the continued productivity of the fisheries resources. Section 30001(d) finds that "economic and social well being of the people of the state" are critical considerations for the Commission. Section 30001.5 requires the Commission to take into consideration "the social and economic needs of the people of the state." Projects that significantly displace fishing activities or harm the marine environment will be inconsistent with Coastal Act policies.

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CC-14 Explain why the construction zone around the Shamrock Platform site is larger than the zones around Irene and the pipelines and power cable to shore routes.

Although the pipelines will be designed, according to federal regulations so that snags to trawlers will be avoided, laying of the pipelines and power cables could displace a portion of the trawl area by creation of anchor furrows and dropped debris. Mitigation measures to lessen or avoid these impacts include pipeline laying techniques which would reduce or eliminate furrows and post-construction surveys which locate and remove the debris. These measures have been agreed to by Exxon and Union for their Pt. Pedernales development and by other companies who are planning offshore developments in the Santa Barbara Channel and southern Santa Maria Basin.

CC-15 An additional measure to limit impacts from Platform Shamrock construction is to adhere to the construction schedule, or if it must be shifted, limit construction to the late spring and summer months, to avoid the peak fishing seasons. Would the rocky reef habitats benefit the trawl and drift gill net fisheries?

Measures to further reduce impacts from the Platforms (Irene and Shamrock) include orienting mooring buoys to minimize interference with the draggers.

CC-16 Installation schedules for Shamrock and Irene are not the same as those listed on Figure 2.8-1. Figure 2.8-1 shows installation of Irene within the last half of 1985, and installation of Shamrock in mid 1986. Figure 6.0-2 shows installation of Irene in the last half of 1986 and installation of Shamrock in the last quarter of 1986. Please clarify.

CC-17 Effects on set gear fishing could also be caused by development at Coal Oil Point, and by development anticipated in projections by the State Lands Commission.

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CC-18 Set gear fisheries will be affected by construction of the pipelines and outfall for the Pt. Arguello unit. According to the EIR/S for that project, approximately 60 percent of the area available to fishermen in DFG blocks 657 and 658 will be excluded. Construction of Platforms Harvest and Hermosa will exclude 11 percent of the area available in the Pt. Arguello Study Region for rockfish and the pipeline from Hermosa to shore will exclude 3 percent of the available area for rockfish. The EIR/S did not quantify impacts on purse seining and trolling but did state that impacts could range from Class I to Class III.

CC-19 The Santa Ynez Unit EIR/S stated that offshore construction would exclude a total of 27 percent of the prawn, rockfish, and halibut trawl areas, and that operation would exclude less than 10 percent.

CC-20 Exclusions from additional development will most likely compound these impacts. The DEIR/S for Pt. Pedernales should include a cumulative impact analysis which quantifies the impacts on the fishermen and the related industries. If the information is not available, it should be developed, consistent with NEPA and CEQA guidelines.

CC-21 The mitigation measures listed in the DEIR/S, such as staggering of construction and the other measures to limit impacts of the individual projects, will reduce the cumulative impacts. But, until the impacts are quantified, the overall impacts of oil and gas development on the commercial fishing industry will not be known.

CC-22 Tables 5.0-5 and 4.1005 in the DEIR/S are identical, thus the text in the DEIR/S should state that Table 4.10-5 does not include trawl catches. This is a major point since those two tables are the only ones which give some idea of recorded catches in the project ar3ea, and the major impacts appear to be on the trawl fisheries. The text on page 12 of the Technical Appendix in fact states that Table 5.0-5 does not include trawl data.

CC-23 Label columns so that it is clear which ones list pounds caught versus dollars earned. The description of the fishing fleets and the maps depicting the trawl areas were especially informative. The major weakness in the DEIR/S documents is the cumulative impact section.

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CC-24 The Coastal Commission's jurisdiction includes any appeals of the Santa Barbara County coastal development permits, including any construction impacts to Ocean Beach County Park. The Commission also has federal consistency jurisdiction on Vandenberg AFB for the portion of the pipelines crossing the base.

CC-25 Since this is an area study for up to six oil platforms, should the cumulative impact analysis onshore include a processing facility with 120,000 B/D capacity (20,000 B/D x 6) rather than the 36,000 B/D capacity proposed?

CC-26 Class II impacts noted in Executive Summary for increased erosion and sediment loading are not noted in appendix on page 1-35. In addition partial mitigation measures listed in Executive Summary should also include revegetation of pipeline route after construction.

CC-27 The EIS/EIR should be revised to reflect the fact that the applicants are not longer proposing to provide onsite oil spill cntainment and clean-up equipment. The new vessel "Mr. Clean III" will be the primary response vessel for this region.

CC-28 Interesting information on degrees of shoreline contamination from various amount of oil(derived from the Ixtoc I oil spill). The author should take into account the different characteristics of the Ixtoc crude which had been weathered for long periods of time prior to shoreline contact.

CC-29 Onsite platform spill response equipment information no longer applies because of the new "Mr. Clean III" vessel.

CC-30 The Commission believes that the limit for effective offshore oil spill response operations is approximately 6 ft. short period seas instead of 6-8. The document should provide or reference documentation on overall equipment performance. Now it makes the simplistic statement that control and removal operation can take place at least 50 percent of the time. This is misleading when compared with the minimal performance of equipment during related moderate sea states where equipment can still be deployed.

CC-31 The writing in the indented portion of the page is a very long way of saying there may be some uncertainties and they have tried to do the best they can.

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CC-32 What kind of tests will Clean Seas and Exxon cnduct on the response vessel?

CC-33 The document recommends that the contingency plans should delineate the equipment performance. Actually it would be better if the EIS/EIR would do this. The contingency plan should be geared more toward actual response actions.

CC-34 In general, the recommendations in the oil spill cntingency section are boiler plate.

CC-35 1. Efficiences of Equipment. To provide a standard analysis of oil spill recovery equipment, the EPA Oil and Hazardous Materials Simulated Environmental Test Tank (OHMSETT) has produced some good information. It provided relative efficiencies of equipment in calm seas produced within the tank and with "rough" 2 foot seas. In dead calm water the skimmers have recovery efficiencies of roughly 50 percent with low viscosity on and slightly higher with medium viscosity oils. In the "rough" 2 foot seas tests the efficiencies are in the 20-30 percent range with low viscosity oils and increase to approximately 40 percent for medium viscosity oils. These efficiencies will naturally decrease as sea conditions get worse. A key factor is the period of the wave act. Short period choppy seas will cause greater reduction in efficiencies that long period swell aciton. Two (2) foot long period swells may have little effect on the efficiency of a (See ccc Report, Page-83).

CC-36 2. Limitations on Use. Six foot seas (relatively short period) have been the limit for safe and useful operations. Once again if we are talking about long period swells wave height could possibly be higher. In seas of six feet the equipment with not much oil even if it can be successfully deployed. (See ccc Report, Page 80-82).

RESPONSES TO CALIFORNIA COASTAL COMMISSION

CC-1 Comment noted. Paragraph has been expanded to state that the policies of the Coastal Act of 1976 as amended would be in effect.

CC-2 Comment noted. Paragraph has been changed.

CC-3 Comment noted. Section has been modified.

CC-4 The Arco Eagle Canyon facility and Getty Supply/Crew Base were still under consideration at the time we conducted the analysis. We will note that the projects are no longer being considered, although we will still include them in the cumulative assessment since it is likely that some variation of these projects will be considered in the future.

CC-5 Figure has been revised.

CC-6 The welds on the pipeline could cause snags, but it is highly unlikely since they are normally sanded down.

CC-7 The power cable and pipeline will be in the same corridor except near the landfall.

CC-8 This figure has been revised.

CC-9 A request was made for inclusion of more descriptions of biological sampling results in the EIS/EIR. These data remain in the Appendix because they are considered of specialized, rather than general interest.

CC-10 The amount of trolling that occurs in the Area Study tracts, and elsewhere, varies with fish movements and market conditions. Based on discussions with CDF&G and fishermen, it is believed that these tracts have no special or relative significance to this type of fishery.

CC-11 Fishermen based in Morro Bay as well as CDF&G representatives were questioned about the gillnetting and swordfish fisheries, and provided confirmatory information.

CC-12 The text on p. 4.10-16 of the EIS/EIR has been expanded to note the existence of the Newsletter for Fishermen and Offshore Operators.

CC-13 P. 4.10-16 has been reworded to note that other sections of the California Coastal Act also are used by the Coastal Commission to minimize impacts on the fishing industry.

CC-14 The construction zone for the Shamrock Platform site is larger than that around Irene and the pipelines to shore because it is in deeper water, requiring greater anchor scope.

CC-15 Limiting Platform Shamrock construction to late spring and summer might minimize impacts to some degree, but based on trawl records for those periods in previous years, this would not appear to be the case. Rocky reef habitats would (and do) benefit rockfish trawlers. It is not clear that they would benefit drift gill-netters.

CC-16 Figure 6.0-2 of the EIS/EIR has been corrected to show installation of Platform Irene in the last half of 1985, not 1986, and Shamrock in mid-1986, not last quarter of 1986.

CC-17 & 18 P. 6.10-1 of the EIS/EIR has been modified to specify that other oil development projects in the cumulative scenario would affect set gear fishing.

CC-19 It is acknowledged that the Santa Ynez Unit EIS/EIR stated that construction and operations would exclude 27 and less than 10 percent, respectively, of the trawl areas covered in that assessment.

CC-20 The EIS/EIR discusses cumulative impacts on fishermen and related industries qualitatively rather than quantitatively because the former type of analysis is considered more informative and defensible given the nature of the industries.

A more quantitative discussion would have to be based on arbitrary assumptions about very detailed future project schedules and market conditions. Therefore, it would almost certainly be inaccurate and misleading.

CC-21 While quantification of overall cumulative impacts may not be particularly helpful (see response CC-21 above), it is suggested that this document's quantification of cumulative impacts at a somewhat more manageable time/geographic scale (e.g., the Area Study included in this EIS/EIR) may provide a good vehicle for accurate enough quantification to develop effective cumulative mitigation measures for the fishing industry.

CC-22 Table 4.10-5 and the text of Technical Appendix J have been modified to make it clear that the block data do not include trawl landings for the most recent years. Impacts were based on projections from previous years data. Fish and Game do not require the data to be collected every year.

CC-23 Correct headings for Table 6.0-1 of Appendix J are specified in Part XI of this Response Document.

CC-24 Comment noted. This will be stated.

CC-25 The Area Study throughput for the onshore oil dehydration facility was analyzed at 100,000 B/D of oil. However, the Area Study offshore is only expected to peak at 67,000 B/D as can be seen in Table 2.9-1. The remaining volume can be used by future state tidewater platforms and other federal leases. See response to CPA-29 through CPA-31.

CC-26 The wording in Technical Appendix C p. 1-35 has been changed to be consistent with the Executive Summary. Revegetation has been added as a mitigation measure for potential impacts of conservation activities. The word "partial" has been deleted from the heading of the fourth column of the table describing Class II impacts, as the mitigation measures described are anticipated to be adequate to reduce impacts to insignificance.

CC-27 Since preparation of the EIR/EIS and of Section 6 and Addendum H of Technical Appendix M, oil companies planning to operate in the region of interest have agreed to purchase a large oil spill response vessel and to station the vessel permanently in the Point Arguello and Point Pedernales Fields. It is understood that the future presence of this state-of-the-art vessel will obviate the need for oil spill containment and cleanup equipment onboard individual platforms, since the new vessel, "Mr. Clean III," will provide a far superior response capability.

CC-28 There is indeed only limited data available to assess the shoreline pollution resulting from oil spills. These data do not take into account the characteristics of the crude and physical processes such as weathering. The Ixtoc I crude had been weathered for nearly three months before it contacted the Texas coastline. The data from this spill correspond to a 80 ton/km for heavy pollution and 18 ton/km for moderate pollution. For the 1969 Santa Barbara spill, the oil concentration on beaches were measured soon after the event. The data indicates an area concentration ranging from 3.4 to 5.6 kg/m^2 with a maximum of 10.6 kg/m^2 at heavily damaged regions. The typical inter-tidal zones range between 8 to 10 m and the above data translate to 27 ton/km to 54 ton/km for typical oil pollution and 85 to 106 ton/km for heavy oil pollution. These estimates appear to be consistent with the Ixtoc I data. Therefore, weathering of crude oil on the sea is expected to have only secondary effects on beach pollution.

CC-29 See response to Comment CC-27.

CC-30 There are several relatively "official" opinions available with respect to the capabilities of modern oil spill containment and recovery equipment, and it is beyond the scope of this EIS/EIR to define which is the better viewpoint. For example, in an enclosure to Commandant Notice 5740 discussing guidelines for the preparation of oil spill contingency plans, the U.S. Coast Guard states "Based on previous R&D studies, observations, and experiences, currently available 'state-of-the-art' equipment is capable of operating in 8-10 foot seas and 20 knot winds with deployment accomplished in the 5-6 foot range. However, the OSC should be aware that mechanical equipment cannot be expected to perform at optimum efficiencies in all environmental situations. Local conditions such as high energy sea states with short wave lengths, or severe icing, may not allow all of the above operational criteria to be met."

With respect to the statement that control and recovery operations can be conducted at least 50 percent of the time, it is noted that data derived from NOAA Buoy EB11 offshore Point Sal for 1981 and 1982* indicate that waves of less than 5.7 feet occur approximately 50 percent of the time. However, the effectiveness of the equipment would be poor as indicated in the discussion presented in Coastal Commission comments CC-35 and CC-36.

CC-31 There are uncertainties in the oil spill trajectory model, as there are in most models of physical phenomena. The intent here was to provide the reader with information on the specific assumptions necessary to apply statistical input data (currents, winds) to obtain a deterministic result. More importantly, it provides a basis for the reader to understand the limitations of such modelling exercises and a sense of the confidence bounds associated with the results.

CC-32 The tests would be expected to be similar to those carried out for those vessels in accordance with Exxon's proposed activities in the Santa Ynez Unit. Their purpose was to ensure the systems were of maximum effectiveness for the spill conditions likely to be encountered. Specific details of the tests have not been made available. The Coast Guard has indicated, however, that testing has been satisfactorily accomplished and that certain modifications have been made to the vessels.

CC-33 The Clean Seas oil spill cooperative has a long and varied list of oil spill containment and recovery devices obtained from numerous manufacturers over the years. We believe it to be important for Clean Seas and oil company personnel to have knowledge and details of the performance limitations of this equipment. These limitations should be specified in contingency plans for quick reference during emergencies to prevent deployment of ineffective equipment. This surely is the responsibility of Clean Seas and its member companies.

CC-34 The recommendations generated during evaluation of Union Oil and Exxon contingency plans and listed on page H.4 of Technical Appendix M, are highly specific to these plans.

CC-35 Comment noted.

CC-36 Comment noted.

* Pacific Weather Analysis, 1982

AIR RESOURCES BOARD

received 5/15/85

State of California

Memorandum

5138

RECEIVED
COUNTY OF SANTA BARBARA

MAY 14 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

To : John Doyle, Chief
Offshore Development

Date : MAY 10 1985

Subject: Comments on Union Oil/Exxon EIR/EIS for Project Shamrock and Central Santa Maria Basin Area

From : James D. Boyd
Executive Officer
Air Resources Board

At your request, we have reviewed the Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study EIS/EIR (hereinafter referred to as "study"). This study assumes that the Union Oil Irene Platform and Exxon Shamrock Platform will be operational at the same time.

Union Oil Company of California and Exxon Company, USA have proposed to develop the Point Pedernales Oil and Gas Fields. These fields lie in federal waters 3 to 5 miles west of Point Pedernales in Santa Barbara County.

3.4.2

Union oil has filed a Development and Production Plan (DPP) to develop the field. It is proposing to ship the oil and gas production to a new onshore oil processing facility north of the City of Lompoc. The dry oil would then be shipped by new and existing pipelines, to Union Oil's Santa Maria Refinery for processing and the gas would be transported to Union Oil's existing Battles Gas Plant for processing.

Exxon has filed a DPP to develop its field. It plans to process the oil at the Lompoc facility and reinject the gas at its platform. Exxon has yet to develop a plan to transport its dry oil out of Lompoc.

Both plaforms will be electrically powered by subsea power cables from a substation at Surf.

Our comments are on the study divided into two sections, "Emissions" and "Modeling."

Comments on Emissions

ARB-1

1. According to the study, construction activities and drilling/production operations are expected to cause violations of the state health-based 1-hour ambient air quality standards for NO_2 and SO_2, and the federal 24-hour standards for SO_2 and TSP. Additionally, the state and federal ozone standards are also expected to be violated. A description of state and federal requirements concerning sources that expect to exceed the standards should have been included with a description of what mitigation measures will be used to prevent these standards from being violated.

ARB-2

2. A description of how the emission sources will comply with the Santa Barbara County Air Pollution Control District's (APCD's) New Source Review (NSR) Rule 409 [Ambient Air Quality Standards and Air Quality Increments - "In no case shall emissions from a source cause a violation of an ambient air quality standards or lead to a violation of an air quality increment,"] should be included.

ARB-3

3. It does not appear that the study has complied with the Santa Barbara County APCD NSR Rule 503, Air Quality Increment Analysis, which requires secondary growth associated with the projects to be included in the determination of the increment consumption. This should be discussed.

ARB-4

4. A description of the federal Reasonable Further Progress requirements should have been included in the study. Also, a description of what measures will be used to comply with these requirements.

ARB-5

5. The study should have included a description of how the project affects the District's Air Quality Management Plan (AQMP). This description should also include what effects these projects have on the plans for attaining standards.

ARB-6

6. The analysis of construction emissions for Platform Irene included emissions from crew boats, deck and module barges, work boats, survey boats, derrick barges, compressors, welding machines, and platform cranes. Such emissions sources were not included in the maximum daily emissions rate in the analysis of air quality impacts caused by the construction of Platform Shamrock. The reason for omitting these emissions should be stated.

ARB-7

7. It is not clear in the study what the net emissions changes are for the Lompoc facility. The emissions before and after the expansion of the facility should have been listed in the study. new facility

ARB-8

8. The emissions presented in the study for the existing operations at Battles are much higher than the District's emissions inventory for this facility. An explanation for this difference should have been provided in the study. Also, the study should have discussed the effects on the AQMP if the higher emissions are used.

ARB-9 9. The study should have indicated whether best available control technology (BACT) is proposed for the modifications at the Lompoc facility, Battles facility, and the Santa Maria refinery. A listing of the equipment modified at the facilities and the emission factors representing BACT should have been included in the study.

ARB-10 10. The study should have indicated whether the existing emissions used for Lompoc, Battles, and the Santa Maria refinery were adjusted for all increases and decreases in emissions since July 2, 1979, as required by the District NSR rules.

ARB-11 11. The study should have included a table summarizing all existing emissions, proposed emissions, offsets, and net emissions increases.

ARB-12 12. The study should have listed and described all proposed emissions offsets to be used for the project. The net result should have been reflected in the table requested in comment 11 above.

ARB-13 13. It is not clear in the study how often emissions occur from some of the upset conditions and intermittently operated equipment. A discussion of these occurrences should be included.

ARB-14 14. As a mitigation measure, the study discusses the use of fuels (other than diesel) that would result in lower emissions. The study should have also included a discussion on the feasibility of using clean burning IC engines and/or engines with catalysts and then compared the magnitude of the emissions from the proposed project to each alternative. It should have also compared the magnitude of SO_x, TSP, CO, NO_x and ozone onshore impacts for the proposed project and each alternative.

ARB-15 15. The study indicated that the proposed boilers will use low NO_x burners to reduce NO_x emissions. The study should have included a comparison of the proposed boiler emissions with emissions if either selective catalytic reduction or Thermal De-NO_x controls were used. The comparison should have included the magnitude of the air quality impacts and feasibility of these alternatives.

3.4.3

ARB-16 16. The study should have included a list of all existing and proposed reactive hydrocarbon emitting sources. In addition, it should have included the emissions and controls from these sources and the calculated magnitude of the air quality benefits if all these sources were controlled by BACT.

Modeling Comments

ARB-17 The study has not documented the development of the trajectories. The study refers to Attachment 10 "Meterological Analysis for Trajectory Development." for reference of the trajectories. However, this response is misleading since Attachment 10 only details the frequency of occurrence of the meteorological scenarios and presents upper air data for the candidate days only. The study lacks a discussion of how the trajectoreis were developed and fails to list the stations used in the analysis. As a result the development of the trajectories remains undocumented.

We appreciate this opportunity to provide comments. If you have any questions, please contact Peter Venturini at (916) 445-0650.

RESPONSES TO AIR RESOURCES BOARD

ARB-1 Violations of the short-term average standards for inert pollutants were considered as Class II impacts in the EIS/EIR since mitigation measures were developed to reduce the levels below the standards. For ozone, additional mitigation measures were developed and were reviewed by SBAPCD, MMS and EPA. These additional mitigation scenarios were modeled with TRACE, and the predicted ozone concentrations were below the federal standard. However, the state standards were predicted to be exceeded with or without the projects. With these mitigation measures, the ozone impacts have been changed to Class II in the Administrative Final EIS/EIR. Details of the additional TRACE mitigation runs are given in the Addendum to the Response to Comments.

ARB-2 Mitigation measures have been identified in the EIS/EIR to reduce the impacts below the standards. Thus, Rule 409 has been complied with.

ARB-3 Secondary growth has been considered in the Cumulative Analysis under Section 6.2 of the EIS/EIR.

ARB-4 The additional mitigation measures that are analyzed in the Addendum to the Response to Comments indicates that the federal ozone standard will not be violated as a result of emissions from the projects. Thus, the projects would not hinder Reasonable Further Progress to achieving attainment.

ARB-5 See Response to Comments ARB-1, 2 and 4.

ARB-6 Technical Appendix B contains hourly and annual impacts calculations for the project. Daily (24 hour) impacts of TSP and SO_2 were calculated using the hourly emission rates and the power law. All appropriate sources were used in the calculation.

ARB-7 There is currently no facility at the proposed processing Site 4. The proposed facility is new, and all emissions are new emissions.

ARB-8 Existing emission rates were supplied by the Applicant in the DPP.

ARB-9 BACT is used for all new and modified equipment in all the facilities.

ARB-10 Existing emissions data were supplied by the Applicant and are generally based on current fuel usage rates and EPA emission factors. These emissions were the same as those occuring after July 2, 1979 since the throughput for existing sources did not change significantly.

ARB-11 Tables and summaries have been used extensively throughout the Technical Appendix. Not all combinations of tabularized data could be presented without a substantial increase in the length and complexity of the document.

ARB-12 Emission offsets are presented in Section 12.1.3 of Technical Appendix B.

ARB-13 Frequency of emissions are contained explicitly in the DPP and are implicitly contained in Technical Appendix B, Attachment 1, as the ratio of hourly emissions to annual emissions.

ARB-14 The study was based on the commercial vehicles currently available in the Santa Barbara area. There is no reason to expect that these vehicles will be replaced with non-conventional IC engined vehicles in the near future.

ARB-15 The Applicant proposes to use BACT for boilers which is low NO_x burners. Air quality impacts after application of SCR or SNCR can be estimated by reducing the impacts by the percentage of control applied. These emission controls have been identified in the additional mitigation modeling runs that are reported in the Addendum to the Response to Comments.

ARB-16 RHC emission rates for all pieces of equipment are contained in Technical Appendix B, Attachment 1.

ARB-17 During the course of the analysis, the additional supporting information for the trajectory development was presented to the reviewing agencies attending the meetings. These included SBAPCD, SLOAPCD and MMS. It was believed that because of the large volume of this information, it should not be included in the Technical Appendix. However, it is part of the project documentation files and can be obtained from the county of Santa Barbara upon request.

IV. COMMENTS SUBMITTED BY LOCAL AGENCIES AND RESPONSES

AIR POLLUTION CONTROL DISTRICT

County of San Luis Obispo (SLO)

AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN LUIS OBISPO
2156 SIERRA WAY, SUITE B – SAN LUIS OBISPO, CALIFORNIA 93401 – (805) 549-5912

April 26, 1985

5/07
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COUNTY OF SANTA BARBARA

MAY 07 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Janice S. Yonekura
Resource Management District
Energy Division
1226 Anacapa Street, Suite 4
Santa Barbara, California 93101

Subject: Comments on Draft EIR/EIS for Union Oil Project/ Exxon Project Shamrock and Central Santa Maria Basin Area Study

Dear Ms. Yonekura:

The following are comments submitted by the San Luis Obispo County Air Pollution Control District on the adequacy of the environmental analysis principally concerning air quality impacts from the Union Oil Project/Exxon Project Shamrock:

SLO-1

Executive summary, Pages E-6, -15, -20 - The air quality consequences are adequately addressed. Potential exceedances of State and Federal one-hour to 24-hour health standards for sulfur dioxide, nitrogen dioxide, and ozone attributed to project drilling and production operations in areas of San Luis Obispo and Santa Barbara Counties not designated as nonattainment is defintely an area of concern. These exceedances coupled with the finding that sulfur dioxide impacts downwind of the Santa Maria Refinery Complex and ozone impacts in the Snat Ynez Valley cannot be mitgaated through control of project emissions to a level of insignificance should provide sufficient evidence to decisionmakers that the Union Oil Project/Exxon Project Shamrock and associated Central Santa Maria Basin petroleum production expansion should be delayed until such time as maximum mitigation of subject pollutants may be imposed on project operations and local Air Quality Attainment Plans may be revised to reduce the air quality background of subject pollutants.

SLO-2

Page 2-2 - It is stated the onshore HS&P can process 36 MBOD (with future expansion to apprximately 100 MBOD) but the pipeline to the Union Oil Orcutt pump station is only designed to handle 20 MBOD. How will the remaining production be handled?

Page 2-3 - Gas production from Exxon platform is given as 30,000 MMCFD. Is this an error? SLO-3

SLO-4

Page 3-25, -26 - Tables 3-9 and 3-10 shows many areas attaining the Federal one-hour ozone standard of 0.12 ppm, but exceeding the State one-hour ozone standare of 0.10 ppm. Air quality goals should be to bring these "attainment" areas into attainmnt with the State ambient air quality standards.

4.1.2

SLO-5

Page 7-63 - Discussion of ambient air quality exceedances of the Federal and State SO_2 standards failed to include the exceedance of the Federal 24-hour SO_2 standard under F1 and E1 conditions.

SLO-6

Page 9-7 - Project generated upset and breakdown SO_2 impacts generally exceed threshold limit values set by OSHA.

SLO-7

Page 12-4, Table 12-1 - Per letter from Air Pollution Control District to Union Oil Company, SO_2 reductions from Santa Maria Refinery modifications are calculated at 2927.1 not 3834.7 TPY.

SLO-8

Page 12-23, ¶12.4.2.2 - It is stated that a reduction in the Refinery throughput of crude oil by 30 percent would require the Refinery gas processing facility to handle 87 MMSCFD. Is 87 MMSCFD correct?

Page 13-10 - Odor recognition threshold of H_2S is 0.00047 ppm (0.65 ug/m³) SLO-9
and not 0.0047 ppm as stated, thus changing the conclusions on page 13-10 to predict potential odor impacts from the Lompoc HS&P facility and Santa Maria Refinery during normal as well as upset conditions (see Table 13-5, page 13-12).

SLO-10

Page 14-2, -3 - The maximum throughput capacity of the HS&P is set at 100 MBOD and of the gas processing facility is 80 MMSCFD. Given these maximums, why is worse case analysis for emissions from offshore production based on 67 MBOD and 43 MMSCFD gas?

SLO-11

Page 14-46, Table 14-29 - Why is the 24-hour TSP concentration resulting from the Santa Maria Refinery during production and processing phase listed as "-na-"? It should be shown as some concentration, insignificant or zero.

Sincerely,

Robert W. Carr

ROBERT W. CARR, Director

RWC/AR/ksw

SLO-1 Comment noted.

SLO-2 The remaining production will be moved by pipeline from Lompoc to a marine terminal at either Gaviota or Las Flores, or to a tie-in with the Celeron or Southern California Pipeline System (SCPS). Exxon has submitted an application for a dry oil pipeline from the Lompoc Dehydration Facility to Las Flores Canyon. Exxon's Application is currently under CEQA review by the County of Santa Barbara. This would allow a tie-in with the marine terminal or the Celeron Pipeline System.

SLO-3 This statement is correct, but the gas production will all be reinjected into the reservoir for pressure maintenance until the year 2000. Therefore, Exxon is not planning to produce any gas for shipment to shore until the year 2000.

SLO-4 We agree with the comments, but it should be noted that detailed plans to achieve attainment of the State ozone standard have not yet been developed.

SLO-5 A correction to the narrative of the Technical Appendix was made. The main document of the EIS/EIR had already indicated this exceedence.

SLO-6 Comment noted. This statement was added to the Appendix.

SLO-7 Correction was made to the table.

SLO-8 The 87 MMscfd should be 8.7 MMscfd and will be corrected in the Technical Appendix; it was mistyped.

SLO-9 The concept of odor recognition threshold for a given pollutant can be very subjective. It generally is dependent on the receptor and on the ambient conditions under which it is perceived. Controlled laboratory experiments have indicated that odor thresholds for H2S would be less than 1 g/m^3. However, under field conditions the generally accepted odor threshold has been measured at levels ranging from 3 to 20 g/m^3. The state standard as a means for regulating odors is 42 g/m^3. Thus, the conservative level of 6.5 g/m^3 was chosen as a typical odor threshold in the EIS/EIR.

SLO-10 Based on the expected offshore production under the Area Study scenario, a maximum throughput from the project and hypothetical platforms was estimated by MMS to be 67 MBOD and 43 mmscfd gas. However, the hypothetical onshore facility was sized to handle potential additional production from state waters and any unforseen on land production. After discussion with a number of agencies and planners, a conservative estimate of 100 MBOD and 80 mmscfd of gas was assumed for the facility.

SLO-11 The table has been changed from -n a- to less than 1.

CITY OF LOMPOC (COL)

CITY OF
LOMPOC

VALLEY OF FLOWERS

May 8, 1985

5135
RECEIVED
COUNTY OF SANTA BARBARA

MAY 13 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Supervisor DeWayne Holmdahl
County of Santa Barbara
401 East Cypress Avenue
Lompoc, CA 93436

Dear Supervisor Holmdahl:

The Lompoc City Council, at their meeting of April 16, expressed concern that there may be inadequate manpower devoted to air quality problems in the North County area. The Council requests that the County consider the need for additional staff to do the necessary technical, air quality monitoring and enforcement to protect the North County environment. COL-1

4.3.2 The excellent air quality enjoyed by Lompoc Valley residents and businesses is a resource contributing to the local quality of life and healthy agricultural economy. Our air quality has been maintained through local planning and strict application of the Santa Barbara County Air Pollution Control District rules and regulations for industry and emission sources in the Lompoc Valley. As a result, the peak-hour concentrations of ozone have never exceeded the Federal ozone standard of .12 ppm. In recognition of this achievement, the Federal Environmental Protection Agency in May, 1984 proposed the Lompoc/Santa Ynez Air Shed for Attainment with respect to ozone. COL-2

The Lompoc City Council is deeply concerned by the Class I non-mitigatable air quality impacts identified in the Union Oil project EIS/EIR. The analysis indicates that the addition of Union and Exxon platforms in Federal waters along with the Mission Hills dehydration facility will result in local excedents of the Federal ozone standard. This will be a significant step backward in air quality and the City Council requests that all mitigation measures, including the hiring of necessary air quality enforcement staff, be incorporated into the project that will reduce or eliminate these adverse impacts to our local air quality. COL-3

Sincerely,

Andrew Salazar, Mayor
City of Lompoc

c: Lompoc City Council
Gene Wahlers, City Administrator
King Leonard, Planning Director
Mike Powers, Area Planning Council
Janice S. Yonekura, S.B. County Resource Management Department

SLO-1 Comment noted.

SLO-2 The remaining production will be moved by pipeline from Lompoc to a marine terminal at either Gaviota or Las Flores, or to a tie-in with the Celeron or Southern California Pipeline System (SCPS). Exxon has submitted an application for a dry oil pipeline from the Lompoc Dehydration Facility to Las Flores Canyon. Exxon's Application is currently under CEQA review by the County of Santa Barbara. This would allow a tie-in with the marine terminal or the Celeron Pipeline System.

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SLO-11 The table has been changed from -n a- to less than 1.

RESOURCE MANAGEMENT AGENCY

County of Ventura (V)

RESOURCE MANAGEMENT AGENCY
county of ventura

Victor R. Husbands
Agency Director

May 3, 1985

5101
RECEIVED
COUNTY OF SANTA BARBARA
MAY 07 1985
RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Janice Yonekura
Resource Management Department
Energy Division
1226 Anacapa Street, Suite 2
Santa Barbara, CA 93101

Dear Ms. Yonekura:

Subject: Comments on Union Oil Project/Exxon Project, Shamrock
(SBC #84-EIR-17, OCS Study MMS #85-0020)

The Ventura County Planning Division comments on the subject EIR/EIS focus on Technical Appendix K, Socioeconomics, Volumes I and II. The comments and issues raised are in the order in which they appear in Appendix K and are keyed to the applicable page number in the text.

Vol. I, p.1-7

4.2.2

V-1

Ventura County understands the C/COG study is still not final and that its survey techniques may have excluded segments of the oil support industry. The status/validity of the study should be confirmed with C/COG and reliance on it adjusted accordingly.

V-2

When the text states, ". . . 92% of the companies are located in the Oxnard Plain," does this include the Ventura Avenue area of San Buenaventura? This area has substantial numbers of oil support businesses, but it is not in (on) the Oxnard Plain.

Vol. I, p.1-10

V-3

Schools should be listed as a concern as should the impacts on special districts such as water districts.

Vol. I, p.1-11

V-4

The significance criteria should be as consistent as possible with previous environmental documents and those in preparation.

Low and moderate income housing is not defined.

Vol. I, p.1-14

V-5

Ventura County, in conjunction with the cities, has just completed a revision to the population/housing forecasts which will change many of the numbers in the environmental documents. The numbers have not been formally adopted at this

time, but are expected to be within a month. Some changes to the attached forecasts may occur, but not in the areas under review in Technical Appendix K. Contact Steve Wood for further information (805) 654-2457.

Vol. I, p.1-16

V-6

The County and cities have just completed the process of adopting a new Solid Waste Management Plan. As a result, the assumptions relative to the Santa Clara landfill will undoubtedly have to be modified. In essence, the Plan includes the following by provisions:

1. The Santa Clara site has been closed for over a year and supplanted by the Coastal site which has capacity through late 1986 for municipal waste only.

2. The Bailard site (adjacent and downstream from the Santa Clara and Coastal sites) will be opened for up to four years beginning with the closure of the Coastal site.

3. These sites will be the only likely sites available in the western end of Ventura County until a canyon site is activated. This is not likely to occur until the time the Bailard site closes.

4. Two canyon sites were recognized in the Plan and each has an anticipated capacity of 35 years.

5. Oilfield wastes are addressed in the Plan, but no sites were identified as yet. The Plan could be amended to include a suitable site. Until such time, no oilfield wastes could be deposited in the County.

Tom Berg of the County Planning Division can answer detailed questions concerning the Plan (805) 654-2481.

Vol. I, p.1-18

V-7

The discussion of the methodology used must include a discussion which will explain why the impacts on Ventura County entities differ to such a great extent from the impacts on these same entities generated by the Chevron and Exxon projects. This explanation should discuss the cumulative and project impacts. Issues of project scale, location, etc., should be addressed in addition to different methodologies, models and assumptions. This explanation is crucial to the credibility of any EIR/EIS because the public and decision-makers must be able to account for different conclusions on the same issues, e.g., houses, school and public finance.

Vol. I, p.1-20

V-8

The cumulative project list should be reviewed in light of recent events and updated if the changes are significant. Also, future State lands projects and Federal 5-Year Leasing program should be addressed.

Janice Yonekura
Resource Management Department
May 3, 1985
Page 3

Vol. I, p.1-22

V-9

The assumption that the Gaviota supply base will be in use may not be realistic. To the extent that EIR/EISs are to assess the worst case scenario, it seems appropriate that Hueneme be considered the sole supply base until alternative sites are more likely prospects.

Vol. I, p.1-41

V-10

Hospitals are private and public. County hospitals must care for those who cannot receive care from private facilities. Health care is an increasingly costly budget item.

V-11

Temporary housing will result in impacts similar to those generated by permanent housing - water, sewer, police, fire, solid waste. There is no discussion of the displacement of tourists because of the use of temporary housing by project employees. Tourist revenue would be lost and perhaps not made up by project employees.

Vol. I, p.2-37

V-12

The "out-of-county jobs" numbers seem to be for the County as a whole as opposed to the "study area" in Ventura County. The out-of-county job condition is particularly prevalent in the eastern portion of Ventura County, but not within the study area. Assumptions and numbers should be revised as necessary.

Vol. I, p.2-51

V-13

General Telephone (GTE) has just purchased the Prudential Insurance building in Thousand Oaks and will be bringing in 1500 to 2000 people. This new employer could necessitate a change in the baseline numbers. Check with GTE for details.

Vol. I, p. 2-154

V-14

No sewer system is being designed for the north coast of Ventura. A limited capacity trunkline back to Ventura is presently in use, however, it is sized only for existing residents.

Vol. I, p.2-191

V-15

Additional classrooms at school sites must eventually be accompanied by more restrooms and other support facilities. Such items should be factored into the assumptions.

Vol. I, p.2-218

V-16

State law has been amended regarding mandatory elements in the General Plan. Check current law. Recently, Seismic Safety and Safety have been combined and Scenic Highways dropped.

Janice Yonekura
Resource Management Department
May 3, 1985
Page 4

Vol. II, p.3-10

V-17

What is the justification for employment distribution numbers between the three counties? To what degree are the numbers based on the C/COG study? Some justification should be provided for similar assumptions made elsewhere in the text.

Vol. II, p.3-56

V-18

The AF/YR/Capita water consumption figures for Oxnard seem low in comparison to other cities. Please double check. If incorrect, the number needs to be changed in subsequent tables. A 1983 survey by Ventura County showed the per capita consumption at .15 AF/YR.

Vol. II, p.4-5

V-19

Monitoring should be for the tri-county area with appropriate representatives from each county. Data collection of public facilities, services etc., on an annual basis will be difficult, costly and time consuming. An alternative should be referenced which would require updating of such data on an as-needed basis when it appears a potential impact may exist and verification is required. Monitoring should be designed in such a way that it is consistent with the cumulative analysis of successive EIR/EIS's for Tri-county projects.

Vol. II, p.4-14

V-20

The range of mitigation measures for Ventura County impacts is too limited. There is no mention of phasing projects to dampen impacts. Monitoring and financial contributions to a "public service fund" are the only measures mentioned, with the exception of "contribution to salt removal or other local water reclamation programs." What does this last mitigation measure mean?

If you have questions about the comments contained herein, please contact Todd Collart at (805) 654-2496. Thank you for the opportunity to comment on the subject documents.

Sincerely,

Thomas Berg for

Victor R. Husbands
Director

VRH:ms

Attachments

cc: Donna Brewer, MMS

TABLE 1

1980 - 2010 Population Forecast

	1980 Census	1985*	1990	1995	2000	2005**	2010**
Camarillo GA	45,711	52,690	61,560	68,150	74,300	79,340	84,280
Camarillo NGA	3,668	3,680	5,050	5,610	6,140	6,640	7,100
Fillmore GA	9,604	10,300	12,700	15,200	18,100	21,600	25,800
Fillmore NGA	2,182	2,240	2,240	2,230	2,230	2,230	2,240
Las Posas NGA	1,312	2,030	2,130	2,240	2,340	2,440	2,520
Moorpark GA	8,054	14,260	23,020	29,590	35,740	41,690	47,080
Moorpark NGA	670	690	750	780	810	830	860
North Half NGA	487	540	570	620	650	690	730
Oak Park GA	3,617	4,880	13,130	17,350	16,740	16,230	15,730
Oak Park NGA	228	300	320	340	350	370	390
Ojai GA	8,411	9,070	9,460	9,550	9,630	9,700	9,760
Ojai NGA	2,298	2,540	2,540	2,620	2,700	2,780	2,860
Oxnard GA	121,055	127,700	144,000	159,000	180,000	198,000	217,800
Oxnard NGA	4,997	5,000	5,120	5,100	5,100	5,090	5,070
Piru GA	1,368	1,400	1,810	1,980	2,150	2,300	2,440
Piru NGA	196	200	240	260	280	300	310
Port Hueneme GA	18,507	20,000	21,670	22,810	24,050	25,230	26,330
Santa Paula GA	20,889	22,320	24,500	26,000	27,500	29,000	30,500
Santa Paula NGA	2,958	3,030	3,050	3,050	3,050	3,050	3,050
Simi Valley GA	80,294	90,640	103,220	112,650	121,170	129,220	136,930
Simi Valley NGA	1,087	1,400	1,600	1,830	2,040	2,260	2,470
Thousand Oaks GA	91,962	101,910	109,900	118,300	126,500	132,600	135,800
Thousand Oaks NGA	1,070	1,210	1,280	1,360	1,450	1,540	1,630
Ventura GA	83,209	90,100	93,000	102,000	111,000	116,940	123,150
Ventura NGA	982	1,120	1,150	1,200	1,250	1,300	1,360
Vta. Riv. GA	12,849	13,500	~~13,500~~ 14,000	~~13,630~~ 14,360	~~13,730~~ 14,600	~~13,940~~ 15,100	~~14,120~~ 15,500
Vta. Riv. NGA	1,509	1,610	1,610	1,630	1,660	1,690	1,710
TOTAL COUNTY	529,174	584,360	~~659,120~~ 659,620	~~725,080~~ 725,810	~~790,660~~ 791,610	~~847,000~~ 848,160	~~902,020~~ 903,400

*Estimated from 1985 actual dwelling unit count, obtained from building completion records.

**To be used for guideline purposes only

L76/1

TABLE 2

1980-2010 Dwelling Unit Forecast

	1980 Census	1985*	1990	1995	2000	2005**	2010**
Camarillo GA	16,804	19,089	23,144	26,314	29,484	31,484	33,484
Camarillo NGA	1,043	1,045	1,508	1,741	1,973	2,206	2,438
Fillmore GA	3,055	3,129	4,205	5,188	6,396	7,855	9,626
Fillmore NGA	729	740	775	797	820	843	866
Las Posas NGA	356	551	608	666	723	781	838
Moorpark GA	2,476	4,361	7,379	9,830	12,281	14,732	17,184
Moorpark NGA	267	269	304	322	340	358	377
North Half NGA	323	340	360	380	399	418	437
Oak Park GA	1,078	1,447	4,091	5,598	5,598	5,598	5,598
Oak Park NGA	76	95	110	120	130	140	150
Ojai GA	3,316	3,502	3,797	3,912	4,027	4,127	4,227
Ojai NGA	855	929	966	1,023	1,076	1,135	1,187
Oxnard GA	39,815	42,029	48,980	55,986	65,217	73,881	83,130
Oxnard NGA	1,287	1,293	1,398	1,454	1,509	1,565	1,620
Piru GA	380	388	528	603	677	751	825
Piru NGA	64	64	82	91	100	110	118
Port Hueneme GA	6,942	7,351	8,301	8,980	9,659	10,338	11,018
Santa Paula GA	7,233	7,645	8,750	9,559	10,377	11,197	12,103
Santa Paula NGA	865	882	934	968	1,002	1,036	1,071
Simi Valley GA	23,534	26,425	31,761	35,875	39,988	44,102	48,215
Simi Valley NGA	447	561	665	774	883	992	1,101
Thousand Oaks GA	31,902	35,019	39,400	43,650	47,900	51,400	53,900
Thousand Oaks NGA	607	655	702	749	796	843	891
Ventura GA	33,811	36,184	38,430	42,857	47,436	50,842	54,249
Ventura NGA	627	674	698	721	744	767	791
Vta. Riv. GA	4,916	5,074	~~5,273~~ 5,467	~~5,452~~ 5,742	~~5,627~~ 6,017	~~5,808~~ 6,242	~~5,983~~ 6,568
Vta. Riv. NGA	576	601	626	649	678	701	725
TOTAL COUNTY	183,384	200,342	~~233,775~~ 233,969	~~264,259~~ 264,549	~~295,840~~ 296,230	~~324,010~~ 324,400	~~352,154~~ 352,739

*Actual count, obtained from building completion records

**To be used for guideline purposes only

L76/2

TABLE 3

POPULATION PER DWELLING UNIT
RATIO PROJECTIONS
(Growth Area Ratios Merge with County Ratio in 2080)

Area	Census 4/1/80	1985	1990	1995	2000	2005*	2010*
Camarillo GA	2.72	2.76	2.66	2.59	2.52	2.47	2.42
Camarillo NGA	3.52	3.52	3.35	3.22	3.11	3.01	2.91
Fillmore GA	3.14	3.29	3.02	2.93	2.83	2.75	2.68
Fillmore NGA	2.99	3.02	2.89	2.80	2.72	2.65	2.59
Las Posas NGA	3.69	3.68	3.50	3.36	3.24	3.12	3.01
Moorpark GA	3.25	3.27	3.12	3.01	2.91	2.83	2.74
Moorpark NGA	2.51	2.57	2.47	2.42	2.38	2.32	2.28
North Half NGA	1.51	1.59	1.58	1.63	1.63	1.65	1.67
Oak Park GA	3.36	3.37	3.21	3.10	2.99	2.90	2.81
Oak Park NGA	3.00	3.16	2.90	2.83	2.69	2.64	2.60
Ojai GA	2.54	2.59	2.49	2.44	2.39	2.35	2.31
Ojai NGA	2.69	2.73	2.63	2.56	2.51	2.45	2.41
Oxnard GA	3.04	3.04	2.94	2.84	2.76	2.68	2.62
Oxnard NGA	3.88	3.87	3.66	3.51	3.38	3.25	3.13
Piru GA	3.60	3.61	3.42	3.28	3.18	3.06	2.96
Piru NGA	3.06	3.13	2.93	2.86	2.80	2.73	2.63
Port Hueneme GA	2.67	2.72	2.61	2.54	2.49	2.44	2.39
Santa Paula GA	2.89	2.92	2.80	2.72	2.65	2.59	2.52
Santa Paula NGA	3.42	3.44	3.27	3.15	3.04	2.94	2.85
Simi Valley GA	3.41	3.43	3.25	3.14	3.03	2.93	2.84
Simi Valley NGA	2.43	2.50	2.41	2.36	2.31	2.28	2.24
Thousand Oaks GA	2.88	2.91	2.79	2.71	2.64	2.58	2.52
Thousand Oaks NGA	1.76	1.85	1.82	1.82	1.82	1.83	1.83
Ventura GA	2.46	2.49	2.42	2.38	2.34	2.30	2.27
Ventura NGA	1.57	1.66	1.65	1.66	1.68	1.69	1.72
Ventura Riv. GA	2.61	2.66	2.56	2.50	2.44	2.40	2.36
Ventura Riv. NGA	2.62	2.68	2.57	2.51	2.45	2.41	2.36
Total County	2.89	2.92	2.82	2.74	2.67	2.61	2.56

*To be used for guideline purposes only

L76/3

RESPONSES TO RESOURCE MANAGEMENT AGENCY COMMENTS

V-1 The C/COG study has been completed. The study is not final only because C/COG has requested 1984 employment information to compare with the 1983 employment estimates provided in response to the survey. Employment among the C/COG members has declined from 1983 to 1984. This requires is an extension of the original scope of work, it is not known whether this additional information will be obained.

V-2 The oil support businesses located in the Ventura Avenue area of San Buenaventura were considered to be located in the Oxnard Plain and were consequently accounted for throughout the analysis.

V-3 Comment noted. Changes are included in the errata for the Socioeconomic Technical Appendix.

V-4 The starting point for developing significance criteria was a review of criteria employed in recently completed EIS/EIRs. Modifications were made to improve or clarify the criteria employed in previous documents to tailor them for North County and differences in this project when compared to others.

Low and moderate income housing is defined as housing for households with income less than 120% of the county median.

V-5 Comment noted. The changes will be primarily for areas of the County outside of the study area.

V-6 Awaiting call from Tom Berg of Ventura County

V-7 There are three key reasons for the differences between the Union/Exxon impacts and those from the other two EIRs:

1. The local expenditures for labor, services, and, particularly, materials are much less for Union/Exxon than for the other two projects. A detailed verification of purchasing (through the use of actual applicant purchase orders) supports this analysis.

2. Based upon recent growth trends and the results of the California Coastal Operators Group Survey it is felt that the existing "oil support" industry has sufficient "capacity" to handle additional sales without requiring proportionate increases in labor. (See Attachment C of the Socioeconomics Technical Appendix for more detail on the CCOG survey) This is also supported by firm specific employment data use in the analysis.

3. The use of GRC's modified economic base approach has allowed a study area to be defined that is more consistent with the range of local impacts from these projects.

V-7 Table 1 provides a comparison of local expenditures for the projects during 1990 and 2000. The years 1990 and 2000 provide for an easier comparison than earlier years since production is presumably well underway for each project.

The Union portion of the Union/Exxon project represents only one-fourth of the total even through it includes onshore facilities.

These local expenditure differentials are the most important factor contributing to employment impact differences since they directly affect oil support industry employment. As shown in Table 2 it is the differences in "oil-support industry" (first-round indirect) employment that are truly large -- the non-basic/basic employment ratios of the various projects are consistent.

The local expenditures generated by the Union/Exxon projects will initially effect the local economies primary through wholesale activities (for offshore facilities and for concrete and dirt work for onshore facilities). Existing wholesale activities (primarily for provision of food) as well as firms providing concrete and dirt moving work, have sufficient "capacity" to supply the needs of these projects without proportionate increases in employment. Attachment E of the Socioeconomics Technical Appendix of the Union/Exxon report provides more detail regarding this matter. This is a major contributing factor to the lower impacts for the Union/Exxon project when compared with the Chevron/Texaco and Exxon/Santa Ynez Unit projects.

A final factor contributing to the wide difference in employment is methodological in nature. While the use of a nationally-based regional input/output model is an accepted approach to impact assessment it must be recognized that the technique used to create the regional model can introduce an upward bias in the input/output table's technical coefficients. This can lead to overstated impacts. The reason for this potential to overstate impacts is that "cross-hauling" is not adequately addressed within this framework. What this means is that the existence of local firms within an industry category implies that these firms will meet local demands for the industry's products, e.g. firms and individuals will always buy from local producers (unless local demand exceed capacity). industry will be met by local firms in that industry. In many instances this is not the case. Rather, firms in a given industry will produce products sold primarily outside of the region while at the same time the local region is importing products from that industry.

The assumption that the existence of oil industry firms and associated manufacturing firms in the Study area implies that substantial amounts of materials and services will be provided by study area firms is a poor assumption in the case of the oil and oil support industries. The equipment and services required for oil platform installation, drilling and production as well as the

TABLE 1

LOCAL EXPENDITURE COMPARISON*

	1990	2000
Union/Exxon	20.6	18.2
Chevron/Texaco	86.3	54.5
Exxon Santa Ynez	78.9	56.6

* Millions of 1983 dollars for Chevron/Texaco and Exxon Santa Ynez, millions of 1984 dollars for Union/Exxon.

TABLE 2

COMPARISON OF PROJECT EMPLOYMENT IMPACTS

	Union/Exxon	Chevron/Texaco	Exxon Santa Ynez Unit
Direct Employment			
1990	76	188	231**
2000	32	153	142
First Round Indirect			
1990	131*	966	994**
2000	60*	824	793
Total			
1990	458	2,504	2,520**
2000	215	2,219	2,097
Non Basic Jobs/Basic Jobs Ratios			
1990	1.21	1.17	1.06**
2000	1.34	1.27	1.23

* "Direct Support" in Union/Exxon
** 1989

materials required by onshore support facilities are extremely specialized. Typically the cost of these materials and services is also large enough that the transportation cost component of total cost is truly small. This makes the operators purchasing such materials and services much less likely to require local provision of such services.

This "cross-hauling" effect causes increased problems for impact assessment when the area of interest is smaller than a particular county. For Union/Exxon the study area of interest includes all of Santa Barbara County, but only portions of Ventura and San Luis Obispo counties. This area was decided upon because of knowledge of the local oil support industry. Since the input/output analysis typically must employ location quotations derived from county level statistics local regions (i.e. study areas) must be comprised of complete counties. This causes local support industries to appear larger than they actually are. For example, oil-related industries in Northern San Luis Obispo County would not typically be utilized for developments in the Santa Barbara County area, but would be assumed implicitly to provide services (and generate impacts) by analysts employing a regional input/output model developed for the three counties from a national model.

A final difference between the studies that is significant (although it does not represent a large share of the total employment impact differences) is the local/non-local labor ratio for specific project components, particularly pipeline construction (Union/Exxon project) to 90% local labor share. This range reflects shares for past projects.

Construction bids for pipeline projects are highly competitive and given the technical skills required for the work bids are often won by highly specialized non-local firms. Given the expected level and type of local purchases likely for other Union project components it is reasonable to assume that the majority of pipeline workers would be non-local. Essentially non-local contractor is expected to provide the most competitive bid.

V-8 Comment noted. State Lands projects and project associated with the Federal 5-Year leasing program are included. See responses CPA-29,30, and 31 for more detail.

V-9 The incorporation of a new supply base at Gaviota is a worst case from Santa Barbara County's standpoint. It was a reasonable scenario at the time of the analysis (and may still be reasonable), since the County is currently processing an application. See Response to CAO-24.

V-10 We agree that health care is an increasingly costly budget item for local government entities, but a seperate impact analysis was not conducted because the project related impacts are insignificant. Increasing costs for health care are implicitly incorporated in the fiscal analysis.

V-11 Temporary housing demands are not sufficiently large to measurably impact tourist revenues in Ventura County (see Socioeconomics Technical Appendix sections 3.1.2.1, 3.2.2.1., 3.3.2.1).

V-12 The "out-of-county jobs" are for Ventura County as a whole, rather than the study area portion of the county. Statistics were not available for sub areas within the county. Since the information was descriptive of an historical situation it does not affect the subsequent impact analysis.

V-13 According to Bud Simon of GTE in Santa Monica the company has purchased the Prudential Insurance building and will begin moving staff into the building in July 1985. They plan to construct an additional 225,000 to 250,000 sq. ft. Initially they will locate 1600 people in Ventura - this will grow to 2500 by the end of 1986 according to current plans. The addition of this number of new employees will potentially exacerbate existing and potential problems such as the demand for Oxnard schools. The time frame for reaching problem situations in the delievery of services would also be foreshortened. This GTE project would not substantially alter the impact analysis results for the Union and Exxon projects.

V-14 Comment noted. Text changes are included in Socioeconomics Technical Appendix errata.

V-15 The cost of school support facilities and restrooms are included in the per classroom cost estimates used in the analysis.

V-16 Comment noted. Text changes are included in the Socioeconomics Technical Appendix errata.

V-17 The employment distribution numbers are based upon discussions with local labor officials (e.g. Firmin Fuerbome of the Santa Barbara - San Luis Obispo Counties Building and Construction Trades Council), knowledge of employee distributions from past projects (e.g. POPCO, HONDO), and the CCOG study results. They are the best estimates available based upon a synthesis of information from this variety of sources.

V-18 The Oxnard AF/YR/per capita water consumption is correct. The 1983 survey estimate of .15 AF/YR appears to be a reasonable "weighted" average of the disaggregated numbers provided the EIS/EIR.

V-19 The monitoring in the tri-county area should be conducted by representatives from each county. This is a political issue that is currently being addressed. Furthermore an RFP has been issued to establish the monitoring program database. While data collection on an annual basis may be costly and time consuming it may be necessary in order to establish a workable monitoring system. Updating on an intermittant or "as needed" basis is often very difficult and more costly due to problems associated with obtaining information that is not regularly collected. The most appropriate approach should be quickly decided by the monitoring group members. Further the monitoring should be designed to be consistent with cumulative assessments in subsequent EIS/EIRs (and vice versa).

V-20 Mitigation measures are appropriate for the type and level of impact expected. Phasing the projects is a potentially useful mitigation measure, but the increasing pace of development will limit the usefullness of the idea.

Development of and contribution to a desalination or other local water reclamation programs could involve the construction of desalination facilities or the provision of monies to promote water conservation and reclamation.

RESPONSES TO CITY OF LOMPOC COMMENTS

COL-1 Comment noted.

COL-2 Comment noted.

Col-3 Since the release of the Public Draft EIS/EIR further Air Quality analysis has been conducted and the predicted federal 1-hour ozone exceedences have been mitigated. The results of these runs are included in the Supplemental Information chapter of this Response to Comments document as well as in the Final EIS/EIR.

V. COMMENTS SUBMITTED BY INDIVIDUALS AND PRIVATE ORGANIZATIONS AND RESPONSES

CITIZENS PLANNING ASSOCIATION (CPA)

916 Anacapa Street • Santa Barbara, California 93101 • 966-3979

ADL 4/18

CITIZENS PLANNING ASSOCIATION OF SANTA BARBARA COUNTY, INC.

April 17, 1985

TO: Janice S. Yonekura
Energy Division
1226 Anacapa Street
Santa Barbara, CA 93101

RE: Comments on Draft EIS/EIR for Union/Exxon/Central Santa Maria Basin Area Study

The Citizens Planning Association has reviewed the draft EIS/EIR, and submits the following comments for consideration by the Joint Review Panel. We may submit additional written comments prior to the May 1 deadline.

Overall, we found the study to be clear and complete. There are, however, a few major points we wish to raise in regard to the adequacy of the document as a tool for planning and permitting. We have also included several specific comments requesting clarification, further detail, or reconsideration of the assigned level of impact and possible mitigation.

5.1.2

MAJOR CONCERNS

Alternative Sites for Oil Processing

CPA-1

The EIS/R has been designed to consider only a two sites for the proposed project and Area Study oil processing facility, both in close proximity to residential areas. The discussion of "Alternatives Not Considered for Further Analysis" does not explain why no sites beyond this particularly Union Oil property were considered.

CPA-2

Since County policy calls for the maximum feasible degree of consolidation of oil and gas facilities, it is reasonable to assume that the first phase approval of Union's plan near Lompoc will ordain the chosen site for major industrial expansion in the future. As this is the case, we fail to see why the EIS/R did not give at least a screening level review to potential sites in the North County that would not impact existing residential areas. We see the lack of review of alternative locations in the project region as a major shortcoming. The final document should consider other sites (e.g. other existing onshore oil fields, any suitable properties more distant from residences), and discuss the environmental and General Plan policy tradeoffs in relation to the currently proposed and alternative Union properties.

Alternative Sites for Gas Processing

CPA-3

We believe that the EIS/R sorely underplays the significant public safety risks associated with siting a major gas processing plant so near to Vandenberg Village and Mission Hills. The discussion is buried in section 5.11.9, and it downplays the risks of explosion, fire and toxic releases from the build out of gas processing. No mention of these risks appears in the Executive Summary.

CPA-4

CPA is doing further study of the System Safety aspects of the gas processing, and plans to submit more detailed comments later. At this point, we suggest that the risks from upset and accidents at the facility, and from truck transport of hazardous gas by-products on local roads, should be reviewed in light of public concerns raised under similar circumstances in the Chevron/Gaviota project hearings. At the least, the EIS/R should highlight these impacts and risks more prominently. In addition, the document should give further consideration to alternative sites for the gas processing that are not near residential neighborhoods.

Project Buildout Impacts

CPA-5

More information should be provided about the impacts associated with full buildout of a 100,000 barrel per day oil facility at the Union site. This is covered in a more general way in the Area Study sections of the EIS/R. The County decision-makers should be given a more detailed and complete analysis of the long-term implications of buildout at this site. More than just Union and Exxon's production from two platforms is before the County, given the consolidation policies.

CPA-6

Particularly, the document should present visual renderings of the buildout scenario, and discuss in more detail the issues of traffic, land use compatibility, safety, noise, etc.

Coastal Resource Cumulative Impacts

CPA-7

In our view, the project and cumulative impacts of large scale industrialization along the North County coast are underplayed in the EIS/R. CPA has raised this concern in previous environmental hearings on South Coast developments. While the incremental impacts of one additional platform, pipeline, helicopter flight, or supply boat may not be judged significant by the consultants, the cumulative effects caused by major industrialization of the entire Santa Barbara County coastline are a serious affront to our resources and quality of life.

CPA-8

We suggest that the EIS/R consider the regional cumulative impacts to coastal resources in the areas of recreation, tourism, visual disruption, noise, odors, air quality, oil spills, wildlife, etc. Public concern about the aggregate impacts to such coastal resources has led Santa Barbara County to adopt a "Coastal Resource Enhancement Fund" as a mitigation program for these impacts. The County Energy Division is familiar with this mitigation program, and can provide more details.

CPA-9

We recommend that the consultant reconsider its conclusions regarding the significance levels assigned to both project and cumulative impacts in the areas of visual aesthetics, recreation, tourism, oil spill effects and other industrial impacts, in light of the tremendous increase in regional industrial activity caused by offshore oil and gas development. The Coastal Resource Enhancement Fund should be incorporated as a mitigation for these impacts.

Please contact Michael Feeney, 966-3979, for clarification of any items in this submittal.

CITIZENS PLANNING ASSOCIATION OF SANTA BARBARA COUNTY, INC.

SPECIFIC COMMENTS

Executive Summary

CPA-10

1. p. E-5 The proposed development schedule calls for construction to commence in late 1985. Several sections of the EIS/R recommend confining certain construction activities (onshore pipeline installation, stream crossing, site grading) to the dry season (May - October) in order to mitigate environmental impacts such as stream flow alteration, runoff and sedimentation. The document does not discuss this possible conflict between the mitigated construction phasing and the applicant's desires.

CPA-11

2. p. E-14 The discussion of the Area Study Development could be written to give readers a more clear understanding of whether the onshore oil and gas facilities (at their expanded maximum) could accommodate the peak production level from anticipated offshore and onshore development in the study area. Three specific questions: Do the peak production estimates reflect the most recent federal OCS lease offerings and projections from the 5 Year Leasing Program being considered by DOI? Are State Lands Commission plans for leasing included in these estimates? Is expanded onshore oil drilling expected to feed into the Union/Lompoc facility?

CPA-12

3. p. E-19 The discussion of hazards associated with the probable gas processing at Lompoc are underplayed and glossed over in the summary. See previous general comment. This is an important public concern which deserves more thorough treatment in the summary.

Project Description

CPA-13

4. p. 2-32 We would appreciate an explanation of the apparent large difference in air emissions between the Union and Exxon drilling and production operations (Tables 2.1-11 and 2.1-12). Is one operator's approach preferable from an air quality standpoint?

CPA-14

5. p. 2-61 The EIS/R should explain why the electrical substation is located in the coastal zone at Surf. Is it possible from a technical standpoint to site this facility at other points along the transmission line which might be less environmentally sensitive?

Geology

CPA-15

6. p. 5.1-2 The risk associated with possibly drilling of deviated wells through faults needs to be better explained. How likely is it that faults will be encountered in this manner? Can special precautionary measures be taken when such a possibility exists? Is avoidance of high risk directional drilling a possible mitigation? In addition, the statement on page 5.1-12 that the impacts of subsea oil release from such an incident is "mitigated to the extent possible within available technology" is not comforting. Is drilling "deviated" wells through faulted substrate a safe or an unsafe practice?

Air Quality

CPA-16

7. p. 5.2-31 - 5.2-39 The discussion of air quality impacts under the Area Study buildout is quite cursory and incomplete. The significance of Table 5.2-10, indicating large emission excesses of allowed increments and standards for NOX and SOX, needs elaboration. Can project-by-project mitigation measures bring the overall pollution levels down to acceptable levels? Is the proposed level of pollution control in the first phase of Union's plan stringent enough so as to leave an adequate increment of allowed emissions for future consolidated oil and gas processing at the site?

CPA-17

Finally, there is no discussion of the availability of required offsets in the affected region. Simply indicating that future development would have to secure offsets does not provide the reader with any understanding of the feasibility of finding adequate offsets. The public agencies cannot make fully informed planning decisions without at least a preliminary assessment of the feasibility of mitigating air quality impacts.

Onshore Water Resources

CPA-18

8. p. 5.3-7 The discussion of design and risk mitigation requirements for the Alternative Pipeline Route crossing of the Santa Ynez River needs to be significantly expanded. This will undoubtedly be an issue of broad public concern. The County Planning Commission will need a thorough analysis of the oil spill risks, flood hazards, and design or mitigation measures which could make such a crossing safe. It is not acceptable to present the County with less than a complete engineering and risk analysis of this issue in the Final EIS/R. Deferring research on this matter to later study by the applicant does not meet the full disclosure requirements of CEQA.

CITIZENS PLANNING ASSOCIATION OF SANTA BARBARA COUNTY, INC.

CPA-19

9. p. 5.3-13 The discussion of potential mitigation of Area Study onshore groundwater demand should be carried out in more detail. Since the cumulative impact of oil and gas project water demand (direct and induced) is significant, the EIS/R should recommend specific mitigation approaches for consideration by the County. The document mentions a produced water desalination facility as a possible mitigation. We suggest that a specific facility size be recommended, based on cumulative demand forecasts, and that Exxon and Union be responsible for implementing this project, with pro-rata reimbursement made as other projects come up for review. The EIS/R could discuss the feasibility of a desalination plant on-site which would yield water for oil and gas processing operations, and a surplus at a quality level satisfactory for either artificial recharge of the basin, or for direct sale to agricultural users. This would offset the water demand from increased pumping on-site and induced in the surrounding community.

Socioeconomics

CPA-20

9. p. 5.7-9, 5.7-27 We disagree that the groundwater demand created by project and Area Study employment/population growth is a Class I, unmitigable impact. The desalination facility measure discussed in Section 5.3.2.4 could provide feasible mitigation through creating of an offsetting supply or recharge program. Otherwise, applicant financial contributions to local water supply/conservation programs could provide mitigation. This approach has been employed on other recent County permits as a mitigation for the same impact on the South Coast.

CPA-21

10. p. 5.7-27 In general, the public service, housing and fiscal impacts projected should be noted as being based on certain assumptions and methodologies which are viewed differently by different expert reviewers. For this reason, the projected impacts in the EIS/R should be considered as a starting point for the applicants' participation in the socioeconomic monitoring and mitigation programs of Santa Barbara and Ventura counties.

Aesthetic Environment

CPA-22

11. p. 5.9-4 - 5.9-8 We disagree with the conclusion that the noise and visual intrusion of helicopter flights over public beaches is an insignificant impact and only an "annoyance." In our view, the chosen criteria are flawed if this effect is judged insignificant. Particularly when the Area Study and cumulative offshore development is considered, helicopter flights from the regional airports will constitute a major new noise intrusion to recreational beaches and some residential areas. On a

cumulative basis, this impact is quite significant to residents, and deserves mitigation. The public agencies should consider taking any legal approaches available to reduce this impact. The applicant should consider voluntary approaches to mitigating this impact, such as contractual terms with flight services.

12. p. 5.9-47 The document notes that an inland site for the electrical substation would be preferable from an aesthetic standpoint. Further analysis should be conducted for the final EIS/R to indicate one or more preferred sites and provide a level of analysis to meet permitting needs of the County. CPA-23

13. p. 5.10-11 The criteria chosen to evaluate impacts to recreational resources are quantitative only, and do not incorporate adverse impacts to the quality of these resources. While major offshore and coastline industrial developments may cause only temporary direct impacts, in terms of land disturbance, in recreational areas, there are potential long-term degradations of the public experience at some areas which are not easily quantified or captured by the listed criteria. Using this criteria, we suggest that the recreational quality impacts may be understated in the discussion. CPA-24

For example, we disagree that a major oil spill reaching the beaches would be an insignificant (Class III) impact to beach recreation, since it is of relatively short duration. Any spillage of oil on the beach should be considered significant, as it has the potential to affect the beach experience and desirability of the area for recreation and tourism beyond the time when there is actually a large volume of oil on the beach. CPA-25

5.1.5

916 Anacapa Street • Santa Barbara, California 93101 • 966-3979

CITIZENS PLANNING ASSOCIATION OF SANTA BARBARA COUNTY, INC.

May 6, 1985

TO: Janice Yonekura
Energy Division
1226 Anacapa Street
Santa Barbara, CA 93101

FROM: Michael Feeney, Executive Director
Citizens Planning Association

RE: Supplemental comments on Draft EIS/EIR for Union/Exxon/ Central Santa Maria Basin Area Study

CPA has continued to review the Union/Exxon EIR, and we have a few further points to be addressed in the final document.

1. ALTERNATIVE SITES FOR GAS PROCESSING. In our previous letter of comment, we criticized the lack of consideration of alternative sites for gas processing at sites more distant from populated and highly travelled areas. Attached is a staff memo of the County Energy Division discussing potential locations for a consolidated gas processing facility in the western Santa Maria Valley. These sites are being discussed as part of planning research by Santa Barbara County and for scoping of environmental review for the Cities Service application in San Luis Obispo County. CPA-26

Since County policy has favored consolidation of similar industrial activities in order to reduce the exposure to risk and environmental damage, we believe that the Union/Exxon EIR should consider a gas processing alternative which: CPA-27

- assumes a consolidated gas processing plant in the western Santa Maria Valley, at one or more sites away from populated areas, and sized to handle the estimated peak gas volume from both the Central and Northern Santa Maria Basin.

- assumes offshore routing of gas pipelines only, to a single landfall south of the Santa Maria River, to avoid piping "dirty" gas across populated and travelled terrain.

- provides sufficient detail on environmental impacts to compare with the Lompoc gas processing potential site, and to judge which is an environmentally preferred alternative.

CPA has a growing concern about the possibility of building a gas processing plant at the Union Lompoc site. We have heard increasing concern from residents of the area about the risks of such a facility so near residential areas. CPA-28

2. VERIFICATION OF BUILDOUT OIL VOLUMES. We request that the JRP and consultants re-examine the assumptions leading to an estimated need for a 100,000 capacity oil processing facility for Central SM Basin crude. We believe this may be a low figure, based on the information on federal leases contained in the EIR, the proposed MMS 5-year leasing program, and plans for leasing in state waters outlined in the letter to Dianne Guzman from the State Lands Commission (3/20/85, attached). CPA-29

If the peak production figure is potentially higher than indicated, then the EIR should discuss the impacts of buildout to a higher capacity. CEQA section 15144 calls for a public agency, when forecasting future activity, to "use its best efforts to find out and disclose all that it reasonably can." In this instance, the most current peak production estimates should be used, and those figures have probably changed since this EIR was scoped. Of particular concern is air quality impact associated with increased oil production offshore and processing onshore. CPA-30

5.1.6

Since approval of the first phase Union processing plant will almost certainly have the effect of designating this area for consolidated buildout to serve the region, we believe that CEQA section 15165, regarding "multiple and phased projects," comes into play. This section would require a more detailed assessment of impacts for the ultimate oil (and gas) buildout, and relevant alternatives to reduce long-term impacts. CPA-31

3. AIR QUALITY ANALYSIS. The EIR should discuss a cumulative impact scenario which uses available peak traffic and air pollution impacts associated with planned Space Shuttle launches. These estimates include tens of thousands of extra car trips in the lower Santa Ynez Valley, which would add significantly to the future baseline of emissions at certain times. The Union/Exxon EIR should evaluate such scenarios as a special case, and then suggest potential mitigation measures (e.g. curtailment of industrial activities in the area during Shuttle launch days). CPA-32

The EIR should also discuss in detail the potential economic effect of marginal increases in air pollution to the seed flower industry in the Lompoc area. CPA-33

4. Finally, the EIR should evaluate the potential for job creation in Northern Santa Barbara County, in terms of the amount of air emissions generated per job created. Such an analysis has been done for the Los Angeles area, comparing employment to CPA-34

pollutant emission ratios for a number of industries. This analysis "Employment and Reactive Organic Gas Emissions for the Manufacturing Sector of the South Coast Air Basin," is cited in a report by Citizens for a Better Environment (excerpt enclosed).

Since a recent County of Santa Barbara Housing Element update projects a 45% population increase in the North County by the year 2000, it is important that the impacts and tradeoffs caused by permitting various types of industrial growth be considered in major environmental documents. Particularly in this case, where buildout of the regional offshore oil and gas industry is purportedly being evaluated, we suggest that some information be provided to clarify the number of jobs created by this industrial growth in comparison to other economic options. CPA-35

Please contact Michael Feeney at the CPA office for clarification of any of our comments on this document.

ATTACHMENT 1

Santa Barbara County

RESOURCE MANAGEMENT DEPARTMENT

Energy Division

Director
Dianne Guzman, AICP

TO: Randy Smith

FROM: Judy Friedman

DATE: 4/9/85

SUBJECT: North County Consolidated Site

Cities Service screened several potential sites in Santa Barbara County for a 125 KBPD consolidated oil processing facility for the San Miguel Project, using the 1980 Envicom Corporation study as a site planning guideline, and other criteria as suggested by Santa Barbara County. Included in the requirements which Santa Barbara County outlined were that the site be located in industrially zoned land, and that the site be located no further than seven miles from the landfall, (the latter was required so that the site would be within the distance that oil can be pumped without reheat). As a result of combined screening criteria, all potential sites in Santa Barbara County were eliminated, and a site was chosen in San Luis Obispo County because it met all of the combined requirements.

5.1.7

Recently, the MMS has told Cities Service to consider the processing of 125 MMSCFD gas from the Northern Santa Maria Basin, creating the need to consider a consolidated gas facility as well. Safety considerations including proximity to residents and number of Fire Department service areas may deem the Callendar site unsuitable for both a gas and oil consolidated site. In light of this I examined potential sites in the North County which could support a combined consolidated oil and gas facility. Minimum acreage needed was determined as follows:

1. Oil processing acreage for 125 KBPD at 1 acre per 15 KBPD: 8.3 acres
2. Oil Storage acreage for 280 KBBL at 1 acre per 90 KBBl: 3.1 acres
3. Gas Processing acreage for 138 MMSCFD (125 MMSCFD for the Northern Santa Maria Basin plus 13 MMSCFD from Exxon's project Shamrock)at 1 acre per 13 MMSCFD: 10.6 acres.

Total acreage needed is 22.0 plus buffer of 10 to 20 acres gives 32 to 42 acres needed.

The best site I found met all of the requirements including the Fire Department's concern in terms of service areas. This site however had been previously eliminated because it is located outside of the seven mile limit. The site is the Douglas refinery area (APN's 113-150-05, 20, 21) and is located 10 miles from the landfall. Portions of this site were assesed in the EIR's associated with the Union and Getty Wastewater Treatment Facility Projects. The site is zoned industrial, allows for consolidation, can be reached by using Highway 166, has little predicted visual, air quality, or endangered species impacts and can be reached by Landfall South of the Santa Maria River. Although it is true that it is outside of the seven mile limit, in view of the need for a consolidated gas facility as well as an oil facility, this site should be considered.

If it is determined that it is absolutely necessary to be within seven miles, there are potential sites in what is now agricultural preserve land. Under Uniform Rule Number 2 of the Santa Barbara County Agricultural Preserve Program Uniform Rules Oil and Gas Facilities are compatible uses in an agricultural preserve. The exact location of such a site would depend upon the landowners involved, and the decision of the Agricultural Preserve Committee, but several large open areas are located South of Guadalupe. One site is near the intersection of Brown and Betteravia Roads, (APN's 113-100-11, 23).

I consulted with Larry Appel as to the suitability of Ag Preserve land for a facility and he strongly discouraged such use. The Douglas Refinery, he indicated, may be a suitable site because it would entail expansion of a site already under industrial use. One or other of the wastewater facility sites would also be suitable, (one site will be used for a consolidated facility, the other would then be available), and environmental review has already been done for those projects.

2761e

ATTACHMENT 2

187

STATE OF CALIFORNIA

GEORGE DEUKMEJIAN, Governor

STATE LANDS COMMISSION

KENNETH CORY, Controller
LEO T. McCARTHY, Lieutenant Governor
JESSE R. HUFF, Director of Finance

EXECUTIVE OFFICE
1807 - 13th Street
Sacramento, California 95814

CLAIRE T. DEDRICK
Executive Officer

RECEIVED
COUNTY OF SANTA BARBARA
MAR 2 1985
RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

File Ref: W 40185

March 20, 1985

RECEIVED
MAR 2 1 1985
S. B. COUNTY
RESOURCE MGT. DEPT.

Dianne Guzman, Director
Santa Barbara County Resource
Management Department
123 East Anapamu Street
Santa Barbara, California 93101

Dear Ms. Guzman:

On behalf of the California State Lands Commission, I appreciate the opportunity to participate in the very important study your staff is now conducting as a part of the County of Santa Barbara's Oil and Gas Policy Work Program. The opportunity to share with your staff our oil and gas production forecasts is as important to us as it is to you.

In response to your letter of March 6, 1985, Commission staff has prepared resource estimate and production/processing forecasts for State lands off Santa Barbara County, between Goleta and the San Luis Obispo County line. The forecasts are submitted in graphic and tabular form.

Several interesting and important pieces of information are conveyed in the forecasts. Three graphic displays are included. The first illustrates our present anticipated development forecast, and incorporates the assumption that it takes 10 years from the time an exploration program is begun until a development is permitted offshore California. In this scenario, there is a significant drop in production between the peak production years of presently proposed developments and the peak production years of anticipated future developments. This "roller coaster" effect is a direct result of the time involved in the permitting process. The second scenario provides a smoother production curve. The only difference is that development on existing leases in the Santa Barbara Channel has been accelerated by two to three years. Is is our goal to achieve the latter production forecast minimizing the roller coaster effects and lowering the peak production processing needs by effective scheduling of projects. The third graphic display is the gas production forecast.

5.1.8

In tabular form, we have itemized, by field, an area resource estimate and daily production forecasts. These areas are grouped into what seem logical co-location groups, but we have not developed preferred sites for co-located facilities. We suggest the County plan for co-located facilities which can be modified as processing needs vary. We have also identified the number of possible platforms in each potentially productive area. The platform numbers, however, are not based on actual exploratory well tests.

If you have any questions on these forecasts, please contact Don Everitts or Al Willard in our Long Beach Office at (213) 590-5201.

Sincerely,

Claire

Claire T. Dedrick
Executive Officer

cc: Sharon Meves w/attachment
Energy Division
1226 Anacapa Street
Santa Barbara, CA 93101

RESOURCE ESTIMATES
PRODUCTION AND PROCESSING FORECASTS
STATE TIDE AND SUBMERGED LANDS
GOLETA TO THE SANTA MARIA RIVER

Field or Area	Estimated Total Resource	Peak Production Level & Year	Start up Year	Number of Leases	Comments
Coal Oil Point*	120 MMB 1 MMMCF	70 M BOD 60 M MCFD 1991	1988	3	DPP in review 3-5
So. Ellwood/ Holly Extension*	10 MMB 10 MMMCF	5 M BOD 4 M MCFD 1995	1993	2	From Holly or onshore.
Ellwood to Naples*	70 MMB 70 MMMCF	42 M BOD 40 M MCFD 1995	1992	4	2 platforms
Molino Area**	40 MMB 80 MMMCF	30 M BOD .85 M MCFD 1992	1989	2-3	1 platform DPP in prep.
Gaviota/ Caliente**	10 MMB 20 MMMCF	5 M BOD 10 M MCFD a 1997 b 1995	1994	2	Onshore wells.
Alegria West to Jade ***	25 MMB 50 MMMCF	11 M BOD 25 M MCFD a 1995 b 1992	1994	4	2 platforms
Cojo Area ***	40 MMB 40 MMMCFD	15 M BOD 15 M MCFD 1992	1989	2	1 platform
Quitclaim Tracts ****	40 MMB 80 MMMCF	15 M BOD 30 M MCF 1998	1995	3	3 platforms
Pt. Conception/ Pt. Arguello*****	153 MMB 150 MMMCF	70 M BOD 60 M MCFD 2000	1997	8	6 platforms
Pt. Arguello to Santa Maria River ******	100 MMB 50 MMMCF	45 M BOD 20 M MCFD 2003	2000	15	4 platforms

a: anticipated under existing constraints (slow permit process)
b: preferred for steady production level

22

SUSAN LIVENICK
LONG BEACH (213) 590-5215

SHARON MAVES

Notes

* All production from leases between Coal Oil Point and Naples could be processed in separate facilities colocated at the same site. Offshore processing would be required if the processing streams were not segregated.

** All production from leases between Capitan Beach and Gaviota could be processed in separate facilities colocated at the same site. Offshore processing would be required if the processing steams were not segregated.

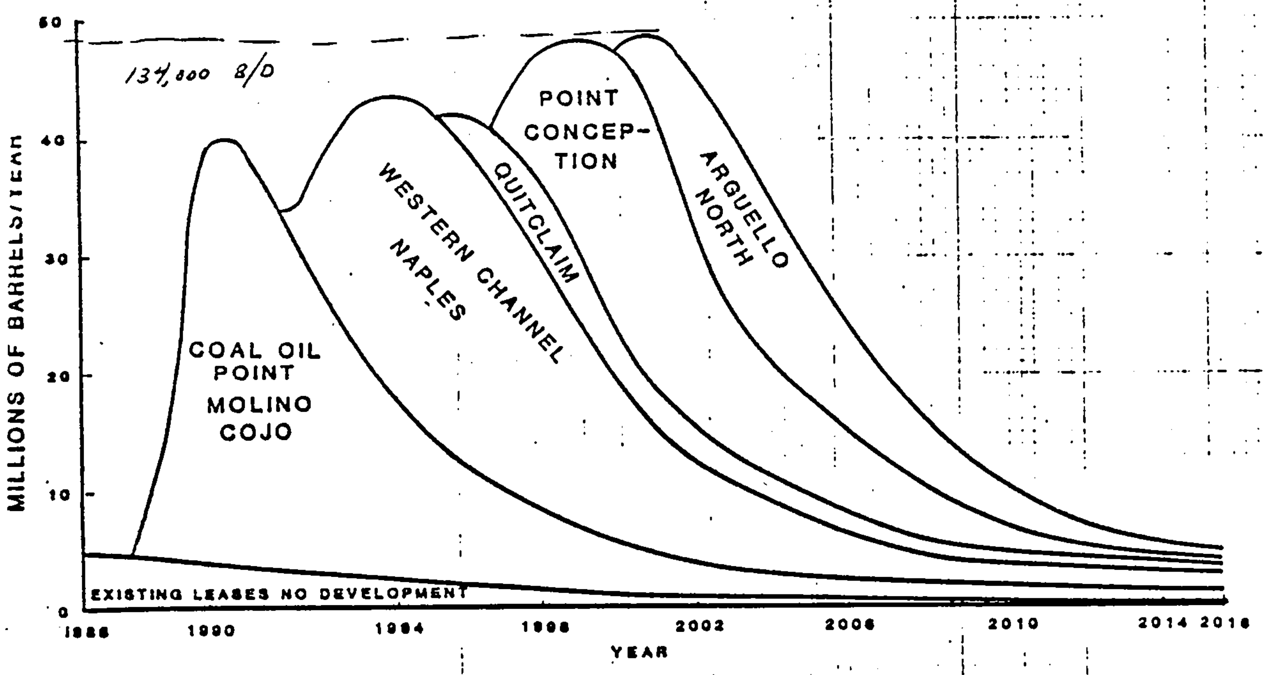
*** All production from leases between Gaviota and Point Conception could be processed in separate facilities colocated at a single site. Offshore processing would be required if the processing steams were not segregated.

**** The three quitclaimed tracts are located near Naples, Refugio and San Augustine, respectively. Production should be processed in a segregated facility colocated with production in the immediate vicinity.

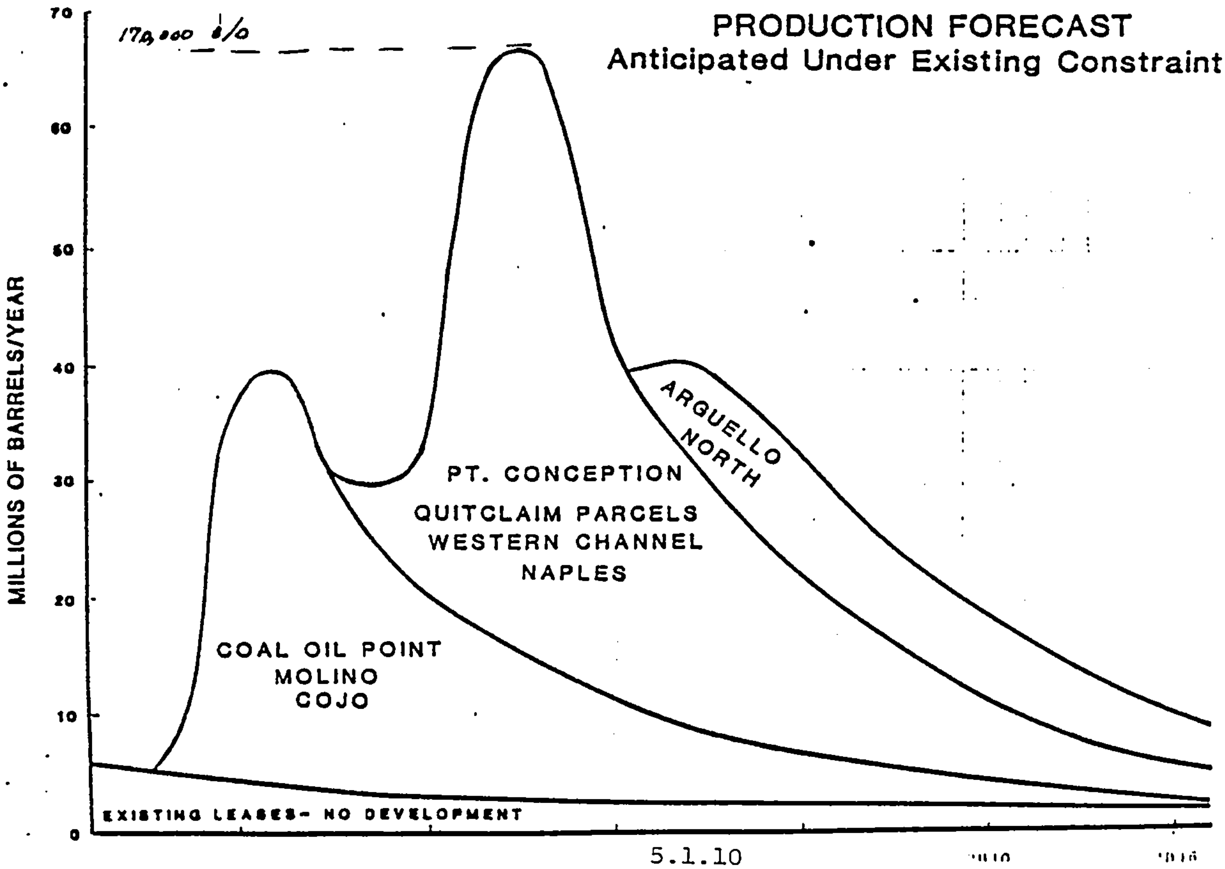
***** Production from the Conception/Arguello area would be suitable for processing at either one or two geographically separated locations. If the production cannot be segregated by lease at the processing facility, offshore processing will be necessary.

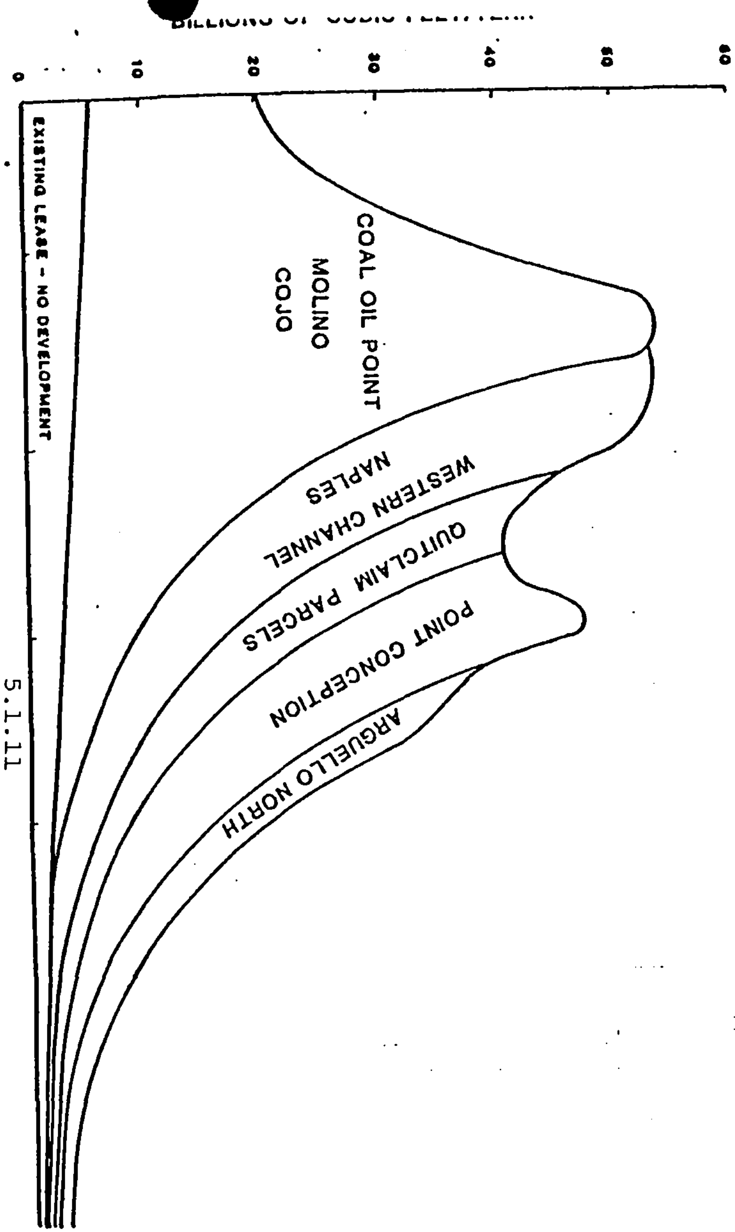
****** Very little is known about the resource on State Lands north of Point Arguello. One hundred million barrels is a conservative figure based on present knowledge of the Santa Maria basin. Production must be segregated; co-location in a single site is acceptable.

PREFERRED PRODUCTION FORECAST



PRODUCTION FORECAST
Anticipated Under Existing Constraints





GAS PRODUCTION FORECAST

Michael + ...
Please read & take appropriate action.
P

#85832

a CBE comment

Comments of
MARK ABRAMOWITZ

on behalf of
CITIZENS FOR A BETTER ENVIRONMENT

to the
MINERALS MANAGEMENT SERVICE, U.S. DEPARTMENT OF THE INTERIOR

regarding the
ADVANCE NOTICE OF PROPOSED RULEMAKING FOR OIL, GAS, AND SULFUR OPERATIONS IN THE OUTER CONTINENTAL SHELF

APRIL 6, 1985

Citizens For A Better Environment
5539 West Pico Boulevard, Los Angeles, CA 90019 (213) 935-0117

5. SIP Tracking Proposal

Not included in the framework, but included in the Federal Register Notice for comment was a proposal to use the onshore SIP tracking process to monitor emissions inventory growth. While CBE agrees that OCS emissions should become part of a basin's emission inventory, we also believe that these OCS emissions should be controlled locally.

We also have two major concerns over the SIP-tracking proposal. First, the decision whether or not to control the OCS source further should not rest entirely with the MMS. The state, EPA or any other agency responsible for air quality standard attainment, should make this decision after public comment. Secondly, CBE does not believe that cost is the only - or even the best - criteria upon which to decide whether or not to control further. Even if there were equal or more cost-effective means of controlling emissions, a decision based on other factors, such as impact on jobs, may indicate that OCS emissions should be controlled first.

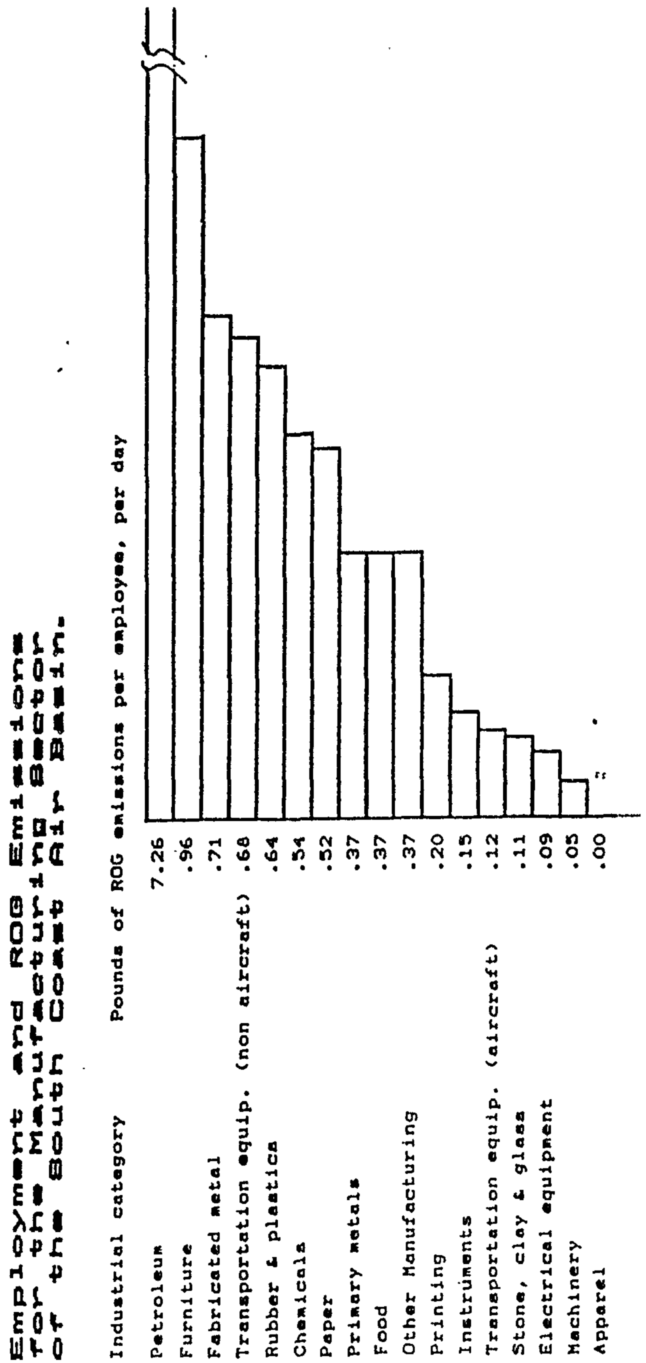
5.1.12 For example, the attached chart, entitled "Employment and ROG Emissions for the Manufacturing Sector of the South Coast Air Basin" was derived from data showing that the petroleum industry provides less jobs per amount of ROG emitted. In fact, per employee, the petroleum industry produced over seven times the pollution of the next closest manufacturing industry. This result is conservative because it includes service stations which probably employ more per amount of emissions.

good argument

Thus, a region may decide to control OCS activities before controlling other more cost-effective industries. Alternatively, another criteria the community may deem important from an air quality standpoint is the location of the source with respect to the air basin and windflow in the basin.

6. NOx Offset Proposal

Another provision set forth for comment was the acquisition of NOx offsets after the installation of BACT. CBE believes that this idea may have some merit. However, we believe that the threshold "F" for triggering the offset requirement should be "0" and, as discussed above, a greater than 1:1 offset ratio may be required. In addition, if the innovative technology fails to work, BACT (LAER) should be applied. We also believe that "innovative technology" should be defined as (1) technologies resulting in greater emission reductions than strategies equivalent to those used in any area, and (2) technologies more



RESPONSES TO CITIZENS PLANNING ASSOCIATION COMMENTS

CPA-1 The Union fee Property was considered to be an appropriate location for the proposed oil dehydration facility since it is a large parcel of land (9,000-plus acres). This land should not see future residential development during the life of the project since it is a producing oil field, and Union has indicated that they have no plans for selling any of this land. Also the property has existing oil development and some of the proposed sites were not considered to be in close enough proximity to residential areas to represent a safety risk even after future Area Study buildout. The safety contours for the buildout facilities can be found in Appendix M on System Safety. These sites also are in relatively close proximity to some existing public services and utilities such as fire fighting equipment that could be expanded to benefit both the local communities as well as to protect the proposed facility. It should also be noted that the residents of Mission Hills support the location at Site 4 as was stated at the Lompoc hearing, on April 17, 1985, and had numerous discussions with Union Oil during the NOP period which resulted in the preferred site being moved from Site 8 to Site 4. A further discussion of this will be added to the Alternatives section of the Final EIS/EIR.

The alternative site locations evaluated in the EIS/EIR are discussed in Chapter III. This included initial screening of eight (8) sites on the Union fee Property for use as a consolidated facility. The issue used to evaluate the sites is given in Chapter III.

CPA-2 The purpose of the EIS/EIR is not to conduct a siting study for a hypothetical gas plant, but to evaluate the proposed projects as submitted by the Applicants, and to look at reasonable alternatives to their proposed projects. The projects as currently proposed only include the construction of a new oil dehydration facility and <u>do not</u> include any proposed new gas processing facility. The Union fee Property as discussed above in CPA-1 was considered an appropriate location for the proposed and expanded oil processing facility from both an environmental and safety point of view. The location on Union Fee Property relies on several public services like water wells and power lines, as well as existing pipeline networks. Other site locations would involve environmental impacts associated with installing these pipelines and public service connections. As reflected above in CPA-1, eight (8) sites were evaluated for a consolidated oil facility and are discussed in Chapter III..

CPA-3 The gas processing alternatives are discussed in greater detail in Section 10 of Technical Appendix M, which addresses the risks associated with onshore area development. Table 10-1 lists events of potential signficance.

Transportation risks associated with such development are also addressed in Section 10 of Technical Appendix M. It was concluded that the overall frequency of a fatality associated with the transportation of gas by-products could be as high as 0.27/yr or, on average, one or more fatalities every 44 months of operation at peak processing levels.

The largest risk was found to be from transportation, not gas processing, and relocating the facility will have very little effect on this risk. For Chevron/Texaco the gas processing facility was also a part of the proposed project.

CPA-4 See response to CPA-3.

CPA-5 The impacts associated with the buildout to 100,000 B/D of the dehydration facility are covered to a planning level of detail throughout the document under the Area Study. Each of the technical appendices covers in more detail the impacts associated with the buildout and appropriate mitigation measures for the Area Study are discussed throughout the document and in the Executive Summary Impact tables. Any future proposed buildout at this site will be subject to a separate CEQA review where more detailed information would be provided.

CPA-6 The buildout of the oil dehydration facility to 100,000 B/D of oil would not substantially change the visual impacts over the proposed facility since the modification would include five heater treaters and one free water knockout drum. See the Facility Plot Plan in Chapter II. Also, as stated under Visual Resources the impacts from the facility would be insignificant after two to five years after landscape screen is complete. The other issues such as traffic, land use compatibility, safety and noise are all discussed in the appropriate technical appendices.

CPA-7 Comment noted. The Cumulative Impacts associated with both oil and non-oil development has been covered in detail in this document. The cumulative analysis has looked at the tri-county area and has even suggested some mitigations for issues such as helicopter traffic, which is normally considered out of the scope of the EIS/EIR's process. The analysis also evaluated the separate effects of both oil and non-oil cumulative projects. The purpose of the cumulative analysis as defined by CEQA and NEPA is to determine what portion of the cumulative impacts are a result of the project. This document contains this analysis and also discusses potential ways that some of the cumulative impacts could be mitigated.

CPA-8 The cumultive impacts for recreation, tourism, visual, noise, odors, air quality, oil spills and wildlife has been covered in both the main EIS/EIR document and the technicl appendices.

CPA-9 The significance criteria and levels for the various issue areas are consistent with that used in previous EIS/EIRs and has been developed and approved by the County of Santa Barbara. The Coastal Resource Enhancement Fund will be incorporated into the Final EIS/EIR as a mitigation measure for areas such as visual aesthetics, recration and tourism.

CPA-10 If these mitigation measures are adopted by the responsible agency, then the Applicants must comply with them. Most of the schedule adjustments are for onshore pipelines and do not conflict with Union's proposed schedule, and Union has committed to these as part of the consistency certification.

CPA-11 Comments noted. Text has been revised and expanded. See response to CPA-29, 30 and 31.

CPA-12 See response to CPA-3.

CPA-13 These emissions are supplied by the Applicants and are not the emissions used for air quality modeling. The air quality modeling emissions can be found in Appendix B, pages 4-65 to 4-75. However, the major difference for the emission levels between Platforms Irene and Shamrock are due to the number of crew and supply boat trips required for the platform. This is shown in Tables 2.1-3 for Platform Irene and 2.1-7 for Platform Shamrock. The platform emissions include the idling emissions from the boats. Platform Irene is proposing to use helicopters and not crew boats which, from an air quality standpoint is environmentally preferred. Also, Platform Shamrock has three diesel cranes in operation, whereas Platform Irene only has two. In general, Platform Irene is a less complicated platform than Platform Shamrock which has larger and more diesel operated equipment.

CPA-14 The substation is at Surf in order to keep it out of the 100-year floodplain of the Santa Ynez River. This facility, since it must be above ground, could be damaged by a flood, resulting in loss of power to the platforms. Also from a safety point of view it would be preferable to limit the amount of ground exposure for the 27,000 KVA cable feeding the platforms.

CPA-15 The Point Pedernales Field will be developed over an anticlinal structure through which several faults have been mapped. These are shown on Figures 1.2.4-2, 1.6.4-7 and 1.6.5-4a of Technical Appendix A. Deviated wells from the platforms will be drilled to intercept the oil horizons. In order to reach the target horizons, faults may be penetrated by directional drilling. Avoiding known faults when drilling is possible but most likely will reduce the production from the field.

For a seafloor spill from a fault to occur several special conditions must exist. These conditions are explained on p. 242-243 of Section 2.1.2.2 of Technical Appendix A and are restated below:

1. A deviated well were to penetrate a fault zone that,if projected, would intercept the seafloor or come close to the bottom sediments.

2. The particular fault is active, potentially active or is capable of sympathetic movement due to distant earthquake activity.

3. The fault ruptures and shears the well casing at the fault zone.

4. Reservoir pressures in the fault zone exceed the overlying hydrostatic pressures.

5. There is fluid continuity to the seafloor along the fault or through the bottom sediments and/or bedrock formations.

The faults in the immediate location of the field are not considered active or potentially active and therefore are not capable of independent fault rupture. The probability of sympathetic displacement on one or more of the local faults due to strong earthquake ground motions is judged to be very low, though possible.

Normally during drilling operations, rock cuttings and/or core are being sampled, logged and evaluated by a geologist. Sudden changes in lithology and drilling rates might indicate that a fault has been penetrated. During the drilling operation the mud pressures are constantly being monitored. A sudden increase in pressure might suggest a fault zone has been encountered which is under pressure from the reservoirs. Blowout preventers on the seafloor provide protection for excessive pressure buildup in the well casing. As long as the pressure remains confined in the well, there is little danger of a spill.

To design a well casing to withstand a fault rupture is not technically feasible. However, preventative measures can be taken during the drilling operation to mitigate possible future problems. The technique would include the close observation of geologic and drilling conditions during hole advancement. If a fault zone is encountered which is under high pressure (greater than hydrostatic), immediate consideration and analysis should be given to the potential danger of a seafloor blowout in the event of a future fault displacement. After a thorough analysis, a decision can be made to either properly abandon and seal the hole or continue drilling if the geologic conditions appear favorable.

In the remote event of a seafloor blowout along a fault due to a severed casing, spillage is likely to occur. In this case directional drilling is immediately employed to intercept the sheared casing or relieve pressure in the fault zone below the seafloor.

In summary, to avoid drilling through a known fault by directional drilling does constitute a mitigation measure. However, unknown faults might be encountered during hole advancement. These conditions would have to be assessed at the time of penetration and a decision made as to what potential hazard might exist. Either the hole should be abandoned or if safe conditions prevail, the hole can be advanced. Normally, drilling through a fault zone is not considered an unsafe practice, and all drilling activities are regulated and controlled by the MMS to ensure safe practices.

CPA-16 The onshore facility for the Area Study buildout was a hypothetical design to be used as a planning tool. It is not part of the present permitting process. Although this facility included an oil dehydration plant which was an expanded version of the Union application, the gas plant was strictly hypothetical with approximate assumptions on configuration and gas processing capabilities. In the DEIS, it is stated that there would be exceedences of the short-term average SO_2 standards with this design. This was due to emissions from the hypothetical gas plant. If and when a permit application for a consolidated facility is received, a detailed design would have to include mitigations that would reduce the SO2 emissions from the gas plant such that the ambient air standards would not be exceeded. SO2 emissions from the Union Oil Dehydration Facility are very small and would not preclude the expansion to a consolidated oil and gas facility.

CPA-17 In the revision to the County Air Quality Attainment Plan, offsets for future development have been addressed and the initial conclusions are that there are not many available in the region. Union has proposed some offsets for their proposed facilities by modifying operations in their Lompoc oil field. This was discussed in the DEIS.

Additional mitigation measures besides offsets have recently been explored for the Union/Exxon projects, and a number that the regulatory agencies believe to be enforceable were modeled. These additional mitigation measures would reduce the need for offsets. The modeling results of the additional mitigation measures are reported and analyzed in detail in the Technical Addendum to this Response to Comments Document.

CPA-18 Possible methods of crossing the Santa Ynez River include trenching, spanning, drilling or attachment of lines to the existing Floradale Bridge. The advantages and limitations of each of these possible approaches is discussed further in Section X of this Response to Comments Volume. In addition, further mitigation measures to reduce the risk of oil spills are proposed.

CPA-19 Comment acknowledged. The discussion of impacts of Area Study development is intended as a planning-level discussion, and is not intended to provide enough detail for permitting of any facilities which might be required for such development. At such time as facilities are proposed, they would be subject to a review similar in detail to that provided in this document for proposed facilities associated with this project.

CPA-20 We agree that the project and area study impacts upon water demand in the Lompoc area should be reclassified from Class I to Class II. Desalination of water at the Lompoc facility would offset project-induced residential and commercial demand in the Lompoc area. Text changes will reflect this reclassification.

CPA-21 Comment noted.

CPA-22 Please see Section 5.2.1, comment CAO-19 for a discussion of the significance of helicopter noise.

Regulation of air traffic is the responsibility of the FAA which is concerned with safety rather than noise control. FAA jurisdiction includes routes, altitudes and limitations on flights as well as enforcement of regulations. Local jurisdictions cannot set aside or modify FAA regulations. Helicopter noise and potential mitigations (e.g., designated routes, minimum altitudes and time of day restrictions) could be addressed in a local letter of agreement negotiated by cities, counties, the operators and the FAA.

In terms of visual impacts, the major impact of helicopter flights from Santa Barbara Airport will occur at Goleta State Beach and nearby residences. The incremental increase in air traffic due to the project and future development would not represent noticeable lowering of visual quality. With respect to departures from Santa Maria Airport under the Area Study and cumulative scenarios, no public use areas or travel routes that are sensitive in terms of visual quality are likely to be affected.

CPA-23 To reduce visual impacts, siting the electrical substation inland and outside the coastal zone is preferable to sitting the facility as proposed. To be unobstrusive, the facility should be in the lowlands either north or south of Highway 246 and about two miles inland. However, to site the facility in these lowlands would be to place it within the 100-year flood plain. There is the infrequent chance of damage due to flooding.

Moreover, it is not feasible to locate the substation on the knoll above Highway 246 which is owned by Vandenberg AFB. No above-ground buildings are permitted in this area due to military testing.

CPA-24 & CPA-25 The presence of oil on a beach will certainly affect the recreational experience of some individuals using or desiring to use the beach. The EIS/EIR process compels the provision of an assessment of impacts that can be used to guide policy makers with respect to the permitting of projects. This demands that we rank impacts so that realistic tradeoffs can be made between issues of concern (e.g. employment growth and effects upon recreation). Since the probability of a spill occuring is small, the probability of a large quantity of oil being released during a spill is small, and the liklihood of spills from these projects reaching recreational beaches is small we consider the impact of the projects upon recreation to be Class III. Clearly a major spill washing ashore at a State or local beach park would be a very significant impact but the liklihood of the event occuring is small. Hence we plan for these unlikely occurances to the extent warrented by the severity of the event and its liklihood of occuring. Safety equipment aimed at preventing and containing spills effectively reduces the liklihood of oil spills impacting recreation areas.

In addition qualitative aspects of the recreational experience are implicit in the visual noise, and odor impact discussions.

In summary a major oil spill reaching Santa Barbara recreational beaches is a significant impact, but due to the low liklihood of such an occurance the potential impact upon recreation is Class III. Small quantities of oil have dotted Santa Barbara beaches prior to both offshore and onshore oil development projects. While this affects the recreational experience of some people it has not to our knowledge altered the usage of Santa Barbara beaches. Therefore we do not consider that "any spillage of oil on the beach should be considered significant."

CPA-26 See CPA-1 and CPA-2. As noted in this comment the evaluation of a gas

CPA-27 processing site in western Santa Maria Valley to handle both the Central Santa Maria Basin and Northern Santa Maria Basin gas production is being considered for evaluation as part of the Cities Service San Miguel Project EIS/EIR. The evaluation of the Douglas Refinery Site for gas processing was included as an option in the Request for Proposal (RFP) as part of the Cities project and therefore should be covered in the next major EIS/EIR. The onshore Area Study is included in this document to serve as a planning tool. Any alternatives to these "hypothetical" Area Study facilities will be covered when and if they are proposed and undergo their CEQA review.

CPA-28 Comment noted. This site was evaluated as a "hypothetical" site only since no gas plant is currently proposed. When and if a plant is proposed for this site it will be subject to a separate CEQA review process. The risks associated with this hypothetical gas plants are discussed in response to CPA-2.

CPA-29
30+31 We have reviewed the estimate of 100,000 B/D capacity oil processing facility for the Central Santa Maria Basin and feel that it is adequate to handle the total production from the EIS Area Study, state waters volumes outlined in the State Lands Commission letter dated March 20, 1985 and the MMS 5-year leasing program. Table 2.9-1 gives the estimated peak production from the Area Study and proposed projects. The State Lands estimate for production from Point Arguello to Santa Maria River is estimated to be 45,000 B/D in the year 2003 with start-up in the year 2000. Table 2.9-1 estimates that the Area Study production will be 15,000 B/D in the year 2000. Therefore, the total for Area Study and state lands will be 60,000 B/D, leaving 40,000 B/D of excess capacity for additional Federal OCS development. This is based on the assumption that the state lands production from Point Conception to Point Arguello will go to a co-located facility at Gaviota.

Currently the State Lands Commission will not allow state developed oil to be processed in facilities that handle co-mingled oil. This requirement is due to their royalty structure on the dry oil. The State Lands Commission will allow the use of co-located facilities that do not mingle the wet oil for processing. For more information on this question see response to OSG-1. For the cumulative analysis of air quality in the Central Santa Maria Basin none of the state lands leases were considered to be in production or drilling at the time of modeling which was 1992. This is consistant with the state lands projects for the areas from Point Arguello to Santa Maria.

CPA-32 We agree with the comment that Space Shuttle launch impacts on the cumulative scenario would be a special case. However, this type of scenario would be out of the scope of the Union/Exxon EIS/EIR. It would involve short-term duration events completely unrelated to the projects. The impacts of the Shuttle Launch Program were reported in a separate EIS Space Shuttle Program, January 1978.

CPA-33 The EIS/EIR indicated that the major ozone impacts would occur in Santa Ynez and not in Lompoc. The changes in ozone in Lompoc were very small and would have no significant impact on the seed flower industry. For inert pollutants the maximum concentrations resulting from the oil dehydration facility in Lompoc were shown to not be significant and would have no effect on the seed flower industry.

CPA-34 The permitting process for new developments (commercial, industrial, institutional, and residential) must consider impacts upon local air quality. A comparison of projects based upon air emissions per job is likely to be misleading however. The use of air emission ratios based upon jobs created introduces a bias against capital intensive operations. Capital intensive industries such as the petroleum, primary metals and chemical industries have relatively fewer employees than service sector industries such as hotels, business services and other office or research and development operations.

The capital intensive industries in many instances have done more to control air emissions than other industries and may have lower air emissions than service sector industries when measured by taxes generated or services required.

A simple comparison of pollutants per job for various industries also fails to account for the fact that the multiplier effect of new jobs varies by industry and by the composition of the local economy in which the jobs are created. The total air emissions (somehow adjusted for differences in the composition of the emissions) from the sum of jobs generated by an increase of one "direct" job should be used to create such air emission ratios. Such detail is beyond the scope of this EIR/EIR.

A comparison of air emissions per job created is most useful when considering alternative uses of a "greenfield" site. In cases where there are a number of competitive uses for a limited number of specific sites "per employee" comparisons become most useful. The Union and Exxon projects will use sites that are either currently being used for oil-related activities or, because of their location are unlikely to be used for non-oil related activities (except grazing). Since the list of industries that could use the proposed sites is very limited the air emission per job comparison may be misleading.

CPA-35 Information on the expected growth in North County due to the oil and non-oil projects through the year 2000 is discussed in the cumulative section of Technical Appendix K.

CONCERNED ABOUT OIL (CAO)

Concerned About Oil

422 NORTH MILPAS STREET #6, SANTA BARBARA, CALIFORNIA 93103 (805) 966-3717

RECEIVED
COUNTY OF SANTA BARBARA

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

April 23, 1985

Janice S. Yonekura
Energy Division
1226 Anacapa Street
Santa Barbara, CA 93101

Re: Comments on Draft EIS/EIR for Union/Exxon/Central Santa Maria Basin Area Study

The following comments supplement our testimony of April 17, 1985 and address specific impacts and mitigation measures mentioned in the Draft EIS/EIR:

CHAPTER IV: ENVIRONMENTAL AND REGULATORY SETTING

1. Marine Water Resources/Offshore Pipeline Route: The discussion on page 4.4-7, concerning the lack of data on offshore currents, waves, and littoral regime near the shore at the Santa Ynez River mouth is inadequate. The purpose of the EIS/EIR is to provide this type of information. CAO-1

5.2.2

2. Marine Water Resources: Likewise, information presented on page 4.4-11 concerning baseline data on ammonia and sulfur is incomplete. The same incompleteness appears on page 4.4-12 where it is stated that "the pollutant load of the sediments (suspended or settled) has not been investigated." CAO-2

CHAPTER V: ENVIRONMENTAL CONSEQUENCES AND MITIGATION

3. Marine Water Resources (Page 5.4-14): Effects of formation water discharge are characterized as Class III; yet it is stated that the potential for treatment chemicals to cause toxic effects in the marine environment is unknown. How can it be determined that discharge of these chemicals will have insignificant effects? CAO-3

4. Marine Water Resources (Page 5.4-17): How can it be "presumed" that impacts from discharges associated with support activity would be Class III when "no estimates were made of the marine water quality and sediment impacts" which might be expected? CAO-4

5. Marine Water Resources (Page 5.4-20): If the total volume and mass of pollutants discharged from Area Study platforms would be three times the amount generated by the Union and Exxon platforms, it is unclear why the magnitude or significance of the impacts will not increase. Even if the discharges CAO-5

occur in the immediate vicinity of the platforms, the marine organisms which are subjected to the effects of such discharges are <u>not</u> restricted to the immediate vicinity of the platforms and <u>may</u> therefore be exposed to an increased volume of pollutants from the added platforms. The EIS/EIR should address these cumulative impacts.

6. Marine Water Resources (Page 5.4-22,23) Baseline Survey: Further survey work to accumulate baseline information is not a mitigation measure. Baseline information is available <u>before</u> the project commences; hence it should be included in the draft EIS/EIR. CAO-6

7. Marine Water Resources (Page 5.4-23,25) Mitigation: Because monitoring is not in itself adequate mitigation, especially if the results of monitoring are to reveal after-the-fact consequences which could have been avoided with proper planning, we urge that further studies regarding the impacts associated with effluents be conducted prior to EIS/EIR certification. CAO-7

8. Marine Biology (Page 5.5-6): To assert that ceasing harmful activities created by the project itself constitutes a beneficial impact is a bizarre statement and a misapplication of the law. CAO-8

9. Marine Biology (Pages 5.5-13,14,15): Tables 5.5-1 and 5.5-2 do not include impacts associated with helicopter traffic, as mentioned on page 5.5-5. CAO-9

10. Marine Biology (Page 5.5-16): We question the characterization of using dispersants and sinking agents as a mitigation measure. As the report indicates, these substances may have toxic effects of their own. The EIS/EIR should examine the impacts associated with use of such substances. CAO-10

11. Marine Biology (Page 5.5-17): The preconstruction field study mentioned as a mitigation measure should be included in the Draft EIS/EIR, since the study involves accumulative <u>baseline</u> data for contamination near the project platforms. CAO-11

12. Terrestrial and Freshwater Biology (Page 5.6-48): The further discussion alluded to on this page should be part of a revised Draft EIS/EIR, rather than being added to the final EIS/EIR. Pipeline alignment is a very crucial element of the proposed project due to terrestrial and biological impacts. Studies addressing "specific impacts associated with some of the realignments" are a proper matter for agency and public review. To circumvent this opportunity for review would result in noncompliance with the mandates of CEQA and NEPA regarding treatment of alternatives in a draft environmental impact report or statement. CAO-12

13. Terrestrial and Freshwater Biology (Page 5.6-48, with reference to Page 5.6-26): The section on mitigation measures does not include measures to minimize impacts caused by helicopter traffic as mentioned on page 5.6-26. CAO-13

14. Socioeconomics: Land Use (Page 5.7-22): Short-term impacts associated with the pipeline route to Lompoc are assessed as "significant and not readily mitigable," yet classified as Class II. This characterization is not in conformance with the criteria for determining the classification of an impact as outlined on page 5.0-1. The fact that the impact is expected to be short-term is a factor to consider in applying overriding considerations, but not in reducing the impact level from Class I to Class II. CAO-14

15. Socioeconomics: Land Use (Page 5.7-28): If rezoning of land from agricultural to industrial use is a significant impact (see Impact Summary Table - Socioeconomics), how can merely limiting the amount of rezoning be considered a mitigation to insignificance? (Land use impacts are characterized as Class II -- avoidable -- on page 5.7-28). CAO-15

16. Socioeconomics: Solid Waste (Page 5.7-29): Contribution to a fund to purchase new landfill sites can hardly be considered mitigation for increased solid wastes in the area. The report fails to discuss the impacts which would be associated with construction and operation of a new landfill. CAO-16

5.2.3

17. Socioeconomics: Public Finance (Page 5.7-29): Once again there is a problem with mitigating impacts through monitoring programs, where such monitoring is possible prior to EIS/EIR certification or project approval. CAO-17

18. Socioeconomics: Police and Fire Protection (Page 5.7-29): There is no discussion of mitigation measures for the impacts to the Lompoc Fire Station, as mentioned on page 5.7-10 as a Class II impact. CAO-18

19. Aesthetic Environment: Noise (Pages 5.9-4,5): The significance criteria outlined on page 5.9-1 indicates that impacts are considered significant if they exceed certain noise levels. In addition, it is stated that a sudden change in noise level may be considered significant even if the criteria are not exceeded. However, despite the fact that both boat and helicopter noise exceed the applicable standards, the EIS/EIR classifies the impact as Class III, or insignificant. The transitory nature of the impact should not justify a characterization of insignificance. For instance, in 1990, helicopter traffic generated by Area Study development would involve 22 round trips per day (or 44 one-way trips). In 1987 and 1988, Union's and Exxon's platforms alone would require 10 helicopter trips per day (or 20 one-way trips). The impacts created by this traffic will be more than annoying; they will be significant according to the EIS/EIR criteria. CAO-19

CAO-20

20. Aesthetic Environment: Visual Impacts (Page 5.9-13/Table 5.9-3): For onshore pipeline impacts, significance for 2-5 years is characterized as short-term and locally significant. However, for impacts from the Lompoc Dehydration Facility, significance for 2-5 yearsis characterized as long-term and locally significant. Please explain this discrepancy.

21. Aesthetic Environment: Visual Impacts (Page 5.9-14): The table indicates that Class II impacts are those impacts which must be addressed in a Statement of Overriding Considerations. This is a misstatement of the law. CAO-21

22. Aesthetic Environment: Visual Impacts (Page 5.9-38): As the document indicates, impacts from offshore spills or leaks could cause significant visual impacts, depending upon the magnitude of the spill. In order to anticipate all possible scenarios, the report should consider the possibility that the impacts from spills may include Class I unavoidable impacts in the event of large spills. In any event, no mitigation measures are mentioned to minimize the visual impacts created by accidents and upsets. CAO-22

23. Other Uses: Recreation (Page 5.10-12): Please clarify the fourth sentence in paragraph two (beginning with "The use of camping or recreational vehicle facilities..."); as stated in the EIS/EIR, this sentence is unintelligible. CAO-23

<u>CHAPTER VI: CUMULATIVE IMPACTS AND MITIGATION MEASURES</u>

24. Scenario for Onshore Oil Development (Page 6.0-11): The EIS/EIR should consider a scenario which includes a consolidated marine terminal at Las Flores. With respect to the Chevron Gaviota facility, on page 6.0-11 it is stated that the facility will have a 200,000 BPD capacity, whereas on page 6.0-13 it is identified as having a 250,000 BPD capacity. Please clarify this inconsistency. In addition, the EIS/EIR should give full consideration to <u>future</u> cumulative development in the region. CAO-24

25. Onshore Water Resources (Page 6.3-1,2): Conservation should be included as a mitigation measure, including a discussion of specific conservation programs and measures. CAO-25

26. Aesthetic Environment: Noise (Page 6.9-1): Boat and helicopter noise should be included in the discussion in Section 6.9.1. CAO-26

27. Recreation: Noise (Page 6.10-4): Boat and helicopter noise should be identified as significant impacts based upon the projected noise levels (see Section 5.9). As mentioned above, the short duration of each trip is not sufficient to reduce the impacts to insignificance. CAO-27

Table 6.10.2-1 (on page 6.10-5) indicates that helicopter flights will reach the astronomical amount of 94 per day in 1990. This increase in traffic should be considered a Class I or Class II impact. Whether or not helicopter noise will "pre-empt" use of recreational areas is not the appropriate criteria by which to judge impact significance. CAO-28.1

28. Tourism (Page 6.10-7): Viewing the total cumulative development in the area, and realizing the importance of Santa Barbara's coastal setting to the success of our local tourist industry, we do not understand how the impacts on tourism can be classified as temporary and insignificant. Furthermore, the effects of a major oil spill deserve further discussion and should not be dismissed so readily. CAO-28.2

5.2.4

ADL 4/18

COMMENTS ON UNION EIS/EIR

BY: CONCERNED ABOUT OIL

APRIL 17, 1985

Thank you for the opportunity to comment on the draft EIS/EIR for the Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study. Due to the incompleteness of the document, Concerned About Oil urges the preparation of a revised draft EIS/EIR which would address alternatives and mitigation measures in more detail. CAO-29
Our testimony tonight deals with the treatment of project alternatives and the Area Study. We plan to submit further testimony in writing which will address our concerns with the document's discussion of specific impacts and mitigation measures (or lack thereof).

ALTERNATIVES

At this time, we are unable to formulate valid assessments regarding alternative project components or mitigation measures because studies are still being conducted or are in the planning stages. The results of these studies need to be incorporated into a draft form of the EIS/EIR, rather than a final version of the document, to ensure that the public and government agencies have an adequate opportunity to review and comment upon such new information. It is the intention of CEQA and NEPA that the draft EIR and EIS provide a full presentation of project impacts, alternatives, and mitigation measures. The purpose of circulating a draft document for review would be vitiated by the addition of new information after the period for public review. CAO-30

For instance, studies are still being conducted regarding the pipeline route from the landfall to the Lompoc dehydration facility. One study would be concerned with the possibility of constructing berms along the route north of Santa Ynez River so as to minimize the consequences of oil spills and leaks. This technique may help mitigate the project's terrestrial and biological impacts. CAO-31

For the southern routes, engineering studies are proposed to examine the different possibilities for crossing the Santa Ynez River. Because the river crossing raises such serious environmental concerns, it is imperative that we have the opportunity to scrutinize the various alternatives. Information must be made available concerning not only the environmental effects of such methods as trenching, drill boring, or spanning at the bridge, but also the relative feasibility of each method. CAO-32

In light of the presence of rare, threatened, and endangered species along the route, such as the Least Tern and the Tidewater Goby, we feel that the choice of a pipeline CAO-33 corridor is of utmost importance and requires the fullest possible public and agency input.

With respect to other portions of the pipeline route, we support the segment which passes through the existing fuelbreak on Vandenberg property. Intruding upon an already disturbed area would be the environmentally and culturally preferred route. For the portion of pipeline from Lompoc to the Orcutt facility, it is our concern that habitat areas for endangered species such as the three-spine stickleback be avoided. CAO-34

In regards to the siting of the Lompoc dehydration facility, we are concerned with the assessment in the EIS/EIR dealing with the relative impacts of Site 4 and Site 8. The discussion concerning impacts on onshore water for the two proposed sites is inadequate. The report merely states that "the alternative site would have the same impacts on groundwater as the proposed site." Due to the closer proximity to the Mission Hills community, and the closer proximity to wells in that area, we do not understand why impacts from the facility itself (in addition to the pipeline) would not be greater for Site 8. Although the document admits that the pipeline route to the alternative Site 8 passes near more wells than the route to the proposed Site 4, the only reference to mitigation is that "relocation would help." However, no specific relocation proposal is indicated. CAO-35

5.2.5

In Chapter 3 (at page 17), it is stated that the alternative of delaying the project was not considered because to delay the project would "only delay, not eliminate, the environmental impacts." Although this conclusion may be correct as applied to project-related impacts, the analysis is simply a misstatement of fact as related to cumulative impacts. Accordingly, this alternative should not have been dismissed without some further discussion. CAO-36

AREA STUDY

We appreciate the inclusion of an Area Study analysis in the EIS/EIR. With the projected increase in offshore oil and gas development in the Santa Barbara area, it is imperative that the County consider future development scenarios as early in the process as possible (i.e. when analyzing current applications). Consolidation of facilities is of utmost importance in our efforts to minimize the degradation of our coastline. CAO-37

We are concerned about the ability of the Lompoc dehydration facility to accomodate the oil and gas expected to be produced from the Central Santa Maria Basin. Union's Platform Irene and Exxon's platform in Project Shamrock are each expected to produce 20,000 barrels of oil per day. CAO-38

This projection, then, would yield a total of 40,000 barrels per day. And yet, the Lompoc facility as proposed would process only 36,000 barrels of oil per day. Not only does the proposed project not accomodate future development, but it does not even adequately handle presently proposed development. The EIS/EIR should have analyzed different sizes of facility capacity, such as the proposed 36,000 barrel-per-day capacity, an alternative facility with 40,000 barrel-per-day capacity, as well as the 100,000 barrel-per-day capacity mentioned in the Area Study. We understand the reluctance to give in-depth analysis to a project larger than the proposed one; however, in light of the production levels associated with Union's and Exxon's current development, and the County's goals for consolidation, the document should have addressed impacts associated with a facility sized to meet those development needs. CAO-39

Along the same lines, the EIS/EIR should consider as part of the Area Study the alternatives available for dealing with the oil and gas after being separated at the Lompoc facility. The Area Study as it exists in the draft report deals primarily with the effects of expanding the Lompoc facility to accomodate 100,000 barrels per day of oil, and the addition of a gas processing facility at the same site to process 80 million standard cubic feet per day of gas. What the Area Study neglects to address is what will happen to that oil and gas after initial treatment in Lompoc. CAO-40

The existing Santa Maria facilities (the Santa Maria Refinery and the Battles Gas Plant) do not have the capacity to handle future development from the Central Santa Maria Basin. In addition, the pipelines to such facilities would be too small to transport the oil and gas. The Study should be expanded to address the possibilities of expansion of the Santa Maria facilities (and associated pipelines) as well as construction of pipelines to transport the oil and gas to other destinations. Currently, Exxon has submitted an application to the County to construct a pipeline from Lompoc to Gaviota or another location for tie-in with a pipeline exiting the County for refineries in Los Angeles or Texas. In order to enable the County to achieve its goals of comprehensive planning, especially in the area of consolidation, we urge that the Area Study analysis encompass a wider range of alternatives for treating and transporting the Central Basin oil and gas. CAO-41

Thank you again.

Joyce Hamilton

RESPONSES TO CONCERNED ABOUT OIL COMMENTS

CAO-1 The available data, from other sites in the region, can be reasonably extrapolated to the project site for the purposes of this EIS/EIR. The data are, however, inadequate to allow certain projection of the impacts that may result; thus a monitoring program is identified to measure and mitigate impacts as appropriate.

CAO-2 The response is similar to that for comment CAO-1 above. In these cases where the data gaps are sufficiently important, the document indicates that additional monitoring be made a condition of the issuance of operating permits. None of the data gaps are considered to relate to "essential" information for which NEPA requires a worst-case analysis, or for which pre-permit baseline data collection would be required. If the recommended monitoring programs indicate that unacceptable impacts may be resulting from platform operations, the additional mitigating steps identified in the EIS/EIR could be taken at that time (and in time) to reduce the impacts to insignificance.

CAO-3 The assignment of a Class III significance to impacts from the discharge of formation water specifically <u>excludes</u> consideration of any treatment chemicals that may be added (DEIS/DEIR, page 5.4-14, para. 4, line 6). By so stating this exclusion, by calling attention to the unknown toxicities of many of the chemicals used, and by recommending (DEIS/DEIR page 5.4-23) exclusion of problematic additives, we expect this potential impact can be controlled.

CAO-4 Text has been changed from "presumed" to "expected." This 'expectation' is reasonable considering the safety precautions that have been proposed by the operators, the small volume of discharges to the ocean, and the large dilution such discharges would undergo following discharge.

CAO-5 Comments noted. Note also, however, that impact significance for marine water resources was defined in Section 5.4.1 (Table 5.4-1) and that the DEIS/DEIR statements are consistent with these definitions.

CAO-6 Comments noted. See also response to comment CAO-2.

CAO-7 See response to comment CAO-2.

CAO-8 Comment noted.

CAO-9 Helicopter noise impacts have been added to the Class III Impact Summary Table in the Executive Summary. See response to comment EPA-39.

CAO-10 The effects of dispersants are discussed more fully in Appendices E (Marine Biology) and M (System Safety, p. H-28).

CAO-11 Comment noted. See response to comment CAO-2.

CAO-12 See response to comment AF-5. These realignments constitute further mitigation measures for alternatives already evaluated, not fundamentally different alternatives requiring equivalent CEQA/NEPA treatment.

CAO-13 See response to EPA-39. Page 5.6-26 has been modified to more consistently reflect the likely Class III nature of these impacts. If these impacts showed some evidence of signicance, potential mitigation measures would include restricting flights to areas where there is no critical bird breeding habitat, and/or to altitudes where disturbance levels would be within acceptable limits.

CAO-14 The complete phase is "short term impacts may be significant and not readily mitigable." Given the uncertainty regarding the significance of the impacts and given that potential impacts could be mitigated (albeit "not readily") a Class II impact rating is most appropriate. The disruption of normal use of the pipeline route land can be partially mitigated by careful scheduling of the construction and minimization of total construction.

CAO-15 The rezoning of land from agricultural use to industrial use has two implications - first, the act of actually changing an existing land use plan designation and associated zoning; and second, the precedent such an action sets for future development. The first implication is deemed to be a class I impact because, technically, it cannot by definition of the action, be mitigated. The zoning is either changed or left unchanged - a yes-or-no situation. Mitigation implies some sort of compromising action that cannot take place in this particular circumstance.

The effect the rezoning has upon future development can be minimized (i.e. mitigated) by placing very stringent restrictions upon the use of the site and surrounding area (i.e. by imposing a petroelum resource overlay rather than a general industry overlay) hence, it is correctly deemed a Class II impact.

CAO-16 New landfill sites will be required to serve baseline growth in the study region irrespective of oil-related development (Section 4.7.5 and Socioeconomics TA Section 2.1.3.3). The provision of monies to aid in the selection and development of new sites will remove some of the financial burden of this future requirement from the populace as a whole. The monies could also be employed to aid in the determination of more efficient use of existing landfill sites. Project timing will also impact solid waste disposal costs by accelerating or decelarating requirements for new landfill sites.

A discussion of potential impacts associated with the development and operation of a future landfill site is clearly beyond the scope of this environmental document. To be useful such a discussion would have to center on a specific site or sites. The effort necessary to define potential sites and to then evaluate the range of potential impacts associated with use of the site(s) is the effort necessary to conduct an additional EIR. An EIR would have to be conducted prior to permitting the development of a new landfill site.

CAO-17 There is uncertainty regarding the magnitude and specific location of project and project-related impacts. A monitoring program can dramatically aid in the precise quantification of impacts induced by individual projects and in doing so allows for a more reasonable allocation of funds to address specific problems. The document analyzes the likely impacts and the monitoring is used to establish size.

Even though the monitoring follows certification, pre-funding through establishment of a trust or through preparation of a letter of agreement to abide by the results of the monitoring effort, can be used to insure suitable impact mitigation.

CAO-18 Comment noted. A discussion has been added to the EIS/EIR.

CAO-19 Within the regulatory context, noise is a significant impact if it exceeds the CNEL levels identified in Section 5.9.1.0. These criteria are consistent with the Santa Barbara County Comprehensive Plan, Noise Element and the California Office of Noise Control, and are applied to all types of noise (e.g., construction equipment, operations, boats, helicopters). Changes in noise levels, although not addressed by regulations, have been discussed in the EIS/EIR to: 1) help people understand why they find the impulsive short-time noise generated by helicopters and boats to be annoying; and 2) to acknowledge that such noise can be an adverse environmental impact even if no criteria are exceeded. Nevertheless, even including noise level changes, the boat and helicopter noise attributable to the proposed project does not exceed the significance criteria (in CNEL) and is properly classified as a Class III impact.

It is also important to note that the determination of noise impacts is highly site specific and is measured/calculated for identified sensitive receptor sites. Therefore, these impacts cannot be generalized over a broader area. Ambient noise levels and impacts have been addressed qualitatively in the draft document.

With respect to Area Study development, the incremental increase in helicopter departures from Santa Barbara Airport will be minimal (2 round trips per day). Most flights are anticipated to depart from Santa Maria Airport. Ambient noise levels and impacts have been discussed qualitatively in the draft document.

Cumulative development will result in a substantial increase in the number of helicopter trips per day (approximately 54) out of Santa Barbara Airport. This traffic will substantially increase the frequency of annoying helicopter noise even though the impacts associated with each flight will result in short-time, concentrated level changes similar to those described for the project. Yet, the noise impacts may or may not exceed the significance criteria's CNEL levels. Because the noise levels and impacts at sensitive receptors are unknown, the cumulative impacts could range from Class III to Class I. Within this context, the text has been changed and helicopter noise has been reclassified as a Class II impact under the cumulative development scenario.

CAO-20 Comment noted. Text has been changed. The impact would be short-term at the Lompoc Dehydration Facility.

CAO-21 Comment noted. Table has been changed.

CAO-22 Comment noted. Text has been changed. Oil spills could have a direct Class I impact on scenic quality at beach areas; in most areas the impacts would be short-term but at rocky headlands the impacts would be longer term. The only mitigation measures are those which would prevent or contain oil spills.

CAO-23 Comment noted. The sentence should read, "The use of camping or recreational vehicle facilities by these workers is not expected to meet or exceed the significance criteria thresholds defined above."

CAO-24 It was decided by the Joint Review Panels of the Union and ARCO projects that the Union project cumulative analysis would look at a marine terminal at Gaviota since this was closer to the proposed projects and to evaluate two marine terminal in the County would be inconsistent with County policy. The ARCO project is evaluating the Las Flores terminal as part of their cumulative analysis. The Gaviota Facility will have a capacity of 200,000 barrels per day of dry oil output. The cumulative analysis has included all reasonably foreseeable oil and non-oil projects in the Region.

CAO-25 Conservation of water has been added as a possible partial mitigation for cumulative impacts of diversion or pumping on water availability.

CAO-26 Comment noted. Text has been revised.

CAO-27 The impact of boat and helicopter noice is currently controlled, to the extent possible given safety considerations, through requirement of carefully defined flight patterns and operating restrictions. We agree that the number of additional helicopter and boat operations induced by oil industry development will increase the public's awareness of helicopter and boat activity, but we feel that the recreation will not be signicantly impacted due to the flight patterns and operating conditions imposed upon the helicopter operators.

Santa Barbara Airport would be likely to receive the greatest increase in helicopter operations, but the only impact upon recreation would occur in the College Point area since it is directly under the flight path. We do not expect recreation activity in the area to be reduced by an increase in helicopter operations.

The increase in supply and crew boat activity will be most moticed at Port Hueneme. Increased activity is not expected to reduce recreation in that vicinity, nor in other coastal recreation areas.

Consideration should be given to developing and operating additional helicopter "pads" to serve offshore development. The sites would have to be carefully chosen so as to not conflict with other uses and not compromise safety, but localized noise impacts could be reduced through this action. To preclude overflight of populated areas a coastal site would be preferred, but coastal zone restrictions might prevent such locations.

CAO-28 The cumulative developments' impact upon Santa Barbara County tourism is Class III because tourist activity is motivated by a number of factors that will not be measurably influenced by expected developments. The "coastal setting" is certainly an important factor contributing to the region's success as a tourist center, but the succes of the tourist industry in the North County (away from the coast) suggest that the County has much more to offer. In addition expected alterations to the current coastal setting are not likely to affect most tourists. The visual setting will alter (through the addition of boats and platforms) as will noise levels in areas near the airport, but the expected changes are not likely to measurably affect tourist levels.

The one exception would be effected by a major oil spill that involved the depositing of substantial quantities of oil on Santa Barbara beaches. This has occured in the past and the impact upon tourism was widely felt. Since the impact upon tourism is highly uncertain - due to the low probability of a spill and the even lower probability of major spill depositing substantial amounts of oil on the Santa Barbara beaches - the impact is classified as adverse, but insignificant. Clearly if a major spill were to affect the beaches the impact would be very significant. The impact of a major spill would likely affect tourist activity and associated expenditures for up to 1 year. The major spill that affected Santa Barbara in 1969 does not appear to have had a lasting effect upon tourist activity in the County.

CAO-29 Comment noted.

CAO-30 Comment noted. These mitigation measures are discussed in the draft document. These mitigation measures will result in a reduction of the overall environmental impacts associated with the pipeline routes. The impacts, or lack of impacts associated with these mitigative pipeline realignments were confirmed with the additional field work conducted after the release of the Public Draft. The results of this work is presented in Chapter X of this document.

CAO-31 The analysis on these mitigated pipeline routes is contained in this Response to Comments document in Chapter X.

CAO-32 The analysis of crossing the Santa Ynez River is provided in this document in Chapter X.

CAO-33 Comment noted. Extensive discussions have been going on with both the U.S. Fish and Wildlife Service and California Fish and Game on the pipeline routes with respect to rare, threatened and endangered species. Revised impacts associated with the mitigated pipeline routes is contained in this document as part of Chapter X.

CAO-34 Comments noted.

CAO-35 Comments noted.

CAO-36 Comment noted. As dictated by CEQA and NEPA, alternatives are for the project only and do not include cumulative impacts. Since it has been shown in the document that this project does not represent a large portion of the projected cumulative impacts, delay of the project would not substantially reduce the overall cumulative impacts.

CAO-37 Comments noted.

CAO-38 Under the Area Study analyses the impacts associated with a fully developed consolidated facility at site were evaluated. This facility was sized to handle 100,000 B/D of oil and 80 MMscfd of gas. This facility is considered sufficient to handle the complete Central Basin production. For more detail on production levels and the Exxon/Union throughput see Responses to OSG-1 and CPA-29.

CAO-39 The 36,000 B/D facility analyzed is a nominal capacity and would most likely be capable of handling both the Exxon and Union production. (For more detail on production levels and Exxon/Union throughput see Responses to OSG-1 and CPA-29.)

CAO-40 The dry oil and gas transportation out of the Lompoc facility was addressed as part of the onshore Area Study. The dry oil pipeline from Lompoc to Gaviota was looked at in the onshore Area Study as a method of moving the oil to either a marine terminal or tie-in with the Celeron/All American Pipeline system. More discussion on this is provided in the Area Study section of Chapter II. The gas, after treatment at Lompoc, would be sold and injected into the local gas distribution network. The gas byproducts would be trucked or pipelined. All of this is analyzed in the document.

CAO-41 The statements that the Santa Maria Refinery and Battles Gas Plant are not capable of handling the Area Study production throughput is correct. However, it is extremely unlikely that any other operator besides Union Oil would use the Santa Maria Refinery since they all have their own refineries where the crude is needed and the operators wish to get their crude out of Santa Barbara County and to their respective refineries. For this reason this was not considered a practical alternative to the Area Study option discussed above in CAO-40. Due to the age of the Battles Gas Plant it would not be a candidate for expansion, so the Area Study looked at a new hypothetical gas facility located at Site 4 with the proposed oil facility.

GET OIL OUT, INC. (GOO)

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COUNTY OF SANTA BARBARA

APR 30 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Get Oil Out Inc. P.O. Box 1513 924 Anacapa Street Santa Barbara California 93102 Phone (805) 965-1519

5.3.2

April 29, 1985

Janice S. Yonekura,
Project Manager
Energy Division
County of Santa Barbara
1226 Anacapa Street
Santa Barbara CA 93101

Re: Comments on Draft EIR/S for Union/Exxon/Central Santa Maria Basin Area Study

The Board of Directors of Get Oil Out Inc. (GOO) submit the following comments on the above-referenced project:

1. The document fails to discuss particulate or SO2 contamination that would result from flaring operations. It should be noted that while flaring is not classified as a normal operation, it is known to occur frequently on offshore operations in the channel, and is both objectionable and polluting. We were unable to determine whether pollutants resulting from flaring were calculated in project air emissions. GOO-1

2. It has long been GOO's policy that all drilling muds and cuttings should be barged ashore until such time as effects from such contaminants have been determined. It is also our policy to object to the issuance of blanket NPDES permits. However, at this time it is suggested that consideration be given to the impacts of disposing of uncontaminated muds and cuttings by barging GOO-2

to water depths in excess of 1,000 feet. According to information given by local fishermen, the majority of fishing is done at depths less than 1,000 feet.

3. The discussion of impacts from helicopter noise and crew/supply boat traffic is inadequate. Anyone living in the path of helicopter traffic knows it exceeds Class IV impacts. GOO-3

GOO urges that all helicopter traffic be confined to specified routes and such flights limited to occur between the hours of 7 a.m. and 7 p.m. An acceptable method of policing such routes and regulations should be established.

The document states that during 1987-88 the project will generate 20 helicopter trips daily. It further relates that we will be experiencing a cumulative total of 90 helicopter trips per day from area offshore operations. GOO urges that the possibility of imposing noise controls on all helicopters used for offshore operations. The noise impacts from helicopters is not insignificant and needs further evaluation.

Additionally, crew/supply boats need to be limited to predetermined corridors and hours of operations offshore of populated areas regulated stringently. The need for this is not evaluated by the document.

4. The document errs in its assessment of Class IV Socio-economic impacts. It is stated that the project will result in a net revenue increase for both Santa Barbara and San Luis Obispo, Counties. However, only the most cursory mention is given to costs resulting from increases in police and fire protection, in school services, road impacts, etc. We believe the Socio- GOO-4

economic section of the document is incomplete and needs further work.

5. The document fails to consider and evaluate total cumulative impacts from planned area oil and gas development. While the pro- GOO-5 ject itself will provide only small growth inducement, development of the entire San Miguel field will involve at least six platforms, and when coupled with other oil resources in the area will result in great pressures to expand public services, rezone for general industry, and the removal of existing impediments to future development. The total needs to be considered at this time to get the true effect of the project.

6. In view of the county's policy of consolidation of oil GOO-6 and gas facilities, we believe a processing facility adequate to accommodate all oil from the San Miguel field should have been evaluated at this time. As noted above, development of the field will require at least six platforms and will result in production of more than 100,000 barrels of oil per day.

7. The water impacts of the project have not been adequately GOO-7 assessed or provided for. GOO urges that a condition be imposed on the project requiring a desalination plant be built large enough to provide all water needed for the ultimate development of the San Miguel field. It is a certainty that an over-draft of the water table in the area will occur if desalination is not required for the project.

8. We noted with concern that throughout the EIR/S monitoring of impacts often replaced mitigation of impacts. This does not GOO-8 fulfill the requirements of NEPA and CEQA.

5.3.3

9. Impacts of possible, and indeed probable, oil spills were not adequately addressed by the document. GOO-9

10. Impacts of the transport of NGL's was not adequately GOO-10 considered by the document. In view of conditions imposed on the Chevron project for the transportation of NGL's by pipeline, if feasible, the imposition of a like condition on this project should have been evaluated.

We want to thank you for the privilege of commenting on this project. If you have any questions relative to these comments please call me at (805) 965-1519.

Ellen Sidenberg

Ellen Sidenberg,
Executive Director
Get Oil Out Inc. (GOO)

RESPONSES TO GET OIL OUT COMMENTS

GOO-1 SO2 and particulate flaring emissions were included in the air quality analysis. A detailed account of these emissions is included in Technical Appendix B. Some example emissions are shown in Tables 4-27 and 4-28.

GOO-2 The barging of uncontaminated muds and cuttings to deeper waters for disposal is mentioned in the EIS/EIR as a possible mitigation measure should discharge at the platform sites be found -- in the recommended monitoring program -- to be leading to unacceptable impacts. Based upon currently available information, it is not thought such a procedure needs to be required.

GOO-3 Please see Section 5.2.1, comment CAO-19 for a discussion of the significance of helicopter noise.

Regulation of air traffic is the responsibility of the FAA which is concerned with safety rather than noise control. FAA jurisdiction includes routes, altitudes and limitations on flights as well as enforcement of regulations. Local jurisdictions cannot set aside or modify FAA regulations. Helicopter noise and potential mitigations (e.g., designated routes, minimum altitudes and time of day restrictions) could be addressed in a local letter of agreement negotiated by cities, counties, the applicants and the FAA.

With respect to area and supply boats, the text has been changed to augment the discussion of mitigation. Several mitigations are appropriate such as reduction of idling time, routing to minimize noise exposure to sensitive receptors and limitation (to the extent practical) of the hours of operation.

GOO-4 The term "net revenue increase" refers to an excess of project-induced tax revenues over project-induced local government expenditures for public services. Both expenditures and revenues were forecast for individual local governments in the tri-county area. Please examine chapter 1 of Technical Appendix K - Socioeconomics for a discussion of the methodology. The fiscal impacts are further detailed for police and fire protection services as well as for schools in the technical appendix chapters detailing project(s), area study, and cumulative impacts. Estimates are made for both capital and operating cost impacts.

GOO-5 This project is to develop the Point Pedernales Field, not the San Miguel Field. The San Miguel Field is for the proposed Cities Service project currently under review in San Luis Obispo County. Also, see response to CPA-7. However, the San Miguel Field is covered in the EIS/EIR as part of the cumulative. This document does cover the impacts associated with full development of the Central Santa Maria Basin which includes six (6) total platforms. The Area Study is discussed further in Chapter II of the EIS/EIR. For each issue area, the impacts associated with the Area Study development is discussed in Chapter V of the EIS/EIR.

GOO-6 The oil from the San Miguel Field will be processed at a proposed consolidated facility in San Luis Obispo County, not Santa Barbara County and is being covered under a separate EIS/EIR where the County of San Luis Obispo is the lead state agency. However, this project is covered as part of the cumulative analysis in this EIS/EIR. In the Area Study a facility large enough to handle the anticipated production from the Central Santa Maria Basin was evaluated, which included both gas and oil. This facility was a consolidated facility. For more information on this facility and the justification for the capacity see Responses CPA-29 through CPA-31.

GOO-7 See Technical Appendix C for detailed discussions of direct project-related water demands, and Technical Appendix K for discussion of indirect project-related water demands. The decision as to whether or not to require a desalination plant for this facility in order to mitigate the impacts of groundwater withdrawals in a basin already considered to be overdrafted lies with permitting authorities, e.g., the Santa Barbara County Planning Commission.

GOO-8 The monitoring programs outlined throughout the document were not proposed as mitigation, but were to determine if mitigation measures would be needed. These suggested monitoring programs have proposed mitigation measures associated with them so if the monitoring results show significant impacts, then these mitigation measures can be imposed.

GOO-9 See Chapter V and VI of the document.

GOO-10 The potential impacts of the transport of NGLs (and LPGs) are addressed in the document in Section 5.11.7 of the EIS/EIR. As indicated in Section 4.11.1 of the EIS/EIR, the NGL products (primarily natural gasoline) will be transported by pipeline and comingled ("spiked" is the industry's term) into a crude oil transportation pipeline and as a result, are not considered to present any significant hazards.

The transportation by truck of the butane and propane by-products, on the other hand, does present a significant potential hazard to the public; considerations of this portion of the project are discussed in Chapter 5 and Addendum F of Technical Appendix M and in Sections 5.11.6 and 5.11.7 of the EIS/EIR. As stated above, the public risks from LPG transportation are the major public risks of the project, this is clearly shown in Figure 5.11.5.

At peak production for the Union project (1991 and 1992), it is estimated that the LPG transportation will require less than four tank truck trips per day (in addition to an equal number of small tank trucks serving local markets). It is not reasonable, in our view, to consider and evaluate pipeline transportation of such a limited quantity of LPG. It is reasonable, however, to consider the possibility of an LPG pipeline transporting the LPG and NGL production of the entire Santa Barbara Channel/Santa Maria Basin to a central distribution location. Such a pipeline is discussed, and is included as a mitigative measure under Cumulative Impacts, Section 6.11 of the EIS/EIR, and in Technical Appendix M.

MISSION HILLS COMMUNITY SERVICES DISTRICT (MHC)

Mission Hills Community Services District

1430 East Burton Mesa Boulevard - Lompoc, California 93436

Telephone: (805) 733-4366

April 25, 1985

Arthur D. Little Inc.
5290 Overpass Rd., Bldg "B", Suite 227
Santa Barbara, CA. 93111

Gentlemen:

It is our pleasure to write to you regarding your Union Oil Project EIS/EIR of March 18, 1985.

We make specific reference to Technical Appendix "C", onshore water. We wish to commend your Engineers on a job nicely done in preparing a well defined analysis and interpetation of the U.S. Geological Survey Report 76-183, Ground-Water Resources in the Lompoc Area. MHC-1

Messrs. Ahlroth and Wassermans contribution to the analysis of Historical Groundwater Recharge within the Santa Ynez River Basins are appreciated.

Very Truly Yours,

C.A. Thompson

C.A. (Al) Thompson
Acting Water Manager

5.4.2

CAT/rw

cc: Janice Yonekura
S.B.C. Rmd.
Board of Directors
M.H.C.S.D.

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APR 30 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

RESPONSES TO MISSION HILLS COMMUNITY SERVICES DISTRICT COMMENTS

MHC-1 Comment Noted.

HOLLISTER RANCH OWNERS' ASSOCIATION (HR)

HOLLISTER RANCH OWNERS' ASSOCIATION, Box 1000 — Bulito Canyon, Gaviota, California 93117 (805) 968-1573

April 29, 1985

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APR 30 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Janice S. Yonekura
Resource Management Department
Energy Division
1226 Anacapa Street
Santa Barbara, California 93101

RE: Union Oil Project/Exxon Project Shamrock
and Central Santa Maria Basin Area Study EIS/EIR

Dear Ms. Yonekura:

Representatives of the Hollister Ranch Owners' Association have reviewed the draft environmental impact report/environmental impact statement for the above project, and we wish to make the following comments:

1. The potential for a consolidated oil-processing facility in the North County is not adequately studied. A significant share of the offshore oil discoveries are north of Point Concepcion, and the failure to address fully a consolidated North County oil-processing facility may unnecessarily impact the South County area. HR-1

2. The environmental impact report/environmental impact statement is incomplete in that it does not adequately address the disposition of Exxon's oil after it is brought to shore. If the potential exists that this oil might be transported to the South County for processing or to some other location than a consolidated oil-processing facility in the North County, the impacts of this project cannot be fully and fairly evaluated. Processing and transportation of processed oil are integral and essential parts of any oil development and production plan, and it is essential that they be addressed in this report. HR-2

3. If the potential exists to transport Exxon's oil to the South County or to some other location than a consolidated oil-processing facility in the North County, this may be contrary to the 1983 staff decision that directed oil from the Point Arguello Field to the South County for processing and stated that more-northerly oil discoveries were to be transported to the North County for processing. Without knowing the destination of Exxon's oil, the environmental impact report is incomplete both as to its potential impacts and as to compliance with stated County policies. HR-3

4. The cumulative impacts of the Union and Exxon projects are not adequately addressed, including their relationship to other pending or planned projects. Moreover, these cumulative impacts cannot fully be addressed when the project description--including the disposition of Exxon's oil--is incomplete. HR-4

We appreciate the opportunity to comment on this report and request that additional consideration be give to the above points.

Sincerely,

Al Remmenga

ALVIN J. REMMENGA
Ranch Manager

RESPONSES TO HOLLISTER RANCH OWNERS' ASSOCIATION COMMENTS

HR-1 See response to OSG-1 and CPA-29, CPA-30 and CPA-31

HR-2 The EIS/EIR states that Exxon will process their oil at the proposed Lompoc Dehydration Facility. Exxon has submitted an Application to the County of Santa Barbara to construct a dry oil pipeline from the Lompoc Dehydration Facility to the Gaviota Marine Terminal or Las Flores Marine Terminal. This Application is currently under CEQA analysis and a Supplemental EIR will be performed for this pipeline. The EIR will most likely look at the alternatives of tying into the Celeron pipeline system at Buellton, or the SCPS pipeline system at Sisquoc. These were looked at in the Area Study portion of this EIS/EIR.

HR-3 Since Exxons wet oil will be treated in the North County, which is in keeping with the staff recommendation on the division between North and South County processing of wet oil. Exxon currently plans to move their dry oil to either Gaviota or Las Flores for marine tankering. For more information see Response HR-2.

HR-4 Comment noted. See Response CPA-7.

H.E. CHRISTENSEN (HEC)

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APR 30 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

County Resource Management Dept.
attn.: Janice S. Yonekura
Energy Div.
1226 Anacapa St.
Santa Barbara CA 93101

The following remarks regarding the Union Oil Project/ Exxon Project Shamrock and Santa Maria Basin Study EIS/EIR, dated 18 March 1985 are submitted in accordance with the cover sheet of Vol. I of the subject study.

Although there has been the nesessity for a regional study of the off-shore oil industry growth, it appears that the site-specific features of the Arthur E. Little study suffer from the area generalities. It is apparent that the immediate and follow-on problems with the proposed Union Oil/Exxon project will have their primary and heaviest effect on the Santa Ynez Valley. The effects on the lower valley - Lompoc, Vandenberg Village and Mission Hills - are lightly covered in the study, but the treatment completely ignores the uniqueness of our valley and the effect of pollution generated over the water or just inland to the atmosphere and weather conditions of the upper valley and the basic water shed of Santa Barbara County. HEC-1

The exceptional low level of the Lompoc Valley inversion layer has been stressed during previous air quality seminars through the years, and has been considered to be much lower than that of the Los Angeles basin. This cap on pollutants will then greatly increase the local concentration of sulfate and nitrate levels throughout the lifetime of the oil operation. As a result, the Lompoc Valley will be regularly bathed in highly acidic concentrations of fog, and the Santa Rosa Valley and the upper watershed feeding into Gibraltar and Cachuma Lakes will suffer from greatly increased amounts of acid rain.

Vandenberg Air Force Base has through the years contributed some elements of these polluting oxides (sulfate and nitrate) into the local air from the various missile firings, and this contribution must naturally escalate when the Space Shuttle operation starts next year. The North County Impact Committee and the Lompoc Chamber of Commerce predict hundreds of thousands of people at that time, and so many automobiles that they anticipate gridlock. However, I do not find references to these situations, which, when combined with a low inversion layer and fog, will cause even the healthiest of individuals to encounter difficulty in breathing, and will require that those with known respiratory and cardiac problems be evacuated. The amount of damage that the pollutants from the off-shore and on-shore oil-generated units will do to the crops in both the lower and upper valleys does not appear to be covered, nor does there appear to be consideration of the increased erosion of the land that is a known result of acid rain. In particular, I would question whether any study has been made of the effects of acid rain/fog on adobe structures such as the old Spanish missions at Lompoc and Solvang.

5.6.2

In recent years Lompoc has concentrated its economic development efforts toward increasing tourism into the area. If the intrusion of the petoleum industry results in damage to the flower-seed industry and erosion damage to the mission, that effort will have been in vain. The fact that the flower-seed industry gravitated to the Lompoc area and has prospered during the past years gives striking evidence to the delicate and fragile ecosystem of our area.

Reference to 6.10.3.2 Helicopter Traffic and Item 5.9.1.0 Significance Criteria of Noise and Vibration Levels: HEC-2

The item 6.10.3.2 dealing with Helicopter Traffic has a paragraph as follows: "The possibility of obtaining an approved flight corridor from Lompoc Airport through Vandenberg AFB would conceivably shift helicopter traffic from Santa Maria and Santa Barbara Airports to Lompoc Airport." The planners should be aware that the Lompoc City Council has granted zoning and building permits for housing completely along Central Avenue adjacent to the airport, and these residents would be harshly impacted by helicopter activity from that airprot. The motels and restaurants that are planned and approved in concept in the airport area should also be mentioned.

Further, the study considers noise impact on the Federal Prison and its inmates in other portions dealing with the pipeline construction, but fails to note that this facility would be immediately adjacent to the flight path from Lompoc Airport to the sea. Finally, the negative impacts on the wildlife inhabiting the fringe area of the Santa Ynez River and the Wildlife Sanctuary at the estuary should be sufficient to preclude any further consideration of this helicopter supply route.

Conclusion:

HEC-3

Those who are in the position of decision makers must keep in mind that this small area of the Forgotten Corner of California has individual weather patterns not conforming to those along the South Coast or even to the climatic conditions in Santa Maria. As a result, conclusions for the Santa Ynez Valley cannot be based on anything other than a very specific long-range study.

Further, it must be remembered that since the time of the Spanish padres, the basic economic underpinning of the Lompoc-Santa Ynez Valley has been agriculture. As time progressed, this evolved into the flower-seed industry that makes Lompoc the Flower Seed Capital of the world, and agriculture still has the pre-eminent place in the economy of the Valley. Early on a secondary industry was developed with the deposits of diatomaceous earth. The reconstruction of La Purisima Mission by the Civilian Conservation Corps during the Great Depression of the 1930's, along with our flower fields, provided a second leg to the structure on which a tourist economy was started. The reentry of the military in the late 1950's provided a stable economic base for the community and is essentially responsible for the current growth and the anticipated increase in tourism. Degradation of the air quality and living conditions in the Valley will make it increasingly difficult to recruit the high-tech personnel that the current NASA-Air Force operation depends on.

As previously pointed out, the area has adopted and followed a plan during the last few years of encouraging tourism, and based on this, there has been considerable development of the amenities needed. The introduction of the oil industry with the consequent degradation of air quality will seriously affect the desire of the traveler to visit the area as well as degrading the agricultural capability and probably adversely affecting our water supply and soil quality.

It seems obvious to me that the price that must be paid for this off-shore oil expansion is hardly worth the overall damage that will accrue. This evaluation has been made without access to the technical appendix B (Air Quality / Meteorology); however, it seems doubtful that the appendix would deal in greater specifics with the locally impacted areas. In respect to the two basic documents, it appears that they are clearly deficient in considering and evaluation the adverse impacts to the tight little valley of the Santa Ynez River and those who reside and work in the area.

5.6.3

H.E. Christensen
H.E. Christensen
1313 E. Locust Ave.
Lompoc CA 93436

RESPONSES TO H.E. CHRISTENSEN COMMENTS

HEC-1 We agree with the comment that the Santa Ynez Valley generally has a greater frequency and persistence of low level inversion layer than the Los Angeles Basin. However, the monitored levels of nitrates and sulfates, which are the main contributions to acid fog, are significantly lower than in the Los Angeles Basin (see Table 5.2-6). Recent studies have correlated high nitrate and sulfate monitored levels to highly acidic fog. Therefore, we can generally assume that NOx and SOx emissions from existing and future sources would not result in highly acidic fog.

HEC-2 Both Union Oil Company and the County of Santa Barbara have submitted requests for a flight corridor from Lompoc Airport through Vandenburg Air Force Base. Both requests have been denied. Based upon these refusals it is very unlikely that a flight corridor will be allowed. The use of Lompoc Airport as mitigation for greatly increased operations at other airports (particularly Santa Barbara Airport) is still included as a possible measure, although the lack of a flight corridor through Vandenburg airspace would probably make use of Lompoc Airport uneconomic.

If a flight corridor were to be granted the number of helicopter operations would be few. It is unlikely that there would be sufficient operations to "harshly impact" local areas.

HEC-3 The effects of air pollution on agriculture were not described in Technical Appendix B, but were analyzed in the Terrestrial Biology section (5.6).

FRIENDS OF THE SEA OTTER (FSO)

ADC 5/3

FRIENDS OF THE SEA OTTER

P.O. BOX 221220. CARMEL. CALIFORNIA 93922

509r
RECEIVED
COUNTY OF SANTA BARBARA
MAY 03 1985
RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

May 1, 1985

Donna Brewer
Minerals Management Service
Pacific OCS Region
1340 W. Sixth Street
Los Angeles, California 90017

Re: Draft EIS/EIR, Central Santa Maria Basin Area Study, Union Oil Project/Exxon Project Shamrock (Point Pedernales Field Development)

Dear Ms. Brewer:

Enclosed, please find FRIENDS OF THE SEA OTTER's detailed critique of the Draft EIS/R for the Central Santa Maria Basin. Our comments focus on the Draft Report's consideration of the condition of California's "Threatened" sea otter population and the anticipated effects of the proposed development on its future welfare.

5.7.2 Although the assessment is superior to those we have reviewed for other projects proposed for the Santa Barbara area (e.g., the Draft EIS/R for the Point Arguello Field), we find that the increasingly precarious status of California's sea otter population and the extent of the problems it faces are still not properly recognized, nor a realistic evaluation of the potential impacts of the proposed development provided.

Indeed, the California sea otter, the most vulnerable to oil of all marine mammals off this coast, is now known to be in far greater jeopardy than was recognized at the time of its initial listing as a "Threatened species" under the Endangered Species Act back in 1977. For today, the population -- surveys of which have not produced a count of over 1200 adult animals in 5 years -- still menaced by tanker traffic, faces massive development just south of its established range (i.e., the Santa Maria River) and 5 tracts recently leased off Morro Bay threaten the placement of rigs directly offshore and deep within its habitat.

The Department of Interior's intention to propose the otter range for oil leasing 3 times in less than 5 years (as part of their Draft Proposed 5 Year OCS Leasing Program 1986-1991) -- clearly an area that should be permanently deleted from oil drilling plans -- threatens to drastically compound oil spill risks in spite of the fact that we are still unable to meaningfully protect otters from oil spills.

The inability of oil spill response measures to effectively combat the massive slicks which resulted from the break up of the tanker Puerto Rican off San Francisco (October 1984) unequivocally demonstrated that contingency plans simply can no longer be looked upon as "reassurance" that offshore oil activity poses little threat to sensitive marine resources.

It is noteworthy that U.S. Senator Pete Wilson recently called for a continuation of the current moratorium against further offshore oil leasing "until spill response mechanisms are sufficiently developed to provide an adequate margin of protection for the California coastline." Clearly, this should hold true for development as well.

The incident involving the Puerto Rican is also further evidence of the urgent need to get on with the establishment of at least one additional breeding colony of sea otters -- a translocation identified as necessary to dilute the existing oil spill threat to the entire otter population. Yet this important measure has still not been implemented.

Through protective legislation designed to drastically reduce if not eliminate the incidence of sea otter drownings in entangling fishing nets (not known to be occurring at the time of the otter's listing) -- estimated to be taking a severe toll of well over 100 animals a year -- it is hoped that the downward trend of the population over the past decade may be reversed and the population spared an immediate change in status to "endangered." However, for the population to have its chance to begin to recover, stringent conservation measures must be in place before development begins in this region. It is imperative that the assessment reflect this critical situation.

We appreciate the opportunity to comment and look forward to reviewing the revised EIS/EIR.

Sincerely,

Rachel T. Saunders

Rachel T. Saunders
Staff Biologist
(408-375-4509)

cc: Janice S. Yonekura, Resource Management Department, Santa Barbara

FRIENDS OF THE SEA OTTER

P.O. BOX 221220. CARMEL. CALIFORNIA 93922

CRITIQUE OF THE DRAFT EIS/EIR
CENTRAL SANTA MARIA BASIN AREA STUDY
UNION OIL PROJECT/EXXON PROJECT SHAMROCK
MAY 1, 1985

General Comments

Based on our review of the Draft EIS/EIR and pertinent supporting documents, FRIENDS OF THE SEA OTTER recommends that the assessment:

1) Consider an additional alternative under the Area Buildout scenario which specifically deletes hypothetical OCS platform 0427 currently proposed for the northeast corner of the Central Santa Maria Basin off Purisima Point. FSO-1

As noted in the Draft Report, a spill within the project area could preclude the otter's reoccupation of the region, thereby halting the range expansion so critical to the population's recovery. Bringing the most northern portion of the region into production would significantly compound these impacts by increasing the likelihood of spills reaching outside the region and inside the otter's established range. Indeed, the U.S. Fish and Wildlife Service has already indicated that a spill need only reach as far north as Pismo Beach to potentially have a jeopardizing impact through the loss of breeding individuals and habitat (U.S. Fish and Wildlife Service, Biological Opinion, Pt. Arguello Field, October 1984).

5.7.3

While "phasing" of development in this region is an action "who's time has clearly come" and would act to temporarily reduce impacts, it falls short of the kind of permanent protection necessary to effectively minimize the probability of an oil spill occurring and contacting the established otter range. This measure should be incorporated within the range of alternatives available for decision makers to consider.

2) Clearly state the limitations of the computer models used to simulate oil spill trajectories from the proposed area of development. In the past we have expressed concern for relying on models to characterize oil spill risks, indicating that they frequently do not accurately portray how spills actually behave. The failure to compare model-predicted behavior with observed conditions may act to underestimate expected impacts or misrepresent where impacts are likely to occur. Thus the risks to areas north of the proposed project area -- including the southern end of the otter range -- may be far greater than predicted. The variability of many short term physical phenomena likely to be important in the trajectory and fate of spilled oil are not incorporated -- small scale features which may spread a spill, abruptly shift its speed and direction (on a scale of hours) and enlarge the area of coastline affected. FSO-2

General Comments (Continued)

Indeed just such features were the kinds of forces that changed the direction of oil spilled from the Puerto Rican 180 degrees, transporting it more than 20 miles overnight (See Attachment 1). As noted by the California Coastal Commission in their consistency review of Exxon and Union projects; numerous studies of winds and currents utilizing various floating materials provide real world observations which may differ significantly from that which is predicted and should be incorporated into this assessment (e.g., drift bottle studies conducted by Scripps Institute, studies of oceanographic features by the Navy Postgraduate School in Monterey, California, observations of a "Lumber Spill in Central California Waters: Implications for Oil Spills and Sea Otters" 1982 by G. VanBlaricom and R. Jameson, Science, Volume 215, pgs. 1503-1505, etc.).

(For an indepth review of the oil spill risk to sea otters and predictive model and trajectory analysis deficiencies see: Tinney, R. October 1984 "Some Factors Affecting the Oil Risk to Sea Otters in California," prepared for the U.S. Marine Mammal Commission, Report No. MMC-84/03)

3) Identify the actual "state of affairs" of California's oil spill response and the limitations of current containment and clean up techniques and equipment. Oil spill response capabilities have long been overstated and, as noted in the Draft Report, any evaluation of equipment performance limitations has been noticeably absent from industry contingency plans. FSO-3

That we are far from being prepared to deal effectively with oil spills in the open ocean off California was clearly demonstrated when deployment of state-of-the-art equipment failed to prevent oil spilled from the Puerto Rican from spreading as much as 140 miles north of the spill site. Had the spill gone south, as was originally predicted, as far as it went north, it would have entered the northern half of the otter range. As indicated in the Draft Report, adequate facilities and the means for rapidly capturing and rehabilitating oiled otters do not yet exist.

Although we agree with the Draft's recommendation that industry contingency plans be improved to reflect greater prepardness and with suggestions for some of the specific improvements that can be made (e.g., mapping sensitive locations, developing site-specific plans, pre-positioning equipment so that it is "on-hand" during an emergency, etc.), it is clear that the EIS/R itself should provide an independent review of the shortcomings of the oil spill response (including an evaluation of the potential disadvantages of dispersant use). This is necessary to assist decision makers in making informed judgements as to potential impacts and the viability of current mitigation. Such an important discussion should not be left to the back of industry contingency plans far less visible to an interested and involved public.

General Comments (Continued)

FSO-4

4) Clarify the relative contribution that the proposed development (for the entire region) will make to the shipment, by tanker, of oil to refineries on the West coast and refined products to market destinations.

Although the oil companies currently proposing development have commited to the use of pipelines to ship crude, it is not clear what mode of transportation will be employed should environmentally preferable pipelines not be available.

To the extent that tankers are used for transport -- traveling in close proximity to and through the California sea otter range -- will increase the risks concomitantly.

The assessment should also consider the extent to which additional supply ships and other vessels associated with development (and ferrying fuel oil) will increase spill risks.

Moreover, while the Draft Report's recommendation that vessel traffic separation lanes be extended west of the project area to reduce platform-vessel collisions is a good one, it falls short of establishing the kind of distance offshore so that, in case of an accident, there is adequate time to respond before oil comes ashore or a ship hits the rocks. The need to keep ships further offshore to protect the sea otter and other sensitive resources should be incorporated into the EIS/R (See Attachment 2).

5.7.4

FSO-5

5) Correct errors in the "otter database," as indicated in the specific comments set forth below and revise sections pertaining to the population's status so that they more accurately reflect its current condition.

Specific Comments

Chapter IV: Environmental and Regulatory Setting

FSO-6

page 4.5-3, table 4.5.1: The biologically sensitive area identified as Pt. Buchon to Pt. San Luis, offshore is part of the established range of the "Threatened" California sea otter and thus should be recognized as endangered species habitat (see also Appendix E, table 4.5.11-1; page 4.5.11-4).

FSO-7

page 4.5-25, figure 4.5-10: The subheading to this figure states that it depicts the range of the California sea otter. Rather, the figure depicts the population's distribution as identified in surveys conducted by Miller et al 1983 and Bonnell et al 1983 (the latter reference does not appear in the reference section in this portion of the document, although it is listed in the reference section in Appendix E). The figure is reproduced in Appendix E, yet is entitled sea otter "distribution." The established otter range is recognized by both the U.S. Fish and

Specific Comments (Continued)

Wildlife Service and California Department of Fish and Game as extending as far south as the Santa Maria River. This is noted correctly on page 4.5-30, figure 4.5-5 and should be reflected in the aforementioned figures.

FSO-8

page 4.5-26, paragraph one: Although discussion focuses primarily on the relative numbers of otters in the Pt. Buchon - Pt. San Luis area, it is important to note the significance of this area as containing the only growing sub-group of reproducing females in the entire range (off Pt. Buchon). Indeed, as pointed out by the U.S. Fish and Wildlife Service in their comments of April 22, 1983 on OCS Lease Sale 73:

> "Although the density of sea otters near the southern end of the range may be lower than other areas, the importance of this segment of the population may be greater than their numbers indicate. There is little evidence that the population is growing...what growth may be attributable to the small nucleus of females that have reestablished south of Morro Bay...Even a relatively small oil spill, coupled with other man-caused mortality, could set back population growth at the southern end of the range. This aspect of population growth must be taken into consideration when assessing the impacts of oil to the population."

FSO-9

page 4.5-30, figure 4.5-5: Why the change from recognizing to not recognizing the subspecies status of the Southern Sea Otter, Enhydra lutris neries?? (In Appendix E the otter is identified as neries on page 4.5..12-7, but is not on the page before nor in table 4.5.12.1 on page 4.5.12-2) Most recent authorities recognize the validity of neries: in Estes, Mammalian Species Account for American Society of Mammalogists in 1980, in the Second Edition of E. Raymond Hall's The Mammals of North America, 1981 and in Nowak and Paradiso's Forth Edition of Walkers Mammals of the World, 1983. The otter's subspecies was noted in the EIS/EIS recently completed for the Pt. Arguello Field.

FSO-10

page 4.5-31, paragraph five: See comment page 4.5-26 regarding the importance of acknowledging the southernmost group of reproducing females at Pt. Buchon.

FSO-11

page 4.5-31, paragraph five: Although severe storms are a source of sea otter mortality, they are far from being the principal cause of the lack of growth in the California sea otter population over the past decade (El Nino has not been documented as a factor adversely affecting the welfare of the population). A "better judgement" is not needed as a review of data compiled by the U.S. Fish and Wildlife Service and California Department of Fish and Game has revealed that there has been essentially no growth in the sea otter population since the mid-1970's (Al Petrovich, Chief of Marine Resources, CDFG, personal communication to FSO). Indeed, the U.S. Fish and Wildlife Service, U.S. Marine Mammal Commission and California Department of Fish and Game have all recognized the downward trend in the population over the past 10-15 years and have attributed it primarily to the incidental take of otters

Specific Comments (Continued)

in gill and trammel (entangling) fishing nets set in shallow waters within the otter range. The U.S. Fish and Wildlife Service views the entanglement of sea otters in fishing nets as "a problem of national concern" and has estimated that "10% of the entire population dies each year as a result of drowning" (Letter from Richard Myshak, Regional Director, USFWS to Jack Parnell, Director, CDFG, January 16, 1985). Moreover, the U.S. Marine Mammal Commission has stated that "Failure to prevent or significantly reduce such taking could very well result in a decline which would jeopardize the continued existence of the population and make it more vulnerable to impacts from oil spills and other threats"(Letter from John Twiss, Executive Director, MMC to Robert Jantzen, Director, USFWS, September 14, 1983). On January 21, 1985 the California Department of Fish and Game enacted an emergency ban on entangling fishing nets set in waters less than 15 fathoms (where the incidence of drownings are highest) throughout the otter range. It is hoped that urgency legislation making the net prohibitions permanent will soon be adopted. Clearly this is a serious conservation problem and should be recognized as such in the assessment.

Appendix E: Marine Biology

FSO-12

page 4.5.9-5, figure 4.5.9-2: See comment page 4.5-25 on distribution/range map for sea otters.

FSO-13

page 4.5.9-10, paragraph two: The U.S. Fish and Wildlife Service survey produced a count of a total of 1226 sea otters; 1062 adults and 164 pups. The Service never gives population estimates, but reports the actual numbers of animals observed (Carl Benz, Senior Marine Biologist, Office of Sea Otter Coordination, USFWS, Sacramento, personal communication, April 26, 1985). Moreover, the U.S. Fish and Wildlife Service's Office of Sea Otter Coordination is unaware of the high number 1535 reported as a Service estimate in 1984. Please check this figure with Service sea otter biologists in California and revise the assessment accordingly (C. Benz, Office of Sea Otter Coordination, USFWS, personal communication, April 26, 1985).

FSO-14

page 4.5.12-7, paragraph two: California sea otter's subspecies status correctly noted, see comment page 4.5-30 for discussion.

page 4.5.12-7, paragraph two: The Draft EIS/R's paraphrasing FSO-15 of the U.S. Fish and Wildlife Service's assessment of the status of the California sea otter has completely misrepresented their conclusions regarding the condition of this population. First, the Service did not "conduct the 5 year review to determine that the sea otter should not be reclassified," but rather to determine its status and if conditions warrant a change in status (i.e, whether or not it should be reclassified). Moreover, the Service's conclusion was not simply that the population didn't appear to be threatened and should there be any indication of a reduction in the population a change in status would be considered.

Specific Comments (Continued)

Key words have been left out of the text, giving a vastly different, and false, impression of the Service's comments. To quote the Service:

> "In summary, the sea otter is in no better condition then it was at the time of its listing, and, is probably somewhat worse off. 'Threatened' still seems to be an appropriate classification because the population does not appear to be immediately threatened with extinction, and a major action on a recovery program is expected in the near future. Rather then reviewing the status of the species only at 5 year intervals, as required by statute, the species and recovery program should be closely monitored and a formal assessment made annually. If there is any indication of further increased threats, decreased numbers or reduced reproduction, a change in status to 'endangered' should be immediately considered."
>
> (USFWS, 5 Year Review of the Status of the Southern Sea Otter, April 1984)

The text must be revised to accurately reflect the Service's findings.

page 4.5.12-7, paragraph four: See comment page 4.5.9-10 for FSO-16 correction of U.S. Fish and Wildlife Service's population estimate.

page 4.5.12-8, para one: Sea otter censuses are a joint effort by the U.S. Fish and Wildlife Service and California Department of FSO-17 Fish and Game and have in recent years been ground surveys, supplemented with aerial observations in areas inaccessible from shore. The estimate of 1521 by the California Department of Fish and Game as a result of the census conducted in June of 1984 has been corrected to an estimate of 1390 (includes independent animals and large pups) (Fred Wendell, Sea Otter Biologist, CDFG, Morro Bay, personal communication to FSO, July 18, 1984). The U.S. Fish and Wildlife Service observed and counted a total of 1304 (1181 adults and 123 pups) animals during that census. Further, the California Department of Fish and Game survey in 1976 (this was an aerial survey supplemented with ground truth stations) produced a count of 1442 (1357 adults and 85 pups) animals from which an estimate of 1789 animals was made. This attention to detail and these distinctions are important for accurately reflecting the status of the population.

page 5.5.2-48 through page 5.5.2-51: Sea otters are extremely FSO-18 susceptible to water quality impacts because of their unique habitat niche and behavioral patterns. Because sea otters must consume relatively large quantities of marine invertebrates -- many of which are filter-feeding organisms known to accumulate toxic elements (e.g., mussels) -- bioaccumulation of contaminants is likely. Although the toxicity and debilitating effects of these compounds are largely unknown, at the time of the otter's listing, several studies has already documented the accumulation of trace metals, PCB's, and pesticides in sea otter tissues (e.g., Martin, J. 1974. BioAccumulation of heavy metals by littoral and pelagic marine organisms . Second Year Progress Report. EPA No. R802-350;

Specific Comments (Continued)

Rote, J.W. 1975. Analysis of chlorinated hydrocarbon pollutants in the marine ecosystem. PhD Thesis, Hopkins Marine Station, Stanford University; and Shaw, S.B. 1971. Chlorinated hydrocarbon pesticides in California sea otters and harbor seals. California Fish and Game 57(4):290-294). Thus contaminants such as those associated with the Oceano outfall of the Santa Maria Refinery and those associated with discharged drilling by-products (i.e., drilling muds, cuttings and produced waters) could seriously affect both the quantity and quality of food items available to the otter and may increase the chance of such impairment within the otters themselves. A Mussel Watch program for this region to monitor the contaminant load and begin to develop baseline information on the quality of receiving waters should be recommended as a necessary mitigation measure and should be well underway before development begins. This is especially important with regard to the increase in the volume of effluent discharged at Oceano -- an outfall located in an important coastal cooridor within the otter range.

page 5.5.2-96, paragraph one: Not only may otters ingest potentially toxic prey and thus be adversely affected, but they may also starve to death as important food resources are lost due to contamination. If unable to feed, otters can lose up to 10% of their body weight a day and a 25% weight loss can be fatal. FSO-19

page 5.5.2-96, paragraph two: There is no data available on the amount of weathering necessary to render spilled oil harmless to sea otters. Mr. Miller's contention that otters would avoid more weathered oil is speculation and does not belong in a document of this nature. The U.S. Fish and Wildlife Service has stated that "...the primary impact of oil on otters is physical contact...; therefore data on oil spills impacting their range within 30 days are the primary data that should be considered when assessing possible effects on sea otters. The residue of crude at the end of 30 days and beyond is also of vital importance to the otter's survival in relation to physical contact, possible ingestion and potentially long term effects of oil toxicity on sea otter habitat." (U.S. Fish and Wildlife Service, Biological Opinion, OCS Lease Sale 53, September 1980). Interestingly, in December of 1983 an adult female otter was found dead on a beach in the central part of the sea otter range, her carcass in good condition with the exception of the pelage which was matted with numerous patches of tarry oil. The report on this incident concluded that "Although it is impossible to say that oiling was the cause of death, it is certainly a possibility since the animal appeared to be in good condition (G. Jameson 1983 Trial Systematic Salvage of Beach Cast Sea Otter Carcasses in the Central Part of the Sea Otter Range in Central California, prepared for the U.S. Marine Mammal Commission). FSO-20

page 5.5.3-12, paragraph three: Casson (1981) does not appear in the reference section of this part of the document. FSO-21

5.7.6

Specific Comments (Continued)

Appendix M: System Safety and Reliability

page 4-14, bottom: We question the assumption of the simulated trajectories that a slick is essentially rendered benign after 5 days because of changes in the weather and enhanced slick break up. The break up of a slick may also result in oil traveling greater distances and contacting more coastal areas. This is precisely what happened to the oil slicks that resulted from the break up of the Puerto Rican -- slicks which reached shorelines well over a week after the initial spill. Other actual spills of crude oil (e.g., Ixtoc) have continuously soiled beaches, but because models characterize spills as "instantaneous events" thay cannot consider the possibility that a spill may go on for days or months or that its break up may enhance its spreading. These aspects should be addressed in this document (see also General Comment on spill models and trajectory analysis). FSO-22

page 7-3, paragraph three: If the California sea otter and other sensitive marine resources are to have any real protection from tanker spills, serious efforts must be made to keep ships further offshore, not only to lessen the chance of collision or grounding, but to allow more response time in case of emergency (i.e., to clean up oil spilled or before a ships the rocks). This aspect should be incorporated into the discussion concerning the need for extending current vessel traffic separation lanes (see also General Comment on tanker transport of oil products). FSO-23

Addendum D

See General Comments on the shortcomings of trajectory analyses FSO-24

Addendum H

page H-28, paragraph one: Thank you for acknowledging our concern over the potential adverse effects of chemical dispersants on the water repellancy (i.e., insulative capabilities) of otter fur. There is a need to consider the application of dispersants on a case-by-case, site-specific basis. FSO-25

Attachment 1

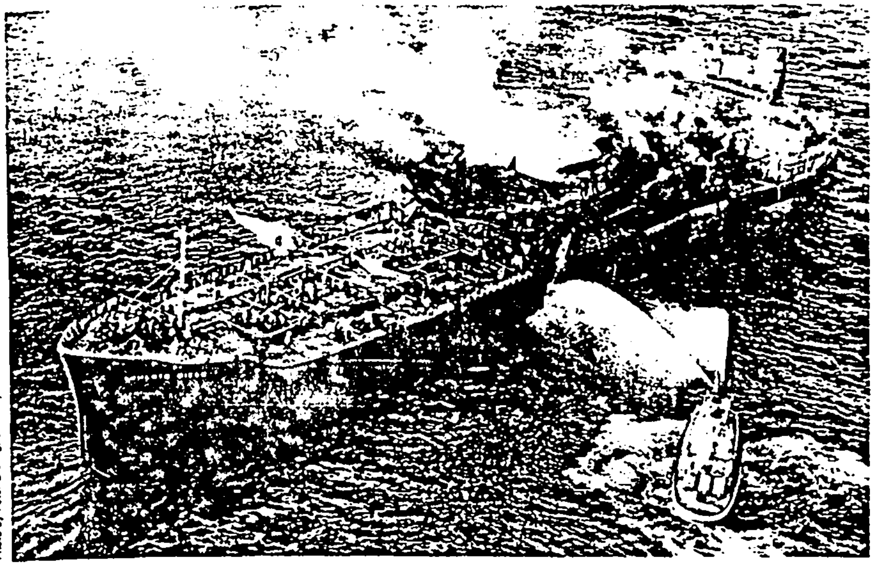


Photo by Peter Breinig, Courtesy San Francisco Chronicle

HALLOWEEN HORROR

A Lesson Too Late for the Learning?

5.7.7

In the pre-dawn hours of October 31, 1984, three explosions ripped through the 632-foot-long tanker *SS Puerto Rican*, setting her ablaze about 10 miles west of San Francisco's Golden Gate Bridge. The U.S. vessel was ferrying approximately 101,000 barrels (over 4 million gallons) of petroleum product owned by Whitco and Chevron. So began a two-week long nightmare when early predictions that the Northern California coast would be spared a major oil spill quickly evaporated as virtually everything that could go wrong did.

- On November 3, as the crippled tanker was being towed about 26 miles offshore, she broke in half. Her stern section, containing an estimated 1.43 million gallons, sank to the bottom in 2400 feet of water, right on or within the boundary of the Pt. Reyes/Farallon Islands National Marine Sanctuary — one of the West Coast's most important areas for marine birds and mammals. There are fears that oil may continue to leak from the stern for years to come. Over 1,000 birds have already been oiled.
- Mechanical clean-up efforts were unable to prevent a 24-mile-long by 1/2 mile wide oil slick when the tanker broke up, or the 50 square mile sheen on the ocean's surface. Nor could they prevent the oil from slopping ashore along the Marin, Sonoma and Mendocino County coastlines, as far north as Fort Bragg, roughly 140 miles north of the spill. The first day of the spill, weather conditions were so bad that clean-up vessels couldn't even get on-scene. "Mr. Clean II," the oil spill response vessel, was seriously damaged when hit by a large wave and forced to retreat to Half Moon Bay. After being repaired, she was sent to protect the Farallon Islands, but collected only minimal amounts of oil due to lack of oil storage capability and heavy seas.
- Dispersants were applied from the air, even though no surface vessels were available to document the results. There is vast disagreement over the effectiveness of this procedure, estimates from aerial observers ranging form 0 to 70% effective. There is also growing controversy as to whether dispersants, which are highly toxic, should have been used at all.
- Oil Spill Trajectory Models were wrong by 180°. The National Oceanic and Atmospheric Administration predicted the spill would go south — most of it went north.

Implications for the Sea Otter

Had the spill moved as far to the south (as originally predicted) as it actually moved to the north, it would have entered the northern half of the sea otter range. In fact, it moved through roughly half of the Northern California area between Bodega Head and Cape Mendocino which has been identified as one of four possible sea otter translocation sites. Moreover, much of the oil which reached the beaches had not weathered as anticipated, but came ashore as a greasy foam which smeared on contact.

Contrary to the empty assurances so frequently given by the Western Oil & Gas Association, U.S. Interior Secretary Clark and California's Deukmejian Administration as they press to open additional areas to offshore oil development, the *Puerto Rican* spill unequivocally demonstrated, to quote the California Coastal Commission's staff report, "the inadequacy of oil spill response measures to protect the northern California coastline from the adverse impacts of oil spills." But this is one time we take very little pleasure in saying, "We told you so." — CF

Attachment 2

Photo by Ben Lyon, Courtesy Monterey Peninsula Herald

Santa Barbara News Press:

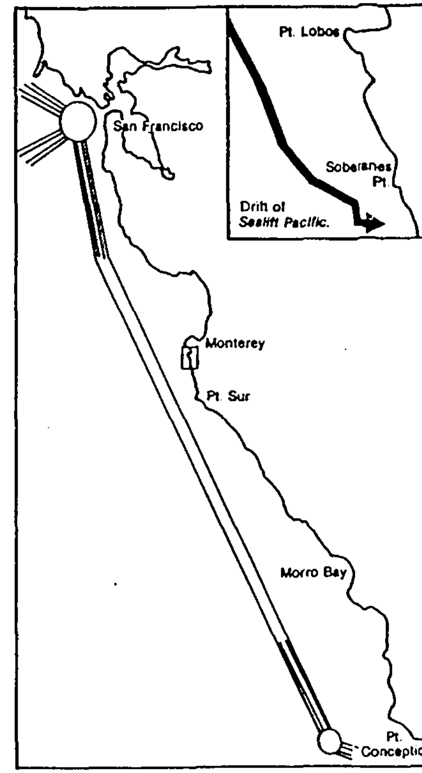
Drifting tanker threatens otters, but anchor holds at last minute

April 19, 1984 — Nightmare comes close to reality when the 587-foot tanker *Sealift Pacific*, ferrying over 6 million gallons of diesel fuel from San Francisco to Long Beach, loses power approximately 12 miles offshore and drifts helplessly throughout the night and morning until able to anchor just a mile and a half off Soberanes Point (north of Pt. Sur) in the heart of the California Sea Otter Refuge. Had her anchor not held, she would have broken up on the jagged shore. No Coast Guard vessel or commercial tug would have reached her in time to prevent a disaster.

What went wrong? A blown piston (could happen to any ship for the *Sealift Pacific* is a well-maintained U.S. Navy contract vessel). The tanker notified its agent of the problem at 1:30 A.M., but the Coast Guard wasn't alerted until 3 A.M. Not until 8:30 A.M. was a powerful tug dispatched from San Francisco (estimated transit time 8 hours). Not until 9 A.M. was the 378-foot Coast Guard cutter *Sherman* diverted to the scene (fortunately she was near Morro Bay, not her home port of San Francisco). The Coast Guard assumed the disabled vessel would be able to anchor before grounding, thus they did not notify either the U.S. Fish & Wildlife Service nor the California Department of Fish & Game that a heavily loaded tanker was drifting perilously close to the craggy Big Sur coast. (Fish & Game only learned of the danger when they overheard a ship-to-shore transmission.)

What went right? A highly-skilled captain was able to find secure footing for the ship's anchor just after 1:00 p.m., and the weather was mercifully cooperative. In a word, luck.

What can be done? Clearly, rapid response at the first report of trouble and immediate communication with state and federal wildlife agencies should be the Coast Guard's standard operating procedure for any potential oil accident near the sea otter range. A commercial tug powerful enough to assist a tanker in distress should be stationed within the otter range to eliminate the 8-hour delay entailed when sending a tug from San Francisco. **Most important, vessel lanes must be established along the central coast to insure that tankers stay far enough off shore so that in case of an accident there is adequate time to respond before a ship hits the rocks.**



U.S. Coast Guard Proposed Vessel Lanes

The Coast Guard will publish proposed vessel lanes (designed to reduce conflicts with offshore oil development) in the Federal Register this December, but as the map shows, the lanes are much too close to shore — in some places only 5-6 miles from major headlands — allowing virtually no response time in case of an accident.

RESPONSES TO FRIENDS OF THE SEA OTTER COMMENTS

FSO-1 Since this platform's location is only hypothetical it is not realistic to delete it from the analysis. When and if a platofrm is proposed for OCS-P 0427 it will be subject to a separate Environmental Review by the MMS.

FSO-2 A Monte Carlo-based computer model was used to relate the motion of oil slicks to prevailing wind and current conditions and to estimate the shoreline contact probability. The assumptions made in estimating the wind and current speeds and directions are stated in Addendum D of the Technical Appendix on System Safety and Reliability.

The short term physical phenomena such as spreading, evaporation, slick breakup and dispersion were considered in the oil spill fate analysis. In examining the fate model, both typical and extreme weather conditions were considered. The results of our analysis are consistent with observation of maximum contaminated area of actual spills (see response to FSO-22).

It is important to recognize that the oil spill trajectory analysis is a stochastic model and is used to estimate the probabilities of landfall. Seasonally averaged wind and current data are used in exercising the model. The actual movement of an oil slick is governed by the prevailing weather conditions and the trajectory can be determined if these conditions are known a priori. Therefore, it is not appropriate to compare the results of the trajectory analysis with observations of a single specific incident.

FSO-3 Comment noted. A comprehensive assessment of California's oil spill response capabilities is well beyond the scope of the EIS/EIR. In accordance with the requirements for "worst-case" analysis, it has been assumed for this assessment that spill containment and cleanup efforts may not be successful in preventing oil from reaching sea otters.

FSO-4 The Union project will not involve any tankering of oil. The Exxon project, and other future projects in the Central Santa Maria Basin Area Development, may involve tankering of crude oil from one of the proposed marine terminals in Santa Barbara County. Given the County's preferred option, it is more likely however, that all of this crude oil will be transported by pipeline. If tankering is used, the destination will be refineries in the Gulf Coast, not the West Coast.

At peak production, the Union project will involve the shipment of three to four tank truck loads of LPG per day to market destinations outside of the Lompoc vicinity and an equal number of small tank trucks to local markets. For the entire Area Development, it is estimated that about 20 to 25 tank truck loads of LPG per day will be transported to markets outside the Lompoc area. This amount will represent about two-thirds as much as will be transported from the Chevron/Gaviota facility. As is currently done, it is assumed that the NGL by-products from the Union project and from the Area

Development will be co-mingled with the crude for shipment to refineries. Further discussion of the by-product transportation risks is given in Technical Appendix M.

If pipeline transportation of crude oil is not available, it is most likely that the crude will be shipped by tanker from one of the proposed marine terminals in Santa Barbara County.

It is anticipated that supply ships ferrying fuel oil (diesel fuel) would visit the Union or Exxon platforms about once a month. This is considered to represent a minor source of potential spill risks. Further discussion is given in Section 3 to Technical Appendix M.

Further information on the extension of the vessel traffic preparation scheme is given in the Response to Comment FSO-23.

FSO-5 See responses to the specific FSO comments below.

FSO-6 Table 4.5.1 has been modified as suggested.

FSO-7 The figure has been relabeled.

FSO-8 P. 4.5-26 has been modified to acknowledge the potential significance of the growing sub-group of reproducing female otters between Point Buchon and Point San Luis.

FSO-9 Table 4.5-5 has been modified to delineate the subspecies name.

FSO-10 The text has been expanded per response FSO-8.

FSO-11 Mention of the emergency ban on entanglement nets has been added to p. 4.5-30. This reinforces the need for continuing assessment of the population status to characterize accurately the significance of such other forms of incidental taking as may be associated with oil and gas development.

FSO-12 Figure 4.5.9-2 plots the range of the southern sea otter relative to the project site. The figure does not show distributional data per se. The caption should therefore read "...and range limits of the sea otter."

FSO-13 Values generated from sea otter surveys are counts and not populational estimates. The term estimate was used due to the difficulty in accurately counting these animals. Animals diving for food is just one factor making such counts difficult.

The 1,535 value was taken from USFWS Endangered Species Technical Bulletin IX(12):2, 1984, which stated, "A 1984 census conducted by the California Department of Fish and Game revealed...1,535 southern sea otters...". This value was presented to show the variability in such results, not the most recent nor most valid count.

FSO-14 The scientific name of the southern sea otter is Enhydra lutris nereis. However, the status of this southern population as a separate subspecies from the Alaskan otters is still in question.

FSO-15 These recommendations have been included as part of the text corrections.

FSO-16 These recommendations have been included in the text corrections.

FSO-17 USFWS data was not available at the time of the draft report preparation.

FSO-18 Previous studies have shown that sea otters can accummulate certain contaminants including mercury, cadmium and PCBs [Martin, 1976; Kathy Casson, personal communication]. Such studies were done primarily in Monterey Bay which is exposed to dumping of sewage and other materials.

Bioaccumulation of contaminants associated with this project are difficult to assess. Few if any otters occur at the platform site since the depths limits feeding. Once installed, the platform might attract otters due to the development of mussels (a prey item) on the support legs. The most likely site for exposure to contaminants would occur near the refinery outfall at Oceano. The few transient otters in the area would be exposed to low levels of oil/grease, chromium, cadmium, copper, led and nickel (Section 5.4). The otters may feed on crabs, clams and sand dollars. Due to the low number of potentially exposed otters, brief exposure duration and low level of contaminants, tissue levels should be low. Levels of recently stranded, dead otters should be examined. If such examinations and/or bioaccumulation of contaminants in prey items around the Oceans outfall provide evidence of a potential threat to the otters, subsequent mitigation measures would include additional treatment of the refinery discharge and/or discharge at an alternate location where otters would not be exposed.

FSO-19 Comments noted.

FSO-20 Comments noted. NEPA requires the EIS/EIR to reflect differences in opinion amoung professional experts.

FSO-21 Comment noted.

FSO-22 In performing the oil spill risk analysis, the spill trajectories were simulated for a time period of five days. This time period was sufficient for the majority of the slicks to reach shore. Simulation of trajectories for a time period greater than five days is considered inappropriate for the following reasons:

- Significant changes in the weather pattern cannot be predicted with reasonable accuracy for time periods greater than five days.

- The key assumption in the trajectory model that the slick moves en masse cannot be justified because of significant slick breakup and dispersion; and

- Mechanisms such as dissolution, degradation and sedimentation become important during the later stages of a spill and these are not considered in the oil spill fate analysis.

Terminating the trajectory model after five days does not imply that the oil slick is benign. It simply illustrates the limitations of the probabilistic wind and current distributions that are assumed in exercising the trajectory model. The results of the ADL trajectory model have been compared with those of Minerals Management Services. The MMS model incorporates a transition probability matrix to predict windspeeds over a longer time duration. The model has been exercised for predicting contact probabilities for up to 10 days and 30 days. The results are shown in Tables D-9, D-10, and D-11 of the Technical Appendix M. The results indicate a negligible probability of oil spills contacting the sea otter region.

The ADL oil spill fate analysis considers slick breakup and the rapid increase in the contaminated area due to slick breakup. In Table 4-3 of Technical Appendix M are given the maximum surface areas covered by oil due to slick breakup. The predicted maximum slick areas are consistent with observations of actual spills (Torrey Canyon, 15,000 bbl spill resulting in a slick of about 1000 km^2 in area; the Santa Barbara Channel spill resulting in a slick area of about 1200 km^2 in about a week). The "instantaneous" release assumption result in a longer slick-sea interaction, which leads to a larger slick breakup. Therefore, the instantaneous release assumption provides an upper bound on the maximum contaminated area in comparison with a continuous release.

FSO-23 As indicated in Comment CG-6, the extension of the vessel traffic separation scheme (VTSS) to the proposed precautionary area (shown in Figure A-1 of Technical Appendix M) has been given preliminary approval by the IMO. Vessel traffic using the VTSS extension and the proposed safety freeway to the northeast would be more than 25 miles offshore of the coastline north of Point Arguello. As indicated in Addendum D of Technical Appendix M, oil spills originating in the precautionary area would have less than one chance in a thousand of impacting the sea otter range.

FSO-24 See response to FSO-22.

FSO-25 Comment noted.

MICHAEL E. MC CLURE (MEM)

May 5, 1985

5119
RECEIVED
COUNTY OF SANTA BARBARA

MAY 08 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Santa Barbara County
Department of Resource Management
Energy Division
1226 Anacapa Street, Ste. 2
Santa Barbara, CA 93101

Attn: Ms. Tracy Hopper

Dear Ms. Hopper:

Having read the Union Oil/Exxon Project Shamrock EIS/EIR, I am in favor of construction of these facilities. MEM-1

I would like to see the Union dehydration plant built at site four, not site eight. I don't think building so close to Mission Hills residences is in their best interest.

I am in favor of the other development listed on the Resource Management Department Status Report below, as long as air quality standards are not neglected.

1. Chevron/Texaco Point Arguello Field/Gaviota Processing Facility.
2. Arco-Ellwood/Coal Oil Point Field.
3. Texaco-Gaviota Consolidated Coastal Facility. All expansion phases.
4. Exxon Santa Ynez/Las Flores Canyon (Option B).
5. Cities Service/Point Sal Development.
6. Celeron/All American and Southern California Pipeline Projects. Phase I. and Phase II.
7. Phillips/Tajiguas Gas Processing Facility.
8. Shell/Molino Gas Field.
9. Union Cojo/Pt. Conception Project.

I hope my input has been useful.

Sincerely,

Michael E. McClure

Michael E. McClure
620 N. Larkspur
Lompoc, CA 93436

RESPONSES TO MICHAEL E. MC CLURE COMMENTS

MEM-1 Comments noted. Site 8 does not offer any environmental advantages over Site 4, and is less preferred from a public safety standpoint. See comparison provided in the Executive Summary. The analysis for each issue area can be found in Chater V of the main EIS/EIR and the appropriate Technical Appendices.

MISSION HILLS COMMUNITY COUNCIL, OIL STUDY GROUP (OSG)

MISSION HILLS COMMUNITY COUNCIL
P.O. BOX 1214
LOMPOC, CALIFORNIA 93436

April 30, 1985

Janice Yonekura
Energy Division, Department of Resource Management
1226 Anacapa Street
Santa Barbara, CA 93101

Dear Ms. Yonekura:

Attached is a letter to you from the Oil Study Group of the Mission Hills Community Council regarding the current EIS/EIR for Union Oil.

The residents of Mission Hills concur with its content and feel the need for answers to the questions it poses as we are so heavily impacted by the outcome of the oil dehydration facility Union Oil plans.

We look forward to reading your comments on these matters.

Sincerely,

Karen Weston

Karen Weston
President
Mission Hills Community Council

5.9.2

5093
RECEIVED
COUNTY OF SANTA BARBARA

MAY 01 1985

RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

April [illegible], 1985

TO: Janice Yonekura
Energy Division
1226 Anacapa Street
Santa Barbara, CA 93101

RE: Comments on Draft EIS/EIR for Union Exxon/Central Santa Maria Basin Area Study

The Oil Study Group of the Mission Hills Community Council submits the following comments for consideration by the Joint Review Panel:

The residents of Mission Hills were distressed with the scope of the EIR concerning Union's dehydration facility's immediate impact on our community. OSG-1

We consider the document to be incomplete in that only sketchy estimates were given for peak production and did not indicate if these included the latest OCS leases from the Five Year Leasing Program currently under consideration by DOI.

In our original meeting with Union we were told we could expect production to peak at 20,000 barrels per day-the EIR gives a figure of 100,000 barrels per day as buildout estimate. We feel this figure is questionable in that more than Exxon and Union's production is before the County, in view of the consolidation policies.

There is a real concern about the inordinate amount of study given to Site 8. If it is not under consideration for development-we object to the term 'alternate'. We consider it just another word for space to expand. The document offers homeowners no protection from creeping expansion in the future by oil interests impacting our urban community. OSG-2

We refer to the petition signed by a large majority of Mission Hills residents-proposed sites 3,5,6,7 and 8 were listed as unacceptable since a school, church, water wells, waste treatment facility, state park and many homes lie in a direct line immediately down valley by less than one-quarter (1/4) of a mile from the current facility and less than one-half (1/2) of a mile from all those listed. We signed this petition in good faith-now we ask you-in good faith to give us your word-in writing-that the expansion and consolidation will not intrude onto these sites which pose a monstrous threat to our community.

Previous oil leaks into Mission Hills have been discovered by the residents and reported to the oil company (June 25, 1983). We fear that a build-up of these sites will bring larger leaks that can't be controlled.

We would appreciate your consideration of our concerns since we are the most heavily impacted community by this facility.

Very truly yours,

Oil Study Group
Mission Hills Community Council

RESPONSES TO MISSION HILLS COMMUNITY COUNCIL OIL STUDY GROUP

OSG-1 As stated on page 2-62 of the EIS/EIR, Union is proposing to build an oil dehydration facility with a nominal capacity of 36,000 B/D of dry oil output. This is the site of a facility that will be considered for permitting by the County at this time.

This capacity is based on the quality of oil found during the exploratory drilling phase. Since the oil quality can change with time, this facility could handle anywhere from 30,000 B/D to 42,000 B/D of dry oil. This is why the facility capacity is referred to as a nominal capacity. It is estimated that this facility would be capable of handling the production from both the proposed Exxon and Union offshore platforms.

This oil dehydration facility could, in the future, be expanded to handle up to 100,000 B/D of dry oil by the addition of five heater treaters, and one freewater knockout vessel. This additional equipment could all be placed within the proposed faclity fence line without any additional land requirements. This expansion is not being permitted as part of this project, and any modification to the plant would require the operating permit be amended. The expansion of the oil dehydration facility is discussed as part of the EIS/EIR for County planning purposes only.

The offshore Area Study which consists of four additional platforms are expected to have a peak oil production of 67,000 B/D in 1992 as shown in Table 2.9-1 of the EIS/EIR. Therefore, the expanded facility with a capacity of 100,000 B/D would have an excess capacity of 33,000 B/D for other future platforms that may be proposed by the five-year leasing program and the state leasing program. However, it should be noted that this available capacity is a lower limit since it assumes that future platforms would be in production at the time of peak Area Study production, which is highly unlikely, since none of the state or future federal lease development have begun. It is felt that for the Central Santa Maria Basin areas off North County, an oil dehydration facility with a capacity of 100,000 B/D will be sufficient to handle the peak production.

OSG-2 The Draft EIS/EIR looked at Site 8 as an alternative site since CEQA requires that all reasonable foreseeable alternatives be evaluated. Since this was at one time Union's preferred site, it was considered a reasonable alternative. Also, there was a considerable amount of information available on the site which made this an attractive site to analyze as an Alternative. However, the document found that Site 8 did not offer any environmental advantages over Site 4, and therefore Site 4 is considered the preferred site. Given the County's consolidation policies, it is highly unlikely that if Site 4 is allowed to be developed that any future development would go on at Site 8. Also, since the land at Site 8 is owned by Union Oil and they have agreed not to use it for this project, it is highly unlikely that they will ever propose additional facilities at this site.

NATIONAL AUDUBON SOCIETY (NAS)

National Audubon Society
Western Regional Office
555 AUDUBON PLACE, SACRAMENTO, CA 95825 (916) 481-5332

MINERALS MANAGEMENT SERVICE PACIFIC OCS REGION RECEIVED MAY 29 1985 REGIONAL MANAGER LOS ANGELES

MINERALS MANAGEMENT SERVICE PACIFIC OCS REGION RECEIVED MAY 30 1985 Leasing and Environment LOS ANGELES

May 23, 1985

Mr. William E. Grant, Regional Director
Minerals Management Service
U.S. Department of the Interior
Pacific O.C.S. Region
1350 West 6th Street
Los Angeles, CA 90017

Dear Mr. Grant:

NAS-1

The draft EIS treating the development of the offshore Pt. Pedernales Oil and Gas Field belatedly came to the attention of the Western Regional Office of the National Audubon Society. I realize the official comment period has passed, but respectfully request that our views be considered when you prepare the Final Draft EIS.

Although the affected area is not open to the general public because of military security considerations, the mouth of the Santa Ynez River is extremely important to a diversified bird population. The protection provided by the U.S. Air Force has resulted in the conservation of one of the finer remaining estuaries in Southern California. It provides excellent habitat for shorebirds, raptors, waterfowl, and least terns.

It is our understanding that the U.S. Air Force has delegated to Minerals Management Service the responsibility for consulting with the U.S. Fish and Wildlife Service, in accordance with Section 7 of the Endangered Species Act, regarding possible impacts of this project on the least tern. The Santa Ynez serves as an essential post breeding dispersal area where the young of the year, from a considerable portion of the total population, receive their final "training" and growth prior to embarking on their annual migration south. The estuary also has important fishery values--especially for fish that serve as forage species for the terns. In addition, the Santa Ynez River historically supported viable runs of steelhead trout and has been considered as a potential recovery site for reestablishing these anadromous fish.

The Audubon Society enlists MMS's aid in insuring that none of the options for recovery of the least tern or steelhead trout, are unnecessarily jeopardized by your regulatory decision. Risks of any catastrophic accidents must be reduced as much as possible.

In this regard, it appears that at least one of the alternatives (the southernmost alignment) you are considering would virtually guarantee that no threat is posed to the species inhabiting the Santa Ynez estuarine area. I hope you will select that option. I again apologize for the delay in providing comments. If the Western Regional Office of the National Audubon Society can be of further assistance in this matter, please don't hesitate to ask.

Sincerely,

Glenn Olson

GLENN OLSON
Vice President

GO/cr

cc: Maj. Gen. Jack L. Watkins, Base Commander

RESPONSES TO NATIONAL AUDUBON SOCIETY

NAS-1 A number of pipeline mitigations have been identified that make the potential for impacts to the Santa Ynez Estuary from the oil and gas pipeline insignificant. These measures are discussed in Chapter X of this document. Both National Fish and Wildlife and California Fish and Game were involved in developing these mitigation measures.

VI. COMMENTS SUBMITTED AT PUBLIC HEARING AND RESPONSES

Nancy Lipsius

Walter B. Burnett

Rosanna Miranda

John Cantrell

Alexis R. Mortenson

VI. PUBLIC HEARINGS (PH)

6.1.2

DRAFT EIR/EIS

UNION OIL COMPANY

COUNTY OF SANTA BARBARA
CERTIFICATION HEARING OFFICER

APRIL 17, 1985

LOMPOC CITY HALL
CITY COUNCIL CHAMBERS
100 CIVIC CENTER PLAZA
LOMPOC, CALIFORNIA

INDEX TO SPEAKERS

-o0o-

6.1.3

JEFF HARRIS: Good evening, this is the county's environmental hearing, being conducted under the auspices of the California Environmental Quality Act, as well as the National Environmental Policy Act, and I would like to make a few statements this evening, before we actually get into the hearings, to appraise you of what this particular hearing is all about, so we all understand the rules equally.

This is basically a public hearing to provide a forum for public comment on the adequacy of the information that is contained in the draft environmental impact report and statement that we are considering this evening, and of course you all know that drafts are imperfect, and the purpose of this hearing is to make that document more adequate, in terms of the adequacy of the information that is contained in it.

The document was prepared pursuant to the National Environmental Policy Act, and the California Environmental Quality Act, and our hearing will be for the purpose of recording your concerns and comments so that we can respond to them at a yet-to-be-announced certification hearing some time in mid-June.

Incidentally, the exact date for that hearing has not been set as yet, and you will be notified when that occurs.

Please keep in mind that this is not a hearing to approve or deny the project that we are considering in this document, and as such I would request that you

please limit your comments to the adequacy of the information in the draft document.

In terms of the hearing schedule this evening, we'll be conducting the hearing until such time as the public input ceases and we deem it necessary to close the hearing.

At this time I would like to take the opportunity to introduce to you members of the Joint Review Panel, seated to my left and right.

First is Donna Brewer, representing the Minerals Management Service. We also have Randy Moory, representing the State Lands Commission, Suzanne Rogalin, representing the State Coastal Commission, and from the Energy Division, Janice Yonekura, and Tracy Hopper. They are employees of Resource Management Department.

The consultant who prepared the draft document is also present tonight, and they are Arthur D. Little, and Company.

And, for those of you who don't know me, my name is Jeff Harris, and I'm the County's Environmental Certification Officer, and I'm charged for certifying all of the county's environmental documents.

For those of you who would like to speak this evening I would request that you fill out a speaker's slip prior to speaking, and submit it to me, and the slips are located at the back of the room, near the entrance on a small round table.

The sequence of events that will occur at this evening's hearing will consist basically of a project description and project alternatives, and a brief statement about the Summary Impact Table, and some of the mitigation measures that have been designed to resolve some of the problems that we foresee.

Following that discussion we'll open it up for public comment and this is where we invite you, as members of the public, to express your concerns, in terms of the information that is being considered in the document.

Subsequent to the public's input, I would then request the applicant, or their representative, to make any statements they wish, and then we will basically close the proceedings this evening.

What I would like to do is to announce before we get started a few dates that you might keep in mind, in regard to this particular draft environmental document.

The close of the comment period has been announced as May 6th, at 5:00 o'clock in the afternoon, June 10 is the date that we anticipate releasing of the Response to Comment document. Now, that Response to Comment document will be a document that will be generated through this evening's process, and the responses will be the responses that the consultant and the Energy Division's staff generate to address your specific concerns, and also the concerns that were expressed in letters that we have received during the public review period.

The certification hearing for this particular

6.1.4

document is anticipated to be some time in mid-June, perhaps the week of June 17th. As yet that date has not been finalized, and again, when it is determined, the exact date will be published in a notice and you will be made aware of that particular certification hearing.

It is also anticipated that in late June, probably the last week in June, the final Environmental Impact Report and Statement would be released, and available for the public.

At this time I would like to initiate the hearing, and turn it over to Janice Yonekura of the Energy Division to describe for you what the project is, and to comment summarily on the Summary Impact Table.

Janice.

JANICE YONEKURA: Thank you, Jeff.

Okay, I am going to present a brief description of the Union project, which is the project Shamrock, and the offshore and onshore areas that it is all hedged on and as presented in the document, with the help of a few slides.

Well, as you know, the county is facing quite a bit of OCS development, most of which is along the coast of south county.

For example, you have ARCO at Ellwood, Exxon at Las Flores Canyon, and Chevron at Gaviota. The county also just recently approved two pipeline projects, Celeron All American, and Southern California Pipeline Systems.

The route for those pipelines does traverse both the north and the south county.

Now, this slide shows an overview of the Union Oil project. The Union Oil project is the first OCS development for the north county.

In starting from offshore, Union is proposing one platform, Platform Irene, on OCS 441. The platform is approximately four miles west of Point Pedernales.

The peak production from this platform is expected to be about 20,000 barrels per day of oil, and 13 million standard cubic feet of gas.

Union's proposal includes three pipelines, a wet oil pipeline, a gas pipeline, and a produce water return line, going to shore--from the platform to shore.

6.1.5

The pipeline landfalls approximately a half-mile north of the Santa Ynez River. The route parallels the river across Vandenberg property, and follows the north westerly boundary of the Federal Correctional Institution, and it goes into Union fee property, which consists of about 9000 acres.

Within the Union fee property, Union is proposing a dehydration facility. At this dehydration facility, the wet oil is dehydrated to three percent, or less, water. After the water is dehydrated it is treated and it enters the produce return water--the produce water return line, for ocean disposal at Platform Irene.

Okay, so after the oil is dehydrated, what

we have is dry oil, and the destination of this dry oil is the Santa Maria refinery, and that's the destination that it is taken to, within the scope of this environmental document.

Between the dehydration facility and the refinery, Union does have existing oil pipelines; however, between the dehydration facility site and--as you can see up there, the Orcutt Pump Station--that existing line is too small to accommodate the OCS crude volume, therefore Union is proposing to install a new, larger, ten-inch pipeline.

At the Orcutt Pump Station, the oil is reheated and mixed with some Lompoc hills', or Orcutt hills' crude. The Lompoc hill or Orcutt hill oil crude is of lighter gravity, so with the reheating and the mixing the viscosity of the OCS crude is lowered, and that helps ease it--allows for more ease in pipeline oil flow.

Modifications are being proposed at the Orcutt Pump Station. That pump station is existing, and mainly consists of two gas engine driven pumps, and an oil tank. The modification includes the replacement of those two gas engine pumps with three electric motor driven pumps.

The pipeline segment between Orcutt and the refinery--as I said before, it is an existing line--and that line is adequate to handle the OCS volume.

The Santa Maria refinery is on the Nipoma

6.1.6

Mesa in San Luis Obispo County. That refinery is a partial refinery, and that refinery, it upgrades the crude, so that it can be further refined up at Union's Rodeo Refinery in the Bay area. That refinery has the capacity of approximately 44,000 barrels per day.

Now, processing modifications are proposed for that refinery, however, the throughput will not increase there, and that's because Union plans on backing out some San Joaquin crude, in an amount equivalent to the incoming OCS crude.

The processing modifications proposed for that facility basically includes the installation of state-of-the-art technology for SO_2 emissions, and what we expect to see there is a substantial reduction in SO_2 emissions at that facility.

Okay, so that's what is happening to the oil.

As for the gas from Platform Irene, as I stated before, that comes onshore along with the oil, but in a separate pipeline. It follows the same route to the dehydration facility; however, near where the dehydration facility enters existing gas lines, it is shipped up to the Battle's gas plant in Santa Maria.

There are no physical modifications being proposed for that Battle's gas plant, because there is available capacity to handle the OCS gas.

Also, within the EIS/EIR, we looked at several

alternatives to Union's proposed project components, and there are two that I would like to bring out at this time.

One is an alternative pipeline route, and--an alternative route between the platform and the dehydration facility; and an alternative landfall south of the Santa Ynez River, rather than north of it like the proposed route, and it parallels the river until Floradale Avenue, and at that point it crosses the river, goes across the federal Correctional Institution and into the Union fee property.

Another alternative is another site for the dehydration facility. When Union first submitted their application to the county, they identified eight potential sites on their fee property. Initially, they did propose site No. 8--well actually let me back track.

Site No. 4 is the currently preferred site for the dehydration facility. When they did submit their application it was site 8, however, due to concerns expresssed by Mission Hills community they moved their preferred site further away.

Because we did have quite a bit of detailed information on site 8, we decided to utilize that information and therefore looked at site 8 as an alternative to the preferred site 4. We looked at it, and analyzed it in equal detail to that preferred facility site.

The other sites were also evaluated within the EIS/EIR. Screening criteria, such as visual, potential

6.1.7

to impact flora and fauna, availability of utilities, were developed and applied to all of these sites.

What we found out was that none of the other sites did provide significant environmental, or safety advantages, over site 4 or 8.

Okay, this is a slide of Union's Mandalay's facility in Ventura, and I just wanted to point out that this is the oil facility right here in green. The tanks and what you see over on the far left is the Southern California Edison's power plant.

Okay, just to avoid confusion, the power plat is blocked out so that you can see what the oil facility looks like.

Now, Union's proposal for the dehydration facility was modeled after the Mandalay facility. I would say that the major difference is that the Lompoc facility is to have the 100,000 barrel oil surge tank.

This is site 4, the proposed site. I believe this was taken from Highway 1.

This is a simulation of what the proposed Lompoc dehydration facility would look like from site 1. As you can see in the back, that's the 100,000 barrel surge tank. Up front those vessels are the heater treaters.

Union is proposing to use landscape screening, however the landscape screening was intentionally omitted so that the public could get a better idea of what the proposed facility would look like in its surroundings.

Okay, now for the Exxon project Shamrock.

Exxon submitted a plan of development to the MMS for one platform on OCS 440, which is adjacent to Union's lease.

The anticipated production from the Exxon's platform is 20,000 barrels per day, the same as Union's.

Exxon's platform will not only be pulling oil from 440, but also from 438 and 437 as well. The 437 is right above 440, it is just not outlined on this screen.

Okay, and Exxon's proposing sub-sea pipelines to tie in to Union's Platform Irene, so that its oil could go to the Lompoc Union dehydration facility. Gas is to be reinjected at the platform, for reservoir mainly, until the year 2000.

Now, at the time they were preparing the EIS/EIR, Exxon's onshore plans were not clear, and there was no application submitted, or filed, with the county for onshore oil transportation facilities; however, since the release of the public draft, Exxon has submitted an application for a pipeline and Tracy is going to later talk about that application.

A major alternative that we did look at for the Exxon offshore project is a tie-in to the Chevron Platform Hermosa. Once Shamrock's production ties into Platform Hermosa, well then the oil and gas could go on to Chevron's Gaviota facility for treatment, so that was the major alternative that we looked at for Exxon's project Shamrock.

6.1.8

Also within the EIS/EIR we have a Central Santa Maria Basin Area Study. This area study looks at the cumulative impact of potential future development within the central basin. This central basin consists of 28 leases.

As you may recall, the Chevron environmental document had a Southern Santa Maria Basin Area Study, and a recently proposed City Services Project in San Luis Obispo County will have a Northern Santa Maria Basin Area Study.

In order to assess the cumulative impacts of potential development, we developed this scenario, and this scenario consists of a maximum of six platforms, two of the six are the Union and the Exxon's proposed, and then there are four hypothetical platforms.

Placement of the hypothetical platforms were based on state-of-the-art technology, information provided to the MMS from oil companies, and also present knowledge of the area's geology.

For the purposes of the study, it was also assumed that production from the hypothetical platforms would tie-in to Union's Platform Irene, and then go onshore to the Lompoc dehydration facility.

Peak production from this area study of the central basin is estimated to be 100,000 barrels per day of oil, and 80 million standard cubic feet of gas.

Now, actually, the option of whether to

tie into a central or a southern, or a northern, basin platform will depend on the processing or treating capabilities at Gaviota, Lompoc, or some future site in San Luis Obispo County.

The MMS required Union to size their pipeline to shore to accommodate the projected 100,000 barrels of oil production from the basin, and what we have here is a pipeline that is capable of transporting 100,000 barrels per day, but at the end of that pipeline there is a facility capable of only treating 36,000 barrels per day.

Also, Union has a way to get its oil out of the Lompoc dehydration facility by using mainly existing Union facilities, and the options available to Union may not be feasible or desirable for other central basin operators, given the refinery destination, and also limited capabilities of the existing facilities.

This situation led us to develop, what we call in the document, "The Onshore Area Study Scenario."

Now, this onshore area study looks at how central basin production might be accommodated onshore, and a scenario consisting of expanded and new facilities was developed and the impacts analyzed on a general level. The results of this study will be used as a long-range planning tool.

The scenario for the onshore area study consists of an expanded Lompoc dehydration facility. The expansion is from the proposed 36,000 barrels per

6.1.9

day to 100,000 barrels per day, and this could be done with the addition of five heater treaters and a pre-water knock-out vessel, which could be installed within the fence line of site 4.

The scenario also includes a colocated gas facility, capable of handling or treating 80 million cubic feet per day--80 million standard cubic feet per day, and again for the purposes of this study, it was sited adjacent to the oil facility.

Also included in this study was a dry oil pipeline exiting the Lompoc dehydration facility. Because we did not have an application for a specific pipeline route, and therefore we lacked detailed information, what we did was we looked at an area, a triangular area that is shaded on this slide, and it is formed by the Lompoc, Buellton and Gaviota areas.

And, we picked this area because Buellton, the area around Buellton, could be a potential tie-in point to say the Celeron All American, or the Southern California Pipeline Systems.

Gaviota was selected because there was a proposed marine terminal, and it could also be a tie-in point for the pipeline, so again this was a very general study of what the impacts would be should there be a pipeline in that shaded area and because certain impacts, such as cultural resources, and visual, are so site specific, it has to be on the general level.

We did also identify some constraint in

that area for pipeline development. I just wanted to emphasize that the expanded Lompoc dehydration facility, and a colocated gas facility, were only developed for the purposes of this Onshore Area Study, and that Union, or any other oil company, is not proposing these facilities.

And, therefore, these facilities are not being considered for permitting under this environmental document.

If and when these, say an expanded Lompoc facility, or a new gas plant is proposed, it would be subject to a separate CEQA review and there would be the opportunity for public input.

In addition, I would like to point out that if a gas plant is proposed in the future, alternative sites would be analyzed as part of that project specific environmental review.

At this time I would like to turn it over to Tracy Hopper, who is going to talk about Exxon's recently submitted application for a dry oil pipeline.

TRACY HOPPER: Okay, my contribution to the information for tonight is going to be to brief you on some interesting or significant events that have taken place during the 45-day review for the Union public draft.

One is that Exxon has submitted a new application, as Janice has mentioned, for an oil pipeline exiting the Lompoc area, and the other interesting point is that additional or ongoing environmental analysis is currently underway for the evaluation of several mitigation measures on Union's proposed and alternate pipeline route.

As Janice mentioned, at the time that we began the Union Environmental Impact Report analysis on the Union project, we had no specific application or plans on file for any processing facilities, or transportation facilities in the Lompoc area for either Exxon's production or that of future areas with any operators, so we developed or created facilities for a study purposes which helped analyzed options to these other operators offshore, and it is the triangular area that Janice was talking about for transportation alternatives.

We identified environmental impacts associated with these options and analyzed them generally in the area study, both onshore and offshore; however, several weeks ago Exxon submitted an application for a very real pipeline route, exiting the Lompoc area, which involves a 26-mile pipeline--this slide shows you the general area. The 26-mile pipeline route from the Lompoc facility, which would run via Highway 246, running south. As you can, it is sort of bisects Highway 1 and 101, and heads towards the Gaviota area.

The pipeline would be sized at 60,000 barrels per day, to transport that amount as a maximum capacity, and could transport both Exxon's production and that of future areas to the operators.

At Gaviota Exxon would plan to use the existing

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Texaco marine terminal there for interim transportation until a pipeline, for instance the Celeron, or the Southern California Pipeline Systems, are in place and are operational.

In the application Exxon also states that should a consolidated marine terminal be approved at the Las Flores Canyon area that they would actually propose the connecting link from down near the Las Flores Canyon, and that is illustrated by the little slashed line there on the slide.

The proposed, or the preferred route, leaves the Union dehydration facility in Lompoc and heads southeast along Highway 246. From there it generally parallels 246 until it joins an existing Southern California gas pipeline right of way, which is approximately two miles west of Drum Canyon, if any of you are familiar with that area.

From there it proceeds south crossing the Santa Ynez River and finally Highway 1 to the Gaviota State Park, where the route would then head east to the proposed Chevron processing facilities at Gaviota, north of Highway 101, and then run under the highway to the existing Texaco marine terminal.

Exxon is also proposing pumping and metering facilities within the existing--or excuse me, the proposed plant boundaries at the Union Lompoc dehydration facilities.

This slide is just in here, and actually it is in here backwards, but it is supposed to show

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you the Gaviota State Park area, and where Highway 101 comes down into the proposed Chevron facilities, and existing Texaco marine terminal.

Alternative routes being proposed, as you see on this slide, there is a corridor that runs along Highway 1 to Highway 101 and into the existing marine terminal.

Another alternative would be to run along Highway 246 until the corridor connects with Highway 101, and it would run south from there to Gaviota.

A pipeline corridor from Buellton to Gaviota is similar to that being proposed, and which was just approved by the Planning Commission, for the Celeron and Southern California Pipeline Systems. However, this pipeline would be running in the opposite direction. Celeron lines are taking oil production out of the county, and this line would be running in the opposite direction to get that crude to the Gaviota area.

And, in light of the recent Planning Commission's decisions to approve the corridor for the Celeron and the Southern California Pipeline System lines, and given the closely trailing start-up schedules of the Exxon and Celeron pipelines, environmental analysis for this project would surely include an alternative which would evaluate a tie-in from Highway 246, an actual tie-in perhaps to Celeron of SCPS pipeline systems at Buellton, alleviating the need to go all the way to Gaviota and access the marine terminal.

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Celeron plans to have their line in place by January of 1987, and Exxon proposes that their pipeline will be operational by October of 1986; therefore the two pipeline schedules are only three months apart, so we would surely analyze this pipeline connecting to the Celeron line if that should be operational.

The application is currently under application review by the county. What this means is that we review all of the plans, and the proposal that's been submitted for informational needs, for preparing an environmental document.

The project would be in need of subsequent enviornmental review, and a document would be prepared that would tier or reference back to the Union document, an analysis that was done under the Onshore Area Studies for the Union project. It would be subject to a separate environmental review process, as well as hearings and opportunities for public participation.

And, the pipeline is somewhat related to the Union project because of its method being proposed for Exxon to transport its production and area study production out of the area, and so we felt that it was appropriate to let you know what was coming down the pipes.

Finally, I would like to mention an additional analysis that is taking place right now on the Union project, Further evaluation is currently taking place for the proposed and the alternative pipeline routes

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in the Union projects. Surveys that were conducted for the environmental document on both routes identified impact issues to several subject areas, particularly in the areas of cultural resources and terrestrial and fresh water biology. These are the principle areas of concern along these pipeline corridors crossing Vandenberg Air Force Base.

Both routes have the potential for disturbing sensitive vegetation and wildlife habitats along the Santa Ynez River estuary, and the river terraces. In an effort to mitigate the potential impacts from these corridors, several mitigation, and/or realignments to the routes have been suggested in our undergoing, further analysis.

The common goal of the mitigations, or the realignments, is to increase the distance from the wetland areas and to avoid the cultural resource sites.

The consultants will be studying methods of buffering these sensitive areas from construction or maintenance activities, or potential leaks or spills from the pipelines.

For instance, along the northern route, if the route were adjusted just further north, it would be out of the flood plain area, which would protect any vegetation or river communities there from threats from a spill.

Also, berms could be constructed, which would contain a spill, if one were to occur, or we will be

6.1.12

evaluating moving the pipeline corridors into existing fire breaks along Vanderberg Air Force Base's boundaries, which will help reduce the amount of vegetation that has to be removed in the area. Important plant communities could then be saved.

If you are interested in taking a closer look at either of these routes, there is a mounted topographic map in the back of the room. It has both the proposed route and the alternative route, and suggested mitigation realignments highlighted in yellow.

The results of the field work that is underway will be incorporated into the final document, and then it will be circulated for review, prior to any hearings--or final hearings on the project.

The document does briefly discuss both the routes and the suggested mitigations to the routes and discusses the trade offs for mitigating the impacts.

A final note here is just to mention that there are Executive Summaries in the back of the room for those of you who have not yet reviewed the document.

The Executive Summary provides a brief overview of the project and the impacts associated with each project component, and we encourage you to review the entire document before making any judgments on the project, but the Executive Summaries are much more convenient to cart around with you to hearings and all.

Also in the back of the Executive Summary are Impact Summary Tables, which identify impacts associated with the project components for the Union project, the Exxon project, area study build outs scenarios, and accumulative are a whole picture analysis which analyzes the combination of both oil and non-oil related projects.

The tables also include mitigation measures which identify trade offs associated with mitigating these impacts.

The impacts are categorized according to their severity. Class 1 impacts are identified as those being significant, that are not completely mitigatable, that is the impact cannot be reduced to insignificance, or level of unimportance.

Class 2 impacts are again significant, but mitigation measures are feasible which can reduce them to a level of insignificance.

Class 3 impacts are adverse, or infers basically, but categorized as maybe being unimportant in the relation to the overall project. For instance, dust may be related to construction activities, and the like.

And, Class 4 impacts are those found to be beneficial in one way or another to the area. For instance, generating jobs, or revenue for local municipalities.

So, the Executive Summary and the Impact Summary Tables will give you a quick overview of the project and the impacts associated with each component, and they are helpful for tracking the significant changes that the area might be facing.

Again, we hope that you will review the entire

6.1.13

document, rather than just forming your opinions from the Executive Summary, and there are at least two weeks left, or so, to submit written comments on the document.

And, now I guess we will turn the hearings over to you, and get a chance to have some input from you.

JEFF HARRIS: Thank you, Tracy.

This is the appropriate time to request any comments from the members of the audience.

I would like to say that I only have one speaker slip, and hopefully there are more speakers than that this evening.

Again, for any of you who did arrive a little bit late, the speaker slips are available on the small round table at the back of the room, near the entrance.

Also, when speaking, please come up to the podium, on my right, and identify yourself for the public record. We are creating a public record of this evening, and the reporter has requested that you spell your name for clarity.

The first speaker on this evening's agenda, is Ms. Nancy Lipsius, representing the Oil Study Group of the Mission Hills Community Council.

Ms. Lipsius.

MS. LIPSIUS: That is L-i-p-s-i-u-s.

I live in Mission Hills, and I've lived in Mission Hills since 1959, and I would like to continue living in Mission Hills, and if site 8 is used, I'm afraid that none of us will be able to live there, for obvious reasons.

My presentation doesn't fall within the purview of what you outlined, so I won't--I'll put it into a letter form and send it in.

But, I would like to say that when this first PH-1 came up, and the Union Oil people came to the Mission Hills Community Council to speak to us about it, we were horrified at what they had in mind, with only 20,000 barrels a day, and we circulated a petition, and later we were told that they would honor the petition and consider site 4.

And, then we were told that site 4 was the preferred site, but then when the EIR came out and we saw all of this study on site 8, we were very upset again, because that is an awful lot of work to put into it if you aren't considering it, and we would just like to say that it is directly uphill from our water wells, our schools, our homes, several million dollar waste treatment plant that has just been completed, and a State Park, and a lot of homes, and a lot of people who have everything invested in those homes, and it is right uphill from us.

Anything that seeps out, it is unstable--the terrain is unstable, and maybe it is not so pretty over on No. 1, but then there are not a lot of people using No. 1, and I'd a whole lot rather go over there and look at something not as attractive than have it come down

6.1.14

on top of me.

Thank you.

JEFF HARRIS: Thank you, Ms. Lipsius.

The next speaker is Walter R. Burnett, who is the Director of the Mission Hills Community Services District.

Mr. Burnett.

MR. BURNETT: That is Walter B. Burnett. I probably didn't write too clearly. PH-2

Originally we had concern which Mrs. Lipsius has expressed, and the concern we had was from the District's viewpoint of site No. 8, with regards to potential spillage and damage to the water well.

The Community Council, which is the community's arm, took issue with site No. 8, as well as the District, and it was moved to site 4, as you've indicated.

Our concerns are that this study was done, including site 8, and we would like to have some assurances, from the District's viewpoint, that site 8 will be deleted from any future expansion or development of the facilities.

Keeping in mind, that it is customary that we try to consolidate these facilities, to control the environment, consolidation could very well mean moving to site 8.

Now, I realize that these ladies expressed it would be held at site 4, but we still want to go on the record as saying that site 8 should be excluded.

Thank you.

JEFF HARRIS: Thank you very much, Mr. Burnett.

Next speaker is Mr. Robert Klausner, representing the Citizens Planning Association.

Mr. Klausner.

MR. KLAUSNER: Thank you. My name is Robert Klausner, representing Citizens Planning Association.

We have prepared a review of the document, and on specifics I have about four or five pages, which I will submit to you. There is no need to go over these and read them to you.

There are four major concerns that we do however--that we have however, that we would like to focus on.

The alternative sites for oil processing, PH-3 the EIR/EIS has designated--is designed to consider only two sites for the proposed project, in the study area oil processing facility, both in close proximity to residential areas. Now, I know that's a relative term, but it is an industrialization that is going to be rather large, has the potential for getting even larger as time goes on, because we can't really anticipate what its ultimate size will be, and it is in areas relatively close to Vandenberg Village and Mission Hills.

The discussions of the alternative not considered for further analysis does not explain why no sites beyond this particular Union Oil property was considered. And, it wasn't clear to me, in your statement--Ms. Hopper's statements, whether or not that study area really did, at least, a first screening of alternative oil properties

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or sites in the area that might be more remote from residential, so we would--if it has been done, fine. If it hasn't then we think that it would be appropriate, that something be done to evaluate the pluses and minuses from the environmental point of view.

The same thing applies to the alternative PH-4 sites for the gas processing. We believe that the EIS/EIR sorely underplays the significant public safety risks associated with siting a major gas processing plant so near to Vandenberg Village and Mission Hills. The discussion is buried in Section 5, 11.9 and it down plays the risks of explosion, fire, and toxic release, from the build out of gas processing, and there was actually no mention of these risks appearing in the Executive Summary.

CPA is doing further study on the system safety aspects of gas processing and plans to submit more detailed comments to you later. At this point we suggest that the risks from upset and accidents at the facility, and from truck transport of hazardous gas by products on local roads, should be reviewed in light of the public concern raised under similar circumstances in the Chevron Gaviota project hearings.

At the least, the EIS/EIR should highlight these impacts and risks more prominently; in addition, the document should give further consideration to alternative sites for the gas processing that are not near the residential neighborhoods.

PH-5

The third thing that we would like to discuss as a major issue is project build out impacts. More information should be provided about the impacts associated with the full build out of the 100,000 barrel per day oil facility at the Union site. This is covered in a more general way in the Area Study sections of the EIS/EIR.

The county decision makers should be given a more detailed and complete analysis of the long term implications of the build out at this site. More than just Union and Exxon production from two platforms is before the county, given our consolidation policies. Particularly the document should present visual renderings of the build out scenarios and discussions in more detail-- and discuss in more detail the issues of traffic, land use compatibilities, safety, noise.

PH-6

The last thing that we would like to point out is the coastal resource cumulative impacts. In our view, the project and the cumulative impacts of large scale industrialization along the north county coast are underplayed in the EIS/EIR. Citizens Planning has raised this concern at previous enviornmental hearings of south coast developments.

While the incremental impacts of one additional platform, pipeline, helicopter flight, or supply boat, may not be judged significant by the consultants, the cumulative effects caused by major industrialization of the entire Santa Barbara County coastline are a serious

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affront to our resources and the quality of our life.

In looking at your development plan for the Santa Maria area, there is nothing in there about the potential for the state leases. Now, if we are going to do this right, we might just as well anticipate worst case situation, and since that is a potential for worst case situation all of those impacts really should be laid into this, so that we know what we are getting into ahead of time.

As was pointed out down in the southern part of the county, once that first project goes through, that's a commitment, and it is going to be wherever that is, and the impacts are going to end up as the result of where that is located. It is too late to make that decision that it was probably not the best place in the world to put it. After the first project has been approved, we get locked in.

We suggest that the EIS/EIR consider the regional, cumulative impacts to coastal resources in the area of recreation, tourism, visual disruption, noise, odors, air quality, oil spills, and wildlife. Public concern about the aggregate impacts to these coastal resources has led Santa Barbara County to adopt a Coastal Resource Enhancement Fund as a mitigation program for these impacts. The County Energy Division, obviously, is familiar with this mitigation program and in order to treat all of these applications equally, and not show a bias towards one at the expense of the

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other, we would think that you might want to incorporate something along these lines in your EIR that would be consistent with those EIR's that have preceeded it, and those projects which have preceeded it.

And, essentially, we will submit to you the balance of these comments, and we will have some more comments for you before the closing. Thank you.

JEFF HARRIS: Thank you, Mr. Klausner.

The next speaker is Ms. Rosanna Miranda, representing the Santa Ynez Elders Council, and by way of explanation the Santa Ynez Elders Council is the officially designated north county entity, basically formed of Native Americans who are concerned about the north county's cultural resources.

Ms. Miranda.

MS. MIRANDA: Okay, number one, avoidance PH-7 of sites should be stressed as a preferred mitigation.

PH-8 Two, the Federally Recognized Elder's Council should be consulted in all decision regarding site avoidance efforts.

Three, the FREC representatives should be PH-9 present at all areas recommended for monitoring, in addition to those areas suitably surveyed.

PH-10 No. 4, more time should be spent to carefully examine Ojuspush [sic.] on down to Onomyo--that's Gaviota.

And, 5, applications should conduct an ethno-historic study of the villages to be impacted by this PH-11 project.

The ethnohistory should include a genealogical study with intent of identifying any possibly living descendents of those villages.

No. 6, More decision of isolated artifacts and possibilities for burials and cemeteries should PH-12 be presented.

No. 7, all artifacts recovered from excavation of such data recovery is necessary and should be returned to the Federally Recognized Elders Council. PH-13

And, thank you for letting us put in our comments. And, I have a map here, too that I will mark out where it is important to us. Thanks.

JEFF HARRIS: Thank you very much, Ms. Miranda.

Mr. John Cantrell, representing the Mission Hills Community Council.

MR. CANTRELL: Mr. Harris, my name is John Cantrell, C-a-n-t-r-e-l-l. My address is 3566 Via Gala. I'm privileged to be a member of the community council and serve as its chairman for the Oil Separation Committee.

Approximately two years ago, when we were PH-14 first presented this project by Union Oil, the community was totally opposed to it--its concept, and through petitions, working with Union Oil, and so on, we decided that site 4 would offer the most protection.

I would like to echo that it is the council's position that in concept we support site 4, and we would be opposed to any other site.

There is some issues that you guys keep PH-15 dreaming up, and it really puts the community at a disadvantage because, you know, it is hard for us to keep up with all of these different scenarios, that you guys sit down there and continually punch out by the reams.

Now, here we started out with the 20,000 barrel processing facility. Okay, now you've increased it 180 percent, it is now 36,000.

PH-16

You are saying that the natural gas is going to be 80 million standard cubic foot a day, would probably go through this facility, well, that is fine except that you are planning falls about 80 million standard cubic foot a day short.

If you get 150 off of Exxon, you get 30 off of Union, and you get 80 off of Chevron, that adds up to a little bit more than 80.

It would seem to me that it would be more appropriate if we just say, "Hey, we will drop a line here. We are going to put a cap on this thing."

And, then all of these different issues that come up, they go through the same route, they give us the same opportunity--us part-time people that look at these things--you know, that gives us a chance to catch up with you full-time people.

And, you know, sometimes you look at these things and you wonder, you know, whose side is everybody on?

Thank you.

JEFF HARRIS: Thank you, Mr. Cantrell, and

6.1-18

we do sympathize with your comments.

Alexis R. Mortenson, also representing Mission Hills Community Services District.

This is the last speaker's slip that I have, and again, if anybody is interested in speaking, please submit a slip.

MR. MORTENSON: Yes, Mr. Chairman, I briefly got to go through the document.

PH-17

One of the issues that I did not see addressed is, as the gentleman stated before, the hazardous materials, and the concept--first of all Mission Hills and Vandenberg Village are presently impacted in the fact that the fire protection there also provides ambulance protection, and the three men at that particular station are now running an ambulance and a fire truck.

Will there be any mitigation as for fire protection provided by Union Oil to offset that impact as it has been done--recommended at the ARCO facility?

And, I think that that is something that should be addressed, because the community is presently impacted.

Thank you.

JEFF HARRIS: Thank you, Mr. Mortenson.

Are there any more persons in the audience who wish to speak at this time?

May I see a show of hands of anybody who would like to speak?

If not, as we had indicated at the opening

6.1.19

of the hearing, we would conduct the hearing until the public input ceased, and apparently it has, and if there are no futher comments, I would just like to remind you again of some of the dates involved in the processing of this particular document.

Again, the close of the public comment period, for written comments, will be May 6th at 5:00 p.m.

June 10th is the anticipated release date of the Response to Comment volume, and basically that will be a response to comments that were recorded this evening, and we do anticipate a certification hearing to be conducted in mid-June, and that date has not been set as yet, but it will be publicly noticed and you will be advised of when the certification hearing is to occur.

And, the release of the final Environmental Impact Report and Statement will occur probably in the last week of June.

And, if there is no further public comments at this time these proceedings are--excuse me, yes, sir?

UNIDENTIFIED PUBLIC SPEAKER: Will there be an opportunity to enter anything into the record in the next few days?

JEFF HARRIS: Yes. The close of comments is May 6th.

UNIDENTIFIED PUBLIC SPEAKER: And, who do we address our comments to?

JEFF HARRIS: You can address your comments to the Energy Division of the Resource Management Department, attention Janice Yonekura, and if you need an address for that, we will be happy to supply that after the proceedings are closed.

Any other questions or comments?

If not these proceedings are closed, thank you for your patience.

-o0o-

CERTIFICATION

I, PRISCILLA PIKE, an official hearing reporter for the State of California, do hereby certify that I have transcribed my stenographic notes for the following:

DRAFT EIS/EIR UNION OIL COMPANY
CENTRAL SANTA MARIA BASIN AREA STUDY

THAT THE PRECEEDING 34 pages comprise a full verbatim transcript of the hearing reported by me.

DATED: April 18, 1985

Priscilla Pike

PRISCILLA PIKE

6.1.20

RESPONSES TO PUBLIC HEARING COMMENTS

PH-1 See response to OSG-2.

PH-2 See response to OSG-2.

PH-3 See responses to CPA-1, CPA-2, CPA-5, and CPA-6.

PH-4 See responses to CPA-1, CPA-2, CPA-3, CPA-4 and CPA-26, CPA-27 and CPA-28.

PH-5 See response to CPA-5.

PH-6 See response to CPA-7.

PH-7 Comment noted. Avoidance of cultural resources is specifically and consistently identified as the preferred mitigation (See Section 5.8.5).

PH-8 Comment noted. Native American consultation concerning site avoidance efforts should be negotiated as part of the permit of agreement, as recommended in Section 5.5.1.3 of Technical Appendix G - Cultural Resouces..

PH-9 Comment noted. Native American monitoring arrangements should be negotiated as part of the permit of agreement, as recommended in Section 5.8.5 of the EIS/EIR and Section 5.5.1.3 of Technical Appendix G..

PH-10 Comment noted. In the Regional and Area Study discussions, the Gaviota area is identified as highly sensitive to the Chumash. Because the proposed Union Oil Project is located to the north, detailed examination of this area (including field surveys) was not conducted as part of this project. Careful examination of this area should occur in conjunction with plans for further development which may impact Chumash cultural resources and values. (See Sections 5.8.5.1 of the EIS/EIR and 5.5.3.1 of Technical Appendix G.)

PH-11 Comment noted. Conducting ethnohistory and geneological studies is consistent with the mitigation measures recommended in the EIS/EIR. (See Sections 5.8.5 in the EIS/EIR and 5.5.3.1 of Technical Appendix G.

PH-12 Comment noted. Shovel pit testing was conducted to confirm or deny the presence or absence of sites in the vicinity of isolates and in other sensitive areas where buried sites were considered likely due to drifting sand. No burials or cemeteries were found. The results of this field work were incorporated into the EIS/EIR.

Isolated artifacts and the possibility of burials is discussed in the EIS/EIR (Sections 4.8.2.1 and 4.8.4.0) and Technical Appendix G. Text has been changed to augment this discussion.

PH-13 Comment noted. This important concern is specifically addressed in Technical Appendix G (Section 5.5.1.3). Arrangements for the disposition of artifacts should be negotiated as part of the MOA, as recommended.

PH-14 See response to OSG-2.

PH-15 See response to OSG-1. The facility will have a nominal capacity of 36,000 B/D, but Union's production level is still only 20,000 B/D.

PH-16 Please see Table 2.9-1 for a realistic estimate of the peak gas production to be handled through the hypothetical gas plant discussed in the Area Study analysis. The peak gas occurs in 1993 at 44 MMscfd since Exxon plans to reinject their gas until after the year 2000. It should also be noted that this analysis is for planning purposes only and that no gas plant is currently proposed. When and if a gas plant is proposed for this site, it will be subject to a separate CEQA review.

PH-17 Union Oil has been in contact with the Santa Barbara County Fire Department, and has agreed to work with them to offset the further impacts due to the project on the Lompoc fire station.

VII. COMMENTS SUBMITTED BY UNION OIL AND RESPONSES (UO)

R.S. Gillen 4/9

R.S. Gillen 4/25

G.W. Moon 4/29

J.E. Nowinski 5/1

UNION OIL (UO)

Union Oil and Gas Div n: Western Region
Union Oil Company of California
2151 Alessandro Drive
P.O. Box 6176, Ventura, California 93006
Telephone (805) 656-7600

UNION 76

Richard S. Gillen
Regional Offshore Construction Manager

April 9, 1985

Santa Barbara County Resource
Management Department
123 East Anapamu Street
Santa Barbara, CA 93101

Attn: Janice Yonekura

Dear Janice:

We are attaching for your consideration a list of comments we have on the Draft EIS/EIR for the Pt. Pedernales Field. We have not listed the misspelling, punctuation mistakes, etc.

We have noted that there is a lot of editoralizing throughout the document. The elimination of these opinions generally made outside the field of expertise of the writer, would greatly reduce the size of the document and add to its credibility. A case in point is found in the third paragraph on page 5.7-27. This paragraph should be removed. UO-1

7.1.2

We will have additional comments in the future and will submit them to you as soon as possible.

Yours very truly,

R.S. Gillen

RSG/dh

cc: Russ Hanscom
Rich Keller

APPENDIX H

SAFETY & RELIABILITY

Page		
2-22	Union's pig launcher/receiver closures include a pressure warning interlock such that the closure can not be opened while under pressure.	UO-2
	The pig launcher valves are equipped with position indication switches which are connected to alarm on any incorrect valve sequence.	UO-3
2-24	Union's pig launchers and receivers are equipped with small bore valves specifically intended for pressuring up the receiver. The main valve is not opened until the receiver/launcher is at operating pressure and has been checked for leaks.	UO-4
2-46	Only one change pump and one shipping pump will be used at a time.	UO-5
2-46	Plate type exchangers are used, not shell and tube. Plates are titanium.	UO-6
2-50	Gas pig receiver inlet valve is manually operated. It cannot be opened quickly.	UO-7
3-12	Union's gross separators have a volume of 143± bbls (8' D x 16' L).	UO-8
3.13	Union's shipping tank has a volume of 200 bbl (10' D x 14' H).	UO-9
3-48	Large shipping surge tank may be 50% full at the time of a rupture but it will be less than 10% full more than 95% of the time.	UO-10
7-8	LPG tank and loading racks have fixed water spray systems already.	UO-11

0894K
3/85

Comments on EIR - Vol 1 & 2

E-24 1st paragraph - neither the proposed pipeline route or the alternate route would affect the lower 42 miles of the Santa Ynez River estuary. UO-12

2-2 Sixth paragraph from top: Replacement of an existing above ground power cable .... not new cable UO-13

2-10 Union is not planning to use Desalination Systems. UO-14

2-12 The spill equipment inventory is being revised with the addition of the area spill response boat and crew. UO-15

Both fire pumps maybe connected to the emergency generator.

2-15 No. of Drilling Rigs 2(can accomodate 2) should read 1 (can accomodate 2) UO-16

2-17 Caustic "road" should be caustic soda. UO-17

2-20 2nd paragraph - sewage food waste will be processed through the sewage unit. Gray water will be discharged directly. UO-18

2-33 What is electro/catalytic sewage treatment? Union is using a biological treating system. UO-19

Union has a 300 gpm (10,000 B/D) cooling water stream with 5°F rise which is not included. UO-20

2-35 "As County Proposed" should be "As currently proposed". UO-21

Last word, second sentence should be currently instead of county?

2-40 The pipe lay barge method installs only one line at a time. Three lines can be installed at once with the shore pull method. Bouys are used to support the line only for the shore pull method. UO-22

2-52 The second valve site is located on Union Oil property on the east side of Floradale Ave. UO-23

2-62 "Emissions are lawed by" should be "emissions are caused by". UO-24

2.4.2 The parcel size is 257 acres and 22.5 acres are being rezoned. UO-25

Figure 2.4-3
Both reject tanks should be 3000 barrels not a 2000 and a 5000. UO-26

7.1.3

2-67 2.4.4.0 - "11 persons plus will supervise" should be "11 persons plus supervision and engineering support". UO-27

2-72 Section 2.4.5.0
Only 1000 feet of Union Oil power system will need to be reconductored not the entire network. UO-28

2-74 Section 2.4.6.0 UO-29
The fire protection system has been expanded to include the following equipment:

- One 3000 gpm 150 psi fire pump which will be diesel engine driven.
- One 3000 gpm 150 psi fire pump which will be electrically driven.
- Four hose reels with foam capability.
- Three street type fire hydrants
- Three hydrant-monitors with foam capability.
- Two 500 gpm monitors with foam capability
- One 5000 barrel water storage tank
- Foam system for 100,000 bbl tank
- Portable fire extinguishers as needed

This list has been approved by the County Fire Dept.

2-75 "Lompoc Fire Dept" should be "County Fire Dept". UO-30

2-88 Section 2.8.1
3rd paragraph - Subsea pipelines will be concurrent with onshore construction not platform construction. UO-31

4.7-11 Gas in northern Santa Barbara is from Southern California Gas. Not PG&E. UO-32

4.11.7 The Orcutt Pump Station tank has a 23,000 bbl capacity, not 5000 bbl. UO-33

5.2-37 Paragraph 6 - Flaring is not a normal occurance. Regular maintenance of the standby diesel generator would not be performed during a flaring episode. UO-34

5.6-23 Paragraph 6 - Fire Department said oaks would have to be trimmed so that branches would be more than 3 feet from the ground. Ground vegetation would have to be cut to 6 inches or less for a 100 foot perimeter around the onshore facility. UO-35

5.6-30 5th paragraph - The risk of loss of animal life from a large gas leak would most likely result from fire or explosion than from H_2S posioning UO-36

5.6-38 5th paragraph - The expanded Lompoc oil dehydrating facility would occupy the same space as the proposed facility. A new gas facility if built would probably be constructed in an area north and east of the proposed facility in an area clear of oak trees. UO-37

5.6-51 Oil spill at facilities - all tanks storing oil or produced water are in bermed areas which will hold 1-1/2 times the volume of the tanks. Any spill which is in an unbermed area or escapes from a bermed area will be directed to a catch basin which is just south of the facility. Any off site water will be directed around the facility so it will not overload the containment features of the facility. U0-38

5.7-22 Paragraph 7 - Reguardless of existing zoning the onshore facility site is part of an active oil field. There is already a similar facility 1-1/2 miles south east which serves the existing Lompoc Oil Field. This is one of the reasons this area was chosen for the onshore facility rather than near the beach. U0-39

5.11-20 "Improve integrity of pig traps." These features are included in the present design. U0-40

5.11-21 "Conduct periodic safety audits and inspections" This is a part of MMS requirements. U0-41

5.11-23 "Provide an interplatform pipeline integrity ....". This is included in the design for the future platform connections. U0-42

"Pump out Platform Irene flare ...". The flare scrubber pump has independent automatic controls. A separate high level shutdown shuts in the wells if the scrubber overfills. U0-43

"Develop safety system testing protocols" This is part of Union's design. U0-44

5.11-24 The drilling group uses simulators for blow out prevention drills. U0-45

5.11-31 Last paragraph - Battles has water spray systems on all propane and butane loading racks and storage vessels. U0-46

5.11-31 2nd paragraph - Since all of the emergency shutdown valves fail closed, a loss of signal for any reason will put the valves in a safe position and initate a total shutdown. U0-47

Union proposed 4 block valves on the Lompoc-Orcutt line. U0-48

Three pages of the Executive Summary Impacts are also attached with erros noted. U0-49

0918K

7.1.4

CLASS I. SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

(Impacts which must be addressed in a "Statement of Overriding Consideration if the project is approved (Section 15089(b), State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY

SOURCE	IMPACT DESCRIPTION	SCOPE	PARTIAL MITIGATION	RESIDUAL IMPACT
Construction of Proposed Pipelines	Removal of Burton Mesa Chaparral	Regional	Use mitigating realignment. Or: (about 50 acres) and Coast Live Oak	Regionally -Minimize permanent
right-of-way (ROW) width.				
from Landfall to Orcutt	Woodland (including about 275 oak stems).	systems intact.	significant. - Replant oak seedlings. - Leave chaparral shrub root	
	Removal of Bishop Pine Forest (including about 30 pine trees).	Local	- Minimize construction ROW width. - Reseed corridor with Bishop Pines.	Locally significant.
	Drainage 1-4 (Oak Canyon) and 1-5: Removal of Oak Woodland, Burton Mesa Chaparral, and rare plants on steep slopes.	Local	Use mitigating realignment. Or: - Use special soil stabilization procedures. - Replant oak seedlings. - Minimize construction ROW width. - Leave chaparral shrub root systems intact.	Locally significant.
Locally	Drainage 1-11: Removal of Oak Woodland and freshwater wetland vegetation.	Local	Use mitigating realignment (into firebreak). Or: - Minimize construction ROW width. - Replant oak seedlings. - Reestablish wetland vegetation.	significant
Construction of Processing Significant Facility at Proposed Site 4 or Alternate Site 8	Removal of Coast Live Oak Woodland.	Local	Allow oak trees to remain in firebreak around Locally facility if consistent with County fire policies.	
Normal Operations Regionally of Proposed Project	Damage to vegetation, including to resistant species, as a result of increased ozone levels from the mouth of San Antonio Creek inland to Barka Slough and the Santa Ynez Valley caused by emissions from platforms Irene and Shamrock and the Lompoc Processing Facility.	Regional	- Modify schedule for testing standby generators at platforms. - Decrease flaring rate at platforms. - Use low NO_x burners at Lompoc Processing Facility. Burners are low NOx	significant.
	Visible injury to leaves and decreased primary production in sensitive plant species near the Santa Maria Refinery as a result of high sulfur dioxide levels that would	Regional	Improve efficiency of sulfur removal system for refinery gas.	Regionally significant.

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Impacts which must be addressed in a "Statement of Overriding Consideration if the project is approved (Section 15089(b), State EIR Guidelines)

GEOLOGY

Source	Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Faults-Offshore	Potentially significant if intersected by drilling related to project. Potentially significant for siting of future development facilities and alternatives.	Local, short- to long-term Regional, long-term	Adherence to existing regulations	Insignificant
Faults Offshore onshore	Possible displacement of Pezzoni-Casmalia fault which crosses Lompoc-Orcutt pipelines.	Local, at crossing	Location and characterization of fault. Design of crossing to accommodate.	Insignificant
Seismicity	Ground shaking, with resulting damage to structures and possible failure	Regional, long-term	Design of facilities to withstand expected levels of ground shaking	Insignificant for Probable Design Earthquake (PDE). Potentially significant for earthquakes which exceed the Contingency Design Earthquake (CDE), an unlikely event.
Shaker Gas Formations	Abnormally high pressures could lead to loss of well control at project or future facilities	Local to regional, short-term	Adherence to existing regulations	Insignificant
Liquefaction	Loss of pipeline support during earthquakes in areas of sandy seafloor sediments, e.g., at mouth of Santa Ynez River.	Local, short-term	Geotechnical investigation to identify potential problems and permit adequate design	Insignificant
Slope Instability, Justified Sediments, Shallow Gas, Seafloor and Buried Channels	A variety of processes could lead to loss of integrity or damage to Area Study and other future offshore facilities	Local to regional	Avoidance or design in context of existing regulations	Insignificant
Landslides, Slope Instability	Loss of integrity or damage to pipelines; possibility of rupture	Confined to a few locations on pipeline routes and alternatives. More regional in nature in Onshore Area Study triangle.	Realignment, stabilization, or removal of slide mass. Avoidance of landslide-prone areas	Insignificant with avoidance or proper design
Gullying	Loss of pipeline support; possibility of rupture	Project-localized primarily in Harris and Graciosa Canyons. Area Study-isolated features.	Realignment or avoidance; stabilization of gully advance	Insignificant

Arthur D. Little, Inc.

CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

(Findings requiring mitigation or that measures are infeasible must be made if project is approved [Section 15091, State EIR Guidelines])

AESTHETIC RESOURCES - NOISE

Source	Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Area Study	Direct impacts of helicopters during platform installation, drilling and production offshore -- minimum of seven to maximum of 22 flights/day leveling off at 18 flights/day during operations.	Long term impacts, localized to flight corridors	Departures from Lompoc, Santa Maria Airports; private pads.	Insignificant
Cumulative	Direct impacts of helicopters during platform installation, drilling and production offshore -- maximum of four flights per day from Santa Barbara (1990); with 48 flights per day when all platforms are operating.	Long term impacts, localized to flight corridors	Departures from Lompoc, Santa Maria Airports; private pads.	Insignificant

AESTHETIC RESOURCES: ODORS AND SMOKE

Source	Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Proposed Projects Union	Nuisance odors from hydrogen sulfide and organic sulfur compounds at Santa Maria Refinery	Long-term, local impacts	Tightening and maintenance of valves and phlanges	Insignificant
Area Study	Odors from gas processing at consolidated facility	Long-term, local impacts	Tightening and maintenance of valves and phlanges	Insignificant

Arthur D. Little, Inc.

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unlon

Richard S. Gilten
Regional Offshore Construction Manager

April 25, 1985

5081
RECEIVED
COUNTY OF SANTA BARBARA
APR 29 1985
RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Janice Yonekura
Santa Barbara County Resource
Management Department
123 East Anapamu Street
Santa Barbara. CA 93101

Dear Janice:

The following comments on the Central Santa Maria Basic DEIS/R have been developed by Mr. R. J. King of our company:

(1) Review of the DEIS centered on two concerns. First, was the data presented accurate and were proposed mitigation measures "reasonable and prudent"? Second, is the document complete (if there are deficiencies, it may be open to judicial challenge)? UO-50

7.1.6

(2) The "completeness" review has been limited since the appendices have not been available (selected volumes have subsequently been ordered). This review did indicate that the socioeconomic section may be incomplete since only the impacts of direct employment are assessed. Unless sufficient infrastructure exists in the impact area, indirect population growth may be expected to induce additional concerns. This deficiency also applies to the cumulative impact discussion. UO-51

(3) Relative to the accuracy of the data, there are two items potentially applicable to the benefits of the project (p. 6.7-25) and proposed mitigation measures which have been omitted. Although the timing is uncertain, California will be a recipient of significant funds from the $5 billion "escrow" account which exists under Section 8(g) of the OCS Lands Act. Further, funds will be distributed to the state following resolution of the revenue-sharing controversy. Recommended mitigation measures should include the condition that these monies be distributed to local governments for impact mitigation of energy developments. UO-52

(4) As identified in the attachment (footnote (d)), federal income from OCS production has averaged 54% of the value of produced resources, before taxes. Considering the U.S. balance of trade deficit, and the potential increase in the deficit generated by offsetting Santa Maria Basic production with foreign imports, this project is important to the national security. This condition should be noted relative to the specific benefits of the project and in the cumulative impacts discussion. UO-53

(5) Sections 5.4.5.0 and 5.5.5.1 advance rather broad and detailed recommendations for discharge-related monitoring programs. Considering that "the area affected by measurable thicknesses of such deposits (10^{-4} centimeters) was estimated to be 150-190 square kilometers per platform" (p. 5.4-12), and "work by the U.S. Geological Survey revealed that the Santa Maria Basin is an area in which no net deposition occurs" (p. 5.4-13), the recommendations appear to be neither reasonable nor prudent, especially since Union has committed to use neither biocides nor chrom-based lignosulfonates, and the release of diesel pills is expected to be disallowed by EPA. Tempering my initial reaction, however, is the recognition that EPA Region IX, as advanced in the draft general permit, will probably require a rather extensive monitoring program for the initial period (2-3 years) of developmental drilling. UO-54

(6) In response to concerns with non-generic mud additives, the respective suppliers should be requested to tender to Union the equivalent of our MSDS's for all materials to be potentially discharged. Unless this data indicates a condition of risk, monitoring and testing is not reasonable or prudent. UO-55

(7) Beyond noting that numerous typographical mistakes exist, other minor comments follow.

- Figure 1 and subsequent reprints, i.e. Fig. 1.0-1 - Irene is a Union project; UO-56
  No platform is proposed for lease 427; and Pipeline connection from Lease 510 not shown.

- Page 4.5-1 - The presence and location of public sewer outfalls should be identified and the level of treatment noted. UO-57

- Page 4.5-22 - Reference to Table 4.5-3 is incorrect. The text should note that no pinniped breeding areas exist on the California mainland. Further, marine mammal takings by commercial fishermen are regulated by permit under the MMPA. UO-58

(7) Cont'd.

- Page 5.7-27 - "The use of grid power also contributes to the local utility's demand growth, hastening the need for additional generating capacity." The mitigation discussion, as noted on page 6.7-10, should indicate that existing capacity is sufficient (as noted under the cumulative scenario discussion). No mitigation is therefore justified. UO-59

- Page 5.7-28 - Mitigation is identified as providing funds for the expansion of wastewater (sewer) treatment facilities. This is not reasonable or prudent since page 6.7-12 indicates that there is sufficient capacity for cumulative growth impacts. UO-60

- Page 4.5-29 & 30 - The discussions of protected species throughout the report should be updated to reflect the California Endangered Species Act which was adopted in 1984. The California Native Plant society list has no status under the law. In addition, the North Pacific fur seal is no longer a candidate for federal listing. The petition was denied (50 FR 9232-9248; March 6, 1985). The Guadalupe fur seal has been proposed for threatened status, but NMFS indicated that no areas within U.S. territorial waters meet the definition of critical habitat (50 FR 294-298; January 3, 1985). UO-61

- Page 5.4-17 (bottom) - Units? ("a few tons of barrels"). UO-62

- Page 5.6-50 - I am unfamiliar with Vandenberg AFB's oiled bird rehabilitation program. The clean Seas manual addresses this concern although they have purchased no equipment. There are two alternative actions available. Update the Clean Seas manual and purchase the identified material, or put Alice Berkner of the International Bird Rescue Research Center in Berkeley on retainer (approx. $10,000/year). UO-63

- Charts indicating the construction and production time schedules, such as occurs in the cumulative impact discussion, are inaccurate. For example, it is indicated the Platform Irene construction will commence in mid-1986 with production in 1987. These are misleading and must be corrected. UO-64

7.1.7

Should you wish to discuss these comments, please feel free to contact Mr. King direct at (213) 977-6924.

Yours very truly,

R.S. Gillen

R. S. Gillen
Regional Offshore Construction Mgr.

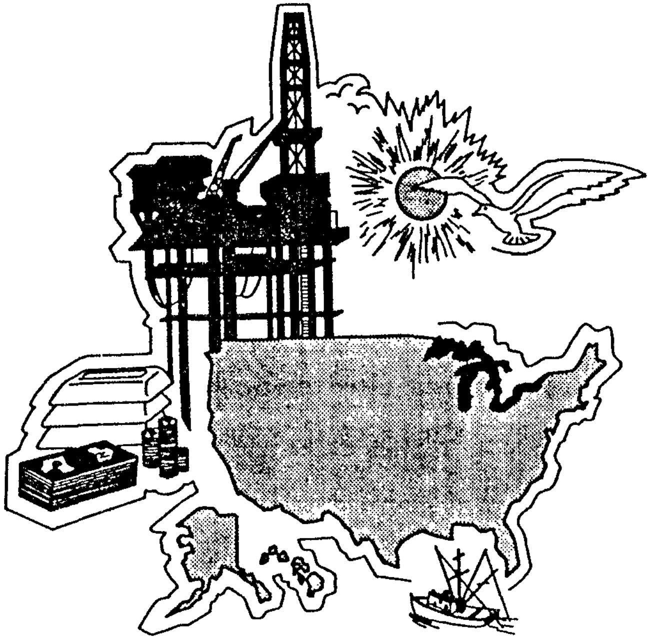
RSG:dr

cc: R. J. King

FEDERAL OFFSHORE STATISTICS

OCS Report
MMS 84-0071

LEASING EXPLORATION PRODUCTION REVENUE



U. S. DEPARTMENT OF THE INTERIOR

MINERALS MANAGEMENT SERVICE

SEPTEMBER 1984

7.1.8

Table 16. REVENUE AND PRODUCTION VAL

Year	Bonuses	Minimum Royalties	Rentals	Shut-in Gas Payments	(a)Oil and Gas Royalties
Prior	$ --	$ --	$ 1,359,630	$ 30,650	$ 967,902
1954	140,969,005	--	3,855,333	86,950	2,748,977
1955	108,528,726	--	3,406,351	122,000	5,140,006
1956	--	--	4,006,193	79,950	7,629,383
1957	--	68,581	3,270,122	110,268	11,391,245
1958	--	184,396	2,420,584	121,218	17,423,878
1959	89,746,992	171,036	2,285,725	84,984	26,539,977
1960	246,985,034	316,975	3,603,140	49,350	36,807,725
1961	--	314,121	3,073,861	37,100	46,733,742
1962	489,481,061	517,722	8,412,207	62,200	65,255,210
1963	12,807,337	668,339	8,435,184	52,950	75,373,865
1964	95,874,327	820,343	9,798,573	45,800	86,535,306
1965	33,740,309	1,072,699	8,731,378	38,450	99,656,284
1966	209,199,893	1,367,250	6,869,277	41,700	132,849,922
1967	510,109,742	1,891,515	6,208,936	41,400	153,432,383
1968	1,346,487,097	2,145,178	8,230,787	52,300	196,491,385
1969	111,660,685	1,923,632	8,312,607	41,650	235,681,825
1970	945,064,773	1,745,864	8,607,855	47,700	276,521,689
1971	96,304,523	1,891,000	7,741,997	32,300	340,634,893
1972	2,251,347,556	2,019,533	7,984,897	49,550	353,581,931
1973	3,082,462,611	2,391,249	8,948,816	52,650	389,735,839
1974	5,022,860,815	2,048,439	13,532,754	32,550	536,018,955
1975	1,088,133,152	2,085,885	17,522,037	39,500	594,725,462
1976	2,242,898,467	2,128,336	23,370,502	38,400	680,392,716
1977	1,568,564,745	1,678,957	19,830,026	21,106	890,469,825
1978	1,767,042,064	2,207,183	21,512,669	3,950	1,139,198,244
1979	5,078,861,692	2,088,478	20,287,300	6,632	1,512,017,664
1980	4,204,640,257	2,291,433	19,062,498	--	2,132,528,739
1981	(e)6,611,899,162	2,250,300	21,731,035	--	3,287,279,402
1982	3,987,490,009	2,393,759	20,061,651	--	3,814,871,635
1983	5,749,016,369	4,463,658	32,267,348	--	3,375,688,165
Totals	$47,092,176,403	$43,145,861	$334,741,273	$1,423,258	$20,524,324,174

(a) Condensate royalties included.
(b) Other revenues total (177,301,594 from the following sources: Sulfur royalties, $45,246,(Salt royalties, $129,546; Gasoline and LPG royalties, $116,689,678; Gas Lost, $15,099,775 and Oil Lost, $135,980. (See page 77 for individual years and totals.)
(c) Production value is value at time of production, not current value.
(d) Percentage reflects total cumulative revenue divided by total cumulative production value This percentage represents the Federal Government's share of the revenue generated from tl competitive leasing and private development of Federal oil and gas resources.
(e) Bonus figure for 1981 is adjusted to include 5 tracts for which leases were not issued un' 1984 because of litigation. Bonus paid for the 5 tracts: $10,846,000.

Note: Escrow funds distributed to the State of Louisiana and lessees, pursuant to Supreme Co decrees, are not deducted from total revenues.

FEDERAL AREAS OFFSHORE ALL STATES -- 1953-1983

(b)Other Revenues	Total Revenue	Total Cumulative Revenue	(c)Total Production Value	Total Cumulative Prod Value	(d)%
$ --	$ 2,358,182	$ 2,358,182	$ 5,036,861	$ 5,036,861	47
--	147,660,265	150,018,447	14,370,098	19,406,959	773
--	117,197,083	267,215,530	27,060,679	46,467,638	575
--	11,715,526	278,931,056	39,497,871	85,965,509	324
--	14,840,216	293,771,272	61,072,588	147,038,097	200
--	20,150,076	313,921,348	96,471,136	243,509,233	129
--	118,828,714	432,750,062	150,472,527	393,981,760	110
287,576	288,049,800	720,799,862	200,969,615	594,951,375	127
1,186,590	51,345,414	772,145,276	273,636,456	868,587,831	93
841,124	564,569,524	1,336,714,800	376,675,900	1,245,263,731	102
1,625,360	98,963,035	1,435,677,835	450,866,484	1,696,130,215	87
1,864,924	194,939,273	1,630,617,108	506,783,510	2,202,913,725	76
3,206,256	146,445,376	1,777,062,484	594,222,732	2,797,136,457	65
4,137,615	354,465,657	2,131,528,141	801,724,611	3,598,861,068	60
4,175,226	675,859,202	2,807,387,343	947,214,691	4,546,075,759	63
4,645,542	1,558,052,289	4,365,439,632	1,179,912,209	5,725,987,968	77
4,408,835	362,029,234	4,727,468,866	1,443,870,472	7,169,858,440	66
6,972,879	1,238,960,760	5,966,429,626	1,707,593,450	8,877,451,890	68
9,407,595	456,012,308	6,422,441,934	2,135,677,078	11,013,128,968	59
9,974,408	2,624,957,875	9,047,399,809	2,229,179,121	13,242,308,089	69
11,390,275	3,494,981,440	12,542,381,249	2,486,864,855	15,729,172,944	80
24,264,934	5,598,758,447	18,141,139,696	3,570,053,959	19,299,226,903	94
20,819,108	1,723,325,144	19,864,464,840	3,924,914,930	23,224,141,833	86
19,032,074	2,967,860,495	22,832,325,335	4,402,439,996	27,626,581,829	83
29,177,641	2,509,742,300	25,342,067,635	5,774,056,434	33,400,638,263	76
11,147,838	2,941,111,948	28,283,179,583	7,096,500,055	40,497,138,318	70
3,330,286	6,616,592,052	34,899,771,635	9,273,278,309	49,770,416,627	71
4,134,686	6,362,657,613	41,262,429,248	13,055,515,832	62,825,932,459	66
1,270,822	9,924,430,721	51,186,859,969	20,199,823,201	83,025,755,660	62
--	7,823,204,504	59,011,677,023	22,573,099,138	105,598,854,798	56
--	9,159,822,990	68,173,112,563	21,033,511,207	126,632,366,005	54
$177,301,594	$68,173,112,563	$68,173,112,563	$126,632,366,005	$126,632,366,005	54

Union Oil and Gas Division: Western Region

Union Oil Company of California
3201 Skyway Drive, Suite 104
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Telephone (805) 922-0376

union 76

April 29, 1985

5089
RECEIVED
COUNTY OF SANTA BARBARA
APR 30 1985
RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Ms. Janice Yonekura
Santa Barbara County
Resource Management Department
123 E. Anapamu Street
Santa Barbara, CA 93101

RE: TECHNICAL APPENDIX B, AIR QUALITY/METEOROLOGY, UNION OIL/EXXON EIS/EIR

Dear Ms. Yonekura:

Union Oil Company has reviewed the above named document and offers the following comments for review:

Volume I

Pg. 4-82, Section 4.2.2.2, 1st Paragraph:

Comment: Union strongly disagrees with the contention that "precise assignment of stack parameters for modeling purposes at the Battles Gas Plant is unnecessary", especially in consideration of short term impact analysis of inert pollutants. The location of exhaust stacks, heights, exit velocities, and pollutant concentrations are extremely important to accurately reflect maximum impacts. UO-65

As an example, an average stack height of 15 meters was applied to all boilers at the gas plant as opposed to an actual height of 30.5 meters for two boilers and 9.1 meters for two separate units. Also, an average stack height of 3 meters was used for all engines and compressors when the actual stack heights vary from 2.4 meters to 12.2 meters. Additionally, uniform exit velocities were applied to similar equipment grouping, i.e., 20 m/s for all compressors, 26 m/s for all engines, etc. The net effect of this type of modeling treatment is to concentrate the exhaust plumes which will result in unrealistically high pollutant concentrations, especially when modeling for short term inert pollutant impacts.

Attached with these comments are input data to a Complex II model Union used to evaluate maximum impact areas for the purpose of locating an air monitoring near the Battles Plant. Two scenarios are given, one for a 10 MMSCF/D throughput (existing case) and one for an 18 MMSCF/D throughput rate (future case). Union requests the attached site specific data be used in lieu of theoretical values and the models rerun for the Battles Plant, the results of which to be presented and discussed in the final document (specifically, Section 7.2.2.2).

7.1.10

Pg. 11-72, Section 11.3.2, 1st Sentence:

Comment: Union is not proposing any modifications to the existing Battles Gas Plant. UO-66

Pg. 12-14, Section 12.3.2 and Pg. 12-17, Section 12.3.2.1:

Comment: Both of these sections should be revised to reflect the results of the additional modeling as requested by Union. UO-67

Pg. 12-21, Section 12.4.1.1:

Comment: As indicated on Pg. 2-3, a gas pipeline is proposed between the Union and Exxon platforms specifically for the purpose of reinjecting gas from Platform Irene. Until Shamrock is installed, Union has the capability to "pack" the gas line to shore for a period of approximately four hours should the Battles Plant temporarily shut-in. UO-68

Union believes both options allow adequate time to rectify a temporary shut-in of the Battles Plant and that production from Platform Irene should not be conditioned to the operation of the Battles Plant.

Pg. 12-22, Section 12.4.2.1:

Comment: Again, Union feels its ability to "pack" the gas line for up to four hours should allow adequate time to correct a temporary shut-in of the Battles Plant and that the operation of the HS&P should not be conditioned to the operation of the Battles Plant. UO-69

Additionally, Union has proposed a 100% redundant vapor recovery system which we feel will afford a 98%+ control efficiency. The 95% efficiency factor represents a number which is readily acceptable to air pollution control agencies and does not reflect the true efficiency of the system.

Volume 2

Pg. 15-47, Section 15.1.3, 1st Sentence:

Comment: Union Oil has not applied as of yet to VAFB for the 221 production well project. An Environmental Analysis (EA) is currently being prepared which will accompany such an application. UO-70

Pg. 15-45, Section 15.1.3:

General Comment: The cumulative impact analysis sections which evaluate the additive effects of Union's 221 well development project on VAFB should be re-evaluated using the following data base: UO-71

A) Pumping units will be driven by electric motors.

B) All production will be pipelined off-base to existing production facilities in Lompoc and Casmalia. No production tankage is proposed for this project.

Ms. Janice Yonekura
April 29, 1985
Page 4

C) Produced gas will be pipelined off-base. There will be temporary use of gas flares at new well locations until they are tied into the gas/oil pipeline transportation system.

Union Oil appreciates this opportunity to comment on the draft EIS/EIR and looks forward to reviewing the final document incorporating those topics identified in this transmission.

Please contact the undersigned at the letterhead address should you wish to discuss any of the issues raised in this correspondence.

Sincerely,

Gregory W. Moon

Gregory W. Moon
Northern District
Environmental Coordinator

GWM:yb

cc: Dick Gillen
Russ Hanscom

POINT SOURCE INFORMATION BATTLES GAS PLANT

18 MMSCF/D

SOURCE	EAST COORD (USER	NORTH COORD UNITS)	NO_2 (G/SEC) EMISSIONS	PART(G/SEC) EMISSIONS	STACK HT(M)	STACK TEMP(K)	STACK DIAM(M)	STACK VEL(M/SEC)	POTEN. IMPACT (MICRO G/M**3)	EFF HT(M)	GRD-LVL ELEV USER HT UNITS	BUOY FLUX F M**4/S**3
1 2UNBOILR	736.86	3868.10	0.97	0.00	30.5	561.0	0.9	12.4	8.23	75.86	260.00	11.76
2 2LWLBOILR	736.85	3868.10	0.18	0.00	9.1	616.0	0.6	5.8	13.52	24.08	260.00	2.68
3 3CLARKENG	736.84	3868.10	14.00 (11.2)	0.00	12.2	505.0	0.6	4.7 (3.7)	1148.10	23.03	260.00	1.74
4 6COOPENG	736.77	3868.10	7.20 (2.4)	0.00	4.6	533.0	0.5	2.9 (2.9)	2711.89	10.64	260.00	0.80
5 RANDENG	736.77	3868.11	1.00	0.00	7.6	533.0	0.3	5.4	293.36	12.08	260.00	0.34
6 WAUKA1	736.87	3868.12	0.23	0.00	2.4	477.0	0.1	17.4	533.33	4.25	260.00	0.16
7 WAUKA1	736.78	3868.10	0.23	0.00	2.4	477.0	0.1	17.4	533.33	4.25	260.00	0.16
8 WAUKA2	736.83	3868.15	0.23	0.00	7.6	366.0	0.1	17.4	128.32	8.73	260.00	0.09
9 WAUKA3	736.82	3868.14	0.16	0.00	2.4	477.0	0.1	13.7	429.49	3.94	260.00	0.13
10 WAUKA3	736.78	3868.14	0.16	0.00	2.4	477.0	0.1	13.7	429.49	3.94	260.00	0.13
11 WAUKA4	736.80	3868.13	0.10	0.00	2.4	477.0	0.1	8.5	343.87	3.48	260.00	0.08
12 WAUKA4	736.79	3868.13	0.10	0.00	2.4	477.0	0.1	8.5	343.87	3.48	260.00	0.08

10 MMSCF/D (Existing CASE)

Same AS Above with the following exceptions:

A. Delete one (1) CLARK compressor from source No. 3

B. Delete four (4) cooper compressors from source No. 4

Emission rates AND exit velocities for this case identified in parenthesis

BATTLES PLANT - AIR EMISSIONS INFORMATION

10 MMCF/D Throughput

Given: Compressor fuel use is approximately 960 MCF/D
Current compressor horsepower loading = 2554 hp
15 Ft^3/bhp-hr fuel rate used in calculations

Boiler fuel use is approximately 1100 MCF/D
400 MCF/D burned in each Union boiler (2)
150 MCF/D burned in each Llewelyn boiler (2)
Air to fuel ratio of 15:1 used in calculations

300 hp Union Boilers

Given: Both boilers exhaust into a common stack
400 MCF/D burned in each unit
Air to fuel ratio is 15:1

Fuel and air volume into boiler

400,000 cf/d x d/24 hr x hr/3600s x 16 = 74.1 cf/s each
= 148.2 cf/s total

Temp. Correction: $148.2 \text{ cf/s} \left(\frac{550^oF + 460^oF}{60^oF + 460^oF}\right)$
=287.9 cf/s @ 550^oF

Velocity: $\dfrac{287.9 \text{ cf/s}}{\frac{\pi (3 \text{ ft})^2}{4}}$ = 40.7 ft/s
= 12.4 m/s

NOx emissions

800,000 cf/d x d/24 hr x 230 lb NOx/10^6 fuel burned

=7.7 lb/hr

=0.97 g/s

70 hp Llewellyn boilers

Given: Each boiler exhaust into individual stacks
150 MCF/D burned in each unit
15:1 Air to Fuel ratio used

7.1.12

Fuel and air volume into boiler

150,000 cf/d x d/24 hr x hr/3600s x 16 = 27.8 cf/s

Temp.correction: $27.8 \text{ cf/s} \times \left(\frac{650^oF + 460^oF}{60^oF + 460^oF}\right)$

= 59.3 cf/s @ 650^o

Velocity: $\dfrac{59.3 \text{ cf/s}}{\frac{\pi(2 \text{ ft})^2}{4}}$ = 18.9 ft/s
= 5.8 m/s (each)

NOx Emissions

150,000 cf/d x d/24 hr x 120 lb NOx/10^6 cf burned

= 0.75 lb/hr
= 0.09 g/s (each)

Clark Compressors (440 hp each)

Given: 15 cf required for each bhp-hr
air to fuel ratio of 11:1 used

Fuel and air volumes into engine

440 hp x 15 cf/bhp-hr x 12 x hr/3600s = 22.0 cf/s

Temperature correction: $22.0 \text{ cf/s} \left(\frac{450^oF + 460^oF}{60^oF + 460^oF}\right)$

= 28.5 cf/s @ 450^oF

Velocity: $\dfrac{28.5 \text{ cf/s}}{\frac{\pi (2 \text{ ft})^2}{4}}$ = 12.3 ft/s
= 3.7 m/s (each)

NOx emissions

440 hp x 15 cf/bhp-hr x 3400 lb NOx/10^6 cf burned

= 22.4 lb/hr

= 2.8 g/s (each)

Cooper Compressor (180 hp each)

Given: Same as for Clark Compressors

<u>Fuel and air volume into engine</u>

180 hp x 15 cf/bhp-hr x 12 x hr/3600s = 9.0 cf/s

Temperature correction: $9.0 \text{ cf/s} \frac{(500^{\circ}F + 460^{\circ}F)}{(60^{\circ}F + 460^{\circ}F)}$

= 16.6 cf/s

Velocity: $\frac{16.6 \text{ cf/s}}{\frac{\pi (1.5\text{ft})^2}{4}}$ = 9.4 ft/s

= 2.9 m/s (each)

<u>NOx emissions</u>

180 hp + 15 cf/bhp-hr x 3400 lb NOx/10^6cf burned

= 9.2 lb/hr

= 1.2 g/s (each)

7.1.13

Ingersol Rand (150 hp)

Given: Same as for Clark Compressor

<u>Fuel and air volume into engine</u>

150 hp x 15 cf/bhp-hr x 12 x hr/3600s = 7.5 cf/s

Temp.correction: $7.5 \text{ cf/s} \frac{(500^{\circ}F + 460^{\circ}F)}{(60^{\circ}F + 460^{\circ}F)}$

= 13.8 cf/s

Velocity: $\frac{12.8 \text{ cf/s}}{\frac{\pi (1 \text{ ft})^2}{4}}$ = 17.6 ft/s

= 5.4 m/s

<u>NOx emission</u>

150 hp x 15 cf/bhp-hr x 3400 16 NOx/10^6cf burned

= 7.6 lb NOx/hr

1.0 g/s

Waukesha (52 hp)

Given: 10 cf fuel required for each 6hp-hr
air to fuel ratio is 11:1

<u>Fuel and air volume</u>

52 hp x 10 cf/bhp-hr x 12 x hr/3600s = 1.7 cf/s

Temp. Correction: $1.7 \text{ cf/x} \frac{(400^{\circ}F + 460^{\circ}F)}{(60^{\circ}F = 460^{\circ}F)}$

Veolcity: $\frac{2.8 \text{ cf/s}}{\frac{\pi (.25 \text{ ft})^2}{4}}$ = 57.0 cf/s

= 17.4 m/s

<u>NOx emission</u>

52 hp x 10 cf/bhp-hr x 3400 lb NOx/10^6cf burned

= 1.8 lb/hr

= 0.23 g/s

Waukesha (39 hp)

Given: Same as for 52 hp Waukesha

<u>Air and fuel volume to engine</u>

39 hp x 10 cf/bhp-hr x 12 x hr/3600s = 1.3 cf/s

Temp.correction: $1.3 \text{ cf/s} \frac{(400^{\circ}F + 460^{\circ}F)}{(60^{\circ}F + 460^{\circ}F)}$

= 2.2 cf/s

The five Clark Compressors exhaust through a common duct which terminates into a four (4) stack discharge system.

The Cooper Compressors are individually stacked.

Clark Compressor

The addition of one Clark will increase the exhaust volume to the header system by 38.5 cf/s (see calculations for 10 MMCF/D scenario). This additional volume will be discharged equally through four (4) exhaust stacks.

Velocity calculation: 38.5 cf/s ÷ 4 = 9.63 cf/s

$$\frac{(9.3\ cf/s) + (38.5\ cf/s)}{\frac{\pi\ (2\ ft)^2}{4}} = 15.2\ cf/s = 4.6\ m/s$$

NOx emissions

Five (5) Clarks on line (see 10 MMCF/D calculations)

5 x 22.4 lb/hr ÷ 4 = 28.0 lb NOx/hr per pack stack

= 3.5 g/s per stack

7.1.14

$$\text{Velocity: } \frac{2.2\ cf/s}{\pi\ \frac{(.25\ ft)^2}{4}} = 44.8\ ft/s$$

= 23.7 m/s

NOx emissions

39 hp x 10 cf/bhp-hr x 3400 16 NOx/10^6cf burned

= 1.3 lb NOx/hr
= 0.16 g/s

Waukesha (25 hp)

Given: Same as 52 hp Waukesha

Air & Fuel volume to engine

25 hp x 10 cf/bhp-hr x 12 x hr/3600s = 0.83 cf/s

$$\text{Temp. correction: } 0.83\ cf/s \left(\frac{400^{\circ}F + 460^{\circ}F}{60^{\circ}F + 460^{\circ}F}\right)$$

= 1.37 cf/s

$$\text{Velocity: } \frac{1.37\ cf/s}{\pi\ \frac{(.25\ ft)^2}{4}} = 27.9\ ft/s$$

= 8.5 m/s

NOx emissions

25 hp x 10 cf/bhp-hr x 3400 lb NOx/10^6cf burned

= 0.85 lb/hr

= 0.10 g/s

18 MMCF/D Throughput

Assumptions: Additional gas would come from future development on Vandenberg AFB and for a short time, Platform Irene. The gas will have been compressed in the field for shipment and will enter the Battles Plant at approximately 225-250 psi. The additional throughput of 8 MMCF/D will require one (1) Clark Compressor and four (4) Cooper Compressors to be brought on line.

Union 76 Division: Western Region
James E. Nowinski
Union Oil Company of California
911 Wilshire Boulevard
Los Angeles, California 90017

ES-109

union 76

May 1, 1985

Donna Brewer
Minerals Management Service
1340 West Sixth Street
Los Angeles, CA 90017

Comments by Union Oil Pipeline
<u>Department Regarding the EIS/EIR</u>

Dear Ms. Brewer:

7.1.15

After reviewing the Draft EIS/EIR for the Union Oil Platform Irene and Exxon Shamrock Projects, we would like to comment on proposed mitigation measures for the crossing of San Antonio Creek and other major waterway crossings by the proposed pipelines. In addition to those mitigation measures already proposed, the following measures should also be considered in the final EIS/EIR:

UO-72

> The crossing of San Antonio Creek should be made with heavier wall pipe, such as .375" wall thickness. Block valves should be placed at both sides of San Antonio Creek, so that it may be isolated from the rest of the pipeline. The line will be properly wrapped prior to installation, then tested to assure the coating quality. Finally, the section of pipe crossing the creek should be provided with its own cathodic protection rectifier and test station, so that it may be closely monitored for any sudden changes in current usage, separate from the rest of the pipeline.

A second mitigation measure which may be considered (but would not be as desirable as the first from a cathodic protection standpoint) is as follows:

UO-73

> Install the creek crossing with a pipe which has been sealed within another pipe which is greater in diameter. The outer pipe would then be equipped with a pressure switch which would send a signal to the dispatcher if any pressure in the outer pipe was present (indicating a leak in the inner pipe). The pipeline would then be shut down.

Please consider these comments as workable alternatives to the existing mitigation measures presently contained within the Draft EIR/EIS.

Sincerely,

James E. Nowinski

James E. Nowinski, Superintendent
Pipeline Engineering and Services

JOA/dkl

RESPONSES TO UNION OIL COMMENTS

UO-1 Comment noted. This paragraph has been removed.

UO-2 Figures 2-7, 2-8, 2-11, 2-17, 2-21 and 2-22 of Technical Appendix M have been modified, as have the accompanying text and various summary tables and figures. Mitigation measures have also been changed as appropriate.

UO-3 See UO.2.

UO-4 See UO.2.

UO-5 Text and Figure 2-16 of Technical Appendix M have been revised.

UO-6 Text and Figure 2-18 of Technical Appendix M have been revised.

UO-7 Text and Figure 2-19 of Technical Appendix M have been revised.

UO-8 Text and tables of Technical Appendix M have been modified.

UO-9 Text and tables of Technical Appendix M have been modified.

UO-10 This comment suggests that the tank will only be used when the refinery and/or the pump station are down and that it will not be used to protect against dehydration facility outages. The appropriate text and figures have been revised to take this into account.

UO-11 This mitigation measure refers specifically to a deluge system and was made with knowledge of the present fixed water monitor system.

UO-12 Comment noted. The text has been changed to read the lower 4.2 miles of the Santa Ynez River estuary.

UO-13 Comment noted. Text has been revised.

UO-14 The desalination system has been deleted.

UO-15 Comment noted. Text has been revised.

UO-16 Comment noted. Table has been revised to read 1 (can accommodate 2).

UO-17 Comment noted. Text has been changed.

UO-18 Text has been revised.

UO-19 Text has been changed to reflect that Union will use a biological treatment system.

UO-20 The cooling water system has been added to the table.

UO-21 Comment noted. Text has been corrected.

UO-22 Text has been modified to reflect that this is the pull barge method not the lay barge method. With the pull barge method all three lines can be layed at once from a work barge anchored offshore. With this method bouys are used to support the pipelines as they are pulled off the work barge.

UO-23 Text has been changed to reflect proper valve location.

UO-24 Comment noted. Text has been changed.

UO-25 Text has been revised to indicate that the parcel size is 257 acres and that 22.5 acres are being rezoned.

UO-26 The Figure has been revised to show the correct tank sizes.

UO-27 Text has been revised.

UO-28 Text has been revised.

UO-29 The revised list of fire protection equipment has been incorporated into the Final EIS/EIR.

UO-30 Comment noted. Text has been revised.

UO-31 The schedule for subsea pipelines will be adjusted as noted.

UO-32 Comment noted. Text change has been made.

UO-33 This change has been incorporated in Technical Appendix M as well as in the main EIS/EIR document.

UO-34 The reasonable worst-case analysis included emission sources that had the potential for occurring during worst-case meteorological conditions. In this case, it was assumed that, because flaring incidents are expected to occur 96 times per year, this emission source was included as part of the worst case. In the analysis for the two project platforms, it was assumed that flaring could occur at one while testing of a standby diesel generator could occur at the other. The comment assumed that flaring and testing of generators would occur at the same platform. Because the two occurrences can be independent of each other (uncorrelated), a probability of the occurrence of the event can be calculated. This analysis which reported a low probability was given on page 5.2-21 of the DEIS.

UO-35 Page 5.6-23 of the EIS/EIR has been revised to reflect the additional information from the County Fire Department.

UO-36 Page 5.6-30 of the EIS/EIR has been modified to clarify the additional sources of impact.

UO-37 Comment noted. In view of the hypothetical nature of this Area Study facility design, the text has been left unmodified.

UO-38 Comment noted. Page 5.6-51 of the EIS/EIR has been modified to reflect this information.

UO-39 The suggested site for the dehydration facility is preferential to a site located near the beach, however, it is necessary to classify the land use impact upon the Lompoc site as Class I, because the required change in zoning cannot be mitigated. The zoning is either changed to allow the facility or it is left unchanged, thereby precluding the facility. The strict definition of the significance criteria necessitated this classification.

UO-40 Mitigation measure dropped for Platform Irene.

UO-41 MMS requirements pertain to certain pieces of equipment only.

UO-42 Mitigation measure dropped.

UO-43 Mitigation measure dropped.

UO-44 Mitigation measure dropped.

UO-45 Mitigation measure modified.

UO-46 The mitigation measure refers specifically to water deluge systems rather than fixed monitor or spray systems.

UO-47 The intent of this measure is that a buried cable might be failed by external impact before or at the same time that the pipeline might fail, thereby enhancing the shutdown capability.

UO-48 Comment noted.

UO-49 Comments noted. The word processing errors have been corrected.

UO-50 Comment noted.

UO-51 The impacts of the total employment generated by the project (as well as area study and cumulative projects) have been considered throughout the EIS/EIR. Total employment generated by the project comprises direct employment, direct support employment, and local support employment. Direct employees are those associated with project components (e.g. facility operators). Their number is estimated by the applicant and reviewed by the consultant. Direct support employees are provided jobs through demand for goods and services required to construct or operate project components. Local support employment is induced by the local spending of direct and direct support employees as well as the demand for goods and services by direct support employers.

Direct employment estimates have been listed seperately from direct support and local employment components, but public service, fiscal, and housing impacts have been based on the total employment generated by the project(s).

UO-52 Comment noted. Distribution of funds will be through the state budgetary process.

UO-53 The benefits of the projects with respect to national security is discussed in section 5.7.7. A text addition has been made to echo this in the cumulative impacts discussion.

UO-54 Comment noted. We have admitted to significant uncertainties in the nature and magnitude of possible impacts, especially those on distant sediments. But the possibility of unacceptable impacts remain high enough that we still believe the monitoring is important. Since some of the impacts may only be seen after several years of operation (giving time for certain levels of pollutant accumulations), we would caution against complete elimination of the expanded monitoring program after only two to three years.

UO-55 We agree that the suppliers (of additives) should provide a detailed description of their products, including aquatic bioassay test data. If these data provided sufficient proof of environmental acceptability, then the monitoring burden on the Applicants could be reduced correspondingly.

UO-56 Figure 1 and Figure 1.0-1 have been revised.

UO-57 Comment noted.

UO-58 Comment noted. Table has been replaced.

UO-59 Since the impact upon the local utility's demand growth is considered adverse, but insignificant, no mitigation discussion was included and no mitigation is required since the impact is insignificant.

UO-60 The discussion of waste water impacts on page 6.7-12 states that cumulative projects' demand alone would not exceed existing capacity levels, but capacity constraints in Santa Ynez and Santa Maria/Orcutt systems cause the waste water increases induced by the cumulative projects (and area study projects) to be classed as significant, but mitigable, impacts. The SMID and Buellton Sanitation Districts discussed on page 5.7-28 are part of the Santa Maria/Orcutt and Santa Ynez systems.

UO-61 The EIS/EIR does reflect the 1984 amendments to the California Endangered Species Act. The CNPS list is specified in CEQA as a basis for CEQA protection of species. Text and tables in Sections 4.5 and 5.5 have been modified to reflect the recent change in status of the Northern Fur Seal.

UO-62 Text has been corrected to read "...a few tens of barrels."

UO-63 Comment noted. The Vandenberg AFB program is reportedly still in the planning stages. depending on its stage of realization, purchase of the required equipment and commitment of the required resources from any of several alternative bird rehabilitation centers, including for example the Santa Barbara Zoo, can serve as appropriate partial mitigation measures.

UO-64 Comment noted. The Figure has been changed to indicate the proper cumulative timing.

UO-65 Additional modeling of the Battles Gas Plant with Irene's throughput was carried out. This future modeling included the emission parameters as reported in the comment. The peak one-hour NO_2 levels would still exceed the State standard although the amount above the standard would be less than reported in the DEIS/DEIR. The total predicted peak before was 1026 ug/m^3. The new predicted peak is 647 ug/m^3 as compared with the standard of 470 ug/m^3. The conclusion in the DEIS/DEIR that mitigation measures would be required to reduce NO_x emissions is still the case. This would thus remain a Class II impact.

UO-66 The statement in the Appendix has been changed to: "Trajectory 2 evaluates the potential impacts due to changes in throughput at the existing Battles Gas Plant."

UO-67 See response UO-65.

UO-68 Comment noted. The upset scenario on p. 12-21 of the Technical Appendix can still occur under the worst-case assumption that the Battles Gas Plant is shut down for more than four hours.

UO-69 See response UO-68.

UO-70 The cumulative analysis includes all foreseeable future projects, including those for which permits have not been applied.

UO-71 Comment noted. The cumulative analysis should be considered a planning tool for foreseeable projects. A general worst-case assumption was made for the 221 production. If and when an application is received by the permitting agencies, a more detailed assumption will be included in the analysis.

UO-72 and UO-73 Comments noted. These proposed mitigation measures are considered sound and more than adequate. These have been incorporated into the Final EIS/EIR.

VIII. COMMENTS SUBMITTED BY EXXON AND RESPONSES (EXX)

EXXON (EXX)

EXXON COMPANY, U.S.A.
P.O. BOX 5025 • THOUSAND OAKS, CALIFORNIA 91359-5025 • (805) 494-2366

PRODUCTION DEPARTMENT
WESTERN DIVISION

DONALD E. CORNETT
ENVIRONMENTAL CONSERVATION MANAGER

April 30, 1985

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RECEIVED
COUNTY OF SANTA BARBARA
MAY 01 1985
RESOURCE MANAGEMENT DEPT.
ENERGY DIVISION

Ms. Janice S. Yonekura
Resource Management Department
Energy Division
1225 Anacapa Street, Suite 2
Santa Barbara, CA 93101

Dear Ms. Yonekura:

We have reviewed the Union Oil Project/Exxon Project Shamrock and Central Santa Maria Basin Area Study Draft EIS/EIR and believe the document meets the guidelines of both the California Environmental Quality Act and the National Environmental Protection Act.

Our attached comments on the EIS/EIR focus on the following seven major areas:

- Project Description
- Air Quality
- Marine Biology
- Terrestrial and Marine Biology
- Cultural Resources
- Commercial Fishing, Kelp Harvesting, Mariculture
- Socioeconomics

We appreciated the Joint Review Panel incorporating the Exxon Lompoc Pipeline Project into the public hearing presentation at Lompoc on April 17, 1985. We understand that a description of the pipeline project will be included in the Final EIS/EIR.

Please call Jack Schweizer at (805) 494-2357 if any clarification of our comments is needed.

Sincerely yours,

D.R. Olsen
for DEC

JMS:sdp
c.c. Mr. Tom Dunaway - MMS

8.1.2

PROJECT DESCRIPTION

LOMPOC PIPELINE PERMIT APPLICATION

EXX-1

The DEIS/EIR (Section 1.0, Section 2.0, numerous places throughout the document) frequently states that Exxon has made no application to Santa Barbara County for transport of crude oil after treatment at the Lompoc facility. This was correct at the time of DEIS/EIR issuance. However, Exxon filed a permit application for the Lompoc Pipeline Project on March 20, 1985. The application has been reviewed by Santa Barbara County, and a letter (dated April 17, 1985) was sent to Exxon requesting additional information.

The DEIS/EIR should be revised to state that an application for the Lompoc Pipeline Project has been filed. Furthermore, the Executive Summary and Project Description (Section 2.0) should be updated to include the project description information which is readily extractable from the permit application on file with Santa Barbara County. Attached is the overview section from the project description portion of the permit application, which can serve as the basis for revising the Executive Summary of the DEIS/EIR.

USE OF LOMPOC FACILITY

EXX-2

In Section 2.0 of the DEIS/EIR, it is stated that the design capacity of the Lompoc facility will be 36,000 barrels of oil per day. Union requires 20,000 barrels per day of this capacity to process peak production from Platform Irene. The DEIS/EIR indicates that the remaining capacity could be used for the Exxon Shamrock Project.

Exxon does plan to use the available remaining capacity at the Lompoc facility. The actual capacity of Union's proposed Lompoc Dehydration Facility will depend on the character of the incoming crude oil emulsion, particularly the Gas-to-Oil Ratio (GOR) and water content. The facilities defined in Union's application should be adequate for 40 kBPD of oil during initial operation, when low GOR and water content are predicted. Even though Union's nominal design capacity is 36 kBPD, with consideration of design equipment allowances, minor manipulation of plant operating variables, and equipment in new condition, it should be possible to maintain 40 kBPD throughput during early operation. Equipment operated during the maximum hour, maximum daily, and normal day operations for 40 kBPD should be the same as estimated for 36 kBPD.

As GOR and water content increase over the field life and equipment ages, additional equipment may be required to maintain 40 kBPD if the field production decline does not pace the plant oil capacity decline. Performance testing during actual operation will help identify potential bottlenecks in the process, and permit applications for any equipment additions which may ultimately be necessary will be filed in a timely manner. The type of changes which may be proposed include:

- Additional gas fired heater-treaters to provide the heating required by the higher water content.
- Additional capacity to the Dry Crude Heat Exchanger.
- Additional capacity to the Gas Precooler heat exchanger.
- Expansion of produced water treating system to provide increased water handling capacity.

OIL SPILL RESPONSE EQUIPMENT EXX-3

In Section 2.0 of the DEIS/EIR (pages 2-12 and 2-28), statements are made that oil spill response equipment will be stored on the Shamrock Platform. This is incorrect. As a result of the Coastal Commision consistency certification, Exxon has agreed to place this equipment on a third Clean Seas vessel. The DEIS/EIR should be revised to reflect this Coastal Commission requirement.

1.0 OVERVIEW

1.1 PURPOSE OF DOCUMENT

This document describes the proposed Pipeline Project, including its location, principal components, consistency with applicable Santa Barbara County policies and requirements, route selection, and pipeline design considerations. The installation, operation, maintenance, and abandonment of the proposed industry pipeline are reviewed and contingency plans for emergency response discussed.

Engineering for the Lompoc Pipeline Project is in the preliminary stage. Specific details concerning methods, facilities, operation, and equipment types, sizes, and capacities are based on the best information currently available. However, as continuing engineering proceeds, such details will be subject to change or refinement as additional information becomes available. Design changes will reflect inputs from the environmental studies and review process as well as those from engineering and economic analyses to ensure that the project is implemented in an environmentally sound manner.

1.2 BACKGROUND

1.2.1 Regional Oil and Gas Development

Oil and gas exploration and proposals for development and production projects in the Santa Maria Basin have increased over the last several years. As Figure 1-1 indicates, permit applications for two platforms are currently being processed for the Central Santa Maria Basin (CSMB) area, along with offshore and onshore pipelines and a treating facility. These activities, along with four additional platforms in the CSMB area, are being evaluated in an EIS/EIR being prepared by a Joint Review Panel, chaired by Santa Barbara County. Further description of CSMB activities can be found in that document.

1.2.2 Need for Project

Crude oil produced in the CSMB is proposed to be treated in a consolidated heating, separation, and pumping (HS&P) facility in the Lompoc oil field. Total production from the CSMB is expected to peak at 67,000 barrels of oil per day (67 kBOD), according to the draft EIS/EIR being prepared. Of this total, up to 20 kBOD could be transported to Union Oil Company's Santa Maria Refinery via their proposed pipeline to Orcutt and an existing pipeline from there to the refinery. We understand that the limit of 20 kBOD is imposed by capacity limitations in the pipeline/Santa Maria Refinery system. In addition to this capacity limit, the Santa Maria Refinery may not be a feasible destination for many of the operators who are expected to be producing oil in the CSMB area. Consequently, a means is needed to transport treated crude oil from the proposed HS&P facility to alternate existing or proposed regional transportation facilities for eventual delivery to refining destinations. The Lompoc Pipeline Project is proposed to fill that need.

The ultimate destination of the Lompoc Pipeline will depend on the location of approved consolidated marine terminal and pipeline transportation facilities. The proposed destination for the pipeline is the existing marine terminal facility at Gaviota; tie-ins with a future consolidated marine terminal facility and pipeline system at Gaviota would then be made as these facilities became available. Alternatively, the Lompoc Pipeline could extend to the Corral/Las Flores Canyon area should that be the eventual location of consolidated storage and marine terminal facilities.

Without this proposed project, there would be no means of transporting much of the output of the HS&P facility to market. Consequently, the project is justified at this time.

1.3 PROJECT LOCATION AND PRINCIPAL COMPONENTS

1.3.1 Project Area

The regional location of the proposed Lompoc Pipeline is shown on Figure 1-1; an overview of the project area is shown on Figure 1-2. Detailed maps of the proposed pipeline corridor and route are presented as Exhibit 1.

1.3.2 Project Facilities

The proposed project consists of a dry oil pipeline and associated facilities including a metering system and shipping pumps. Table 1-1 lists the components of the pipeline system together with a description and summary of their functions. At its inlet, the pipeline will connect to Union Oil Company's heating, separation, and pumping (HS&P) facility in the Lompoc oil field. This facility will receive crude oil emulsion produced in the CSMB, separate water

and gas from the emulsion, and transfer the dry oil to the proposed pipeline. At its terminus, the pipeline will connect with existing approved transportation facilities. The HS&P facility at Lompoc and the transportation facilities at the pipeline terminus will be permitted and constructed as separate projects from this pipeline.

1.4 CONSISTENCY WITH SANTA BARBARA COUNTY PLANNING POLICIES

An oil pipeline is a permitted use in all zoning districts in Santa Barbara County under both the County Zoning Ordinance (Section 35-290) and the Coastal Zoning Ordinance (Section 35-157). Route selection included consideration of potential adverse environmental impacts as well as other criteria (see Section 2.0) and the proposed corridor is believed to be the least environmentally sensitive one possible. Thus the proposed pipeline is consistent with the County's zoning policies.

Santa Barbara County has undertaken a review of its oil and gas development policies over the last several years in response to the increased oil and gas development activities within and offshore of the County. The Oil Transportation Plan, completed in 1984, compared three modes of transporting oil--pipeline, tanker, and rail--and concluded that Santa Barbara County's primary objective of balancing development and environmental protection would be met most appropriately by relying on pipelines as the primary transportation mode; however, it was recognized that marine transport may be necessary for certain operators instead of, or in addition to, pipeline transport (SBC, 1984). The proposed terminus of the Lompoc Pipeline at Gaviota is consistent with these policies and the LCP, as it allows connections with either the major industry pipeline, or consolidated storage and marine terminal facilities expected to be built there or at Las Flores Canyon.

In addition, the Santa Barbara County Energy Division is in the process of developing a multi-issue oil and gas development policy analysis. Consolidation is an issue in the analysis workplan, and one objective in addressing this issue is to identify, evaluate, and approve corridors for future pipelines, based on currently proposed and existing corridors. Because the proposed pipeline corridor follows an existing gas pipeline along most of its length and could accommodate dry oil from several CSMB producers, it is consistent with the County's effort to consolidate oil and gas pipelines and corridors.

TABLE 1-1

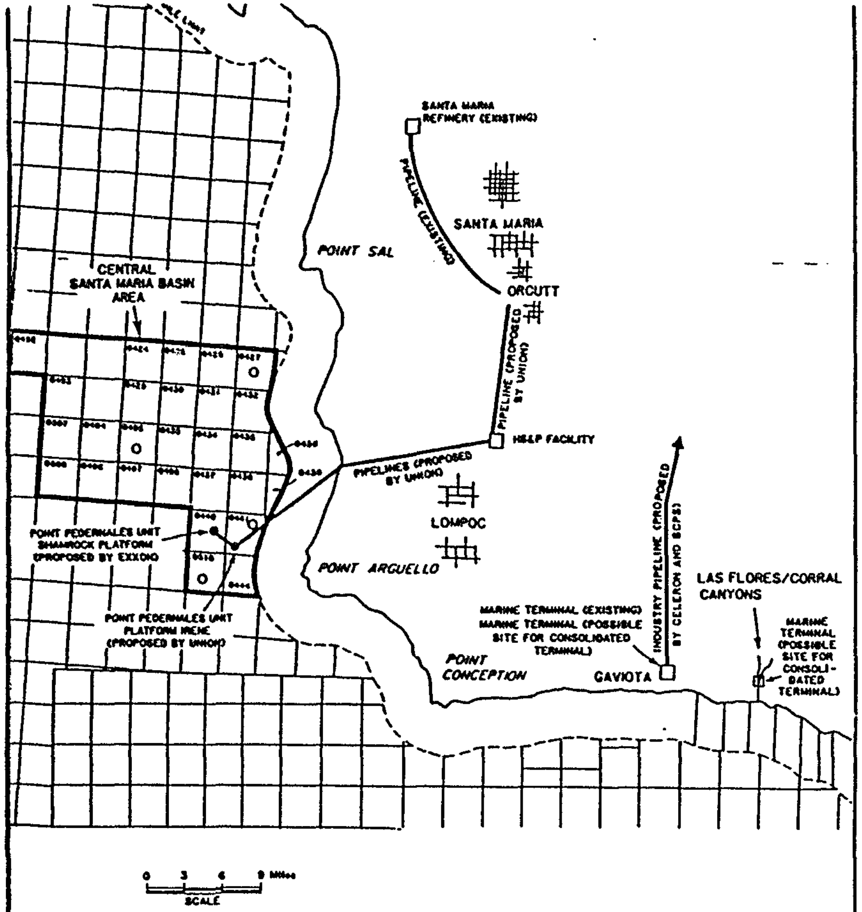
PIPELINE COMPONENTS

Item	Description	Function	Comments
Pipe	12.75" OD, 0.25" wall thickness, Grade API 5L, X-52.	Conduct dry oil flow.	—
Pumps			
Accounting and Custody Transfer (ACT) charge pumps	2 centrifugal pumps (1 on standby). Discharge: 1230 gpm each @ 50 psig. Power: 75 bhp each, electric motor drives.	Deliver oil through the ACT meters and provide pressure boost for the shipping pumps.	Located at the HS&P facility.
Shipping pumps	3 pumps (1 on standby) Discharge: 615 gpm each @ 500 psig. Power: 250 bhp each, electric motor drives.	Provide pressure to ship the oil through the pipeline without intermediate pumping stations.	Located at the HS&P facility.
ACT meters	2 positive displacement meter units with continuous sampler and Basic Sediments and Water (BS&W) monitor.	Measure flow rates at the inlet and outlet.	Used in financial accounting and leak detection. Units will be located at the HS&P facility and at Gaviota.
Valves	4 block valves.	Isolate pipeline segments and contain flow.	Part of spill prevention system.
Cathodic protection system	1 rectifier and ground bed; 15 test points.	Provide protection against corrosion of the pipe.	—

7.45/15-T1-1

TABLE 1-1 (concluded)

Item	Description	Function	Comments
Pig launching/ receiving stations	1 pig launcher and 1 pig receiver	Launches flexible scrapers or pigs into pipe; receives pigs from pipe. Pigs used to clean and inspect pipeline during operation.	Launcher located at the HS&P facility; receiver located at Gaviota. Part of routine maintenance and spill prevention systems.
Supervisory Control and Data Acquisition (SCADA) System	Central processing unit (CPU) and software plus remote terminal units (RTUs) and ACT units.	Monitors pipeline pressure and flow rate. Provides status information, remote control, and alarms.	Part of spill prevention system. System will be operated from the HS&P facility.
Pressure regulator	1 pressure regulator	Regulate pressure to the outlet ACT unit.	Located downstream of pig trap and upstream of ACT unit at Gaviota.



EXPLANATION:

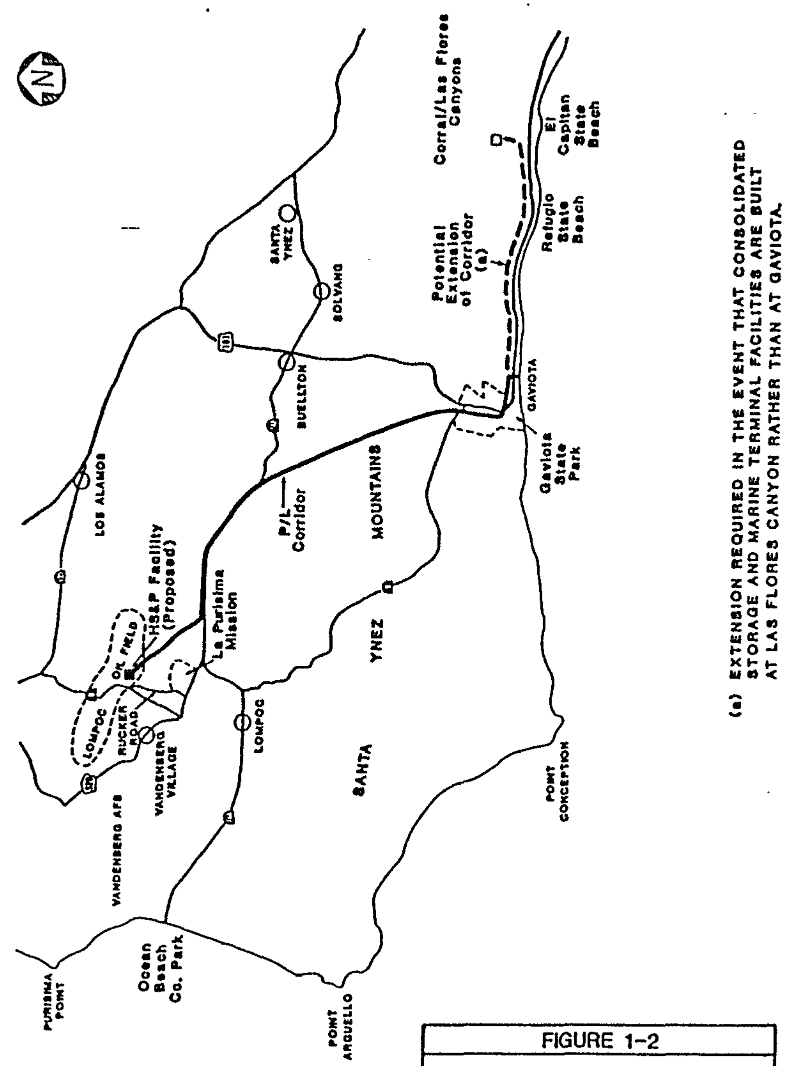
O ASSUMED LOCATION OF FUTURE PLATFORM FOR PURPOSE OF CSMB AREAWIDE EIS/EIR

NOTE: PIPELINE ROUTES ARE SCHEMATIC

FIGURE 1-1

REGIONAL OIL AND GAS DEVELOPMENT

Lompoc Pipeline Project



(a) EXTENSION REQUIRED IN THE EVENT THAT CONSOLIDATED STORAGE AND MARINE TERMINAL FACILITIES ARE BUILT AT LAS FLORES CANYON RATHER THAN AT GAVIOTA.

FIGURE 1-2

PROJECT AREA

Lompoc Pipeline Project

AIR QUALITY

In reviewing the DEIS/EIR (Section 5.2 and Technical Appendix B), certain issues became evident where the accuracy of the air quality analysis is in doubt. These various issues have been combined into the six topic areas that are described briefly below.

INERT POLLUTANT MODELING

EXX-4

The modeling assumptions made are overconservative in almost every aspect. The model used is a Complex II equivalent which was agreed to be overconservative by a panel of experts convened in Santa Barbara in October 1983. The analysis used hypothetical worst case meteorology rather than the more accurate approach of using measured data. When the percentage of time a meteorological condition is expected to occur is listed, it is unclear if these typically very low percentages reflect a combination of all three critical meteorological variables; i.e., wind speed and direction, and stability class. Emissions impacts seemed in certain cases to inaccurately reflect future emissions. For example, the Gaviota Marine Terminal showed no vapor recovery which it almost certainly will have if it is even still operational in 1992. Eliminating the emissions from the existing refinery from the background SO_2 seems inaccurate, since they are clearly present up until the time of operation of the new facility at which time they will be assimilated into the emissions for the new plant but will still be present. Finally, the exponents used to convert impacts for 1-hour averaging times to other averaging periods seem overconservative.

8.1.7

REACTIVE POLLUTANT MODELING

EXX-5

Modeling for ozone impacts was done using a trajectory model unproven for application in an offshore and coastal environment. Assumptions used to define the trajectories are also questionable, especially since the text states that trajectories were adjusted to "capture" additional platform and onshore sources. Additionally, the conservatism of the modeling is increased by including low probabililty events such as equipment testing. Again emissions inventories seem to be unnecessarily large since items such as the probable use of vapor recovery at the Gaviota Terminal are not included. It also appears that no VOC reductions are credited from the use of Inspection and Maintenance

programs commonly used in the County and which are expected to be required in the future.

BACT ISSUES

EXX-6

Before doing a modeling impact analysis or offset liability calculation, the DEIS/EIR should have considered reductions in emissions which would result from incorporation of BACT. For example, it appears that no reduction of VOC emissions is credited for implementation of an Inspection and Maintenance program. Such a program alone would be expected to result in at least a 50% reduction of the largest source of hydrocarbon emissions. Also, NO_x reductions are assumed to result from low NO_x burners but no consideration is given to the use of more effective Thermal $DeNO_x$ technology. All of these factors which seem to have been ignored would help to reduce VOC and NO_x emissions and thereby lessen expected O_3 imacts.

TOTAL HYDROCARBON (THC) VS. REACTIVE HYDROCARBON (RHC)

EXX-7

Throughout the DEIS/EIR, the terms THC and RHC appear to be used interchangeably. If this is not simply an error of word usage, a serious problem exists since THC is neither a criteria pollutant as stated in the report nor is it of concern in developing an emissions inventory, determining offset liability, or running a reactive pollutant model. RHC which is of concern is almost always less than THC and is often substantially lower. Therefore, if THC values were in fact used, a serious overestimation of reactive hydrocarbons (i.e., those regulated and used in modeling) is present in the report. An extremely critical place in Technical Appendix B where this confusion exists is in Table 12-1 where the available RHC offsets are listed and Table 12-2 where the required THC offset liability for the project is described.

OFFSET LIABILITY CALCULATION

EXX-8

The offset liability described in Technical Appendix B, Table 12-2, incorrectly includes the emissions from facilities on the federal OCS. Onshore air quality districts do not have authority to require offsetting of OCS facilities. These facilities are within the jurisdiction of the Minerals Management Service (MMS) and the very conservative cumulative analysis in the DEIS/EIR showed that the OCS sources did not exceed the MMS significance levels which could lead to requirements for controls or offsets. Additionally, all feasible BACT technologies should be considered before considering offset requirements. These include, but are not limited to, Inspection and Maintenance for VOC emissions and Thermal $DeNO_x$ for NO_x emissions.

CONTROL REQUIREMENTS OR PROJECT CONSTRAINTS BASED ON AREA STUDY EXX-9

It is inappropriate to consider limiting a project which is requesting a permit based on a hypothetical scenario of what may occur in the future. The time to do the impact analysis for expected future facilities is when they are prepared to proceed with the permitting process. At that time, the actual impacts of the facilities currently proposed may well be known through monitoring data, and the future facilities can then be more realistically evaluated and controlled.

8.1.8

MARINE BIOLOGY

MARINE MAMMAL IMPACTS EXX-10

The DEIS/EIR (Section 5.5.2.3 and Technical Appendix E) indicates that, although unlikely, support vessel collisions with marine mammals would be a Class I impact. Suggested mitigation includes special reporting requirements and restrictions on vessel movements.

EXX-11

Exxon is willing to report any accidental collisions between support vessels and marine mammals. However, the DEIS/EIR should specify the agency responsible for administering the reporting process and what type of reporting procedures will be required. Furthermore, the DEIS/EIR should explain how reporting such an accident will provide mitigation for the accident.

EXX-12

The proposed mitigation regarding restrictions on vessel movements is not explained in sufficient detail to assess its reasonableness or effectiveness. Shamrock Project support vessel activity would represent a small increase to current levels of vessel traffic in the Santa Barbara Channel vicinity. This relatively minor increase to what is categorized as an unlikely impact situation does not justify establishment of special restrictions beyond those that are already in effect to control vessel movements in the Santa Barbara Channel vicinity.

EXX-13

As discussed above, Exxon is willing to implement mitigation measures which can be shown to be reasonable and effective. However, we believe that the DEIS/EIR overstates the issue of potential collisions between support vessels and marine mammals. Historical data should be presented to support the conclusion that collisions could have a Class I impact of regional significance. In fact, the conclusion is contradicted by statements in Technical Appendix E (page 5.5.2-48). The Technical Appendix indicates that the probability of collision occurring is slight (Class III) and that impacts should be insignificant (Class III). It even states "The unlikely mortality of a single gray would result in a local, Class III impact to this endangered species." The DEIS/EIR should be revised to accurately reflect conclusions presented in the Technical Appendix. Recommending that mitigation be required for such a small impact which has no regional significance is inappropriate and not needed.

ARTIFICIAL HABITAT MITIGATION

EXX-14

The DEIS/EIR (Section 5.5, Table 5.5-2 and Technical Appendix E) indicates that the loss of habitat associated with platform removal would be a localized Class II impact. The suggested mitigation for this impact is to create or maintain similar habitats.

The impacts associated with installation of platforms are identified in the DEIS/EIR as Class III. After installation has been completed, it is stated that the new substrate represented by the platform structure would have a localized beneficial impact (Class IV). Consistent application of this logic presented in the DEIS/EIR would indicate that removal of platforms (artificial habitat) is a minor, localized impact; i.e., Class III not Class II. Recommending that mitigation be required for such a small impact which has no regional significance is inappropriate and not needed.

8.1.9

TERRESTRIAL AND FRESHWATER BIOLOGY

EXX-15

The DEIS/EIR (Section 5.6.5.0 and Technical Appendix F recommends installation of block valves and/or check valves at frequent intervals to mitigate potential onshore oil spill impacts to drainages of biological significance. Similar recommendations are made in System Safety and Reliability discussions (Section 5.11.3.6 and Technical Appendix M) related to installation of subsea isolation valves for offshore pipelines.

The use of frequent in-line block valves in pipelines should not be specified to mitigate oil spills. Any benefits from reducing the total volume of oil in a broken or leaking segment of pipeline are offset by additional environmental impacts plus increased risk of oil spills due to operations upsets as discussed below.

A critical pipeline design requirement to minimize the risk of oil spills is to make the system as simple as possible to minimize operation upsets. This concept is widely supported by industry codes, practice and experience. The DEIS/EIR recommends multiple in-line isolation block valves to reduce the maximum volume of oil in a given pipeline segment to mitigate impacts of oil spills from those segments. However, the increased risk of system failure and additional environmental impacts from the incremental equipment are not addressed.

Multiple in-line block valves in pipelines should be avoided for numerous reasons. First, valves, like all equipment, occasionally malfunction resulting in pigs being trapped or inadvertent valve closures. These events result in serious upset conditions which increase the risk of oil spills. The probability of upsets increases with the number of valves.

Second, detecting corrosion inside valves is more difficult than inside pipe since the primary detection method, Linalog pigs, does not give accurate readings from valves. The pigs detect surface discontinuities typical of corrosion. These discontinuities are present in the valve body by design, and pig signals from valves are thereby largely unusable. This problem is particularly important since localized corrosion inside valves is most likely due to the inherent "nooks and cranies" in the body.

Thirdly, in onshore pipelines, aboveground valve stations for multiple valves result in permanent biologic and visual disturbances. Also, valve station maintenance activities increase disturbance to the general vicinity around the station.

Finally, onshore pipelines in biologically sensitive areas are not subject to many of the major causes of pipeline spills; i.e., construction and deep agricultural plowing activities.

For the reasons discussed above, multiple in-line block valves should be deleted as mitigation for oil spill risk in the DEIS/EIR. As a minimum, the environmental impacts and increased risk of operations upsets from these incremental valves should be addressed as offsetting any advantages.

8.1.10

CULTURAL RESOURCES

PROPOSED SHAMROCK PLATFORM EXX-16

The DEIS/EIR (Section 5.8.2.1 and Technical Appendix G) correctly points out that one unidentified sonar target which could be a cultural resource is located about 2,000 feet northwest of the proposed Shamrock Platform site. Possible impact to this anomaly during construction is identified as Class II.

The DEIS/EIR indicates that the agency with jurisidiction in this area is the MMS. The MMS requires that all offshore operators comply with OCS Orders. In the case of cultural resources, OCS Order No. 2 mandates that anomalies which may be potential cultural resources either be avoided or investigated in detail to determine their actual nature. If the latter investigation is necessary and an anomaly is revealed to be a cultural resource, then avoidance or mitigation must be implemented. Exxon must comply with this requirement. Therefore, no significant adverse impact to offshore cultural resources will be allowed under MMS regulations. The DEIS/EIR should be revised to incorporate this information and indicate that there will be either no impact or a Class III impact to the unidentified sonar target.

ALTERNATIVE PIPELINE ROUTE: SHAMROCK PLATFORM TO PLATFORM HERMOSA EXX-17

The DEIS/EIR (Section 5.8.4.1 and Technical Appendix G) correctly indicates that nine unidentified anomalies which could be cultural resources occur along the alternative pipeline route from the Shamrock Platform to Platform Hermosa. Possible impacts to these anomalies during construction are identified as Class II. As discussed previously, Exxon must comply with OCS Order No. 2 which provides for full protection of offshore cultural resources. Therefore, there will be either no impact or Class III impacts to the nine unidentified anomalies.

COMMERCIAL FISHING, KELP HARVEST AND MARICULTURE

EXX-18

The DEIS/EIR (Section 5.10.1.1 and Technical Appendix J) indicates that crew boat traffic at Ellwood Pier would have a Class II impact on kelp canopy, although there is acknowledgement that the impact is more likely Class III. However, mitigation is recommended on the presumption that the impact would be Class II. The mitigation is to establish a corridor through the kelp and re-establish kelp plants offsite, or alternatively use Carpinteria for a crew base.

The impact assessment fails to recognize that there is already an existing, approved corridor through the kelp which has been established in conjunction with the Coastal Commission. Shamrock Project crew boat traffic will use this approved corridor. Therefore, the impact on kelp canopy and associated harvesting would be Class III and no special mitigation required. Furthermore, the suggested mitigation to use Carpinteria as the crew base is not environmentally preferable. The longer travel distance would increase total air pollutant emissions, fuel consumption (an energy conservation consideration), and the potential for interference with other vessel traffic in the area.

8.1.11

SOCIOECONOMICS

Our comments pertaining to the socioeconomics analysis contained in the DEIS/EIR and Technical Appendix K thereto are focused principally in four areas: (1) definition and projection of baseline conditions in the tri-county area, (2) the effect of those projections on subsequent impact assessments, (3) the development and application of significance criteria and threshold values to these impact determinations, and (4) other specific areas concerning technical inaccuracies and unfeasible mitigation measures in the document.

EXX-19

The most significant area of concern relates to the projection of baseline conditions. The projection fails to account for the current trend of declining employment for the oil-related workforce in the tri-county area (see Figure 1). The decline results from the changing nature of offshore petroleum activity as the transition from construction/drilling to a production mode occurs. Without new projects, this continually increasing "absorptive" capacity will translate into high unemployment levels. Even the combined job opportunities afforded by the Union Project, Exxon Project, and Area Study Projects would be insufficient to fill the void associated with the projected declining employment situation (see Figure 1). By failing to factor this real situation into the projection of baseline conditions, the DEIS/EIR estimates population growth and associated infrastructure impacts (e.g., on water, public finances, and schools) that would not occur. As a consequence, mitigation measures are recommended that are inappropriate and not needed.

The following discussion details our concerns with each major area and subarea.

BASELINE PROJECTIONS

EXX-20

The definition of historical and future baseline employment and population conditions in the tri-county area is developed in Sections 1 and 2 of Technical Appendix K to the DEIS/EIR. Of particular importance to the subsequent impact assessments is the determination of future oil and industry-related employment in the region. The discussion of present and future conditions is included in the following sections of Technical Appendix K:

1.4.4 - Future Baseline
2.1.1.2 - Santa Barbara County Economic Conditions
2.1.2.2 - Ventura County Economic Conditions
2.1.3.2 - San Luis Obispo County Economic Conditions
Attachment C - Oil Support Infrastructure
Attachment F - C/COG Survey (of local oil service companies)

EXX-21

Within these sections, it is noted that the population and economic projection utilized for Ventura County "takes into account existing oil-related activity" (p. 1-22). Similarly, it is stated that the projection for Santa Barbara County excludes projected increases in oil-related activities which had been incorporated in Forecast "82" (p. 1-23). No comparable statement is made with respect to the oil-related component of San Luis Obispo County's projections.

EXX-22

Attachment C summarizes an analysis of historical employment within Santa Barbara and Ventura counties within SIC Codes 131 and 138. The following statement concludes that discussion: "Indications from discussions with oil-related service firms are that the 1983 employment figures for Oil and Gas Field Services represent the peak of activity in the Santa Barbara Channel, and that 1984 data will show a <u>lesser number of employees</u>. Also supporting this finding are the observed conclusion of production drilling on several platforms, a <u>lesser level of exploratory activity</u> and declining supply boat and helicopter activity" (p. C-3, underlining added).

EXX-23

Finally, Attachment F draws conclusions from preliminary findings of a C/COG survey relating to tri-county "direct support" employment in the oil-service industry. The following SIC codes were included in the analysis:

1381, 1382, 1389 - Mining, Oil and Gas Wells and Field Services
1629, 1731, 1796, 1799 - Construction
3599 - Manufacturing - Machinery Except Electrical
4212 - Transportation - Local Trucking Without Storage
4469 - Transportation - Water Transportation Services
4521 - Air Transportation, Non-Certified Carriers
7394, 7399, 7692, 8911 - Services

8.1.12

EXX-24

The analysis concludes that the 58 responding firms employed 2,984 persons in the tri-county region (p. F-5) and that this figure represents 71 percent of actual employment (p. F-17). Therefore, total oil-industry "direct support" employment in the region amounted to an estimated 4,203 persons* in 1983.

EXX-25

In the absence of local constraints on population growth, it is generally accepted that employment growth or decline dictates population growth or decline. Therefore, since employment is the fundamental driving force behind growth impacts, we have closely examined the employment analyses contained in the DEIS/EIR and have concluded that:

1. The interpretation and use of C/COG survey (Attachment F) results led to inconclusive findings because the survey form failed to ask some of the most important questions. Furthermore, consideration was not given to all SIC codes related to the industry.

2. The analysis of the oil-support infrastructure (Attachment C) was flawed because it considered only one "basic" SIC category (131) and one "direct support" SIC category (138).

3. The analyses fail to consider the findings of the recent MMS Study by Centaur Associates, Inc. titled: "Cumulative Socioeconomic Impacts of Oil and Gas Development in the Santa Barbara Channel Region: A Case Study", August 1984.

4. As a consequence of the above, the baseline projections of oil-industry employment do not recognize and incorporate the regional employment scenario which is now underway. That scenario shows that industry employment is now declining and without new projects, many more industry employees will not be employed by oil-related firms and may, in fact, be added to unemployment roles.

* 2,984 divided by .71 = 4,203.

EXX-26

The C/COG survey of local oil service companies (Attachment F) utilized a questionnaire to secure certain employment, worker residence, sales, expenditure and facilities data from C/COG-member and non-member firms. Actual employment data for 1980 and 1983 were requested. In addition, each respondent was asked for the "projected growth in employment to 1988". Responses, therefore, were submitted in the context of continued offshore growth in the industry. A more appropriate survey question would have requested future employment plans: (1) in the absence of new offshore projects (i.e., employment related only to existing in-place projects), and (2) with the development of new projects as presently contemplated. Because of this oversight, a true picture of future baseline conditions (absence of new projects) was not developed. If the survey and subsequent analysis would have included such a consideration, we believe that baseline employment in the industry would show a significant decline in the next several years. Furthermore, both the analysis of the C/COG survey (Attachment F) and the oil support infrastructure analysis (Attachment C) included only a limited array of SIC code categories. Excluded from the first analysis were the manufacture of fabricated metal products and construction, mining and materials handling machinery and equipment, including oil field machinery and equipment (SIC Codes 347, 349 and 353) as well as wholesale trade (SIC Codes 50 and 51), waste disposal (SIC Code 4953), and catering (SIC Code 5812).

EXX-27

The oil support infrastructure analysis covered only SIC Code 138, Oil and Gas Field Services, failing to incorporate an employment analysis of construction, transportation, and services for the oil industry. A complete analysis of employment in all sectors would confirm a general decline in industry activity since 1981.

EXX-28

Because of the limited scope of both analyses, the findings are inconclusive as to industry employment and cannot be utilized to develop baseline employment information.

EXX-29

A recent and more comprehensive study of regional employment in the oil and gas industry was completed by Centaur Associates, Inc. (1984) on behalf of the Minerals Management Service. This study reported that employment in Santa Barbara and Ventura counties resulting from oil and gas development declined

8.1.13

from a peak of 30,240 persons in 1970 to only 13,285 persons in 1980 (p. 197). Of this amount, approximately 70 percent were located in Ventura County and 21 percent in Santa Barbara County. This decline in employment is in direct contradiction to the historic employment growth shown in Attachment C to Technical Appendix K.

EXX-30

Further analysis of industry employment in the region was performed in connection with comments on the EIR/EIS for the Point Arguello Field and Chevron/Texaco project (Arthur D. Little, 1984). That in-depth study of sector-by-sector employment concluded that industry activity has been in a state of decline since 1981. Furthermore, in the absence of any new oil industry projects, basic and direct support employment in Ventura and Santa Barbara counties is predicted to decline from a 1984 level of 12,800 persons to as low as only 4,000 persons by 1987. This substantial decrease is due to the changing nature of offshore activity as the transition to a production-only mode occurs. Exploratory and development drilling in the OCS will have declined to a negligible amount by 1987 if new projects are not brought on-line in the near future.

EXX-31

The effect of this industry employment condition is illustrated on Figure 1. As is readily apparent, significant employment "capacity" will soon exist to absorb new industry projects in the region. In the absence of new projects to "fill the pipeline" a substantial number of workers could be subject to lay-off. The proposed Union Project, Exxon Project, and the Area Study scenarios can easily be absorbed by the available capacity without employment, population, or housing growth in the area resulting. The analysis contained in the report (Arthur D. Little, 1984) goes on to develop a cumulative impact scenario which involves "stacking" of future industry projects (proposed and hypothetical) on top of the previously defined baseline. These projects include 19-20 new platforms, two marine terminals, and two pipeline projects. Under these conditions, industry employment is projected to increase as high as 20,400 persons, or 5,200 persons over the recent historic peak of 15,200 achieved in 1981. The report goes on to show that it would be impossible for new employment to peak even at that level, since permitting and other delays are extending the schedules of the hypothetical platforms into the early 1990s.

8.1.14

Exx-32

By adjusting the schedules of future projects to reflect currently realistic permitting and startup dates, peak industry employment in the two counties would be 19,000 persons, or 3,800 persons higher than the recent historic peak of 1981.

Exx-33

With these studies as the basis for our review and conclusions, we believe that the population and permanent housing impacts attributed to the various scenarios are overstated. The applicable impact tables in Technical Appendix K which are affected are as follows:

Union Project: 3.1.15, 3.1.16, 3.1.3.5, 3.1.2.6
Exxon Project: 3.2.1.13, 3.2.1.14, 3.2.2.1, 3.2.2.2
Area Study: 3.3.1.5, 3.3.1.6, 3.3.2.2, 3.3.2.3
Cumulative Oil Projects: 3.4.1.7, 3.4.1.9, 3.4.2.5, 3.4.2.6

IMPACT ASSESSMENTS USING BASELINE PROJECTIONS

Exx-34

The determination of socioeconomic impacts has been based on the population and housing impacts presented in the 16 tables in Technical Appendix K mentioned earlier. The figures contained in those tables overstate the impacts due to the incorrect determination of baseline conditions. As a result, subsequent analyses dependent on the information in those tables have tended to likewise overestimate impacts in the following areas:

1. Low and moderate income housing demand
2. Water demand
3. School enrollment increases
4. Public finance impacts.

Low and Moderate Income Housing Demand

Exx-35

Within the Area Study and Cumulative Oil Project scenarios, the DEIS/EIR attributes a Class II impact to the projected demand for low and moderate income housing in the following report sections:

Section 5.7.3.1 - Area Study Permanent Housing Impacts
Section 5.7.8.1 - Area Study Permanent Housing Mitigation Measures

Section 6.7.3.1 - Cumulative Oil Projects Permanent Housing Impacts
Section 6.7.8.1 - Cumulative Oil Projects Permanent Housing Mitigation Measures

Exx-36

Based on our earlier discussion, we believe that because of the available absorptive "capacity" of the local oil support infrastructure, there is ample supply of workers in the tri-county area for new work. Additional employment will not result as a consequence of the Area Study scenario and, in fact, the new projects included within this scenario are insufficient in themselves to even maintain local industry employment at its current level. Hence, no population or permanent housing growth will occur in the Area Study scenario and the new demand for low and moderate income housing will be zero. No mitigation measures are required.

Exx-37

Under the Culumative Oil Projects scenario, the demand for low and moderate income housing has likewise been overstated. The DEIS/EIR fails to consider the declining baseline employment which results as existing in-place projects transition to a production-only mode. Therefore, the impact on low and moderate income housing (demand for 617 units) as shown in Table 6.7-4 is overstated and the attendant mitigation measures are excessive.

Water Demand

Exx-38

Within all scenarios, the DEIS/EIR predicts significant (Class I and Class II) impacts on water demand as a consequence of population and housing growth associated with each scenario. These impacts are discussed in the following report sections:

Sections 5.7.4.0, 5.7.4.1, 5.7.4.2 - Union, Exxon and Area Study Project Water Demand
Section 5.7.8.0 - Union, Exxon, and Area Study Water Demand Mitigation Measures
Sections 6.7.4.0, 6.7.4.1, 6.7.4.2 - Cumulative Oil Projects Water Demand
Section 6.7.8.0 - Cumulative Oil Projects Water Demand Mitigation Measures

EXX-39

As discussed previously, the local industry infrastructure possesses sufficient capacity to absorb the Union, Exxon and Area Study scenarios without causing growth in the local region. In fact, the Area Study scenario, in itself, will be insufficient in size to utilize all of the available "capacity" and, consequently, workforce reductions would result if the Area Study was the scenario ultimately realized in the local economy. The population growth induced water demands presented in the DEIS/EIR are based on an incorrect assessment of baseline conditions and, therefore, are themselves incorrect. The suggested mitigation measures are unnecessary.

EXX-40

Under the Cumulative Oil Projects scenario, the DEIS/EIR again overstates water demands resulting from expected population growth, because of the failure to properly evaluate future baseline employment conditions in the industry. The resulting mitigation measures are excessive.

School Enrollment Increases

EXX-41

Within the Area Study and Cumulative Oil Project scenarios, the DEIS/EIR predicts Class II impacts on the school systems in all three counties as a consequence of enrollment increases resulting from population growth. These impacts are discussed in the following report sections:

Sections 5.7.4.0, 5.7.4.1, 5.7.4.2 - Area Study School Impacts
Section 5.7.8.1 - Area Study Schools Impact Mitigation Measures
Sections 6.7.4.0, 6.7.4.1, 6.7.4.2 - Cumulative Oil Projects School Impact
Section 6.7.8.1 - Cumulative Oil Projects Schools Impact Mitigation Measures

EXX-42

As discussed previously, the Area Study scenario will not, in itself, be of sufficient size to fully utilize available industry capacity. Therefore, adverse impacts on schools as a result of this scenario will not occur, since no new population growth would result from implementation of the Area Study. Mitigation measures are unnecessary and unwarranted.

EXX-43

Failure to properly assess the character of future baseline employment in the oil industry has resulted in an overestimate of new school enrollment resulting from the Cumulative Oil Projects scenario.

EXX-44

Finally, Section 2.3.1.4 (page 2-171) of Technical Appendix K states that "the schools income is derived through State subventions under a complex formula which is based primarily on the average daily attendance and the district's ability to pay. This funding mechanism has varied each year since 1978, making it impossible to analyze whether additional enrollment is a positive or negative impact" (underlining added). The DEIS/EIR contains no fiscal analysis of the affected school districts. Therefore, we further believe that, as the DEIS/EIR states, it is impossible to assess school impacts and any proposed mitigation measures cannot be justified.

Public Finance Impacts

EXX-45

Within all scenarios, the DEIS/EIR predicts significant (Class II) adverse fiscal impacts in Ventura County as a consequence of oil-related projects. These impacts are discussed in the following report sections:

Section 5.7.5 - Union, Exxon and Area Study Public Finance Impacts
Section 5.7.8.1 - Union, Exxon, and Area Study Public Finance Impact Mitigation Measures
Section 6.7.5 - Cumulative Oil Projects Public Finance Impacts
Section 6.7.8.1 - Cumulative Oil Projects Public Finance Impact Mitigation Measures

EXX-46

Incorrect assessments of baseline conditions have resulted in the attribution of population, housing and fiscal impacts to the Union, Exxon and Area Study projects. As demonstrated earlier, none of these scenarios would fully utilize industry capacity and, hence, growth impacts would not result. Consequently, no adverse fiscal impacts would be expected.

EXX-47

For the same reasons, the annual shortfall of $18,000 projected for Ventura County under the Cumulative Oil-Related Projects scenario is substantially overestimated. It is recommended that impacts be reassessed after incorporating the more realistic projections of baseline employment conditions.

SIGNIFICANCE CRITERIA AND THRESHOLD VALUES

EXX-48

The DEIS/EIR utilized predetermined "significance criteria" to assign a particular designated classification to an impact. Section 5.7.1 (page 5.7-2) of the DEIS/EIR indicates that in the category of Public Finance "an annual negative fiscal impact to the County General Fund or special districts exceeding $1,000 is Class II."

EXX-49

The DEIS/EIR discusses Public Finance Impacts of the Union, Exxon and Area Study projects in Section 5.7.5 (page 5.7-13) where the following statements are made: "Under the Area Study scenario, Guadalupe's imbalance will be $207 in the year 2000." "The Union project would induce a net revenue shortfall of $1,777 in 1990 and 2000 for Ventura County. The Exxon project will induce a $2,410 shortfall by 1990 for the Ventura County, falling to $1,566 by 2000. These impacts are considered significant, (Clas II), using the adopted criteria."

EXX-50

Section 5.7.1 of the DEIS/EIR and Section 1.3 of Technical Appendix K each detail significance criteria for temporary housing. The two sections are in disagreement with one another, although it appears as though neither criteron was utilized in the assessment. In fact, the criterion imposed was that point at which the demand for temporary housing decreases the vacancy by one-half.

EXX-51

The adopted significance criteria for fiscal impacts are unrealistic in that it is impossible to accurately project revenues and expenditures to within $1,000 for periods five and fifteen years in the future. Fiscal impact assessments are based on project data and population and housing estimates which are only approximate at best. Compounding this built-in imprecision results in fiscal projections which vary significantly and are likewise imprecise. Significance criteria should be defined in terms of a range of values, such as ± $10,000 being considered as "no impact".

EXX-52

The above discussion of project-related Public Finance impacts for Union, Exxon, and the Area Study illustrates the results of selecting unrealistic criteria. We believe that fiscal shortfalls of $207, $1,177, $2,410, and $1,566 are well within any reasonably developed margin of error. These Class II impacts should be reclassified as "no impact".

EXX-53

The selection of the significance criteria for temporary housing was obviously arbitrary and may or may not reflect the importance of a decline in housing availability nor the benefits to landlords and owners of higher occupancy rates. Further, the significance criteria make no allowance for the duration of this temporary impact. For example, the demand for 100 units for three months in a given geographic area is considered to be equal in significance to the demand for 100 units for only one week. Finally, Table 1.1 in Technical Appendix K which purportedly details the current occupancy rates of temporary housing in various study areas (which, in turn, is utilized to define significance criteria), does not deal with each area uniformly. Some occupancy rates are year-round averages, others are for summer weekends, summer months only, and weekdays only. This inconsistency of data results in inconsistently applied significance criteria. These serious flaws in the development and utilization of criteria for temporary housing have rendered the impact classifications invalid.

TECHNICAL INACCURACIES AND UNFEASIBLE MITIGATION MEASURES

Temporary Housing Impacts

EXX-54

Section 3.4.2.1 of Technical Appendix K discusses temporary housing impacts for the Cumulative Oil Projects scenario and assigns a Class II impact level to motel unit demand in Lompoc and Santa Maria. The application of demand factors fails to consider that construction workers typically "double-up" on motel room usage, thereby halving the demand indicated in Table 3.4.2.3. Although the sharing of short-term rental housing was apparently accounted for in the calculations, it was not incorporated for motel units. Under revised criteria incorproating this phenomenon, impacts would be reclassified to Class III.

Solid Waste Impacts

EXX-55

Section 5.7.4.1 of the DEIS/EIR addresses solid waste impacts in Ventura County and assigns a Class II impact to the Union, Exxon and Area Study scenarios. This assessment is based on capacity limitations at the Santa Clara landfill. According to Technical Appendix K, Section 2.3.1.3.2 (page 2-169), the Toland Road landfill has a life expectancy to the year 2033. The DEIS/EIR,

8.1.16

however, fails to address available capacity at this and other landfills in Ventura County which is sufficient to accept projected solid waste disposal requirements. The text should be revised to reclassify the impact to the level of insignificant (Class III).

Temporary Housing Mitigation

EXX-56

Section 6.7.8.1 of the DEIS/EIR proposes measures to mitigate forecasted temporary housing impacts. Among the measures suggested is the "avoidance of construction during space shuttle launches to minimize the loss of tourist revenue during construction periods."

EXX-57

This proposed measure assumes that lost daily tourist revenue would be replaced by lower daily revenue levels from workers. In fact, no evidence is given which shows that tourists spend more than construction workers. Furthermore, because of the incorrect assumption discussed above concerning "doubling-up" of workers in motel units, the impacts in the DEIS/EIR have been overstated. Demand for motel units will likely be significantly less than that presented. The threshold values adopted as part of the significance criteria leave ample capacity for both worker and tourist demand.

EXX-58

Furthermore, the mitigation measure is impractical to implement and potentially would cause the proposed projects to incur unjustifiable costs associated with the periodic shut-down and start-up of construction activities. Scheduling of construction activities around the uncertain schedule of the space shuttle would cause temporary unemployment of a costly magnitude and project delays which would result in materials shortages and excesses, material storage and transportation problems, and other unacceptable results. This proposed measure should be eliminated from the text.

Local Hiring Mitigation

EXX-59

The DEIS/EIR (Section 5.7.8.1 and Technical Appendix K) suggests that mitigation for temporary housing impacts during construction could include issuance by Exxon of a letter of intent to hire local workers.

8.1.17

EXX-60

As a condition of obtaining Coastal Commission consistency certification, Exxon has already stated that it "plans on using local labor and local contractors in support of platform operations, and will encourage and promote employment from local sources. However since many aspects of offshore oil and gas operations are highly technical, employment needs must necessarily reflect these demands. As such, the most qualified technicians must be hired by Exxon and its contractors for certain jobs regardless of whether or not they come from the local labor market."

REFERENCES

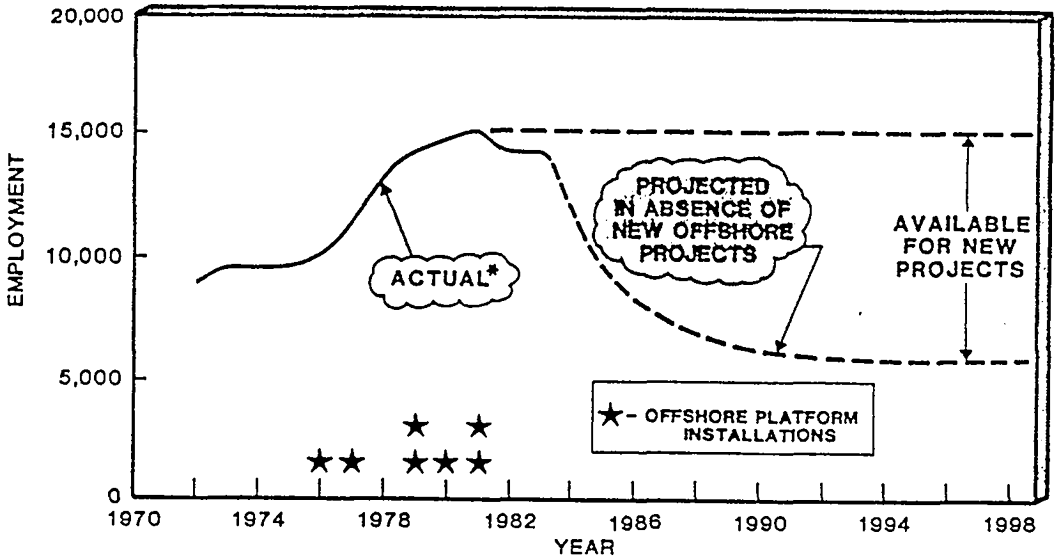
Centaur Associates, Inc., 1984. Cumulative Socioeconomic Impacts of Oil and Gas Development in the Santa Barbara Channel Region: A Case Study. Minerals Management Service OCS Study 84-0059, August 1984.

Little, Arthur D., 1984. Point Arguello Field and Gaviota Processing Facility, Area Study and Chevron/Texaco Development Plans EIR/EIS, Public Draft, Response to Comments, October 11, 1984.

FIGURE 1

9647

DIRECT & INDIRECT
OIL AND GAS INDUSTRY EMPLOYMENT
(VENTURA & SANTA BARBARA COUNTIES)



*SOURCE: California Employment Development Department

RESPONSES TO EXXON COMMENTS

EXX-1 Comment noted. Text has been revised.

EXX-2 Comment noted. This discussion is in the Project Description.

EXX-3 The text has been revised.

EXX-4 The PTMOCS model, which is equivalent to Complex II, was utilized in the analysis after discussions with and approval by the representative agencies on the JRP. A separate analysis for the OCS sources alone was carried out for MMS with the MPTER model. The use of the Complex II algorithm is consistent with a conservative worst-case approach when evaluating a new source. In the PTMOCS analysis, hypothetical worst-case meteorology was used, because there were no onsite measured data available. We agree that, consistent with EPA guidelines, actual onsite measured data of at least one year's duration would be preferred when carrying out the analysis. As part of the New Source Review (NSR) process, the Applicant will be required to conduct onsite meteorological and air quality monitoring. In their Authority to Construct (ATC) permit application, the air quality analysis will be revised to include the updated measured data. The use of hypothetical worst-case meteorology in the analysis was based on actual measurements from stations in the region and should reasonably represent conditions at the actual sites. The percentage of time that a meteorological condition is expected to occur was based on the frequency of a given wind speed and direction along with the combination of stabilities that would lead to high impacts.

We assume that the comment which refers to future emissions refers to cumulative sources that are not part of the application. Most of these cumulative emissions were taken from other documents and were not scrutinized as closely as those for the project. However, we believe that they are reasonably accurate and represent potential future scenarios. For example, we did include vapor balance/recovery systems for the Gaviota Marine Terminal (see Technical Appendix B, p. 15-23).

Emissions for the existing refinery were not eliminated when reporting existing background SO2 levels (Table 4.2-11). The reported values in the table were based on actual SO2 monitor data for Nipomo and Grover City. For the expected future worst-case SO2 levels, it was assumed that only two sources would contribute significantly to the peak level, the modified refinery and a nearby coke plant. Thus for the impact analysis, only the coke plant emissions were included as future background, and the modified refinery was modeled to determine the project impacts over that background.

The exponents used to convert 1-hour average impacts to other averaging times were based on recommendation of ARB and they represent minimized wind meander conditions typical of worst-case conditions.

EXX-5 The TRACE Trajectory model has been used for a number of offshore and coastal environment analyses in the past and has been considered acceptable by the regulatory agencies. It has been modified to reflect the transport and diffusion that is unique to over water and coastal conditions. Trajectories were adjusted only within the realm of "reasonable" occurrence based on observed meteorological data for the calibration days. These adjustments were made by using the sound judgment of staff meteorologists and technical staff of the reviewing agencies. Equipment testing was only included for the worst-case conditions. The probability of this occurrence was acknowledged in the EIS/EIR as being low. A mitigation measure was proposed to carry out equipment testing during times which minimize the air quality impacts. There were no VOC reductions credited to Inspection and Maintenance (I&M), because this may have already been included in the fugitive emissions model that was applied to the facilities. Also, it is difficult to estimate the emission changes due to an I&M program. Most estimates have been very subjective.

EXX-6 Some of the mitigations that were mentioned in the comment were included in the analysis. Others such as selective catalytic reduction (SCR) and Thermal DeNOx have been considered in the FEIS and are reported in detail as supplemental information in Chapter X of the Response to Comments Document.

EXX-7 In the modeling and subsequent air quality analysis, the distinction was correctly made between RHC and THC. Only RHC emissions were included in the photochemical modeling.

EXX-8 For conditions in which pollutant emissions (OCS and other) might cause an exceedence of a federal standard, the offsets could be required by either MMS or EPA. Therefore in the case of ozone, offsets could be required for the pollutants RHC and NOx.

EXX-9 Mitigation measures were applied in a two-step process. First, a fully mitigated project was considered. Then additional mitigation measures were applied only to the non-project Area Study sources afterward. We therefore do not agree that the project permit is not based solely on the hypothetical Area Study scenario.

EXX-10 through EXX-12 The impacts are described in the text as ranging from Class III to Class I depending on species. Appropriate reporting agencies would include U.S. Fish and Wildlife Services, California Department of Fish and Game and U.S. Minerals Management Service. Reporting has at least two benefits: (1) it can provide a basis for assistance to injured animals; (2) it can provide data concerning repeated use of certain parts of vessel routes by sensitive species. This could be a basis for modifying the routes as appropriate.

Restricting vessel movements in areas of repeated incidents would be an effective measure. The impact in question assumes greater significance when the Shamrock-related traffic is placed in the context of Area Study and Cumulative traffic.

EXX-13 The EIS and Appendix text are consistent, although they elaborate on different aspects. The example in the Appendix does not cover a species such as the Southern Sea Otter where a single mortality may have regional significance.

EXX-14 There is no parallel between Class III installation impacts on soft bottoms and Class II impacts, of removal of hard bottoms.

EXX-15 Comment noted. The number and placement of block/check valves for the pipeline routes has been reviewed and revised. The new placement of valves is discussed in Chapter X of this document. It is true that installation of valves can lead to increased locations for oil spills they do serve a very useful purpose in limiting the amount of oil that could spill in a sensitive area like the Santa Ynez River.

EXX-16 The Notice to Lessees referenced in the EIS/EIR discusses operators' responsibilities with respect to offshore cultural resources. As required, all anomolies with cultural significance must be avoided or mitigated. Therefore, no significant/adverse impacts would result from Exxon's proposed Platform Shamrock. The text and impact tables have been changed to clarify this.

Indirect impacts, such as masking, however, could have a Class III impact. Text and tables have been changed to reflect this.

EXX-17 As discussed above, no direct impacts to offshore cultural resources will result from this alternative pipeline route since Exxon will comply with applicable MMS regulations. The text and tables have been changed to reflect this. Indirect impacts, however, may still damage cultural resources resulting in Class III impacts. Tables and text have been changed to clarify this.

EXX-18 There is a commitment in the record of Exxon's Coastal Act Consistency Certification to use pre-established vessel traffic corridors. As noted in Technical Appendix J, existing corridors are on the order of 1,500 feet wide. It is not clear that use of Carpinteria would be less preferable, as the residual impacts of air emissions, fuel consumption and vessel traffic cited in the comment are likely of only Class III significance.

EXX-19 This comment can be summarized as a concern that baseline conditions, upon which impacts are measured, are overstated for future years. The reason for the suspected overstatement is that expected declines in oil industry employment are not accounted for in the baseline forecast.

It is important to remember that impacts are measured against the prevailing situation of the entire local economy, not merely a particular component or industry within that economy. Hence declines in one sector may be offset by gains in another sector.

The future baseline forecast that was provided does incorporate recent trends in oil industry employment. The growth in industry employment due to increased offshore activity in the late 1970's, as well as the recent decline in employment were common knowledge during the time this baseline forecast was prepared. (Note Paragraph 3, Page C-1 in the Socioeconomics Technical Appendix). Explicit efforts were therefore undertaken to create a baseline forecast that only: 1) accounted for oil developments that had been permitted by the time the baseline forecast was created and 2) accounted for the declining historical trend in employment.

Local planning officials in the tri-county area were closely involved in the development of the forecast. Before proceeding with the impact assessment the forecast and methodology was reviewed by officials from San Luis Obispo, Santa Barbara, and Ventura counties.

EXX-20 Comment noted.

EXX-21 "Existing oil-related activity" in Ventura County includes existing onshore oil activities, as well as permitted offshore activity. The Area Planning Council's Forecast "82" was modified to remove oil-related activities that were not permitted at this point in time (they become part of the cumulative assessment). San Luis Obispo County's forecast implicitly included only existing onshore oil-related activities.

EXX-22 Comment noted.

EXX-23 Comment noted.

EXX-24 Comment noted

EXX-25 Comments noted. Responses to bullet points follow in EXX 26, EXX-27, EXX-28 and EXX-29.

EXX-26 The C/COG respondents estimates of future employment was obtained from their responses to the question of employment in 1988. Given the fact that actual employment for some respondent firms fell between 1980 and 1983 and given that C/COG members are very aware of trends in the local industry suggests that the use of the phrase "growth in employment" did not bias responses.

Furthermore the response to the employment growth question was not employed in the creation of the baseline. -

The C/COG survey excluded certain SIC categories since the survey was only of C/COG members. Other SIC categories were analyzed separately.

EXX-27 See Comment EXX-26.

EXX-28 The analysis was very detailed. A comprehensive listing of firms in the study area was used to support the analysis.

EXX-29 The estimates provided in the centaur study attempts to capture the total employment impact using regression techniques. Attachment C in the Socioeconomics Technical Appendix cites California Department of Employment Development (EDD) employment statistics for SIC 131 and 138. The numbers are not contradictory because they cannot be directly compared.

EXX-30 Comment noted.

EXX-31 As discussed in the response to comment EXX-19 recent trends in the tri-county oil industry have been accounted for in the baseline forecast.

EXX-32 Comment noted.

EXX-33 See Comment EXX-19.

EXX-34 See Comment EXX-19.

EXX-35 Comment noted.

EXX-36 See Comment EXX-19.

EXX-37 See Comment EXX-19.

EXX-38 Comment noted.

EXX-39 & EXX-40 See Comment EXX-19. Furthermore several resources, e.g., Lompoc water supplies and Oxnard school capacity, are already strained, hence growth in these areas must be monitored.

EXX-41 Comment noted.

EXX-42 & 43 As stated above the baseline forecasts incorporate current and expected trends in the industry, hence the impacts are correctly measured. See Response to EXX-19.

EXX-44 The quote is taken out of context. The subsequent line is "hence there is no reliable means to fund capital construction for schools or additional classrooms." The significance criteria regarding schools are stringent, but to ignore potential impacts entirely is not prudent. The permitting process, while influenced by the EIS/EIR findings, is still a separate process. Permitting agencies may decide to only require mitigation for schools already impacted.

EXX-45 Comment noted.

EXX-46 & 47 See EXX-19.

EXX-48 Comment noted.

EXX-49 Comment noted.

EXX-50 Comment noted. The criteria used was "the demand for temporary housing decreases current average vacancy rate by 50%. Text changes have been made.

EXX-51 Point estimates of fiscal impacts tend to hide the fact that the impacts are approximations that can vary a great deal depending on future conditions. This is one of the reasons supporting applicant involvement in a monitoring program. The program would be employed to obtain more accurate assessments of impacts thereby allowing mitigation measures to be more effectively (and fairly) undertaken.

EXX-52 Any impact to a small municipality can be significant. The question of whether or not the listed fiscal impacts are significant should be discussed within the framework of the monitoring program.

EXX-53 We recognize the difficulties in addressing impacts upon temporary housing. Additional effort should be jointly undertaken by local planning bodies and applicants through the proposed Tri County monitoring program to obtain consistent occupancy data and to establish an improved significance criteria for temporary housing impacts. Until this is accomplished we feel that the existing criteria are superior to <u>no</u> criteria. The inconsistency in occupancy data is noted in the technical appendix so that policy makers will be cautioned in their treatment of the results. An improved criterion would take into account both impact upon occupancy and duration of impact. The relative "weighting" of these components and their critical levels should be addressed by the Tri County monitoring group.

EXX-54 We recognize that some construction workers staying in motels will "double up" in order to reduce personal expenditures for housing. The fact that we determined impacts, throughout the issue areas, based upond a "worst-case scenario" is the reason we assumed only one person per room.

EXX-55 The accepted significance criteria regarding solid waste cause the impact to be deemed Class II. There are alternative disposal sites elsewhere in Ventura County; these sites will presumably be employed more intensively upon closure of the Santa Clara site.

EXX-56 Comment noted.

EXX-57 There was no assumption that daily worker revenue (to local entities) would be less than daily tourist revenue. The issue is displacement of available revenue. If the supply of rooms is constrained such that all of the potential tourists <u>cannot</u> stay in the area a potential exists for reduced revenue. However, depending on construction schedules, construction workers may displace tourists (and tourist revenue) even though they may spend more.

EXX-58 The mitigation measure suggests "avoidance of construction during space shuttle launches". Clearly, construction activity cannot be halted on short notice without substantial cost to the applicant. This mitigation measure is meant to insure that the space shuttle activity is considered when scheduling construction activity.

EXX-59 Comment noted.

EXX-60 Comment noted.

TECHNICAL APPENDIX A - GEOLOGY

No revisions.

TECHNICAL APPENDIX B - AIR QUALITY

Volume I

page 7-63, para. 3, line 2
add the following sentence after "to 2.)."
"The federal 24-hour standard would also be exceeded under F1 and E1 conditions"

page 9-7, para. 1, line 8
add the following setence after "logical scenarios."
"The peak concentrations would also exceed the threshold limit value as set by OSHA."

page 12-4, Table 12-1
change the value of "3,834.7 tons/yr of SO_2 for the Santa Maria Refinery" to "2,927.1 tons/yr".

page 12-23, para. 2, line 7
change "87 MMscfd of sourgas" to "8.7 MMscfd of sourgas".

VOLUME II

page 14-46, Table 14.29
change the value of " 'na' under increment for the Santa Maria Refinery" to " '< 1'."

page 1-29, para. 1, line 2
change "22.5 acres" to "21.2 acres"

page 1-35, para. 2, last sentence
change to: "This impact is considered potentially Class II."

page 1-35, para. 5, line 3
change to: "seven of the 16 drainages with potentially significant projected increases (Class II)."

page 1-35, para. 4, line 7
add to end of sentence, "(Class II)"

page 2-30, para. 1, line 6
change "Class I" to "Class II"

References (Section 3)
add the following references:

Corps of Engineers, 1970. Flood Plain Information, Santa Ynez River (Lompoc to Pacific Ocean). Prepared for the Santa Barbara County Flood Control and Water Conservation District.

Terzaghi, K. and R.B. Peck, 1967. Soil Mechanics In Engineering Practice, 2nd ed., John Wiley & Sons, Inc., New York.

TECHNICAL APPENDIX D - MARINE WATER RESOURCES

No revisions.

page 4.5.9-5
the title should read: "Figure 4.5.9-2 ... and range limits of the sea otter."

page 4.5.12-2, Table 4.5.12-1
shoud read: "Enhydra lutris nereis"

page4.5.12-6, para. 3, line 9
should read: "Enhydra lutris nereis"

page 4.5.12-7, para. 2, line 2
should read: The U.S. Fish and Wildlife Service conducted a five-year review to determine the health of the southern sea otter population and if conclusions warrant, a possible change in its threatened status. The species and recovery program should be monitored and assessed annually. Any indication of increased threats, decreased numbers or reduced population should result in immediate consideration to "endangered" status [USFWS, 1984].

page 4.5.12-7, para. 4, lines 3-4
should read: "USFWS personnel counted 1,226 individuals including 164 pups..."

page 56, para. 1, line 17.
add new paragraphs:

"During spring surveys vernal wetlands along 35th Street and at the Tangair railroad crossing were investigated. The vernal wetlands along 35th Street occur in Burton Mesa Chaparral in the vicinity of a colony of Lompoc Yerba Santa (Eriodictyon capitatum), a state-listed and federal candidate species found in three locations at Vandenberg AFB. The vernal wetlands form a series of interconnecting depressions between low mounds. Characteristic species include Juncus phaeocephalus, Phalaris lemmonii, Eryngium sp. and Brodiaea jolonensis. Two species reach their southern limits in this habitat. Danthonia californica, a grass characteristic of North Coastal Prairie, and Juncus falcatus, rediscovered in Santa Barbara County during field surveys for this project, occur in these vernal wetlands. Dudleya blochmaniae, a regionally rare plant, also occurs here.

"The Tangair vernal wetlands are similar to those described above but are located behind sand dunes and support some species associated with seasonally wet grasslands. One large vernal pool also is found here immediately behind the active dunes. These wetlands were unreported previous to surveys conducted for this project. They are not as diverse in species as the wetlands along 35th Street, but support several of the same vernal wetland plants (Juncus falcatus, Danthonia california, Eryngium sp. and others. Associated with and possibly once continuous with the Tangair vernal wetlands are similar habitats in Coastal Sage Scrub along Tangair Road north of the new extension of the airport runway."

Page 95, para. 1, line 12.
add new paragraph:

"Spring surveys for this project located a breeding pair of Black-shouldered Kites in the vicinity of the Floradale Avenue Bridge crossing of the Santa Ynez River and one to several breeding pairs at Barka Slough."

Page 95, para. 2, line 16.
add sentence:

"Surveys conducted for this project have revealed that breeding Northern Harriers occur at Vandenberg AFB as far inland as the fields near the bird farm in Oak Canyon, about 1 mile east of 13th Street."

Page 96, para. 4, line 18.
add sentence:

"Snowy Plovers were sighted during field surveys conducted for this project on the beach near landfall of the proposed pipeline route."

Page 97, para. 4, line 8.
add sentences:

"Field surveys in late May, conducted for this project, failed to locate Willow Flycatchers in riparian habitats along the Santa Ynez River and at Barka Slough. However, these birds typically migrate through the Project Area no earlier than early June."

Page 98, para. 1, line 10.
add sentence:

"Breeding Tree Swallows were found during spring surveys conducted for this project in riparian habitat along the Santa Ynez River from the Surf bridge upstream to the vicinity of the active water treatment plant (east of the 13th Street crossing) and at Barka Slough."

Page 98, para. 2, line 7.
add sentence:

"Breeding Swainson's Thrushes were found during spring surveys conducted for this project in riparian habitat along the Santa Ynez River from the Surf Bridge upstream to the Floradale Avenue Bridge and at Barka Slough."

Page 98, para. 3, line 8.
add sentence:

"Spring surveys for this project located breeding Warbling Vireos in riparian habitat along the Santa Ynez River from the Surf Bridge upstream to the Floradale Avenue Bridge and at Barka Slough."

Page 98, para. 4, line 4.
add sentence:

"Breeding Yellow Warblers were found during spring surveys conducted for this project in riparian habitat along the Santa Ynez River from the Surf Bridge to the Floradale Avenue Bridge, in several locations along Graciosa Road (near Orcutt) and at Barka Slough."

Page 98, para. 5, line 10.
add sentence:

"Breeding Wilson's Warblers were found during spring surveys conducted for this project in riparian habitat along the Santa Ynez River from the Surf Bridge upstream to the Floradale Avenue Bridge and at Barka Slough."

Page 99, para. 1, line 7.
add sentences:

"A few regularly summer along the Santa Ynez River, inland from the 13th Street crossing. During spring surveys conducted for this project breeding Yellow-breasted Chats were found in riparian habitat along the Santa Ynez River near the active water treatment plant (east of 13th Street) and at Barka Slough."

Page 99, para. 2, line 6.
add sentence:

"Breeding Blue Grosbeaks were found at Barka Slough during spring surveys conducted for this project."

Page 99, para. 3, line 14.
add sentence

"A small breeding population of Grasshopper Sparrows was found on a grassy hillside south of San Antonio Road, near Barka Slough, during spring surveys conducted for this project."

Page 102, para. 1, line 13.
add paragraph:

"During spring surveys conducted for this project, about 25 sites that had been earlier identified as potential breeding locations for Red-legged Frogs were searched. These locations include drainages and ponds intersected by or near both the proposed and alternate pipeline routes. Crossing sites at Oak Canyon, the Santa Ynez River, Davis Creek, San Antonio Creek, and several sites within the Harris and Graciosa Canyon drainages were surveyed. A number of locations at Barka Slough also were surveyed. Red-legged Frogs were found at one location, a small cattail marsh along Central Avenue, 0.3 mile east of its intersection with Artesia Avenue. This marsh is crossed by the alternate pipeline route."

Page 137, para. 2, line 7.
add after "Morro Bay" "and bred there until 1942."

Page 137, para. 2, line 10.
add after "[Gill, 1979]" "April 25, 1967 and September 26, 1973."

Page 138, end of para. 2.
add sentence:

"During spring surveys conducted for this project a Least Tern was sighted at the Santa Ynez River estuary."

Page 140, end of para. 2.
add new paragraphs:

"The California Department of Fish and Game has requested additional information on the identity of the Savannah Sparrows found at the mouth of the Santa Ynez River (see comment RA-18). Determination of the subspecific identity of these sparrows is a task not within the scope of this project. The features that separate the subspecies are subtle, and could be best seen in a set of specimens in fresh winter plumage. Since such specimens are not currently available, several birds would have to be collected in the fall to provide them. Collecting birds at Vandenberg AFB would require permits from the California Department of Fish and Game and, possibly, the base Environmental Planning Branch. A series of specimens would need to be examined and measured by an ornithologist familiar with sparrows. At the present time, there is no recognized expert on Savannah Sparrows. Proper examination would probably require that the specimens be sent to the Smithsonian Institution in Washington, D.C., or another institution with the facilities and personnel for making such an identification. The time required to complete these studies after birds have been collected and specimens made is estimated at six months [Dunn, pers. comm.].

"Also, the morphology of Savannah Sparrows varies clinally along the coast, and it is possible that close examination of the birds at the Santa Ynez River mouth would reveal that they are intermediate between the subspecies to the north and south and thus, not easily placed into either group [Dunn, pers. comm.]."

Page 141, end of para. 1.
add new paragraphs:

"The California Department of Fish and Game has requested additional information on the status of the California Black Rail at the Santa Ynez River estuary (see comment RA-18). Further determinations of the status of this highly secretive bird are beyond the scope of this project. The one existing probable record of May 1981 (seen briefly by one observer and heard by Lehman) does not provide adequate information to determine if these birds are resident or migratory at the river mouth, since some seasonal movement occurs in this species. There have been no additional records from the area since 1981 although it is frequently visited by observers [Lehman, pers. comm.]. A proper census would require several observers stationed at different locations in marsh habitats. It should take place during several spring nights, since Black Rails are most easily detected by their calls, which are given at night. Special permits would be required to carry out this survey, since normal access to Vandenberg AFB does not extend past dark. The survey would require several nights of good weather and could probably be completed within a two week period [Lehman, pers. comm.].

"Based on existing information, the marsh habitats at the mouth of the Santa Ynez River are not of prime quality for Black Rails. In the areas that still support breeding populations, such as Bolinas lagoon and Morro Bay, marsh habitats occupied by these birds are subject to tidal fluctuations throughout most of the year. The estuary at the Santa Ynez River mouth typically is closed to tidal influence during the dry season. Therefore it is unlikely that this area supports a breeding population of Black Rails. This cannot be determined with certainty, however, unless proper censusing is carried out at the right time of year [Lehman, pers. comm.].

Pages 228 through 232.
Replace "Table 5.2-5" with the following revised version, "Table 5.2-5A."

Pages 233 through 239.
Replace "Table 5.2-6" with the following revised version, "Table 5.2-6A".

Pages 244 and 245.
Replace "Table 5.2-8" with the following revised version, "Table 5.2-8A".

Table 5.2-5A
(See also Figure 5.2-1)

COMPARISON OF DRAINAGES OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

Drainage No.& Type	Crossed By[1] Prop. to 4	Alt. to 4	Prim. to 8	Alt. to 8	Drainage Name/ Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
1-1 (E)	X		X		Unnamed-Drains into marsh on no. side of Santa Ynez R. estuary near Least Tern breeding area. Tidewater goby in estuary. Potential for steelhead trout in river. Several regionally rare birds* and Red-legged Frog in Santa Ynez R. and vicinity.	Construction: Removal of Coastal Sage Scrub, (a) increased erosion and sedimentation, and (b) noise will disrupt activities of some local wildlife species. Vegetation & Wildlife: Class III Aquatics: Class II-regional Accidents: Oil spill could reach estuary. Gas vapor cloud could reach Least Tern breeding area. Vegetation: Class II-regional Wildlife & Aquatics: Class II-regional	1. Use Northern Mitigated Pipeline Route. 2. Install block valves every 0.5-1 mile from landfall to Oak Canyon. 3. Build berms and containment basins along mitigated route from landfall to Oak Canyon. 4. Revegetate pipeline scars with local native plants. 5. Inspect pipeline frequently. 6. Develop oil containment and clean-up plans. 7. Construct this segment between Sept. and Nov. to avoid Least Tern and other rare birds nesting and rainy seasons.
1-2 (E)	X		X		Unnamed-Drains into marsh/willow Riparian Woodland on no. side Santa Ynez R., just upstream from estuary. Tidewater goby in estuary. Potential for steelhead trout in river. Several regionally rare birds* and Red-legged Frog in Santa Ynez R. and vicinity.	Construction: Removal of Annual Grassland and Coastal Sage Scrub, disruption of nesting and feeding activities of regionally rare birds, (a) and (b). Vegetation: Class III Wildlife & Aquatics: Class II-regional Accidents: Oil spill could reach river and estuary. Vegetation: Class II-regional Wildlife & Aquatics: Class II-regional	1-7 above.
1-4 (E)	X		X		Oak Canyon-Steep canyon walls with oak woodland, Burton Mesa Chaparral, Black-flowered Figwort. Drains into Santa Ynez R. marsh/willow Riparian Woodland. Tidewater goby, potential for steelhead trout and Red-legged Frogs in river. Several regionally rare birds* use, and possibly breed, in river-associated Riparian and wetland habitats.	Construction: Removal of oak trees and chaparral on steep slopes, disruption of nesting and feeding activities of regionally rare birds, (a) and (b). Vegetation: Class I-local Wildlife & Aquatics: Class II-regional Accidents: Oil spill could reach river and estuary. Vegetation: Class II-regional Wildlife & Aquatics: Class II-regional	1-7 above. 8. Special revegetation procedures, such as jute netting tacked in place to stabilize soil surface and replanting of chaparral shrubs and oak trees, will be required on steep slopes. 9. Keep disturbance corridor as narrow as possible.
1-5 (E)	X		X		Unnamed-Steep-sloped drainage with high erosion potential. Oak trees and Burton Mesa Chaparral with Shagbark Manzanita and other rare plants on slopes in pipeline corridor.	Construction: Removal of oak trees, Shagbark Manzanita and Burton Mesa Chaparral, (a) and (b). Vegetation: Class I-regional Wildlife: Class III Accidents: Oil spill could reach Santa Ynez River. Vegetation: Class II-local Wildlife & Aquatics: Class II-regional	4-6, 8, 9 above. 10. Install block valves on both sides of Santa Lucia Canyon.

9.0.10

Table 5.2-5A
(See also Figure 5.2-1)
(continued)

COMPARISON OF DRAINAGES OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

Drainage No.& Type	Crossed By[1] Prop. to 4	Alt. to 4	Prim. to 8	Alt. to 8	Drainage Name/ Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
1-8 (I/P)	X		X		Santa Lucia Canyon-Steep-sloped canyon with diverse wetland vegetation in the canyon bottom. Black-flowered Figwort on canyon slopes in pipeline corridor.	Construction: Removal of wetland vegetation and Black-flowered Figwort, (a) and (b). Vegetation: Class II-regional Wildlife: Class III Aquatics: Class II-local to regional Accidents: Oil spill could reach Santa Ynez River. Vegetation: Class II-local Wildlife & Aquatics: Class II-regional	4-6, 8-10, above. 11. Construct this segment between May and Nov. to avoid rainy season.
1-9 (E)	X				Unnamed tributaries to Santa Lucia Canyon-Broad swale containing diverse freshwater wetland vegetation.	Construction: Removal of wetland vegetation, (a) and (b). Vegetation: Class II-local Wildlife & Aquatics: Class III Accidents: Oil spill could reach Santa Lucia Canyon and Santa Ynez River (less likely). Vegetation, Wildlife & Aquatics: Class II-III-local to regional (depending upon size of spill).	4-6, 9, 11, above. 12. Move pipeline route ± 100 feet west into existing fuelbreak on eastern border of Vandenberg AFB.
1-10 (E)	X				Seep area with diverse freshwater wetland vegetation; probably tributary to 1-9.		
1-11 (I)	X				Unnamed intermittent spring tributary to Santa Lucia Canyon-Oak woodland with large old oaks and wetland vegetation in pipeline corridor.	Construction: Removal of 6 large oaks and wetland vegetation (11 other large oaks nearby could be lost from trenching in root zone), (a) and (b). Vegetation: Class I-local Wildlife & Aquatics: Class III Accidents: Oil spill could reach Santa Lucia Canyon and Santa Ynez River (less likely). Vegetation, Wildlife & Aquatics: Class II-III-local to regional (depending upon size of spill).	4-6, 9, 11, 12, above.
1-12 (P/E)	X				Unnamed perennial spring tributary to Santa Lucia Canyon- Willow-dominated Riparian Woodland and other diverse wetland vegetation downslope (adjacent to pipeline route).	Construction: Degradation of nearby Riparian Woodland and wetlands from (a) and (b). Vegetation & Aquatics: Class III Wildlife: Class II-III-local to regional Accidents: Oil spill could reach Santa Lucia Canyon and Santa Ynez River (less likely). Vegetation, Wildlife & Aquatics: Class II-III-local to regional, depending upon size of spill).	4-6, 9, 11, 12, above.

Table 5.2-5A
(See also Figure 5.2-1)
(continued)

COMPARISON OF DRAINAGES OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

Drainage No.& Type	Crossed By[1] Prop. to 4	Alt. to 4	Prim. to 8	Alt. to 8	Drainage Name/ Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
1-14 (E)	X				Unnamed tributary of Davis Creek-Willow-dominated Riparian Woodland downslope (adjacent to pipeline route).	Construction: Degradation of nearby Riparian Woodland from (a) and (b). Vegetation, Wildlife & Aquatics: Class III Accidents: Oil spill could reach Davis Creek. Vegetation, Wildlife & Aquatics: Class II-III-local to regional (depending upon size of spill).	4-6, 9, 11, above.
1-16 (E)	X				Unnamed tributary of Davis Creek-Erosional gully with Coastal Sage Scrub and Black-flowered Figwort.	Construction: Removal of Coastal Sage Scrub and Black-flowered Figwort (a) and (b). Vegetation: Class II-regional Wildlife & Aquatics: Class III Accidents: Oil spill could reach Davis Creek. Vegetation, Wildlife & Aquatics: Class II-III-local to regional (depending upon size of spill).	4-6, 9, 11, above.
2-1 (P)		X		X	Unnamed-Permanently flooded ditch bordered by Riparian Woodland and other diverse wetland vegetation. Flows seasonally into Santa Ynez River estuary. Potential Red-legged Frog breeding habitat. Potential nesting habitat of several regionally rare and declining birds* found nearby. Tidewater goby in estuary.	Construction: Removal of Riparian Woodland and wetland vegetation (a) and (b). Vegetation, Wildlife & Aquatics: Class II-local Accidents: Oil spill could reach Santa Ynez River estuary. Vegetation: Class II-regional Wildlife & Aquatics: Class II-regional	4-6, 9, 11, above. 13. Use Southern Mitigated Pipeline Route. 14. Bury pipeline 5 to 10 feet in 100-year flood plain. 15. Install valve at landfall connecting produced water and oil lines so that oil can be displaced quickly in the event of flooding.
2-3 (I/P)		X		X	Unnamed-Local drainage now fed by agricultural runoff. Marsh on south side of Central Avenue provides breeding habitat for Red-legged Frog (presence verified by spring 1985 survey).	Construction: Removal of wetland vegetation (a) and (b). Vegetation & Aquatics: Class II-local Wildlife: potentially Class I-regional Accidents: Oil spill could affect local area. Vegetation & Aquatics: Class II-local Wildlife: potentially Class I-regional	4-6, 9, 11, 14, 15, above.

9.0.12

Table 5.2-5A
(See also Figure 5.2-1)
(continued)

COMPARISON OF DRAINAGES OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

Drainage No.& Type	Crossed By[1] Prop. to 4	Alt. to 4	Prim. to 8	Alt. to 8	Drainage Name/ Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
2-5 (I/P)		X		X	Santa Ynez River-Perennial river channel, seasonally flooded floodplain and banks with high diversity of wetland habitats and Riparian Woodland. Potential breeding habitat of Red-legged Frog and several regionally rare bird species*. Flows directly into major willow-dominated Riparian Woodland and estuary of Santa Ynez River, the latter containing tidewater goby and nesting site of Least Tern. La Graciosa Thistle in downstream marsh habitat.	Construction: Removal of Riparian Woodland and other wetland vegetation, (a) and (b), temporary dewatering of river. Vegetation: Class II-local Wildlife & Aquatics: Class II-regional Accidents: Oil spill would affect Santa Ynez River and could reach estuary. Vegetation: Class II-regional Wildlife & Aquatics: Class II-regional	4-7, 9, above. 16. Install block valve on south side and check valve on north side of Santa Ynez River crossing. 17. Cross river by spanning or drilled crossing.
2-7 (E) 2-8 (E) 2-9 (E)		X X X	X X X	X X X	Both Unnamed-Two forks join in area of pipeline corridor. Oaks and willows on banks. Wetland vegetation on lower banks. Unnamed-Entrenched ravine with with willow-dominated Riparian Woodland on banks.	Construction: Removal of oaks, willows and wetland vegetation, (a) and (b). Vegetation: Class II-local Wildlife & Aquatics: Class III Accidents: Oil spill would affect local area. Vegetation: Class II-local Wildlife & Aquatics: Class III	4-6, 8, 9, 11 above. 18. Move pipeline route south into fuelbreak on Lompoc Federal Correctional Institution property.
2-12 (E/I)		X	X	X	Unnamed western tributary of Davis Creek-Cottonwood and willow-dominated Riparian Woodland on banks. Several seeps occur along stream banks. Wetland vegetation in stream corridor. Shagbark Manzanita on slopes above.	Construction: Removal of cottonwoods, willows, wetland vegetation (a) and (b). Vegetation: Class II-local Wildlife & Aquatics: Class III Accidents: Oil spill would affect local area. Vegetation & Aquatics: Class II-local Wildlife: Class III	4-6, 8, 9, 11, above.
2-13 (I/P)		X	X	X	Davis Creek-Perennial stream channel with seasonally flooded slopes and banks and narrow floodplain. Willow-dominated Riparian Woodland, freshwater marsh and other wetland species.	Construction: Removal of willows, wetland vegetation (a) and (b). Vegetation & Aquatics: Class II-local Wildlife: Class III Accidents: Oil spill would affect local area and could reach Santa Ynez River (the latter is unlikely). Vegetation: Class II-local to regional Wildlife & Aquatics: Class II-local to regional	4-6, 8, 9, 11, above. 19. Install check valve on east side of Davis Creek crossing.

Table 5.2-5A
(See also Figure 5.2-1)
(continued)

COMPARISON OF DRAINAGES OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED, PRIMARY AND ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES

Drainage No.& Type	Crossed By[1] Prop. to 4	Alt. to 4	Prim. to 8	Alt. to 8	Drainage Name/ Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
2-14 (I/P)		X	X	X	Unnamed eastern tributary of Davis Creek-Channelized section with willow-dominated Riparian Woodland and fresh-water marsh plants.	Construction: Removal of wetland plants and possibly willows (a) and (b). Vegetation: Class II-local Wildlife & Aquatics: Class III Accidents: Oil spill would affect local area and probably Davis Creek. Vegetation, Wildlife & Aquatics: Class II-local to regional	4-6, 8, 9, 11, above.
2-15 (E)		X	X	X	Unnamed eastern tributary of Davis Creek-Broad sandy swale with Coastal Sage Scrub, chaparral shrubs and native annuals, including Annual Curly-leaved Monardella.	Construction: Removal of Coastal Sage Scrub and other native plants including Annual Curly-leaved Monardella (a) and (b). Vegetation: Class II-local Aquatics & Wildlife: Class III Accidents: Oil spill would affect local area and could reach Davis Creek. Vegetation, Wildlife & Aquatics: Class II-local to regional	4-6, 9, 11, above.
2-16 (E)		X		X	Unnamed eastern tributaries of Davis Creek-Freshwater marsh and other wet-land vegetation. Seep and vernal pool. Black-flowered Figwort nearby.	Construction: Removal of wetland vegetation, possible loss of some vernal pool habitat (a) and (b). Vegetation: Class II-local Aquatics & Wildlife: Class III Accidents: Oil spill would affect local area and could reach Davis Creek. Vegetation, Wildlife & Aquatics: Class II-local to regional	4-6, 9, 11, above.
2-17 (E)		X		X			
3-1 (E)			X		Unnamed-Freshwater marsh and other wet-land vegetation with high native plant species diversity. Oak trees and Shag-bark Manzanita nearby.	Construction: Removal of wetland vegetation (a) and (b). Vegetation: Class II-local Aquatics & Wildlife: Class III Accidents: Oil spill would affect local area. Vegetation: Class II-local Aquatics & Wildlife: Class III	4-6, 9, 18, above.

9.0.14

1. Prop. to 4= proposed pipeline route to Site 4
   Alt. to 4 = alternate pipeline route to Site 4
   Prim. to 8= primary pipeline route to Site 8
   Alt. to 8 = alternate pipeline route to Site 8
2. Numbers correspond to those used in figures and Onshore Water Technical Appendix (C); E = ephemeral, I = intermittent, P = perennial.

* (e.g., White-faced Ibis, American Bittern, Common Moorhen, Tree Swallow, Swainson's Thrush, Warbling Vireo and others; Spring surveys needed to verify presence).

Table 5.2-6A

RARE SPECIES POTENTIALLY AFFECTED BY USE OF THE PROPOSED, PRIMARY OR ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES AND THE PROPOSED ROUTE FROM THE LOMPOC SITE TO THE ORCUTT PUMP STATION

Species Name	Status[1]	Potentially Affected By: Prop.[2] to 4 (1)	Alt. to 4 (2)	Prim. to 8 (3)	Alt. to 8 (4)	Lompoc to Orcutt (5)	Known or Expected Occurrence in Project Area	Evidence for Presence
PLANTS								
Agrostis hooveri Hoover's Bentgrass	CNPS-4	X	X	X	X	X	Reported from Burton Mesa and the Purisima Hills. [Smith, 1976]	Presence unverified. Late spring surveys needed.
Arctostaphylos rudis Shagbark Manzanita	FC-2, CNPS-4	X	X	X	X	X	Unevenly distributed within ROWs of all routes in Burton Mesa Chaparral.	Plants identified during fall surveys.
Castilleja mollis Soft-leaved Indian Paintbrush	FC-2, CNPS-1B	X		X			Reported from coastal dunes in the vicinity of Surf. [Smith, 1976]	Presence unverified. Not found during spring survey.
Ceanothus impressus var. *nipomensis* Nipomo Mesa Ceanothus	FC-2	X	X	X	X		Reported from sandy mesas near Lompoc. [Smith, 1976]	Plants identified as *C. impressus* during fall surveys.
Chorizanthe pungens var. *pungens* Monterey Spineflower	FC-2, CNPS-1B	X	X	X	X		Reported from Burton Mesa. [Smith, 1976]	Presence unverified. Not found during spring survey.
Cirsium loncholepis La Graciosa Thistle	FC-2, CNPS-1B	X	X	X	X		Found in floodplain marshes along Santa Ynez River upstream from estuary.	Plants located during recent field studies. [Smith, 1983a,b]
C. rhothophilum Surf Thistle	FC-2, CNPS-1B	X		X			Found on foredunes just outside the ROW for routes (1) and (3) at landfall.	Plants identified during fall surveys.
Cordylanthus rigidus ssp. *littoralis* Seaside Bird's-beak	FC-1, SE, CNPS-1B	X	X	X	X		Found on Burton Mesa in Lompoc Oil Field. New record for Santa Barbara County. Hochberg, pers. comm.]	Plants identified by Heckard (U.C. Berkeley) from material collected during recent field studies [HDR,a].
Dithyrea maritima Beach Spectacle Pod	FC-2, CNPS-1B	X		X			Reported from coastal dunes near Surf. [Smith, 1976; Smithy 1983a,b]	Plants located during recent field studies (Bevier, pers. comm.).

Table 5.2-6A
(continued)

RARE SPECIES POTENTIALLY AFFECTED BY USE OF THE PROPOSED, PRIMARY OR ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES AND THE PROPOSED ROUTE FROM THE LOMPOC SITE TO THE ORCUTT PUMP STATION

		Potentially Affected By						
Species Name	Status[1]	Prop.[2] to 4 (1)	Alt. to 4 (2)	Prim. to 8 (3)	Alt. to 8 (4)	Lompoc to Orcutt (5)	Known or Expected Occurrence in Project Area	Evidence for Presence
Erigeron foliosus var. *blochmaniae* Blochman's Leafy Daisy	FC-2, CNPS-4	X	X	X	X		Reported from dunes near Surf and Burton Mesa. [Smith, 1976]	Plants tentatively identified from route (1). Late spring surveys needed to confirm identification.
E. sanctarum Saint's Daisy	CNPS-4	X	X	X	X		Reported from Burton Mesa. [Smith, 1976]	Presence unverified. Not found during spring survey.
Eriodictyon capitatum Lompoc Yerba Santa	FC-2, SR, CNPS-1B	X	X	X	X		Reported from Burton Mesa. Found near Project Area on Vandenberg AFB during recent field studies. [Smith, 1983a,b]	Presence within pipeline ROWs unverified. Not found during spring survey.
Erysimum suffrutescens var. *grandifolium* Large-leaved Wallflower	CNPS-4	X	X	X	X		Reported from sandy areas and Coastal Sage Scrub of Project Area.	Presence unverified. Not found during spring survey.
E. suffrutescens var. *lompocense* San Luis Obispo Wallflower	CNPS-4	X	X	X	X		Reported from sandy hills near Lompoc and on Burton Mesa. [Smith, 1976]	Plants identified from Route 1 during spring survey.
Malacothrix incana Dune Malacothrix	CNPS-4	X		X			Found on foredunes within ROW of routes (1) and (3) at landfall.	Plants identified during fall surveys and other recent field studies [Smith, 1983a,b].
Monardella undulata var. *frutescens* Curly-leaved Monardella	FC-2, CNPS-1B	N		N			Found on foredunes several hundred yards south of ROW for routes (1) and (3) at landfall.	Plants identified during fall surveys.
M. undulata var. *undulata* Annual Curly-leaved Monardella	CNPS-4	X	X	X	X		Found west of Site 8 [HDR, 1983a] and within ROW for routes (1), (2) (3) and (4).	Plants identified during other recent field studies [HDR, 1983a] and field studies for this project.
Quercus parvula Santa Cruz Island Oak	CNPS-4	X	X	X	X	X	Found within ROW in Bishop Pine Forest in Purisima Hills and less commonly in Burton Mesa Chaparral.	Located during fall field studies.

Table 5.2-6A
(continued)

RARE SPECIES POTENTIALLY AFFECTED BY USE OF THE PROPOSED, PRIMARY OR ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES AND THE PROPOSED ROUTE FROM THE LOMPOC SITE TO THE ORCUTT PUMP STATION

Species Name	Status[1]	Potentially Affected By: Prop.[2] to 4 (1)	Alt. to 4 (2)	Prim. to 8 (3)	Alt. to 8 (4)	Lompoc to Orcutt (5)	Known or Expected Occurrence in Project Area	Evidence for Presence
Scrophularia atrata Black-flowered Figwort	FC-2, CNPS-3	X	X	X	X	X	Reported from several vegetation types of the Project Area. Found in vicinity of Project Area during other recent field studies. [Smith, 1983a,b]	Plants identified as this species were found on all routes during spring surveys.
INVERTEBRATES								
Globose Dune Beetle (*Coelus globosus*)	FC-2	X	X	X	X		Reported from foredune habitat like that found within the ROWs of all routes at landfall. [Envicom, 1980a,b]	Presence unverified. Summer collecting and identification by a specialist would be required to determine if present.
Morro Bay Blue Butterfly (*Plebejus icariodes moroensis*)	FC-2	X	X	X	X		Reported from dune habitat like that found within the ROWs of all routes at landfall. [Envicom, 1980a,b] Host plant occurs within and near ROWs.	Presence unverified. Summer collecting and identification by a specialist would be required to determine if present.
FISHES								
Tidewater Goby (*Eucyclogobius newberryi*)	FC-2	X	X	X	X	X	Found in lagoons at mouths of Santa Ynez River and San Antonio Creek and upstream in river to Vandenberg AFB boundary and in creek to 13th St. Bridge.	Located during fall field studies and field studies for another recent project [Irwin and Soltz, 1984].
Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsoni*)	FE					X	Found in upstream habitats of San Antonio Creek to 13th St. Bridge and above Barka Slough.	Located during fall field studies and field studies for other recent projects [Irwin and Soltz, 1982; PLUS, 1984].

Table 5.2-6A
(continued)

RARE SPECIES POTENTIALLY AFFECTED BY USE OF THE PROPOSED, PRIMARY OR ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES AND THE PROPOSED ROUTE FROM THE LOMPOC SITE TO THE ORCUTT PUMP STATION

Species Name	Status[1]	Potentially Affected By					Known or Expected Occurrence in Project Area	Evidence for Presence
		Prop.[2] to 4 (1)	Alt. to 4 (2)	Prim. to 8 (3)	Alt. to 8 (4)	Lompoc to Orcutt (5)		
AMPHIBIANS								
California Tiger Salamander (*Ambystoma tigrinum californiense*)	CR					X	Expected at Barka Slough and possibly in other Project Area wetlands. [Dial, 1980]	Presence unverified. Spring sampling required to determine if present.
Red-legged Frog (*Rana aurora draytoni*)	CP	X	X	X	X	X	Expected at Barka Slough and several other Project Area wetland habitats. Found in Santa Ynez River near estuary.	Presence unverified at Barka Slough survey. Museum records from Santa Ynez River. Located during spring surveys on Routes (2) and (4).
BIRDS								
California Brown Pelican	FE, SE	X	X	X	X		Regularly rests in groups at mouth of Santa Ynez River. Feeds in nearshore waters. [Lehman, 1982]	Many recent sightings at Santa Ynez River mouth.
Black-shouldered (=White-tailed) Kite	CFP	X	X	X	X	X	Resident and breeder in Project Area. One known nesting site is just inland from Santa Ynez River estuary; others probably exist. [Lehman, 1982]	Sightings of hunting and roosting birds made during fall surveys. Spring surveys located nesting birds at river mouth, Floradale Avenue Bridge and Barka Slough.
Northern Harrier (= Marsh Hawk)	SC-P2, BL	X	X	X	X	?	Resident and probable breeder in Project Area. Nesting sites in Project Area have not been located.	Sightings of hunting birds made during fall surveys. Adults with recently fledged young have been seen at the Santa Ynez River mouth. [Lehman, 1982]
Cooper's Hawk	SC-P3, BL	X	X	X	X	X	Resident and probable breeder in riparian and oak woodlands of Project Area. [Lehman, 1982] Nesting sites in Project Area have not been located.	Recent sightings and breeding records from Vandenberg AFB. Spring surveys did not locate nesting sites in Project Area.

Table 5.2-6A
(continued)

RARE SPECIES POTENTIALLY AFFECTED BY USE OF THE PROPOSED, PRIMARY OR ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES AND THE PROPOSED ROUTE FROM THE LOMPOC SITE TO THE ORCUTT PUMP STATION

Species Name	Status[1]	Potentially Affected By: Prop.[2] to 4 (1)	Alt. to 4 (2)	Prim. to 8 (3)	Alt. to 8 (4)	Lompoc to Orcutt (5)	Known or Expected Occurrence in Project Area	Evidence for Presence
Merlin	SC-P1, BL	X	X	X	X	?	Rare transient and winter visitor at Vandenberg AFB. [Lehman, 1982]	Presence unverified within Project Area.
American Peregrine Falcon	FE, SE	X	X	X	X		Recent sightings at the mouth of the Santa Ynez River suggest that a few birds feed occasionally in this area. These birds probably breed to the north.	Several recent sightings at the mouth of the Santa Ynez River.
Snowy Plover	SC-P2, BL	X	X	X	X		Winter resident and breeder at the mouth of the Santa Ynez River.	Sightings of feeding birds made during fall surveys. Breeding survey in 1978 [Page and Stenzel, 1981] found five pairs breeding at Santa Ynez River mouth.
California Least Tern	FE, SE	X	X	X	X		Summer resident and breeder at Santa Ynez River estuary. River mouth is important post-breeding dispersal locality with up to 20-25 nesting and feeding adults and fledglings regularly noted.	Most recent nesting at estuary in 1983 [Bevier, pers. comm.]. Numerous recent sightings at river mouth sandbar. Feed in estuary and rarely noted upriver.
Burrowing Owl	SC-P2, BL	X		X			Good habitat is found along routes (1) and (3) between landfall and the Lompoc Federal Correctional Institution.	Presence unverified. Not sighted during fall or spring surveys.
Long-eared Owl	SC-P2					X	Appropriate nesting habitat occurs at Barka Slough.	Presence unverified. Not located during spring surveys.
Willow Flycatcher	SC-P1, BL	X	X	X	X	X	Appropriate nesting habitat occurs at Barka Slough and along Santa Ynez River.	Breeding unverified, unlikely. Late spring surveys required.
Tree Swallow	RRD	X	X	X	X	X	Summer resident and breeder at Barka Slough and along Santa Ynez River.	Spring surveys found breeding birds at Barka Slough and Santa Ynez River from mouth to Lompoc.

Table 5.2-6A
(continued)

RARE SPECIES POTENTIALLY AFFECTED BY USE OF THE PROPOSED, PRIMARY OR ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES AND THE PROPOSED ROUTE FROM THE LOMPOC SITE TO THE ORCUTT PUMP STATION

Species Name	Status[1]	Potentially Affected By: Prop.[2] to 4 (1)	Alt. to 4 (2)	Prim. to 8 (3)	Alt. to 8 (4)	Lompoc to Orcutt (5)	Known or Expected Occurrence in Project Area	Evidence for Presence
Swainson's Thrush	RRD	X	X	X	X	X	Summer resident and breeder at Barka Slough and along Santa Ynez River.	Spring surveys found breeding birds at Barka Slough and Santa Ynez River from mouth to Lompoc.
Warbling Vireo	RRD	X	X	X	X	X	Summer resident and breeder at Barka Slough and along Santa Ynez River.	Spring surveys found breeding birds at Barka Slough and Santa Ynez River from mouth to Lompoc.
Yellow Warbler	BL	X	X	X	X	X	Summer resident and breeder at Barka Slough and along Santa Ynez River.	Spring surveys found breeding birds at Barka Slough, Santa Ynez River from mouth to Lompoc and along Harris Canyon drainage.
Wilson's Warbler	RRD	X	X	X	X	X	Summer resident and breeder at Barka Slough and along Santa Ynez River.	Spring surveys found breeding birds at Barka Slough and Santa Ynez River from mouth to Lompoc.
Yellow-breasted Chat	SC-P2	X	X	X	X	X	Breeds uncommonly at Barka Slough and possibly in other Project Area riparian habitats.	Breeding birds found at Barka Slough and along Santa Ynez River during spring surveys.
Blue Grosbeak	RRD	X	X	X	X	X	Breeds at Barka Slough and possibly in other Project Area riparian habitats.	Recent breeding records from Barka Slough [Webster, 1980]. Spring surveys found breeding birds at Barka Slough.
MAMMALS								
Western Gray Squirrel (*Sciurus griseus*)	RRD					X	Resident breeding population in the Bishop Pine Forest of the Purisima Hills.	Sightings made during fall field surveys.

Table 5.2-6A
(continued)

RARE SPECIES POTENTIALLY AFFECTED BY USE OF THE PROPOSED, PRIMARY OR ALTERNATE PIPELINE ROUTES FROM LANDFALL TO THE LOMPOC DEHYDRATION FACILITY SITES AND THE PROPOSED ROUTE FROM THE LOMPOC SITE TO THE ORCUTT PUMP STATION

Species Name	Status[1]	Potentially Affected By: Prop.[2] to 4 (1)	Alt. to 4 (2)	Prim. to 8 (3)	Alt. to 8 (4)	Lompoc to Orcutt (5)	Known or Expected Occurrence in Project Area	Evidence for Presence
Badger (*Taxidea taxus*)	RRD	X	X	X	X	X	Resident in open habitats of Project Area.	Evidence of presence (burrows, scats) noted on all routes during fall surveys.

1 CNPS-1B = California Native Plant Society, List 1B; CNPS-3 = List 3; CNPS-4 = List 4 (lists discussed in Section 2.4.1.2). FC-1, FC-2 = Federal Candidate Species, Category 2 (explanation in Section 2.5); SR = State-listed as rare; SE = State-listed as endangered; FE = Federally-listed as endangered; CR = California regulated species; CP = California protected species; CFP = California fully protected species; SC = Special Concern, P-1,2,3 = Priority 1, 2 or 3 [Remsen, 1978], priorities explained in Section 2.4.2.2; BL = Blue List [Tate and Tate, 1982]; RRD = Regionally rare and declining.

2 Prop. to 4 = Proposed route to proposed Site #4; Alt. to 4 = Alternate route to proposed Site #4; Prim. to 8 = Primary route to alternate Site #8; Alt. to 8 = Alternate route to alternate Site #8; Lompoc to Orcutt = Proposed route from Lompoc site to Orcutt Pump Station. N = Nearby, but probably not affected by project.

Table 5.2-8A

DRAINAGE OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED PIPELINE ROUTE FROM THE PROPOSED LOMPOC DEHYDRATION FACILITY SITE TO THE ORCUTT PUMP STATION
(see also Figure 5.1-1)

Drainage No. & Type	Drainage Name/Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
1-17 (E)	Unnamed. Erosional ravine with Coastal Sage Scrub and Black-flowered Figwort.	Construction: Removal of Coastal Sage Scrub and Black-flowered Figwort, (a) increased erosion and sedimentation and (b) noise will disrupt activities of some local wildlife species. Vegetation: Class II - regional. Wildlife & Aquatics: Class III. Accidents: Oil spill could affect local area. Vegetation, Wildlife & Aquatics: Class II - local.	1. Revegetate pipeline scars with local native plants. 2. Inspect pipeline frequently. 3. Develop oil containment and clean-up plans. 4. Construct this segment between September and November to avoid spring breeding (birds) and rainy seasons. 5. Keep disturbance corridor as narrow as possible.
1-19 (I)	San Antonio Creek. Disturbed sandy streambed with scattered colonies of native wetland plants on margins. Unarmored threespine stickleback occurs upstream and downstream and tidewater goby occurs downstream from pipeline crossing. Barka Slough, one of the County's largest and most biologically important remaining riparian/wetland complexes, is located about one mile downstream from pipeline crossing. Regionally rare amphibians and birds* breed at Barka Slough.	Construction: Removal of wetland plants, (a) above which could affect unarmored threespine stickleback and other species at Barka Slough, and (b) above. Vegetation: Class III. Wildlife & Aquatics: Class III - Class II, regional. Accidents: Oil spill could affect Barka Slough, especially aquatic biota, including unarmored threespine stickleback. Vegetation, Wildlife & Aquatics: Class II, local to regional (depending upon extent of spill).	1-3,5 above. 6. Construct this segment between May and November to avoid rainy season. 7. Install block valves on both sides of San Antonio Creek crossing. 8. If dewatering is necessary, filter water through sediment trap before returning to creek. 9. Store boom nearby that would be deployed to inhibit oil movement in case of a spill. 10. Realign route to east side of Highway 1. 11. Use thicker, factory-coated pipe at creek crossing. 12. Install special cathodic protection system from south side of creek to north of Harris Canyon tributaries.
1-21 (I/P)	Harris Creek, west of Highway 1. Scattered willows on banks of stream that supports other wetland vegetation, including many native species. Tributary to San Antonio Creek.	Construction: Removal of native wetland vegetation and Black-flowered Figwort, (a) which could affect unarmored threespine stickleback and other species at Barka Slough, and (b) above. Vegetation, Wildlife & Aquatics: Class III - Class II, regional.	1-5,8,9, 10, 11, above. 13. Special soil stabilization and revegetation procedures will be necessary on steep slopes
1-22 (I/P)	Harris Creek, east of Highway 1. Riparian woodland dominated by oak trees and willows, shrubby riparian vegetation and Black-flowered Figwort on steep banks of stream. Tributary to San Antonio Creek.	Accidents: Oil spill could affect Barka Slough, especially aquatic biota, including unarmored threespine stickleback. Vegetation, Wildlife & Aquatics: Class II, local to regional (depending upon extent of spill).	

Table 5.2-8A
(continued)

DRAINAGE OF SPECIAL BIOLOGICAL SIGNIFICANCE CROSSED BY THE PROPOSED PIPELINE ROUTE FROM THE PROPOSED LOMPOC DEHYDRATION FACILITY SITE TO THE ORCUTT PUMP STATION
(see also Figure 5.1-1)

Drainage No. & Type	Drainage Name/Reasons for Significance	Anticipated Principal Impacts	Potential Mitigations
1-25 (I) 1-26 (I) I-27 (E) I-28 (E) I-29 (I)	Upper Harris Creek. Sandy streambeds and drainage ditch tributaries, some weedy and disturbed, with scattered willows and other native wetland plants. Tributary to San Antonio Creek.	Construction: Removal of native wetland vegetation, (a) which could affect unarmored threespine stickleback and other species at Barka Slough, and (b) above. Vegetation, Wildlife & Aquatics: Class III - Class II, regional. Accidents: Oil spill could affect Barka Slough, especially aquatic biota, including unarmored threespine stickleback. Vegetation, Wildlife & Aquatics: Class II, local to regional (depending upon extent of spill).	1-5,8,9, 11, 12, 13, above.
1-30 (E/P)	Unnamed Perennial and Seasonal Seeps. Diverse Riparian Woodland and other native wetland vegetation making up one of the most important wetland associations on the proposed pipeline corridor. Supports uncommonly collected Small-flowered Petunia and provides breeding habitat for regionally rare Yellow Warbler.*	Construction: Removal of native wetland vegetation, (a) and (b) above. Vegetation, Wildlife & Aquatics: Class II, local - regional. Accidents: Oil spill would affect local area. Vegetation, Wildlife & Aquatics: Class II, local - regional.	1-5 above. 14. Install pipeline immediately adjacent to Graciosa Road, or preferably realign route to east side of road south of seeps to avoid wetland habitat.
1-35 (E/P) 1-36 (E) 1-41 (E) 1-42 (E)	Graciosa Canyon Drainage. Perennial seeps and ephemeral stream with Riparian Woodland and shrubland including many native wetland plants. Steep banks with high erosion potential. Provides breeding habitat for regionally rare Yellow Warbler.* Drainage 1-42 currently heavily disturbed. Tributary to Orcutt Creek.	Construction: Removal of native wetland vegetation, (a) and (b) above. Vegetation & Wildlife: Class II, local - regional. Aquatics: Class III. Accidents: Oil spill would affect local area and could reach Orcutt Creek. Vegetation, Wildlife & Aquatics: Class II, local to regional (depending upon extent of spill).	1-5,8, 13, above. 15. Clean up dumped materials and restore native wetland habitat in highly disturbed 1-42. wetland habitat in highly disturbed 1-42.

9.0.23

1. Numbers correspond to those used in figures in this Technical Appendix and in Onshore Water Technical Appendix C; E = ephemeral, I =intermittent, P = perennial.
* (e.g., Red-legged Frog, California Tiger Salamander, Tree Swallow, Swainson's Thrush, Warbling Vireo, Yellow Warbler, Wilson's Warbler, Yellow-breasted Chat, Blue Grosbeak and possibly, Long-eared Owl and Willow Flycatcher.

Page 247, para. 4, sentences 3 and 4.
replace with:

"Coast Live Oak trees on the edge of the site would have to be trimmed so that branches would be more than 3 feet above the ground, and ground vegetation would have to be cut to 6 inches or less, according to policies of the Santa Barbara County Fire Department. Impacts to these oaks would therefore be Class III."

Page 261, end of para. 3.
add new sentence:

"Results of spring surveys are presented in the revised version of Table 5.2-6. (See additions to pages 233-239.)"

Page 275, end of para. 4.
add new sentence:

"Results of spring surveys are presented in the revised version of Table 5.2-6. (See additions to pages 233-239.)"

Page 285, end of para. 2.
add new sentences:

"The results of field studies and additional analyses of the Mitigating Realignment are presented in Chapter X, Supporting Information, Section 10.1.4. This section also discusses the Northern Mitigated Pipeline Route, a mitigating realignment of the proposed route, which was submitted by Union Oil Company after the Draft EIS/EIR was issued."

page 312, end of para. 5
add new references

"Benville, P.E. and S. Korn. 1977. The acute toxicity of six monocyclic aromatic crude oil components to striped bass (<u>Morone saxitilis</u>) and bay shrimp (<u>Crago franciscorum</u>). Cal. Fish. and Game 63:204.

"Bjorn, T.C., M.A. Brusven, M.P. Molnau, and others. 1977. Transport of granitic sediment in streams and its effects on insects and fish. University of Idaho, For., Wildl. and Range Stn., Bull. #17, 43p."

page 312, end of para. 8
add new references:

"Burns, J.E. 1970. Importance of streamside vegetation to trout and salmon in British Columbia. Dept. Res. and Conserv., Vancouver Is. Reg., Fish and Wildl. Br., Fish. Tech. Circ. 1: 10pp.

"Burns, J.W. 1970. Spawning bed sedimentation studies in northern California streams. Calif. Fish and Game 56: 253-270."

page 313, end of para. 6
add new reference

"Cordone, A.J. and D.E. Kelley. 1961. The influence of inorganic sediment on the aquatic life of streams. Calif. Fish and Game 47: 189-228."

page 313, end of para. 10
add new reference

"Cummins, K.W. 1974. Structure and function of stream ecosystems. Bio. Sci. 224: 631-641."

page 318, end of para. 3
add new reference

"Johnson, R.R. and J.F. McCormick. 1979. Strategies for protection and management of floodplain wetlands and other riparian ecosystems. Proc. of the Sympos. Dec. 11-13, 1978, Callaway Gardens, GA. USDA-FS GTR WO-12."

page 318, end of para. 12
add new reference

"Lemly, A.D. 1982. Modification of benthic insect communities in polluted streams: combined effects of sedimentation and nutrient enrichment. Hydrobiol. 87: 229-245."

page 321, end of para. 9
add new reference

"Pickering, Q.H. and C. Henderson. 1966. Acute toxicity of some important petrochemicals to fish. Wat. Poll. Contr. Fed., J. 38:1419."

Pages 339 through 347.

Replace "Appendix 3" with the following revised version, "Appendix 3A", which includes the results of late winter and spring sampling.

page 350
add the following

"Aquatic Fauna"

"To examine seasonal changes in species composition and to provide a more complete list of aquatic taxa, aquatic habitats along proposed pipeline routes were resampled in the spring of 1985 (April 4 and 6). Sampling sites and methods were the same as in October 1984 with the following additions: (1) With the exception of San Antonio Creek at El Rancho Road, all sites examined in October 1984 were resampled, and the following additional sites were sampled: the Santa Ynez River at the Floradale Avenue Bridge, both springs north of the Lompoc-Casmalia Road on the pipeline route, the permanent pond north of these springs (south side of Site 2), San Antonio Creek just above its intersection with Highway 1, Harris Creek, Graciosa Creek at the Orcutt Pump Station, Oso Flacko Lake, and the salt pond near landfall just north of the mouth of the Santa Ynez River. Several of these sites, including San Antonio Creek at Highway 1, Harris Creek, Graciosa Creek at the Orcutt Pump Station, and the salt pond near landfall, were dry in October 1984. Because of the mild 1984-85 winter, none of the vernal pools along the pipeline routes filled with water this year. (2) To supplement hand net sampling for fish, I seined the larger, perennial waters along the pipeline routes, including the Santa Ynez River at Floradale Avenue, the 13th Street

APPENDIX 3A

BIRDS OBSERVED OR EXPECTED TO OCCUR
WITHIN THE PROJECT AREA

SPECIES	SEASONAL STATUS				HABITATS								
	SP	SU	AU	WI	RC/SB	CS	G	C	OSW	EF	RW	W	AGR
Red-throated Loon[w]	U	R	U	U								U	
Arctic Loon	R	Ca	R	R								R	
Common Loon[1]	U	R	U	U								U	
Pied-billed Grebe[1]	C	C*	C	C								C	
Horned Grebe[1]	U		U	U								U	
Red-necked Grebe				Ca								Ca	
Eared Grebe[1]	C	Ca	C	C								C	
Western Grebe[1]	C	U	C	C								C	
Brown Pelican[1]	R	C	U	R	C								
Double-crested Cormorant[w]	C	U	C	C								C	
American Bittern	U		U	U								U	
Great Blue Heron[1]	C	C*	C	C								C	
Great Egret[1]	U	R	U	U								U	
Snowy Egret[1]	C	U	C	C								C	
Little Blue Heron		Ca										Ca	
Cattle Egret	R		R	R			R				U	U	
Green-backed Heron[w]	U	U?	u	U	U						U	U	
Black-crowned Night Heron[1]	U	U?										U	
White-Faced Ibis			Ca									Ca	
Tundra Swan				Ca								Ca	
Greater White-fronted Goose			Ca	Ca								Ca	
Snow Goose			Ca									Ca	
Brant[s]	R	R	R	R								R	
Canada Goose	R		R	R								R	
Wood Duck	Ca	Ca	R	R							R	R	
Green-winged Teal[1]	C	R	C	C								C	
Mallard[1]	C	C*	C	C								C	
Northern Pintail[1]	C	R*	C	C								C	
Blue-winged Teal	R	R	R	R								R	
Cinnamon Teal[1]	C	U*	C	C								C	
Northern Shoveler[1]	C		C	C								C	
Gadwall[1]	C	C*	C	C								C	
American Wigeon[1]	C	Ca	C	C								C	
Canvasback	R		U	U								U	
Redhead	R		R	R								R	

APPENDIX 3A
(Continued)

BIRDS OBSERVED OR EXPECTED TO OCCUR
WITHIN THE PROJECT AREA

SPECIES	SEASONAL STATUS				HABITATS								
	SP	SU	AU	WI	RC/SB	CS	G	C	OSW	EF	RW	W	AGR
Ring-necked Duck	R		R	R								R	
Greater Scaup	R	Ca	R	R								R	
Lesser Scaup[1]	C	Ca	C	C								C	
Oldsquaw			Ca									Ca	
Black Scoter		Ca	Ca									Ca	
Surf Scoter[1]	U	R	U	U								U	
White-winged Scoter[1]	R	Ca	R	R								R	
Common Goldeneye			Ca									Ca	
Common Merganser			Ca	Ca								Ca	
Red-breasted Merganser[s]	U	U	C	C								U	
Ruddy Duck[1]	C	C*	C	C								C	
Turkey Vulture[1]	C	C?	C	C		U	C	R	C	U	U	C	C
Osprey[1]			R									R	
Black-shouldered Kite[1]	C	C*	C	C		U	C		U		U	C	C
Bald Eagle				Ca								Ca	
Northern Harrier[1]	C	C*	C	C		U	U					C	U
Sharp-shinned Hawk[1]	U		U	U		U	U	R	U	U	U	R	U
Cooper's Hawk[1]	U	U*	U	U		U	U	R	U		U	R	U
Red-shouldered Hawk[1]	C	C*	C	C		U	U	R	C	C	C	U	U
Red-tailed Hawk[1]	C	C*	C	C		C	C	U	C	U	U	C	C
Golden Eagle[s]	Ca	Ca	Ca				Ca					Ca	
American Kestrel[1]	C	C*	C	C		C	C	R	U	U	U	C	
Merlin	R		R	R	R	R	R				R	R	R
Peregrine Falcon			Ca	Ca	Ca		Ca					Ca	Ca
Prairie Falcon	R		R	R	R	R	R					R	R
California Quail[1]	C	C*	C	C		C	U	C	C	C	C		U
Black Rail	Ca											Ca	
Virginia Rail[w]	U	U*	U	U								U	
Sora	U		U	U								U	
Common Moorhen	R		R	R								R	
American Coot[1]	C	C*	C	C								C	
Black-bellied Plover[1]	C	U	C	C	C							C	U
Lesser Golden-Plover		Ca	R									R	
Snowy Plover[1]	C	C*	C	C	C							C	

APPENDIX 3A
(Continued)

BIRDS OBSERVED OR EXPECTED TO OCCUR
WITHIN THE PROJECT AREA

SPECIES	SEASONAL STATUS				HABITATS								
	SP	SU	AU	WI	RC/SB	CS	G	C	OSW	EF	RW	W	AGR
Semipalmated Plover[1]	C	C	C	C	R							C	R
Killdeer[1]	C	C*	C	C	R		U					C	C
American Black Oystercatcher[w]	U	U*	U	U	U								
Black-necked Stilt[w]	U	U*	U	U								U	
American Avocet[1]	U	U	U	R								U	
Greater Yellowlegs[1]	C	C	C	C								C	U
Lesser Yellowlegs[1]	U	R	C	R								C	U
Solitary Sandpiper			R									R	
Willet[1]	C	C	C	C	C							C	
Wandering Tattler[w]	U	R	U	U	U							R	
Spotted Sandpiper[1]	C	U*	C	C	U						U	C	R
Whimbrel[s]	C	U	C	U	C							C	U
Long-billed Curlew[1]	C	C	C	C	C		C					U	C
Marbled Godwit[1]	C	U	C	C	U							C	C
Ruddy Turnstone	U	R	U	R	U							U	
Black Turnstone[w]	C	R	C	C	C							U	
Surfbird	U	R	U	U	U							R	
Red Knot	R	R	R									R	
Sanderling[w]	C	C	C	C	C							C	
Semipalmated Sandpiper		Ca	Ca									Ca	
Western Sandpiper[1]	C	C	C	C	R							C	U
Least Sandpiper[1]	C	C	C	C	U							C	U
Baird's Sandpiper[1]		Ca	R		Ca							R	Ca
Pectoral Sandpiper[1]			R									R	R
Dunlin[1]	U		C	U								C	
Short-billed Dowitcher[1]	C	C	C	R	U							C	U
Long-billed Dowitcher[1]	C	C	C	C								C	U
Common Snipe	U		U	U								U	U
Wilson's Phalarope	U		C									C	U
Red-necked Phalarope[1]	U	U	C		R							C	R
Red Phalarope	Ca		R	Ca	R							R	
Laughing Gull	Ca											Ca	
Franklin's Gull			Ca									Ca	
Bonaparte's Gull[1]	C	R	U	U	R							U	R

APPENDIX 3A
(Continued)

BIRDS OBSERVED OR EXPECTED TO OCCUR
WITHIN THE PROJECT AREA

SPECIES	SEASONAL STATUS				HABITATS								
	SP	SU	AU	WI	RC/SB	CS	G	C	OSW	EF	RW	W	AGR
Heermann's Gull[1]	U	C	C	C	C							C	
Mew Gull[1]	C		U	C	C							C	U
Ring-billed Gull[1]	C	C	C	C	U							C	C
California Gull[1]	C	C	C	C	C							C	C
Herring Gull[1]	U		U	U	U							U	U
Thayer's Gull[1]	U		U	U	U							U	U
Western Gull[1]	C	C?	C	C	C							C	U
Glaucous-winged Gull[1]	C	R	C	C	C							C	C
Black-legged Kittiwake	Ca			Ca	Ca							Ca	
Caspian Tern[s]	U	U	U	Ca								U	
Royal Tern[1]	R	R	U	U								U	
Elegant Tern[1]		C	C									C	
Common Tern	U	U	U									U	
Foster's Tern[1]	U	U	U	U								U	
California Least Tern[s]	C	C*	C		C							C	
Black Tern			Ca									Ca	
Black Skimmer		Ca	Ca									Ca	
Band-tailed Pigeon	R	Ca	R	R					R	R	R		
Rock Dove[1]	C	C*	C	C			U					C	
White-winged Dove			Ca										C
Mourning Dove[1]	C	C*	C	C		U	C	U	C	U	C	C	C
Yellow-billed Cuckoo		Ca									Ca		
Greater Roadrunner[1]	U	U*	U	U		U	U	R	U	U	U	U	U
Common Barn-Owl[s]	U	U*	U	U		U	U	R	U	U	U	U	U
Western Screech-Owl	R	R*	R	R					R	R			
Great Horned Owl[s]	C	C*	C	C		C	C	U	C	C	C	U	C
Burrowing Owl	R		R	R			R					R	R
Long-eared Owl		Ca?									Ca		
Short-eared Owl			R	R			R					R	R
Lesser Nighthawk			Ca										
Common Poorwill	U	U*	U	U		R		U		R			
Black Swift	Ca												
Vaux's Swift	U		U										
White-throated Swift[w]	U	U*	U	U	U			U		U			U

APPENDIX 3A
(Continued)

BIRDS OBSERVED OR EXPECTED TO OCCUR
WITHIN THE PROJECT AREA

SPECIES	SEASONAL STATUS				HABITATS								
	SP	SU	AU	WI	RC/SB	CS	G	C	OSW	EF	RW	W	AGR
Black-chinned Hummingbird[s]	U	U*	R						R	R	U		R
Anna's Hummingbird[1]	C	C*	C	C		C	U	C	C	C	C	R	C
Costa's Hummingbird[s]	C	C*	U			C	U	C	U	U	R		R
Rufous Hummingbird	U		U						R	R	U		U
Allen's Hummingbird[w]	C	C*	U	C		U	R	U	C	U	C		C
Belted Kingfisher[1]	U	U*	U	U	U						U	U	R
Lewis' Woodpecker			Ca						Ca	Ca			Ca
Acorn Woodpecker[1]	C	C*	C	C					C	U	U		R
Red-breasted Sapsucker	R		U	U					U	U	U		U
Nuttall's Woodpecker[1]	C	C*	C	C		U		U	C	C	C		U
Downy Woodpecker[1]	C	C*	C	C					C	U	C		C
Hairy Woodpecker[1]	U	U*	U	U					R	U	U		R
Common Flicker[1]	C	U*	C	C		U	U	U	U	C	C		U
Olive-sided Flycatcher	R		R							R	R		R
Western Wood-Pewee	U	R?	U						U	U	U		U
Willow Flycatcher	R		U							R	U		R
Hammond's Flycatcher	R										R	R	
Western Flycatcher[s]	C	C*	C						U	U	C		U
Black Phoebe[1]	C	C*	C	C		U	U	R	U	U	C	C	C
Say's Phoebe[1]	C	C*	C	C				U	C	U	C		U
Ash-throated Flycatcher[s]	C	C*	U			U	U	U	U	U	C		U
Cassin's Kingbird[s]	U	U*	U	R							R	R	U
Western Kingbird[s]	U	R?	U			R	U	R	R	R	U	U	U
Horned Lark[w]	U	U*	C	C	U	U	U					R	C
Purple Martin	Ca												
Tree Swallow[s]	C	C*	C	U		R	R				C	C	U
Violet-green Swallow[s]	C	C*	C	R		R	R	U	C	C	U	U	U
Northern Rough-winged Swallow[s]	U	U*	U			R	R		R		U	U	U
Bank Swallow	R		R										
Cliff Swallow[s]	C	C*	C		U	C	C	U	C	C	C	C	C
Barn Swallow[s]	U	U*	U		U	R	U	R	R	R	U	U	U
Scrub Jay[1]	C	C*	C	C		R	R	U	C	C	U		C
Yellow-billed Magpie	U	U*	U	U			R		U				U
American Crow[1]	C	C*	C	C	U	C	C	U	C	C	C	C	C

APPENDIX 3A
(Continued)

BIRDS OBSERVED OR EXPECTED TO OCCUR
WITHIN THE PROJECT AREA

SPECIES	SEASONAL STATUS				HABITATS								
	SP	SU	AU	WI	RC/SB	CS	G	C	OSW	EF	RW	W	AGR
Chestnut-backed Chickadee[1]	C	C*	C	C							C		R
Plain Titmouse[1]	C	C*	C	C		U		C	U	C	U		U
Bushtit[1]	C	C*	C	C		C		C	C	C	C		C
Red-breasted Nuthatch[1]	Ca		R	R							R		R
White-breasted Nuthatch	U	U*	U	U					U	U	R		R
Brown Creeper	Ca		R	R					R	R	R		R
Rock Wren[w]			R	R	R	R		R					
Canyon Wren		Ca											
Bewick's Wren[1]	C	C*	C	C		C		C	C	C	C		C
House Wren[1]	U	U*	U	R				R	U	U	U		U
Winter Wren			R	R						R	R		
Marsh Wren[w]	C	U*	C	C							U	C	
Golden-crowned Kinglet	Ca		R	R					R	R	R		R
Ruby-crowned Kinglet[1]	C		C	C		R		U	C	C	C		C
Blue-gray Gnatcatcher[1]	U	R?	U			R	U	R	R	R	U	U	U
Western Bluebird[1]	U	U*	U	U				R	U	U	U		R
Swainson's Thrush[s]	C	C*	U							R		C	
Hermit Thrush[1]	C		C	C		U		U	U	C	C		U
American Robin[1]	C	U*	C	C		U		U	C	U	C		C
Varied Thrush			R	R					R	R	R		
Wrentit[1]	C	C*	C	C		U		C	U	C	U		U
Northern Mockingbird[w]	U	U*	U	U					R		R		U
California Thrasher[1]	C	C*	C	C		C		C	U	U	U		U
Water Pipit[1]	U		C	C	U		U					U	C
Cedar Waxwing[1]	U		U	U				U	U	U	U		U
Phainopepla	R	R?	R					R	R				R
Loggerhead Shrike[1]	C	C*	C	C		C	C	U	U	U	U	C	C
Eurasian Starling[1]	C	C*	C	C		C	C	U	C	C	C	C	C
Solitary Vireo	R		R						R	R	R		R
Hutton's Vireo[1]	C	C*	C	C				R	C	U	C		U
Warbling Vireo[s]	C	C*	C						U	U	C		U
Tennessee Warbler			Ca										
Orange-crowned Warbler[1]	C	U*	C	C		R		R	C	U	C		C
Nashville Warbler	U		R								U		R

9.0.31

APPENDIX 3A
(continued)

BIRDS OBSERVED OR EXPECTED TO OCCUR
WITHIN THE PROJECT AREA

SPECIES	SEASONAL STATUS				HABITATS								
	SP	SU	AU	WI	RC/SB	CS	G	C	OSW	EF	RW	W	AGR
Northern Parula				Ca									
Yellow Warbler[s]	C	C*	C						R	U	C		U
Yellow-rumped Warbler[1]	C		C	C	U	U		U	C	C	C	U	C
Black-throated Gray Warbler	U		U	Ca					U	U	U		U
Townsend's Warbler[1]	U		U	U					U	U	U		U
Hermit Warbler[1]	R		R	Ca					R	R	R		R
Black-throated Green Warbler			Ca										
Palm Warbler			Ca										
Black-and-white Warbler			Ca										
MacGillivray's Warbler	R		U								U		R
Common Yellowthroat[1]	C	C*	C	C		C	C	U	C	C	C	C	C
Wilson's Warbler[s]	C	C*	C	R					R	R	C		R
Yellow-breasted Chat[s]	U	U*	U								U		
Western Tanager[s]	C		U						U	U	C		U
Rose-breasted Grosbeak	Ca	Ca											
Black-headed Grosbeak[s]	C	C*	U						U	U	C		U
Blue Grosbeak[s]	U	U*	U								U		R
Lazuli Bunting[s]	U	U*	U					U	R	R	U		R
Rufous-sided Towhee[1]	C	C*	C	C		U		C	U	C	C		U
Brown Towhee[1]													
Chipping Sparrow	R		R				R		R	R	R		R
Vesper Sparrow	R		R				R						
Lark Sparrow[1]	C	U*	C	C			C		U	R	U		U
Sage Sparrow[1]	R	R	R	R				R					
Savannah Sparrow[1]	C	C*	C	C	U	U	C				R	C	C
Grasshopper Sparrow[s]	U	U*	R				U						
Fox Sparrow[1]	U		U	U				U	R	U	U		R
Song Sparrow[1]	C	C*	C	C		U	U	U	U	U	C	C	C
Lincoln's Sparrow[1]	C		C	C		U	U	R	U	U	C	U	U
Swamp Sparrow[1]			R	R							R		
Golden-crowned Sparrow[1]	C		C	C		C	U	C	U	C	C		U
White-crowned Sparrow[1]	C	C*	C	C		C	C	C	C	C	C	U	C
Dark-eyed Junco[1]	C	U*	C	C		R	U	U	C	C	U		U

9.0.32

APPENDIX 3A
(continued)

BIRDS OBSERVED OR EXPECTED TO OCCUR
WITHIN THE PROJECT AREA

SPECIES	SEASONAL STATUS				HABITATS								
	SP	SU	AU	WI	RC/SB	CS	G	C	OSW	EF	RW	W	AGR
Red-winged Blackbird[1]	C	C*	C	C		U	C		U	U	C	C	C
Tricolored Blackbird	U	U?	U	U			R				U	U	U
Western Meadowlark	C	C*	C	C		U	C					U	C
Yellow-headed Blackbird	R		Ca									R	R
Brewer's Blackbird[1]	C	C*	C	C		C	C	U	C	C	C	C	C
Brown-headed Cowbird[1]	C	C*	C	C					R		C	C	R
Hooded Oriole	R	R?	R								R		R
Northern Oriole[s]	U	U*	U						U	U	U		U
Purple Finch[1]	C	C*	C	C				R	U	C	C		U
House Finch[1]	C	C*	C	C		C	C	C	C	C	C	U	C
Pine Siskin[w]	R		R	R					R	R	R		R
Lesser Goldfinch[1]	C	C*	C	C		C	C	C	C	C	C	U	C
Lawrence's Goldfinch[s]	U	R	R	R				R	R	R	U		R
American Goldfinch[1]	C	C*	C	C		U	C	U	C	C	C	U	C
House Sparrow[1]	C	C*	C	C									C

KEY TO ABBREVIATIONS

SEASONS:

SP - Spring [March 1 - May 31]
SU - Summer [June 1 - July 31]
AU - Autumn [August 1 - November 30]
WI - Winter [December 1 - February 28]

HABITATS:

RC/SB - Rocky Coast/Sandy Beach
CS - Coastal Scrub
G - Grasslands
C - Chaparral
OSW - Oak Woodland and Savannah
EF - Evergreen Forests
RW - Riparian Woodland
W - Wetlands [Saltwater and Freshwater]
AGR - Agricultural and Modified Habitats

APPENDIX 3A
(continued)

BIRDS OBSERVED OR EXPECTED TO OCCUR
WITHIN THE PROJECT AREA

KEY TO ABBREVIATIONS

ABUNDANCE:	C	-	Common [5 or more individuals/day]
	U	-	Uncommon [1-4 individuals/day]
	R	-	Rare [1-5 sightings/season]
	Ca	-	Casual [Less than 5 sightings ever]
BREEDING:	*	-	Definitely has nested in Project Area in past ten years.
	?	-	Possibly has nested in Project Area in past ten year.

[T] Observed in Project Area during study (September to October 1984-May 1985) by project team biologists.
[w] Additional species observed in Project Area during January to February 1985 by project team biologists.
[s] Additional species observed in Project Area during April to May 1985 by project team biologists.

Bridge, and Ocean Park, and San Antonio Creek at Lompoc-Casmalia Road and just below Barka Slough. Zooplankton tows were taken in lentic (still water) habitats, including the mouth of the Santa Ynez River, the perennial pond (Site 2), and Oso Flacko Lake, and kick or sweep samples were taken with a hand net at all sites.

"A list of taxa collected at each site is presented in Appendix 4A. In general, the most widespread taxa were midge (chironomid) larvae, beetles, baetid mayfly nymphs, amphipods (Hyalella azteca), and snails (Physa sp.). True bugs (Hemiptera) and dragonfly and damselfly larvae (Odonata) were also commonly collected. Of special interest was the collection of tidewater gobies (Eucyclogobius newberryi) at the mouth of the Santa Ynez River and in the Santa Ynez River at the 13th Street Bridge. There were some differences in species composition compared to the autumn of 1984, with more beetles and fewer hemipterans being collected in spring 1985. Within the mayfly family Baetidae, the genus Callibaetis was more common in the fall whereas Baetis was more common in the spring. This is not surprising because Baetis prefers faster flows than Callibaetis. A more detailed discussion of the spring 1985 sampling results is presented below. It should be remembered that the winter of 1984-85 was mild, and that we may find a different species composition than that found this year after a winter with more rainfall and flooding.

"From landfall to Site 4 the proposed pipeline could potentially affect the following aquatic habitats: the Santa Ynez River, Santa Lucia Creek, vernal pools, springs and a permanent pond. No vernal pools filled in the winter of 1984-85, and no aquatic taxa were collected in the southern spring north of the Lompoc-Casmalia road in spring 1985. For other habitats our spring 1985 results were generally similar to those reported in previous studies. Damselfly naiads (Argia) and amphipods (Hyalella) were common in the northern spring north of the Lompoc-Casmalia Road in spring 1985, and dipteran (Dixidae, Chironomidae) and caddisfly (Lepidostoma) larvae were also collected. This spring flows through a small canyon into an Azolla marsh at its base. The permanent pond north of these springs contained emergent vegetation, and a variety of invertebrates (water boatmen, backswimmers, mayflies, leeches, midges, and aquatic earthworms). Zooplankton samples contained high numbers of water fleas (Daphnia pulex), copepods (Diaptomus), and rotifers (Brachionus). We collected tadpoles but no fish at this pond; however, other investigators have sighted fish in this pond.

"Santa Lucia Creek below the pipeline crossing contained a higher discharge in spring 1985 than fall 1984. At the pipleine crossing, branches and isolated backwaters of this stream inundated parts of a cattail marsh. Because of the higher flow and the greater diversity of habitats present along this stream in spring 1985, the abundance and diversity of invertebrates was higher in spring 1985 than fall 1984. Littoral water fleas, ostracods, snails, tadpoles, and a variety of insects were collected from this site in spring 1985 (see Appendix 4A).

"The fauna of the Santa Ynez lagoon was similar in fall 1984 and spring 1985; however, water boatmen were much less common in marshy areas in spring 1985 than fall 1984. In April 1985, mysid shrimp and calanoid copepods were extremely abundant in open water areas of the lagoon, and mosquitofish and midges were abundant in marshy areas. Probably owing to higher flows, the diversity of invertebrates in the Santa Ynez River at the 13th Street Bridge was much higher in spring 1985 than fall 1984. A variety of beetles, dragonfly and damselfly naiads, flatworms, snails, baetid mayfly nymphs, amphipods, and midges were collected at this site. A variety of fish species were collected from the Santa Ynez River at Ocean Park and at the 13th Street Bridge, including the tidewater goby. Despite extensive sampling, only one species of invertebrate and no fish were collected from the Santa Ynez River at the Floradale Avenue Bridge. The water at this site was very warm (27o C) and probably contained pollutants from upstream sewage facilities.

"The only additional perennial stream affected by the proposed pipeline route to Alternate Site 8 is Davis Creek. In spring 1985 blackfly larvae, midges, baetid mayfly nymphs, damselfly naiads and a variety of beetles were collected from Davis Creek, near its intersection with the Lompoc-Casmalia Road (see Appendix 4A). All aquatic habitats potentially affected by the alternate pipeline routes to the processing sites are covered above.

"From the Lompoc Dehydration Facility to the Orcutt Pump Station the proposed pipeline will cross San Antonio, Harris, and Graciosa Creeks. In spring 1985 many of the streams crossed by the proposed pipeline contained water. Only parts of Graciosa and Harris Creeks contained water, however, and, in Harris Creek, there was considerable day-to-day variation in flow, probably because this stream is fed by agricultural return flows. A small section of Graciosa Creek adjacent to the Orcutt Pump Station contained water in April 1985 and a variety of beetles, tadpoles, baetid mayfly nymphs, midge and mosquito larvae, and dragonfly and damselfly naiads were collected there. A variety of beetles, dipteran larvae, odonate naiads, true bugs, and an amphipod were collected from the sections of Harris Creek which contained water in April 1985.

"At its intersection with Highway 1, San Antonio Creek looked very polluted. At this site the stream was filled with silt, oil, and suds and had the color of chocolate. Extensive sampling resulted in the collection of only one amphipod at this location in April 1985. Both San Antonio and Harris Creeks, at their confluence, were very muddy in spring 1985. The presence of terrestrial grasses in the channels of these streams suggested that stream flow had risen recently, probably owing to increased irrigation return flows. At this site, near the San Antonio Road Bridge, the aquatic fauna was very depauperate in both streams, consisting of only a few deerfly larvae, snails, amphipods, and beetles. In lower sections of San Antonio Creek, below Barka Slough, the faunal assemblage was much more diverse (see Appendix 4A). In spring 1985 unarmored threespine sticklebacks (Gasterosteus aculeatus williamsoni) and mosquitofish

(Gambusia affinis) were collected from San Antonio Creek just below Barka Slough and at this stream's intersection with the Lompoc-Casmalia Road. A variety of aquatic invertebrates were collected at one or both of these sites, including mayfly nymphs, midge larvae, amphipods, blackfly larvae, flatworms, odonate naiads, leeches, beetles, true bugs, snails, and caddisfly larvae (see Appendix 4A).

"A series of ponds and lakes are located in the dunes west and north of the Santa Maria Refinery. One of these lakes, Oso Flacko Lake, was sampled in April 1985. Common invertebrates found in vegetation at the lake's edge included backswimmers, water boatmen, snails, and amphipods (Hyalella), whereas dominant invertebrates on the lake's mud bottom included another amphipod (Corophium), midge larvae, and aquatic earthworms. The abundant zooplankton were dominanted by water fleas (Daphnia spp.), copepods (Acanthocyclops vernalis), and rotifers (Keratella, Brachionus). We collected mosquitofish in vegetation at the lake's edge, and fishermen were observed catching largemouth bass (Micropterus salmoides). Conversations with fishermen indicate that a variety of sunfish (Centrarchidae) and minnows (Cyprinidae) may be present in this lake."

APPENDIX 4A

FAUNA COLLECTED FROM AQUATIC HABITATS OF THE PROJECT AREA

	SYRM[1] CV	SYRM SM	SYR 13 BR	SYR FB	SLC	DC	LCR SPR	ST 2 PND	SAC LCR	SAC BS-20	SAC SAR	SAC HWY 1	HC	OPS GC	OPS PND	OFL	NLF SP
INSECTA																	
Ephemeroptera																	
Baetidae																	
Callibaetis sp.			X		X			X					X	X	X		
Baetis sp.			X			X			X	X				X			
Leptophlebiidae																	
Paraleptophlebia sp.					X												
Tricorythidae																	
Tricorythodes sp.									X								
Odonata																	
Coenagrionidae																	
Argia sp.						X	X										
Enallagma sp.										X				X			
Ischnura sp.			X		X								X				
Aeshnidae																	
Aeshna or *Anax* sp.			X		X					X			X		X		
Libellulidae																	
Sympetrum or *Erythrodiplax* sp.			X										X	X			
Hemiptera																	
Belostomatidae																	
Abedus indentatus									X								
Belostoma sp.															X		
Corixidae																	
Corisella sp.		X														X	
Sigara sp.					X				X								
Trichocorixa sp.	X	X															X
Unident. corixids			X		X			X					X				
Notonectidae																	
Notonecta sp.								X		X					X	X	
Buenoa sp.								X		X						X	
Veliidae																	
Microvelia sp.						X							X				
Gerridae																	
Gerris sp.													X			X	
Hebridae sp.																	
Merragata sp.									X								

APPENDIX 4A
(continued)

FAUNA COLLECTED FROM AQUATIC HABITATS OF THE PROJECT AREA

	SYRM[1] CV	SYRM SM	SYR 13 BR	SYR FB	SLC	DC	LCR SPR	ST 2 PND	SAC LCR	SAC BS-20	SAC SAR	SAC HWY 1	HC	OPS GC	OPS PND	OFL	NLF SP
INSECTA (continued)																	
Saldidae																	
Unident. sp.					X												
Trichoptera																	
Hydropsychidae																	
Hydropsyche sp.										X							
Hydroptilidae																	
Ochrotrichia sp.									X								
Sericostomatidae																	
Gumaga nigricula					X												
Lepidostomatidae																	
Lepidostoma sp.							X										
Coleoptera																	
Dytiscidae																	
Agabus sp.			X		X	X				X				X			
Deronectes sp.			X		X	X			X	X			X	X			
Liadessus sp.									X				X	X			
Rhantus sp.	X												X				
Unident. dytiscids						X					X		X				
Dytiscus sp.													X				
Hydrophilidae																	
Laccobius sp.						X			X	X				X			
Tropisternus sp.			X			X			X	X	X		X				
Berosus sp.					X												
Hydrobius sp.													X	X			
Unident. hydrophilids					X												
Enochrus sp.									X								
Staphylinidae			X						X								
Dryopidae																	
Helichus sp.			X			X					X						
Hydraenidae																	
Ochthebius sp.					X												
Haliplidae																	
Peltodytes sp.									X								
Unident. haliplids										X							

APPENDIX 4A
(continued)

FAUNA COLLECTED FROM AQUATIC HABITATS OF THE PROJECT AREA

	SYRM[1] CV	SYRM SM	SYR 13 BR	SYR FB	SLC	DC	LCR SPR	ST 2 PND	SAC LCR	SAC BS-20	SAC SAR	SAC HWY 1	HC	OPS GC	OPS PND	OFL	NLF SP
INSECTA (continued)																	
Diptera																	
Chironomidae																	
Rheotanytarsus sp.									X								
Misc. chironomids		X	X		X	X	X	X	X	X			X	X	X	X	X
Culicidae																	
Culex sp.										X			X	X	X		
Anopheles sp.					X												
Dixidae																	
Dixella sp.					X								X	X			
Unident. sp.							X										
Simuliidae																	
Simulium sp.						X			X	X							
Sciomyzidae																	
Unident. sp.					X												
Ephydridae																	
Unident. sp.																	X
Psychodidae																	
Pericoma sp.				X													
Muscidae																	
Limnophora sp.										X							
Tipulidae																	
Unident. sp.										X							
Tabanidae																	
Tabanus sp.											X						
Collembola			X										X	X			
CRUSTACEA																	
Amphipoda																	
Gammaridae																	
Anisogammarus sp.	X	X															X
Talitridae																	
Hyalella azteca			X		X		X	X	X	X	X	X	X			X	

APPENDIX 4A
(continued)

FAUNA COLLECTED FROM AQUATIC HABITATS OF THE PROJECT AREA

	SYRM[1] CV	SYRM SM	SYR 13 BR	SYR FB	SLC	DC	LCR SPR	ST 2 PND	SAC LCR	SAC BS-20	SAC SAR	SAC HWY 1	HC	OPS GC	OPS PND	OFL	NLF SP
CRUSTACEA (continued)																	
Corophiidae																	
Corophium sp.	X															X	
Cladocera																	
Daphnia pulex								X		X[2]						X	
Daphnia magna													X				
Daphnia ambigua[3]																X	
Daphnia sp.[3]																X	
Ceriodaphnia sp.								X								X	
Scapholeberis sp.								X									
Simocephalus sp.					X												
Chydoridae								X									
Copepoda																	
Cyclops vernalis													X		X	X	
Diaptomus sp.								X									
Unident. calanoid	X																
Mysidacea																	
Neomysis mercedis	X	X															
Ostracoda					X			X						X		X	
ROTIFERA																	
Keratella spp.																X	
Unident. rotifers																X	
Brachionus spp.								X								X	
MOLLUSCA																	
Gastropoda																	
Physidae																	
Physa sp.			X		X			X	X	X	X		X	X	X	X	
ACARI					X			X	X				X	X			
TYRBELLARIA			X					X	X	X							

APPENDIX 4A
(continued)

FAUNA COLLECTED FROM AQUATIC HABITATS OF THE PROJECT AREA

	SYRM[1] CV	SYRM SM	SYR 13 BR	SYR FB	SLC	DC	LCR SPR	ST 2 PND	SAC LCR	SAC BS-20	SAC SAR	SAC HWY 1	HC	OPS GC	OPS PND	OFL	NLF SP
ANNELIDA																	
Oligochaeta								X	X	X						X	
Hirudinea																	
Helobdella sp.								X		X							
AMPHIBIANS																	
Hyla sp.					X	X		X						X	X		
Unident. tadpoles			X										X				
FISHES																	
Gambusia affinis	X	X	X						X	X						X	
Gasterosteus aculeatus williamsoni									X	X							
Gasterosteus aculeatus microcephala			X														
Pimephalas promelas			X														
Eucyclogobius newberryi	X		X														
Atherinops affinis	X																

1 SYRM/CV = Santa Ynez River mouth, channel vegetation; SYRM/SM = Santa Ynez River mouth, salt marsh; SRY/13 BR = Santa Ynez River/13th Street Bridge; SYR/FB = Santa Ynez River/Floradale Bridge; SLC = Santa Lucia Creek; DC = Davis Creek; LCR/SFR = Spring along route north of Lompoc-Casmalia Road; ST 2/PND = Pond, South side of Site 2; SAC/LCR = San Antonio Creek/Lompoc-Casmalia Road; SAC/BS-20 = San Antonio Creek, below S-20; SAC/SAR = San Antonio Creek/San Antonio Road; SAC/HWY 1 = San Antonio Creek, just above intersection with Highway 1; HC = Harris Creek; OPS/GC = Orcutt Pump Station/Graciosa Creek; OPS/PND = Orcutt Pump Station/Pond; OFL = Oso Flacko Lake; NLF/SP = Salt Pond near Landfall, Surf.

2 Water fleas (*Daphnia pulex*) and mosquito larvae (*Culex* sp.) were collected from small isoldated pockets left by receding stream waters, not from the stream itself.

3 The *Daphnia* fauna of California is poorly known, and many specimens do not fit available keys. The "*D. ambigua*" collected from Oso Flacko Lake have characteristics of both *D. ambigua* and *D. parvula*, and the *Daphnia* sp. in this lake most closely resembles *D. catawba*, which has only been reported from the northeastern United States and eastern Canada.

page 11, para. 4
replace paragraph with: "The Cultural Resources stipulation is applicable to all Santa Maria Basin leases. When invoked by MMS, this requires operators to mitigate any potential impacts to cultural resources through: 1) employment of operational procedures designed to protect the resources; 2) site relocation, or 3) more intensive surveying.

page 24, para. 2, line 6
insert "although additional isolated burials may exist." after "areas"

page 24, para. 6, line 3
insert "were" before "developed"

page 29, para. 2, line 3
replace "when it was transferred to the Navy" with "when the southern portion of the present Vandenberg AFB was transferred to the Navy and the northern portion was transferred to the Air Force."

page 30, para. 2, line 10
change "1980" to "1981"

page 31, last line
delete "McKay House" and "Designated a local landmark....West"
change "Spanne House" to "Fabing-McKay-Spanne House"

page 31, second column, second line
add "National Register of Historic Places (1978)" after "No. 340"

page 37, lines 7-11
delete "SBa-931 and related information in second, third and fourth columns"

page 41, para 3
under heading "SBa-687" insert
"This site, measuring 155 metrs northeast/southwest and 82 meters northwest/southeast, extends south from the corridor centerline. The surface is characterized by a low density scatter of shellfish fragments, chert flakes and other artifacts including two small round based points and two small round based points and two small concave based points. These points indicate that the site was used after AD 900 and probably after AD 1500. Features containing fire altered rock also were observed at this site in the 1950s by Larry Spanne, and are probably the remains of hearths.

ISOLATE X-2"

page 54, number 85, column 1
delete "represents town of Graciosa."

page 57
replace "Figure 2.3-1" with "Figure 2.3-3"

page 58
replace "Figure 2.3-2" with "Figure 2.3-4"

page 62, para. 4, line 7
change "Hauk" to "Houk"

page 62, para. 4, line 13
delete "and the Spanne House...Artesia"

page 67, para. 1, line 5
delete "was" between minds, and a town

page 67, para. 3, line 7
insert after "tracks." "The earth dam is still visible just east of Gracios Road near the intersection of Highways 1 and 135 and appears on the 360 foot contour of the USGS 7.5' 1959 Orcutt Quadrangle."

page 69
replace "Figure 2.3-3" with "Figure 2.3-1"

page 70
replace "Figure 2.3-4" with "Figure 2.3-2"

page 76, para. 3, line 1
change "Proposed" to "Alternate"

page 79, para. 1, line 9
replace "decayed but stabilized" with "low-profile"

page 79, para. 1, line 10
replace "with" with "among"

page 79, para. 4, line 7
insert after "manufacture" "due to the rapid deterioration of organic construction materials in the marine environment"

page 94, para. 3, lines 9-10
replace "undoubtedly mark...location" with "could exist to mark the exact location of the wharf and the center of the historic activity in association with it."

page 95, para. 1, line 5
change "fiora" to "flora"

page 95, para. 3
delete paragraph

page 96, para. 2, lines 6-7
replace wife's "kin group" with "mother"
and husband's "kin group" with "father"

page 96, para. 2, line 15
delete "but not the residence of"
insert "father's" after "husband's"

page 110, para. 3, line 6
insert after "below" "and isolated burials also may exist."

page 114, column 1, line 11
change "Soup" to "Soap"

page 114, column 1, line 15
change "Montia" to "Claytonia"

page 114, column 2, line 21
change "vulgar" to "vulgare"

page 114, column 2, line 24
change "Matricaria matricarioides" to "Aretostaphylos spp."

page 114, column 3, line 25
insert "Medicinal"

page 114, column 2, lines 26, 30 and 32
change "California" to "californla"

page 114, column 2, line 33
change "Artemisiz" to "Artemisia"

page 114, column 2, line 40
change "Rhus diversiloba" to "Toxicondendron diversilobum"

page 117, para. 3
insert following new paragraph after paragraph 3
"Applicable laws, regulations and policies emphasize avoidance of cultural resources. When this is not possible, testing must be done to determine the significance of sites. As discussed below, significant sites (i.e., those eligible for the National Register of Historic Places) which will be adversely impacted by a project require mitigation. Mitigation options include avoidance, data salvage and a combination of avoidance and data salvage."

page 117, para. 5, line 2
change "60.6" to "60.4"

page 123, para. 5, line 7
insert after "eligibility." "This further testing may indicate that some sites are not significant and therefore, are not eligible."

page 130, para. 1, lines 6-8
delete: "...could have a significant impact" to the end of paragraph.
insert in its place: "...are not likely to have a significant adverse impact since avoidance is required. Indirect Class III impacts, however, could occur to any of the potential resources identified below."

page 130, para. 2, line 8
insert following sentence at end of paragraph
"Avoidance of this feature, however, makes direct impacts unlikely."

page 131, para. 2, line 3
replace "would have Class II" with "could have indirect Class III"

page 133, para. 3, line 6
change "the use" to "these"

page 134, column 4 (Site Extends Through One Half of ROW), line 6
delete "X"

page 134, column 4 (Site Extends Through One Half of ROW), line 7
insert "X"

page 135, para. 3, line 5
replace "Class II" with "Class III due to indirect effects such as masking. No direct adverse impacts are anticipated due to avoidance of sites."

page 136, para. 4
delete paragraph

page 138, para. 2, line 8
insert following at end of paragraph. "Avoidance of potential cultural resources, as required by MMS makes direct, significant impacts unlikely. Indirect Class III impacts may result from Area Study development.

page 138, para. 3, line 1
insert "onshore" after "...all of the"

page 138, para. 3, line 4
insert after "(Class II)" "Indirect Class III impacts also may rsult from offshore development activities."

page 138, para. 3, line 6
insert at end of paragraph. "All cultural resources which are determined to be significant and cannot be avoided, must be mitigated."

page 141, para. 3, line 3
insert after "5.2.2)" "...and must be guided by a defensible and SHPO coordinated research design."

page 141, para. 4, line 7
insert after "lectures" "to construction crews, including supervisors,"

page 141, para. 6, line 6
change "7.2" to "6.2"

page 142, para. 5, line 8

change "Rosewater" to "Reservation," and insert "the Environmental Planning Branch at Vandenberg AFB."

parge 142, para. 5, line 11

insert after "followed;" "and to provide sufficient information for a determination of eligibility for inclusion in the National Register of Historic Places under 36CFR63."

page 143, para. 6, lines 1-2

replace "According...offshore:" with "No mitigation measures in addition to those stipulated by MMS are necessary. These three optios are:"

page 143, para. (c)

insert additional paragraph at end of paragraph (c):
"Within this context, the exact location of the historic Meheren Wharf should be identified through additional survey (e.g., SCUBA reconnaissance) to permit avoidance."

page 145, para. 3, line 6

change "west" to "east"

page 145, para. 5, line 2-3

replace "should be...avoidance" with "are subject to the mitigations allowed by MMS unmder the Notice to Leasees and discussed in Section 5.5.1.2."

page 146, para. 4, line 3

replace "in such cases is avoidance" with "are those allowed by MMS under the Notice to Leasees..."

TECHNICAL APPENDIX H - VISUAL RESOURCES

No revisions.

page 37, para. 5, line 10
insert at end of paragraph after "FAA", "...and cannot be set aside or modified by local jurisdictions. Concerned cities and counties can negotiate local Letters of Agreement with operators and the FAA to address noise concerns and establish specific policies, guidelines and requirements."

page 38,
insert after Reference 7
Federal Aviation Administration. 1983. Noise Assessment Guidelines for New Helicopters. Advisory Circular No. 150/S020-2., U.S. Department of Transportation, Washington, D.C.

page 38
insert after Reference 9
Pybus, Colonel W. 1985. Rotocraft Program. FAA. Washington, D.C. Personal Communication.

page 39
insert after Reference 16
Wesler, John. 1985. Director, Environmental and Energy Division. Federal Aviation Administration, Washington, D.C.

TECHNICAL APPENDIX J - COMMERCIAL FISHING, KELP HARVEST AND MARICULTURE

P. 12 3rd full para., line 2:
add "For 1983," after "Note:".

P. 19 Table 6.0-1:
add the heading "lbs" above the first, third and fifth columns of figures. Add the heading "$" above the second, fourth and sixth columns of figures.

TECHNICAL APPENDIX K - SOCIOECONOMICS
Volume 1

page 1-10, para. 1, line 7
change sentence to: "...increased demand for public facilities and services, especially water, sewage, landfill, fire and police schools."

page 1-10, para. 1, line 9
change sentence to: "...fiscal impacts on local, state and federal governments and special districts."

page 1-11, para. 2, line 1
change "increases" to "decreases."

page 2-154, para. 1, line 3
change second sentence to: "Subsurface sewage disposal is limited by many factors."
add third sentence
"A limited capacity trunkline to Ventura is in use, but it is sized only for existing residents."

page 2-218, para. 4, line 6
change last sentence to: "There are seven mandatory elements:"

change 5 to: "Seismic Safety and Safety"

page 2-219, lines 3 and 4
delete numbers "8" and "9"

Volume 2

page 3-278, line 11
change "Getty" to "Getty*"

page 3-278, line 13
Change "ARCO" to "ARCO*"

page 3-278, last line on page
change to read: "The Getty and ARCO projects are not being pursued at this time."

page 3-279, para. 1, line 10
change "...Table 3.4.5.2, over 800 acres of" to "...Table 3.4.5.2, over 80 acres of"

TECHNICAL APPENDIX L - TRAFFIC

No revisions.

TECHNICAL APPENDIX M - SYSTEM SAFETY AND RELIABILITY

page 1-1, para. 3, line 1
change "This introduction..." to "This introduction and summary..."

page 1-9, line 4 of table
change "120 (minor)" to "45-120 (minor)"

page 1-9, line 5 of table
change "(10 min.)" to "(1 min.)", "140 (minor)" to "15 (minor)", and "83,000" to "25,000"

page 1-14
replace with new page 1-14 (attached)

page 1-15
replace with new page 1-15 (attached)

page 2-22, para. 2, line 2
add to end of first sentence "...for the Project Shamrock Platform"

page 2-23
replace with new pages 2-23 and 2-23a (attached)

page 2-24, para. 1, line 2
change "1.1×10^{-1} per year and 1.1×10^{-5}" to "5.7×10^{-2} per year and 5.7×10^{-6}"
add new paragraph, following line 2, which reads "The fault tree for Platform Irene's pig launcher is given as Figure 2-7a. The use of small bore valves to pressure the launcher and the presence of alarmed valve position indicators which will verify the proper valve sequencing will greatly reduce the likelihood of an improper closure or mechanical defect not being detected before the launcher is at full pressure. The presence of interlocks to prohibit opening the door while the launcher is under pressure requires failure of the interlock. However, there is another concern that while the pig has been safly inserted into the launcher and the launcher has been properly tested, a major mechanical failure causes the door to blow off or open while the pig is being launched. This is very unlikely however. The resulting frequencies of 1-minute and 5-minute spills are estimated as 3.6×10^{-4} per year and 3.6×10^{-8} per year, respectively."

page 2-24, para. 2
change last sentence to "The scenario of mechanical failure is identical to the pig launcher case and the scenario of failing to vent before opening the pig receiver again requires an interlock failure."

page 2-24, para. 3

change second sentence to "It is noted that there are no alarmed valve position indicators on the pig receiver, so that if the operator forgot to pressure up the pig receiver and the main inlet valve were opened quickly it might lead to an oil slug being propelled into the receiver at high speed, rupturing the receiver."

page 2-24, para. 5

change "1.1 x 10^{-1} per year and 1.1 x 10^{-4}" to 3.6 x 10^{-4} per year and 3.6 x 10^{-7}"

page 2-25

replace with new page 2-25 (attached)

page 2-30

replace with new page 2-30 (attached)

page 2-35, para. 4, lines 2-3

change second sentence of para. to "This pig receiver has been assumed to be..."

page 2-38

replace with new page 2-38 (attached)

page 2-45

change "4 pumps" to "2 pumps"; "1.3 x 10^{-5}/yr" to "6.4 x 10^{-6}/yr"; and "77,000" to "156,000"

page 2-46, para. 2, line 1

change "four" to "two" and "two charge pumps" to "one charge pump"

page 2-46, para. 2, line 2

change "two shipping pumps" to "one shipping pump" and "1.3 x 10^{-5}" to "6.4 x 10^{-6}"

page 2-46, para. 3, lines 2-3

change second sentence of para. to "This equipment is assumed to be ..."

page 2-46, para. 3, line 6

change "1.1x10^{-3} per year" to "7x10^{-6} per year, with a 5 minute release being even more unlikely."

page 2-46, para. 4, line 4

change "ruptured tube" to "major leak between passes"

page 2-46, para. 4, line 6

change "ruptured tube" to "major leak"

page 2-47

replace with new page 2-47 (attached)

page 2-48

change "rupture tube" to "major leak"

page 2-49, para. 2, line 1
change "is not yet" to "currently" and "so it has been assumed" to "suggests"

page 2-49, para. 2, line 3
change "is the rapid" to "is the failure to pressure the receiver off the bypass line followed by rapid"

page 2-49, para. 2, lines 6-7
change beginning of sentence to "Mechanical failure of the door as well as a failure..."

page 2-49, para. 2, line 9
change "$4.4x10^{-1}$" to "$2.2x10^{-3}$"

page 2-49, para. 4, line 4
change "two" to "three"

page 2-50
replace with new page 2-50 (attached)

page 2-52
replace with new page 2-52 (attached)

page 2-53, para. 1, line 1
change "will" to "could" and delete "or" at end of line

page 2-53, para. 1, line 3
add "...pig or mechanical failure of the door, The..."

page 2-53, para. 1, line 4
change "$1.1x10^{-3}$" to "$7x10^{-6}$"

page 2-53, para. 3, line 4
change "$2.1x10^{-3}$" to "$7x10^{-6}$"

page 2-53, para. 5, line 1
change "(3,750 bbl)" to "(17,250 bbl maximum spill)"

page 2-54
replace with new page 2-54 (attached)

page 2-63
replace with new page 2-63 (attached)

page 3-12, para. 3, line 3
change line to "have volumes of approximately 140 (Union) to 350 (Exxon) barrels of oil. For the"

page 3-13, para. 2, line 2
change "400" to "200 (Union) to 400 (Exxon)"

page 3-13, para. 2, lines 3-4
change "on estimated 200-bbl spill volume" to "estimated 100 to 200 bbl spill volumes"

page 3-16, line 2
change "Irene: 0.33 x 350 bbl = 120 bbl" to "Irene 0.33 x 140 bbl = 45 bbl"

page 3-16, line 5
change "Irene: 0.50 x 400 bbl = 200 bbl" to "Irene: 0.50 x 200 bbl = 100 bbl"

page 3-48, para. 2, line 5
add "In fact the shipping tank will be less than 10 percent full almost all the time according to Union's plans for operating this tank."

page 3-50, para. 4, line 4
change "5,000" to "23,000"

page 3-53, para. 2, line 4
change "3,750" to "17,250"

page 3-63
change title to "POTENTIAL RELEASE SCENARIOS FROM HIGHWAY TANK VEHICLES"
change "spills" to "scenarios" in first line of note

page 4-11
delete "Irene or" under Scenario 1 and Scenario 2
add "or Shipping Surge Tank - Irene" under Scenario 5

page 4-14, para. 2, line 2
change "providing" to "prevailing"

page 5-9, table 5-2
change "$4x10^{-5}$/yr" to "$4x10^{-6}$/yr" in next to last line in frequency column

page 5-9, table 5-2
delete "10,000 or more" and "4.5×10^{-4}/yr"

page 5-13
delete "Irene or" under Scenario 1 and Scenario 2
add "or Shipping Surge Tank - Irene" under Scenario 5

page 7-2, para. 1, lines 1-3
change first three sentences to "Improve integrity of pig launcher on Project Shamrock Platform. A pig launcher for the interplatform oil pipeline will be located on the Shamrock platform. This should provide..."

page 7-2, para. 2
delete paragraph ("Provide small-bare...")

page 7-3, para. 2, line 1
change "Audits of" to "Audits of all"

page 7-3, para. 3, lines 3-4
change to "...the U.S. Coast Guard has been given preliminary approval by the Intergovernmental Maritime Organization. This extension would aid in avoiding..."

page 7-3, para. 3, line 11
change to "Effectiveness: reduce the risk of oil spills from marine vessel-related casualties."

page 7-4, para. 2
delete paragraph ("Pump out...")

page 7-4, para. 3
delete paragraph ("Develop safety...")

page 7-5, para. 1, line 4
delete "drilling process upsets and"
add "(Simulators are already used for blowout prevention drills.)"

page 7-6, para. 3
delete paragraph ("Provide an interplatform...")

page 7-7, para. 2, line
delete "- Development of safety system testing protocols;"

page 7-7, para. 2, line 7
delete "- Improvements in pig receiver designs;"

page 7-12, para. 2
delete paragraph ("- The two existing...")

page 7-12, para. 6
delete paragraph ("- The primary response...")

page A-7, para. 2, lines 2-3
change to "...follows: The extension of the VTSS has been given preliminary approval by the 1140, and the plan will be presented..."

page D-16, para. 2, line 2
change "1,500" to "500"

page H-5, para. 2
delete paragraph ("- The two existing...")

page H-5, para. 6
delete paragraph ("- The primary response...")

page H-28, para. 2, lines 3-13
delete "The National...State/Federal representatives."

page H-28, para. 3, line 1
do not start as a separate paragraph
change "specific government" to "specific past government"

FIGURE 2-7

SPILL FROM OIL PIPELINE PIG LAUNCHER ON PLATFORM -- SHAMROCK

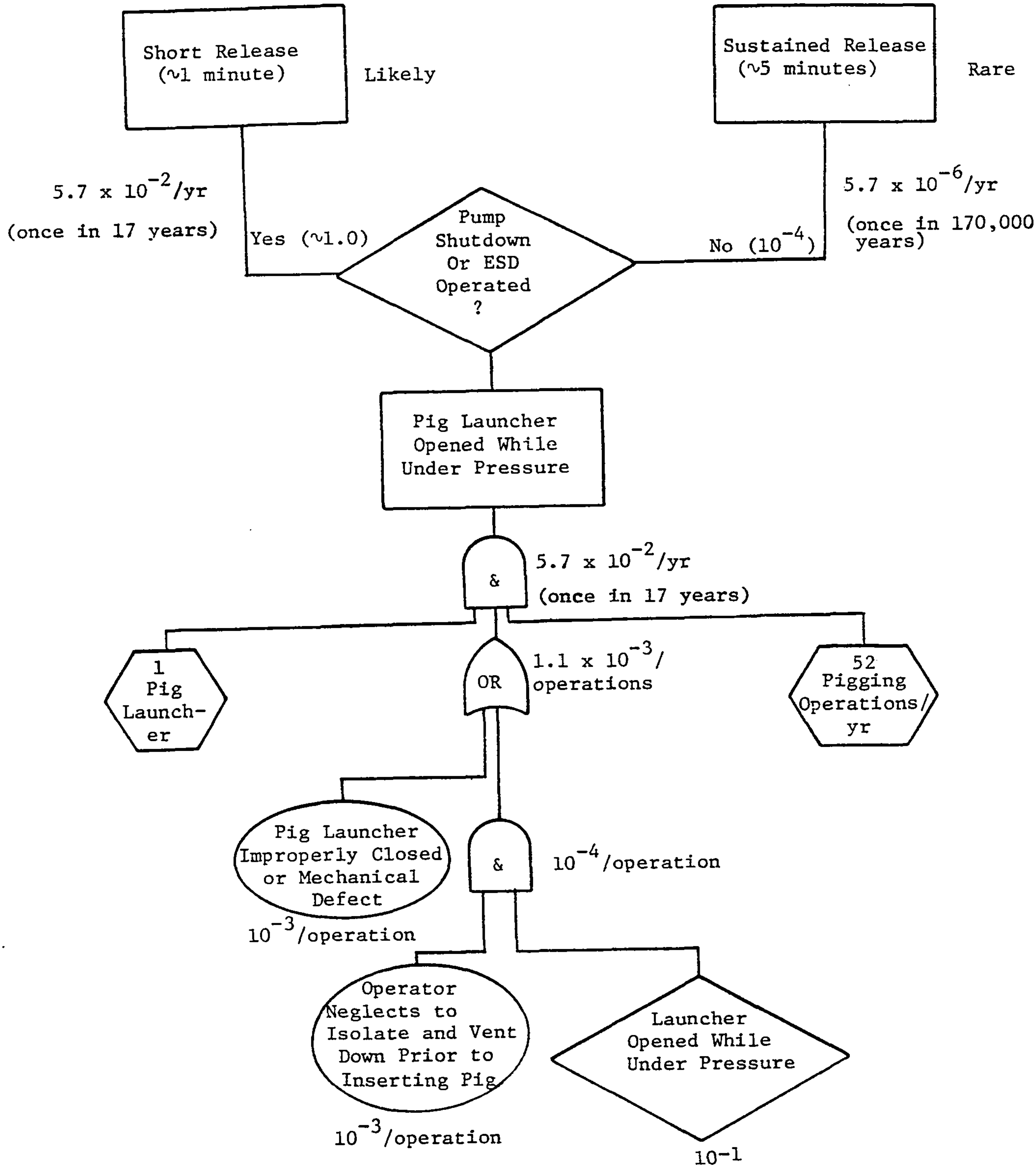


FIGURE 2-7a

SPILL FROM OIL PIPELINE PIG LAUNCHER ON PLATFORM -- IRENE

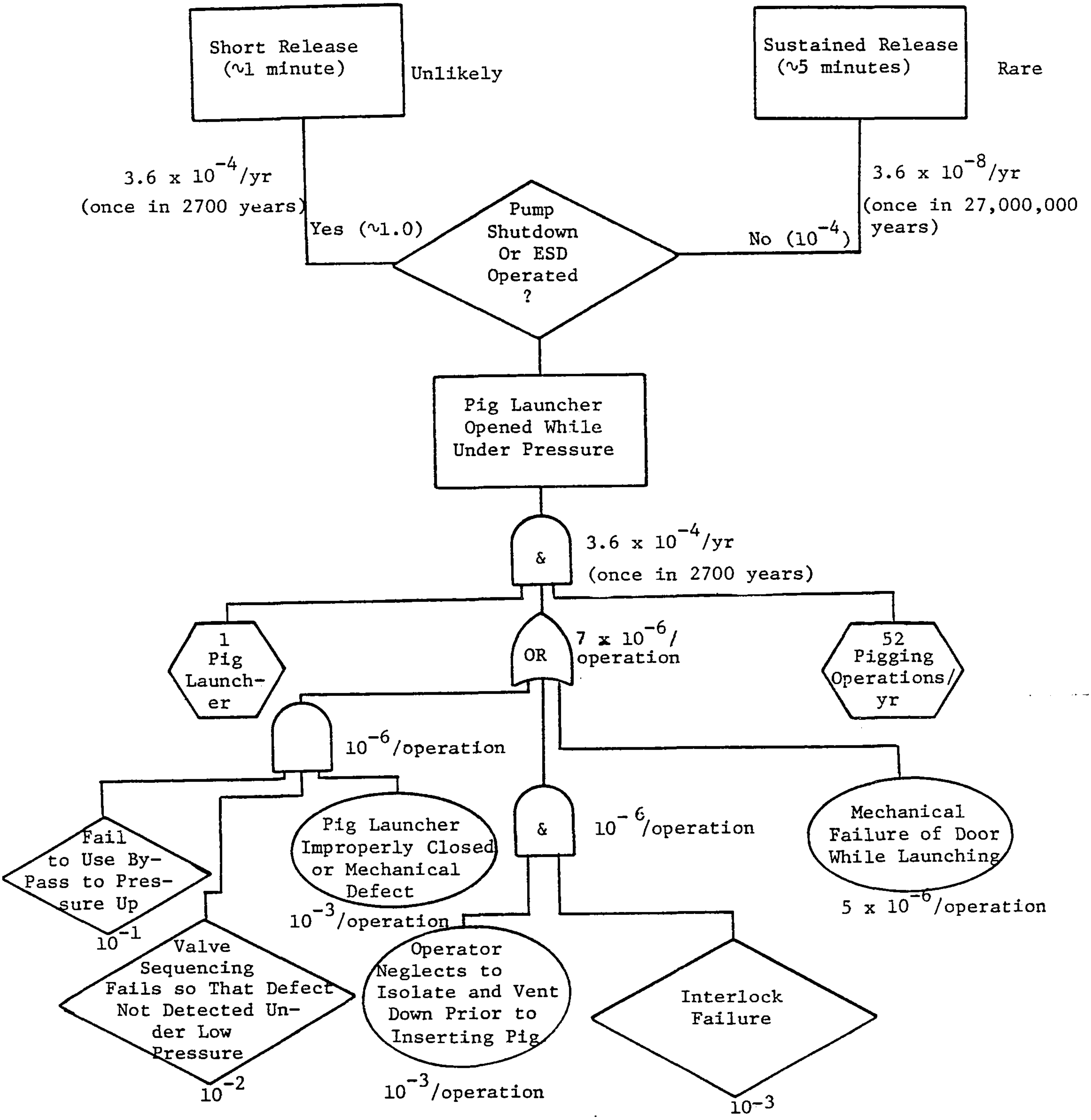


FIGURE 2-8

SPILL FROM INTERPLATFORM OIL PIPELINE PIG RECEIVER -- IRENE

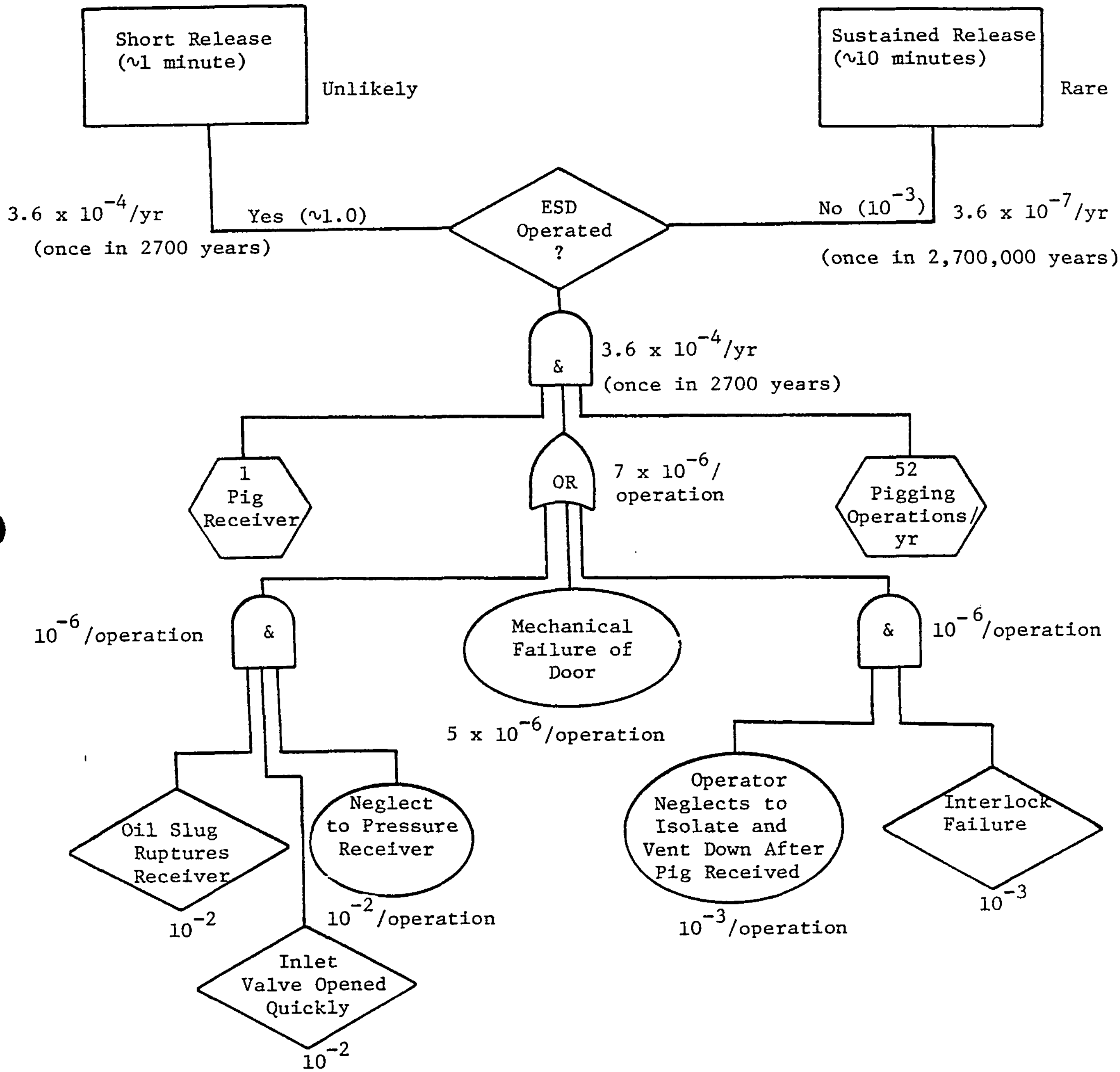


TABLE 2-1

SUMMARY OF PLATFORM ACCIDENTAL EVENTS AND FREQUENCIES

Significance	Accidental Event (Frequency)	Fault Tree
Likely	1 minute spill from pig launcher (5.7×10^{-2}/yr)	2-7/2-7a
	Diesel fuel spill (1.7×10^{-1}/yr)	2-9
Unlikely	Oil spill from blowout (8.1×10^{-3}/yr)	2-2
	1 minute spill from pig receiver (3.6×10^{-4}/yr)	2-8
	Rupture gross separator (1.9×10^{-4}/yr)	2-5
Rare	Rupture surge tank (5.6×10^{-5}/yr)	2-6
	5 minute spill from pig launcher (5.7×10^{-6}/yr)	2-7/2-7a
	Complete platform loss (2×10^{-5}/yr)	2-10
	10 minute spill from pig receiver (3.6×10^{-7}/yr)	2-8

FIGURE 2-11

SPILL FROM OIL PIPELINE PIG RECEIVER AT LOMPOC

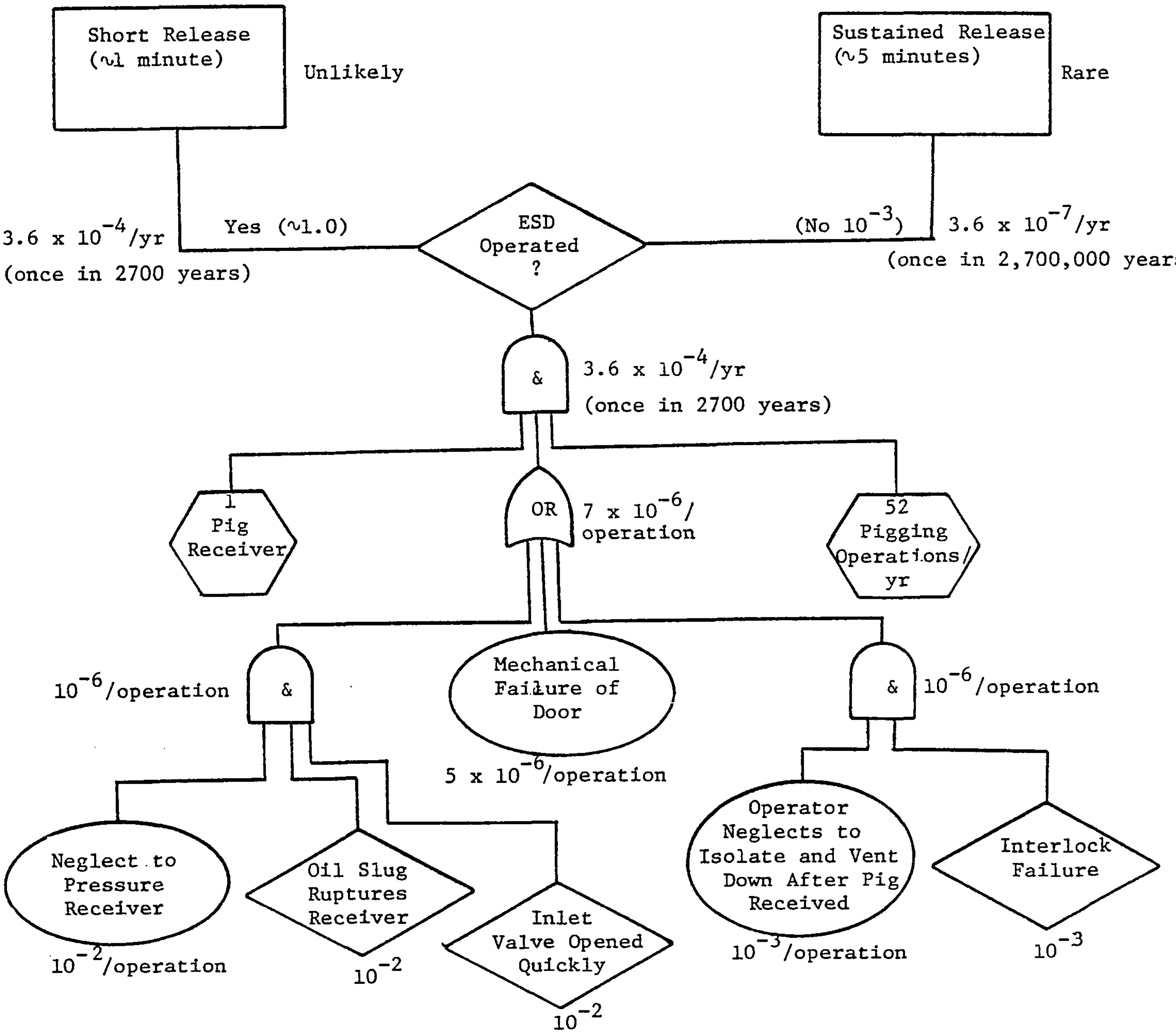
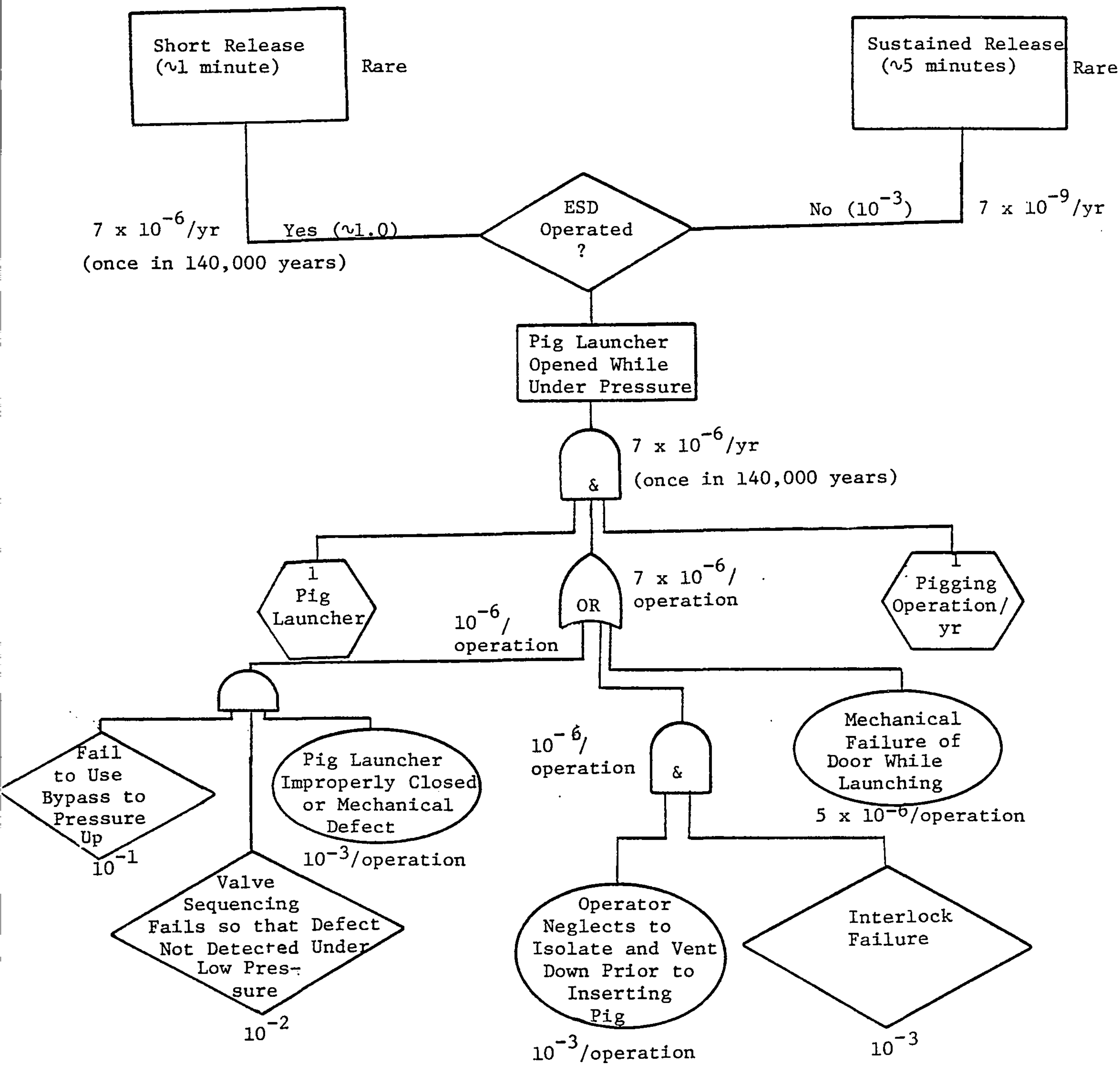


FIGURE 2-17

SPILL FROM DRY OIL PIPELINE PIG LAUNCHER TO ORCUTT



Arthur D. Little, Inc.

FIGURE 2-19

RELEASE FROM GAS PIPELINE PIG RECEIVER AT LOMPOC

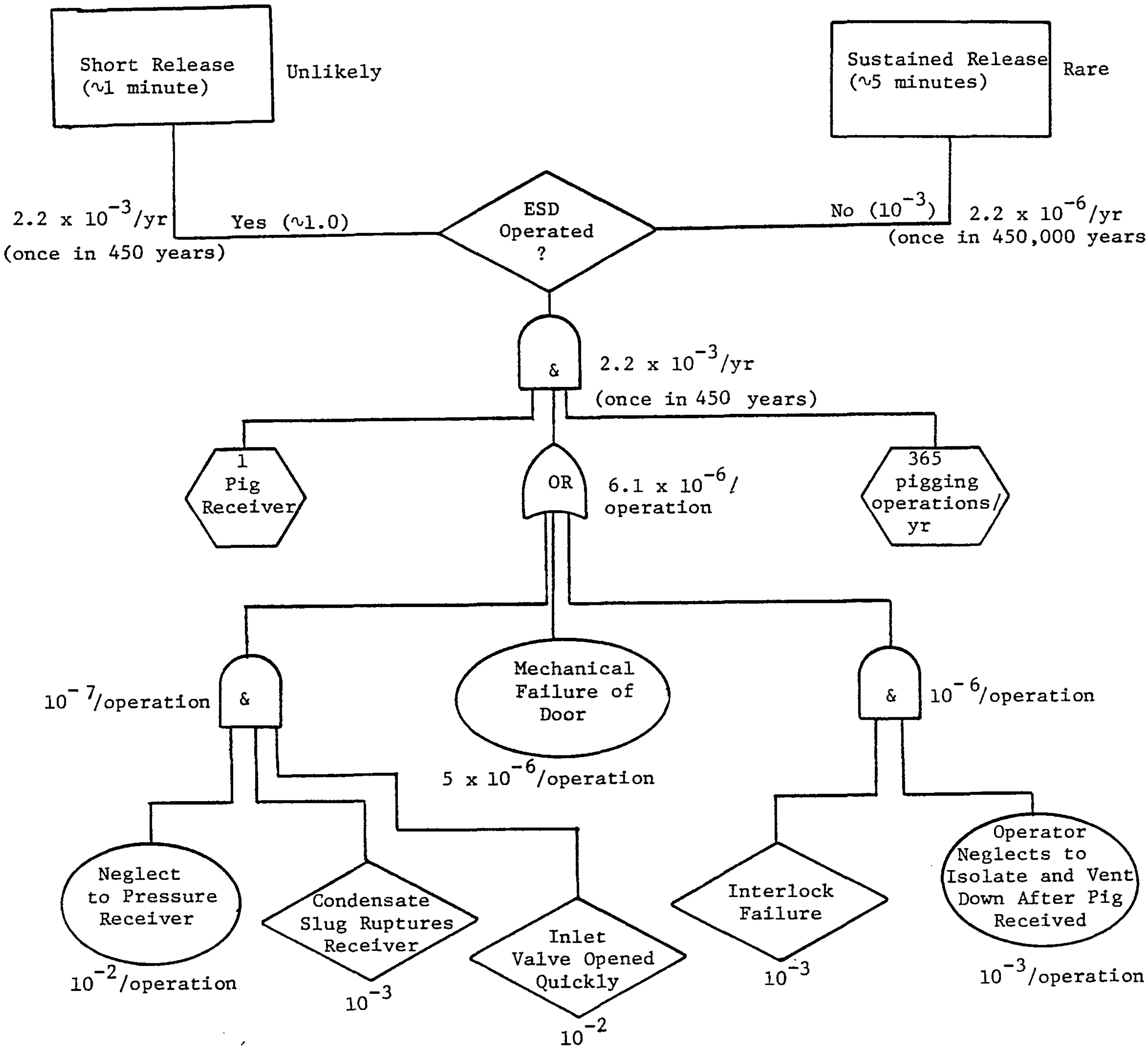


FIGURE 2-21

RELEASE FROM DRY GAS PIPELINE PIG LAUNCHER TO BATTLES

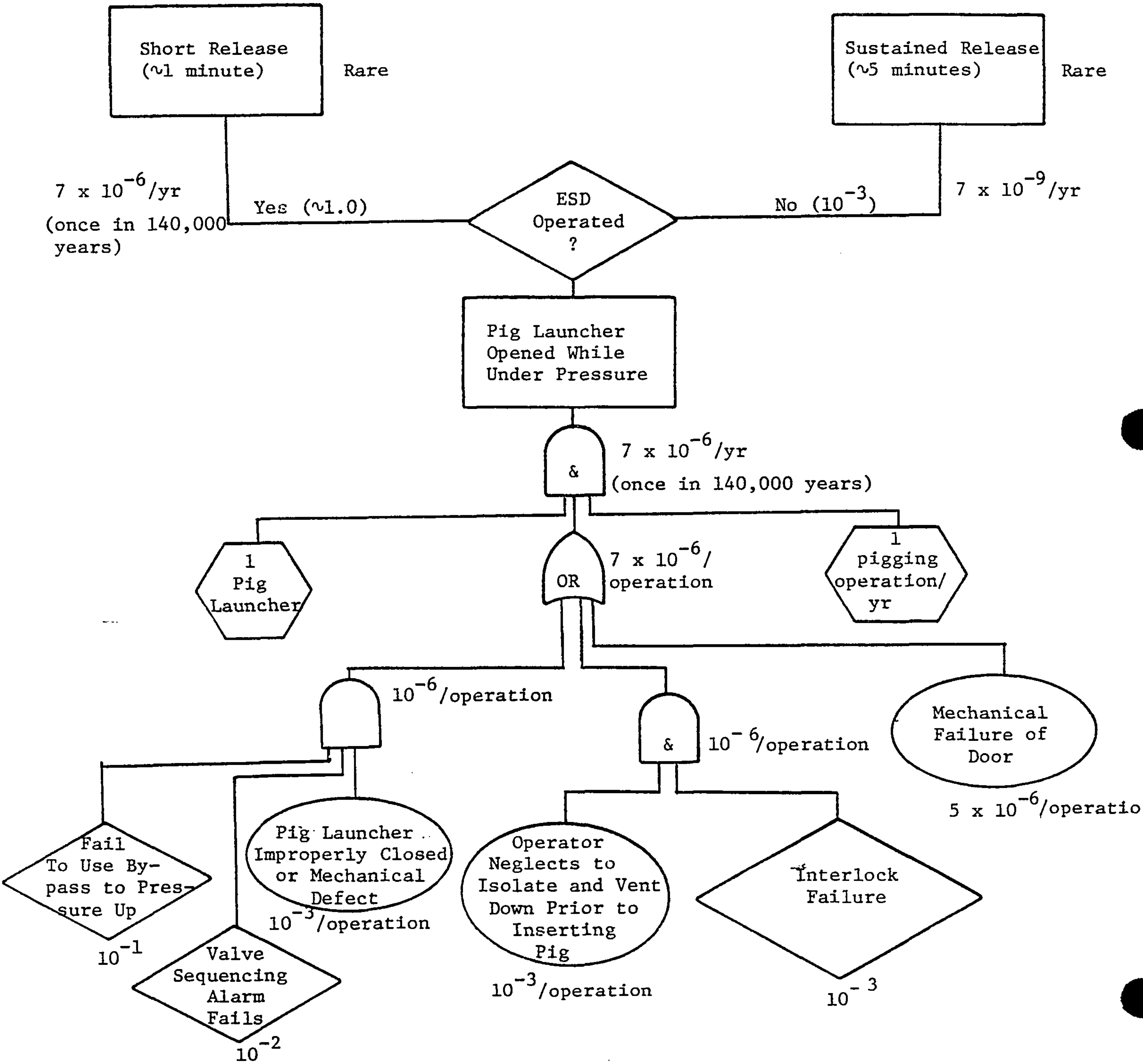


FIGURE 2-22

SPILL FROM OIL PIPELINE PIG RECEIVER -- ORCUTT

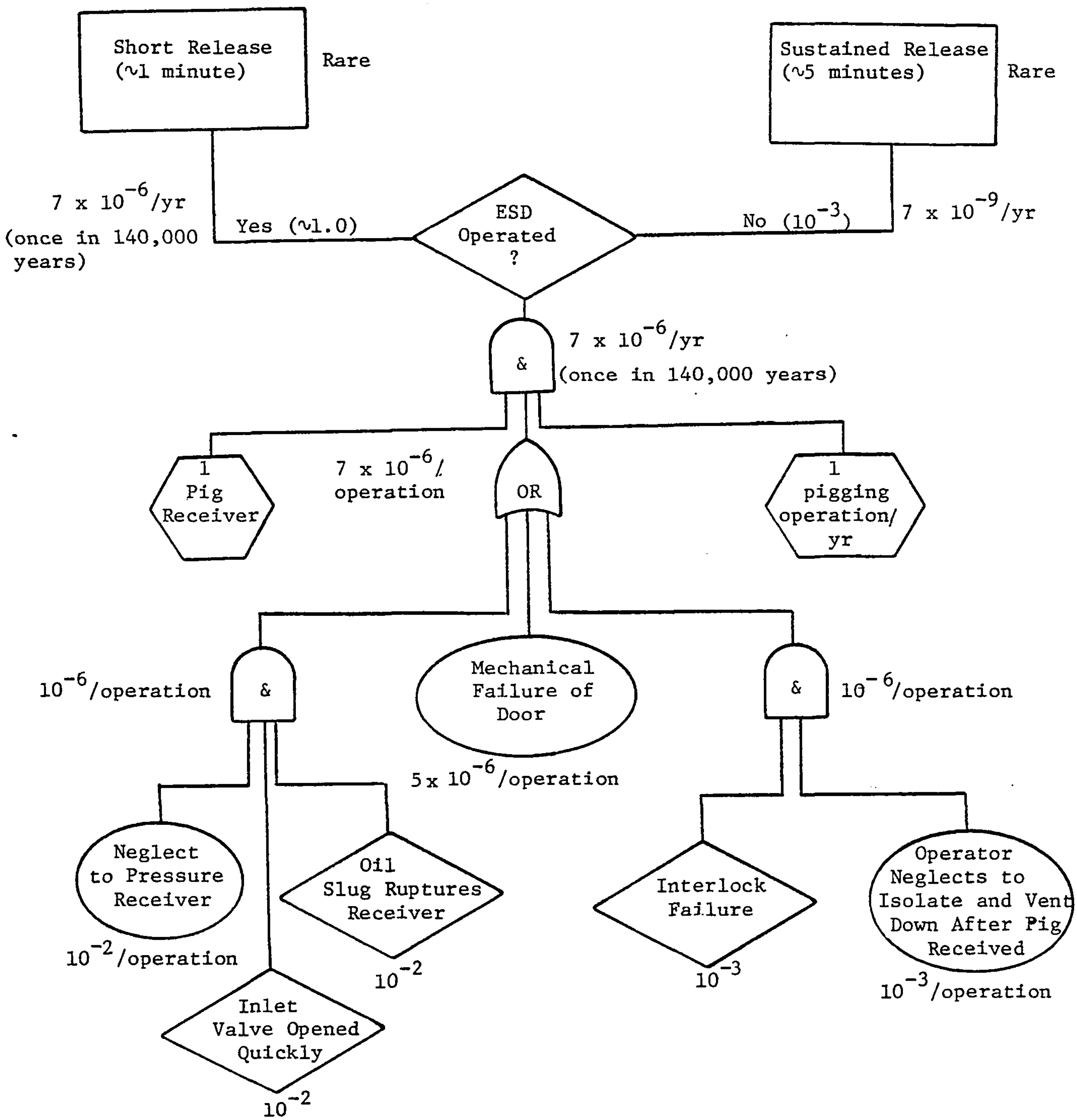


TABLE 2-3

SUMMARY OF PROJECT RELATED ONSHORE FACILITIES
ACCIDENTAL EVENTS AND FREQUENCIES

Significance	Accidental Event (Frequency)	Fault Tree
Likely	Sustained LPG Loading Release (5.6×10^{-2}/yr)	2-24
Unlikely	Lompoc Gas Pig Receiver-1 min (2.2×10^{-3}/yr)	2-19
	Lompoc Oil Pig Receiver-1 min (3.6×10^{-4}/yr)	2-11
	Corrosion-Induced Oil Release (1.3×10^{-3}/yr)	2-12
	Major Fire in Heater-Treater (1.2×10^{-4}/yr)	2-13
	Rupture of Pressure Vessel (1.2×10^{-4}/yr)	2-14
	Rupture of Atmospheric Oil Tank (1.6×10^{-4}/yr)	2-15
	Small Release of Oil in Produced Water (10^{-4}/yr)	2-18
	Gas/Condensate Release through Fitting Breaks (2.1×10^{-3}/yr)	2-20
	LPG Tank Truck BLEVE (1.1×10^{-3}/yr)	2-24
	LPG Tank BLEVE (1.1×10^{-4}/yr)	2-25
Rare	Major Spill from Oil Pumps (6.4×10^{-6}/yr)	2-16
	Lompoc Oil Pig Launcher-1 min (7×10^{-6}/yr)	2-17
	Lompoc Gas Pig Receiver-5 min (2.2×10^{-6}/yr)	2-19
	Lompoc Gas Pig Launcher-1 min (7×10^{-6} /yr)	2-21
	Orcutt Oil Pig Receiver-1 min (7×10^{-6}/yr)	2-22
	Lompoc Oil Pig Receiver-5 min (3.6×10^{-7}/yr)	2-11

10.1 DISCUSSION OF MITIGATING PIPELINE ROUTES

In their Application to the County of Santa Barbara, Union presented two pipeline routes for evaluation in the EIS/EIR. For both pipeline routes it was determined that the chance of an onshore oil spill was unlikely during the lifetime of the project. Section 10.1.8 on System Safety discuses oil spills further. However, in the event of an oil spill, both the proposed (Northern) and alternate (Southern) pipeline routes could have impacted the Santa Ynez River estuary which is used by rare and endangered species. In order to avoid the estuary, the Southern Mitigated Pipeline Route, discussed in the Draft EIS/EIR was developed. This route places the pipeline on the other side of Highway 246 completely out of the estuary, and is shown in Figure 10.1-1.

Union Oil, upon reviewing the document, proposed a mitigated northern route that moved the pipeline north away from the estuary. This route would follow Terra Road on the north side. Union also has proposed to build berms and catch basins in strategic locations to help contain the oil and keep it from entering the estuary in the event of a pipeline rupture. Union Oil has provided detail strip maps of this Northern Mitigated Route, which is also shown in Figure 10.1-1.

Two other pipeline realignments that have been evaluated include moving the pipeline into the firebreak on Vandenberg properly north of San Lucia Canyon as shown on Figure 10.1-1, and a realignment by San Antonio Creek as shown in Figure 10.1-2.

10.1.1 Engineering Considerations

Table 10.1-1 provides a summary of some of the general information on each of the two mitigated pipeline routes. Each route is discussed separately below.

Union is proposing to use a Supervisory Control and Data Acquisition System (SCADA) to monitor the oil pipeline for leaks. This system measures the volume of oil entering the pipeline at the platform and compares that volume with the measured volume arriving at the Lompoc Dehydration Facility. If these values do not compare (i.e., a leak exists) then an alarm sounds, warning the operators at both the platform and the Lompoc facility. The operator at the Lompoc facility is given a few minutes to react to the warning, and then must either shutdown or override the system. If no action is taken, and the volumes continue to disagree, then the SCADA system will automatically shutdown the pipeline system and close all the block valves. The accuracy of the SCADA system is estimated to be one-tenth of 1 percent of the throughput. The SCADA system is designed to detect leaks over both short and long periods of time. The short detection time (approximately 15 minutes) is used to detect larger leaks (greater than 1 barrel/min), and the long detection time (approximately 2 hours) is used to detect smaller leaks (0.5 barrels/min-1.0 barrels/min). It would be possible to have a small leak (less than 0.5 barrels/min) that could go undetected by the SCADA system. Such a small leak would not be a surface spill, but would saturate the surrounding soil and migrating in the path of least resistance. For a large pipeline rupture the oil would be blown to the surface and would move above ground as an oil slick. Therefore, it is necessary to evaluate both large and small spills from pipelines since there mechanisms of travel could be quite different. Each of these types of spills are discussed below.

Large Oil Spills from a Pipeline Rupture

For this type of oil spill it is assumed that the pipeline is completely ruptured and the spilled oil would move above ground as an oil slick.

For this analysis it has been assumed that the time required to shutdown the pipelines in the event of a major rupture would be ten minutes. This represents a very worst case assumption and under normal response conditions the pipeline would shutdown in a matter of minutes. The spill from the pipeline would include the static volume of the line between block/check valves, plus the amount of oil pumped through the line over the ten minute period. The assumed pumping rates for Union, Union plus Exxon, and the Area Study are given below. A large spill of this type of oil would move very slowly in the direction of the downhill grade, and would only slightly penetrate into the soil.

Small Leaks in the Pipeline

This type of oil spill is more likely to occur and can result from corrosion, weld failure, or flange leak. For this analysis it was assumed that the pipeline could leak up to 30 barrels/hours for 12 hours before th leak was detected either by visual detection of oil on the gorund, or by the pipeline operator detecting a constant hourly differential reading in the SCADA system totalizer. For this type of oil leak, the total undetected spill could be as large as 360 barrels.

With this type of leak, the oil would not come directly to the surface, but would penetrate the soil and move in the direction of least resistance causing saturating in the soil as it went. This type of leak would be an area of soil around the rupture to become saturated with oil resulting in a black spot on the surface that could be visually detected.

Case	Pumping Rate (bbls/min)	Total Oil Pumped Before Shutdown (bbls)[1]
Union only	14	140
Union & Exxon	28	280
Area Study	70	700

[1]Assumes ten minutes of pumping.

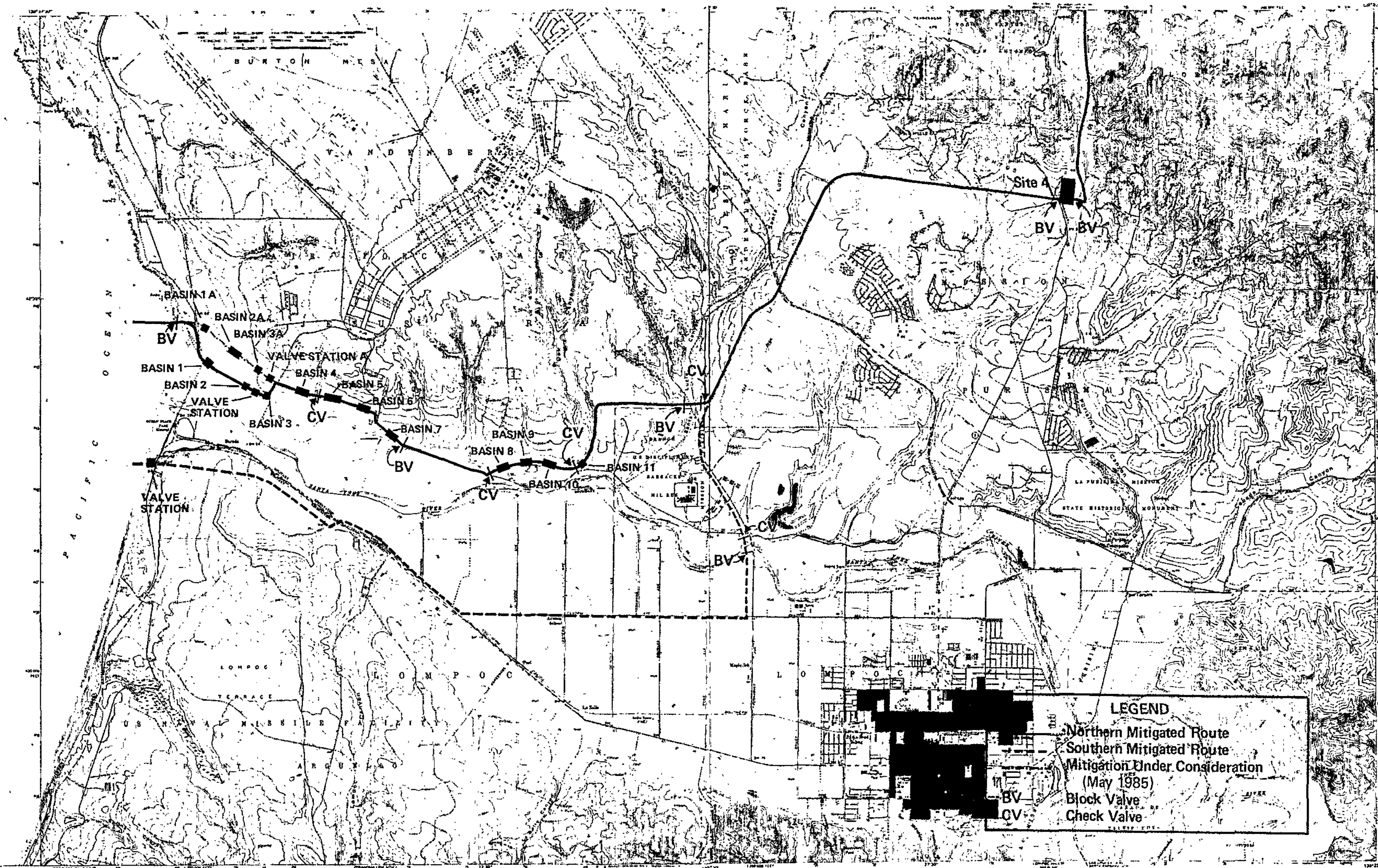


FIGURE 10.1-1 PROPOSED ONSHORE PIPELINE ROUTES TO LOMPOC DEHYDRATION FACILITY AT SITE 4

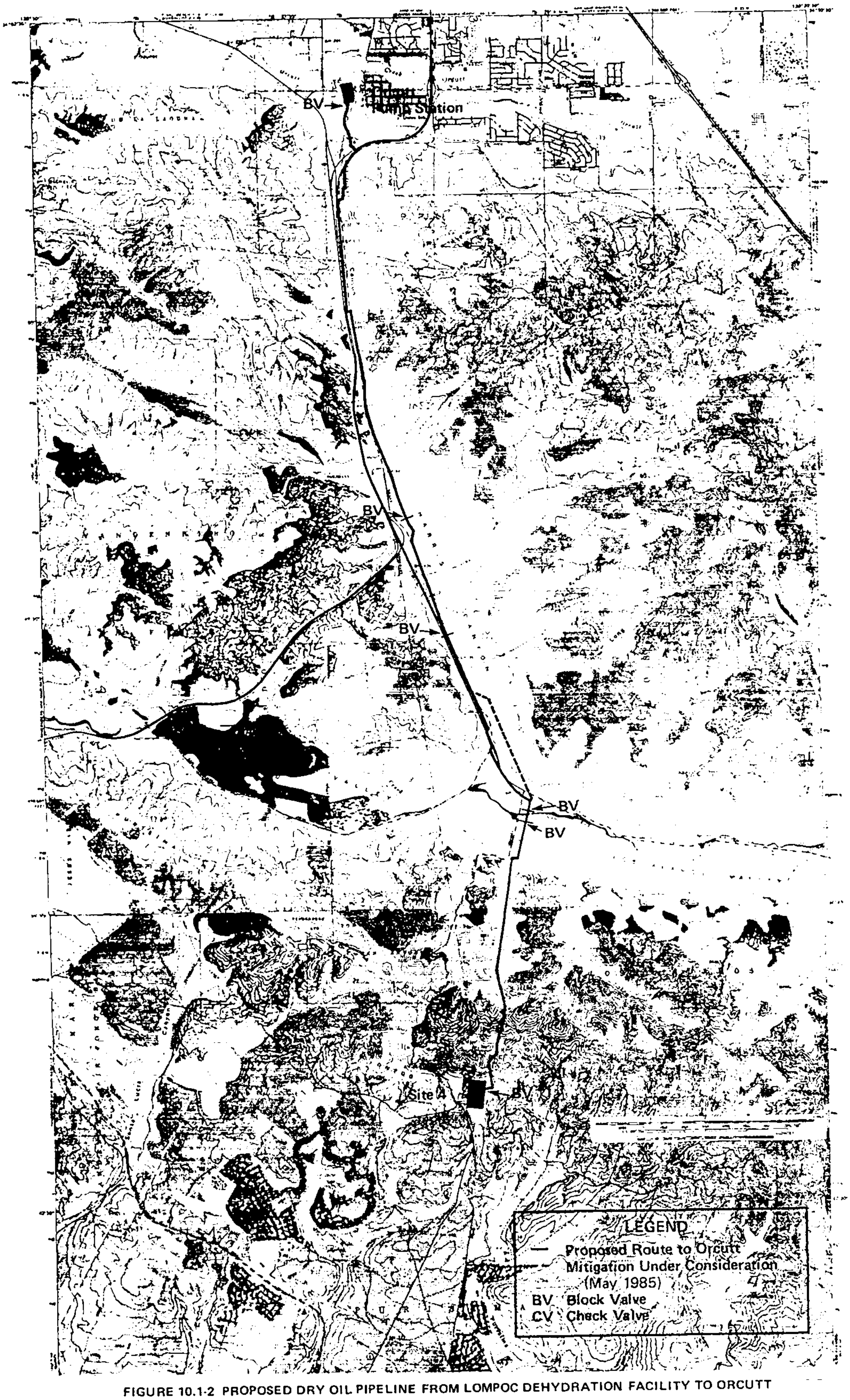


FIGURE 10.1-2 PROPOSED DRY OIL PIPELINE FROM LOMPOC DEHYDRATION FACILITY TO ORCUTT

Table 10.1-1

GENERAL PIPELINE ROUTE DATA

ITEM DESCRIPTION	LANDFALL TO SANTA LUCIA CANYON NORTHERN MITIGATED ROUTE	LANDFALL TO SANTA LUCIA CANYON SOUTHERN MITIGATED ROUTE
Length (miles)	7.3	9.1
Railroad Crossings	1	2
Public Road Crossings	6	8
Space Shuttle Haul Road Crossings	1	3
Santa Ynez River Crossings	0	1
Miles on Vandenberg AFB	7.4	3.4
Miles in 100-Year Floodplain	1.1	7.1
Proposed Number of Block/Check Valves	3/3	2/1
Burial Depth of Pipelines (feet)	3	5-10
Temporary Right-of-way (feet)	50	50-150
Acreage of Sensitive Vegetation Disturbed	37	23
Archaeological Sites	17	12

10.1.1.1 Northern Mitigated Pipeline Route

The landfall of this pipeline route is approximately 0.8 miles north of the Santa Ynez River mouth and then runs primarily east on the north edge of Terra Road, to Oak Canyon. For this mitigated route, Union is proposing to install three block valves, three check valves, and a network of berms and containment basins to contain the oil in the event of an oil spill. The location of the valves and containment dikes/berms are shown in in Figure 10.1.

Table 10.1-2 provides some general data on the catch basins that are proposed for the Northern Mitigated Pipeline Route. These basins have been numbered from 1 to 12 starting at the landfall and moving east. Union is proposing to use three different types of basins.

Type 1 - This type is designed as a catch basin and would require that the area just north of Terra Road be excavated as shown in the Figure 10.1-3. Union is proposing to install six of these basins along the pipeline route. All of these are being proposed in areas where the topography on the north side of the road is relatively level. The basins are placed at the bottom of hills so that if the pipeline ruptures the oil would flow into the catch basin.

Type 2 - This type is designed as a bermed basin and would require that one-foot berms be constructed parallel to Terra Road on the south side and the above road crown be built across Terra Road at strategic locations. Union is proposing to build five of these basins in areas where topography on the north side of the road would require extensive excavation to construct a type 1 basin. A detail of this type of containment system is shown in Figure 10.1-4.

Type 3 - This type of basin is similar to type 2 except that it uses the natural terrain on the north side of Terra Road as a berm and would require that a three-foot berm on the south side of Terra Road be constructed. Union is proposing to use only one basin of this type, and detail of this containment system is shown in Figure 10.1-5.

For all the basin types it was assumed that the effective volume of the basin would be 90 percent of the total available volume. This assumption was made to account for potential loss of volume due to erosion of the berms and dikes, and sedimentary buildup in the catch basins.

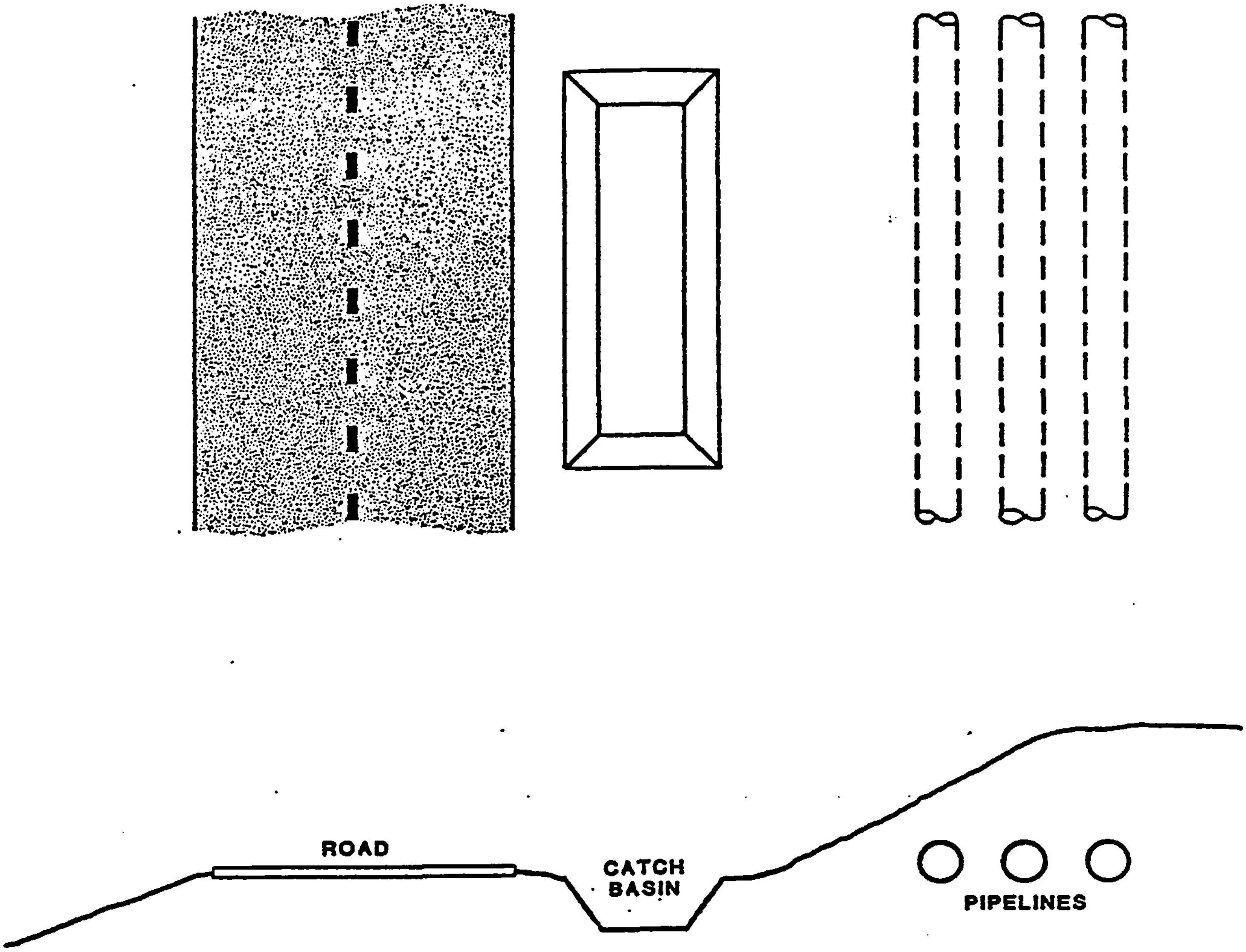
The basin volumes present in Table 10.1-2 are based on the assumption presented above as well as the total areas study throughput volume of 100,000 barrels of wet oil per day. Some additional mitigation measures that could be used for stabilizing the dikes and basins include:

Table 10.1-2

NORTHERN MITIGATED ROUTE
CATCH BASIN DATA

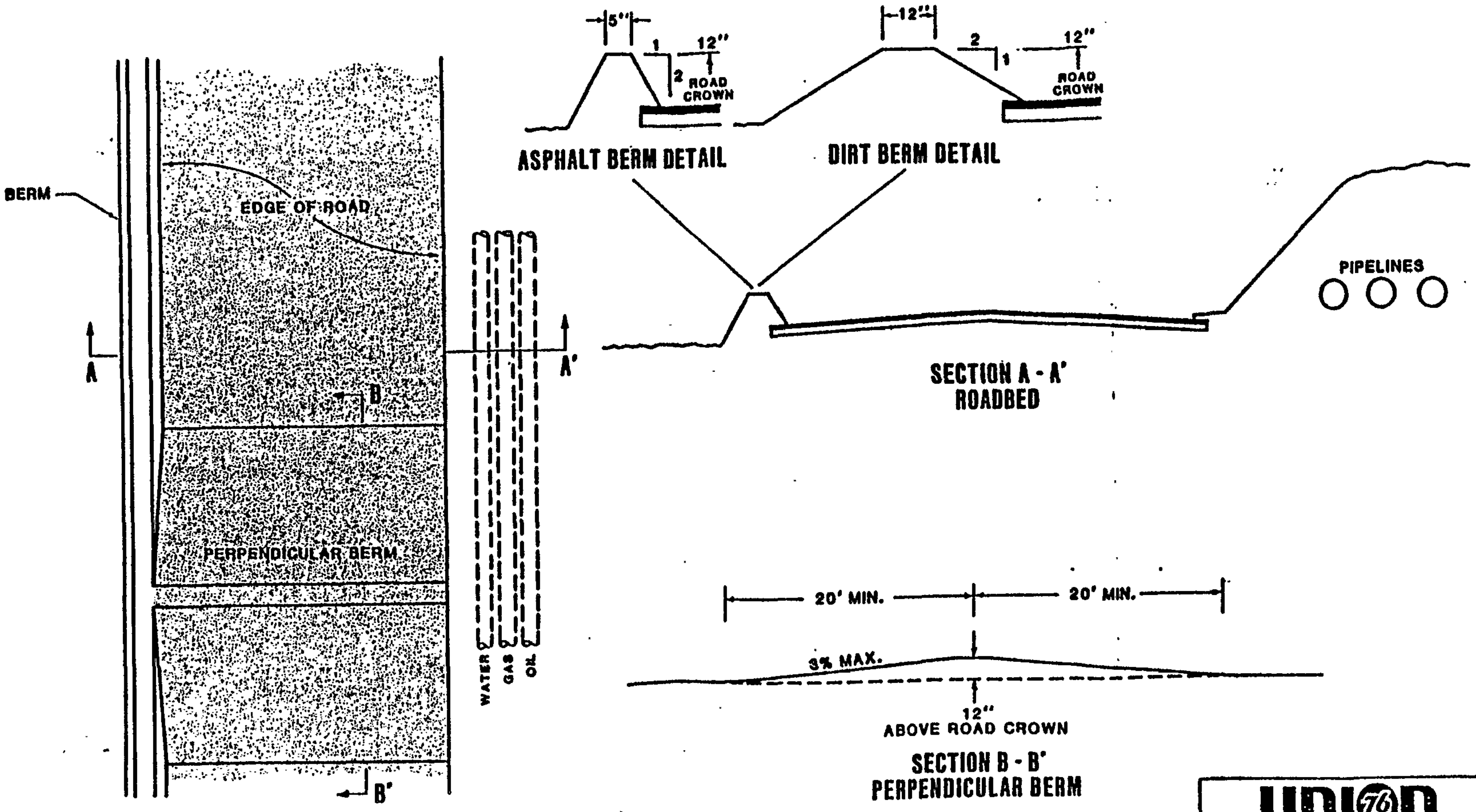
BASIN NUMBER	BASIN LOCATION[1]	BASIN TYPE[2]	REQUIRED BASIN[3] VOLUME (bbls)	TOTAL BASIN VOLUME (bbls)	SPILL VOLUMES (bbls)			
						TOTAL POTENTIAL SPILL (STATIC AND PUMPED LOSSES)		
					STATIC	UNION	UNION AND EXXON	AREA STUDY
1	43	One	2,482	2,750	1,782	1,922	2,062	2,482
2	73	One	1,413	1,570	713	853	993	1,413
3	83	One	1,475	1,640	775	915	1,055	1,475
4	111	Two	1,552	1,720	852	992	1,132	1,552
5	121	Two	2,443	2,700	1,743	1,883	2,023	2,443
6	146	Two	1,281	1,420	581	721	861	1,281
7	176	One	2,056	2,280	1,256	1,496	1,636	2,056
8	230	Dike	3,276	3,640	2,576	2,716	2,856	3,276
9	248	One	2,346	2,600	1,646	1,786	1,926	2,346
10	252	Two	1,707	1,900	1,007	1,147	1,287	1,707
11	265	Two	1,223	1,360	523	663	803	1,223
12	281	One	1,862	2,070	1,162	1,302	1,442	1,862

1 Basin Location is the route survey distance shown on Drawing 14C-10141,2,3. Basins are ordered from Landfall to San Lucia Canyon.
2 See attached drawings for basins type details.
3 Required volumes are 90 percent of total volume.
4 Union peak production, (14 bbls/min); U&E - Union & Exxon peak production, *28 bbls/mikn); AS - Area Study, (70 bbls/min).



TYPE 1

FIGURE 10.1-3	
CATCH BASIN DETAILS	
DRN BY: JCR	4/15/85
APP BY: RCH	NO SCALE



TYPE 2

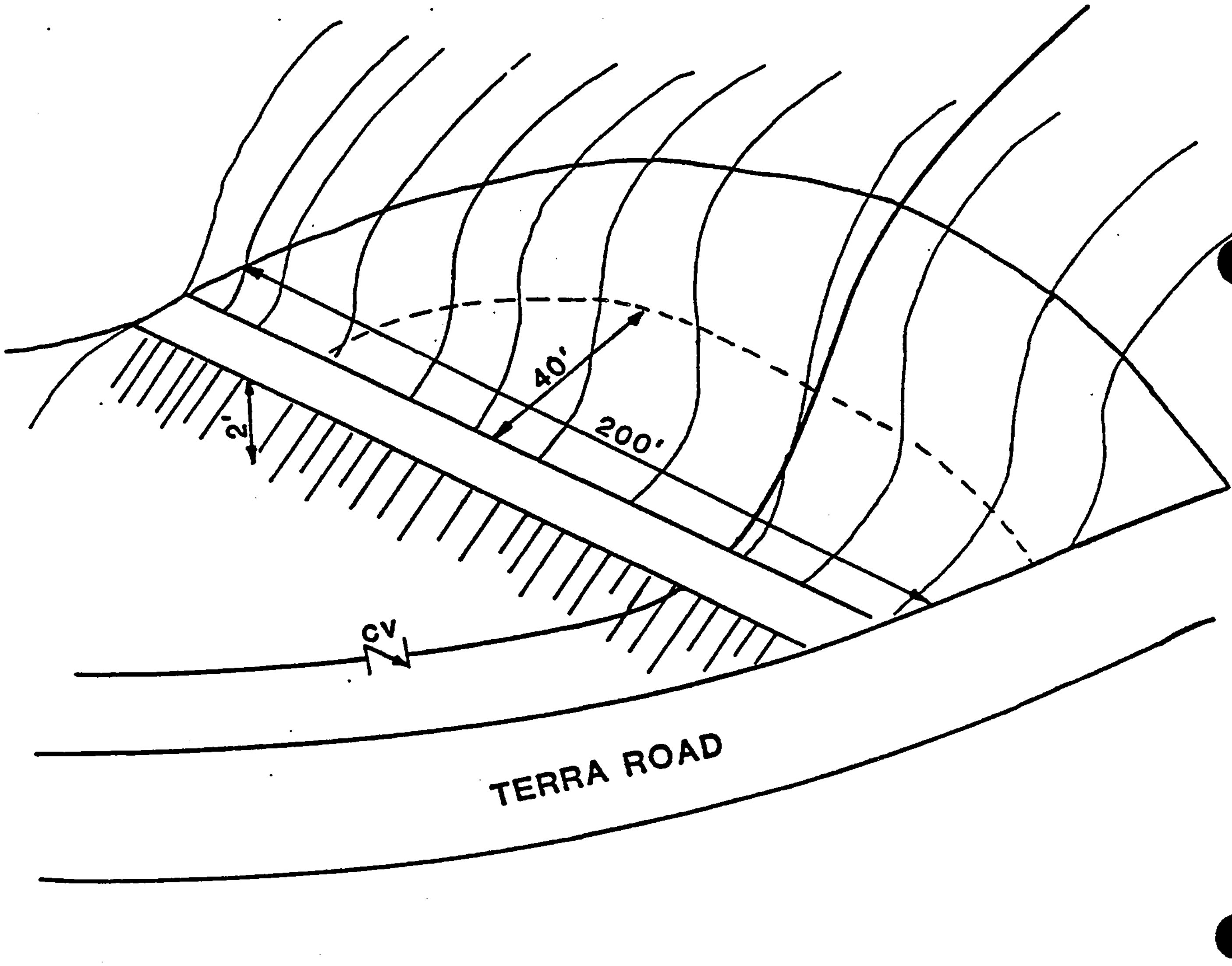
UNION 76

BERM DETAILS

FIGURE 10.1-4

FIGURE 10.1-5

DIKE DETAIL 3



Other possible mitigation measures that could be used for stabilizing the dikes and basins include:

(1) Cover all the dirt berms with a layer of grout or concrete to help Prevent erosion.

(2) Revegetate the catch basins and dirt berms. A maintenance program would be required for the first few years to assure that revegetation measures are successful and the newly established plants are effective in erosion control.

The Northern Mitigated Pipeline Route would use Terra Road as part of the construction right-of-way (ROW) and the road would serve as the access road for the pipeline after construction. Therefore, only an additional 50 feet of ROW would be required for construction. The dirt for building the berms would come from the dirt displaced by the pipelines and the material excavated in building the catch basins. No additional cut and fill should be required.

10.1.1.2 Southern Mitigated Pipeline Route

This pipeline route proceeds inland from a landfall at Surf, south of the Santa Ynez River estuary, crossing the Santa Ynez River at the Floradale Avenue Bridge. It follows Santa Lucia Canyon Road through the property of the Lompoc Federal Correctional Institution. For this route two block valves and one check valve are proposed. The first block valve would be at the valve station located at the Surf electrical substation just west of highway 246. The other two valves would be located on either side of the Santa Ynez River crossing. This route passes mainly through agricultural fields and is in the 100-year floodplain for the majority of its length. The route is shown in Figure 10.1-1.

One of the major issues associated with this southern route is the potential damage of the pipelines due to scour from flooding. During the 1969 flood, which was a 50-year flood, scour up to 8 feet was observed in the vicinity of the pipeline route. Under extreme flood conditions it is possible that the scour could rupture the pipeline, resulting in an oil spill. This would most likely occur during the winter months when 95 percent of the area's rainfall occurs. If this were to occur, then the oil would mix with the flood water and move out to sea with the water. In order to help mitigate this problem the pipeline should be buried 3 to 4 feet below the scour depth. This would require the trenches to be up to 12 feet deep. The increased trench depth would slightly increase both the required ROW and the construction time for the pipelines. This deeper burial depth would also eliminate the chance of the pipelines being damaged by agricultural farming equipment which has a maximum digging depth of 3 to 4 feet.

Table 10.1-3 presents the expected spill volumes for the Mitigated Southern Pipeline Route assuming that the pipeline has two block valves and one check valve. The longest span of pipeline without valves is through the agricultural fields from the valve station to the southern edge of the Santa Ynez River crossing. This portion of the line (7.2 miles) is mostly in the 100-year floodplain on flat terrain. Since the terrain is relatively flat once the pipeline crosses the hill south of 246, one only needs to worry about

Table 10.1-3

SPILL VOLUMES FROM SOUTHERN MITIGATED PIPELINE ROUTE

SECTION NUMBER	LOCATION	LENGTH OF PIPELINE BETWEEN VALVES	SPILL VOLUMES (bbls) STATIC	TOTAL POTENTIAL SPILL (STATIC + PUMPED LOSSES)[1,2] U	U&E	AS	COMMENTS
1	Valve station to top of hill south of Highway 246	4,000 ft	1,549	1,689	1,829	2,249	This oil would drain down the hill toward the landfall. This assumes a break on the west side of the railroad tracks near the beach.
2	Top of hill south of 246 to southside of Santa Ynez River	37,960 ft	14,705	915	1,055	1,475	Since this terrain is mostly flats only the static volume from the hill south of 246 would drain once the valves were shut.
3	Santa Ynez River crossing	1,000 ft	387	527	667	1,087	These volumes assume that the drilled crossing method is used, which will require a crossing length of at least 1,000 feet. With a trenched or spanned crossing the length between valves could be reduced to approximately 350-400 feet.
4	North side of Santa Ynez River to Santa Lucia Canyon	7,200 ft	2,789	2,929	3,069	3,489	

[1] Assumes pumping for ten minutes before pipeline is shut down.
[2] U - Union peak production, (14 bbls/min); U&E - Union & Exxon peak production, (28 bbls/min); AS - Area Study, (70 bbls/min).

the pumping losses plus a static volume of about 800 barrels, because once the valves at either end of this stretch close, the rest of the static volume should not drain.

The spill volumes shown for the Santa Ynez River crossing are based on the use of a drilled crossing which represents the greatest distance between valves on either side of the river. The longer span distance is required for this type of crossing since the pipe has limits on its allowable angular deflection and in order to go 50 feet below the river bed a span of at least 1,000 feet would be needed. With trenching and spanning, the distance would be around 350-400 feet.

This route does have some engineering construction concerns that would have to be addressed prior to construction. The first one is that Union is currently planning to use a beach pull method for installing the offshore pipelines. With this method the lines are fabricated onshore and then pulled offshore by a pull barge with bouys attached. This requires an area on the beach of 600 feet by 100 feet. The Surf landfall could provide up to 500 feet of length, but would require the sand dunes to be leveled for the construction period. This loss of 100 feet would lengthen the construction period slightly. If this is still unacceptable to Union, another option that could be explored would be to do the beach pull method for most of the offshore pipeline from the northern landfall and only do the Surf zone portion from the Surf landfall.

There also exists some areas of unstable soil and landslide potential on the east side of the hill just east of Surf. Special construction and revegetation plans would need to be developed for this portion of the pipeline route. For the portion through the agricultural fields the line would need to be buried to 5-10 feet to protect against scour due to flooding. The major construction issue for the southern route is the crossing of the Santa Ynez River. Here there are three options that are available to Union and they include:

Trenching,

Spanning, and

Drilled crossing.

Each of these methods is discussed below. It should be noted that all these methods are technically feasible, but their environmental impacts are quite different as is their relative cost.

TRENCHING

With this method a trench would have to be dug across the river. The pipelines would have to be buried to a depth of approximately 40 feet to avoid scour effects. Since the soil in the river is silty sand the ROW would need to be 250-300 feet wide. This large ROW requirement is due to the low stability of the river sand and therefore, the banks on either side of the trench must have gradual inclines to prevent cavity in. The trench itself would need to be approximately 150-200 feet wide at the top to allow for equipment and men to work in the trench. Depending on the amount of water found in the river, various well points would have to be placed both upstream and downstream of the trench to provide for dewatering. This method of construction would lead to significant impacts to the riparian habitat in the vicinity of the crossing. This method of construction could require three to eight weeks to install the pipeline and would involve a considerable amount of labor and heavy construction equipment. An alternative to direct trenching would be the use of a drag line to dig a trench across the river. This method is applicable when there exists underground aquifers that move very slowly. In this method the water is not removed from the river but is left in and a trench is dug by dragging a large scoop or pan across the river. Once the desired depth is reached the pipelines are layed in the water-filled trench and then the soil is placed over the pipeline. This method of trenching is normally used on larger rivers and is less labor intensive than conventional trenching and does not require the use of well pointing.

Whether or not this method of trenching would be applicable for this river crossing would require additional analysis and some preconstruction borring samples in the area of the crossing. It is estimated that this method of crossing the river would be more expensive than spanning, but less than a drilled crossing.

SPANNING

With this option, the pipelines would be either suspended from the Floradale Bridge on the downstream side, or suspended on a separate structure. With the bridge crossing the pipelines would be placed on an outrigger off the main boxes of the bridge. In order to reduce visual impacts and vandalism the lines could be covered on the top and outside with sheetmetal that would be painted a concrete color. A structural analysis of the Floradale Bridge was conducted to determine if the bridge would be capable of supporting the three pipelines plus the weight of the supporting outrigger. The data used for this analysis is given in Table 10.1-4. The design for supporting the pipelines is shown in Figure 10.1-6.

The analysis was based on the as-built plans provided by the County of Santa Barbara. The analysis showed that the bridge would support the new pipelines with the supports mounted adjacent to the bridge piers. This would result in pipe spans of approximately 90 feet. Given this span, additional steel pipe supports were assumed to support the pipe. It was assumed that this additional weight would be approximately 100 pounds per linear foot. The analysis assumed the use of wide flange beams for the pipeline support during construction which would last approximately two to four weeks. A portion of the overhang would have to be removed and then later replaced. Labor for this would be minimal and primarily consist of metalworkers. Traffic on the bridge would be partially disrupted during the construction period.

DRILLED CROSSINGS

With this type of river crossing a hole is drilled horizontally underneath the river and then the pipelines are placed in the hole. For this project two drilled crossings would be required. The first would be for the 20" oil pipeline, the second would be for the two 10'' pipelines. It has been

Table 10.1-4

UNION OIL PROJECT PIPELINE DATA

ITEM	DATA
1. Oil Pipeline	
Outer Diameter (in)	20
Wall Thickness (in)	0.625
Steel Grade	APL 5LX52
Welding	Electric Resistance
Weight Full (lbs/ft)	265.4
2. Gas and Water Pipelines	
Outer Diameter (in)	10-3/4"
Wall Thickness	0.365
Steel Grade	APL 5LX52
Welding	Electric Resistance
Weight Full (lbs/ft)	49.5/each
3. River Data	
Minimum Burial Depth (ft)	40.0
River Width	250 feet
Soil Type	Silty Sand
Water Source	Underground wells

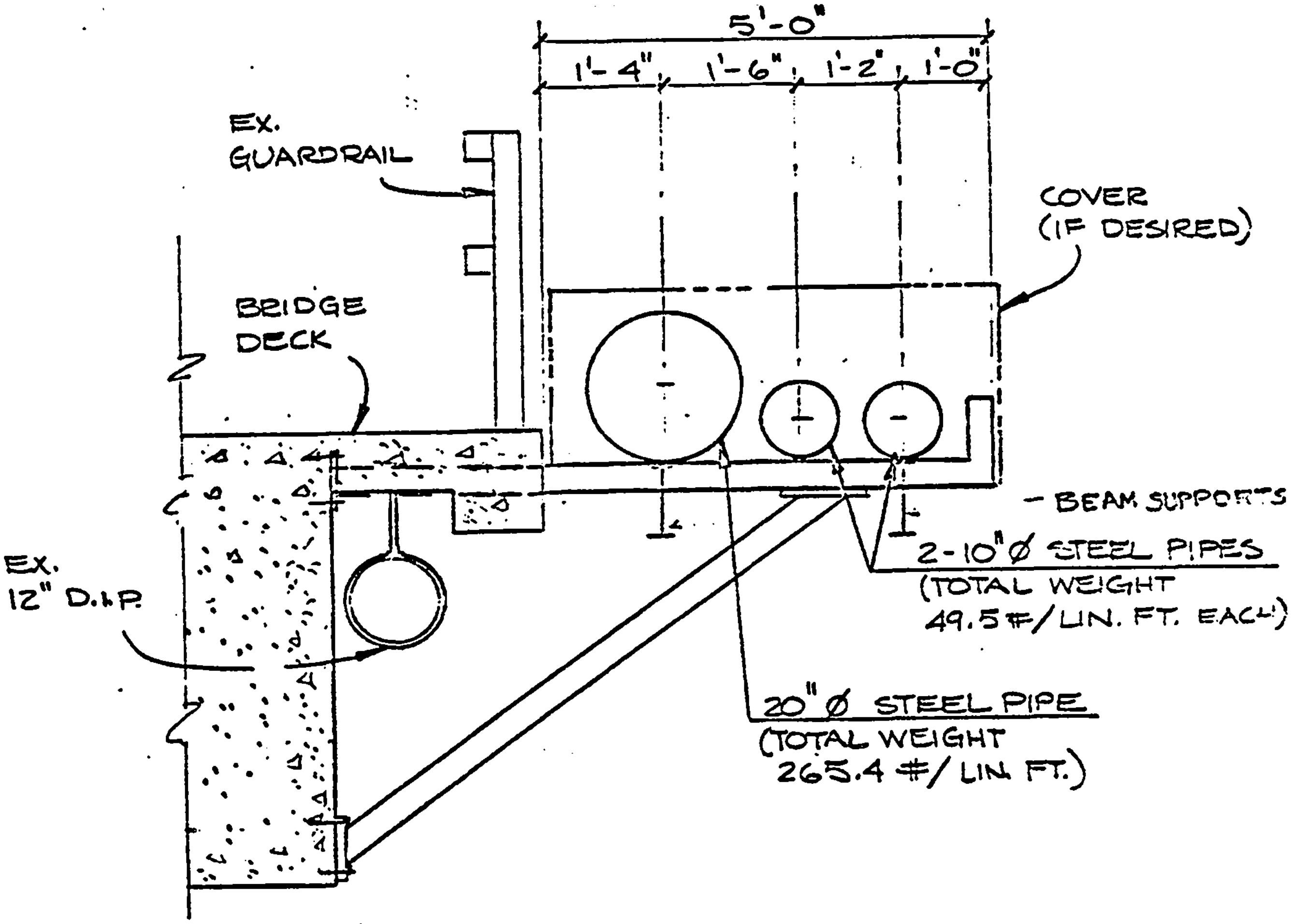


FIGURE 10.1-6

PROPOSED FLORADALE
BRIDGE OIL PIPELINE

FOR ARTHUR D. LITTLE, INC.
4-29-85 W.O. 606

estimated that the drilled crossing would be over a 1,000 foot span. This distance is required in order to keep the bends in the 20" pipeline below its allowable stress. With this method the holes would be drilled from the south side of the river, and then the pipelines would be pulled back through the hole. An area of 100' x 100' would be required for the drilling operation. The steps in drilling would include:

(1) Drill pilot hole
(2) Run wash pipe
(3) Ream hold once or twice
(4) Pull pipe string back through hole
(5) Fill hole with drilling mud.

For the 20" pipeline, the hole drilled would be 32" to 34" in diameter, for the two 10" pipelines a diameter of 30"-32" would be needed. This method would require use of water for preparation of the drilling muds (approximately 100 bbls per day). The waste muds would have to be disposed of either by hauling to a landfill or by spreading and mixing with the local soil in the vicinity of the crossing. The muds used are fresh water based and would not contain any diesel fuel oils.

The pipelines to be pulled back through the holes would be prefabricated on the north side of the river. Prior to being pulled through the hole the lines would be hydrotested and coated with a thin epoxy layer. The estimated construction time for this option would be three to five weeks with a crew of five persons working on the drilling operations. The scheduled timing would be approximately two days to set-up the drilling rig, five days to drill each hole, four days to ream the holes, and three days to clean-up followed by two days for breakdown of the equipment.

Prior to selecting this option for crossing the river several boring samples would have to be taken and some engineering analysis would have to be conducted in order to confirm the suitability of this option.

10.1.1.3 San Antonio Creek Realignment

This realignment is shown in Figure 10-1-2. A portion of this realignment was recommended and discussed as a mitigation measure in the Draft EIS/EIR. This portion was the area just around the creek crossing where the pipeline was moved to the east of the Route 1 bridge crossing. Figure 10.1-2 shows the location of the four recommended block valves for the Lompoc to Orcutt pipeline. These valves would limit the potential size of an oil spill locations in the vicinity of San Antonio Creek to a maximum of approximately 1,365 barrels of oil from a complete rupture of the pipeline south of the creek. By placing the block valve back 500 feet from the creek edge, this oil, given the terrain, would not reach the creek.

The oil would flow over a fairly even area of approximately 4,000 feet2. The block valve on the north side of the river should be placed approximately 300 feet from the creek edge. This will allow sufficient distance to prevent oil from getting into the creek. Both these distances would be sufficient to keep small short-term leaks that penetrate the soil from reaching the creek. This is discussed further in the Onshore Water section. These distances would allow for approximtely 500 barrels of oil to drain into the creek based on a complete rupture which is highly unlikely.

Union is proposing to use thick wall pipe and coating as well as an independent cathodic protection system for the stream crossing. Use of this pipe and coating is recommended for the length of Harris Canyon (i.e., just north of all the block valves). The remainder of this minor realignment was suggested by Union Oil and agreed to by USFWS to avoid crossing some of the Harris Canyon drainages. This minor realignment will be evaluated and discussed in detail in the final EIS/EIR. The route, however is discussed in this document in terms the expected worst case impacts.

10.1.1.4 Northern Mitigated Pipeline Route II (May 1985)

This minor realignment was agreed to by Union Oil and USFWS. This mitigative realignment will result in a larger buffer zone between the Santa Ynez River estuary and the pipeline route. This realignment is shown in Figure 10.1-1 and results in the pipeline being moved approximately 1,000 feet further from the estuary. This minor realignment will be evaluated and discussed further in the final EIS/EIR. The mitigative realignment is discussed in this document in terms of the expected worst case impacts.

10.1.2 Onshore Geology

10.1.2.1 Introduction

Only those sections of the Northern and Southern Mitigated Routes (proposed in March, 1985) not previously described in Technical Appendix A are discussed in this report. The reader is referred to Sections 1.0 to 1.5 of Technical Appendix A for general background and baseline information. Environmental consequences, mitigation measures, geologic impacts and cumulative impacts associated with the portions of the alignments not previously discussed in Technical Appendix A are included in this supplement. Generally, very few new constraints or impacts have been identified.

The baseline information for this study was obtained from Technical Appendix A. No new references are cited. A field reconnaissance of the realignment portion of the corridors was performed by our geologist on May 4, 1985.

10.1.2.2 Northern Mitigated Pipeline Route I

EXISTING SETTING

Physiography and Geomorphology

From the landfall, 1.4 miles (4.3 kilometers) north of Surf, the Northern Mitigated Route traverses east across a 400 foot (122 meters) wide gently sloping sand beach. Geologic processes of surf runup and wind erosion and deposition are very active in this reach. Just to the south along the beach are several extensive longitudinal sand dunes reaching heights of 40 feet (12.4 meters). The corridor from the beach area skirts east and then south around these old but active north and northwest trending dunes. The relatively low relief surface east of the beach to the toe of Burton Mesa is a portion of the alluviated Lompoc Valley estuary. This area has been elevated and abandoned with regard to future alluviation by the Santa Ynez River. Just north of the landfall a low sea cliff is actively being degraded by wave action. Teritary Age bedrock, terrace and alluvial deposits are well exposed in this near vertical cliff face.

The alignment turns south where it crosses the Southern Pacific Railroad tracks, about 1,700 feet (530 meters) east of the coastline. Here the corridor slowly rises in elevation above the flat valley floor onto an older marine terrace perched along the lower south- and west-facing slopes of Burton Mesa. This poorly defined terrace surface extends eastward to the first major deeply incised south flowing drainage on the mesa slope which is about 2,500 feet (775 meters) east of the proposed valve station.

The terrace surface in this area is of very low relief, smooth and has a gentle south-facing slope of less than 10 degrees. Surface geologic processes of wind and water erosion or deposition are repressed and are not considered excessive. Stream channels are poorly defined and little natural or man-made incision has developed. Vegetation presently controls the erosion of sand by wind which once was actively depositing and eroding sands over this surface.

From the valve station, the alignment turns eastward and parallels Terra Road. The corridor continues eastward immediately to the north of Terra Road gaining very little elevation, to the Vandenberg AFB dog training facility. At this location the alignment turns south and southeast downslope to the Lompoc Valley floor where it intersects that portion of the corridor previously described in Technical Appendix A, Section 1.7.6.1. The route along this reach remains on the lower slopes of Burton Mesa about 75 to 100 feet (23 to 30 meters) above the Santa Ynez River floodplain. This gentle south-facing slope of the mesa is generally smooth and well rounded with very little stream incision or excessive erosion. No evidence of slope instability has been identified along this section of the route on the slope face.

Approximately 2,000 feet (620 meters) east of 35th Street a deep arroyo will be crossed by a bridge structure. This south-facing drainage has deeply incised the slope area. The intermittent drainage has eroded a channel about 50 feet (15 meters) deep with near vertical slopes. The channel is about 200 feet (60 meters) across at the top. The floor is relatively flat, alluviated and 75 feet (23 meters) wide. Stratified bedrock is exposed nearly continuously along the channel walls in the vicinity of the crossing. Jointing and fracturing in the relatively hard bedrock has caused some degradation of the slopes in the form of rock falls and translational slab or pop-out failures. Channel enlargement appears locally to be a very slow process and deposition rather than erosion apparently is occurring.

Stratigraphy

The alignment from the landfall to the railroad tracks will traverse a section underlain by mostly recent sands which are both water and wind deposited. These units range from loose to medium dense, fine to medium grained, well-graded sands typical of beach deposits.

East of the railroad tracks to the first main arroyo (bridge crossing), the slopes are underlain by a thin cover of marine terrace deposits which are poorly lithified and stratified. The terrace deposits consist of sand and silty sands of Pleistocene Age. These materials vary from loose to medium dense and are very susceptible to erosion on exposed nonvegetated surfaces.

Orcutt Sand of Middle Pleistocene Age underlies the corridor slope area eastward of the bridge crossing and past the dog training center to the Lompoc Valley floor. This is a continental marine sedimentary unit consisting of poorly stratified sandstone, siltstone and pebbly sandstone. The formation is lightly cemented and is susceptible to erosion by concentrated water flow.

The entire Burton Mesa surface and slopes are underlain at shallow depth by the Miocene Age Monterey formation. It is exposed at two locations along this portion of the corridor between the landfall and Santa Ynez floodplains. Rock crops out on the west side of 35th Street near the intersection of Terra Road and at the bridge crossing. The bedrock is composed of interbedded shale, siliceous shale and siltstone that is moderately well to well cemented and thinly bedded. Bedding, jointing and fracturing are well developed.

Structure

Burton Mesa is underlain by a broad, shallow east-plunging, east-west trending anticline known locally as the Burton Mesa Anticline. The alignment traverses along the south flank of the fold, as seen in the south-dipping beds exposed in the Monterey formation at several locations on the slope. Bedding generally dips between 6 and 10 degrees to the south on the slope area in the vicinity of the proposed corridor.

The bedrock is moderately well jointed and fractured. These features are well exposed in the arroyo areas and generally parallel the channels and dip at high angles. These discontinuities are probably related to pressure release of the exposed bedrock along the arroyo walls.

No known or mapped faults trend towards or intersect the alignment between the landfall and Site 4. The closest mapped fault is the Lompoc-Solvang Fault located adjacent to the south side of the Lompoc Valley 3 miles (4.8 kilometers) to the south of the alignment. This fault is not considered a seismic hazard to the pipeline as proposed.

Seismicity

Figures 1.4.1-1 and 1.4.1-2 (Technical Appendix A) show the location and magnitude of historic earthquakes in the vicinity of the pipeline corridor. Figure 1.4.1-1 shows that the earthquakes in proximity to the alignment are small events of magnitude less than 4.

Geotechnical Conditions

Between the landfall and the Santa Ynez floodplain the corridor will traverse mostly cohesionless deposits of sand, silty sand and sandy silts. The sands may be in a loose to medium dense condition within the depths of burial of the pipeline. The bearing capacity and settlement characteristics of soils encountered along the pipeline alignment are very good and are not subject to collapse or expansion upon wetting. Sandy materials of this nature on shallow slopes (e.g., less than 25 degrees) are not susceptible to gross unstable slope conditions. Their loose consistency does make them prone to erosion from concentrated water flow and/or wind. Natural vegetation in the area has helped retard the erosion processes.

Where the pipeline crosses the first main canyon a span structure is planned. The bedrock on either side of the channel can be expected to perform well with regard to foundation piers and associated tie-back structures. The bedrock immediately adjacent to the canyon walls is susceptible to rock falls and large pop-out slab failures. Such failures are due to stream undercutting which results in channel enlargement, widening and depening.

Bedding attitudes measured in local exposures indicate that slopes underlain at the surface or at shallow depths are not subject to major bedding plane or cross-bedding plane sliding. Bedding dips southward at about the same angle as do the slopes (e.g., 6 to 10 degrees) and therefore slip plane failures are considered remote. Similarly, the rock has a high enough strength integrity to preclude cross-bedding failures. No landslides have been identified in the region between landfall and the point where the alignment reaches the Santa Ynez River floodplain.

The potential for liquefaction is low in the area between the landfall and Santa Ynez River floodplain. The generally medium dense soils, cemented bedrock and moderate to great depth to groundwater minimize the likelihood of seismically-induced failures.

ENVIRONMENTAL CONSEQUENCES AND MITIGATION

Introduction - Methodology

See Section 2.1.1 of Technical Appendix A.

Faults

See Section 2.1.1 of Technical Appendix A.

Seismicity

See Section 2.1.3 of Technical Appendix A.

Onshore Slope Instability

Slopes along the Pipeline Route between the landfall and the Santa Ynez River floodplain are expected to remain grossly stable regardless of the propose pipeline construction. No landslides or landslide-prone terrain exist along this section. Rock falls and large pop-out failures are expected to continue at a very low rate on the steep canyon walls of the first major canyon crossing. Such failures will be nature-induced. If large slabs of rock were to break free in the vicinity of the span foundation piers and weaken their integrity, a span failure is possible. The impacts of potential slope instability are considered significant but mitigable (Class II) in design.

Mitigation Measures

Potential minor slope failures are possible at the bridge crossing in the first major canyon. The steep slopes on either side of the canyon will need to be geotechnically investigated to mitigate potential slope instability problems. The investigation should include detailed geologic mapping, subsurface investigation, laboratory testing and analysis with subsequent recommendations for repair and design criteria. Mitigative measures could include: stabilizing the slope by lowering the slope ratio; removing large blocks of rock susceptible to failure; and establishing bridge footings far enough back from the slope face to preclude a failure. Spill prevention measures such as pressure sensors and shut off valves at critical locations could be considered.

Tsunami

See Section 2.1.8 of Technical Appendix A.

Uplift and Subsidence

See Section 2.1.9 of Technical Appendix A.

Erosion and Scour

See Section 2.1.10 of Technical Appendix A.

Mineral Resources

See Section 2.1.12 of Technical Appendix A.

IMPACTS OF THE PROJECT ON THE GEOLOGIC ENVIRONMENT

Pipeline Construction and Maintenance

See Section 2.2.2.4 of Technical Appendix A.

The only adverse geologic impact of project activities along the pipeline section between the landfall and the Santa Ynez River floodplain is associated with man-induced erosion on slopes underlain by loose cohesionless soils. Such impacts are discussed in Section 2.2.2.4.2, Impacts of the Pipeline, Technical Appendix A. Trench excavations are planned to follow the contour of the land and would be buried to a depth of 5 feet (1.5 meters). After placement of the pipeline, the trenches would be backfilled to the original grade and proper drainage and plant cover reestablished.

Erosion on slopes as a result of trenching can be minimized and stopped by normally accepted engineering practices. This includes properly compacting the trench backfill, reestablishing the surface drainage and not allowing water to pond above or concentrate and flow freely over slope surfaces. On sloping surfaces, low longitudinal graded berms can be constructed subparallel to the slope trend to intercept surface concentrated runoff and divert flow back to sheet wash drainage or into improved drainage facilities. A deep rooted, drought-resistant plant cover could be established on all denuded areas. If gullying does commence after completion of the trenching operation, regrading and surface drainage improvements should be implemented. Periodic inspection of all pipeline corridors is necessary, especially after periods of heavy rain, to confirm pipeline integrity and erosional conditions. If the above practices are followed, impacts would be Class II.

10.1.2.3 Southern Mitigated Pipeline Route

EXISTING SETTING

Physiography and Geomorphology

From the landfall near Surf the Southern Mitigated Route traverses eastward over a 500 foot (153 meters) wide sandy beach of generally low to moderate relief. Large longitudinal sand dunes lying parallel to the shore line are actively being eroded and deposited in this area. These dunes change their shape and size constantly due to strong northwesterly winds. The Southern Pacific Railroad tracks have been constructed on the back beach area upon an artificial fill which acts as a barrier for otherwise eastward blowing sands.

East of the tracks the alignment rises at a moderate rate as it crosses Highway 246 onto the Lompoc Terrace. This west-facing slope is gentle, relatively smooth and gains about 200 feet (61 meters) of elevation over a distance of 1 mile (1.6 kilometer). Lompoc Terrace is an uplifted structural platform surrounded by low to moderate slopes and is locally incised by youthful drainages. The pipeline corridor traverses the northernmost extent of the terrace which terminates at the south edge of the Lompoc Valley. The terrain on the terrace surface is of low relief and densely covered by low brush and grass. The alignment parallels an existing overhead power line and buried water line. Natural erosion on this surface has been minimal. However, excessive deep gullying has been taking place locally along the buried water line backfill. This was due to improper drainage practices and/or poorly compacted backfill.

A 700 foot (214 meters) long and 175 foot (48 meters) high east-facing slope is traversed by the route as it descends the Lompoc Terrace. This slope forms a very large amphitheater-shaped bowl and has a slightly irregular or hummocky surface. Aerial photographs indicate that the entire bowl area may represent an ancient landslide of major size. This was not readily evident in the field. However, in the high road cut adjacent to Highway 246 and next to the bowl, a thick section of colluvium landslide debris is exposed. This debris could be associated with the apparent landslide in the slope area of the corridor. Exposure of the soils in the bowl area suggests a deep colluvial cover that may be creep affected.

This apparent landslide is one of several others that were identified along the northern limits of Lompoc Terrace. Whether they are bedding plane failures or translational failures across bedding is not evident. Due to their size and subdued outward appearance, they are considered ancient landslides that probably moved during a much wetter climatic period. Such a period existed in the coastal areas of California at the end of the Wisconsin

Ice Age about 17,000 to 20,000 years before present. Conceivably, these particular features could be of that vintage. Presently, they appear to be in a stable condition and the possibility of reactivation is not likely, at least on a grand scale.

At the toe of the slope, the alignment continues east-southeast across the floor of Lompoc Valley along its southern margin. The valley floor is very flat and smooth and has been cultivated extensively. This low relief surface is a result of alluviation and plaination by the Santa Ynez River. The river has carved the broad channel of Lompoc Valley as the region was uplifted. Burton Mesa on the north side of the valley and Lompoc Terrace to the south represent the structurally uplifted highlands.

At a point about 12,000 feet (3,660 meters) east of the coastline the alignment merges with the previously characterized corridor. From this location eastward to Site 4 a thorough description of the alignment can be found in Section 1.7.6.1 and 1.7.7.2 of Technical Appendix A.

Stratigraphy

The coastal beach area at the landfall is covered with water and wind deposited sands. The sands are fine to medium grained, loose and unconsolidated. The thickness of the recent sand deposit is unknown. The landfall area is close to the intersection of a bedrock wave cut platform and the incised Santa Ynez River channel, both of which are buried by the beach sands and/or alluvium. The depth of bedrock could underlie the surface as little as 10 feet (3 meters) or as much as 100 feet (30 meters) or more within the corridor area of the beach.

As the alignment crosses the highway and trends east, the Pleistocene Age Orcutt Sand will be encountered across the Lompoc Terrace. These massive sand, silty sand and gravelly sand beds are well exposed in the road cut of Highway 246 just to the north of the alignment. Loose, disturbed sandy soils estimated to be up to 5 feet (1.5 meters) in thickness overlie the Orcutt Unit. The Orcutt Sands are poorly bedded, lightly cemented and are very susceptible to erosion by concentrated water flow on exposed slopes.

Well-bedded and cemented Miocene Age Monterey Shale underlies the Orcutt Sand within the Lompoc Terrace. The Monterey is also well exposed in the Highway 246 road cut opposite the alignment. The depth to the Monterey bedrock appears to shallow toward the east and may be only a few feet below the surface near the location where the corridor starts to descend into the Lompoc Valley. A manmade cut (quarry?) was excavated into the southern limits of the bowl-shaped slope through which the alignment will traverse. The Monterey Shale is exposed in this excavation and has only a thin overlying soil mantle.

The descending slope into Lompoc Valley is overlain with what appears to be a thick colluvial cover which consists of a medium brown clayey silt that locally contains gravel. These materials appeared disturbed and possibly creep-affected. Erosion (gullying) is very evident locally along the backfill of the existing buried water line. This water line lies near the proposed alignment. A question remains as to whether or not landslide debris underlies this slope area.

At the toe of the bowl-shaped slope the corridor will continue eastward over a thick section of river alluvium. At the surface this alluvium has been disturbed by cultivation activities, but generally consists of unconsolidated combinations of silt and sand with minor gravel fractions. From the valley floor to Site 4 the stratigraphy has previously been characterized in Section 1.7.6.1 and 1.7.7.2 of Technical Appendix A.

Structure

From Surf and eastward the alignment will traverse over the north flank of the east-west trending Santa Rita Syncline which parallels the Santa Ynez River Valley. Bedding expressed in the pre-Quaternary Age bedrock generally dips to the south in the area of Lompoc Terrace near the alignment. The Monterey Shale exposed in the Highway 246 road cut indicates that near the surface the bedrock is contorted and undulatory and does not totally conform to the regional south dip inferred from the mapped syncline. In most cases bedding is very shallow dipping, very fractured and jointed. A few minor shears were noted in the road cut.

Bedding in the overlying Orcutt Sand is indistinct, since the unit is fairly massive in character. In general, bedding dips at very shallow angles toward the west. The alluvium on the valley floor, east of Lompoc Terrace, is judged to be lying near horizontal, since it is of recent age and has not been structurally deformed.

No mapped or known faults are crossed by the route. The closest mapped fault is the Lompoc-Solvang Fault located about 3 miles (4.8 kilometers) south of Surf. This fault is not considered active and therefore does not constitute a seismic hazard.

Seismicity

Figures 1.4.1-1 and 1.4.1-2 of Technical Appendix A show the locations and magnitudes of historic earthquakes in the vicinity of the pipeline corridor to Site 4. A general discussion of large earthquakes is given in Section 1.4.1. Figure 1.4.1-1 shows that the earthquakes in proximity to the corridor are small events of magnitudes less than 4.

Geotechnical Conditions

Near the landfall at Surf the beach sands are loose, making them susceptible to erosion by wind and wave action. Shallow groundwater in this area may cause them to be susceptible to liquefaction.

On the Lompoc Terrace surface, the soil mantle is composed of loose to slightly cemented fine to medium grained sand. These materials are susceptible to erosion and gullying from concentrated water flow. Natural vegetation presently appears to control the erosion rate on this surface.

On the east side of the Lompoc Terrace where the alignment descends into the Lompoc Valley, a possible landslide area may be crossed. The morphology of the feature was discussed in the preceeding section under Physiography and Geomorphology. Based on its outward appearance and existing slope ratio (e.g., 2:1 to 3:1 horizontal to vertical), even if it is a major slide, it appears stable and is probably not susceptible to reactivation under the present climatic conditions. The stability of the mass has not been analyzed.

The Lompoc Valley floor is underlain by unconsolidated combinations of sand and silt with some gravel. This deposit is expected to be in a loose to medium dense condition and when combined with shallow depth to groundwater may be susceptible to liquefaction. These materials should not be highly prone to collapse or expansion upon wetting. Erosion and scour may occur in this area, especially within the active flood plains. See Onshore Water Resources, Section 10.1.3, for additional discussion.

The reader is referred to other geotechnical conditions along the alignment eastward of the intersection of 13th Street and Highway 246 in Section 1.7.6.1 and 1.7.7.2 of Technical Appendix A.

ENVIRONMENTAL CONSEQUENCES AND MITIGATIVE MEASURES

Introduction - Methodology

See Section 2.1.1 of Technical Appendix A.

Faults

See Section 2.1.2 of Technical Appendix A.

Seismicity

See Section 2.1.3 of Technical Appendix A.

Onshore Slope Stability and Liquefaction Potential

One major possible landslide exists on the alignment at a location about 4,800 feet (1,464 meters) east of the coastline. The limits or stability of this possible slide have not been delineated or analyzed. Based on a field reconnaissance of the area, the feature appears old and reactivation on a grand scale does not appear likely. If climatic conditions were to become drastically wetter, or if water is introduced in large quantities into the possible slide mass, movement might occur. Such movements of a few feet could rupture the pipelines and release hydrocarbons into the biosphere. The impacts of potential slope instability are considered significant but mitigatable (Class II) in design.

A liquefaction potential exists in areas underlain by low density, loose (unconsolidated) silty and sandy soils where shallow groundwater exists. The beach area between the landfall at Surf and the relatively flat alluviated Lompoc Valley floor are two areas where such conditions exist. To date, no liquefaction has been reported in the region. Also, no site-specific studies have been made to determine the liquefaction potential. In the event of a major nearby earthquake, strong ground shaking conceivably could produce liquefaction and/or lateral spreading, which could cause pipeline rupture, resulting in the release of hydrocarbons into the biosphere. The impact of potential liquefaction or lateral spreading are considered significant but mitigable (Class II) by design.

Mitigation Measures

The nature of the possible landslide area located about 4,800 feet (1,464 meters) east of the coastline can be characterized by a geologic investigation which might include: geologic mapping, aerial photographic analyses and a subsurface investigation. If the feature is found to be a landslide, then a slope stability analysis can be performed by laboratory testing of samples obtained from within the slide mass to determine a factor-of-safety. A factor-of-safety of 1.5 or greater indicates the slide is stable and reactivation is unlikely. A factor-of-safety of less than 1.5 would suggest the slide mass should be stabilized, avoided or removed. Stabilization can be accomplished in several ways, including buttressing, lowering the slope angle and dewatering.

The potential for liquefaction can be determined by field drilling and sampling, laboratory testing and analysis. If liquefaction is possible in the low lying areas, consideration should be given to either designing the pipe structure to withstand the stress or developing a method to relieve the sudden buildup of pore water pressure in the underlying soils.

Tsunami

Section 2.1.8 of Technical Appendix A.

Uplift and Subsidence

See Section 2.1.9 of Technical Appendix A.

Erosion and Scour

See Section 2.1.10 of Technical Appendix A.

Mineral Resources

See Section 2.1.12 of Technical Appendix A.

GEOLOGIC IMPACTS OF THE PROJECT ON THE GEOLOGIC ENVIRONMENT

Pipeline Construction and Maintenance

See Section 2.2.2.4 of Technical Appendix A and section regarding Impacts of Project Components for the Northern Mitigated Route in this supplemental report.

A Class II impact has been identified associated with man-induced erosional conditions on slopes.

10.1.2.4 Mitigated Route - Lompoc to Orcutt

The proposed realignment of the dry oil line to upstream of the Highway 1 crossing of San Antonio Creek does not present any different or new impacts, hazards or constraint from a geologic perspective and does not avoid any previously existing problems. See Section 5.1.2.3 of the EIS/EIR for discussion.

The realignment north of San Antonio Creek suggested by Union in May 1985 is shown in Figure 10.1-2 and passes through an area of suspected landslides just north of San Antonio Creek. These slides are relatively small features and should be amenable to design mitigations, if the pipeline corridor were to be routed through this area.

10.1.3 Onshore Water Resources

10.1.3.1 Introduction

This supplemental discussion considers two major realignments of the proposed and alternative pipeline corridors from landfall to the Lompoc processing facility sites and a minor realignment of the dry oil line from Lompoc to Orcutt. The Southern Mitigated Pipeline Route, proposed by Arthur D. Little, makes landfall at Surf, crosses the Lompoc Terrace, descends the Terrace to the flat valley floor and rejoins the corridor analyzed as the southern alternative in the EIS/EIR, just to the west of 13th Street. The Northern Mitigated Pipeline Route, proposed by Union, makes landfall at the same location as the proposed northern route. The realignment differs from the proposed route on the section from just east of landfall to 13th Street with the realigned route located on the north side of Terra Road and therefore upslope of the proposed route along most of this stretch.

The discussion here will focus on several points: 1) the differences between the routes previously analyzed and the realignments proposed; 2) additional discussion of the flood hazard posed by the Santa Ynez River for the previously analyzed southern alternative; and 3) characterization of the flow regime of San Antonio Creek, as input to discussion of the effectiveness of realigning the Lompoc-Orcutt dry oil pipeline to a position east of State Route 1, as a spill containment mitigation.

10.1.3.2 Northern Mitigated Pipeline Route

EXISTING SETTING

The surface water baseline environmental conditions are discussed in Section 4.3.1 of the Union EIS/EIR and in Section 1.1 of Technical Appendix C. The locations of drainages in the Project Area are shown in Figures 4.3-1 and 4.3-2 of the Union EIS/EIR. Characteristics of these drainages are presented in Table 4.3-1.

All drainages listed in these exhibits are crossed by the mitigated route, though the crossings of drainages 1-1 and 1-2 are slightly upslope of the previous crossing points.

Groundwater baseline conditions are discussed in Section 4.3.1 of the EIS/EIR and in Section 2.2 of Technical Appendix C.

ENVIRONMENTAL CONSEQUENCES

Impacts to surface water resources associated with construction, normal operations and abandonment have been characterized as Class III for drainages 1-1 and 1-2 with regard to streamflow, sediment loadings, and water quality. The mitigated route would not introduce any additional sources for impacts, though the location of impacts would change from relatively close to the estuary and flood plain to locations further upslope and beyond existing roads. This will have a tendency to further reduce the potential for adverse impacts to surface water resources. In addition, spanning drainage 1-2, as opposed to the previously proposed trenched crossing, would likely reduce potentially adverse construction-related impacts at this location. Impact classifications remain as before with respect to surface water resources.

Impacts to groundwater from construction are related to water requirements for dust control and hydrotesting. There would be no change in construction impact as a result of the realignment of the northern route. The pipelines are not expected to require water during normal operations. The realignments also cause no change to potential impacts related to abandonment.

The significant changes of impacts resulting from realignment of the northern route and additional design features proposed by Union concern the fate of spills of pipeline fluids. The design features include three types of catch basins to be placed at topographic low points in the segment from landfall to east of 13th Street, and the construction or reconstruction of berms along this same stretch. A detailed description of the basins and berms is included in Section 10.1.1 of this supplement. Analysis of the basin capacities indicates that some of the basins appear inadequate to contain the full contents of spills which could occur. If these basins are redesigned to have adequate capacity and if berms are constructed and maintained in accordance with guidelines suggested in the Terrestrial Biology sections of this addendum material, the impacts to surface water if the largest anticipated spill at full Area Study production, 700 bbl spill, (calculated assuming that block valves are placed on this stretch as proposed by Union) reached the ground surface would be reduced to insignificance (Class III) because the spill would not be able to reach the estuary. Previous analysis suggested that impacts to surface water as a result of a spill in the vicinity of the Santa Ynez River estuary would be potentially Class I.

In addition, estimates of maximum hand distance of an underground spill of the same magnitude were made, assuming only a 3-foot depth of oil affected and maximum migration of emulsion in the subsurface. A depth of three feet was selected based on the presence of frequent clay lens in soils in this area. Maximum migration assumes that oil migrates to residual saturation levels and moves primarily toward the estuary. These assumptions are considered to constitute a reasonable worst-case both in terms of spill volumes and migration pattern. Estimated maximum travel distance is about 500 feet. The closest approach of the proposed route to the estuary (i.e., the Least Tern nesting area) is about 500 feet. Impacts are considered potentially Class I.

An additional realignment currently under consideration would move the section of the line from landfall to the valve station about 1000-1500 upslope of the current route and further away from the estuary. Potential impacts to water resources would be Class III, because of the increased distance to the estuary.

Maximum worst-case subsurface travel distances of spills associated with Union only and Union-plus-Exxon production were estimated to be 240 and 340 feet, respectively. Potential impacts to the estuary are considered Class III for either alignment.

Impacts of spills on groundwater quality would be insignificant on the section of the line from landfall to approximately the Vandenberg AFB dog training facility, because of the lack of existing users and the increased depth to groundwater compared to the previously proposed alignment. In addition, placement of the route further upslope reduces the likelihood of migration of free oil or dissolved oil fractions to points of discharge close to the estuary. In the section of the realigned route that is in the 100-year flood plain, depths to groundwater are likely to be similar to the previous alignment, though distances from existing wells (as noted in Miller [1976] and USGS [1982] are greater. Impacts are considered potentially significant but less so by comparison to the previous alignment. Specifically, placing the line further from existing wells suggests that it would take a larger spill to cause significant degradation of water quality in an existing well, compared to the previous alignment. Therefore, though the impact is still potentially Class I, the likelihood of occurrence is reduced, because of the lower probability of occurrence of larger spills.

Placement of the lines to the north of Terra Road in this section also reduces the likelihood that any scouring or flooding would result in exposure or damage to the lines. During floods of the Santa Ynez River scour hazards exist in areas just downstream of roads which are oriented across the flow [Corps of Engineers, 1970]. By taking advantage of the road as a berm against inundation in the event of moderate flows, and by placing the line upstream of the road in the event of large flows, scour hazards can be avoided.

10.1.3.3 Southern Mitigated Pipeline Route

EXISTING SETTING

Regional and Project Area baseline environmental conditions are discussed in Section 4.3 of the Union EIS/EIR and in Sections 1.1 and 2.2 of Technical Appendix C. Figures 4.3-1 and 4.3-2 show surface water drainages and resources in the Project Area. Table 4.3-1 summarizes characteristics of drainages crossed by all pipeline corridors under consideration. The Southern Mitigated Route differs from the Southern Alternative Route by avoidance of drainage 2-1, an arm connecting to the Santa Ynez River estuary near Ocean Beach Park.

The mitigated route traverses up the Lompoc Terrace, descending the Terrace about 4000 feet east of Surf. At the base of this slope, the route enters the flood plain, in an area which is at least partially protected from high flood velocities by the railroad embankment, lying to the north. The route then crosses Highway 246 and the railroad, to regain the previously considered alternative.

The Terrace does not have any defined drainages in the vicinity of the mitigated route, either on the gentle slopes toward Surf or the steeper eastern slope. One drainage crossing is eliminated by the realignment:

drainage crossing 2-1. An additional crossing is required. At the location where the route crosses Highway 246 and the SP Railroad tracks, a flood control drainage ditch, which lies south of the highway, must be crossed. This ditch carries runoff from Lompoc Canyon to the Santa Ynez River and drains an area of approximately 3000 acres, somewhat less than the area drained by the same channel at drainage crossing 2-1 of the original alternative alignment.

ENVIRONMENTAL CONSEQUENCES

Impacts of construction activities on streamflow, sediment loading and water quality on the realigned portions of the southern route are considered Class III, and less significant when compared to the previous alignment, which was routed both in and adjacent to the Santa Ynez River estuary. Impacts of normal operations and abandonment would also be Class III.

Impacts to groundwater from construction relate to water requirements for dust control and hydrotesting. Impacts of abandonment relate to water needed for dust control, if lines were removed. There are no changes to impacts of construction, normal operations and abandonment associated with the realigned southern route, when compared to the previously analyzed southern alternative.

Impacts of spills of pipeline fluids on surface water quality were considered potentially Class I for that portion of the original route in and adjacent to the estuary. Realignment of the route places the highway and railroad embankments between the pipelines and the estuary, and places the lines over a mile from the estuary at closest approach. The impacts are considered Class III along all realigned sections except at the crossing of the Lompoc Canyon flood control ditch, where impacts of a spill are still potentially Class I.

Impacts to groundwater quality of spills are Class III on the section of the realignment from landfall to the foot of the Lompoc Terrace because of lack of existing use and great depth to groundwater. From here to just beyond the crossing of the Santa Ynez River, impacts are potentially Class I because of shallow depth to groundwater and existing use of groundwater for irrigation. Compared to the original southern alignment, the length of line where impacts are potentially Class I is reduced by about one mile, and areas in or adjacent to the estuary are avoided completely.

Some additional discussion on the nature of the flood damage which has been associated with major flood events of the Santa Ynez River is included here as a refinement to previous discussions. The discussion is derived primarily from the report prepared by the U.S. Army Corps of Engineers [1970] in cooperation with the Santa Barbara County Flood Control District.

The January 1969 flood was considered a 50-year event for the river. This flood and the subsequent flood in February 1969 caused extensive erosion to the banks of the main channel of the river, destroyed the Floradale Bridge and a replacement bridge erected between the two floods, and caused scour of up to 6-8 feet in some places in the vicinity of the bridge. Observations indicated that generic locations especially susceptible to scour and erosion are on the immediate downstream side of roads oriented perpendicular to the direction of flow of flood waters. These roads, if at all elevated above the surrounding terrain, act as dams and induce erosion on the downstream side of the road. Roads oriented parallel to flood flows can act as dikes in certain cases.

The area in the vicinity of the Floradale Bridge has historically experienced significant damage during major floods.

Placement of pipelines to depths of 3' in the flood plain would likely not be deep enough to avoid exposure and potential rupture as a result of scour accompanying floods which can be expected to occur during the life of the project. Impacts are considered potentially Class I.

MITIGATION MEASURES

To avoid potential impacts of scour, particularly as associated with roads, the pipeline could be placed on the upstream (east) side of roads oriented perpendicular to flood flows (i.e., Floradale Avenue). To take advantage of the tendency of parallel-oriented roads to act as dikes, the pipelines could be placed on the south side of Central Avenue.

Together with provisions discussed elsewhere in this supplement for crossing the Santa Ynez River, the potential hazard of flooding to the pipeline integrity would be greatly reduced. Impacts of a spill would still be potentially Class I to water resources, but the likelihood of occurrence would be greatly reduced.

10.1.3.4 Mitigated Route - Lompoc To Orcutt

The particular mitigation of interest here is the suggestion of moving the route to the upstream side of the Highway 1 crossing of San Antonio Creek. This would permit the use of the bridge for spill containment and protection of Barka Slough in the event of a spill in the streambed.

A crossing has been suggested several hundred feet upstream of the bridge. The creek bed in this area is incised 8-10', with oversteepened, nearly vertical banks along the majority of this section. There are some areas of fill on the south bank, where it appears concrete and other debris has been deposited. If construction were to occur in areas of oversteepened banks, these banks should be reconstructed to limit the possibility that flow could concentrate in the notch which would be required in trenching. Fill areas are currently less than vertical, but could still constitute areas of concentrated flow and erosion if not reconstructed.

In an effort to design spill containment measures that would be effective in the flow regime of San Antonio Creek, a flow duration curve for the creek has been constructed (Figure 10.1-7) using data from a gaging station maintained by the USGS just downstream of the proposed crossing from 1941-1955. The curve is based on daily flow data. Mitigations could include simple booms, to be placed directly across the streambed between bridge piers in the event spills occurred during times of no flow, and fabric curtains

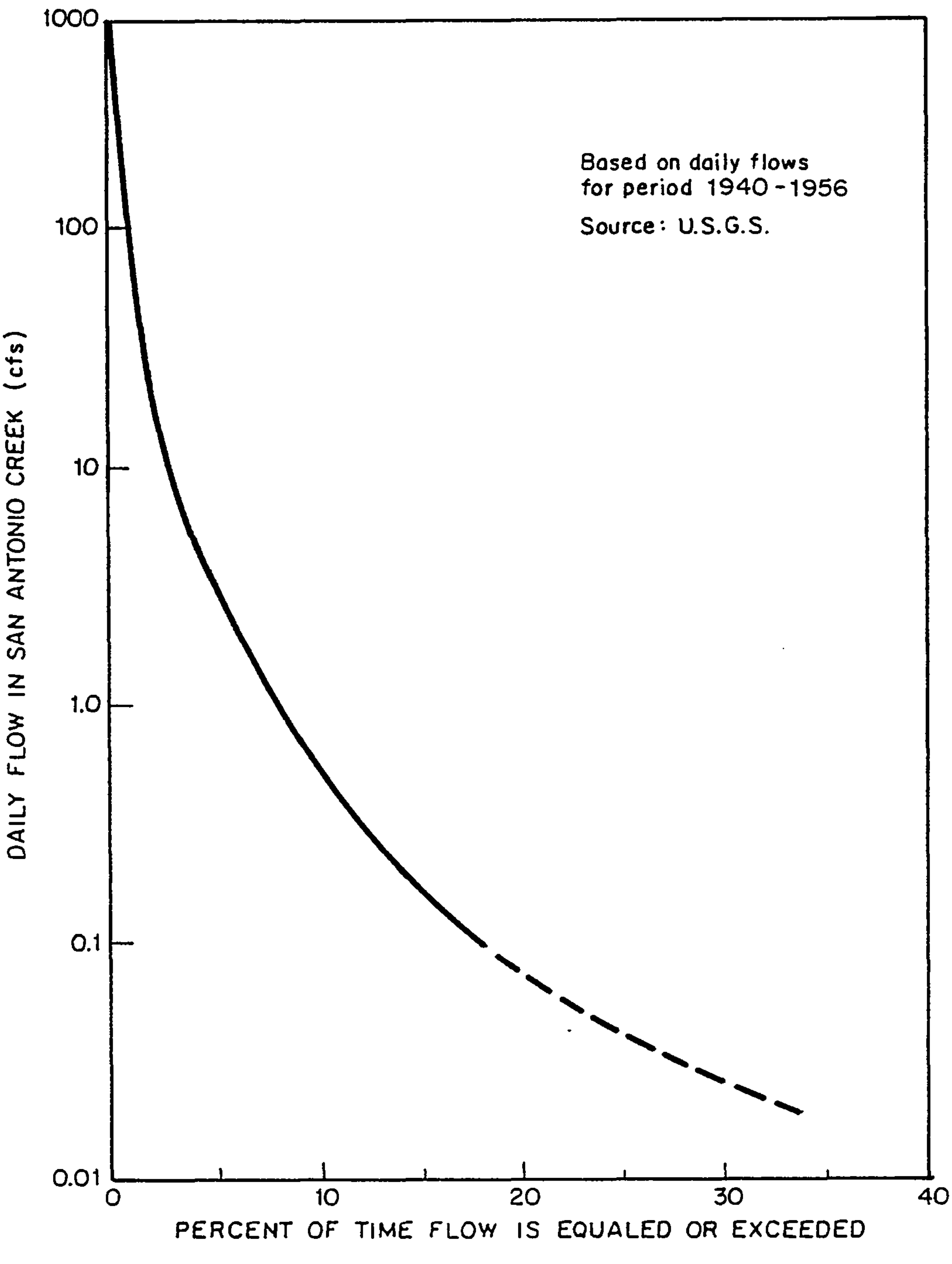


FIGURE 10.1-7 **FLOW-DURATION CURVE FOR SAN ANTONIO CREEK, HARRIS STATION**

which or specially-designed dams to act as simple retainers of floating oil during periods of low and moderate flow. For flood flows, notification procedures similar to those suggested for the Santa Ynez River could be instituted to permit draining or displacement of dry oil in anticipation of severe flooding events. By reference to Figure 10.1-7, booms curtains or dams would be effective mitigations for about 95 percent or more of the flows that occur on the creek (flows up to about 10 cubic feet per second). Draining of the line would account for a very small percentage of total flow, but would address the extreme, and therefore most destructive, events.

Spill volumes at San Antonio Creek have been calculated as 170 bbl for the project and 495 bbl for the Area Study, assuming that static volume and a volume of pumped oil equal to 10 minutes of flow escape the line. To estimate spread of these volumes, a formula presented in CONCAWE (1981) was used. Assuming a depth to groundwater of 20 feet, a spill area at the surface of 1000 ft^2, and a course to medium sand, maximum spread of oil as a free phase is estimated to be less than 700 feet for the Area Study spill. This value also assumes a ratio of length to width of 10:1. For the project and making similar assumptions, spill travel distance would be about 130 feet.

10.1.4 Terrestrial and Freshwater Biology

10.1.4.1 Introduction

This section discusses: (1) existing conditions along Northern Mitigated Pipeline Route #1 where these differ from those described for this part of the proposed route in Section 4.1.1.1 of Technical Appendix F and (2) potential impacts associated with the realignments, valves and containment basins. Northern Mitigated Pipeline Route #1 is shown in Figure 10.1-1.

EXISTING CONDITIONS

Vegetation

The vegetation types crossed by Northern Mitigated Pipeline Route #1 are the same as those crossed by the proposed route from landfall to Santa Lucia Canyon. They include Coastal Strand, Coastal Scrub, Annual Grassland, Coastal Dune Scrub, Coast Live Oak Woodland, Burton Mesa Chaparral, Riparian Woodland and Freshwater Marsh. These vegetation types are described in Sections 2.1 and 4.1.1.0 of Technical Appendix F. The realigned segments cross larger areas of Coastal Scrub and smaller areas of Annual Grassland compared to the proposed route. A comparison of acres of vegetation found within the rights-of-way of the proposed route and Northern Mitigated Pipeline Route #1 is given below under Impacts and Mitigations.

Wildlife

Wildlife habitat types along or near Northern Mitigated Pipeline Route #1 include coastal beach and foredune, coastal scrub, grassland, chaparral, oak woodland, coastal salt marsh, riparian woodland, freshwater marsh, agricultural and other modified habitats. A detailed description of the distribution of these habitats within the Study Region and some of the characteristic wildlife species found in them is presented in Section 2.2 of Technical Appendix F. Detailed information concerning Northern Mitigated Pipeline Route #1 follows.

Along the north side of the Santa Ynez River mouth, the pipeline route has been realigned to the north side of Terra Road, decreasing the width of the right-of-way and the area of wildlife habitat that would be removed. This segment passes through grassland and coastal scrub habitats which support relatively abundant and widespread wildlife species as well as a number of raptors, such as Northern Harrier, Black-shouldered Kite, Red-tailed Hawk and American Kestrel. The most significant bird species utilizing these habitats on a regular basis are foraging Northern Harriers, which nest in the Santa Ynez River mouth area, and possibly, migrant or wintering Burrowing Owls in the more open, grassy sections.

The Santa Ynez River estuary downslope from this segment is a very rich area supporting large numbers of grebes, cormorants, herons, waterfowl, shorebirds, gulls and terns (see Section 2.5.2 of Technical Appendix F.)

Further inland the pipeline route crosses agricultural fields near 13th Street. These areas do not regularly support any wildlife species of concern with the exception of foraging Northern Harriers.

East of the water treatment plant (east of 13th Street) the pipeline corridor passes near a regionally sensitive willow-dominated riparian woodland. Field censuses in April 1985 determined that these riparian woodlands support a rich assemblage of species, including regionally declining birds such as Tree Swallow, Warbling Vireo, Yellow Warbler, and Wilson's Warbler, all of which breed here. It is also likely that Swainson's Thrush, Yellow-breasted Chat, and, possibly, Blue Grosbeak, nest in these riparian woodlands. Further late spring censuses would be needed to verify the present status of these three riparian dependent nesting bird species.

Much of the remainder of this route crosses oak woodland, coastal scrub, chaparral and grassland habitats which have been affected by fuel management and grazing activities. Just east of Oak Canyon the pipeline route enters and follows for more than two miles an existing cleared firebreak, minimizing disturbance to wildlife.

Aside from the regionally sensitive riparian woodlands along the Santa Ynez River, the habitats crossed by Northern Mitigated Pipeline Route #1 support relatively numerous and widespread species such as: Pacific Treefrog, Western Fence Lizard, Southern Alligator Lizard, Side-blotched Lizard, Gopher Snake, Common Kingsnake, Western Rattlesnake, Botta's Pocket Gopher, California Vole, Dusky-footed Woodrat, Deer Mouse, Desert Cottontail, Black-tailed Jackrabbit, California Ground Squirrel, Coyote, Badger, Raccoon, Mule Deer, Red-tailed Hawk, American Kestrel, California Quail, Anna's Hummingbird, Common Flicker, Scrub Jay, Bushtit, House and Bewick's Wrens, California Thrasher, Yellow-rumped Warbler (winter only), Rufous-sided and Brown towhees, White-crowned Sparrow (winter only), Brewer's Blackbird, Western Meadowlark, House Finch and Lesser Goldfinch (See Sections 2.2.2-2.2.5 and Appendix 1-3 of Technical Appendix F).

Although the only regionally rare wildlife habitat present near Northern Mitigated Pipeline Route #1 is the willow-dominated Riparian woodlands situated along the northern edge of the Santa Ynez River west of 13th Street there are a number of regionally rare wildlife habitats downslope from this route. These include the extensive riparian woodlands, salt and freshwater marshes and vernal wetlands of the Santa Ynez River estuary. These habitats have the potential of harboring a number of regionally sensitive wildlife species (see Sections 2.2, 2.4.2.0, 2.4.2.1, and 2.5.2.0 of Technical Appendix F).

Aquatic Habitats and Biota

Aquatic habitats crossed by and located in the vicinity of the Northern Mitigated Pipeline Route are the same as those of the proposed route. They include those of the drainages of Oak Canyon, Santa Lucia Canyon and the Santa Ynez River and estuary. These habitats and their biotas are discussed in Section 4.1.1.0 of Technical Appendix F. This route is within the 100-year floodplain of the Santa Ynez River for about one mile in the vicinity of its intersection with 13th Street.

Areas and Species of Special Importance

In addition to the areas and species of special importance discussed in Section 4.1.1.0 of Technical Appendix F, spring surveys have confirmed the presence of several additional species of importance.

Black-flowered Figwort, a federal candidate plant tentatively identified during fall surveys, occurs in scattered sites in Coastal Sage Scrub and Coastal Dune Scrub. Colonies of Annual Curly-leaved Monardella (listed by the California Native Plant Society) were located in open flats in Burton Mesa Chaparral in the vicinity of Oak Canyon.

Several regionally rare and declining birds were found during spring surveys to breed along the Santa Ynez River and near the estuary. A nesting pair of Black-shouldered Kites was sighted near the mouth of the Santa Ynez River. Breeding birds located along the Santa Ynez River from the estuary upstream to Oak Canyon include: Tree Swallow, Swainson's Thrush, Warbling Vireo, Yellow Warbler, Wilson's Warbler and Yellow-breasted Chat. A California Least Tern (federally- and state-listed as endangered) was sighted at the mouth of the Santa Ynez River.

IMPACTS AND MITIGATIONS

Northern Mitigated Pipeline Route #1 is approximately 7.3 miles long and construction along this route would result in the partial or complete removal of about 66 acres of vegetation and wildlife habitat, of which 56 percent (37 acres) is composed of native types (see Table 10.1.4-1). These figures assume a right-of-way width of 50 feet for the section of the route on the north edge of Terra Road and 100 feet elsewhere. Removal of Coastal Strand, Coastal Scrub, Riparian Woodland and Freshwater Marsh habitats constitutes locally to regionally significant, Class II impacts. Removal of Burton Mesa Chaparral and Coast Live Oak Woodland is considered Class I, locally significant. Other construction-related impacts for this section of pipeline route would not differ substantially from those discussed in Technical Appendix F.

Table 10.1.4-1

COMPARISON OF ESTIMATES OF VEGETATION/LAND COVER TYPES (ACRES) WITHIN RIGHTS-OF-WAY OF THE NORTHERN (#1) AND SOUTHERN MITIGATED PIPELINE ROUTES

Vegetation/Land Cover Types (in acres)	1. Northern Mitigated Pipeline Route #1	2. Southern Mitigated Pipeline Route
Coastal Strand	0.8	2.3
Coastal Scrub	19.8	16.2
Burton Mesa Chaparral (with scattered oak trees)	1.8	2.3
Coast Live Oak Woodland	1.6	0.0
Riparian Woodland	0.2	0.9
Freshwater Marsh	0.2	0.1
Annual Grassland	12.7	1.1
Agricultural Land	8.5	59.7
Cleared/unvegetated	19.8	0.0
Planted trees/ruderal	0.0	11.5
Roads/railroad tracks	1.4	0.9
Totals	66.0	95.0
Percent Native Vegetation	56.0	24.0
Percent Other Land Cover	44.0	76.0
Length of Route (in miles)	7.3	9.1

Source:
1. Determined from measurements of field-checked vegetation strip maps provided with Union's application (October 1983). Assumes a 50-foot right-of-way adjacent to Terra road and a 100-foot right-of-way elsewhere.
2. Determined from measurements of field-checked vegetation strip maps provided with Union's application (October 1983) and field-checked analysis of vegetation/land cover types as shown in color air photographs (scale approx. 1:24,000) flown 29 March 1983. Assumes a 50-foot right-of way adjacent to Central Avenue and a 100-foot right-of-way elsewhere.

Union Oil Company has proposed, in addition to realigning portions of the proposed route, to construct a series of containment basins and add three block valves and three check valves between landfall and Oak Canyon as a means of reducing the likelihood of oil spill impacts to sensitive habitats and species of the Santa Ynez River and estuary. The effects of these mitigations have been analyzed with special emphasis given to the California Least Tern, a federal- and state-listed endangered species. The results of this analysis are that onshore oil spill impacts to Least Terns and other sensitive habitats and species of the Santa Ynez River and estuary should be considered Class II, regionally to locally significant, rather than Class I. The details of this analysis are presented below under Rare Species.

Rare Species

The classification of potential impacts from onshore oil spills has been changed for some rare species as a result of mitigations associated with Northern Mitigated Pipeline Route #1. These species are:

Tidewater goby - Class I, regionally significant changed to Class II, regionally significant

Red-legged Frog - Class I, regionally significant changed to Class II, regionally significant

Northern Harrier - Class II to Class I, regionally to locally significant changed to Class II, locally significant

California Least Tern - Class I, regionally significant to Class II, regionally significant

These changes in classification do not apply to potential impacts from offshore oil spills. Offshore oil spill classifications remain the same as those presented in Technical Appendix F and Section 5.6 of the EIS/EIR.

The following discussion presents details of the analysis on which the changes in classifications listed above are based.

Impacts to California Least Terns

Although Northern Mitigated Pipeline Route #1 passes within about 500 feet of the area used for nesting by Least Terns, noise and human presence associated with construction activities are not expected to affect these birds, since Union Oil Company has agreed, as a condition of the Coastal Commission's finding that the proposed pipeline route is consistent with the California Coastal Act, to construct this section of the pipeline between November and March, when terns are not present in the area. An additional mitigation required by the Coastal Commission is that accelerated erosion and sedimentation of the Santa Ynez River estuary be controlled so that estuarine species, including those used as a food source by Least Terns, will not be affected.

The potential for impacts to Least Terns from oil spills has been reevaluated with regard to Northern Mitigated Pipeline Route #1. Factors considered in this reevaluation include the new location of the pipeline route, the system of berms and containment basins, and the series of three check valves and three block valves proposed by Union Oil.

Northern Mitigated Pipeline Route #1 is located on the north edge of Terra Road in the vicinity of the Santa Ynez River estuary. This realignment moves the route closer to the estuary for some sections and further from the estuary in other sections, compared to the original preferred route. The location of the route on the north side of and adjacent to Terra Road would permit the road to be used for movement of construction machinery and would thus reduce the width of the right-of-way required for pipeline construction. Reducing this width would reduce the potential for accelerated erosion and sedimentation of the habitats of the Santa Ynez River estuary. An additional mitigation required by the Coastal Commission for a finding of consistency is: "All cut and fill areas along the pipeline route will be regraded to match the existing contours and revegetated with native plant species." A further suggestion is that all cleared areas, including berms and containment basins, be revegetated with native plant species. This measure would serve as an aid to erosion control and would help to maintain the physical integrity of the berms and basins. A maintenance and revegetation plan for the berms, basins and dikes should be prepared and reviewed prior to the start-up of the construction period.

Engineering drawings (see Figures 10.2, 10.3 and 10.4) and statistics provided by Union Oil show that most of the containment basins have been designed to hold substantially more oil than the static volume of the section of pipeline that could drain in the event of a break or leak in addition to the pumped oil that would flow from the western end of the break until the line is shut down or the block valves are activated. It is recommended that the capacity of those basins that would not accommodate substantially more than the maximum drained and pumped oil volume be increased. With this mitigation, the likelihood that spilled oil would reach the Santa Ynez River estuary is significantly reduced from that of the originally proposed pipeline route, providing that the berms and containment basins are maintained at the required height and capacity throughout the period of Union Oil and other Area Study production, estimated at 30 years.

Some of the berms and dikes would be constructed of dirt and these could be worn down over time as a result of natural erosive processes such as rainfall. Similar processes could cause the basins to fill in over the long term. Revegetation of the berms, dikes and basins would protect them from erosive forces and would not significantly alter their ability to function in the manner prescribed. It is recommended that Union develop a revegetation plan for this area that utilizes locally obtained native plant species. Also, it is suggested that Union Oil prepare a maintenance plan for the berms and containment basins to cover the life of the project, and that provisions be made for periodic monitoring of the condition of these structures by the staff of Vandenberg AFB's Environmental Planning Branch.

Potential impacts to Least Terns resulting from a leak in the gas line are not considered to be different from those discussed in Technical Appendix F.

10.1.4.2 Northern Mitigated Pipeline Route #2

INTRODUCTION

Northern Mitigated Pipeline Route #2 consists of a realigned section of Northern Mitigated Pipeline Route #1. This realigned section is located near landfall and is about 1 mile long. The realignment would move the route to the north and upslope about 500 to 1,000 feet from the present location of Terra Road. Northern Mitigated Pipeline Route #2 is shown in Figure 10.1. No field studies have been conducted on this realignment. This section discusses existing conditions based on examination of color air photographs (scale approximately 1:24,000) and knowledge of similar adjacent habitats, potential worst-case impacts and recommended field studies.

EXISTING CONDITIONS

The vegetation of Northern Mitigated Pipeline Route #2 appears to consist of Annual Grassland and Coastal Sage Scrub communities. These are probably similar in species composition to those described for the proposed pipeline route in Section 4.1.1.0 of Technical Appendix F. One distinguishing feature of Northern Mitigated Pipeline Route #2 is that introduced Ice Plant forms a dominant component of the vegetation. No state- of federally-listed or candidate threatened or endangered plant species are expected along this route, since none were found in similar downslope communities. Two or more regionally endemic plant species may occur along Northern Mitigated Pipeline Route #2, although the predominance of Ice Plant makes this less likely than in vegetation dominated by native species.

Wildlife habitat types crossed by Northern Mitigated Pipeline Route #2 include grassland and coastal scrub. The species found here are expected to be similar to those found in similar habitats along Northern Mitigated Pipeline Route #1, described in Section 10.1.4.1. No state- or federally-listed or candidate threatened or endangered wildlife species are expected along this route. The regionally rare Northern Harrier and Black-shouldered Kite nest in the vicinity of the Santa Ynez River estuary and probably forage occasionally in the area crossed by Northern Mitigated Pipeline Route #2. The habitats along Northern Mitigated Pipeline Route #2 are of the type utilized by the regionally rare Burrowing Owl, which has been seen on Vandenberg AFB, although not in the vicinity of Northern Mitigated Pipeline Route #2. The regionally rare Badger occurs along both the proposed route and Northern Mitigated Pipeline Route #1 and may be found as well along Northern Mitigated Pipeline Route #2.

No aquatic habitats are crossed by Northern Mitigated Pipeline Route #2.

Recommended field studies include a visual survey of the realigned route by a botanist and a wildlife biologist.

IMPACTS AND MITIGATIONS

Northern Mitigated Pipeline Route #2 is a realignment that would move the pipeline route from 500 to 1,000 feet further north from the nesting area of the California Least Tern and other sensitive habitats and species of the Santa Ynez River mouth. This would substantially reduce the likelihood that either accelerated erosion or sedimentation from construction, or onshore oil spills, would affect the Santa Ynez River estuary. As a condition of using this route, Vandenberg AFB will require that Terra Road be relocated upslope to follow the pipeline route and the existing Terra Road be recontoured and revegetated with locally obtained native plants. This action would reduce noise and human presence in the vicinity of the estuary below existing levels and would restore native plant communities and wildlife habitat in areas that currently do not support them. Both of these are regarded as Class IV (beneficial) impacts. The relocation of Terra Road would allow inspection of this section of the route by vehicle using an established roadway.

Construction of the pipeline using Northern Mitigated Pipeline Rote #2 probably would require the use of a 100-foot wide right-of-way, compared to the 50-foot right-of-way that would be required for this section of Northern Mitigated Pipeline Route #1. Therefore, twice as much vegetation and wildlife habitat would be removed for a given length of route. However, Northern Mitigated Pipeline Route #2 is slightly shorter than Northern Mitigated Pipeline Route #1, so the total acreage removed would be somewhat less than twice that required for the comparable section of Northern Mitigated Pipeline Route #1. There would be no changes in the number of drainages crossed as a result of using Northern Mitigated Pipeline Route #2.

Block valves, berms and containment basins would be installed along Northern Mitigated Pipeline Route #2, although no site-specific plans have been presented showing their locations or capacities.

Use of Northern Mitigated Pipeline Route #2 also would reduce the likelihood of impacts to sensitive species from a toxic gas leak in the vicinity of the Santa Ynez River estuary.

No impact classifications would change from those discussed for Northern Mitigated Pipeline Route #1 (see Section 10.1.4.1).

Additional potential mitigations include the same actions as those suggested for Northern Mitigated Pipeline Route #1. These include conditions required by the Coastal Commission's finding of consistency and the development of a berm and basin maintenance plan and a revegetation plan prior to the commencement of construction. It is also proposed that the possible need to install monitors for hydrogen sulfide be anticipated and that junction boxes and communication links be installed at appropriate locations during pipeline construction. Installation of sensing devices would be required only in the event that the gas turns sour.

10.1.4.3 Southern Mitigated Pipeline Route

INTRODUCTION

The Southern Mitigated Pipeline Route was developed by consulting biologists and staff of Arthur D. Little as a means of mitigating potential impacts from construction and oil spills that could result from installation and operation of the onshore pipeline. It is identical to part of the Mitigating Realignment discussed in Section 6.2.1.1 and shown in Figure 6.1 of Technical Appendix F. The Southern Mitigated Pipeline Route is shown in Figure 10.1-1 of this section.

This section discusses (1) existing conditions along the Southern Mitigated Pipeline Route where this route differs from the alternate pipeline route and (2) potential impacts associated with the Southern Mitigated Pipeline Route.

EXISTING CONDITIONS

Vegetation

Vegetation and land cover types crossed by this route include Coastal Strand, Coastal Scrub, agricultural land, Annual Grassland, Freshwater Marsh, Riparian Woodland, Burton Mesa Chaparral, planted trees and ruderal vegetation. These types are described for the Study Region in Section 2.1 of Technical Appendix F.

Section I: Landfall to Agricultural Field

From landfall one-half mile south of the Santa Ynez River mouth this route proceeds east across a low hill for just over a mile to a large agricultural field south of Highway 246. The route ascends the gradual west-facing slope of the hill, which crests at about 210 feet elevation, then descends the steeper east-facing slope. A utility pole line crosses the hill and field to the east near the Southern Mitigated Pipeline Route.

Near landfall this route passes through Coastal Strand dominated by Red and Yellow Sand Verbenas, Beachbur and Sea Rocket on dunes toward the ocean. The inland dunes here have been heavily disturbed by activities associated with the installation and maintenance of the Southern Pacific Railroad tracks and Surf Station. Weedy species such as Ice Plant, Crystalline Ice Plant, European Beach Grass and Sickle Grass dominate the inland dunes.

To the east the route passes through Coastal Bluff Scrub and then Coastal Dune Scrub as it ascends the small hill. Coastal Bluff Scrub at the base of the hill is dominated by Coast Goldenbush, Giant Coreopsis and Coyote Brush. Black-flowered Figwort (a federal candidate species) is scattered within this vegetation.

Coastal Dune Scrub gradually replaces Coastal Bluff Scrub on the higher part of the slope. The former is dominated by low shrubs of Coastal Bush Lupine, Mock Heather, California Sagebrush and Seacliff Buckwheat. Many native annual herbs are found in the understory, including Small-fruited Seaside Amsinckia (Amsinckia spectabilis var. microcarpa, a regional endemic), two species of spineflower (Chorizanthe diffusa and C. angustifolia, the latter a regional endemic), Sky Lupine (Lupinus nanus) and Coastal Phacelia (Phacelia ramosissima). Black-flowered Figwort is scattered throughout this vegetation. The vegetation of the west-facing slope is largely undisturbed.

Near the hilltop a few young individuals of Surf Thistle (a federal candidate species) were found growing near the base of a utility pole (outside of the pipeline right-of-way). Weedy species such as Rip-gut Grass, Foxtail Fescue, Wild Radish and Tumble Mustard (Brassica geniculata) are abundant along the pole line maintenance road and in other disturbed areas.

The crest of the hill forms a broad knoll of clay soil covered in part with Annual Grassland. Common species include Wild Oats, Soft Chess and Yellow Bur-clover. Small depressions where water accumulates include species characteristic of moist areas, such as rushes (Juncus spp.), Brass Buttons (Cotula coronopifolia) and Blue-eyed Grass (Sisyrinchium bellum). Native herbs found in this grassland include Goldfields (Lasthenia chrysostoma) and Brodiaea (Dichelostemma pulchellum).

The vegetation of the east-facing slope is disturbed, with greater disturbance toward the bottom of the slope. Annual grassland with scattered shrubs of Coastal Dune Scrub species dominates this slope. At the base of this slope Black-flowered Figwort plants are scattered among the shrubs.

Section II: Agricultural Field to Junction with Alternate

Pipeline Route

The Southern Mitigated Pipeline Route traverses a plowed but presently unplanted agricultural field south of Highway 246. At the eastern end of the field this route turns north and crosses a flood control ditch (an extension of Drainage 2-1) dominated by California Tule and containing a few Arroyo Willows. On the raised banks of the ditch are shrubs of gooseberry (Ribes sp.) and Coyote Brush with Black-flowered Figwort plants growing among them.

The route continues north across Highway 246 and the Southern Pacific Railroad tracks into a field that appears to have been cultivated in the past. The vegetation of this field at present consists of a mixture of Annual Grassland and Coastal Dune Scrub species, including Rip-gut Grass, Wild Radish, Wild Rye and Coyote Brush. In this field the route turns southeast and extends through similar vegetation for about two-tenths of a mile. The route continues southeast through scattered stands of Arroyo Willow, then crosses an agricultural field planted with barley just west of 13th Street. Southeast of 13th Street this route crosses agricultural fields to a point about half a mile west of Union Sugar Avenue where it joins the alternate pipeline route.

Section III: Junction with Alternate Pipeline Route to Santa Lucia Canyon

From the junction with the alternate pipeline route to the north side of the Santa Ynez River the Southern Mitigated Pipeline Route is identical to the alternate pipeline route to Site #4. The vegetation of this segment of the route is discussed in Section 4.1.1.2 of Technical Appendix F.

North of the Santa Ynez River this route trends northwest on the west side of and parallel to Santa Lucia Canyon Road, then north on the east side of and parallel to Santa Lucia Canyon Road until it intersects the proposed pipeline route to Site #4 on Union Fee property. For most of this section the route crosses Lompoc Federal Correctional Institution property and therefore was not accessible on foot during field surveys.

On the north side of the Santa Ynez River this route parallels the road on the west side and passes through mowed ruderal vegetation and patches of Ice Plant. To the north, the road is lined with Blue Gum (*Eucalyptus globulus*) trees. (If the edge of the road is considered to be the border of the right-of-way, then these trees would be located within the right-of-way. If the route were shifted about 20 feet to the west these trees would be avoided.) Near the main entrance to the Lompoc FCI the route crosses landscaped grounds with grass and scattered trees. The route crosses Santa Lucia Canyon Road near Oakridge Road and continues northwest on the east side of the road. For a short distance the route passes through landscaped vegetation. About one-tenth mile north of the landscaped area the route curves and proceeds due north. From this point north to the northern boundary of the Lompoc FCI the vegetation of the pipeline route is composed of Burton Mesa Chaparral that has been mowed at frequent intervals for fire safety. Some chaparral shrubs and Coast Live Oak trees remain and are within the pipeline route right-of-way. The vegetation of this roadside area includes various weedy grasses and herbs.

This route continues north on the east side of Santa Lucia Canyon Road onto Union Fee property. The vegetation here is a mixture of grassland and Burton Mesa Chaparral species with some planted eucalyptus trees. The trees are located outside of the pipeline right-of-way. Grassland areas contain a diverse assemblage of native annual and perennial herbs as well as a variety of introduced weedy species. Native species found here include Scarlet Bugler (*Penstemon centranthifolius*), White Layia (*Layia glandulosa*), Blochman's Larkspur (*Delphinium parryi* ssp. *blochmaniae*, a regional endemic), California Spineflower (*Chorizanthe californica*) and Purple Owl's Clover (*Orthocarpus purpurascens*). Common introduced species include Rip-gut Grass and Broad-leaf Filaree (*Erodium botrys*). North of this area the Southern Mitigated Pipeline Route reaches the proposed route to Site #4.

Wildlife

Wildlife habitat types along or near the Southern Mitigated Pipeline Route include: coastal beach and foredune, coastal scrub, chaparral, oak woodland, grassland, freshwater marsh, riparian woodland, agricultural and other modified habitats. Detailed descriptions of the distribution of these habitats within the Study Region and their characteristic wildlife species can be found in Section 2.2 of Technical Appendix F. Detailed information concerning the Southern Mitigated Pipeline Route follows.

After crossing Highway 246 near Surf the pipeline route follows for about 0.5 mile an existing utility line corridor. This portion of the route passes through coastal dune scrub and scattered grasslands. These habitats do not regularly support any rare species of wildlife. Some of the more common breeding birds include: Red-tailed Hawk, American Kestrel, Anna's and Costa's Hummingbirds, Bewick's Wren, California Thrasher, Wrentit, Brown Towhee, Song Sparrow, White-crowned Sparrow, and House Finch. This area does provide important foraging habitat for a number of raptors such as Red-tailed Hawk, American Kestrel, and the regionally rare Black-shouldered Kite and Northern Harrier. The most common reptiles observed or expected are Western Fence Lizard, Side-blotched Lizard, Gopher Snake, and Western Rattlesnake. Common land mammals include the Deer Mouse, Heermann's Kangaroo Rat, Botta's Pocket Gopher and Coyote. The Badger is the only regionally rare wildlife species observed along this portion of the route.

To the east, the route crosses an agricultural field south of Highway 246. Such a habitat is virtually devoid of reptiles, amphibians and land mammals. A number of widespread bird species like the Red-tailed Hawk, American Kestrel, Cliff and Barn swallows, Common Crow, Eurasian Starling, Red-winged and Brewer's blackbirds, Western Meadowlark, House Finch, and Lesser and American goldfinches are expected to use this modified habitat. The regionally rare Northern Harrier may forage in this habitat, however, this species is more common in areas closer to the Santa Ynez River mouth.

Of more interest to wildlife is the flood control channel that is an extension of Drainage 2-1 with an extensive growth of tules that is located between Highway 246 and the agricultural field. This channel is of sufficient size and quality to support the regionally rare Red-legged Frog. Field censuses during April 1985 failed to locate Red-legged Frogs at the point where the pipeline would cross this drainage. A number of fairly common breeding birds, such as American Coot, Cliff and Barn swallows, Marsh Wren, Common Yellowthroat, Song Sparrow, Red-winged Blackbird, and House Finch, were observed or expected in the tules that fill this channel. These tules may also support breeding Virginia Rails and migrant or wintering American Bitterns.

North of Highway 246 the pipeline passes through a roadside ditch that contains a small stand of recently trimmed willows. These willows are not expected to support any regionally rare riparian-dependent nesting birds. The realigned route then crosses the railroad tracks and enters a large open field dominated by Coyote Brush and grasses. From here the pipeline route parallels Highway 246 until it crosses 13th Street where it begins to diverge east across agricultural fields. About 0.5 mile west of Union Sugar Avenue the mitigated pipeline route joins the alternate route. From this point to the north side of the Santa Ynez River the Southern Mitigated Pipeline Route is the same as the alternate route to Site #4.

The habitats located along this segment of the pipeline route and along Central and Floradale Avenues support no rare wildlife species except the Red-legged Frog. A survey in late April 1985 located Red-legged Frogs in a small cattail marsh (Drainage 2-3) situated along Central Avenue 0.3 miles east of its junction with Artesia Avenue.

Characteristic bird species found in the agricultural fields along this segment include those listed above for agricultural fields as well as Killdeer, Horned Lark, Water Pipit (winter only), and White-crowned Sparrow (winter only). In general, agricultural fields are frequented by a relatively large number of birds (see Section 2.2 of Technical Appendix F) and, with the exception of foraging raptor species, most species are relatively numerous and widespread. Black-shouldered Kites are known to use this area regularly for hunting but are not expected to nest here.

North of the Santa Ynez River crossing this route follows Santa Lucia Canyon Road through the Lompoc Federal Correctional Institution and joins the proposed route to Site #4 at the latter's intersection with Santa Lucia Canyon Road.

The mitigated route along Santa Lucia Canyon Road from the Santa Ynez River crossing to its junction with the proposed route to Site 4 is an area largely characterized by planted eucalyptus, mowed grassland, and roadside iceplant. These disturbed habitats are frequented by relatively common widespread species such as Western Fence Lizard, Southern Alligator Lizard, Gopher Snake, Botta's Pocket Gopher, California Ground Squirrel, California Vole, Skunks, Coyote, Killdeer, Savannah Sparrow, Horned Lark, Western Meadowlark, Eurasian Starling, Red-winged and Brewer's blackbirds, Common Crow, and House Finch. Breeding Cassin's Kingbirds are the only species of local interest which are expected here.

Aquatic Habitats and Biota

Drainages crossed by the Southern Mitigated Pipeline Route are the same as those crossed by the alternate route from landfall to Santa Lucia Canyon. These are discussed in Section 4.1.1.2 of Technical Appendix F. One major difference between these routes is that the alternate route crosses salt marsh habitat on the border of the Santa Ynez River estuary, while the Southern Mitigated Pipeline Route is located further to the south, no closer than one-forth mile to the edge of the estuary, and is separated from it by intervening roads and topographic features. The Southern Mitigated Pipeline Route passes through the southern part of the 100-year floodplain of the Santa Ynez River for a distance of about seven miles from the agricultural field east of landfall to the north side of the Santa Ynez River.

Spring sampling for this project included sampling the fauna of the Santa Ynez River at the Floradale Avenue bridge. The stream was found to support a depauperate fauna consisting of a few species that are characteristic of shallow warm water stream habitats. The low number of species found is probably a result of high water temperatures and possibly eutrophic conditions that are a result of the influence of the Lompoc Sewage Treatment Plant, which is located directly upstream from this site.

Areas and Species of Special Importance

The Southern Mitigated Pipeline Route crosses a small area of disturbed Coastal Strand vegetation near landfall and a small area of disturbed Burton Mesa Chaparral near its intersection with the proposed route. It crosses Riparian Woodland at the Santa Ynez River and two small disturbed Freshwater Marsh habitats, one along Central Avenue and one in a flood control ditch.

Recent field surveys of those sections of the Southern Mitigated Pipeline Route that differ from the alternate route and spring surveys for rare plants, birds and amphibians located several species of concern along or near this route.

Three plant species that are federal candidates for listing were found within or near the right-of-way. Black-flowered Figwort is scattered to locally common in Coastal Dune Scrub vegetation within the right-of-way on the hill east of the dunes and on the border of the flood control ditch (an extension of Drainage 2-1) at the east end of the agricultural field south of Highway 246. Surf Thistle (two immature individuals) was found at the base of a utility pole on the crest of the hill east of the dunes. These plants are outside of the right-of-way. Shagbark Manzanita grows in disturbed Burton Mesa Chaparral along Santa Lucia Canyon Road within the pipeline right-of-way.

The regionally rare Red-legged Frog was found during an April census in a small cattail marsh (Drainage 2-3) along Central Avenue, 0.3 mile east of its intersection with Artesia Avenue.

Several regionally rare birds were found to be breeding in Riparian Woodland habitats along the Santa Ynez River in the vicinity of the Floradale Avenue bridge. A pair of Black-shouldered Kites and one to several pairs of Swainson's Thrushes, Warbling Vireos, Yellow Warblers and Wilson's Warblers were located during spring surveys. Black-shouldered Kites and Northern Harriers are expected to forage occasionally within the agricultural fields and grasslands along this route.

IMPACTS AND MITIGATIONS

The Southern Mitigated Pipeline Route is about 9.1 miles long and construction along this route would result in the partial or complete removal of about 95 acres of vegetation and wildlife habitat, of which 24 percent (23 acres) is composed of native types (see Table 10.1.4-1). These figures assume a right-of-way width of 100 feet, except along Central Avenue, where the width was assumed to be 50 feet. Removal of Coastal Strand, Coastal Scrub, Riparian Woodland and Freshwater Marsh habitats constitutes locally to regionally significant Class II impacts. Removal of Burton Mesa Chaparral is considered to be a Class I, locally significant impact. Within the right-of-way there are 426 trees, including 276 oak stems and 96 eucalyptus trees. All of the eucalyptus and some of the oak stems could be avoided by minor realignments or by narrowing the corridor for a short distance along Santa Lucia Canyon Road. Construction of the pipeline using this route would not affect the habitats and species of the Santa Ynez River estuary. Other construction-related impacts to wildlife from noise and human presence would be similar to those discussed in Technical Appendix F.

Oil spill impacts for this route are considered Class II, locally to regionally significant, depending upon the size of the spill. For the alternate pipeline route, which passes through the border of the Santa Ynez River estuary, oil spill impacts are considered Class I, locally to regionally significant. Mitigating features that have been proposed for the Southern Mitigated Pipeline Route to reduce the likelihood of oil spill impacts include the use of block and check valves, burying the pipeline deeper (5 to 10 feet) within high-risk portions of the 100 year floodplain and several alternate methods of crossing the Santa Ynez River at the Floradale Avenue bridge. The effects of these mitigations were analyzed with special emphasis given to the California Least Tern, a federal- and state-listed endangered species. The details of this analysis are presented below under Rare Species.

Rare Species

Compared with the original Southern Alternative Pipeline Route, the Southern Mitigated Pipeline Route would affect fewer rare species. No Class I impacts to rare species are anticipated if the Southern Mitigated Pipeline Route is used with the mitigating features discussed above. Rare species potentially affected by this route include:

Black-flowered Figwort

Construction - Class II, locally significant
Oil spills - Class II, locally significant

Shagbark Manzanita

Construction - Class II, locally significant
Oil spills - Class II, locally significant

Red-legged Frog

Construction - Class II, locally significant
Oil spills - Class II, locally significant

Tidewater goby

Construction - Class II, locally to regionally significant
Oil spills - Class II, locally to regionally significant

Black-shouldered Kite

Construction - Class II, locally significant

California Least Tern

Oil spills - Class II, locally to regionally significant

Swainson's Thrush

Construction - Class II, locally significant

Warbling Vireo

Construction - Class II, locally significant

Yellow Warbler

Construction - Class II, locally significant

Wilson's Warbler

Construction - Class II, locally significant

The following discussion presents details of the analysis on which the above impact classifications are partly based.

Impacts to California Least Terns

The California Least Tern is a federally- and state-listed endangered species that nests and feeds in the Santa Ynez River estuary. An important post-breeding dispersal site is located at the mouth of the estuary. Construction of the pipeline using the Southern Mitigated Pipeline Route would not result in adverse impacts to Least Terns because the route passes no closer than one-half mile to the area used by the terns.

The possibility that Least Terns could be affected by oil spills from the Southern Mitigated Pipeline Route has been investigated. Questions have been raised since (1) the Southern Mitigated Pipeline Route passes through the southern part of the 100-year floodplain of the Santa Ynez River and (2) this route crosses the Santa Ynez River at the Floradale Avenue bridge.

The route passes through the southern part of the 100-year floodplain for most of its length from a point approximately one mile east of landfall to the north side of the Santa Ynez River. During the 1969 flood, which was considered to be a 50-year flood, most of this area was under water and scouring to a depth of about eight feet occurred in some sites. This indicates that there is a possibility that under worst-case conditions a severe flood could result in a major rupture of the pipeline. If this were to occur without warning and without any preventative measures being taken, pumped oil would spill from the western end of the break at a rate of from 14 barrels per minute (Union's production) to 70 barrels per minute (maximum Area Study production) until the line were shut down. Shutdown can be accomplished within ten minutes or less of determination that a break has occurred, and monitoring equipment at the Lompoc Dehydration Facility would be capable of detecting a major break within a few minutes. In addition to oil pumped out of the line, some oil could drain from the section east of the break. The amount that would drain would depend upon local topography and the location of the break relative to the nearest valve. Since this area of the floodplain is more or less flat and a block valve would be located on the south side of the Santa Ynez River crossing site, it is unlikely that oil would drain from this section of pipeline.

Preventative measures could be taken that would reduce the likelihood of a flood-caused oil spill. Burying the pipeline at a depth greater than the proposed three-foot depth would decrease the likelihood that the line would be exposed as a result of scour by flood waters.

The probability of a rupture of the pipeline as a result of flooding is unknown, however, the probability of a 100-year flood is 1 percent per year and of a 50-year flood, 2 percent per year.

Another factor to be considered is that Least Terns are present in the vicinity of the Santa Ynez River estuary from late April to early September, whereas over 95 percent of annual rainfall occurs from the beginning of November until the end of April. It is therefore unlikely that terns would be present during flood conditions. However, if large amounts of oil were to be deposited in the estuary during a flood, this could result in subsequent effects on estuarine biota that could reduce the food supply available to terns during the following year.

Since the Southern Mitigated Pipeline Route crosses the Santa Ynez River at the Floradale Avenue bridge, the possibility of impacts to Least Terns from oil spilled as a result of a pipeline break at this point also has been considered. Three methods of crossing the river have been investigated: (1) trenching, (2) spanning and (3) a drilled crossing. These methods are discussed in detail in Section 10.1.1, Engineering Considerations. Construction using any of these three methods would not affect Least Terns, since the crossing site is more than five miles upstream from the area used by these birds. Oil spilled at the crossing site would affect Least Terns only if it were to travel five miles downstream to the estuary.

The calculated probability of an oil spill of 100 barrels or more for a 1-mile segment of the pipeline in the vicinity of the Santa Ynez River crossing is one chance in 2000 years; for a spill of 1000 barrels or more, it is one chance in 20,000 years. These probabilities are independent of the method used to cross the river. In addition to calculated probabilities, the following information is presented for consideration.

Trenching (burying the pipeline in an excavated ditch) or a drilled crossing would effectively eliminate the possibility of pipeline damage from vandalism or from vehicular accidents. Either of these methods could be used to place the pipeline deep enough (40 feet or more) so that scouring during flood conditions would not expose the pipeline. (The local environmental effects of construction associated with trenching would be significant, whereas those of a drilled crossing would be insignificant.) Spanning the river, either by suspending the pipeline from the bridge or from a separate suspension structure, would expose the pipeline to damage from vandalism, unless special means were taken to protect it. Suspending the pipeline from the bridge would expose it to damage from vehicular accidents. If a break in the pipeline occurred at the bridge, the largest spill that would be expected under worst-case conditions would be 350 barrels if valves are located on both sides of the river crossing. Without valves in these locations the spill could be larger.

On the basis of calculated probabilities and additional information presented above, it is considered unlikely that an oil spill at the Floradale Avenue bridge crossing would affect Least Terns five miles downstream. The potential effects to terns if oil were to reach the estuary are discussed in Technical Appendix F.

10.1.4.4 Proposed Pipeline Route From Santa Lucia Canyon to Site #4

INTRODUCTION

The Mitigating Realignment discussed in Section 6.2.1.1 of Technical Appendix F includes a section of about 2.7 miles located north of the crossing of Santa Lucia Canyon Road. Along this stretch the realignment would place the pipeline in an existing cleared firebreak on the eastern border of Vandenberg AFB. This firebreak is located adjacent to and just west of the proposed pipeline route. This section discusses existing conditions and impacts for this realigned segment based on additional field studies and analyses that were performed after the Draft EIS/EIR was issued.

EXISTING CONDITIONS

The firebreak is bordered to the east and west by Burton Mesa Chaparral for most of its length. Small areas of Oak Woodland and wetland vegetation associated with springs occur on the borders in a few sites. The firebreak is cleared on a regular, although not annual, basis so no large shrubs are present within it. The firebreak vegetation consists of a dense growth of annual and perennial grasses and herbaceous plants, including a variety of both native and introduced species. Young shrubs of some chaparral species are present as well. Common introduced species include Rip-gut Grass, Broad-leaf Filaree and Veldt Grass. Natives include Purple Owl's Clover, Small-flowered Lupine (Lupinus bicolor), White Layia, several species of spineflower, Fern Phacelia, Gilia (Gilia angelensis), Baby Blue-eyes (Nemophila menziesii) and San Luis Obispo Wallflower (Erysimum suffrutescens var. grandifolium), the latter a regional endemic and CNPS-listed species.

Two drainages (1-9 and 1-10) traverse the firebreak. These wetland habitats support plants characteristic of moist sites, including sedges, rushes and Common Monkeyflower (Mimulus guttatus).

The firebreak is used by wildlife species found in the adjacent Burton Mesa Chaparral. Characteristic birds include: California Quail, Greater Roadrunner, Anna's Hummingbird, Bewick's Wren, Wrentit, California Thrasher, Golden-crowned and White-crowned sparrows (winter only), Rufous-sided and Brown towhees, House Finch and Lesser Goldfinch. No rare wildlife or bird species are expected to occur within the firebreak. The drainages that cross the firebreak are not of sufficient size or quality to support significant aquatic faunas.

IMPACTS AND MITIGATIONS

The section of the proposed route that would be moved into the firebreak by this realignment is about 2.7 miles long. Use of this realignment would substantially reduce the amount of native vegetation and wildlife habitat that would be adversely affected by construction, compared to the amount affected if the proposed route were used. Using the firebreak would eliminate the need to remove about 32 acres of native vegetation, including about 27 acres of Burton Mesa Chaparral, three acres of Annual Grassland, one acre of Coastal Scrub and 0.6 acre of Coast Live Oak Woodland. No trees would need to be removed along this segment if the firebreak were used, compared to about 300 trees that would be removed if the proposed route were used. After construction the firebreak would be cleared of most vegetation, as it is under existing conditions.

10.1.4.5 Proposed Pipeline Route From Site #4 To Orcutt

The Mitigating Realignment discussed in Section 6.2.1.1 of Technical Appendix F includes a segment about one mile long in the vicinity of the San Antonio Creek crossing. This realignment is shown in Figure 10.1-2. The proposed route is located to the west of Highway 1 in this area. The realignment would place the route several hundred feet east of Highway 1 so that the crossing of San Antonio Creek would be at a greater distance from Barka Slough and the Highway 1 bridge could be used as a support structure for a boom to be placed in the creekbed in the event of an oil spill.

The new crossing location of San Antonio Creek was examined during spring surveys to assess the condition of biological resources and determine if these would be adversely affected by the use of this area as a crossing site. At the mitigated crossing site San Antonio Creek appears to have been channelized or cleared of vegetation in the recent past. The vegetation is composed mainly of weedy species and low, shrubby willows and wildlife habitat quality is poor. This section of the creek receives runoff from nearby agricultural operations. Stream sampling during spring surveys revealed a depauperate fauna composed of very few species. The creek is dry through most of the year along this section. No rare species were noted, nor are any expected to occur, at or in the vicinity of the mitigated crossing site. The classification of impacts of construction would remain the same as presented in Technical Appendix F and Section 5.6 of the EIS/EIR. For vegetation these are considered Class III and for wildlife and aquatic habitats and species, Class III to Class II, regionally significant.

Additional mitigation presented by Union Oil Company for the San Antonio Creek to Harris Canyon drainage crossings include the use of thicker, factory-coated pipe and a special cathodic protection system. Union Oil Company has agreed to place block valves in locations recommended in the mitigation sections of Technical Appendix F and the EIS/EIR. Also, Union Oil has proposed a realignment that would eliminate the need for three crossings of the Harris Canyon drainage, a tributary to San Antonio Creek.

The additional realignment suggested by Union Oil is described in Section 10.1.1.3 and shown in Figure 10.1. This change would place the route in a cultivated vineyard adjacent to and on the east side of Highway 1 and Graciosa Road for a length of approximately 1 mile. This realignment would eliminate the potential for construction impacts at drainages 1-20, 1-21 and 1-22, and would reduce the likelihood that spilled oil from a pipeline leak or break along this section would reach San Antonio Creek and the sensitive habitats and species of Barka Slough.

Other impacts for this section of the route would not be significantly different from those previously discussed. No changes in impact classifications to sensitive species would occur as a result of the mitigations discussed above; since these are currently Class II, locally to regionally significant.

No additional field studies on the Union-proposed realignment are recommended, since the area crossed is a vineyard where no sensitive habitats or species are expected to occur. Also, this vineyard has been visually observed from Graciosa Road several times during previous field investigations.

The conclusion reached is that construction of the pipeline across San Antonio Creek at the mitigated crossing site would not affect significant biological resources, so long as construction is completed during the dry season and downstream sedimentation is controlled.

10.1.5 Cultural Resources

10.1.5.1 Methodology

Two mitigating pipeline routes (the Northern Mitigated Route #1 and Southern Mitigated Route, respectively) have been proposed to minimize environmental impacts. Field surface reconnaissance along these realignments was conducted to identify prehistoric, historic and Native American ethnographic sites. The surveys were conducted by the Arthur D. Little field archaeologist, trained assistants and Native American monitors in accordance with the methodology described in Section 4.8.2.0 of the EIS/EIR. No subsurface testing, boundary definition or significance testing were performed. The results of the surveys are discussed below and summarized in Table 10.5-1.

In addition, two minor realignments -- the Northern Mitigated Route #2 and the San Antonio Creek Crossing Realignment -- are under consideration and will be surveyed.

10.1.5.2 Northern Mitigated Pipeline Route

The pipeline right-of-way contains some of the same sites as the right-of-way of the preferred route. As noted in Table 10.5-1. SBa-1888, SBa-687, and all of the sites east of SBa-687 are within the right-of-way of the northern mitigating route. The Northern Mitigated Route #1 right-of-way contains parts of the three sites not in the original route (SBa-131, SBa-913, and SBa-1917) and may also include part of SBa-1146 or SBa-1889 and part of SBa-1891.

The Northern Mitigated Route #1 will avoid four sites: SBa-912, SBa-1890, SBa-1909, and SBa-914. These sites were in the right-of-way of the preferred route.

10.1.5.3 Southern Mitigated Pipeline Route

The Southern Mitigated Route right-of-way impacts three new sites (SBa-931, SBA-932 and SBA-1860) in addition to four sites and five isolates identified as being within the right-of-way of the Alternative Pipeline route as originally defined. The Southern Mitigated Route avoids SBa-1895.

Table 10.5-1

ARCHAEOLOGICAL SITES AND ISOLATES IN THE AREAS OF THE TWO MITIGATED ROUTES

NORTHERN MITIGATED ROUTE #1		SOUTHERN MITIGATED ROUTE	
Archaeological Site	Tentative Site Type	Archaeological Site	Tentative Site Type
SBa-1888*	Base or camp	SBa-931	Village and camp
SBa-1131	Possible site	SBa-932	Village or base
SB-1889 or SBa-1146*	Base or camp	SBa-219*	Village
SBa-913	Base or camp		
SBA-1917	Base or camp		
SBA-1891*	Base or camp		
SBa-687*	Base or camp		
Isolate X-2*	Isolate		
Isolate X-3*	Isolate	SBa-1860	Base or camp
Isolate SOH-2*	Isolate	Isolate SOH-2*	Isolate
Isolate SOH-3*	Isolate	Isolate SOH-3*	Isolate
Isolate X-6*	Isolate	Isolate X-6*	Isolate
Isolate SOH-4*	Isolate	Isolate SOH-4*	Isolate
Isolate X-4*	Isolate	Isolate X-4*	Isolate
SBa-1743*	Base or camp	SBa-1743*	Base or camp
SBa-1896*	Base or camp	SBa-1896*	Base or camp
SBa-1910*	Base or camp	SBa-1910*	Base or camp

*Site discussed in Technical Appendix G of Draft EIR/EIS

10.1.5.4 Comparison of Impacts of Mitigated Routes

It appears that north of SBa-1860, both mitigated routes will result in impacts to cultural sites similar to the corresponding segment of the original Proposed Pipeline route to Site 4 which follows Santa Lucia Canyon and terminates at the facility. Site comparison of impacts resulting from pipeline construction, therefore, involves comparison of the routes from the coast to a point north of SBa-1860.

The Southern Mitigated Route contains three sites which have been tentatively identified as prehistoric villages. All three sites extend beyond both edges of the right-of-way and will therefore be impacted by project construction. Site SBa-1860 will also be impacted unless the roadcut for Floradale Avenue is not widened.

The Northern Mitigated Route #1, will result in impacts to SBa-913, SBa-1917, and SBa-1891, all residential bases or camps. Sites SBa-1888 and SBa-687 extend through approximately half of the right-of-way and may be impacted. Site SBa-1889 or SBa-1146 may also be impacted by pipeline construction. These three sites are probably the remains of residential bases or camps.

As presently designed, it appears that the Southern Mitigated Route will result in greater impacts to cultural resources than the Northern Mitigated Route #1.

10.1.5.5 Mitigation of Impacts of Mitigated Routes

In most cases, it will be possible to modify either mitigation route in order to avoid most cultural resources. Site SBa-1891 along the northern route may be difficult to avoid because of its large size. On the southern route, site SBa-219 may also be difficult to avoid. It is probable that test excavations can locate corridors through both sites where a minimum of intact cultural deposits are present.

MITIGATION OF THE NORTHERN MITIGATED ROUTE #1

(1) Subsurface testing should be conducted in order to determine if SBa-1888 can be avoided by moving the centerline of the right-of-way a maximum of 50 feet to the north.

(2) Testing at SBa-1131 should be done to determine whether any intact archaeological deposit exists.

(3) The area north of the road adjacent to SBa-1889 should be tested to determine whether intact site deposits are present. If they are, it may be possible to move the right-of-way around the northern edge of SBa-18B9.

(4) In the area of SBa-913 and SBa-1917, the pipeline could be moved to the south where the slope is steeper and no evidence of sites was found during surveys of original preferred route. It is also possible that testing of the proposed route would indicate that these sites are located north of the zone which will be disturbed.

(5) Subsurface testing should be done along the route where it passes through SBa-1891 to determine whether intact deposits are present. If intact deposits are found, further testing should be conducted in order to locate a zone where impacts will be minimal.

(6) From SBa-687 to the proposed facility, impacts should be mitigated as recommended in EIS/EIR.

MITIGATION OF THE SOUTHERN MITIGATED ROUTE

The mitigation route recommended on pages 139 and 140 of Technical Appendix G outlines the major changes which are necessary to mitigate the impacts of the Southern Mitigated Route.

(1) The corridor should be moved south outside the boundaries of SBa-931 and SBa-932.

(2) The route should be designed to avoid the intact areas of SBa-219. At SBa-219, filled marsh areas possibly can be located and used as corridors for the pipeline.

(3) At SBa-1860, if possible, the pipelines should be laid within the existing roadcut. If not possible, the route should connect with the northern mitigation route south of the site and go around the site.

(4) Impacts to the sites north of SBa-1860 should be mitigated as recommended in the EIS/EIR.

10.1.5.6 Additional Realignments

Field surface reconnaissance along these realignments will be conducted. Impacts and mitigations will be presented in the Final EIS/EIR.

NORTHERN MITIGATED ROUTE #2

This minor realignment in the vicinity of the landfall may impact SBa-1762, a prehistoric site. Buried sites also may be present given the geomorphological conditions of the area, notably drifting sands. Impacts to buried sites along the realignment, however, are not expected to differ from those described for the proposed route. Based on the field surface reconnaissance and verification of SBa-1762, adjustments may be identified which will avoid impacts to cultural resources.

SAN ANTONIO CREEK CROSSING REALIGNMENT

This realignment may impact both historic and prehistoric sites. The knoll above San Antonio Creek is in direct proximity to the Harris Ranch and stop along the old Pacific Coast narrow gauge railroad. Although the area is disturbed (much of the knoll has been removed), historic sites may be located within the right-of-way. No prehistoric sites are known to exist in this area. Given distribution of sites throughout the region, however, the ridge above the floodplain may contain prehistoric sites.

10.1.6 Aesthetic Resources

10.1.6.1 Visual Resources

The visual impacts associated with pipeline installation have been described in Section 3.4.1.1. No aspects of normal pipeline operation would be visible. When abandoned, the pipelines would be sealed and left underground; no disturbance of soil and vegetation would occur at that time.

NORTHERN MITIGATED PIPELINE ROUTE

Long-term impacts of low significance would occur for certain views from 35th Street, Terra Road and Ocean Beach County Park. No impacts would occur on views from Civilian Beach. These would be due to the 1-acre gravel pad for the valve station at the foot of 35th Street. Reducing the size of the pad and using dark gravel would reduce the visual impact of the valve station site to negligible levels (Class II impact).

Long-term impacts on some views from Terra Road and 35th Street would occur due to the potential erosion of the four earthen catch basins, and the pipelines, where exposed to view at the drainage 1/2 mile east of the proposed valve station. Using jute meshing to stabilize the banks of the containment basins would help in revegetating the exposed soil surfaces, fully mitigating their impact (Class II). Although painting the pipelines earthtones would miminize the degree of contrast with their surroundings, they would remain visible (Class I impact).

The graded and cleared pipeline right-of-way would have short-term impacts of low significance on views from 35th Street, Terra Road and the Southern Pacific Railroad. The proposed site restoration measures would reduce the visual impacts noted to a level of insignificance within five years. Further mitigation is not possible, and the short-term impacts would be Class I.

SOUTHERN MITIGATION ROUTE

Where the route runs down the moderately steep slope (20 percent) near the turnoff from Highway 246 to Ocean Beach County Park, there is the potential for erosional scarring. The use of jute meshing to stabilize the slopes is recommended, as are other measures which would promote rapid revegetation (see Terrestrial and Freshwater Biology, Technical Appendix F). However, since the expected visual impacts would not be significant (Class III), these measures are not required.

No visual impacts would occur to views from SPRR or Central Avenue. At the Lompoc-Casmalia crossing, visual impacts would remain adverse but insignificant (Class III).

OTHER REALIGNMENTS

The northern mitigated realignment #2 shown in Figure 10.1-1 would result in a new visible scar that would be visible from Terra Road during construction. This would become insignificant at 2-5 years once the old Terra Road was revegetated since the new pipeline route would also become the new Terra Road.

There are no visual impacts associated with the realignment by the San Antonio Creek.

10.1.6.2 Onshore Noise and Vibration

Northern Mitigating Pipeline Route

The realignments proposed as part of the mitigating pipeline route will have no impact in terms of onshore noise and vibration. The realignments do not pass in close proximity to any known sensitive receptors.

Southern Mitigating Pipeline Route

The Southern Mitigating Pipeline Route passes in close proximity to the Federal Correctional Institution residential complex. During pipeline construction, the impacts in this vicinity are likely to be significant and adverse, (Class II), lasting for several weeks at varying levels. No other impacts are attributed to the proposed Southern Mitigating Pipeline Route.

Comparison of Mitigating Pipeline Routes

From the perspective of onshore noise and vibration, the Northern Mitigating Pipeline Route is preferable since it is associated with no impacts. The southern route, on the other hand, would have short-term but significant adverse impacts at the Federal Correctional Institution residential complex.

Mitigations

As noted in Section 5.9.1.2 it is difficult to effectively mitigate pipeline construction noise. The effects, however, will be transitory, disappearing when installation in the area has been completed.

10.1.7 Socioeconomics

As stated in previous sections, the Northern Mitigated Pipeline Route is situated in close proximity to the proposed northern route. The pipeline length is essentially equivalent and the terrain conditions are consistent. The mitigated route is adjacent to Terra Road until it reaches the Vandenberg AFB dog training facility where it turns south and intersects the proposed the proposed northern route corridor.

Given the similar topography and pipeline length of the mitigated northern route when compared to the northern route the cost of the alternative is expected to be similar to the cost of the northern pipeline route. For this reason the employment, housing, public service and public finance impacts will be indistinguishable from those identified for the northern route.

Land use impacts will also be consistent. There will, however, be slightly more disruption of traffic on Terra Road during construction of the mitigated route. This is not considered significant.

The southern mitigated pipeline route is proximate to the southern alternative pipeline route. It diverges substantially only north of the Santa Ynez River where it follows Santa Lucia Canyon Road until it intersects the northern pipeline route (the endpoint of the southern mitigated pipeline route). This divergence brings the proposed pipeline in closer proximity to housing for the U.S. disciplinary facility.

This alignment is not so substantially different from other alignments as to cause measurably different socioeconomic (i.e., employment, housing, public service and public finance) impacts.

Land use impacts are consistent with those listed for the southern alternative route. Short-term disruption during construction is the most notable impact, although it is not significant. There are some areas that suffer increased exposure to potential public hazard, but the probability of release is still very remote. The areas are noted in the following section on System Safety.

10.1.8 System Safety

The proposed northern mitigative pipeline route is essentially identical to the basic proposed northern route in terms of length, expected spill/release frequency, and proximity to populated areas. Reductions in the potential oil spill consequences of this route as compared to the proposed northern route have been discussed in Sections 10.1.3 and 10.1.4.

The proposed southern mitigative pipeline route is slightly longer than either the original mitigative northern routes as well as the alternate southern route and, therefore, has slightly higher expected spill/release frequencies. The frequencies for both mitigative routes are:

		Northern	Southern
Oil -	100 bbl	Once per 170 years	Once per 140 years
-	1,000 bbl	Once per 1,700 years	Once per 1,400 years
Gas -	6 kg/s	Once per 50 years	Once per 45 years
-	60 kg/s	Once per 500 years	Once per 450 years

In terms of potential consequences of these releases, the southern route is less likely to impact any portion of Vandenberg AFB than the northern route, however, several areas would have an increased exposure potential. These are:

- Buildings on the U.S. Naval Missile Facility to the south of the pipeline
- Artesia School
- Maple School
- the outskirts of Lompoc city
- Portions of the disciplinary barracks

With the exception of the last location, these areas are also potentially at risk from the alternate pipeline as discussed on page 8.5 of Technical Appendix M. Probabilities of releases near any one of these locations are still quite remote and would require the wind to be blowing in a particular direction and the gas cloud to be ignited before there could be any adverse impacts. The realignment in the firebreak along the northern route will require the pipelines to be buried approximately eight feet below grade. This deep burial is required to prevent damage to the pipelines due to firebreak maintenance and fire control.

Small leaks were only predicted to have flammable hazards for a maximum of 850 feet from the pipeline. Per the discussion in Section 2 of the Technical Appendix M, ruptures represent only 10 percent of all releases and their effects are limited to within one mile of the pipeline if there is a vapor cloud and an explosion, and significantly less if there is just a vapor cloud. Toxic hazards persist for less than 500 feet, even under very stable weather conditions. The Artesia School is the only location which could be adversely affected by the toxic portion of a release.

The minor additional realignments on both the Northern Mitigated Route and San Antonio Creek realignments would not effect the system safety impacts. The oil spill probabilities for the San Antonio Creek crossing, and Lompoc to Orcutt pipeline are given below.

Spill Size	Pipeline Probability	Creek Probability
100 bbls	Once per 60 years	Once per 4,100 years
1,000 bbls	Once per 600 years	--

ADDITIONAL PHOTOCHEMICAL MODELING FOR MITIGATING THE SIGNIFICANT OZONE IMPACTS OF THE UNION/EXXON PROJECT AND AREA STUDY FACILITIES

1. INTRODUCTION

As shown in the Draft EIS/EIR significant ozone impacts (i.e., exceedance of the Federal ozone standard of 12 pphm) were predicted with Trajectory 6 and its derivatives (Trajectories 6B for Area Study analysis and 6C for cumulative analysis) by all development scenarios (Union, Union plus Exxon, Area Study and cumulative). These Federal standard exceedances were still predicted to occur with the mitigation measures proposed in the Technical Appendix (Section 12 for the Union and Exxon facilities, Section 14 for the Area Study facilities and Section 15 for the full cumulative scenario).

This document discusses the ozone impacts predicted by the photochemical trajectory model TRACE for additional mitigation measures proposed for the project and Area Study facilities (both onshore and offshore). These mitigation measures are beyond those already analyzed in Technical Appendix B. Table 1-1 lists the additional mitigation measures that have been adopted for the additional TRACE runs. The table identifies all of the emission sources for the project and Area Study platforms for each run with the new mitigation measures.

2. OZONE IMPACTS OF FURTHER MITIGATION OF PROJECT EMISSIONS

As mentioned in Section 12.6 of the Technical Appendix, the mitigation measures to reduce NO_x emissions from the project facilities include: use of low NO_x burners at the Lompoc Dehydration Facility; and the scheduled testing of standby generators when there is no flaring and when no supply boat is present.

With the above mitigation measures for Platform Irene and the Lompoc Dehydration Facility, the mitigated onshore peak of 12.03 pphm would still slightly exceed the Federal standard (Table 12-9 of Technical Appendix). A further mitigation for Platform Irene would be to use an electric cement pump (i.e., eliminate its emissions on run 1). Table 2-1 and Figure 2-1 present the modeling results for the future baseline, unmitigated emissions, mitigated emissions (as discussed in the Technical Appendix) and those with the proposed further mitigation. As shown in the Table 2-1, the additional use of an electric cement pump would be sufficient to bring the onshore peak (11.61 pphm) below the Federal standard.

For the combined Union plus Exxon scenario, the mitigation measures recommended in the Technical Appendix succeeed in only reducing the onshore peak from 15.31 pphm (with the unmitigated emissions from Platform Irene, Platform Shamrock, and the Lompoc Dehydration Facility) to 12.58 pphm (Table 12-10 of Technical Appendix). To reduce this mitigated peak below the Federal standard, three further mitigation cases were analyzed.

In the first case (run 2 of Table 1-1), the cement pump on Platform Irene and the power tong on Platform Shamrock were assumed to be electric. Modeling results for this case are summarized in Table 2-2 and plotted in Figure 2-2. As shown in the table, the elimination of emissions from these two equipment items would result in an onshore peak of 12.16 pphm which would be slightly higher than the Federal standard.

Table 2-1

MITIGATED OZONE IMPACTS OF UNION PROJECT FACILITIES ON TRAJECTORY NUMBER 6

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.01	--
Mitigated	8.00	0.01
Further Mitigation	7.70	0.31

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.12	--
Mitigated	10.18	-0.06
Further Mitigation	10.41	-0.29

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	12.28	--
Mitigated	12.03	0.25
Further Mitigation	11.61	0.67

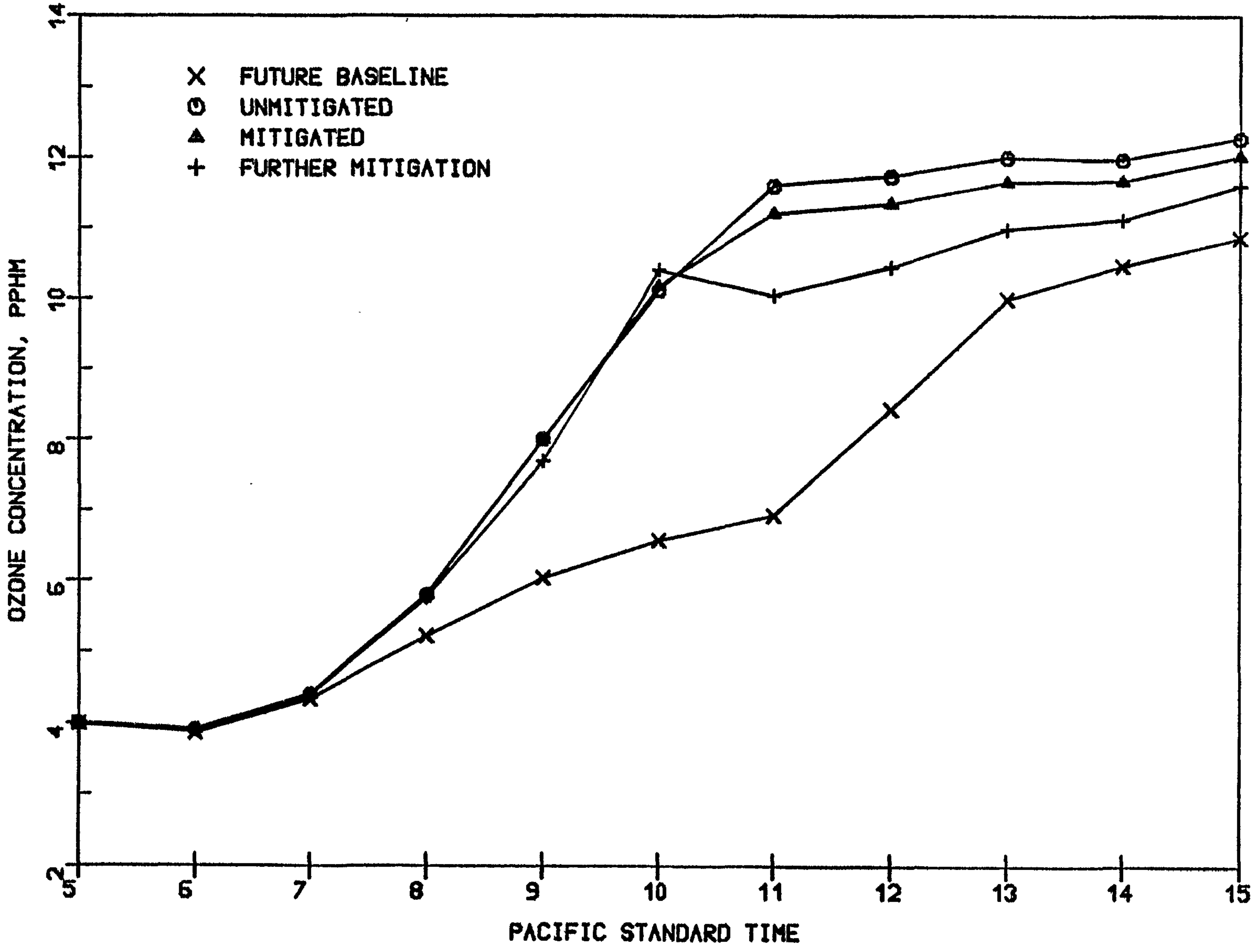


Figure 2-1.

MITIGATED OZONE IMPACTS OF UNION FACILITIES ON TRAJECTORY 6

Table 2-2

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY NUMBER 6

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	7.92	--
Mitigated	8.03	-0.11
Further Mitigation	8.20	-0.28

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	9.95	--
Mitigated	10.80	-0.85
Further Mitigation	10.54	-0.59

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	15.31	--
Mitigated	12.58	2.73
Further Mitigation	12.16	3.16

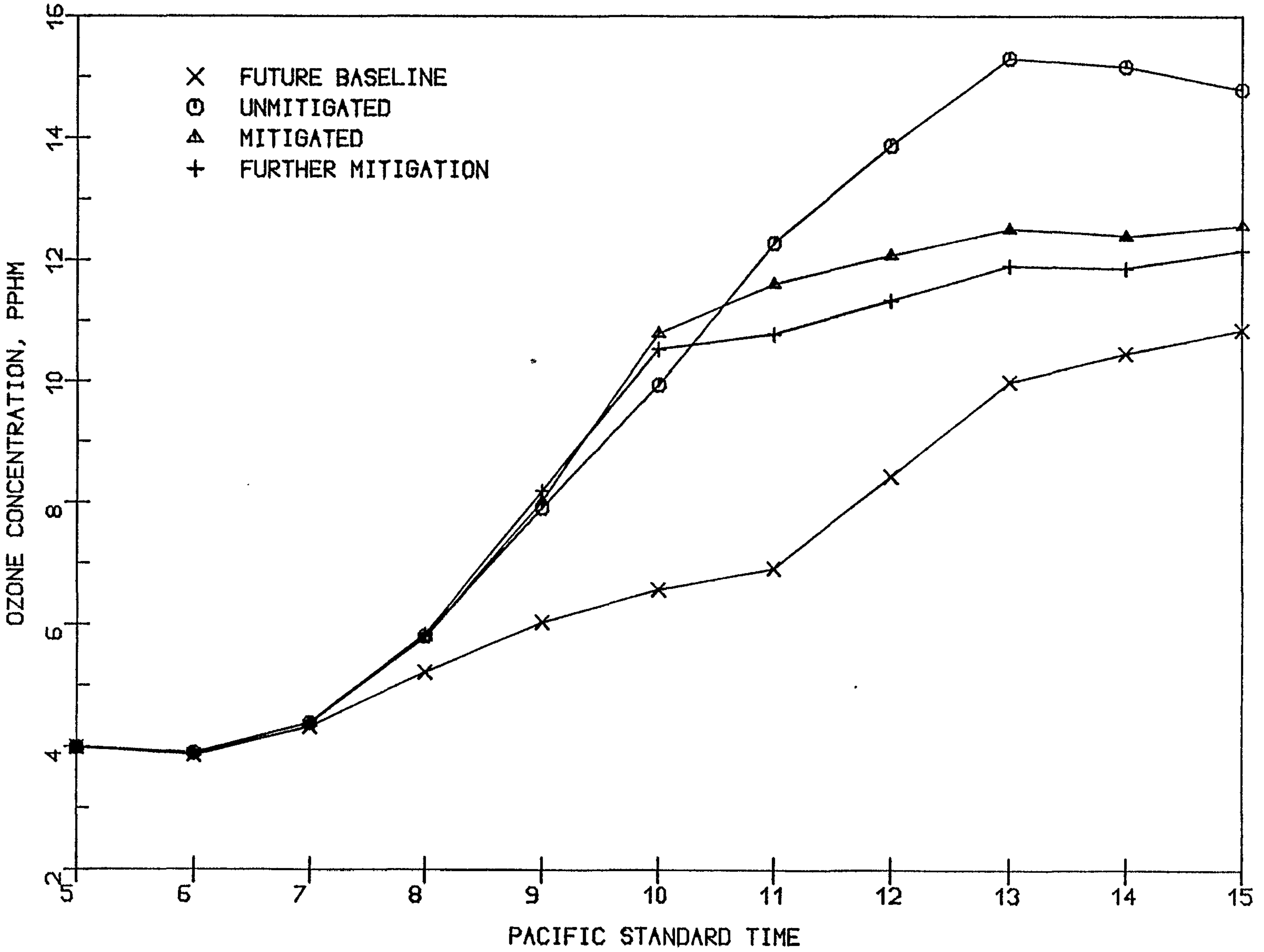


Figure 2-2.

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

Another case (run 5 of Table 1-1) assumes that Platform Irene would use an electric cement pump and an electric crane (the other crane is diesel-powered), and two cranes (one large and one small) on Platform Shamrock would also be electric. As shown in Table 2-3 and Figure 2-3, these further mitigation measures would be sufficient to bring the onshore peak below the Federal standard. The onshore peak was predicted to be 11.91 pphm with these further mitigation measures.

In a final case for the projects (run 6), the cement pump on Platform Irene was assumed to be electric and the supply boat idling at Platform Irene was eliminated. Since Platform Irene and Platform Shamrock would be close to each other, they could share a single supply boat. This boat was assumed to be idling at Platform Shamrock while Platform Irene was flaring in the model simulation. Modeling results are presented in Table 2-4 and Figure 2-4. This table shows that the onshore peak (11.99 pphm) would be slightly below the Federal standard.

It is noted that, while some of these mitigation measures succeed in reducing the onshore peak to a level below the Federal standard, they could not mitigate the state standard exceedances predicted near the shoreline.

3. OZONE IMPACTS OF FURTHER MITIGATION OF AREA STUDY EMISSIONS

As shown in Section 14.11 of the Technical Appendix, the mitigation measures suggested for the project and Area Study facilities include: scheduled testing of standby generators when no supply boat is present, use of low NO_x burners at the Lompoc Oil and Gas facilities, and elimination of offshore power generation of Platform P-0427 through the use of power cables to shore. With these mitigation measures, the predicted onshore peak (14.16 pphm) would still be above the Federal standard by 2.16 pphm (see Table 14-81 in Technical Appendix). To reduce this onshore peak below the Federal standard, four additional mitigation cases were analyzed.

In the first case for the Area Study (run 3), one of the two cranes on Platform Irene and P-0427 was assumed to be electric and Platform Shamrock would also use two electric cranes (one large and one small). As shown in Table 3-1 and Figure 3-1, these further mitigation measures would not be sufficient since an onshore peak of 13.32 pphm was predicted.

The second Area Study case (run 4) is similar to run 3 with the additional elimination of flaring on both Platform Irene and P-0427 platforms to determine the effects on the impacts. Table 3-2 and Figure 3-2 show that the onshore peak (12.78 pphm) would still exceed the Federal standard. Compared to the first case, elimination of flaring emissions on Platform Irene and P-0427 would bring about a reduction of 0.54 pphm in the onshore ozone peak.

In run 7 it is assured that for the Area Study one of two cranes on Platform Irene, P-0441 and P-0427 would be electric, and Platform Shamrock would use two electric cranes (one large and one small). In addition, it was also assumed that Platform Irene and Platform Shamrock would share a supply boat, and P-0441 and P-0427 would share another boat. This boat sharing would result in eliminating the boat idling emissions at Platform Irene and P-0441. As shown in Table 3-3 and Figure 3-3, the onshore peak (11.92 pphm) would be below the Federal standard.

Table 2-3

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY NUMBER 6

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	7.92	--
Mitigated	8.03	-0.11
Further Mitigation	8.13	-0.21

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	9.95	--
Mitigated	10.80	-0.85
Further Mitigation	10.44	-0.49

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	15.31	--
Mitigated	12.58	2.73
Further Mitigation	11.91	3.40

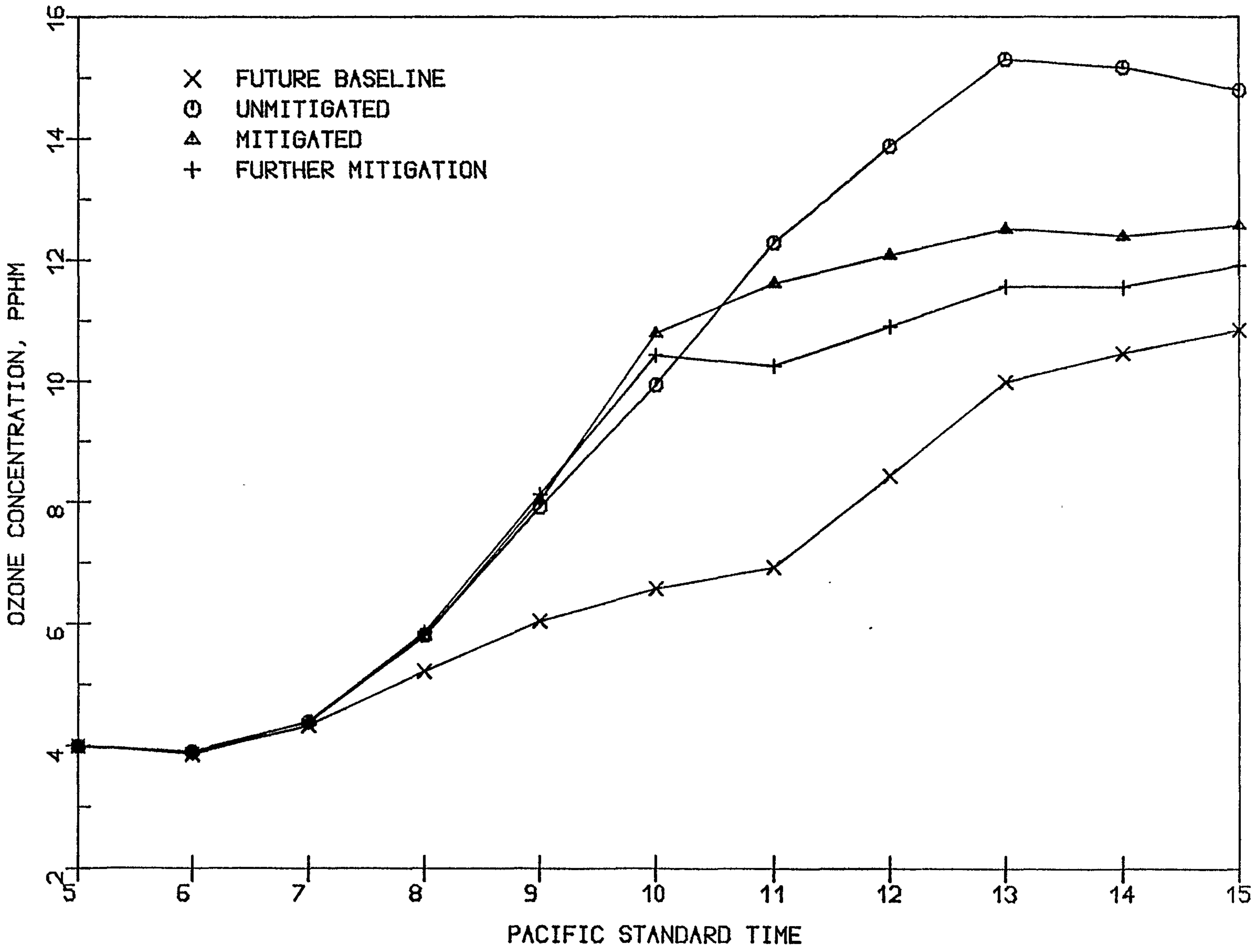


Figure 2-3.

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

Table 2-4

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY NUMBER 6

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	7.92	--
Mitigated	8.03	-0.11
Further Mitigation	8.21	-0.29

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	9.95	--
Mitigated	10.80	-0.85
Further Mitigation	10.23	-0.28

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	15.31	--
Mitigated	12.58	2.73
Further Mitigation	11.99	3.32

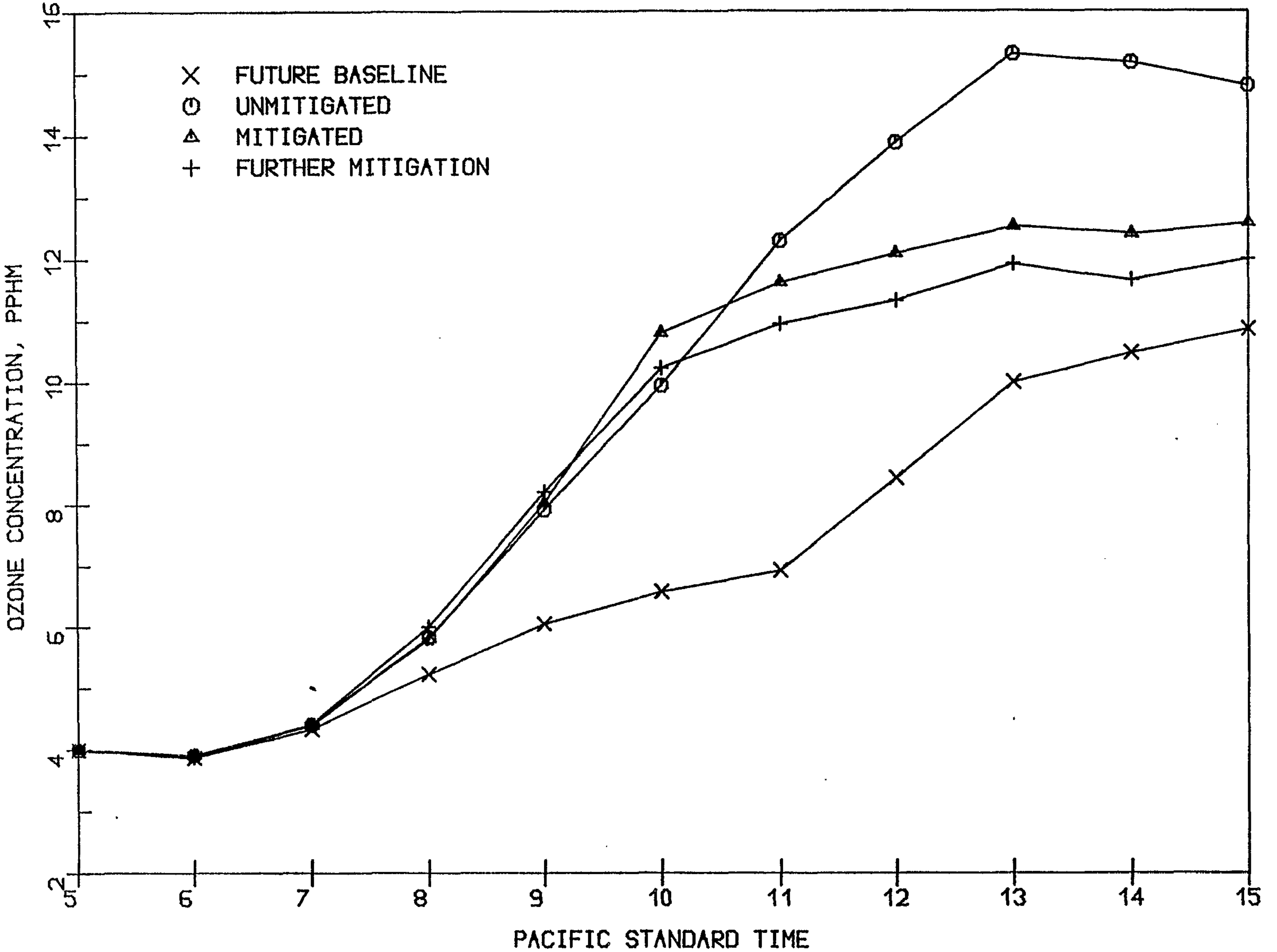


Figure 2-4.

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

Table 3-1

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY NUMBER 6B

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.23	--
Mitigated	8.22	0.01
Further Mitigation	8.05	0.18

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.91	--
Mitigated	10.69	0.22
Further Mitigation	10.38	0.53

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	16.21	--
Mitigated	14.16	2.05
Further Mitigation	13.32	2.89

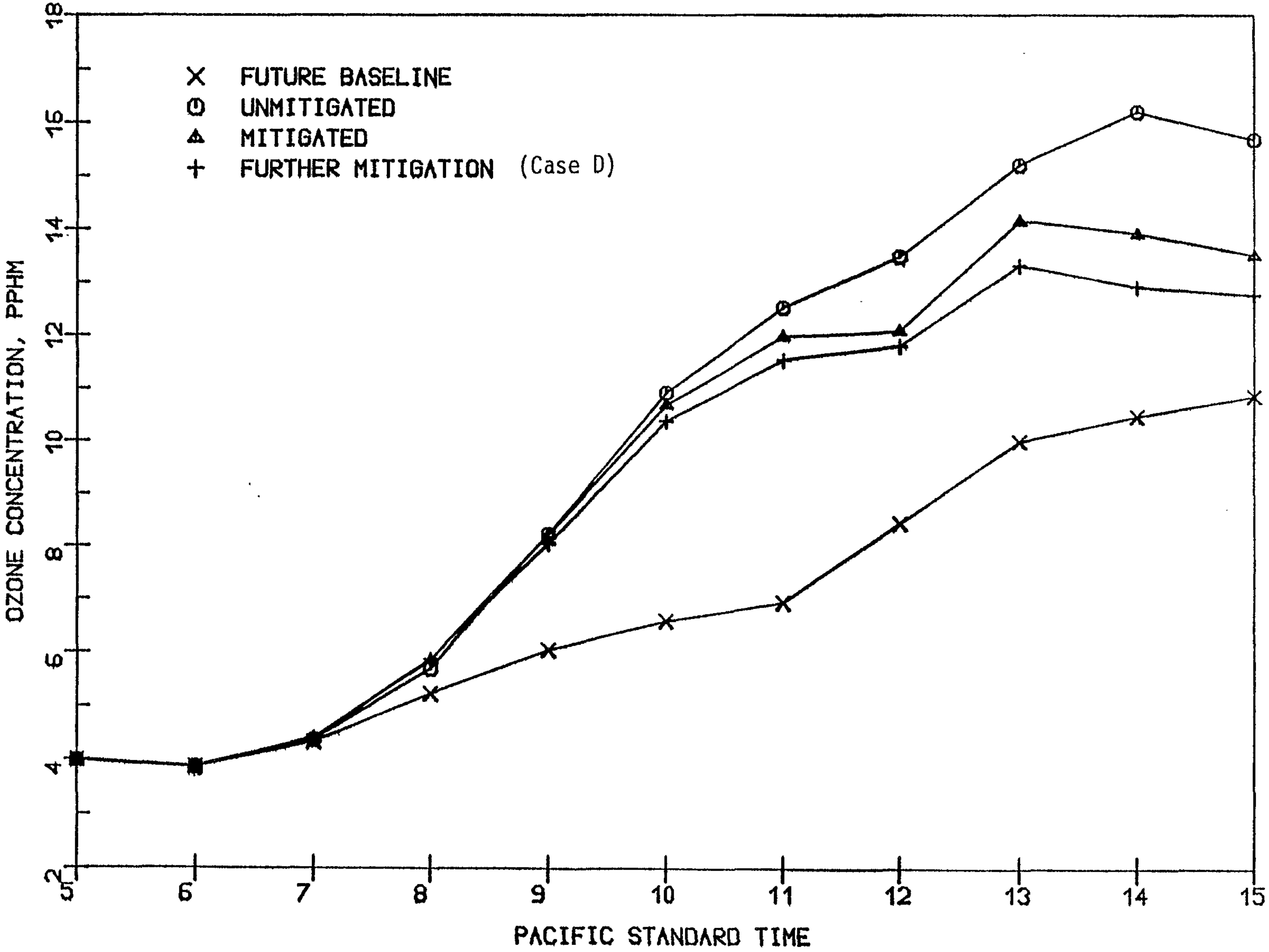


Figure 3-1.

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

The last Area Study case (run 8) is similar to run 7 with the additional use of selective catalytic reduction (SCR) or thermal de-nox at the Lompoc gas plant to reduce NO_x emissions by 80 percent from the boilers. As shown in Table 3-4 and Figure 3-4, this additional mitigation measure would further reduce the onshore peak (11.58 pphm with NO_x reduction and 11.92 pphm without).

Compared to the future baseline ozone values, all of the above further mitigation cases would not eliminate the state standard exceedances predicted for the region.

4. EFFECTS OF STANDBY GENERATORS

A number of TRACE runs were carried out to determine the effects of testing standby generators during the time that idling supply boats were present. These runs are numbers 10 through 17 of Table 1-1. They include project and Area Study scenarios similar to the first eight runs with standby generators turned on. The peak ozone concentration for runs 10 through 17 are all greater than the federal standard, ranging from 12.36 pphm to 14.36 pphm.

Hourly plots for these runs are given in Figures 4-1 through 4-9. The results of these runs indicate that the federal standard will be exceeded unless mitigation measures are implemented that include the elimination of the testing of standby generators while boats are present.

5. OZONE IMPACTS OF CUMULATIVE BASELINE SOURCES AND PROPOSED MITIGATION

The Federal ozone standard of 12 pphm was predicted to be exceeded with Trajectories 6C and 7C1 by the full cumulative emissions (Union, Exxon, Area Study and other non-project). For both of these trajectories, the TRACE model was used to predict the maximum impacts contributed by the non-project sources (i.e., cumulative baseline sources). Given the result of the full cumulative impacts, the cumulative baseline results would allow one to determine the net incremental impacts of the proposed project and Area Study emissions.

5.1 Trajectory 6C

Table 5-1 and Figure 5-1 compare the modeling results obtained with Trajectory 6C for the future baseline, cumulative baseline, full cumulative and mitigated full cumulative scenarios. The mitigated full cumulative scenario incorporates all mitigations proposed for the Area Study (runs 8). As shown in the table, the cumulative baseline emissions were predicted to cause an increase of 1.52 pphm in the onshore ozone peak of the future baseline. The 17.21 pphm onshore peak of the full cumulative case can therefore be largely attributed to the emissions from the project (Union and Exxon) and Area Study facilities. With the mitigation measures proposed for both onshore and offshore facilities, this peak would decrease by 4.83 pphm (from 17.21 pphm to 12.38 pphm). Thus the mitigated ozone peak would be slightly above the Federal ozone standard. For this 12.38 pphm peak the major contributors would be the unmitigated future cumulative sources. As these additional facilities are reviewed for permitting, mitigation measures will be required to achieve the standards.

5.2 Trajectory 7C1

Modeling results for Trajectory 7C1 are presented in Table 5-2 and plotted in Figure 5-2. From this table, it can be concluded that the cumulative baseline sources are principally responsible for all ozone increases predicted overwater, at the shoreline and onshore. These emissions were predicted to increase the future baseline onshore peak by 4.40 pphm. Thus, emissions from the project and Area Study facilities would only contribute a small function to the 12.40 pphm onshore peak.

6.0 SUMMARY OF MITIGATION ANALYSIS

6.1 Project Mitigations

For the Union and Exxon projects there were two mitigation runs identified on Table 1-1 in which the predicted levels were below the federal standard (runs 5 and 6). Run 1 was under the federal standard, but it included only the Union project. Therefore the mitigation measures identified in runs 5 and 6 should form the basis for evaluating the projects. The main difference in the two runs involves the use of cranes. For run 5, in which the NO_x emission are lower, the predicted ozone level is 0.08 pphm lower. This mitigation assumes that at each platform during the drilling/production phase, one of the two cranes would be electric. In run 6 it was assumed that both cranes would be diesel driven.

6.2 Area Study Mitigations

For the Area Study scenario, runs 7 and 8 would result in levels below the federal standard. Therefore mitigation measures that are identified in Table 1-1 for runs 7 and 8 would be required to achieve the standard. The difference in the two mitigation strategies is that for run 7 additional NO_x reduction would occur at the hypothetical Area Study gas plant by use of SCR or thermal de-nox on the boilers.

Table 3-2

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY NUMBER 6B

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.23	--
Mitigated	8.22	0.01
Further Mitigation	8.03	0.20

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.91	--
Mitigated	10.69	0.22
Further Mitigation	10.04	0.87

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	16.21	--
Mitigated	14.16	2.05
Further Mitigation	12.78	3.43

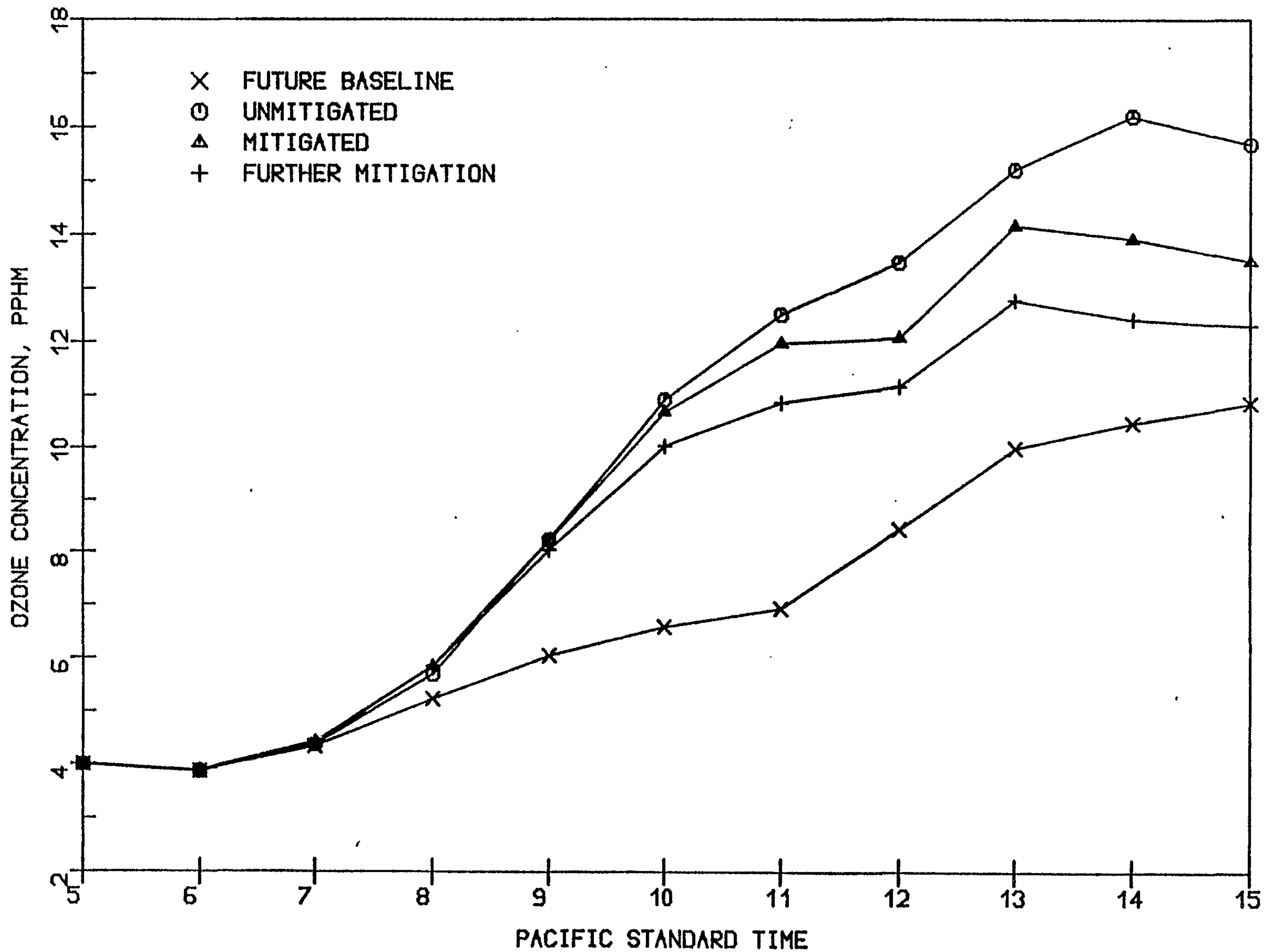


Figure 3-2.

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

Table 3-3

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY NUMBER 6B

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.23	--
Mitigated	8.22	0.01
Further Mitigation	8.09	0.14

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.91	--
Mitigated	10.69	0.22
Further Mitigation	9.32	1.59

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	16.21	--
Mitigated	14.16	2.05
Further Mitigation	11.92	4.29

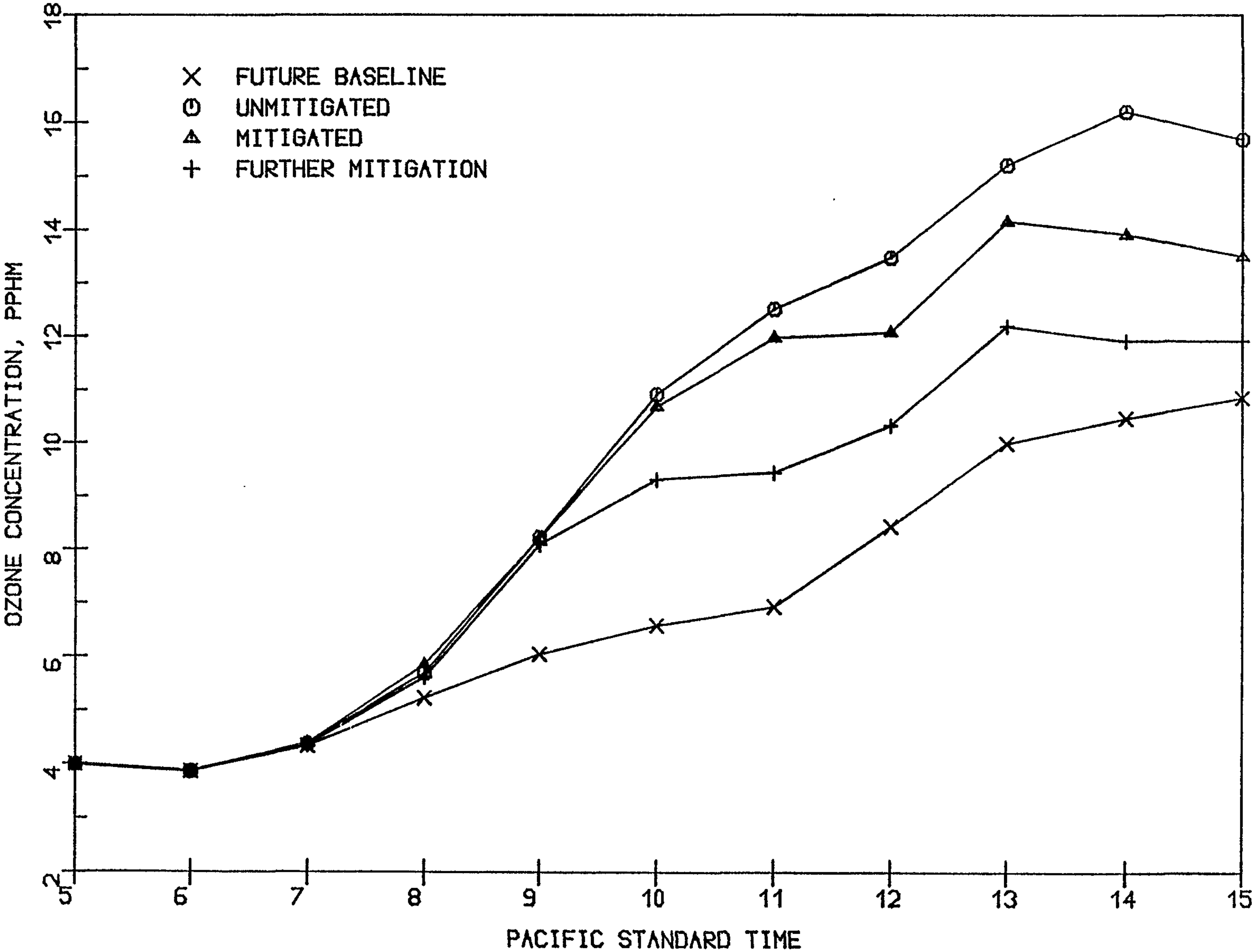


Figure 3-3.

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

Table 3-4

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY NUMBER 6B

a. Peak Overwater Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (0900 PST)	6.05	--
Unmitigated	8.23	--
Mitigated	8.22	0.01
Further Mitigation	8.09	0.14

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1000 PST)	6.58	--
Unmitigated	10.91	--
Mitigated	10.69	0.22
Further Mitigation	9.32	1.59

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline (1500 PST)	10.86	--
Unmitigated	16.21	--
Mitigated	14.16	2.05
Further Mitigation	11.58	4.63

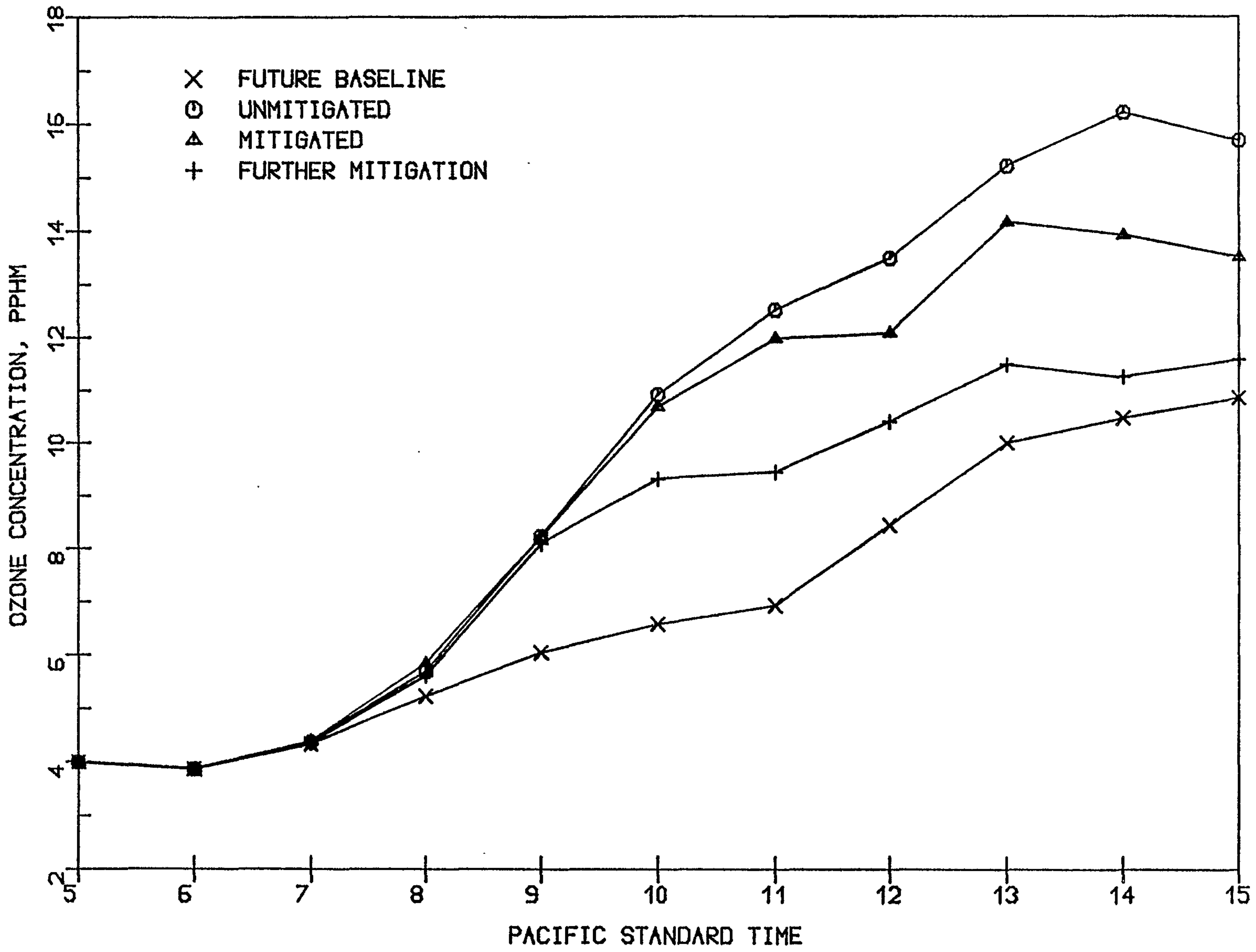


Figure 3-4.

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

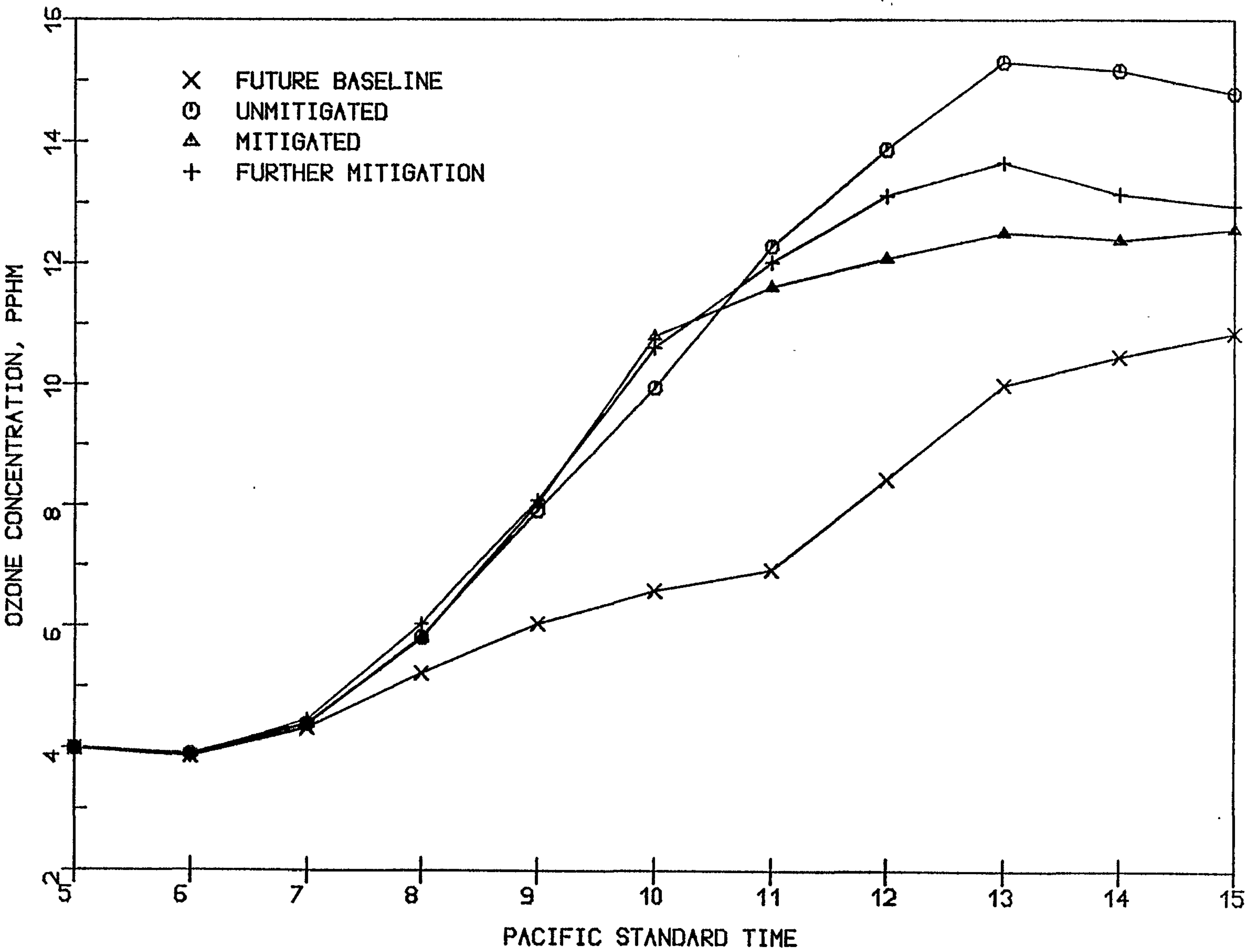


FIGURE 4.1 Run 9

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

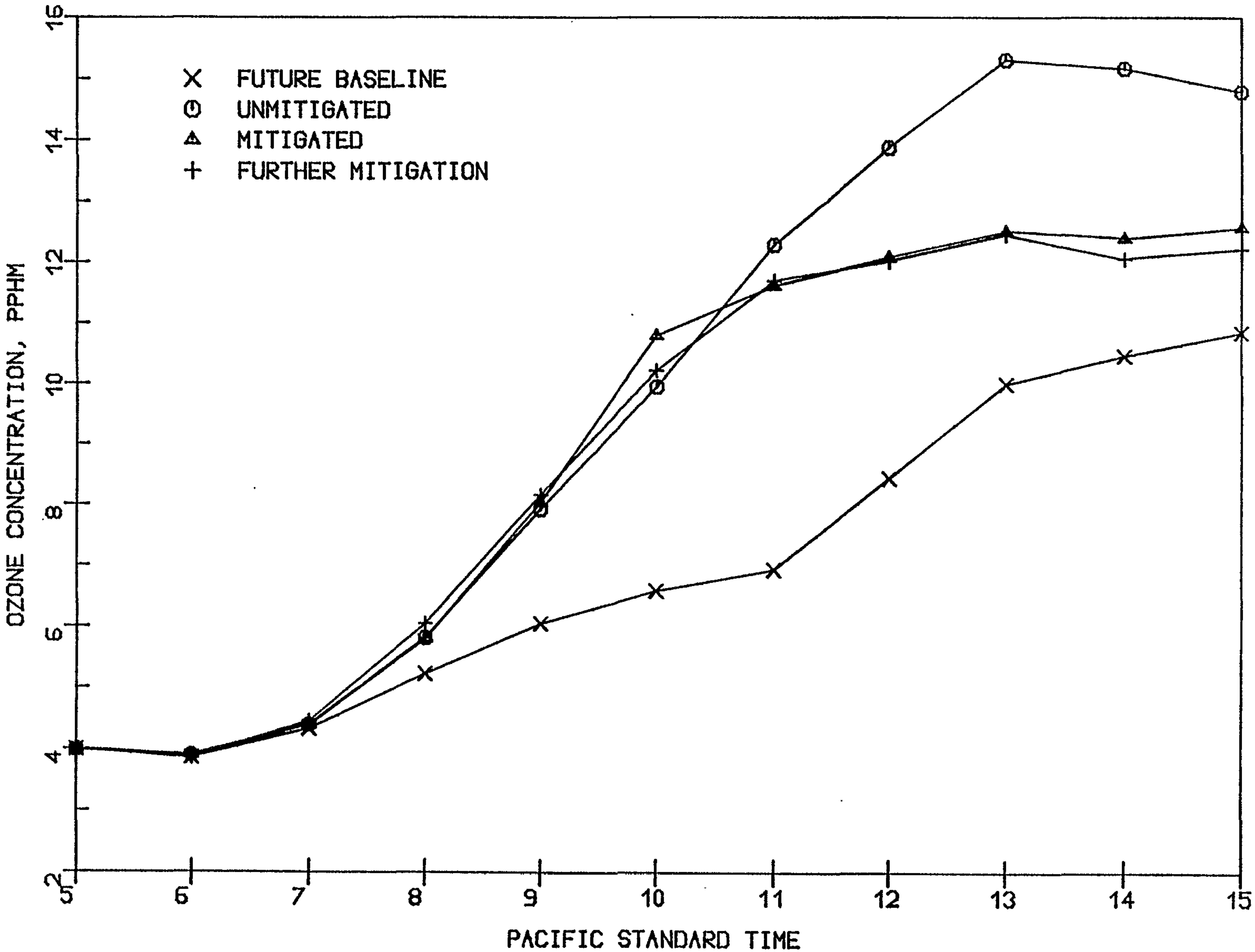


FIGURE 4.2 Run 10

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

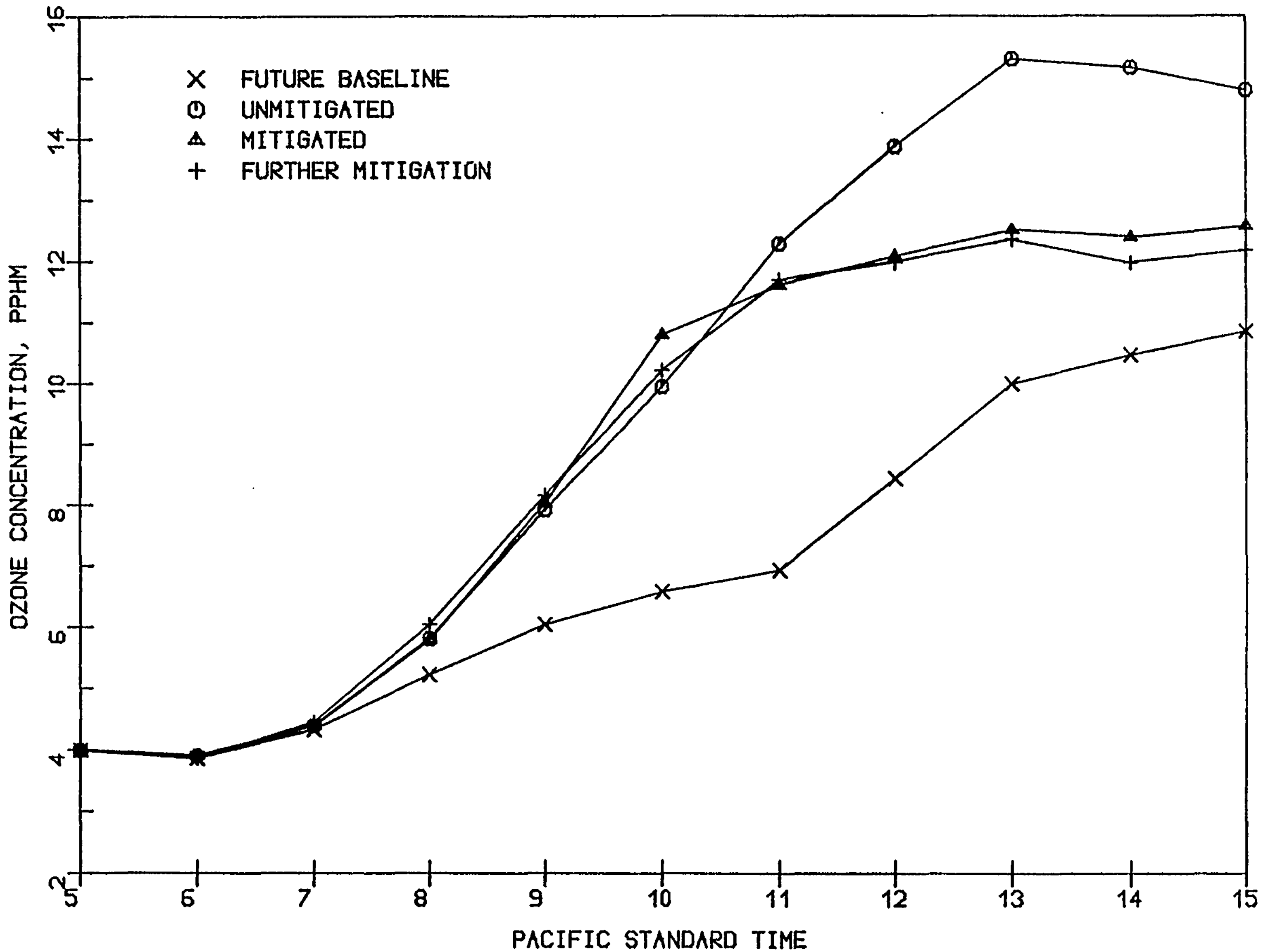


FIGURE 4.3 Run 11

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

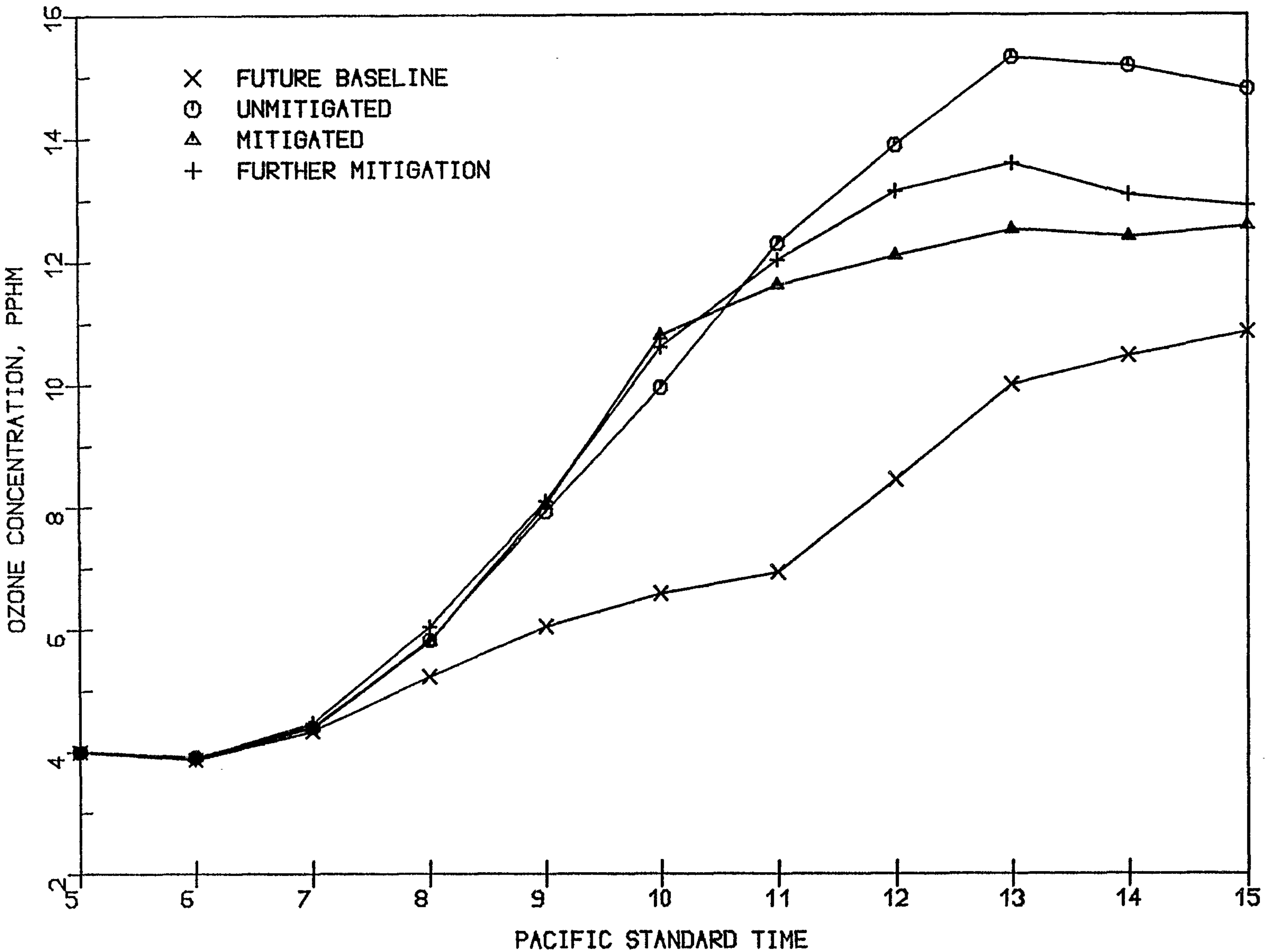


FIGURE 4.4 Run 12

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

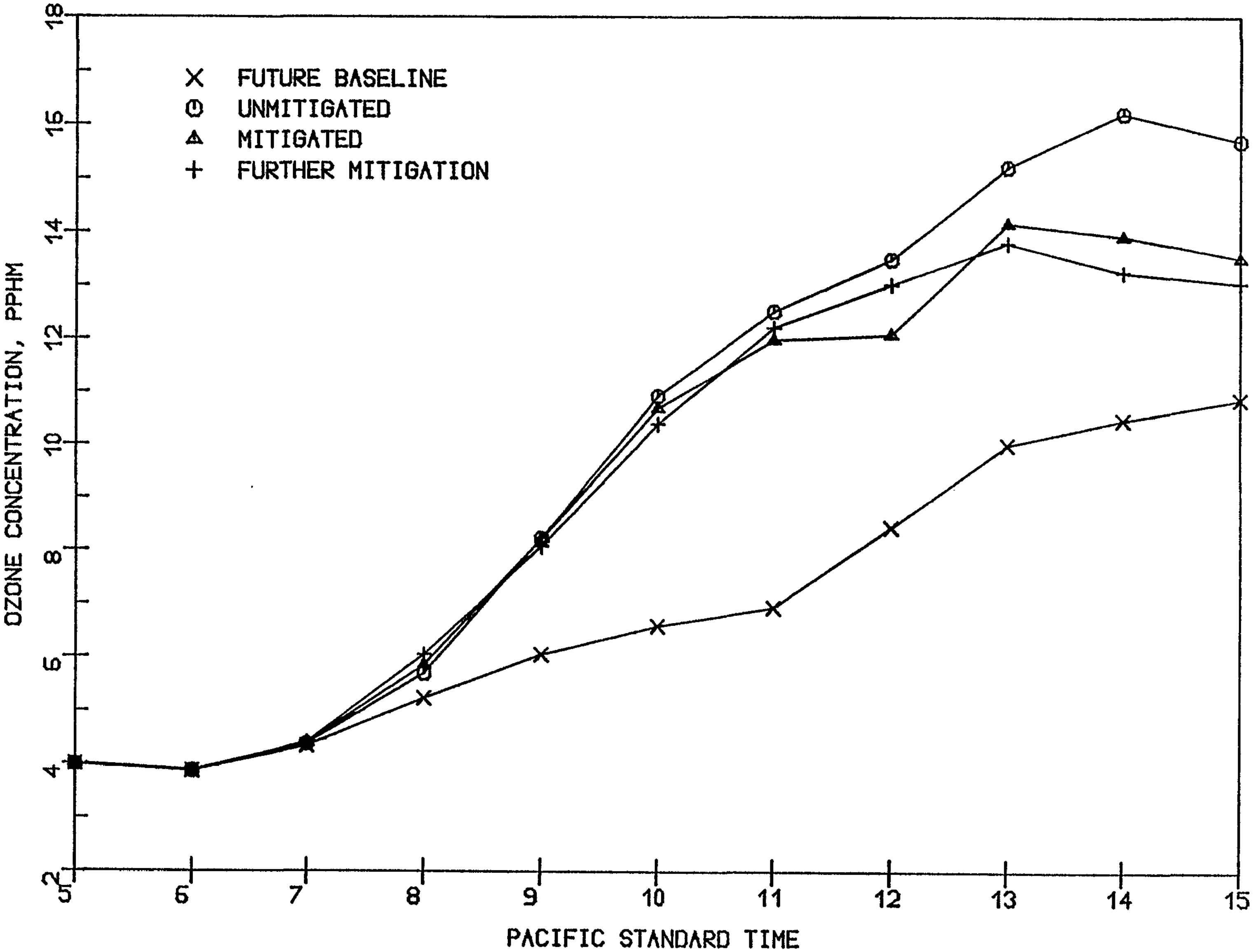


FIGURE 4.5 Run 13

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

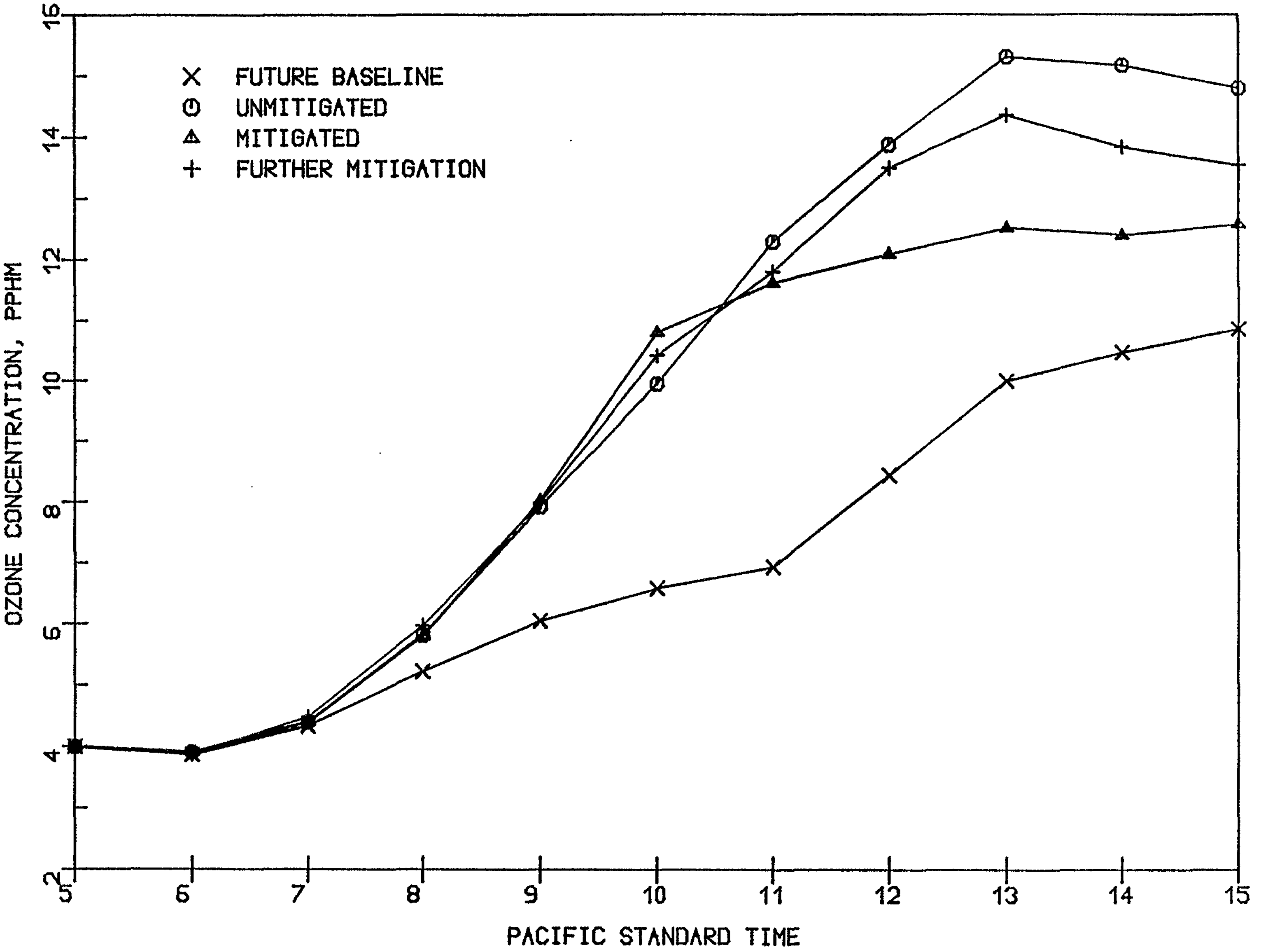


FIGURE 4.6 Run 14

MITIGATED OZONE IMPACTS OF UNION AND EXXON FACILITIES ON TRAJECTORY 6

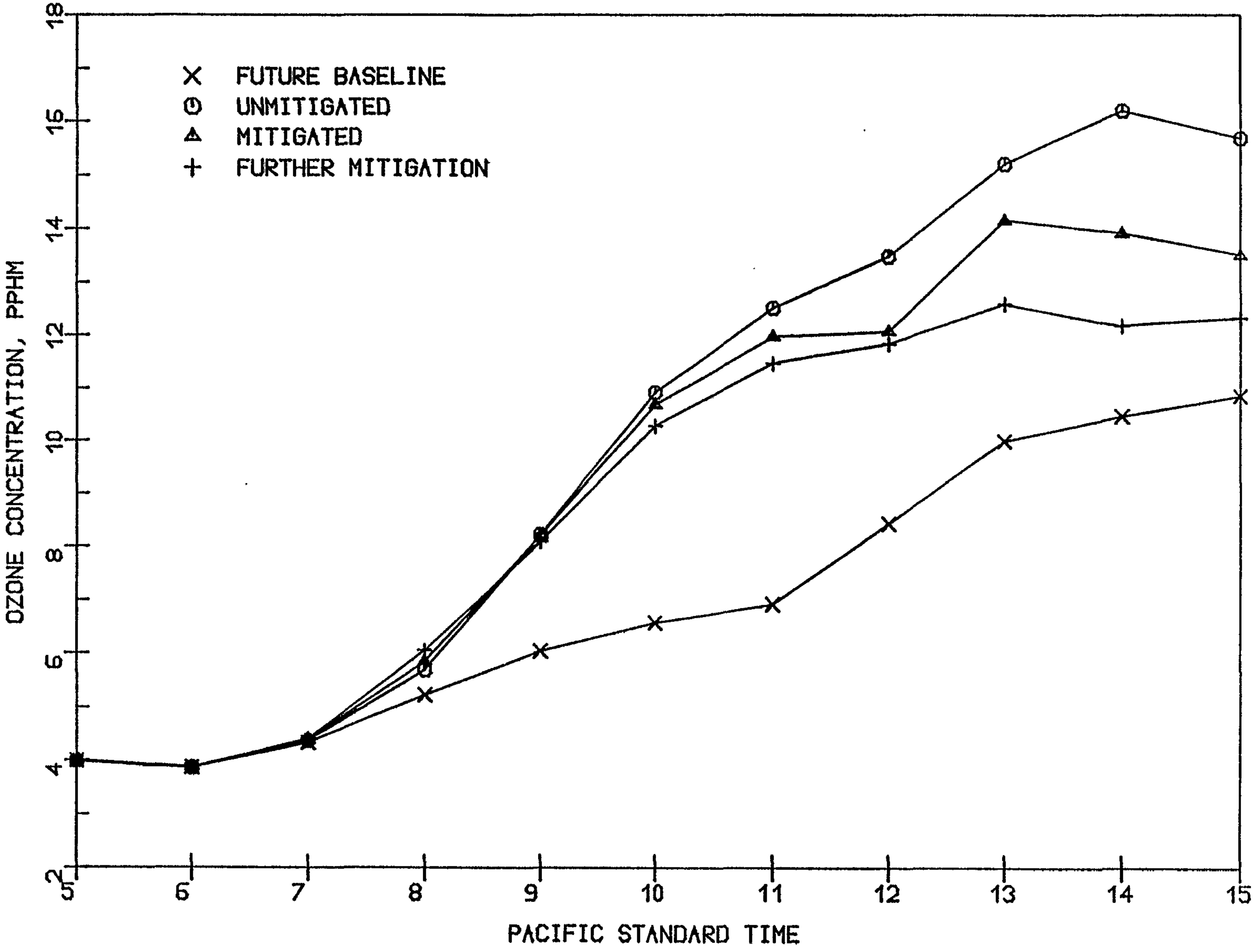


FIGURE 4.7 Run 15

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

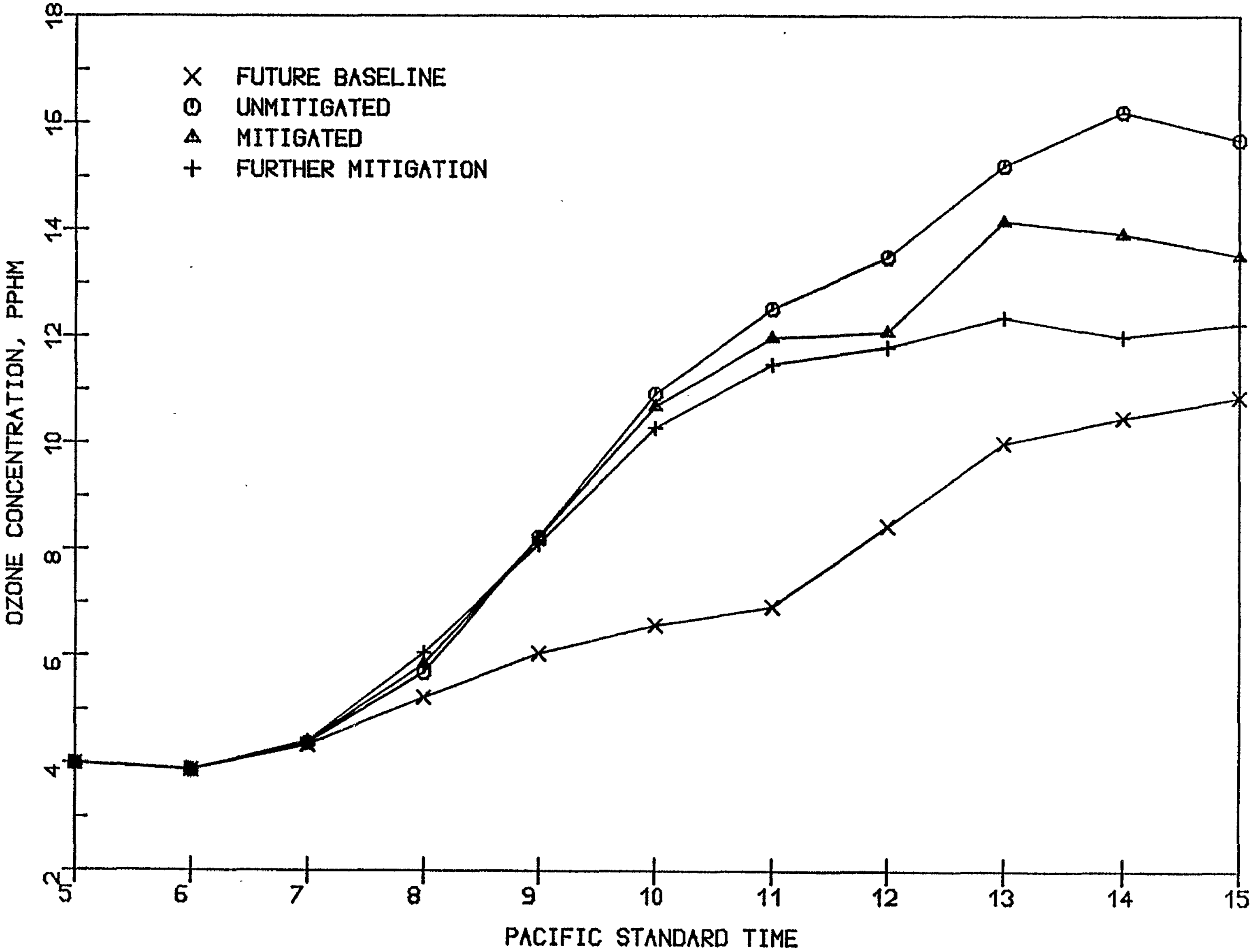


FIGURE 4.8 Run 16

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

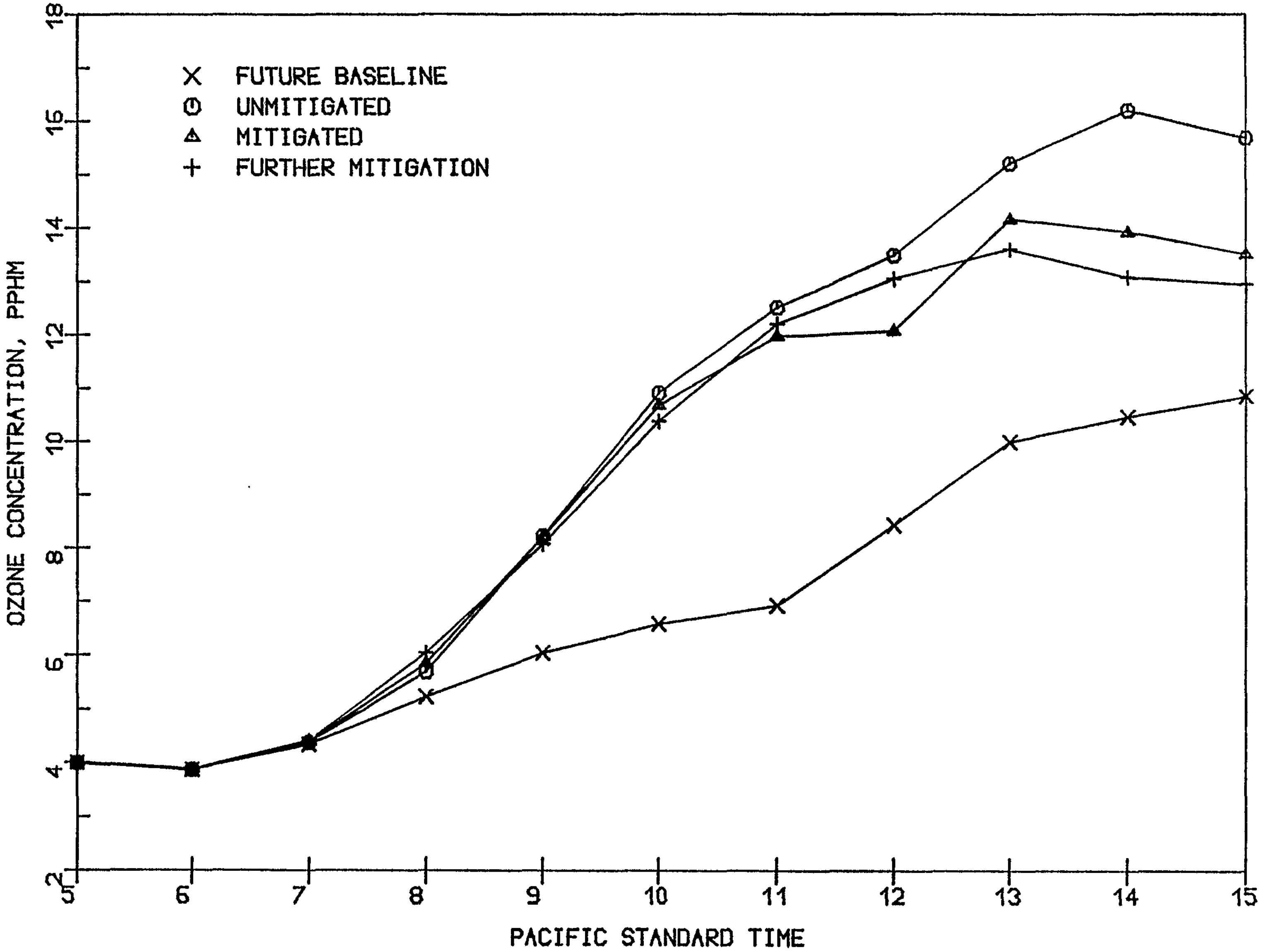


FIGURE 4.9 Run 17

MITIGATED OZONE IMPACTS OF AREA STUDY FACILITIES ON TRAJECTORY 6

Table 5-1

PREDICTED OZONE IMPACTS OF CUMULATIVE FACILITIES ON TRAJECTORY NUMBER 6C

a. Peak Overwater Impacts

Source	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	5.85	--
Cumulative Baseline	9.26	3.41
Full Cumulative	9.19	3.34
Mitigated Full Cumulative	9.38	3.53

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	6.58	--
Cumulative Baseline	10.33	3.78
Full Cumulative	12.67	6.12
Mitigated Full Cumulative	10.95	4.40

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	10.22	--
Cumulative Baseline	11.74	1.52
Full Cumulative	17.21	6.99
Mitigated Full Cumulative	12.38	2.16

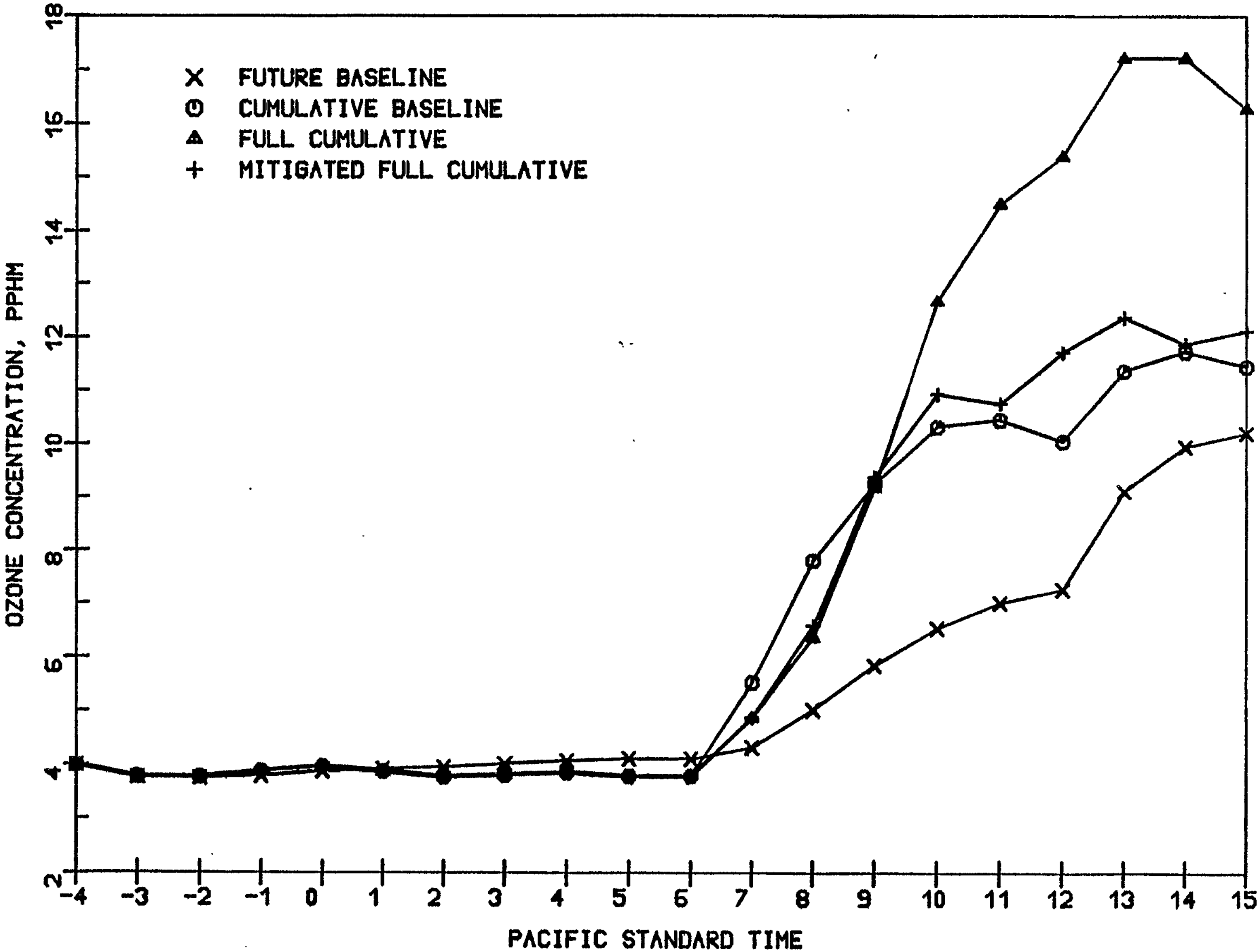


FIGURE 5-1

CUMULATIVE IMPACTS ON TRAJECTORY 6C

Table 5-2

PREDICTED OZONE IMPACTS OF CUMULATIVE FACILITIES ON TRAJECTORY NUMBER 7C1

a. Peak Overwater Impacts

Source	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	8.29	--
Cumulative Baseline	13.23	4.94
Full Cumulative	13.40	5.11

b. Peak Shoreline Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	7.64	--
Cumulative Baseline	13.20	5.56
Full Cumulative	13.38	5.74

c. Peak Onshore Impacts

	Peak O_3 (pphm)	Decrease (pphm)
Future Baseline	7.49	--
Cumulative Baseline	11.89	4.40
Full Cumulative	12.40	4.91

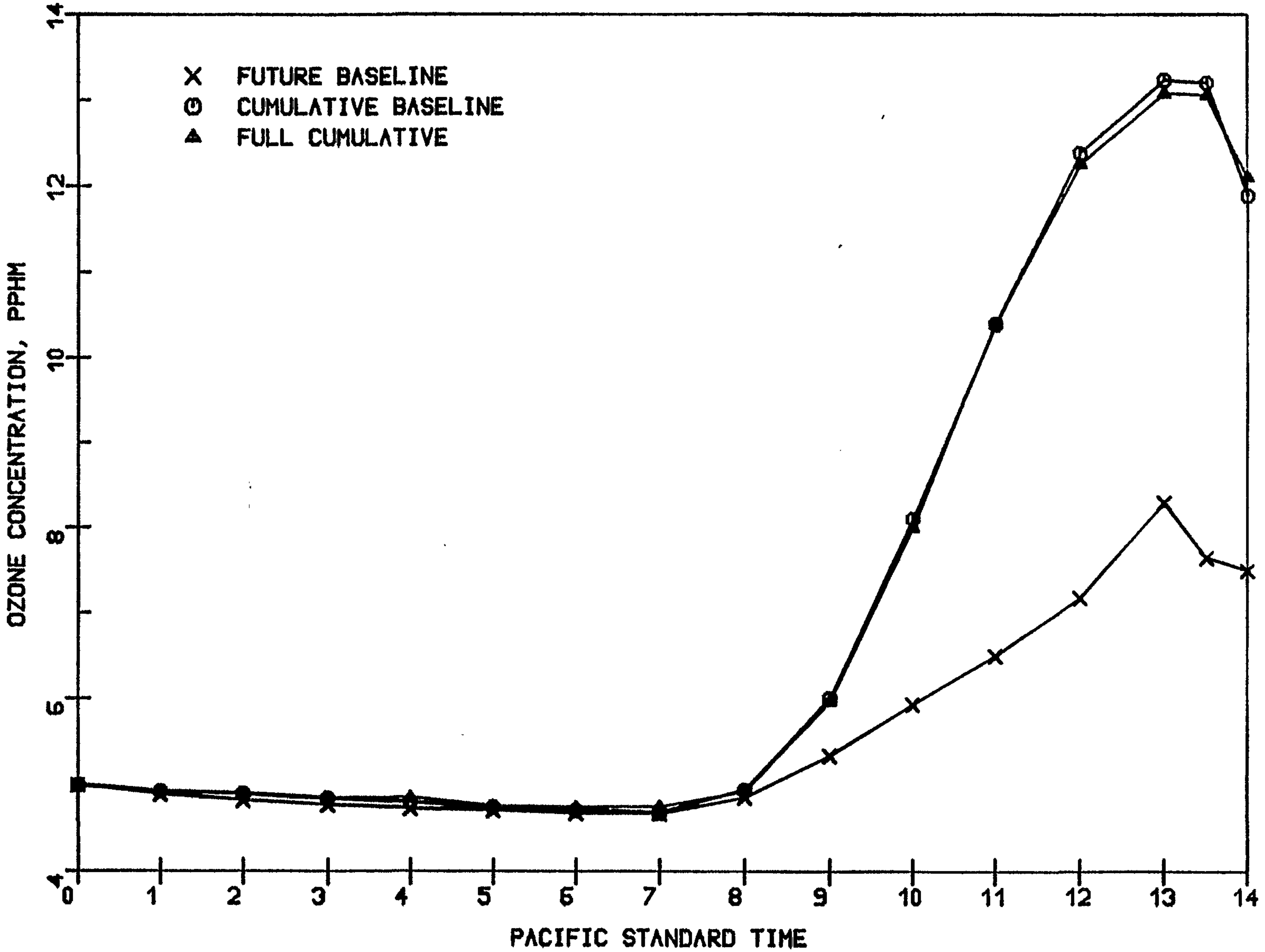


FIGURE 5.2

CUMULATIVE IMPACTS ON TRAJECTORY 7C1

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

1\. PLATFORM IRENE

- 2 Cranes (diesel)
- 1 Cement Pump (electric)
- 1 Logging Unit (diesel)
- 1 Supply Boat (idle)
- 1 Flare (1/2 hour) (.1mmscf)
- 1 Flare Pilot

MITIGATION

- Electric cement pump at Platform Irene
- Onshore ozone concentration 11.6 pphm

2\. PLATFORM IRENE

- 2 Cranes (diesel)
- 1 Cement Pump (electric)
- 1 Logging Unit (diesel)
- 1 Supply Boat (idle)
- 1 Flare (1/2 hour)(.1mmscf)
- 1 Flare Pilot

PLATFORM SHAMROCK

- 2 Large Cranes (diesel)
- 1 Small Crane (diesel)
- 1 Supply Boat (idle)
- 1 Power Tong (electric)
- 1 Flare Pilot

MITIGATION

- Electric cement pump at Platform Irene
- Electric power tong at Platform Shamrock
- No testing of emergency generators during flaring or when a supply boat is at the platform
- Onshore ozone concentration 12.16 pphm

3\. PLATFORM IRENE

- 1 Crane (diesel)
- 1 Supply Boat (idle)
- 1 Flare (1/2 hour)(.1mmscf)
- 1 Flare Pilot

PLATFORM SHAMROCK

- 1 Large Crane (diesel)
- 1 Small Crane (diesel)
- 1 Supply Boat (idle)
- 1 Flare Pilot

OCS-P 0441

- 1 Crane (diesel)
- 1 Flare Pilot

OCS-P 0427

- 1 Crane (diesel)
- 1 Flare (1/2 hour) (.1mmscf)
- 1 Supply Boat (idle)
- 1 Flare Pilot

MITIGATION

- Grid power for OCS-P 0427
- No testing of emergency generators during flaring, or when a supply boat is at the platform
- Onshore ozone concentration 13.3 pphm

4\. PLATFORM IRENE

- 1 Crane (diesel)
- 1 Supply Boat (idle)
- 1 Flare Pilot

PLATFORM SHAMROCK

- 1 Large Crane (diesel)
- 1 Small Crane (diesel)
- 1 Supply Boat (idle)
- 1 Flare Pilot

OCS-P 0441

- 1 Crane (diesel)
- 1 Flare Pilot

OCS-P 0427

- 1 Crane (diesel)
- 1 Supply Boat (idle)
- 1 Flare Pilot

MITIGATION

- Grid power for OCS-P 0427
- No testing of emergency generators during flaring, or when a supply boat is at the platform
- Onshore ozone concentration 12.78 pphm

5\. PLATFORM IRENE

- 1 Crane (diesel)
- 1 Crane (electric)
- 1 Logging Unit (diesel)
- 1 Supply Boat (idle)
- 1 Cement Unit (electric)
- 1 Flare (1/2 hour)(.1mmscf)
- 1 Flare Pilot

PLATFORM SHAMROCK

- 1 Large Crane (electric)
- 1 Large Crane (diesel)
- 1 Power Tong (diesel)
- 1 Flare Pilot
- 1 Supply Boat (idle)
- 1 Small Crane (electric)

MITIGATION

- Electric cement pump at Platform Irene
- Eectric crane at Platform Irene
- 2 electric cranes at Platform Shamrock
- No testing of emergency generators during flaring, or when a supply boat is at the platform
- Onshore ozone concentration 11.91 pphm

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

6.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
2 Cranes (diesel)	2 Large Cranes (diesel)	• Electric cement pump at Platform Irene
1 Logging Unit (diesel)	1 Small Crane (diesel)	• Shared supply boat for Platforms Shamrock and Irene
1 Cement Unit (electric)	1 Supply Boat (idle)	• No testing of emergency generators during flaring, or when a supply boat is at the platform
1 Flare (1/2 hour)(.1mmscf)	1 Power Tong (diesel)	• Onshore ozone concentration 11.99 pphm
1 Flare Pilot	1 Flare Pilot	

7.

PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric)	1 Large Crane (electric)	1 Crane (electric)	1 Crane (electric)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427
1 Flare (1/2 hour)	1 Small Crane (electric)	1 Flare Pilot	1 Flare Pilot	• 2 electric cranes at Platform Shamrock
1 Flare Pilot	1 Flare Pilot	1 Supply Boat (idle)	1 Flare (1/2 hour)(.1 mmscf)	• Shared supply boat for Platforms Shamrock and -P 0427
	1 Supply Boat (idle)			• Shared supply boat for Irene and -P 0441
				• Grid power for -P 0427
				• No testing of emergency generators during flaring or when a supply boat is at the platform
				• Onshore ozone concentration 11.92 pphm

8.

PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric)	1 Large Crane (electric)	1 Crane (electric)	1 Crane (electric)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427
1 Flare (1/2 hour)(.1mmscf)	1 Small Crane (electric)	1 Flare Pilot	1 Flare (1/2 hour)(.1 mmscf)	• electric cranes at Platform Shamrock
1 Flare Pilot	1 Flare Pilot	1 Supply Boat (idle)	1 Flare Pilot	• Shared supply boat for Platforms Shamrock and -P 0427
	1 Supply Boat (idle)			• Shared supply boat for Irene and -P 0441
				• Grid power for -P 0427
				• No testing of emergency generators during flaring or when a supply boat is at the platform
				• SCR or Thermal deNOx on boilers at Area Study Gas Plant
				• Onshore ozone concentration 11.58 pphm

9.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel)	1 Large Crane (electric)	• Electric cement pump at Platform Irene
1 Crane (electric)	1 Large Crane (diesel)	• Electric crane at Platform Irene
1 Logging Unit (diesel)	1 Power Tong (diesel)	• 2 electric cranes at Platform Shamrock
1 Cement Unit (electric)	1 Flare Pilot	• No testing of emergency generators during flaring
1 Flare (1/2 hour)(.1mmscf)	1 Supply Boat (idle)	• Shared supply boat between Shamrock and Irene
1 Flare Pilot	1 Small Crane (electric)	• Onshore ozone concentration 13.67 pphm
	1 Large Generator Testing (diesel)	

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

10.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel)	1 Large Crane (electric)	• Electric cement pump at Platform Irene
1 Crane (electric)	1 Large Crane (diesel)	• Electric crane at Platform Irene
1 Logging Unit (diesel)	1 Power Tong (diesel)	• 2 electric cranes at Platform Shamrock
1 Cement Unit (electric)	1 Flare Pilot	• No testing of emergency generators during flaring
1 Flare (1/2 hour)(.1mmscf)	1 Supply Boat (idle)	• Shared supply boat between Shamrock and Irene
1 Flare Pilot	1 Small Crane (electric)	• Exxon uses small Irene-like standby generator
	1 Small Irene-like Generator (diesel)	• Onshore ozone concentration 12.46 pphm

11.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel)	1 Large Crane (electric)	• Electric cement pump at Platform Irene
1 Crane (electric)	1 Large Crane (diesel)	• Electric crane at Platform Irene
1 Logging Unit (diesel)	1 Power Tong (diesel)	• 2 electric cranes at Platform Shamrock
1 Cement Unit (electric)	1 Flare Pilot	• No testing of emergency generators during flaring
1 Flare (1/2 hour)(.1mmscf)	1 Supply Boat (idle)	• Shared supply boat between Shamrock and Irene
1 Flare Pilot	1 Small Crane (electric)	• Exxon uses small Irene-like standby generator
	1 Small Irene-like Generator (diesel)	• SCR or Thermal deNOx on boilers at Lompoc Dehydration Facility
		• Onshore ozone concentration 12.36 pphm

12.

PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel)	1 Large Crane (electric)	• Electric cement pump at Platform Irene
1 Crane (electric)	1 Large Crane (diesel)	• Electric crane at Platform Irene
1 Logging Unit (diesel)	1 Power Tong (diesel)	• 2 electric cranes at Platform Shamrock
1 Cement Unit (electric)	1 Flare Pilot	• No testing of emergency generators during flaring
1 Flare (1/2 hour)(.1mmscf)	1 Supply Boat (idle)	• Shared supply boat between Shamrock and Irene
1 Flare Pilot	1 Small Crane (electric)	• SCR or Thermal deNOx on boilers at Lompoc Dehydration Facility
	1 Large Generator Testing (diesel)	• Onshore ozone concentration 13.59 pphm

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

13. PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Large Generator Testing (diesel)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Testing Generator (diesel)	1 Crane (electric) 1 Flare Pilot 1 Flare (1/2 hour)(.1 mmscf)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • 2 electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring • SCR or Thermal deNOx at Gas Plant in Lompoc • Onshore ozone concentration 13.79 pphm

14. PLATFORM IRENE	PLATFORM SHAMROCK	MITIGATION
1 Crane (diesel) 1 Crane (electric) 1 Logging Unit (diesel) 1 Cement Unit (electric) 1 Flare Pilot Testing Generator (diesel)	1 Large Crane (electric) 1 Large Crane (diesel) 1 Power Tong (diesel) 1 Flare Pilot 1 Supply Boat (idle) 1 Small Crane (electric) 1 Flare (1/2 hr)(.23 mmscf)	• Electric cement pump at Platform Irene • Electric crane at Platform Irene • 2 electric cranes at Platform Shamrock • No testing of emergency generators during flaring • Shared supply boat between Shamrock and Irene • Onshore ozone concentration 14.36 pphm

15. PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Small Generator Testing (diesel)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Testing Generator (diesel)	1 Crane (electric) 1 Flare Pilot 1 Flare (1/2 hour)(.1 mmscf)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • 2 electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring • SCR or Thermal deNOx at Gas Plant in Lompoc • Exxon uses Small Irene-like standby generator • Onshore ozone concentration 12.59 pphm

Table 1-1

ADDITIONAL PHOTOCHEMICAL RUNS FOR THE PROJECT AND AREA STUDY

16. PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour)(.1mmscf) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Small Generator Testing (diesel)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Testing Generator (diesel)	1 Crane (electric) 1 Flare Pilot 1 Flare (1/2 hour)(.1 mmscfs)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • 2 electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring • SCR or Thermal deNOx on oil dehydration facility • Exxon uses small Irene-like standby generator • Onshore ozone concentration 12.36 pphm

17. PLATFORM IRENE	PLATFORM SHAMROCK	OCS-P 0441	OCS-P 0427	MITIGATION
1 Crane (electric) 1 Flare (1/2 hour) 1 Flare Pilot	1 Large Crane (electric) 1 Small Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Large Generator Testing (diesel)	1 Crane (electric) 1 Flare Pilot 1 Supply Boat (idle) 1 Testing Generator (diesel)	1 Crane (electric) 1 Flare Pilot 1 Flare (1/2 hour)(.1 mmscf)	• 1 electric crane at Platform Irene, -P 0441 and -P 0427 • 2 electric cranes at Platform Shamrock • Shared supply boat for Platforms Shamrock and -P 0427 • Shared supply boat for Irene and -P 0441 • Grid power for -P 0427 • No testing of emergency generators during flaring • SCR or Thermal deNOx on oil dehydration facility • Onshore ozone concentration 13.60 pphm