Pt. Arguello, Toc

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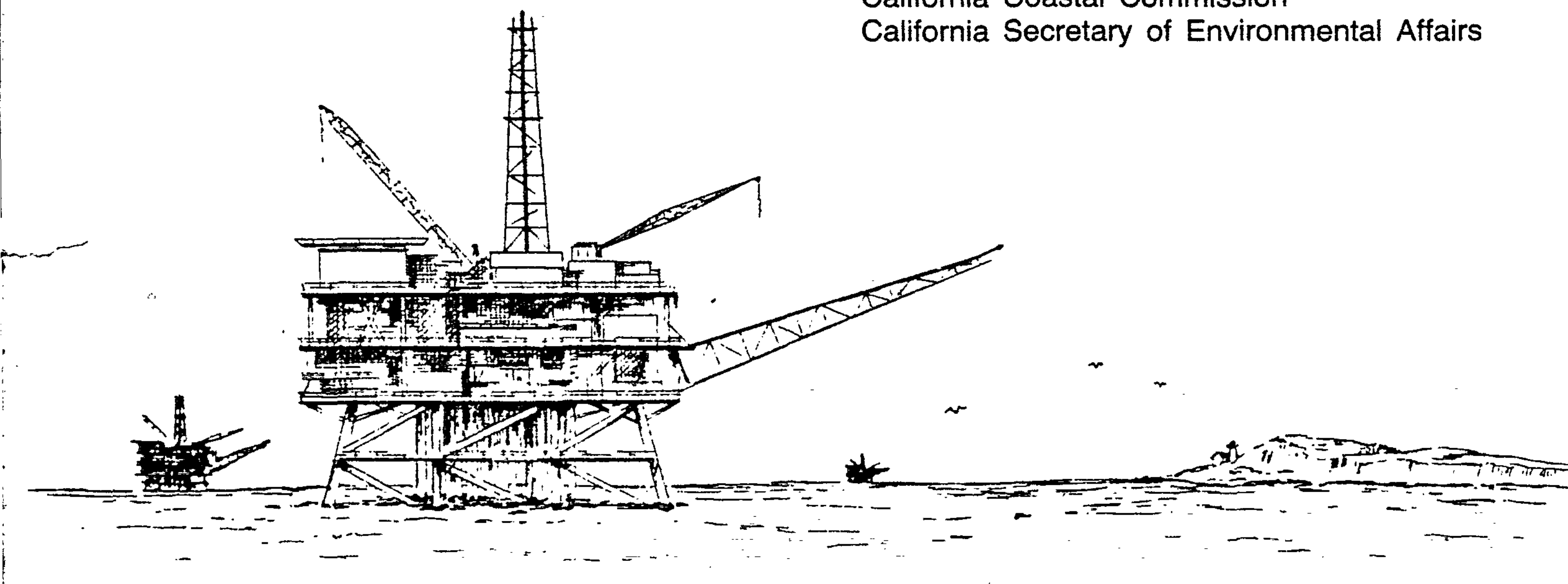
Point Arguello Field and Gaviota Processing Facility Area Study and Chevron/Texaco Development Plans EIR/EIS

Final Report

November 1984

Prepared for:

County of Santa Barbara
U.S. Minerals Management Service
California State Lands Commission
California Coastal Commission
California Secretary of Environmental Affairs



Prepared by:

Arthur D. Little, Inc.
Santa Barbara, California

IMAGE# 1,

Pt. Arguello, Toc

This document is the joint Draft Environmental Impact Report/Environmental Impact Statement (DEIR/EIS) for the Point Arguello Field and Gaviota Processing Facility: Area Study and Chevron/Texaco Development Plans. The Draft EIR/EIS 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 DEIR/EIS considers the proposed offshore oil and gas OCS development of the Point Arguello Field located in the lower Santa Maria Basin offshore Santa Barbara County, California, and the related processing of produced oil and gas at facilities proposed at Gaviota in Santa Barbara County. Chevron USA, Inc. and their partners are proposing to install two oil and gas drilling and production platforms; Texaco, Inc. and their partners are proposing to install one platform. Proposed platforms would be connected by subsea lines to a system of consolidated offshore and onshore pipelines to carry produced oil and gas from the platforms to the processing facility. The offshore lines would landfall north of Point Conception and would continue overland along the coastal terrace to Gaviota. A consolidated oil and gas processing facility is proposed at Gaviota which would have an ocean outfall line for disposal of produced water offshore. Alternatives evaluated in the DEIR/EIS are: an alternative location for the onshore processing facility at Point Conception; an entirely offshore route for industry pipelines to Gaviota; transportation of liquid petroleum gas and natural gas liquids by rail or pipeline; and use of possible supply bases at Gaviota or Ellwood instead of Point Hueneme or use of a possible crew base at Gaviota.

Because of the potential for additional development in this area over the next ten years, this document also evaluates impacts for projected Southern Santa Maria Basin development assuming hypothetical installation of five additional platforms and associated pipelines. This analysis is done to provide for a comprehensive evaluation of impacts and for use as a planning tool 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 EIR/EIS describes likely impacts to the environment due to the project.

The Draft is available for public review until September 3, 1984. The purpose of this review 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 September 3, 1984 in order to be addressed.

Additional details are available in the following 11 individually bound technical appendices:

E. Geology
F. Air Quality
G. Onshore Water Resources
H. Marine Water Resources
I. Marine Biology
J. Terrestrial and Freshwater Biology
K. Cultural Resources
L. Aesthetics (Noise, Visual)
M. Socioeconomics
N. Other Uses (Commercial Fishing, Recreation, Traffic)
O. System Safety and Reliability

Public hearings will be held to receive testimony regarding the Draft EIR/EIS. Testimony may be given at the following times and location:

Date: August 14, 1984
Time: 1:00 p.m. and 7:00 p.m.
Location: Planning Commission Hearing Room
County Administration Building
105 East Anapamu Street, first floor
Santa Barbara, California

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

Randall T. Smith
Resource Management Department
Energy Division
1226 Anacapa Street, Suite 4
Santa Barbara, California 93101
(805) 963-3434

or

Mary Elaine Warhurst
Minerals Management Service
Pacific OCS Region
1340 W. Sixth Street
Los Angeles, California 90017
(213) 688-4360

IMAGE# 2,

Point Arguello Field and Gaviota Processing Facility:
Area Study and Chevron/Texaco Development Plans EIR/EIS

FINAL REPORT

November, 1984

This package contains those pages from the Public Draft EIR/EIS (dated July 9, 1984) that have been revised to reflect updated information and responses to comments received during public review of the Draft report. To create a complete Final Report document, the reader should replace the similar page in the Draft with the revised page contained in this package.

Each of the enclosed pages can be identified as revised by an "R-" added to the page number. In addition, vertical lines along the margin indicate where additions or changes have been made to the Draft text. Deletions are indicated by a (>) in the margin.

Due to numerous minor changes, the following sections have been reprinted in their entirety for the convenience of the reader: Table of Contents; Executive Summary; Cultural Resources, Section 4.7; Cultural Resources, Section 5.7; and Index. As a result, additions and deletions are not indicated in the margin and the reader is asked to simply replace the entire section.

Final revisions have also been made to the technical appendices. Technical Appendix K, Cultural Resources, and O, System Safety and Reliability, have both been revised and reprinted as complete documents. Revisions to the remaining appendices are compiled in a Technical Appendix Addendum.

The agencies of the Joint Review Panel appreciate the hard work of the many people that contributed to the EIR/EIS preparation process.

Pt. Arguello, Toc

EDITORIAL STANDARDS DISCLAIMER

THIS REPORT HAS NOT BEEN EDITED FCR CONFORMITY WITH MINERALS MANAGEMENT SERVICE EDITORIAL STANDARDS

IMAGE# 4,

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EXECUTIVE SUMMARY

1. INTRODUCTION

1.1 Purpose and Organization

The purpose of this Executive Summary is to provide the reader with an overview of the Point Arguello Field project, its elements, anticipated effects and feasible mitigations to reduce significantly adverse impact levels. The Project Alternatives, Area Study Development and Cumulative Impacts are also discussed together with their related impacts and mitigations. The reader should study the entire EIR/EIS document thoroughly and not rely exclusively on the Executive Summary as the sole basis of judgement. The EIR/EIS is accompanied by a series of Technical Appendices which include data and discussion of analytical methods on all major issue areas.

The Joint EIR/EIS will be used by different agencies to make decisions on the proposed projects and future projects in the 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 EIR/EIS 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 Chevron's applications to the County for a land use re-zone, a major Conditional Use Permit, a Coastal Development Permit, a Comprehensive Plan/Coastal Plan amendment and approval of the Development Plan for the onshore pipelines and processing facilities.

The County Air Pollution Control Distict 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.

MMS has jurisdiction over the oil and gas activities on the Outer Continental Shelf (OCS) which extends 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

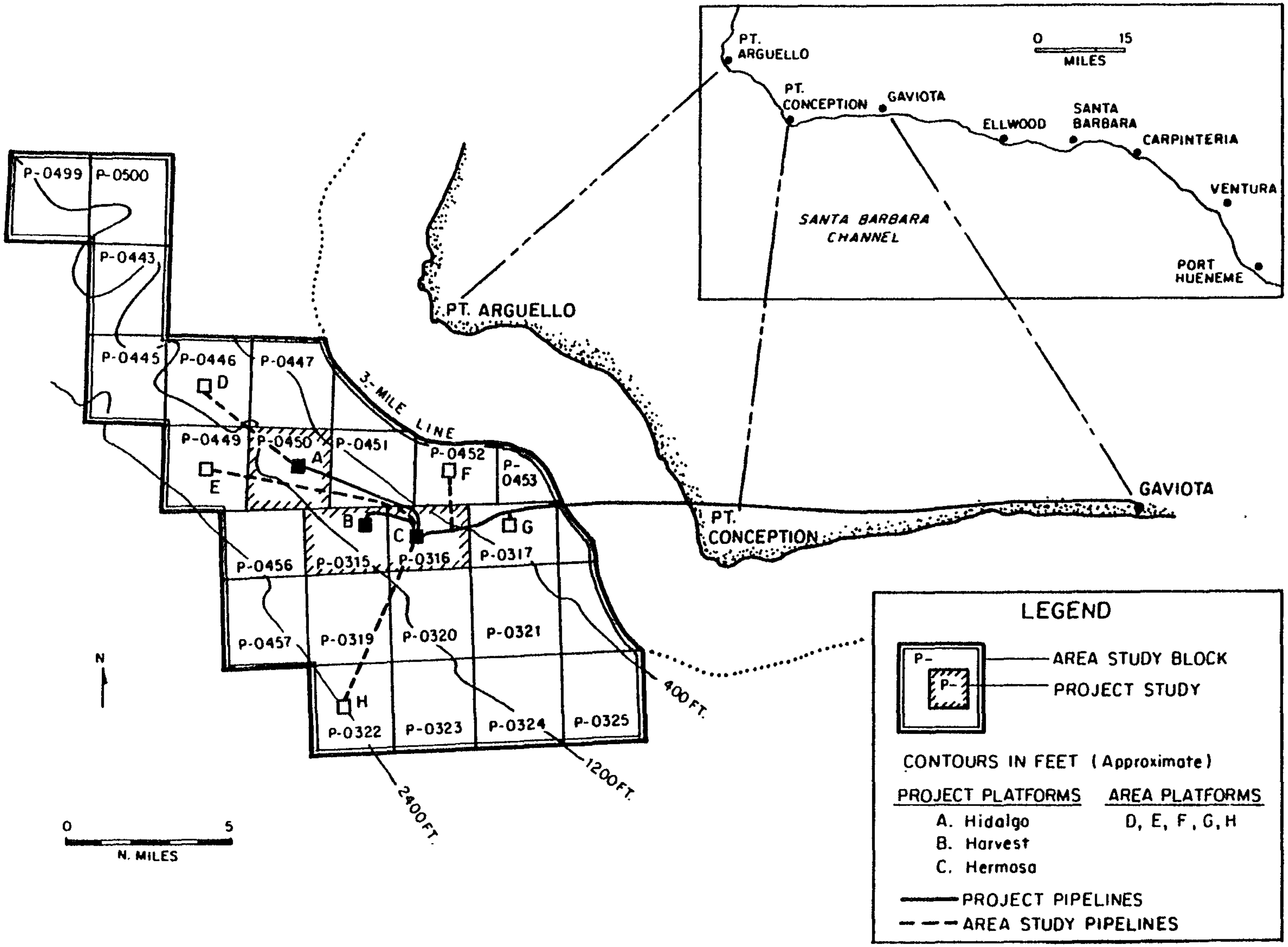

FIGURE 1 PROJECT / AREA STUDY ELEMENTS

requirements, and royalty monitoring. Specific approvals required by MMS for this project include: Development and Production Plans (DDPs), 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 of Chevron's request for a pipeline right-of-way through these waters.

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 tide lands. 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 Reports prepared for Chevron Platform Hermosa DPP and Texaco's Platform Harvest DPP (10/23/83, Texaco) and future permit decisions.

The Executive Summary is organized into sections that discuss: (1) the proposed project; (2) the environmental consequences associated with each project component; (4) major issues that must be resolved if the project is to be approved; (3) the advantages/disadvantages of project alternatives; (5) the Area Study scenario and associated consequences; (6) cumulative impacts; and (7) the utilization of impact mitigation measures, as presented in Impact Summary Tables.

1.2 The Project

The Point Arguello Field, which lies in Federal waters 10-15 miles west of Point Conception, was discovered by Chevron on OCS-P 0316 in 1981 (Figure 1). Delineation drilling on adjoining leases was performed on OCS-P 0315 and on OCS-P 0450. Primary recoverable reserves from the Point Arguello Field are estimated at 300-500 million barrels of oil, which is 10 to 17 percent of the estimated 3 billion barrels in place. The productive area is estimated to be 6,000 acres.

The proposed project, which is the initial development of the Point Arguello Field, consists of the following:

- Two Chevron oil and gas drilling and production platforms, Hermosa and Hidalgo, on OCS leases P 0316 and P 0450, respectively.

- One Texaco oil and gas drilling and production platform, Harvest, on OCS-P 0315.

- An oil and gas processing facility adjacent to the inland side of U.S. Highway 101 at Gaviota 28 milés west of Santa Barbara and 15 miles east of Point Conception. The processing facility would have an ocean outfall line for disposal of produced water offshore of Gaviota.

- A system of consolidated offshore and onshore pipelines to carry the produced oil and gas from the platforms to the processing facility. The dual pipeline system would carry Hidalgo and Harvest's products to Hermosa from which the combined oil and gas would be piped to a landfall 1.5 miles north of Point Conception and then overland along the coastal terrace to the facility at Gaviota.

- An overpass over Highway 101 and associated ramps and frontage roads to support the anticipated traffic increases through the facility. The overpass would service both Chevron and Getty Trading and Transportation proposed facilities at Gaviota. Both companies are involved in this project component.

Peak production is estimated as: 27,000 barrels per day (B/D) of oil and 28 million standard cubic feet per day (MMSCF/D) of gas from Platform Hermosa, 20,000 B/D of oil and 10 MMSCF/D of gas from Platform Hidalgo, and 46,000 B/D of oil and 42 MMSCF/D of gas from Platform Harvest. Because of the anticipated future development of the Point Arguello Field and surrounding area, as well as existing County policies regarding consolidated pipelines and facilities, Chevron is designing the consolidated pipelines and facilities for a peak capacity of 250,000 B/D of wet oil (200,000 B/D of dry oil plus 50,000 B/D of formation water) and 120 MMSCF/D of gas.

A major component of each project not evaluated in the EIR/EIS is transportation of each operator's processed oil from the processing facility to refineries in or out of California. These issues are being addressed first through Santa Barbara County's comprehensive Oil Transportation Plan and EIR (Final document released May 31, 1984), and secondly through the County's current consideration of specific transportation facility applications.

The construction phase for all facilities proposed is scheduled to begin in 1985. Specifically, Platforms Hermosa and Harvest are proposed for installation in mid-1985 and installation of Platform Hidalgo is proposed for mid-1986. Construction and installation of the offshore and onshore pipelines are scheduled for mid-1985. The Gaviota processing facility would be constructed beginning in early 1985, with some specific components added intermittently up through 1988. Offshore drilling operations are proposed to begin as early as late 1985 and would extend through 1991. Production operations are anticipated to last 30-35 years.

2. ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED PROJECT

The proposed project would create several significant environmental impacts. In most instances identified mitigation measures could reduce impacts to insignificance; in other cases residual significant impacts would remain even after identified mitigations are applied.

The term "significance" is used in these tables and throughout the EIR/EIS to characterize the magnitude of the projected impact. For the purposes of this EIR/EIS, a significant impact is a substantial or potentially substantial adverse change to resources in the local project area or the area adjacent to the project. The actual difinitions of significance and the region studied vary according to the environmental discipline analyzed, and are defined at the beginning of each section in Chapter V (Environmental Consequences) of the EIR/EIS. However, for DOI air quality regulations and regulations implementing the National Historic Preservation Act, significance has a different meaning and is defined by these laws and regulations. Refer to the EIR/EIS Environmental Consequences section for these definitions of significance. To the extent feasible, impacts are also characterized in terms of geographic range (local or regional) and duration (short or long term). Definitions for these descriptors also vary by discipline, and are defined throughout Chapter V.

The impacts of the project are discussed below in relation to the project elements. Issue areas (e.g., air quality) affected by or affecting the project component are dicussed in the order in which they appear in Chapters 4, 5, and 6 of the EIR/EIS. The text portion of this Executive Summary is followed by a series of Impact Summary Tables which identify impacts by issue area and Class. Class definitions are described in Section 7.

2.1 Platforms

Results from air quality modeling have indicated that significance levels for the four criteria inert pollutants are not expected to be exceeded during construction, drilling or production. Nitrogen oxide (NO_x) and hydrocarbon (HC) emissions from the platforms, however, may contribute to violation of both the State and Federal ozone standards. One mitigation measure identified in the EIR/EIS that would reduce this impact to insignificance is to replace platform electrical generators with electrical power supplied by subsea power cables from shore. This mitigation measure may itself lead to additional ocean bottom impacts from cable installation. This measure could also lead to increased emissions at power plants that are required to supply the increased electrical demand.

There is a potential to exceed the Federal 1-hour and 24-hour SO_2 standards because of flaring during upset conditions on Platform

Harvest. There is also a low probability that the 1-hour ozone standard could be exceeded during the same episode. The only mitigation identified would be to maintain a spare compressor on standby to be used during compression failure. This would reduce the need for flaring during a failure.

During normal drilling operations, the platforms would discharge drill cuttings and drilling muds into the ocean. Discharges from both drilling and production operations would also include treated sanitary waste and deck drainage. The impacts on water quality from such discharges are considered regionally insignificant. However, an accumulation of pollutants in the sediments may arise from these discharges. The potential for accumulation is not well understood and impacts are therefore difficult to assess. It is possible that pollutants accumulated in the sediments could have toxic effects on fish and benthic invertebrates inhabiting areas where pollutant levels rise above normal background levels. Discharges which have the potential for significantly degrading local water quality or accumulate in sediments if released in sufficient quantities include biocides, organic chemicals, inorganic chemicals, and heavy metals. By monitoring the discharges, the sediment quality and toxicity in the marine biota, actions can be taken to reduce the discharges if the impacts are found unacceptable.

Significant loss of hard-bottom benthos is likely from vessel anchoring during the construction of all three platforms and their interconnecting pipelines. This impact may be partially mitigated by minimizing the number of anchoring events and attempting to place anchors away from hard bottom features. Significant loss is defined as that greater than 10% of an individual feature in "local" terms and 10% of the Study Area features in "regional" terms.

Though a major (1000-10,000 barrels) oil spill ocurrence was found to be unlikely from this project, impacts from such an event would be regionally significant. An oil spill could originate at a platform site or anywhere along the offshore pipeline routes. For convenience, potential impacts are described here.

Adverse, not completely mitigable impacts from a major offshore spill would include: oiling and mortality of seabirds, potential oiling and smothering of intertidal and subtidal biota and (less likely) oil coating of marine mammals which may result in sublethal effects from ingestion of oil and/or mortality. An offshore oil spill during certain storm and high tide conditions could enter coastal lagoons. If this were to occur the impacts to the lagoon would be significant and long term (i.e., longer than 5 years but less than 50 years). Offshore spills would also impact commercial and/or recreational fishing by excluding areas of use and would impact coastal-related recreational and tourist activities by pre-emption of use areas and degradations of the shoreline resource.

These effects would be partially mitigated through an efficient and sufficient clean-up response. Selective use of oil dispersants and animal recovery assistance would also partially mitigate effects on seabirds and mammals. Local to regional short- to long-term impacts to the intertidal or subtidal ecology can be expected from a major spill that reaches resources prior to weathering. Regional has been defined as the overall Study Area, short-term is less than five years and long-term is greater than five years. Another measure which would partially mitigate impacts would be to minimize the use of both dispersants and mechanical clean-up when only invertebrate resources are threatened.

During both construction and operation, locally significant aesthetic impacts such as visual clutter and noise and congestion along the coast from increased crew boat, helicopter and truck activity would occur. These impacts are the results of a general increase in industrial activity in a recreational and tourist area. The impacts cannot be completely mitigated, but partial mitigation would include enhancing shoreline opportunities in areas away from the industrial activities and developments.

The construction of the platform and connecting offshore pipelines would pre-empt 10 percent of the region's rockfish tow area if the construction schedules of the platforms and pipelines overlap. The mitigation for this impact is to schedule the construction of individual project elements in a sequence which avoids the pre-emption of 10 percent or more of tow area at any given point in time. At present it is not known if this mitigation is feasible.

2.2 Pipelines

Pipeline constructions offshore would likely result in a loss of hard-bottom benthos from vessel anchoring activities. Mitigations identified which would partially mitigate this impact include reducing the number of anchoring events and attempting to place anchors away from hard-bottom features. Disturbance and possible mortality of marine mammals and disturbance of nesting seabirds could result from construction of the pipelines in nearshore waters if blasting is needed to reach required burial depths in the surf zone. Blasting is not part of the proposal but could be necessary. Mitigations identified include the use of multiple, small charges instead of fewer large charges.

Pre-emption of halibut tow and set gear fishing areas along the combined offshore pipeline routes and proposed Gaviota outfall line could result in significant impacts to these commercial fishermen. One mitigation measure identified which would reduce this impact would be to construct the shore-to-shore 3-mile (4.8 km) offshore segment of the Hermosa-to-shore pipeline in late summer/early fall and the produced water outfall between late spring and early summer.

The offshore pipeline could also be the cause of an unlikely major oil spill which could have significant impacts on marine mammals, seabirds, sensitive habitat, recreation, and tourism. See previous discussion of oil spills under platforms.

The large slide area on the west side of Gaviota Canyon could be remobilized by pipelaying activity if the toe of the slide is undercut by construction of the onshore portion of the pipelines. A possible mitigation measure is to avoid this potentially unstable area which could in turn adversely impact Gaviota Creek riparian habitat and for recreation at Gaviota State Park.

Erosion of active gullies, which in several cases are eroding at a rate expected to advance past the onshore pipeline corridor during the life of the project, has the potential to undermine pipeline support and possibly result in pipeline rupture. A gully of particular concern is located immediately west of Damsite Canyon. Mitigation measures identified include spanning specified gullies, maintaining vegetated areas and collecting run-off for diversion.

Impacts of the onshore pipeline installation and operation on surface water resources and aquatic biota parts overlap with geological impacts from slope instability and erosion. Construction and burial of the onshore pipeline would impact numerous stream crossings and several lagoons by increasing sediment loading, disrupting streamflow at crossings and causing bank destabilization and would impact stream biota such as the Federally-listed candidate species, the tidewater goby. Construction of the pipeline would cause adverse impacts on air quality due to fugitive dust. Post-construction conditions along the corridor would continue to have adverse effects on surface water because of increased erosion and effects on streamflow.

Significant adverse impacts on the terrestrial biota along the pipeline route are those which would occur as a result of construction (clearing, trenching, sidecasting equipment and materials storage) and post construction occurrences of erosion, slides or slope failures associated with the in-place pipeline. The pipeline route traverses 26 stream corridors and several important coastal lagoons. Elimination of riparian oak woodland, and wetlands vegetation would result with associated degradation of terrestrial and aquatic habitats, including that of the tidewater goby. Mitigation measures identified are, first, avoidance by re-routing the line around or spanning the resource, and second, the preparation, implementation and monitoring of wetland and vegetation restoration plans and slope/erosion stabilization plans.

Impacts from a major oil spill along the onshore segment of the pipeline are toxic effects on terrestrial stream biota, including the tidewater goby, and habitat loss due to oil clean-up activities. A major spill from the onshore pipeline, though unlikely (one to three in 10,000 years), could affect at least one of the 26 streams or one of the lagoons within less than 0.25 mile downstream of the pipeline.

The area from Point Conception to Gaviota is known to contain numerous potentially significant archeological sites and is an area of religious importance to Native Americans. As surveyed, the pipeline corridor contains several sites, the significance of which has not yet been determined. The principal mitigation measure is avoidance; however, avoidance may not be possible in every instance. It is highly likely that one or more sites would be impacted by construction or burial of the pipeline. Should the pipeline route be unable to avoid these sites, the significance of each site would be detemined and a site-specific mitigation plan would be developed and implemented.

2.3 Processing Facilities

Emissions during grading at the onshore Gaviota site may cause local, short-term exceedance of the 24-hour State standard for total solid particulates--principally dust. Depending on weather (particularly wind and rain) it may not be possible to avoid violation of the 24-hour standard without substantial impact on the site excavation and grading schedule/methods. The Vista del Mar Union School would be impacted by construction activity as would motorists on Highway 101, residents of the Hollister Ranch and, to a lesser extent, activities at Gaviota Village. Construction activity may also cause exceedances of the California one-hour NO_2 standard.

Nitrogen dioxide may be a problem of local significance during operation of the Gaviota facility's cogeneration turbines and auxiliary heaters since there is the likelihood of occasional exceedance of the California short-term NO_2 standard. The mitigation identified, which is to take power from the grid, would only partially mitigate this impact. Additional controls on the process heaters by using selective catalytic reduction (SCR) would reduce the concentrations below the standards. Detailed site specific tracer monitoring and modeling would be needed to accurately define the extent of the high concentrations.

There is a potential to exceed the short term SO_2 standards in the event of upsets, expected about once in ten years, at the sulfur recovery plant, with likely significant adverse effects on vegetation on the south-facing slope of the Santa Ynez Mountains near the processing facility. Maintenance of auxiliary scrubber capacity, in order to considerably increase the efficiency of SO_2 removal, would mitigate these effects to insignificance.

Onsite groundwater resources do not appear to be adequate to meet project water requirements without creating an overdraft condition in the three site watersheds, as well as producing significant impacts on surface water and biological resources. Development of supplies in adjacent watershed (Canada San Onofre and Canada de la Gaviota) would avoid an overdraft in the vicinity of the project area, but would not reduce impacts on surface water and biological resources to insignificance. Reduction of overall water demand is a partial mitigation; for example, elimination of cogeneration units, which is a mitigation measure identified to reduce air emmission impacts, would reduce freshwater demand impacts but not to insignificant levels. Another mitigation, desalination, could supply maximum anticipated project needs with minimal adverse environmental impact.

The onshore facility at Gaviota would discharge produced water, SO_2 scrubber waters and other waste water through a subsurface diffusion about 4900 feet offshore. One impact associated with these operations is depletion of local dissolved oxygen around the Gaviota outfall, which would locally impact marine biota. Forced oxidation of waste water prior to discharge was identified as a mitigation reducing this impact to an insignificant level. Other impacts associated with the discharge include potential impacts due to long-term accumulation of pollutants in the sediments from release of potentially toxic organics, inorganics, and heavy metals. Monitoring of the discharge would be needed to determine if this impact occurs. Mitigation measures would only be appropriate if monitoring of the outfall finds that toxic chemicals are accumulated in bottom sediments in amounts resulting in significant adverse impacts on the biota. Reinjection of waste water is identified as a measure which would mitigate these if they occur. Though the technology for reinjection exists, it is not known whether there are suitable geologic formations at this location to accept reinjection waters.

Construction activities will result in the disruption and/or loss of Environmentally Sensitive Habitat Areas (e.g., Butterfly and raptor roost trees) at the construction site. At the Gaviota site locally and possibly regionally, significant habitat loss of Butterfly trees cannot be fully mitigated. These trees are designated as protected Environmentally Sensitive Habitat Areas (ESHA) by the Santa Barbara County Local Coastal Plan (LCP).

At the Gaviota facility location, two known archeological sites may be affected by grading and construction. Avoidance of these sites would eliminate the impact; mitigations other than avoidance needed to reduce the impact to an insignificant level depend upon the results of the significance testing. If they cannot be avoided, a site-specific mitigation plan will be developed and implemented.

Catastrophic failure of the two future wet-oil storage tanks at the Gaviota processing facility in a major earthquake (estimated probability of about one in 5,000 years), while unlikely, could overtop the presently proposed dike and represent a release of more than 1,000 (up to 40,000) barrels of oil less than half a mile from the coast. Even assuming maximum feasible containment and cleanup of such a spill, oiling mortality impacts of regional significance on diving seabirds and smothering and cellular toxicity impacts of local or regional significance on intertidal and nearshore subtidal benthos would be expected from such a spill.

Reduction of commercial shellfish and/or finfish populations off Gaviota due to the Chevron outfall discharge may be a significant impact. Oxidation of the waste water prior to discharge (previously mentioned) would reduce this impact to an insignificant level.

Noise during construction will also create a locally significant impact at the Vista del Mar Union School ranging from 7dB to 20dB above existing levels. Mitigation discussed includes focusing construction during non-school periods and erecting temporary barriers around the noisiest activities. This impact and mitigation assumes that the school continues in its present location.

For public hazards, the major concerns are the potential transportation accidents resulting in spills of gas by-products, and accidents involving release of sour gas at the processing facility and along the onshore gas pipeline. Major to severe risks to the public can occur from accidents from the transportation and processing activities over the project lifetime. In the peak year four truck accidents per year are expected with one leading to a spill. Mitigative measures would include scheduling of truck trips to avoid peak population exposure times, development of coordinated emergency response plans, conducting specialized driver training, monitoring of critical safety devices and using longer routes to bypass urban areas.

2.4 SUPPORT OPERATIONS

Chevron and Texaco plan primarily to use helicopters for crew transport. However, in instances where crew boats are utilized, reduction of the kelp canopy at Ellwood and Gaviota or interference with kelp harvest at Gaviota would result from support vessel traffic. Mitigation measures identified are: using Port Hueneme as a supply base, and Carpinteria as the emergency crew base, restricting crew vessel traffic to corridors of minimum length and width through the kelp bed, and replacing and insuring regrowth of kelp plants. If all measures were implemented, the impact would be insignificant.

Crew supply boat and helicopter support flights will create additional noise in the coastal county area. Mitigations include use of Gaviota for supply/crew loading, placing this activity farthest west and thus nearer to Point Arguello Field development. This minimizes distance along shore and places the activity in an area of lesser population density. However, this mitigation would have regionally significant residual impacts on marine biota and commercial fishing/kelp harvesting. Alternatively, routing offshore rather than along shore could be required; however, this longer routing increases engine emissions. Finally, with respect to helicopters, another basing location could be considered such as Lompoc.

Onshore, mitigable project-related transportation impacts include impacts on Santa Barbara Airport parking; the Bixby/Hollister/Western LNG Road; U.S. Route 101 along the central coast during peak hours and most particularly in the vicinity of the at-grade intersection at the proposed onshore Gaviota facility. Mitigations are detailed in the accompanying Summary Impact Tables.

3. EVALUATION OF PROJECT ALTERNATIVES

3.1 Locate Proposed Onshore Gaviota Facilities at Point Conception

No substantial overriding benefit is provided by this suggested relocation. Predictive models show that ozone formation will increase while other air quality components decline slightly (but not by significant amounts). Terrestrial biological elements are still impacted since the site is important for migrating birds and is part of the range of regionally rare, large carnivores. A dry-oil pipeline and a sales gas line would still need to be built to the Gaviota area. In addition, truck and employee traffic on Jalama and Hollister roads would increase significantly causing degradation of the relatively peaceful and currently undisturbed ranch/range environment. Relocation would significantly reduce the impact on the Vista del Mar Union School but some impacts could remain depending upon what facilities might still be needed at Gaviota to support the alternative Point Conception processing plant. The Point Conception area is of great significance to Native Americans and a facility at the site would visually intrude since the terrain does not offer natural, topographic visual screening.

3.2 Locate Oil and Gas Lines From Platform Hermosa to Gaviota Offshore

The offshore route would avoid sedimentation in streams and impacts to riparian habitat (environmental sensitve areas); erosion problems in steep canadas; revegetation problems; and the potential for disturbance of the many significant Chumash archeological and historic sites which exist along the pipeline route. Disadvantages include the potential for increased fishing conflicts, a slightly increased risk of spill damage to the intertidal habitat; and a slight increase in construction impacts on the Gaviota kelp bed. Overall, the offshore pipeline is less environmentally damaging than the onshore pipeline.

3.3 Transport of Liquid Petroleum Gas (LPG) and Natural Gas Liquids (NGL) by Rail or Pipeline

The alternative rail and pipeline modes of LPG and NGL transportation, instead of truck, reduce but do not eliminate the risk of truck-related accidents leading to possible spills/fires. Spill volumes are likely to be larger if rail or pipeline accidents occur. Trucks may still be used at cargo transfer points at the end of the pipeline and/or rail depots. Traffic impacts associated with proposed LPG/NGL transport in the local area would be eliminated. Railcar operations would be increased to move the additional volumes and pipeline construction would cause temporary distubances along its route(s). Without knowing the actual destination of the LPG/NGL, comparison between transportation modes cannot be definitive enough to select a preferred transportation method at this time.

3.4 Use of Possible Supply Bases at Gaviota or Ellwood Instead of Port Hueneme; Use of a Possible Crew Base at Gaviota

Both Chevron and Texaco propose to use Port Hueneme as their source of offshore supply. They both propose to use Santa Barbara Airport for crew transportation via helicopter. In inclement weather Chevron would operate crew boats from Carpinteria while Texaco would operate boats from Ellwood Pier. The proposed facilities are preferred to any alternative facilities near Gaviota because of the latter's exacerbation of cumulative impacts to air quality, near shore traffic and construction disturbance of kelp beds and other resources, as well as lack of adequate water supply. The savings in transport time and fuel because Gaviota is nearer to the leases than are the proposed bases is not a significant benefit, although it does lessen the longshore noise impact of crew boat operation. Crew boats are used only when other helicopter transport is unavailable (approximately 2 to 5 percent of the time). The one environmentally preferable alternative would be to use only Carpinteria (not Ellwood) as the emergency crew base because of reduced impacts to the kelp bed off Ellwood.

3.5 "No-Project" Alternative

The "no-project" alternative assumes continuation of presently permitted activities in the Santa Barbara Channel. The Arguello Field is not developed. Present activities at Ellwood, Gaviota, and other onshore processing sites continue and there is no assumed expansion as proposed in various development applications. The advantages for the no-project alternative are in avoiding:

- Adverse local and regional environmental impacts.

- Potential public safety hazards.

- Negative fiscal impacts in the Tri-County area, primarily Ventura and San Luis Obispo Counties.

The disadvantages for the No-Project Alternative are the denial of:

- New domestic supplies of oil and gas which increase energy availability, enhance national security, and improve the international balance of payments.
- Expanded employment resulting from project expenditures;
- Increased economic output to the businesses serving the offshore industry;
- Increased total personal income, as well as per capita personal income, for the tri-county area; and
- Long-term fiscal surplus for Santa Barbara County because of increases in property taxes and personal income from the project.

4. MAJOR ISSUES

Of the environmental consequences identified in Section 2 above, the following are recognized as major issues because they involve either impacts which cannot be mitigated to insignificance and/or for which the mitigations represent important tradeoffs between resources. These are major concerns which will need to be resolved by the decision-makers and they are presented below within the context of their associated project component.

4.1 Offshore Platforms

Construction activities associated with the offshore platforms will result in the pre-emption of sufficient rockfish tow fishing grounds to constitute a significant, unavoidable impact on the commercial fishing industry.

4.2 Onshore Pipeline

The environmental analysis in this document indicates that because of construction related impacts, the alternate offshore pipeline route from Platform Hermosa to Gaviota may be less environmentally damaging than the proposed/mitigated onshore route. The offshore pipeline route should be given careful consideration as a permitted project element.

Construction of the onshore route will significantly impact or be impacted by coastal streams, lagoons, woodlands, upland habitats, rare species, steep slopes with unstable soils and geology, archeological resources, air quality and visual resources. The mitigation necessary to reduce these impacts to insignificance is extensive. In some instances, long-term mitigation programs, whose ultimate success is questionable, will likely require modification of construction schedule sequences. The construction impacts of the offshore alternative are much less in comparison.

The environmental consequences of day-to-day operations of the mitigated onshore and offshore pipeline route are such that neither has a clear advantage over the other in terms of impact. The proposed corridor would be visible until vegetation was complete, and in several areas may be visible for a long period because of erosion and unsuccessful revegetation attempts. The mitigation identified to reduce impacts to biological and cultural resources involves spanning streams. Therefore, the proposed or mitigated onshore line would be visible on the landscape, whereas the offshore line would not be visible. The construction of the pipeline would contribute to the project's potential to exceed the State one-hour NO_2 standard during construction in either case. The offshore line, depending upon its route, may impact some commercial fishing activities which the onshore line would not.

The probability of an oil spill leak from an offshore line is roughly equivalent to that for an onshore line (5-8 events per 1000 years), and the maximum volume spilled would be of roughly the same probable size (6000-7000 barrels) were it to occur. Depending upon sea conditions and location of the landfall (if any), an offshore spill would have a high likelihood of reaching ESH areas between Point Conception and Gaviota and would, in general, be more difficult to contain and would perhaps have greater impact than an equivalently sized onshore leak, unless the onshore leak enters a lagoon.

In summary, selection of a pipeline route to Gaviota involves consideration of the tradeoffs between the significant unavoidable impacts associated with the construction and mitigation of the onshore route and the effects of an oil spill (of low probability) emanating from an offshore line which could damage important intertidal resources and impact some commercial fishing activities.

4.3 Processing Facility

Processing Facility Impacts on Vista del Mar Union School

The location of the Gaviota processing facility in direct proximity to the Vista del Mar School will generate significant unavoidable impacts to the school. Both construction and operational impacts of noise, odors, emission, dust, safety hazards, and public health hazards, together with traffic, will severely impact the learning environment of the school. The only adequate mitigations are either to relocate the proposed processing facility away from the school or to move/rebuild the school at a distant location.

Inadequate Water Supply Unless Desalination is Implemented

Water demands of the processing facility exceed the local available supplies if the long-term protection of groundwater basins is to be achieved and biological productivity of coastal streams is to be maintained. The only mitigation measure, without major adverse effects on other resources, for this impact is the contruction of a desalination plant for water supply.

Exceedance of Air Quality Standards

Exceedance of certain air quality standards during both construction and operation of the facilities will occur. The emissions standards subject to this impact are 24-hour total suspended particulates during construction; 1-hour State NO_2 Standards; and 1-, 3- and 24-hour SO_2 Standards. Partial mitigation measures are available but will not reduce the impacts to insignificant levels; that is, at or below the appropriate State or Federal standards. No offsets for the exceedances described above are available.

Elimination of a Protected Environmentally Sensitive Habitat (Monarch Butterfly Trees)

A major portion of the Gaviota facility site contains a eucalyptus grove utilized by migrating monarch butterflies and roosting turkey vultures. The facility and other project-related terrain modifications (e.g., frontage roads associated with the proposed Highway 101 overpass) will reduce or eliminate the grove. The impact is significant and unavoidable. This grove is important in the species life cycle. The mitigation identified in the EIR/EIS, other than avoidance, is to replant trees in an undisturbed area as new habitat. This approach is untried and may not be successful. Butterfly tree groves are designated and protected as environmentally sensitive habitats in the County's Local Coastal Plan.

Inconsistency with Santa Barbara County Land Use Policies

The proposed project appears to conflict with numerous policies of the County's Land Use Plan and with elements of the County's Local Coastal Plan. Mitigations identified in the EIR/EIS may not eliminate the conflict in all instances.

5. EVALUATION OF THE AREA STUDY DEVELOPMENT SCENARIO

In addition to the proposed projects, this document includes a study of the impacts from further potential oil and gas production in the Arguello Slope/Southern Santa Maria Basin area, where substantial additional reserves are expected to be developed. Potential development over the next ten years was represented by five additional, hypothetical platforms and connecting pipelines not part of either Chevron's or Texaco's current project proposals. The hypothetical platforms are assumed to be tied to the existing pipeline system and processing facilities without causing a new phase of major construction onshore (Figure 1).

The analysis of the Area Study development scenario assumed:

1) A maximum of eight platforms (i.e. Hermosa, Hidalgo, Harvest and five hypothetical platforms).

2) Installation of these platforms over a nine-year perod at a rate of one per year, following the installation of Platforms Hermosa and Harvest in 1985.

3) A 30-year life for each platform.

4) Total production of oil and gas from the eight platforms remaining within the design capacities of the transportation and processing facilities presently proposed for the Gaviota area by Chevron.

Platform placement for purposes of the EIR/EIS is based on company response, state-of-the-art technology and MMS's present knowledge of the geology of the area. While preserving confidentiality of the drilling results, the MMS assumed placement of platforms in areas where drilling has occurred, where one or more wells have been found "capable of producing paying quantities" (OCS Order No. 4) by the MMS and, hence, where future development activities are more likely to occur. For this analysis, area study platforms are assumed to be in the centers of the leases.

The following impacts identified in the Area Study Development analysis are those which appear to be additive to proposed project impacts and to approach or further exceed thresholds of significance:

- Air emissions from the additional operating platforms could contribute to worst-case scenario ozone levels' exceeding State standards over larger areas than for the proposed project. Mitigation of this impact to insignificance would be possible by supplying of power for the platforms from the onshore grid as opposed to onsite generation.

- Discharges associated with fine particulates among the drill muds, cuttings and produced waters from the additional operating platforms could add to those from the proposed project and create areas of contaminated sediment buildup on the Arguello Slope, with potential toxic effects on benthic biota. There are insufficient data to judge the likelihood of this impact prior to operation of the proposed project platforms. If vessel anchoring activities associated with construction of the additional platforms and connecting pipelines occur in areas with raised profile, hard-bottom features, damage to invertebrates will occur. This impact would likely remain of regional significance, but could be partially mitigated by the development and enforcement of anchoring restrictions as described in the document for the proposed project.

- Construction of the additional platforms and pipelines could impact significant offshore cultural resources, but this impact potential would likely be mitigated to insignificance by and avoidance of the potential resources.

- The construction and operation of some or all of the five additional platforms would be visible from North Coast locations between Point Conception and Ocean Beach County Park, creating a significant adverse visual impact for an undetermined percentage of viewers who might not notice or object to a lesser number of platforms. A secondary impact of reduced recreational and tourist use of Jalama and/or Ocean Beach County Parks is possible. No measures have been identified that would mitigate this impact to insignificance.

- The range of potential oil spills originating from offshore production and pipeline transportation would become 2-3 times more likely to occur with the additional Area Study Development platforms and pipelines. Probabilities of all spills combined would increase from about one in ten years for the proposed project to about one in 3-4 years with the additional Area Study Development. The probability of a major spill of over 10,000 barrels could increase from about 5 percent to about 10 percent over the combined facility lifetimes. Consequences in the various subject areas and potential mitigation measures are essentially as described for offshore spills from the proposed project.

6. EVALUATION OF CUMULATIVE IMPACTS

Cumulative development scenarios were structured to allow analysis of reasonably likely non-oil related developments along with three alternative configurations of reasonably likely oil development projects. Figure 2 shows the locations of both the oil and non-oil related cumulative development projects considered in the analysis. Cumulative oil and gas production was assumed to peak at about 500 MB/D and 400 MMCF/D respectively in 1991, with the alternatives involving different means of processing and transporting the production. In the Base Scenario, onshore processing would occur at Gaviota and dry oil would be transported via a full-scale marine terminal at Gaviota. Alternative I would involve onshore processing at both Gaviota and Corral/Las Flores Canyon, with transportation via a Las Flores Marine Termnal. In Alternative II, processing would also occur at Gaviota and Las Flores, but transportation would be by onshore pipelines instead of a marine terminal.

The non-oil related development projects considered in the cumulative analysis include highway and airport expansions, a variety of commercial, light industrial and residential projects in western Goleta, and cluster residential development on the Bixby Ranch near Point Conception.

The following impacts identified in the evaluation of cumulative development are those which appear to be additive to proposed project and Area Study development impacts and to approach or further exceed thresholds of significance.

In the Base Scenario, the development of both the proposed Chevron processing facility and the full-scale Getty treatment, storage, marine terminal and supply base at Gaviota would be expected to have locally or regionally significant impacts in at least six issue areas:

Air Quality: Exceedances of the short-term State NO_2 and SO_2 standards and the Federal Ozone Standard would be expected because of the combination of marine terminal (tanker) plus processing facility emissions and would only be partially mitigable.

Onshore Water Resources: Cumulative water demands would exceed the capacity of the local supplies that could be obtained onshore without significant adverse effects on streamflow; desalination would be an effective mitigation.

Aesthetic Resources: Cumulatively, oil related projects proposed for the CCS and State water will significantly impact the aesthetic attributes of the South Coast area which support its recreation and tourism popularity. Increased industrial activity will conflict with non-industrial uses along the shoreline. Increased intensity of use from both oil and non-oil related population increases will further degrade the existing recreational amenities.

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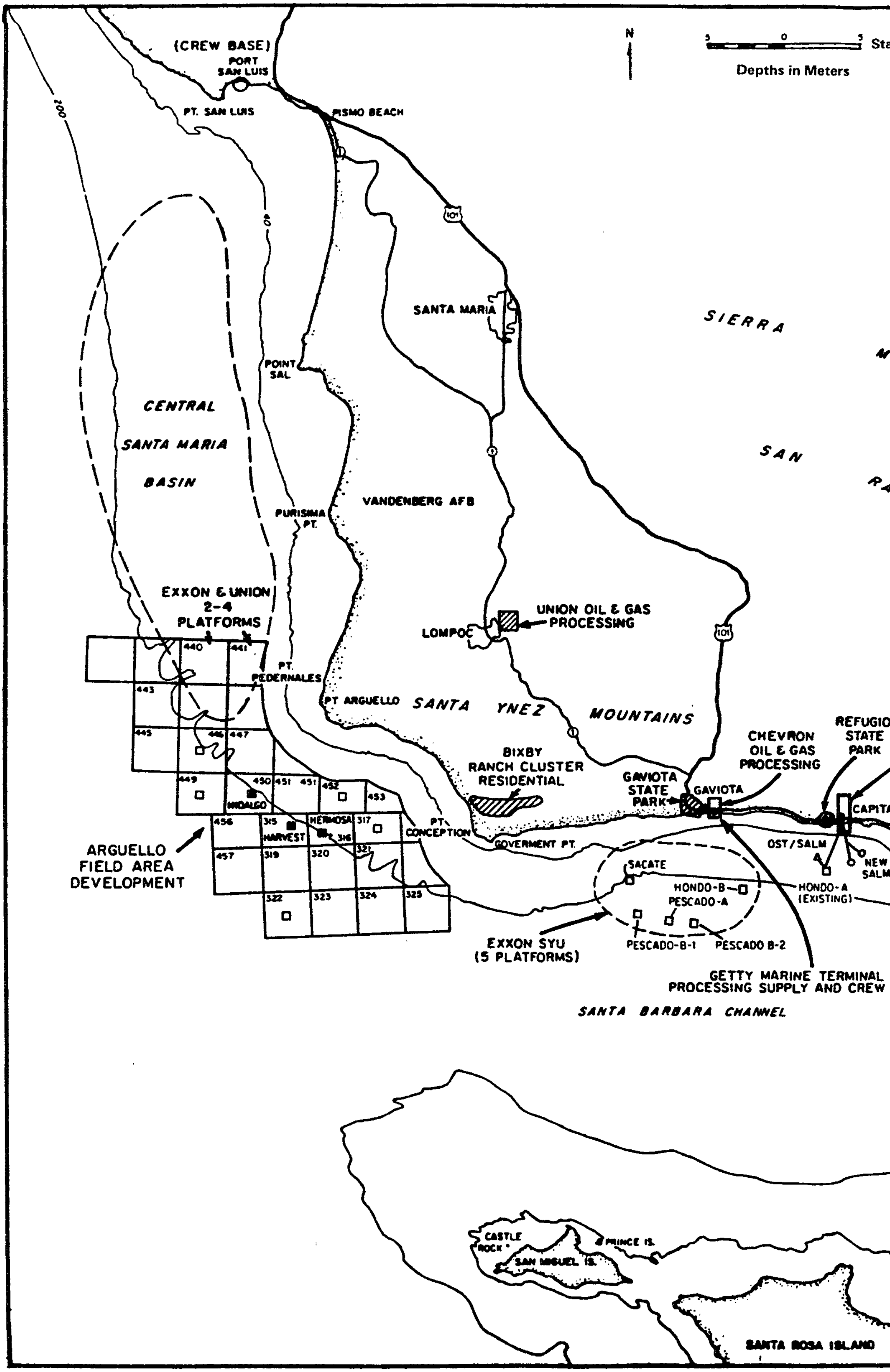

FIGURE 2 LOCATIONS OF CUM

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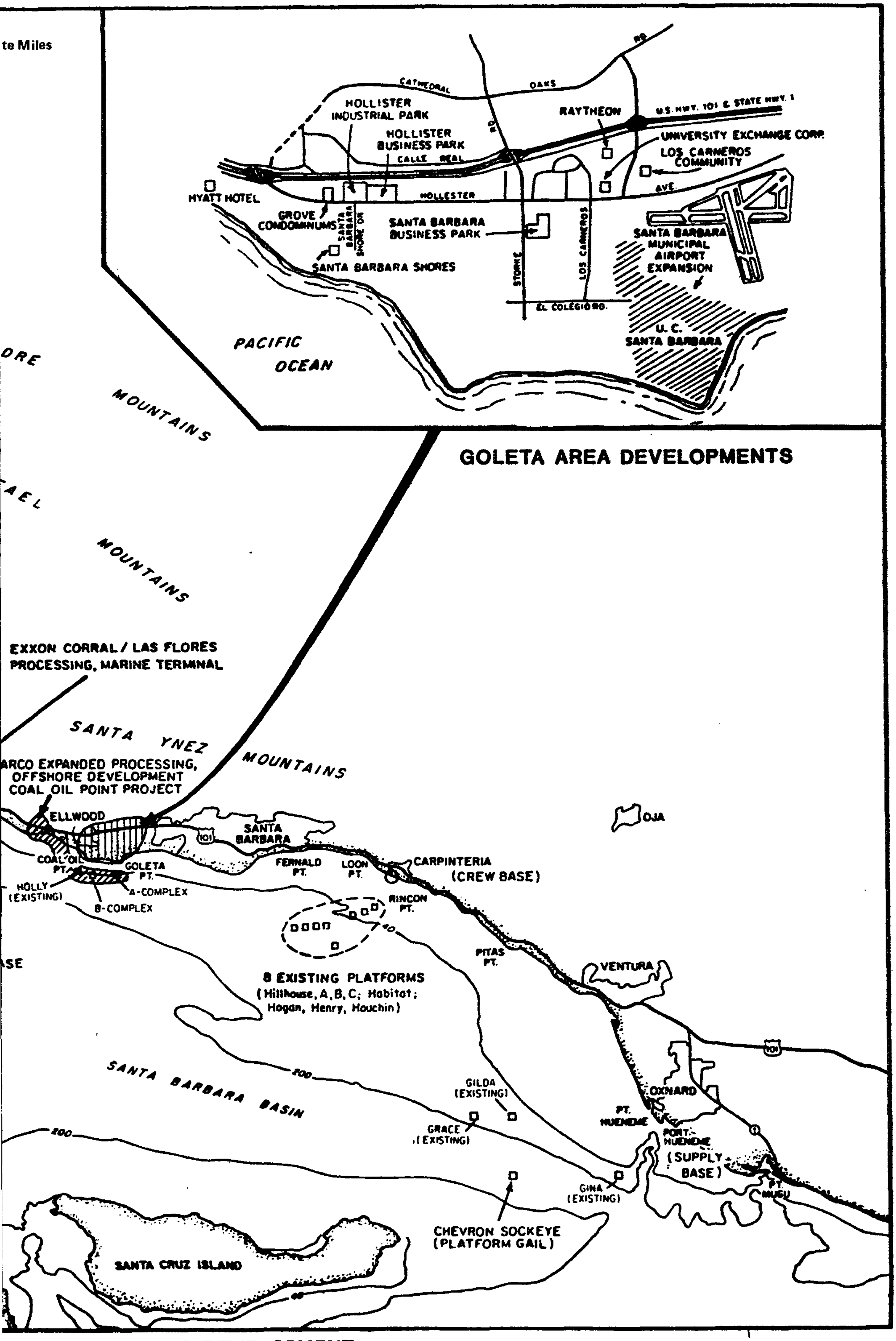

LATIVE SCENARIO DEVELOPMENT

IMAGE# 21,

Commercial Fishing and Kelp Harvest: This activity would be adversely affected by the construction and operation of the marine terminal and supply base (Getty) by interference with set gear fishing, and potentially by supply vessel traffic damage to the kelp canopy.

The Learning Environment at the Vista del Mar Union School: The school would be closely surrounded on two or more sides by oil development facilities, and would likely be considered no longer functional for its objectives.

Impacts from other aspects of cumulative development include:

- Cumulative population growth in the tri-counties would be affected by both oil and non-oil related development, which would add 4-5 percent short term and about 3 percent long-term to the baseline. These estimates represent about 5 times the short-term impacts and about 10 times the long-term impacts of the proposed projects. This development would increase regional population by 45,000 - 55,000 in the short term and by 38,000 - 45,000 in the longer term. Between 16,000 and 20,000 new housing units would be demanded in an area with limited supply. Impacts on services such as solid waste disposal and public finance are expected to be felt most heavily in Ventura County, where short-term annual deficits of about $1 - 4 million are projected. San Luis Obispo County is projected to incur small incremental net deficits, while Santa Barbara County is projected to incur deficits through 1986 but surpluses thereafter. Personal income is projected to increase by about 4-6 percent initially and level off at about a 3-4 percent increase. Unemployment is conservatively projected to decrease long term by about 0.5 percent in the Tri-counties.

- Environmentally sensitive habitat areas in Santa Barbara County would be expected to experience regionally significant, additive losses at separate locations because of both oil and non-oil related developments. In addition to the Gaviota area impacts noted above, cluster residential development of foothill canyons on the Bixby Ranch, processing at Corral/Las Flores Canyons, and connecting hydrocarbon pipelines among Ellwood, Gaviota, and/or Las Flores facilities would displace and disrupt riparian woodland ESH's and their associated streams. Wetland habitat loss, which would be of relatively small magnitude for the proposed oil developments, could be of additional regional significance with the proposed airport expansion in the Goleta Slough wetland. The feasibility of mitigation by avoidance and/or restoration and replacement is site- and condition-specific.

- Prospective oil and non-oil development in the foothill canyons and beach areas (see above) would also have a high probability of disrupting cultural resources (e.g., historic or pre-historic villages or burial sites) of regional significance. The feasibility of mitigation by avoidance is site-specific.

- The existence of up to three new oil and gas processing facilities larger than any presently operating along the South Coast in Santa Barbara County would pose potentially significant safety risks at the sites themselves and along product transport routes. Such risks could be partially mitigated by facility consolidation and selection of transportation modes.

- The cumulative development scenarios indicate the potential for 2-4 times greater probability of offshore oil spillage in the Study Region than prevails today. In particular, Alternative I, in which the accelerated development of the Santa Ynez Unit would occur in conjunction with 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. Additive risks of impact for Arguello Slope and Santa Ynez Unit Development would likely be focused on the nearshore coastal areas between Point Conception and Point Arguello and in Cojo Bay. Additive cumulative risks from Point Conception to Ellwood coastal area would be expected from the Santa Ynez Unit, Getty Gaviota and Coal Oil Point projects, especially if the Gaviota marine terminal and the OS&T for the Santa Ynez unit co-exist. Arguello Slope production would generally not add measurably to the latter risk unless the alternate offshore pipeline from Platform Hermosa to Gaviota becomes part of the project. Measures that could in combination mitigate the above spill risks to marine resources to potential insignificance by reducing impact probabilities to less than one in a thousand years include: (1) use of onshore pipelines instead of marine terminals for crude oil transport; (2) limiting the number of areas where concurrent production and oil transfer take place; and (3) phasing development to limit the volume of concurrent production and spill potential.

7. <u>IMPACT SUMMARY TABLES</u>

The tables that follow represent a compilation of project impacts, the causes of the impacts, possible mitigation measures that would reduce the specific impacts, and a brief description of residual impacts if the mitigation measures were implemented. Refer to Section 2 of this summary for a discussion of meaning and use of the term significance.

The following Impact Summary Tables are separated into four discrete sets according to the Class of Impact discussed. Impact classes are defined as follows:

- <u>Class I - Significant adverse impacts that cannot be mitigated to Insignificance</u>: 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, 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 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 Joint Review Panel has identified those primary permitting agencies that have authority to assign mitigation measures to project permits. For the benefit of comprehensive analysis, and in response to a comment received by EPA (see Response to Comments, Volume I, Section II, EPA comment A.2(2)), agency acronyms have been added to the tables after each mitigation measure identified with a project impact.

The following agencies are listed in the tables.

Abbreviation	Agency Name
APCD	Air Pollution Control District
CCC	California Coastal Commission
CDFG	California Department of Fish and Game
DPR	Department of Parks and Recreation
MMS	Minerals Management Service
RWQCB	Regional Water Quality Control Board
SBC	Santa Barbara County
SLC	State Lands Commission
USCG	U.S. Coast Guard

SUMMARY IMPACT TABLES

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE TOTALLY MITIGATED

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE TOTALLY MITIGATED[1,2]
(Impacts which must be addressed in a "Statement of Overriding Considerations" if the project is approved (Section 15093, State EIR Guidelines)

AIR QUALITY

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Proposed Projects (Individually and Combined)	1.	Emissions during grading and construction at the onshore site may result in a violation of the 24-hour TSP Standard	Local, short term	Additional TSP control plans needed for excavating and grading the site (APCD/SBC)	Significant; may still exceed the 24-hour TSP standard
	2.	Potential to exceed the California one-hour NO_2 standard as a result of construction of the pipeline, the Gaviota facility and pipe line, and the Gaviota outfall	Local to regional (limited to coastline), short-term	Modify construction schedules to minimize overlapping of equipment emissions (SBC)	Significant; may still exceed the standard because construction schedule could not be adjusted in a practical way
	3.	Potential to exceed California one-hour NO_2 standard near Gaviota due to operation of the onshore facility	Local, occasional exceedence of short term standard during life of project	Replace cogeneration units at Gaviota with electrical power from the grid. The steam-producing boiler will have to be expanded, but there will be a net reduction of NO_x emissions for the facility and a resultant reduction in short term NO_2 impacts (APCD/SBC)	Significant; may still exceed standard. Detailed site specific modeling would be required to more accurately define extent of the increment Facility water demand would decrease due to elimination of water injection requirements. Increased emissions may occur at power plants supplying this electricity demand.
	4.	Potential to exceed the short-term SO_2 standards (1-hr, 3-hr, 24-hr) during onshore sulfur recovery plant failure at Gaviota. This can occur even after incinerating the H_2S and scrubbing the SO_2	Local, high levels can occur at elevated receptor near the onshore facility only when onshore winds occur during the failure	Supply clean gas to incinerator to increase exhaust gas flow rate and raise plume height (APCD/SBC)	Significant, Maximum concentrations would be reduced but SO_2 short-term standards may still be exceeded. Also pollutant maximum, although lower than unmitigated consequence, may occur farther downwind in areas supporting the peregrine falcon

MARINE WATER RESOURCES

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Project-Related Accidents		Surface oil slicks, tar balls, contamination of sediments 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	Modify contingency plans as necessary to provide removal equipment to nearshore waters off Point Conception to Point Arguello in less than 3 hours (MMS,USCG)	Significant

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE TOTALLY MITIGATED[1,2] (continued)
(Impacts which must be addressed in a "Statement of Overriding Considerations" if the project is approved (Section 15093, State EIR Guidelines)

MARINE WATER RESOURCES (continued)

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Area Study Development		Impact above more likely due to additional platforms and pipelines	Local or regional, short- to long-term	Rapid and efficient spill clean-up	Significant
Project Alternatives	.	Impact above slightly more likely with offshore Hermosa-to-Gaviota pipeline	Local to regional, short- to long-term	As above	Significant
Cumulative Development		Impact above more likely due to additional platforms and pipelines.	Local to regional, short- to long-term.	As above	Significant

NOTE: Additional details on impacts and mitigation measures appear in Section 5.4.

MARINE BIOLOGY

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Proposed Project (Individual and Combined Components)		Loss of hard-bottom benthos due to construction-vessel anchoring	Local individually to regional combined, short to long term	Pre-construction demarcation, restricting vessel activities, consolidated moorings, establishment of additional hard-bottom features (MMS, USCG, SLC, USCG, CCC)	Locally to reginally significant
Project-Related Accidents	1.	Mortality and disturbance of seabirds and/or marine mammals due to unlikely major oil spill and cleanup activities	Regional, short to long term	Achieve adequate response time at key locations, selective use of dispersants for oil, animal animal recovery assistance (MMS, USCG, CCC, SLC)	Regionally significant
	2.	Damage to subtidal ecology due to unlikely major oil spill	Local or regional, short to long term	Request that RRT consider procedures which avoid use of chemical agents if only these resources are threatened (MMS,USCG,CCC,SLC)	Locally to regionally significant
	3.	Damage to estuarine lagoons and/or wetlands due to unlikely onshore pipeline spill	Regional, short to long term	Install additional block valves, barriers at culverts, emergency water flow maintenance procedures (SBC, CCC, CDFG, SLC)	Regionally significant to insignificant
	4.	Damage to marine mammals due to unlikely encounters with support vessel activities	Regional, short to long term	State-of-the-art operator training, reporting requirements, adhere to vessel traffic corridor program (voluntary compliance) (MMS, CCC)	Regionally significant to insignificant, potentially inconsistent with Federal Marine Mammal Protection Act; CCA Section 30230.

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE TOTALLY MITIGATED[1,2] (continued)
(Impacts which must be addressed in a "Statement of Overriding Considerations" if the project is approved (Section 15093, State EIR Guidelines)

MARINE BIOLOGY (continued)

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Area Study Development		Impact types 1 under Project, 1 and 2 under accidents above more likely due to additional platforms and pipelines	Local to regional, short to long term	As above for Proposed Project, and related accidents, plus limitation of concurrent production activities	As above for Proposed Project and related accidents
Project Alternatives	1.	Impact types 1 and 2 and damage type 3 above under accidents more likely due to offshore Hermosa to Gaviota pipeline	Local or regional, short to long term	As above for Project-related accidents, modify oil spill plan to clarify response procedures for lagoons specified in EIR/EIS to prevent entry of spill to lagoon	Significant to insignificant
	2.	Disturbance of seal rookery at Burmah Beach by use of supply base near Naples	Regional, long term	Expand Vessel Traffic Corridor Program to include this area (voluntary compliance)	Regionally significant unless alt. site used, inconsistent with Marine Mammal Protection Act, CCA Sections 30230, 30240; LCP Policy 9-25
Cumulative Development Base 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	Restricted construction and use of vessel corridors, reestablish kelp plants	Locally to regionally significant unless alternate site used for supply base
Base Scenario and Scenario I	1.	Impact types 1 through 3 under project-related accidents become likely, #4 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-term to long-term	Restriction of construction to non-migration periods; restriction of over-lapping construction schedules, restriction of seismic survey activities	Significant to insignificant

TERRESTRIAL AND FRESHWATER BIOLOGY

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Proposed Project	1.	Loss of Butterfy trees, potential impact on raptor roosting with construction of processing facility	Local to regional, long term	Replant some Butterfly trees in appropriate lowerlying areas. Monitor Butterfly population and raptor use at site for better understanding of impacts applicable to future projects (SBC)	Locally significant to insignificant. Potentially inconsistent with local Coastal Plan

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE TOTALLY MITIGATED[1,2] (continued)
(Impacts which must be addressed in a "Statement of Overriding Considerations"
if the project is approved (Section 15093, State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY (continued)

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
	2.	Potential loss of high intensity use Butterfly Trees in Canada Alacatraz with either water retention pond or highway overpass at processing facility	Local to regional, long-term	Offsite replacement of habitat if relocation of these facilities is impossible (SBC)	Locally to regionally significant to insignificant
	3.	Loss of rare and declining plants or animals (tidewater goby, reddlegged frog, steelhead trout, coast live oak, Hoffman's nightshade, mariposa lily) with pipeline construction	Locally to regionally short-term to long-term	If no avoidance possible attempt to to reestablish as per special restoration subplan (SBC)	Locally to regionally significant to insignificant
Proposed Project Optional Component	1.	Potential impacts as in 3 above with construction of pipeline from Gaviota to Las Flores	Local to regional short- to long-term	As in 3 above	Locally to regionally significant to insignificant
Project Related Accidents	1.	Damage to estuarine lagoons and/or wetlands due to unlikely onshore pipeline spill and cleanup. Could include loss of stream population of tidewater goby	Local or regional (relocation spill size (specific long-term)	Install block valves and barriers at downstream culverts as in special mitigation subplan. Implement restoration program following cleanup (SBC, CCC, CDFG, USCG)	Locally or regionally significant to insignificant
	2.	Damage to estuarine lagoons and/or wetlands due to unlikely offshore spill reaching shore in very bad weather. Impacts the same as above.	Local or regional (location specific), long-term	Install barriers at upstream culverts; implement restoration program following cleanup (SBC, CCC, SCC, MMS/USCG)	As above
	3.	Damage to tree crowns and extensive acreage from oil fueled and/or deadwood fueled fire at processing facility	Local, long-term	Fire management and protection measures as in 5.11. Deadwood clearing. Implement restoration program (SBC)	Locally significant
Proposed Project Optional Pipeline Component	1.	Potential impacts as in Project Related 3 above with unlikely optional pipeline related spill and cleanup	Local to regional, short- to long-term	As in Project Related (3) above (SBC)	Locally to regionally significant to insignificant

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE TOTALLY MITIGATED[1,2] (continued)
(Impacts which must be addressed in a "Statement of Overriding Considerations"
if the project is approved (Section 15093, State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY (continued)

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Proposed Project Optional Component Accident	1.	Potential impacts as in Project Related #1 above with unlikely optional pipeline-related spill and cleanup	Local or regional (location and spill size specific)	As in Project Related #1 above, following field work to identify most sensitive areas for block valves, etc. (SBC)	Locally or regionally significant. Potentially inconsistent with LCP
Project Alternatives Point Conception Site	1.	Loss of grassland habitat, potential loss of windrow of major importance to bird migration; disruption of wildlife in important remaining south coast remote habitat area	Regional, long-term	Noise and light screening. Replant and add tree windrows (SBC)	Regionally significant
Project Alternative with Area Study Development		Increase in worst case ozone levels that affect moderately sensitive plants with Point Conception location of processing facility and Area Development platforms	Local to regional short- to long-term	Air quality (5.2) Mitigations	Significant to insignificant
Project Alternative Accident	1.	Damage to estuarine lagoons and/or wetlands more likely due to spill and cleanup from offshore Hermosa to Gaviota Pipeline. Could include loss of stream populations of tidewater goby	Local or regional (location and spill size specific) long-term	Minimize response time to key locations and provide equipment to prevent entry of oil to lagoons for areas identified in EIR/EIS (MMS/USCG, CCC, SBC,SLC)	Locally or regionally significant to insignificant (depending upon location)
Cumulative Development Scenario I	1.	Loss of regionally unique oak and riparian habitat with processing facility in Las Flores Canyon	Regional, long-term	Create similar habitat offsite (feasibility uncertain)	Regionally significant
Cumulative Development		Loss of native grassland on Gervais fee property with full-scale development	Regional, long-term	Create similar habitat offsite (feasibility uncertain)	Regionally significant
Cumulative Development All Scenarios	1.	Loss of some Goleta slough wetland with potential airport expansion	Regional, long-term	Create similar habitat adjacent and/or offsite (feasibility uncertain)	Regionally significant
	2.	Potential loss of habitat in remaining South Coast remote habitat area, and stream impacts with Bixby Ranch residential development	Regional, long-term	Require habitat restoration plan for development	Regionally significant to insignificant
	3.	Potential loss of terrestrial habitat to housing and shopping area construction due to induced cumulative population growth	Local or Regional long-term	Require habitat restoration and/or enhancement for development	Regionally or locally significant to insignificant

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE TOTALLY MITIGATED[1,2] (continued)
(Impacts which must be addressed in a "Statement of Overriding Considerations"
if the project is approved (Section 15093, State EIR Guidelines)

TERRESTRIAL AND FRESHWATER BIOLOGY (continued)

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Cumulative Development Accidents	1.	Damage to estuarine lagoons and/or wetlands due to unlikely onshore pipeline spill and cleanup from Ellwood to Gaviota or Las Flores pipelines vegetation	Local or regional (location and size specific) long-term	Field program to identify most sensitive areas; block valves; barriers at culverts; develop implement restoration program	Locally or regionally significant to insigificant.
	2.	Losses due to major fire at up to three processing facilities	Local to regional, short- to long-term	Implement fire management and protection measures as in 5.11. Implement restoration program; consolidiate facilities	Locally significant

VISUAL RESOURCES

Source	Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Proposed Project	Direct impact on ocean views due to appearance of three platforms	Long-term locally signifi- from Jalama Beach County Park. Long-term regionally significant impacts on views from Southern Pacific Rail Line	Paint platforms grey/white	Significant
Area Study Development	Direct and cumulative impacts due to appearance of eight platforms	As above	None	Significant
Cumulative Development: Platforms	Direct and cumulative effects on ocean views due to from 5-7 platforms	Long-term locally signifi- impact on views from Ocean Beach County Park and Southern Pacific Rail Line	None	Significant
Cumulative Development: Onshore Facilities	Impacts due to Getty marine terminal expansion and tank farm (Scenarios "A" and "B") plus Chevron facilities: direct impacts include industrial appearance of combined facilities plus blocking of existing scenic views by facilities and screen plantings	Long-term regionally significant impacts on views from Southern Pacific Rail Line and U.S. 101. Long-term locally significant views impact on views from the the east end of Hollister	Screen plantings within Caltrans right-of-way west of site; screen plantings along west site boundary at top of slope, and on berm surrounding reject tanks on Gervais Fee property. Depressed pad for reject tanks. Painting facilities a color that blends with surroundings	Significant

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE TOTALLY MITIGATED[1,2] (continued)
(Impacts which must be addressed in a "Statement of Overriding Considerations" if the project is approved (Section 15093, State EIR Guidelines)

COMMERCIAL FISHING

Source	Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Proposed Project (Individual and Combined Components)	Pre-emption of harvest in 10-15% of productive rockfish tow area by construction of offshore platforms and connecting pipelines	Regional, short term	Minimize extent of simultaneous offshore construction Establish notification procedures with liaison office (MMS)	Regionally significant
Project-Related Accidents	Pre-emption of harvest in rockfish/halibut tow, halibut/shellfish set gear areas, or abalone diving areas 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 (MMS, SLC, CCC, USCG)	Locally to regionally significant, failure to use sinking agent may threaten seabirds and/or marine mammals at certain sites
Area Study Development	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	Pre-emption of halibut tow and halibut/shellfish set gear areas more likely for spill from alternative Hermosa to Gaviota pipeline	Local to regional, short to long term	As above for project-related accidents	As above for project-related accidents
Cumulative Development Base 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 plant offsite	Regionally significant unless alternate supply base used
Base Scenario or or Scenario I	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 Sections 5.10.1 and 6.10.1 and Appendix N, Part One.)

RECREATION

Source	Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Proposed Projects	1. Degradation of offshore visual environment from Jalama Beach due to installation of platform	Locally significant, adverse and not mitigable long-term	None	Significant
	2. General decline of shoreline recreational experience due to increased industrial activity and development	Same as above	Offset impacts by expanding and enhancing shoreline opportunities in areas away from the industrial activity and development See 5.10.4 (SBC)	Regionally Significant

CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE TOTALLY MITIGATED[1,2] (continued)
(Impacts which must be addressed in a "Statement of Overriding Considerations"
if the project is approved (Section 15093, State EIR Guidelines)

RECREATION (continued)

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Area Development Buildout	1.	Same as above	Same as above	None	Significant
	2.	General decline of shoreline recreational experience due to increased industrial activity and development	Same as above	Offset impacts by expanding and enhancing shoreline opportunities in areas away from the industrial activity and development	Regionally Significant
Cumulative Development	1.	Degradation of offshore visual environment from key beaches along coast (see Visual Impact Tables)	See Visual Impact Tables	See Visual Impact Tables	See Visual Impact Tables
	2.	General decline of shoreline recreational experience due to increased industrial activity and development	Same as above	Offset impacts by expanding and enhancing shoreline opportunities in areas away from the industrial activity and development	Regionally Significant

TRANSPORTATION

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Cumulative Development	1.	Reduction in level of service at Goleta intersections due to increased traffic	Local and long-term	Redesign of intersections to accommodate increased traffic	Potentially significant due to funding constraints for improvements

[1] Resource impacts due to "frequent," "likely," and "unlikely" accidental events are discussed under the individual issue areas affected (Class I-III). "Rare" and extraordinary" event impacts are discussed under system safety and reliability.

[2] Greater detail on mitigation measures and specific implementation strategies are included in Chapters 5 and 6 of the DEIR and Sections 6 and 7 of the Executive Summary.

SUMMARY IMPACT TABLES

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2]
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

GEOLOGY

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Construction of Pipeline	Accelerated erosion and potential slope instabilities from notching of over-steepened ocean banks	Local to regional; long-term	Span per Terrestrial Biology discussion (SBC)	Insignificant
Construction and Operation	Gully initiated from diversion of upslope runoff	Local; long-term	Collect runoff and divert to site runoff discharge point (SBC)	Insignificant

AIR QUALITY

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Projects (Individually and Combined)	1. NO_x and HC emissions from offshore platforms and support activities may contribute to violations of the ozone standard and hinder the reasonable further progress of attaining the standard	Southern Santa Barbara and Ventura Counties	Reduce NO_x emissions at platforms by replacing electric generators with power from the grid through land lines (MMS)	Insignificant, would lead to additional ocean bottom impacts from cable installation and changes in platform design
			Secure NO_x/HC emission offsets (MMS)	May be insignificant depending on offset locations
	2. Violation of the short-term SO_2 standards (1-hr and 3-hr) during onshore sulfur recovery plant failure at Gaviota. This can occur after incinerating the H_2S and scrubbing the SO_2	Local, high levels can occur at elevated locations near the onshore facility only when onshore winds occur during the failure	Maintain spare standby stages at the sulfur plant (APCD/SBC)	Insignificant, may be a delay in start-up time of standby states
			Maintain additional auxiliary SO_2 scrubber as standby to reduce SO_2 emissions (APCD/SBC)	Insignificant
	3. Potential violation of Federal ozone standard (1-hr) during flaring at Platform Harvest because of compressor failure. Flaring under this upset could also cause DOI significance levels of SO_2 for 3-hr and 2-4-hr averages to be exceeded.	Southern Santa Barbara and Ventura Counties	Maintain a spare standby compressor on Platform Harvest (MMS)	Insignificant
			Maintain a spare standby compressor on Platform Harvest (MMS)	Insignificant

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

MARINE WATER RESOURCES

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project (Individual and Combined Components)	1.	Potentially toxic concen-centrations of biocides possible in discharge of drilling fluids from platforms	Local, short- to long-term	Avoidance of specific drill fluids containing such chemicals, alternate offshore or onshore discharge of fluids and muds containing such chemicals (MMS, EPA)	Insignificant
	2.	Depletion of dissolved oxygen near discharge points due to oxygen demand of formation water and SO_2 scrubber water	Local, long-term	Treatment of wastewaters (e.g., by aeration) to lower oxygen demand (RWQCB, CCC, SLC, SBC)	Insignificant; treatment air emissions may affect air quality
	3.	Discharge of potentially toxic inorganic chemicals (esp. ammonia and sulfides) with formation water and gas treatment wastewater. In situ formation of chloramines possible	Local, long-term	Treatment before discharge (e.g., via aeration); or redesign of outfalls for greater initial dilution (RWQCB, CCC, SLC, SBC)	Insignificant; treatment air emissions may affect air quality
	4.	Accumulation of pollutant chemicals in sediments (over long-term) to potentially harmful levels possible due to discharges of formation water, drilling fluids and other wastewaters (from both platforms and outfall)	Regional, long-term	Monitor discharges, sediment quality, and toxicity in marine biota. Take action to reduce discharges if impacts found unacceptable (MMS/EPA, RWQCB, CCC, SLC)	Probably insignificant after recovery period of a few years
Project-Related Accidents		Surface oil slicks, tar balls and contamination of sediments likely from small to moderately sized oil spills	Local, long-term	Rapid and efficient spill cleanup (MMS, USCG, SCC, CCC, SBC)	Insignificant after reasonable recovery period

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(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 Impact	Scope	Mitigation Measures	Residual Impact
Area Study Development	Impacts of Types 1-4 and accidents above more likely due to additional platforms and productions.	Local for Types 1-3, local/ regional for Type 4 and accident type impact	As described above for each impact type. Increased need for monitoring of impacts	As above for corresponding impact types
Cumulative Development	Impacts of Types 1-4 and accidents above more likely due to additional platforms and production	Local for Types 1-3 local/regional for Type 4 and accident type impact.	As described above for each impact type. Increased need for monitoring of impacts, especially of pollutant accumulation in sediments	As above for corresponding impact types.

ONSHORE WATER RESOURCES

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Construction of Pipeline	Disruption of streamflow due to impoundment at stream crossings	Local to regional; short-term	Divert streamflows around construction. Span lagoons and most sensitive streams (SBC, CCC, CDFG)	Potentially significant short-term at immediate stream crossings. Insignificant long-term and regionally
	Sediment loading to streams due to trenching activities and disturbances to stream channels	Local to regional; short- to long-term	Use of sediment retention devices during construction. Span lagoons and most sensitive streams. Implement a soild conservation revegetation program for post-construction. Relocate pipeline per Figure 5.3-1 (SBC, DFG)	Potentially significant locally and short-term insignificant long-term and regionally
Accidental Pipeline Rupture	Oil spill from pipeline into perennial water body	Local, short- to long-term	Installation of check valves on both sides of sensitive streams as noted in Figure 5.3-1 (SBC)	Potentially significant, locally short- to long-term. Impacts less if spill volumes reduced

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

ONSHORE WATER RESOURCES (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
Operations at Gaviota Facility		Overdraft of site drainage basins and excessive drain-downs from facility withdrawals. Class I impacts on surface water and terrestrial biology	Local to regional; short- and long-term	Reduce facility water requirements (SBC)	All impacts persist at same levels
		Same as above	Same as above	Withdraw from adjacent watersheds (SBC)	Overdraft mitigated to likely Class III. Drawdowns reduced but still likely Class II. Class I surface water and biology impacts
		Same as above	Same as above	Desalination (SBC, CDFG, SLC, CCC, RWQCB)	Onshore water resource and biology impacts insignificant. Class III impacts in other areas (air, marine water resources)
		Potential seawater intrusions when an overdraft condition exists	Local, long-term	Same as above	Insignificant if an overdraft condition does not exist
MARINE BIOLOGY					
Proposed Project (Individual and Combined Components)	1.	Disturbance of seabird and/or harbor seal rookeries, benthic, intertidal and fish communities at Point Conception due to nearshore pipeline construction	Local and regional, short term	Pre-construction seabird use survey, construct in late September-October, restrict blasting, apply substance of LCP Policy 9-34 to this type of development (SBC, CCC, CDFG)	Insignificant if blasting is avoided
	2.	Damage to kelp Bed 31 due to outfall construction off Gaviota	Regional, short term	Document recovery status, restrict blasting, restrict vessel activities, reestablish kelp plants (SLC, CCC, CDFG)	Insignificant
	3.	Damage or disruption of nearshore kelp bed biota due to runoff discharge of suspended sediment from dry season storm during construction at Gaviota site	Local, short-term	Provide sediment retention for dry season as well as wet season construction (SBC)	Insignificant

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

MARINE BIOLOGY (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
	4.	Damage to local hard-bottom biota due to discharge deposition near platforms	Local, short to long term	Pre-operations survey, continue during operations; as necessary further restrict discharge mode, mud components, disposal sites; establish new hard bottom features (MMS)	Potentially significant locally, short term; insignificant long term
	5.	Damage to nekton and benthos due to oxygen depletion and, potentially, ammonia from Gaviota outfall discharge	Local, long term	Forced oxidation of wastewater prior to discharge (SBC, RWQCB, SLC)	Insignificant
	6.	Damage to kelp canopy off Ellwood due to Texaco crew boat traffic	Local and regional, long term	Restrict and monitor vessel movements and/or require use of alternate site without kelp canopy (SLC, CCC, CDFG, USCG)	Insignificant
	7.	Loss of habitat upon removal of platforms	Local, short to long term	Create or maintain similar habitats (MMS)	Insignificant
Project-Related Accidents		Damage to seabirds and near-shore biota from unlikely catastrophic wet-oil reject spill at Gaviota	Local to Regional, short to long term	Increase retention capacity and ensure earthquake resistence of dikes (SBC)	Insignificant
Area Study Development		Cumulative damages to Arguello Slope hard-bottom biota due to operation 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 3 above and/or impose cap on number of concurrent development projects	Potentially locally significant short term, insignificant long term and regionally
Project Alternatives	1.	Greater damage to kelp Bed 31 due to alternative offshore Hermosa to Gaviota pipelines' installation	Regional, short term	As above for item 2 under Proposed Project, plus restriction of all Gaviota pipelines to common installation schedule and corridor	Insignificant if blasting is avoided
	2.	Greater disturbance of Point Conception biota due to outfall construction for altertive onshore processing facility (see item 1, Proposed Project)	Local and regional, short term	As above for item 1 under Proposed Project, plus common installation corridor	Insignificant if blasting is avoided

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

MARINE BIOLOGY (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
	3.	Potential damage to kelp Bed 31 and other biota by installation of offshore reinjection pipeline instead of outfall for Gaviota waste-water	Local and/or regional, short to long term	Same as item 2 under Proposed Project, plus selection of nearest feasible reinjection site away from kelp beds	Insignificant if blasting is avoided
	4.	Greater damage to kelp canopy off Ellwood or Gaviota due to supply and/or expanded crew vessel traffic	Local and regional, long term	Same as item 6 under Proposed Project	Insignificant if Alternative sites are used
Cumulative Development Scenarios		Impact types 4 and 5 under Proposed Project, of greater magnitude due to occurrence at several sites	Local and regional, long term	Same as items 4 and 5 under Proposed Project, plus consolidation of facility sites	Insignificant
Scenario II - Accidents		Oil spill impacts 2-3 times more likely than for Proposed Project because of additional offshore production	Local to regional, short to long term	Minimize response time at key locations, selective use of dispersants and sinking agents, animal recovery assistance, limitation of concurrent production activities	Can be reduced to rare or extraordinary occurrence with limitation of production activities

NOTE: Additional details on impacts and mitigation measures appear in Sections 5.5 and 6.5

TERRESTRIAL BIOLOGY

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project	1.	Loss of vegetation in pipeline corridor through agricultural land, introduced grassland, coastal sage scrub and steep slopes	Local, short-term	Site specific grade modification minimization, erosion control, site restoration and monitoring for success (SBC)	Insignificant if stabilization and revegetation are successful
	2.	Pipeline corridor clearing and crossing ESHs	Regional, long-term	Same as 1) above, with additional subplan that achieves avoidance and/or restoration of these resources (SBC, CCC, CDFG)	Insignificant if stabilization and revegetation are successful and sensitive resources avoided
	3.	Potential loss of habitat utilized by migrating birds at Point Conception with construction staging area	Local to regional long-term	Avoid area of trees during all construction activities (SBC)	Insignificant

IMAGE# 40,

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

TERRESTRIAL BIOLOGY (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
	4.	Potential loss of stream or wetland habitat and riparian habitat with water drawdown in creeks in the vicinity of the processing facility	Regional, long-term	Water supply by desalination (SBC)	Insignificant for terrestrial biota. Class III adverse impacts on marine water quality and biota with desalination
Project Related Accidents	1.	Damage to upslope vegetation; possible damage to wildlife and/or slope erosion with one in ten-year sulfur plant upset or initially proposed mitigation in onshore wind condition. May impact regionally rare and endangered species	Local to regional, short- to long-term	Add auxilliary SO_2 scrubbing instead of modeled mitigation case (SBC/APCD)	Significant to insignificant
	2.	Damage to terrestrial and stream biota due to wet oil reject tank catostrophic failure at Gaviota	Local, short- to long-term	Increase dike retention capacity to exceed spill volume; ensure earthquake resistance of dikes (SBC)	Insignificant
Optional Component of Proposed Project Pipeline from Gaviota to Las Flores	1.	Pipeline corridor clearing and burial; burial or spanning of stream related ESHs from Gaviota to Las Flores	Local to regional, short- to long-term	Field reconnaissance and development of site specific impact prevention and restoration plans (per proposed pipeline above). Implementation of plans with monitoring of success (SBC)	Insignificant if stabilization and revegetation are successful
Project Alternatives	1.	Impact Types 1 and 2 same as for proposed project with Point Conception processing facility alternative	Local to regional, short-	Same as for proposed project numbers 1 and 2 above	Insignificant if plans implemented
	2.	Potential impact types 1 and 2 above from construction of onshore pipeline for waste reinjection	Local to regional, short-term to long-term	As above for proposed project impact Types 1 and 2	As above for proposed project impacts 1 and 2
Cumulative Impacts	1.	Impact types 1 and 2 for Proposed Project for other lines from Ellwoodto Gaviota	Local to regional, short- to long-term	Minimize impacts with programs similar to 1) and 2) under Proposed Project	Insignificant to significant, local to regional

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

TERRESTRIAL BIOLOGY (continued)

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
	2. Further Air Quality related impacts to vegetation due to ozone and possibly SO_2 and NO_2	Local to regional long-term	Air Quality mitigations; limit oil production and throughput	Significant to insignificant

NOTE: Additional discussions of impact and mitigation are found in Sections 5.6 and 6.6 of this report.

CULTURAL RESOURCES

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project: Landfall to Gaviota	Potential construction activities impact sites in pipeline corridor.	Site specific	Avoid all known sites, conduct detailed field program to identify sites. Determine significance and then formulate appropriate mitigation program with appropriate Native American involvement, throughout process (SBC)	Insignificant
Onshore Pipeline: Gaviota to Las Flores	Same as above	Site specific	Same as above	Insignificant
Gaviota Facility	Two known sites (SBS 1507 and SBA 1555 H) will be affected by grading and construction	Site specific	Avoid all known sites; perform additional archaeological field testing if avoidance is not possible withappropriate Native American involvement throughout process (SBC)	Insignificant
Offshore Platforms	During installation of offshore platforms known cultural resources may be impacted	Site specific	Require anchoring plans and accurate positioning of anchors, or install protective ring of buoys around each cultural resource	Insignificant
Area Buildout Scenario Offshore Platform	During installation of offshore platforms known cultural resources may be impacted	Site specific	Require anchoring plans and accurate positioning of anchors, or install protective ring of buoys around each cultural resource	Insignificant
Alternative Project Offshore Pipeline	During installation of offshore pipeline cultural resources may be impacted	Site specific	If this alternative is selected gather available geophysical data. Determine specific mitigation based on assessment of data (MMS, SLC)	Insignificant

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(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 Impact	Scope	Mitigation Measures	Residual Impact
Processing Facility at Point Conception		Potential construction activities may impact sites in facility area	Site specific	Avoid all known sites, conduct detailed field program to identify sites, determine significance and then formulate appropriate mitigation program with appropriate involvement by Native Americans (SBC)	Insignificant
AESTHETIC RESOURCES: VISUAL					
Project Alternative: Onshore Processing Facilities		Direct Impact due to industrial appearance in a rural setting; high exposure to viewing public	Long-term; regionally significant impacts on U.S. 101 views. Long-term locally significant impacts on views from Vista del Mar School and Gaviota Village	Screen plantings within Caltrans right-of-way west of site; screen plantings along west site boundary at top of slope, and on berm surrounding reject tanks on Gervais Fee property. Depressed pad for reject tanks. Painting facilities a color that blends with surroundings (SBC)	Insignificant after 5 to 20 years, depending on mitigation
Project Alternative: Onshore Pipeline		Direct effect due to grading, clearing, trenching, backfilling during pipeline installation at stream crossings; creates linear trace. Indirect effect due to erosion and mass wastage along steep slopes	Long-term at stream crossings; short-term across terrace, slopes, hilltops, regionally significant impacts on views from Southern Pacific Rail Line; locally significant for views from Hollister; Bixby Ranch Roads	See Terrestrial Biology and Water Resources Technical Appendices. Avoid woodlands, span drainages, compact backfill and hydroseed; jute mesh slopes; plant large diameter trees; guy trees; irrigate, paint visible portions of pipeline (SBC)	Insignificant after 5 to 15 years
AESTHETIC RESOURCES: NOISE					
Proposed Project	1.	Pipeline construction noise; 7 to 9 dB above existing	Local at Vista del Mar School; short-term	Construction only when school is not in session (SBC)	Insignificant
	2.	Process plant construction noise 17 to 20 dB above existing	Local at Vista del Mar School; short-term	Schedule nearest activities when school is not in session; erect temporary barriers around noisiest activities (SBC)	Insignificant

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

AESTHETIC RESOURCES: NOISE (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
	3.	Crew boat/helicopter operations	Local/regional	Routing restrictions reducing populated areas effected by noise (SBC, CCC)	Insignificant
Project Alternative	1.	Pipeline construction noise	Localized near construction activity; short-term	Restrict hours of construction to hours of the day when construction as near critical areas (SBC)	Insignificant
	2.	Process plant construction noise	Localized around site; short-term	Erect temporary barriers around noisiest activities (SBC)	Insignificant
	3.	Crew boat/helicopter operations	Local/regional	Same as Proposed Project	Insignificant
Cumulative Development	1.	Construction phases: same as proposed project	Same as proposed project with specific local area effected; short-term	Same as proposed project	Insignificant
	2.	Crew boat/helicopter operations	Local/regional	Same as Proposed Project	Insignificant
Area Development	1.	Same as proposed project	Same as proposed project	Same as proposed project	Insignificant

COMMERCIAL FISHING AND KELP HARVEST

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project (Individual and Combined Components)	1.	Combined pre-emption of halibut tow area off Point Conception and set gear area off Gaviota closely sequenced construction of hydrocarbon and wastewater pipelines	Regional, short-term	Construct nearshore portions of pipelines at opposite ends of construction period (see Section 5.10) (MMS, SLC, CCC)	Insignificant, minimize impacts on mammals and seabirds by construction in nearshore off Point Conception in fall
	2.	Pre-emption of lobster/crab set gear fishery off Gaviota if outfall construction occures in fall or winter	Regional, short-term	Construct Gaviota outfall in late spring/early summer (see above) (SBC, SLC, CCC)	Insignificant (see above)

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(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 (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
	3.	Reduction of kelp canopy off Ellwood by Texaco emergency crew vessel traffic	Local to regional, long-term	Delineate and enforce minimum length and width corridor through kelp bed and reestablish kelp plants offsite; or require Texaco to use Carpinteria as crew base (CCC, CDFG, SLC, USCG)	Insignificant if combined measures applied
	4.	Reduction of lobster and/or crab resource off Gaviota due to oxygen depletion and, potentially, ammonia from Chevron outfall discharge	Local to regional, long-term	Forced oxidation of wastewater prior to discharge (SLC, CCC, SBC, RWQCB)	Insignificant
Project Related Accidents	1.	Damage to lobster or crab resource and/or pre-emption of set gear fishing due to unlikely catastrophic wet-oil reject spill at Gaviota	Local to regional, short- to long-term	Increase retention capacity and ensure earthquake resistence of dikes (SBC)	Insignificant
	2.	Damage to fishing gear and/or vessels due to collison with and/or hangup on project structures or support vessels	Regional, short- to long-term	Apply a training program for vessel operators, require removal of construction debris and use of smooth pipelines; ensure timely full compensation for losses (MMS, SLC, CCC)	Insignificant if all measures applied
Area Study Development	1.	Potential interference of support vessel traffic with fishing activities	Regional to long-term	Limit support vessel activities as proposed by Chevron and Texaco	Insignificant
Project Alternatives	1.	Impact types 1) and 2) under Proposed Project become more likely and of greater potential magnitude with offshore Hermosa to Gaviota pipeline and/or offshore wastewater reinjection pipeline	Regional, short-term	As above for impact types 1) and 2) under Proposed Project, plus placement of pipelines in common corridor of minimum width	Insignificant
	2.	Reduction of kelp canopy and/or interference with harvest off Ellwood or Gaviota by vessel traffic if either is used as supply base	Local to regional, long-term	Delineate minimum length and width corridor through kelp bed, restablish kelp plants offsite, schedule supply and harvest activities to avoid overlap use of vessel traffic corridors (voluntary compliance) (CCC, CDFG, USCG)	Insignificant if all measures applied

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(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 (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
Cumulative Development All Scenarios	1.	As above for Area Study Development, of greater magnitude, especially for Base Scenario and Scenario I	Regional, short- to long-term	As above for Area Study Development	Insignificant
	2.	Pre-emption of drag fishing areas by concurrent construction of Santa Ynez Unit and Point Arguello Field projects	Regional, short-term	Schedule projects to avoid overlapping construction	Same as individual proposed projects
Cumulative Development Scenario II Accidents	1.	Oil spill impacts 2-3 times more likely than for proposed project because of additional offshore production	Local to regional, short- to long-term	Minimize response time at key locations, avoid use of sinking agents; timely, full compensation for losses; limitation of concurrent production activities	Can be reduced to rare or extraordinary occurrence with limitation of production activities
	2.	Impact type 2 under project related accidents more likely because of additional offshore production	Regional, short- to long-term	As above for item 2 under Project related accidents, plus limitation of concurrent production activities	Insignificant if all measures for item 2 under Proposed Project are applied

NOTE: Additional details on impacts and mitigation measures appear in Sections 5.10.1 and 6.10.1 and Appendix N, Part One.

TRANSPORTATION

Proposed Project:

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Santa Barbara Airport Parking	Shortage of parking space for airport users due to parking of project worker vehicles.	Local, short term	Bus workers from outlying lots. Pave additional areas inside airport (SBC)	None
Bixby/Hollister Ranch Roads	Damage to roadway and culverts plus travel delays due to worker vehicles and construction equipment	Local, short term	Strengthen roads, culverts, and bridges prior to use. Bus workers to pipeline work sites. (SBC)	Minor travel delays to residents during construction
U.S. 101 Corridor on South Coast	Congestion and delay at peak hours	Local, short term	Vanpools, buses for workers. Shift changes at nonpeak hours (SBC)	Delays and congestion due to baseline traffic

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

TRANSPORTATION (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
U.S. 101 At-grade Intersection at Chevron Gaviota Facility		Congestion and delay for project traffic	Local, short term	Build overpass with on and off ramps. Add acceleration and deceleration lanes (Cal Trans, SBC)	None if overpass built
Area Study Development Santa Barbara Airport Parking		Shortage of parking spaces for airport users due to parking of project workers.	Local, short term	Bus workers from outlying lots. Pave additional areas inside airport	Minor travel delays to residents during construction.
Project Alternative: Oil and Gas Facility		Bixby Ranch Beach Park access roads Jalama Rd./Route 1	Delays and congestion experienced by workers and park visitors at U.S. 101 intersections	Bus workers to processing site during construction	Minor travel delays to residents during construction
		Crew and supply base at Ellwood, Carpinteria, or Gaviota	Local, short-term	Schedule deliveries during non-peak hours; bus crew to crew base (SBC)	Carpinteria or Goleta streets and intersections. Delay and congestion

RECREATION

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project	1.	Onshore pipeline transverses northwest corner of Gaviota State Park	Local; short-term	Alter proposed route or use revegatation and erosion control techniques; and compensate State Park for lost revenues (SBC, CDFG,DPR)	Minimal
	2.	Cut for pipeline trench on steep slopes could cause erosion and hillside scarring thus causing visual impact at Gaviota State Park	Local; significant, but mitigable; short-term	Use maximum revegetation and erosion control techniques. Use different pipeline route (SBC)	Not significant
	3.	Campsite overcrowding at local recreational facilities due to construction worker influx and insufficient temporary housing	Regionally; short-term	Develop temporary housing for construction workers at remote locations from tourist and recreational activities (SBC)	Adverse, but not significant
	4.	Oil spill hits public beaches	Local to regional	Efficient/sufficient oil spill contingency plan (MMS/USCG, SLC, CCC, SBC)	Adverse but not significant in the long-term

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

RECREATION (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
	5.	Overcrowding of regional recreational facilities resulting from indirect population impacts associated with project	Regional; long-term	See 5.10.4 of EIR/EIS (SBC)	Minimal
	6.	Removal of sections of State Parks resulting from construction activities	Regional; short-term	All pipeline construction on State Park property to take place during the off-season (Sept. through March). During those periods of time that the State Parks are closed due to pipeline construction, the Dept. of Parks and Recreation to be compensated for loss of revenue.	Minimal
Area Development Buildout	1.	On pipeline and facility impacts, same as Proposed Project	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
	2.	Oil spill hits public beaches	Local to regional: probability if occurrence higher than for project alone	Same as Proposed Project 4	Same as Proposed Project 4
	3.	Overcrowding of regional recreational facilities resulting from indirect population impacts associated with project	Regional; long-term	See 5.10.4 of EIR/EIS	Minimal
	4.	Same as Proposed Project	Regional; short-term	Same as Proposed Project 6	Minimal
Cumulative Development	1.	Campsite overcrowding at local recreational facilities due to construction worker influx and insufficient temporary housing	Regional, short-term	Develop temporary housing for construction workers	Minimal

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

RECREATION (continued)

Source		Description of Impact	Scope	Mitigation Measures	Residual Impact
	2.	Oil spill hits public beaches	Local to regional: probability if occurrence higher than for project alone	Same as Proposed Project 4	Same as Proposed Project 4
	3.	Overcrowding of regional recreational facilities resulting from indirect population impacts associated with project	Regional; long-term	See 5.10.4 of EIR/EIS	Minimal
	4.	Same as Proposed Project 6	Regional; short-term	Same as Proposed Project 6	Minimal
Project Alternative	1.	Campsite overcrowding at local recreational facilities due to construction work influx and insufficient housing	Regional, short-term	Develop temporary housing for construction workers (SBC)	Minimal
	2.	Oil spill hits public beaches	Local to regional: probability if occurrence higher than for project alone	Same as Proposed Project 4	Same as Proposed Project 4
	3.	Overcrowding of regional recreational facilities resulting from indirect population impacts associated with project	Regional; long-term	See 5.10.4 of EIR/EIS (SBC)	Minimal
	4.	Same as Proposed Project 6	Regional; short-term	Same as Proposed Project 6	Minimal

[1]Resource impacts due to "frequent," "likely," and "unlikely" accidental events are discussed under the individual issue areas affected (Class I-III). "Rare" and "Extraordinary" event impacts are discussed under system safety and reliability.

[2]Greater detail on mitigation measures and specific implementation strategies are included in Chapter 5 and 6 of the DEIR.

INSERT A - DELETED

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

SOCIOECONOMICS: PUBLIC HAZARDS

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project	Potential impact of Proposed* Project due to oil spills, pipeline failures, explosions/fires at processing facilities and truck transport of natural gas by-products	Localized, short-term* could be long-term depending on severity of event	Improve/install instrumentation* controls and valves (SBC)	Reduced frequency*
Area Development Buildout	Same as for Proposed Project	Same as for Proposed Project	Same as for Proposed Project	Same as for Proposed Project
Alternative Project	Same as for Proposed Project	Same as for Proposed Project	Same as for Proposed Project	Same as for Proposed Project
Cumulative Development Scenario	Same as for Proposed Project	Same as for Proposed Project	Same as for Proposed Project	Same as for Proposed Project

*See System Safety and Reliability Summary Tables.

SOCIOECONOMICS: PUBLIC FINANCE

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project	Negative fiscal impacts due to increases in population and demand for services	Tri-county over short-term; Ventura and San Luis Obispo Counties also in the long-term	Applicant pre-pay all or portion of annual completed facility properly tax; implement program to monitor and report to local government project expenditures and hiring in the region to provide basis for government assessment of fiscal burdens related to the project (SBC)	Significant
Area Development Buildout	Same as above	Same as above	Same as above	Same as above
Alternative Project	Same as above	Same as Proposed Project	Same as above	Same as above
Cumulative Development Scenario	Negative fiscal impacts due	Ventura County; long-term	Same as above	Same as above

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

SOCIOECONOMICS: SERVICES

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project	Increased demand from project for water in areas with tight water supply. If the housing stock expands to accommodate increased demand, water demand will further escalate due to indirect population growth, depending on extent of local labor availability. Goleta impacts would be particularly acute	Santa Barbara County, South Coast	County regulate housing development applications on South Coast, thus limiting population and housing growth to that supportable by available water supplies (SBC) Applicant constructs oversized desalination facilities for use to offset local water shortage (SBC, SLC, RWQCB, CCC)	Potentially significant increases in housing prices and rents; Potentially significant
	Demands for all utilities and services (schools, police, fire, waste water treatment, etc.) will be impacted as a result of the proposed project	Tri-county area	Applicant develops a monitoring plan to maintain the level of service resulting. Applicant could contribute to affected agencies to help offset cost (SBC)	Same as above
Area Development Buildout	Same as above	Tri-county area	Same as above	Same as above
Alternate Project	Same as above	Tri-county area	Same as above	Same as above
Cumulative Development Scenario	Same as above	Tri-county area	Same as above	Same as above

SOCIOECONOMICS: TOURISM

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project	Potential losses to tourism industry due to perception regarding increased noise degradation of offshore visual environment and air quality, and oil spill potential	South Coast, Santa Barbara County	Applicant provide remote area temporary housing for project workforce to avoid impact on tourist-related facilities/accommodation (SBC) Refer to Air Quality, Visual and System Safety and Reliability tables	Insignificant

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

SOCIOECONOMICS: TOURISM (continued)

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
	Overcrowding of campsites due to their use as temporary residence for direct workers. Public campgrounds presently operate at or near full capacity at peak periods	State Beach and Santa Barbara Parks	Applicant to provide temporary quarters for directly employed construction workers at remote locations or offshore (SBC)	None
Area Development Buildout	Type of impact the same as above but somewhat larger	Same as above	Same as above	Same as above
Alternative Project	Same as Proposed Project	Same as above	Same as above	Same as above
Cumulative Development Scenario	Same as Proposed Project	Same as above	Same as above	Same as above

SOCIOECONOMICS: HOUSING

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project	Increased demand from project for housing by direct and indirect employment-induced immigrant population. About half of permanent demand would be for low-to-moderate affordable housing. Available vacancy rates would be very low without the project, and even lower with the project if new housing construction is limited. This would cause upward pressure on housing prices and rents, would extend the time required to find suitable housing, and would displace some lower-income individuals from the housing market	Santa Barbara County	Applicant provides temporary housing for direct workers in a manner which minimizes possible conflicts with visitor-serving facilities (hotels, motels, and campgrounds) and minimizes environmental impacts at temporary housing sites (recreational vehicle parks, trailer parks) (SBC)	Potentialy significant, since indirect demand would remain and some conflicts with visitor serving uses and environmental impacts may remain
			Applicant install oversized desalination facilities to reduce water shortage which would reduce pressure on housing restrictions and prices (SBC, RWQCB, SLC, CCC)	Potentially insignificant

CLASS II: SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED[1,2] (continued)
(Findings Requiring Mitigation or that Measures are Infeasible Must be Made if Project is Approved (Section 15091, State EIR Guidelines)

SOCIOECONOMICS: HOUSING

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Area Development Buildout	Same as above, but number of housing requires proportionally greater	Same as above	Same as above	Same as above
Cumulative Development Scenario	Same as above, but number of housing requires proportionally greater	Same as above	Same as above	Same as above

SOCIOECONOMICS: VISTA DEL MAR

Source	Description of Impact	Scope	Mitigation Measures	Residual Impact
Proposed Project	Vista del Mar School: the proposed project will affect the learning environment at the school (noise, air quality traffic visual and safety)	Local, long-term	Applicant relocate school to a safety distance (Applicant has offered to relocate the school) the new site and school must be at least equal in quality (SBC)	Insignificant
Area Development Buildout	Same as above	Local, long-term	Same as above	Same as above
Project Alternative Offshore Pipeline	Same as above	Local; long-term	Same as above	Same as above
Cumulative Development Scenario	Same as above	Local; long-term	Same as above	Same as above

SUMMARY IMPACT TABLES

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

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT[1,2]

GEOLOGY

Source	Description of Impact	Scope
Offshore Construction Activities	Sediment disturbance; sediment transport disturbance; topographical alternatives	Local, short term
Offshore Operations	Subsidence	Regional; long term

AIR QUALITY

Source	Description of Impact	Scope
Proposed Projects	Increase in short-term averageconcentrations of CO and SO_2 during construction of the offshore and onshore facilities	Regional for the offshore construction and local near the Gaviota site and onshore pipeline route for onshore construction, for a short-term
	Increase in ambient NO_2, SO_2 and TSP annual average concentrations	Regional for the offshore platforms and local for the Gaviota facility

MARINE WATER RESOURCES

Source	Description of Impact	Scope
Proposed Projects (Individual and Combined)	1. Increases in temperature, turbidity and other pollutants (e.g., oil and grease, metals) from wastewater discharges at platforms and Gaviota	Local, long-term
	2. Resuspension of oil-containing sediments (near seeps) likely during subsea trenching and pipe-laying. Impacts equivalent to small oil spill (oil slick, dissolution of organics, depletion of dissolved oxygen, etc.)	Local in Point Conception area during construction phase

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT[1,2]

MARINE WATER RESOURCES (continued)

Source	Description of Impact	Scope
	3. Degradation of sediment quality associated with local accumulation of drill cuttings and associated pollutants on seafloor near each platform	Local, short- to long-term
	4. Water quality changes (e.g., increase in turbidity, BOD) associated with offshore construction activities (platform installation and pipe laying)	Local, short-term
	5. Release of zinc or aluminum from sacrificial anodes used to reduce corrosion of subsea structures	Local, long-term
Project-Related Accidents	Small oil spills (e.g., less than 1 bbl) will be likely from variety of operations	Local, short-term
Area Study Development	Impacts of Types 1-5 and accidents above more likely due to additional platforms and production	Local, short- to long-term (as above)
Project Alternatives	Type 2 and 3 impacts above have increased probability and extent of impact if offshore (Hermosa to Gaviota)pipeline route used	Local, short-term
Cumulative Development	Impacts of Types 1-5 and accidents above more likely due to additional platforms and production	Local, short- to long-term (as above)

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT[1,2]

ONSHORE WATER RESOURCES

Source	Description of Impact	Scope
Construction at Processing Facility	Increased sediment loading to streams	Local; short term (see related Class II Marine Biology Impacts
Runoff Collection and Treatment System Discharge	Degradation of water quality from potentially contaminated discharge	Local; short to long term
Construction of Pipeline	Increased streamflows due to runoff increases	Local; short term
	Spills of diesel fuel or engine oil	Local; short to long term
	Leaks of hydrostatic test water	Local; short term
Operations at Gaviota Facility		
Accidental Releases	Degradation of groundwater quality due to spills of process fluids	Local; short and long term

MARINE BIOLOGY

Source	Description of Impact	Scope
Proposed Project (Individual and Combined Components)	1. Disruption of activity patterns of water column organisms by platform and hydrocarbon pipeline construction and operations	Local to regional, short to long term
	2. Disruption of intertidal benthos by changes in littoral transport near pipeline landfalls	Local, short to long term
	3. Disruption of seabird and/or marine mammal activity patterns by proposed Gaviota outfall construction and operation	Regional, short to long term
	4. Kelp response to changes in water quality from proposed Chevron Gaviota discharge	Local, long term

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT[1,2]

MARINE BIOLOGY (continued)

Source	Description of Impact	Scope
	5. Disruption of distribution and activity patterns of any/all marine biota by proposed supply and emergency crew vessel activities at Port Hueneme and Carpinteria	Local to regional, long term
Project-Related Accidents	1. Damage to sandy intertidal beach beach organisms due to oil spills from onshore pipeline	Local, short term, assuming no mechanical cleanup
	2. Disruption of activity patterns by small spills or leaks off-shore	Local, short to long term
Area Study Development	Impact types 1 and 5 under Proposed Project and type 2 under Accidents above repeated at additional locations	Local to regional, short to long term
Project Alternatives	1. Disruption of seabird activity patterns by construction of alternate offshore pipeline from Platform Hermosa to Gaviota	Local to regional, short term
	2. Impact types 1 and 2 above under Proposed Project and type 2 under Accidents above for alternative offshore hydrocarbon or wastewater pipelines	Local to regional, short to long term
	3. Impact type 5 above under Proposed Project for alternate supply from Port Hueneme and crew from Carpinteria	Local to regional, long term
Cumulative Development All Scenarios	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[1,2]

TERRESTRIAL BIOLOGY

Source	Description of Impact	Scope
Proposed Project	1. Effects on biota from changes in air quality due to all construction activities, operation of crew bases, truck and car traffic increases and normal operation of the processing facility would be adverse. Significantly different from baseline effects.	Local to regional, short to long term
	2. Noise impacts due to construction would be too short term to be significant for wildlife. Noise impacts due to operations are in areas already impacted by such noises, and therefore, insignificant for wildlife.	Local to regional, short to long term,
Project-Related Accidents	3. Damage to biota from minor oil spills (less than 100 bbls) in most areas of the pipelines (except streams)	Local, short to long term
Project Alternatives	1. Pipeline for LPG and LNG in the prospective Los Angeles pipeline corridor would represent an insignificant increment in impacts in that specific corridor (construction impact assessment of LA pipeline out of scope of project but likely at least Class II impact)	Regional, short to long term
	2. Railroad alternative transportation of LPG and LNG would add to air emissions and noise impacts, but would not elevate either to significant levels above existing conditions	Local to regional, short to long term
Cumulative Development	Impact types above repeated at additional sites	Local to regional, short to long term

(Additional details on impacts can be found in Sections 5.6 and 6.6.

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT[1,2]

TERRESTRIAL BIOLOGY

VISUAL

Source	Description of Impact	Scope
Project Alternative: Platforms	Visibility within ocean views; direct impact	Long term locally insignificant impact on views from Ocean Beach County and Bixby Ranch Road
Onshore Processing Facility	Direct impact due to industrial appearance in a rural setting	Long term, regionally insignificant impact on views from Southern Pacific Rail Line
Area Study Development	Visibility of two "area" platforms plus Hidalgo	Long term, locally insignificant relative to Ocean Beach County Park views

Additional details on impacts appear in Sections 5.10.1, 6.10.1 and Appendix N, Part One.

NOISE

Source	Description of Impact	Scope
Proposed Project	Pipeline construction, 10% increase in road traffic, 0.5 dB increase in noise level	Local residences; short term
	Process plant operation; 1 to 2 dB increase in CNEL	Local at Vista del Mar School, long term
	Process plant operation, unmeasurable increase in traffic noise	Regional along Highway 101; long term
	Process plant operation, ground vibration	Local around project site, long term
	Helicopter noise during construction, during operation	Regional, short term, long term
	Support and crew boat noise during construction, during operation	Local pier or port, and shore, short term, long term

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT[1,2]

COMMERCIAL FISHING AND KELP HARVEST

Source	Description of Impact	Scope
Proposed Project (Individual and Combined Components)	1. Pre-emption of fishing areas for species other than rockfish, halibut, lobster or crabs by construction activities	Local, short term
	2. Coping with project-related obstructions in fishing areas around offshore platforms and pipelines during project operations	Local, long term
	3. Reduction of harvestable kelp resource in Bed 31 by construction and operations at Gaviota site	Local, short to long term
	4. Removal of platforms as potential mariculture sites upon project abandonment	Regional, long term
	5. Disruption of activity patterns of commercially valued species by platform wastewater discharges and offshore corrosion protection systems	Local, long term
	6. Competition with oil industry vessels for support services at Port Hueneme	Regional, long term
Area Study Development	1. Pre-emption of fishing areas around additional platforms and connecting pipelines during construction and operations	Local to regional long term
	2. Impact types 4, 5 and 6 above under Proposed Project and impact of smaller spills as described under project-related accidents would occur at additional sites	Local to regional, long term

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT[1,2]

COMMERCIAL FISHING AND KELP HARVEST (continued)

Source	Description of Impact	Scope
Project Alternatives	Impact types 1, 2, 3, 4 and 5 under Proposed Project and impact of smaller spills as described under project-related accidents also apply to alternate offshore Hermosa to Gaviota and/or waste-water reinjection pipelines	As above for corresponding impact types
Cumulative Development - All Scenarios	Impact types 1, 2, 4, 5 and 6 above under Proposed Project and impacts of smaller spills as described under project-related accidents would be of greater magnitude and would occur at additional sites	As above for corresponding impact types
Scenarios I and II	Reduction of kelp canopy and harvest activity in Bed 31 limited to construction phase of Chevron and Getty projects	Local, short term

MILITARY

Source	Description of Impact	Scope
Proposed Project Offshore Platforms	Military missile and space vehicle launches could be delayed or interrupted if offshore crew did not evacuate the platform in conformance with lease stipulations	Localized, short term

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT[1,2]

MILITARY (continued)

Source	Description of Impact	Scope
Area Development Buildout - Offshore Platform	Same as above	Localized; short term
Cumulative Development Offshore Platform	Same as above	Localized; short term

ONSHORE TRANSPORTATION

Source	Description of Impact	Scope
Proposed Project: Carpinteria Streets and Intersections	Congestion and delay due to worker vehicles short term	Local (when pier is used in Carpinteria);
U.S. 101/Gaviota Beach Access Road	Congestion and delay due to worker vehicles during construction	Local; short term
U.S. 101	Pipeline constructure across roadway	Local; short term
Cumulative Projects: Pt. Hueneme Area Streets and Intersections	Congestion and delay due to trucks and offshore crew vehicles	Local; long term
Elwood Area Streets and Intersections	Congestion and delay due to vehicles at Ellwood Pier	Local, long term

CLASS III: OTHER ENVIRONMENTAL IMPACTS WHICH ARE ADVERSE BUT NOT SIGNIFICANT[1,2]

RECREATION

Source	Description of Impact	Scope
Proposed Project	During construction of offshore facilities decrease in recreational fishing due to noise, toxics and project traffic	Localized, short term
	During operation of facilities and support bases, local area recreational facilities will see increased use	Regional; long term
Project Alternative	During construction of process facility at Pt. Conception near-shore recreational fishing and diving would be impacted	Localized in the vicinity of Cojo Bay short term
	During operation of facilities and support bases local area recreational facilities will see increased use	Same as for proposed project
Cumulative Development	During construction of offshore facilities, decrease in recreational fishing due to noise, toxics and project-related traffic	Localized, short term

[1] Resource impacts due to "frequent," "likely," and "unlikely" accidental events are discussed under the individual issue areas affected (Class I-III). "Rare" and Extraordinary" event impacts are discussed under system safety and reliability.

[2]Greater detail on mitigation measures and specific implementation strategies are included in Chapter 5 and 6 of the DEIR.

SUMMARY IMPACT TABLES

CLASS IV: BENEFICIAL ENVIRONMENTAL IMPACTS

CLASS IV: BENEFICIAL ENVIRONMENTAL IMPACTS

MARINE BIOLOGY

Source	Description of Impact	Scope and Significance
Proposed Project (Individual and Combined Components)	Use of platforms and pipelines as new raised profile bottom features by benthic organisms and fish	Locally significant, short to long term
Area Study Development	As above for Proposed Project	As above for Proposed Project
Project Alternatives	Greater amounts of new raised profile substrate due to longer alternate pipelines from Platform Hermosa to Gaviota and/or offshore reinjection of wastewater	Locally significant, long term
Cumulative Development All Scenarios	As above for Proposed Project	As above for Proposed Project

Additional details on impacts appear in Sections 5.5 and 6.5.

TERRESTRIAL BIOLOGY

Source	Description of Impact	Scope and Significance
Proposed Project	Abandonment of Gaviota processing facility with removal of all equipment and impervious pads	Locally significant, long term

Additional details on impacts appear in Sections 5.6 and 6.6.

CLASS IV: BENEFICIAL ENVIRONMENTAL IMPACTS

COMMERCIAL FISHING AND KELP HARVEST

Source	Description of Impact	Scope and Significance
Proposed Project (Individual and Combined Components)	Provision of potential additional mariculture sites on project platforms	Regionally insignificant, short- to long-term
Area Study Development	As above for Proposed Project	As above for Proposed Project
Cumulative Development All Scenarios	As above for Proposed Project	As above for Proposed Project

Additional details on impacts are found in Sections 5.10.1 and 6.10.1 and Appendix N, Part 1.

OFFSHORE TRANSPORTATION

Source	Description of Impact	Scope and Significance
Proposed Project Offshore Platforms	Installation of fixed navigational aids on the project platforms will allow extension of the VTSS to Point Fermin	Localized, long-term
Area Study Development Offshore Platforms	Same as above	Same as above
Cumulative Development Offshore Platforms	Same as above	Same as above

Additional details on impacts appear in Sections 5.10.2 and 6.10.2.

CLASS IV: BENEFICIAL ENVIRONMENTAL IMPACTS

SOCIOECONOMIC: ONSHORE SUPPORT ACTIVITIES

Source	Description of Impact	Scope and Significance
Proposed Project	Increased economic output to the business serving the the offshore industry	Ventura County; long-term
Area Development Buildout	Same as above	Same as above
Alternative Project	Same as above	Same as above
Cumulative Development Scenario	Same as above	Same as above

Additional details on impacts appear in Sections 5.9 and 6.9

SOCIOECONOMIC: REGIONAL GROWTH

Proposed Project	Expanded employment mostly due to indirect jobs resulting from project expenditures, and corresponding reduction in the unemployment rate to about 0.5% lower than the no-project alternative	Tri-county area, long-term
	Total personal income, as well as per capita personal income, would increase significantly	Tri-county area, long-term
	Fiscal surplus, due to increases in property taxes and personal income from project. Cumulative development postpones surplus to post development period	Santa Barbara County, long-term

CLASS IV: BENEFICIAL ENVIRONMENTAL IMPACTS

SOCIOECONOMIC: ENERGY

Source	Description of Impact	Scope and Significance
Proposed Project	New domestic supplies of oil and gas provided to the market place, increasing energy availability, enhancing national security, and improving international balance of payments	United States, long-term
Area Development Buildout	Same as above	Same as above
Alternative Project	Same as above	Same as above
Cumulative Development Scenario	Same as above	Same as above

Additional details on impacts appear in Sections 5.9 and 6.9

S U M M A R Y   T A B L E S

System Safety and Reliability

SYSTEM SAFETY AND RELIABILITY:
ACCIDENTS WHICH HAVE THE POTENTIAL TO CAUSE ENVIRONMENTAL IMPACTS AND PUBLIC HAZARDS

Causal Event	Resulting From	Location	Frequency	Criticality	Mitigation	Effectiveness of Mitigation
A. Oil Spill Accidents						
Loss of Platform	Major Impact from External Hazards	Platform Vicinity	Rare	Major	-	-
Well Blowout	Operational Error	Platform	Likely Unlikely	Minor Severe	-	-
Wellhead Area Spill	Loss of Reliability, Operational Error	Platform	Rare	Negligible	-	-
Spill from Platform Processing Vessels	External Impacts, Structural Failure	Platform	Unlikely	Minor	-	-
Pig Receiver Spill	Mechanical Defects, Operational Error	Onshore, Platform	Likely/Rare Likely/Unlikely	Minor Minor	Improve Instrumentation/ Control (MMS)	Reduce Frequency
Pig Launcher Spill	Mechanical Defects, Operational Error	Platform, Onshore	Likely/Rare Likely/Rare	Minor Minor	Improve Instrumentation/ Control (MMS)	Reduce Frequency
Subsea Pipeline Break or Large Leak	Structural Failure	Offshore	Unlikely	Major	Install Subsea Valves (MMS)	Reduce Volume Spilled
Subsea Pipeline Leak	Structural Failure Mechanical Defects	Offshore	Likely	Minor	Install Subsea Valves (MMS)	Reduce Volume Spilled
Onshore Pipeline Break or Large Leak	Structural Failure	Onshore	Unlikely	Major	Increase Number of Block Valves (SBC)	Reduce Volume Spilled
Onshore Pipeline Leak	Structural Failure Mechanical Defects	Onshore	Unlikely	Minor	Increase Number of Block Valves (SBC)	Reduce Volume Spilled
Produced Water System	Mechanical Defects	Platform	Likely	Negligible/ Minor	Additional Instrumentation (MMS)	Reduce Frequency
Vessel Rupture (Storage or Process)	Structural Failure, Fire, Natural Hazards	Onshore	Unlikely	Major/	-	-

SYSTEM SAFETY AND RELIABILITY: (Continued)

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

Causal Event	Resulting From	Location	Frequency	Criticality	Mitigation	Effectiveness of Mitigation
B. Sour Gas Release Accidents						
Subsea Pipeline Break	Structural Failure	Offshore	Unlikely	Negligible	Install Subsea Valves	Reduce Volume Spilled
Subsea Pipeline Leak	Structural Failure, Mechanical Defects	Offshore	Likely	Negligible	Install Subsea Valves	Reduce Volume Spilled
Onshore Pipeline Break	Structural Failure	Onshore	Unlikely	Minor/Severe	Increase Number of Block Valves	Reduce Volume Spilled
Onshore Pipeline Leak	Structural Failure, Mechanical Defects	Onshore	Unlikely	Minor/Major	Increase Number of Block Valves	Reduce Volume Spilled
Processing Vessel Spill	Defect, External Hazards	Onshore	Unlikely	Minor	-	-
Release from SourGas Treatment Equipment	Defect, External Hazards	Onshore	Likely	Negligible	-	-
Pig Receiver Spill	Mechanical Defects, Operational Errors	Onshore	Frequent	Severe	Improve Instrumentation/ Control	Reduce Frequency
C. Gas By-product Spill Accidents						
Failure of Processing Vessel	Reliability, External Hazards	Onshore	Unlikely	Minor	Instrumentation	Reduce Frequency
Failure of Mechanical Processing Equipment	Reliability	Onshore	Unlikely	Minor	Instrumentation, Redundancy	Reduce Frequency
Failure of LPG/NGL Storage Vessel	Defect, External Hazards	Onshore	Unlikely	Major/Severe	Relocation Mounding	Reduce Criticality Reduce Frequency
Spill During Loading Operations	Operational Error, Defects	Onshore	Likely	Minor/Severe	Operational Procedures, Security	Reduce Frequency
Spill During Transportation	Vehicle Accidents	Highway	Frequent	Minor/Disastrous	Scheduling, Routing, Training	Reduce Frequency

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I. INTRODUCTION

1.0 GENERAL

The contents of this document provide information needed by government agencies and the public to evaluate the project with respect to proposals by Chevron U.S.A. (Chevron) and Texaco U.S.A. (Texaco) related to development of the Point Arguello Field whose discovery was announced in November, 1981. The field represents a major, new crude oil resource and is among the largest discoveries in the United States since the finds at Alaska's Prudhoe Bay.

Since Chevron has proposed major pipeline and processing facilities with capacities significantly in excess of the production expected from the three proposed project platforms, a more general impact analysis of the Southern Santa Maria basin (referred to as the Area Study) is also presented which will:

- Provide for the additional evaluation of impacts related to development in the area, and

- Facilitate coordination among involved permitting and planning agencies.

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

Chevron is proposing to install two offshore oil and gas drilling and production platforms, Platform Hermosa and Platform Hidalgo, on leases OCS-P 0316 and P 0450, respectively (Figure 1.1). Texaco proposes to install one offshore oil and gas drilling and production platform, Platform Harvest, on OCS-P 0315. These three platforms are those currently proposed to develop the Point Arguello Field which lies offshore Santa Barbara County in Federal waters, 10-15 miles west of Point Conception. Platform Hermosa is proposed as the central production platform in the Point Arguello Field; production from Platforms Hidalgo and Harvest would be transported by subsea lines to Hermosa where it would be placed in consolidated pipelines to shore.

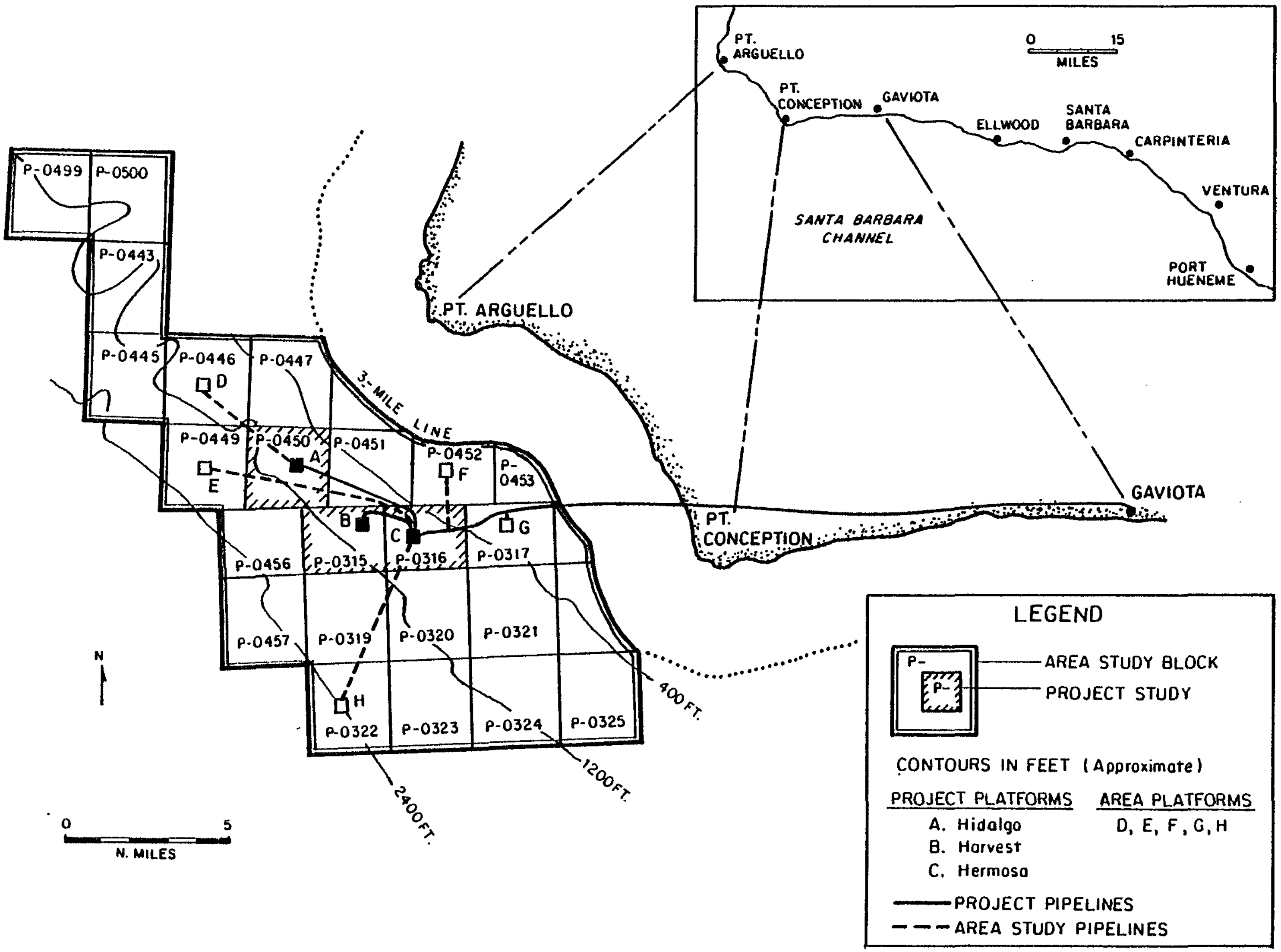


FIGURE 1.1 PROJECT / AREA STUDY ELEMENTS

These consolidated lines come onshore about 1.5 miles north of Point Conception and approximately follow the coastline to the proposed oil and gas processing facilities at Gaviota, which lies north of Highway 101 approximately 28 miles west of Santa Barbara and 15 miles east of Point Conception. Chevron is also proposing an ocean outfall line at the Gaviota facilities for disposal of produced water.

Peak production is estimated as: 27,000 barrels per day (B/D), oil and 28 million standard cubic feet per day (MMSCF/D) gas from Platform Hermosa, 20,000 B/D oil and 10 MMSCF/D gas from Platform Hidalgo, and 46,000 B/D oil and 42 MMSCF/D gas from Platform Harvest. Because of the anticipated future development of the Point Arguello Field and surrounding area, and the State and County desire for consolidated pipelines and facilities, Chevron is designing the consolidated pipelines and facilities for a peak capacity of 250,000 B/D of wet oil (200,000 B/D dry oil and 50,000 B/D produced water) and 120 MMSCF/D of gas. Details of the projects proposed by Chevron and Texaco are described in Chapter II of this document.

A major component of each project excluded from consideration in this document is transportation of each operator's dry oil from the processing facility to refineries in or out of California. These issues are excluded because they are being addressed first through Santa Barbara County's comprehensive Oil Transportation Plan (Public Review Draft released in April, 1984), and second through the County's consideration of specific transportation facility applications as they arise.

1.3 THE AREA STUDY

In addition to the proposed projects, this document also includes a study of the impacts from other development expected in the Southern Santa Maria Basin where substantial additional reserves are expected.

Because of the potential for development, this document provides a general impact analysis for the Southern Santa Maria Basin considering reasonably foreseeable developments over the next ten years. That development is represented by five additional, hypothetical platforms whose locations have been assumed to be as shown in Figure 1.1. The five additional platforms are not part of either Chevron's or Texaco's current project proposals, and hence are described and evaluated separately throughout this document.

The general Area Study analysis provides an evaluation of impacts related to expected additional developments in the area. Second, it facilitates coordination among all involved permitting and planning agencies. Third, it will be beneficial when projected cumulative impacts are considered. Finally, it gives the public and agency reviewers and decisonmakers a perspective on the developments which may occur in the Southern broader Santa Maria Basin.

It is important to recognize that many of the most significant impacts to the State would occur early in the Chevron/Texaco projects' life since all major onshore and offshore pipelines and related processing facilities are installed essentially at the time that the first platform is installed. Subsequent platforms would be tied to the existing pipelines offshore. Hence a number of additional, comparable platforms could be accommodated by the proposed pipeline and processing facilities without causing a second phase of major construction disruption onshore.

The analysis of the Area Study scenario assumes:

1) A maximum of eight platforms to be installed in the area (i.e., Hermosa, Hidalgo, Harvest and five hypothetical platforms).

2) Installation of these platforms over a nine-year period at a rate of one per year, following the installation of Platforms Hermosa and Harvest in 1985.

3) A 30-year life for each platform.

Platform placement, for purposes of the 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 quantity" (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 centers 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.

Site-specific information not directly applicable to the broad nature of the Area Study will be considered in subsequent environmental analyses based on specific future production plans. These reports will also consider new information not available at the time of the Area Study and any changed conditions which may affect the significance or severity of a project's impacts. General data on all impacts to air quality, marine biota, geology, etc. from the five hypothetical platforms will be considered at that time.

1.4 OIL TRANSPORTATION

A major component of each project not specifically evaluated in this document is transportation of each operator's dry oil from the proposed processing facility to refineries in or out of California.

The oil transportation issue has been the subject of several major environmental and policy analyses, and remains unresolved at the time of this writing. Two key milestones have been reached, however: 1) the County Board of Supervisors has agreed to the construction of a new, consolidated marine terminal. The ongoing Marine Terminal Siting Study will help identify which nearshore location is more environmentally suitable for such a facility; 2) there are two crude oil pipeline proposals in environmental review at this time (Getty and Celeron/All American), and another is expected shortly (Southern California Pipeline System).

Although no development permits have been issued for any of these transportation projects, it is apparent that at least one of the facilities (pipeline or marine terminal) must be approved in order to transport the OCS crude to refinery markets. The necessary oil transpoortation decisions will be, and must be, based upon the extensive environmental analyses prepared for the particular transportation facility proposals. Since any new transportation system will be sized to accommodate all anticipated crude oil production, the evaluation of "cumulative" impact has been incorporated into the project environmental documents.

Detailed siting and impact analysis regarding this issue are found in the following documents:

- Final Environmental Impact Report, Santa Barbara County Oil Transportation Policies, SCH 83110909, Santa Barbara County 84-EIR-3, May 31, 1984.

- Draft Environmental Impact Report, Proposed Getty Gaviota Consolidated Coastal Facility at Gaviota, California, SCH 83113017, Santa Barbara County 84-EIR-15, June 1984.

- Final Environmental Impact Statement/Report, Santa Ynez Unit/Las Flores Canyon Development and Production Plan, SCH 83030805, Santa Barbara County 83-EIR-22, June 1984.

The Getty project EIR contains an analysis of air emission impacts from a tanker loading at a five-point mooring terminal, similar to the facilities now in use at Getty's facilities at Gaviota. The analysis indicates there is a potential for exceedence of the California 1-hour nitrogen dioxide (NO_x) standard. Since Chevron proposed to use Getty's existing facilities until the time that a larger, consolidated marine terminal is operational, the five-point mooring impacts analysis in the Getty EIR is considered representative of the related impacts from Chevron's use of the facility. It is important to note that use of Getty's facilities for "interim" tankering is allowable under its existing APCD permit (since 1976).

Environmental impacts associated with both crude oil pipelines and marine tanker transport are evaluated in this EIR/EIS as integral components of the cumulative impact analysis, found in Chapter 6.

1.5 READER GUIDE TO THE USE OF THIS DOCUMENT

Two separate projects and an Area Study Scenario are evaluated in this EIR/EIS. The separate proposed projects are: (1) Texaco's Platform Harvest and associated pipelines; and (2) Chevron's Platforms Hermosa and Hidalgo and associated pipelines, onshore oil and gas processing facilities.

The document is organized into the following major chapters:

- Description of the Projects and Project Alternatives (Chapters II, III). The Chevron and Texaco project proposals 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 (Chapter VI). Chapter VI deals with impacts associated with potential future offshore oil developments, their associated onshore activities and other reasonably feasible, probable development projects such as the Santa Barbara Cross-Town Freeway and residential/resort developments such as the Hyatt Hotel.

This EIR/EIS 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.

1.6 AGENCY USE OF THIS DOCUMENT

The Joint EIR/EIS will be used by different agencies to evaluate impacts from proposed projects and future projects in the 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 EIR/EIS will also be the basis for all State and Federal responsible agency permit decisions. Each agency will record its respective decisions related to the proposed project in separate documents. The MMS will document its decisions a Record of Decision in accordance with NEPA, the County of Santa Barbara as CEQA lead agency records its decisions in a Notice of Determination.

Santa Barbara County will use the document to make specific decisions and permit conditions regarding Chevron's applications to the County for a land use re-zone, a major Conditional Use Permit, a Coastal Development Permit, a Comprehensive Plan/Coastal Plan amendment and approval of the Development Plan for the onshore pipelines and processing facilities.

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 Point Conception/Point Arguello area.

The County Air Pollution Control District will use air-quality information from the document in making its permit decisions as a responsbile agency.

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 0316 (Chevron--Hermosa), OCS-P 0315 (Texaco--Harvest) and OCS-P 0450 (Chevron--Hidalgo), 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 EIR/EIS.

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 Plan of Development (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 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 Land 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 collection. Specific approvals required by MMS for this project include: Development and Production Plans (DPP's), right-of-ways for offshore lines, platform verification, and Application for Permit to Drill (APD's) 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 Chevron's request for a pipeline right-of-way through these waters. The Commission will also use the document when leasing State lands for the ocean outfall at the processing facility and for considering a possible amendment of the Getty Marine Terminal lease to allow for transportation of Chevron oil from the proposed processing facility. 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 tide lands. 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 Reports prepared for Chevron's Platform Hermosa DPP and Texaco's Platform Harvest DPP (10/26/83, Chevron; 11/23/83, Texaco) and future permit decisions. 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.

Appendix C provides a representative listing of permits and approvals required for project construction/operation by various Santa Barbara County, State and Federal entities.

As with all agencies, the Joint EIR/EIS 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.

II. PROJECT DESCRIPTION

2.0 INTRODUCTION

Chevron has filed applications to develop leases OCS-P 0316 and OCS-P 0450. Texaco has filed an application to develop lease OCS-P 0315.

The Chevron applications include the following segments:

- One 48-slot drilling and production platform (Hermosa) on Lease OCS-P 0316.

- One 56-slot drilling and production platform (Hidalgo) on Lease OCS-P 0450.

- Two subsea pipelines, one wet oil and one gas, between Platforms Hidalgo and Hermosa.

- Two subsea industry pipelines, one wet oil and one gas, between Platform Hermosa and landfall near Point Conception.

- Continuing industry pipelines from landfall to new oil and gas processing facilities at Gaviota.

- Replacement of existing gas processing with new oil and gas processing facilities at Gaviota.

- One onshore dry oil pipeline from the processing facility to the Getty marine terminal at Gaviota, or as an option, a dry oil pipeline to the proposed Exxon marine terminal at Las Flores.

- One ocean outfall waste water pipeline near Gaviota.

The Texaco application includes the following segments:

- One 50-slot drilling and production platform (Harvest) on Lease OCS-P 0315.

- Two subsea pipelines, one wet oil and one gas, between Platforms Harvest and Hermosa.

As can be seen in Figure 1.1, the three proposed platforms are located in the Point Arguello Field, which is part of the Southern Santa Maria Basin. The peak production from the applicants' three platforms will be considerably less than the design capacity of the industry pipeline system from Platform Hermosa to Gaviota and less than the ultimate design capacity of the processing facilities at Gaviota. Additional production required to bring the industry pipeline system and the Gaviota treating facilities up to capacity is expected to come from future platforms in the Southern Santa Maria Basin for which applications have not yet been made. The description of peak production operations anticipated from the three proposed platforms as well as from the additional platforms hypothesized for the Southern Santa Maria Basin is covered in Section 2.10.

Sections 2.0 through 2.9 are specific to the projects proposed by Chevron and Texaco in their applications as listed above. Figure 2.1 provides an overall system diagram showing the interrelationships of the components proposed by Chevron and Texaco.

The applicants are proposing to install a single conventional platform on each of their three leases. These platforms will be combination drilling/production platforms with an eight-leg steel jacket, bottom founded, and anchored by pilings. The general platform characteristics are given in Table 2.1. Locations of the three platforms and their related pipelines are shown on Figure 1.2. in the Introduction Section.

The following discussion is applicable to all three proposed platforms. A more detailed description for each platform is presented in subsequent sections.

2.0.1 Platform Construction and Installation

Platform design, fabrication, and installation will be in accordance with MMS OCS orders including an independent third-party verification pursuant to MMS OCS Order No. 8. The platforms will be designed to withstand the maximum credible wind, wave, and seismic conditions expected off Point Conception. The platforms (jackets, decks, and components) will be fabricated outside the Santa Barbara Channel area and then towed to the installation sites by barges. Fabrication activities are not considered in this document. 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 are 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 jacket will then be launched from the barge and floated horizontally in the water.

- Jacket Upending - Once the jacket is launched it will be positioned over the installation site and uprighted by flooding selected leg and skirt pile sleeve compartments. The final positioning and leveling of the jacket will be done with the derrick barge and by controlled leg flooding. Once the jacket is positioned and levelled on the ocean floor, the remainder of the leg and skirt pile sleeves will be flooded.

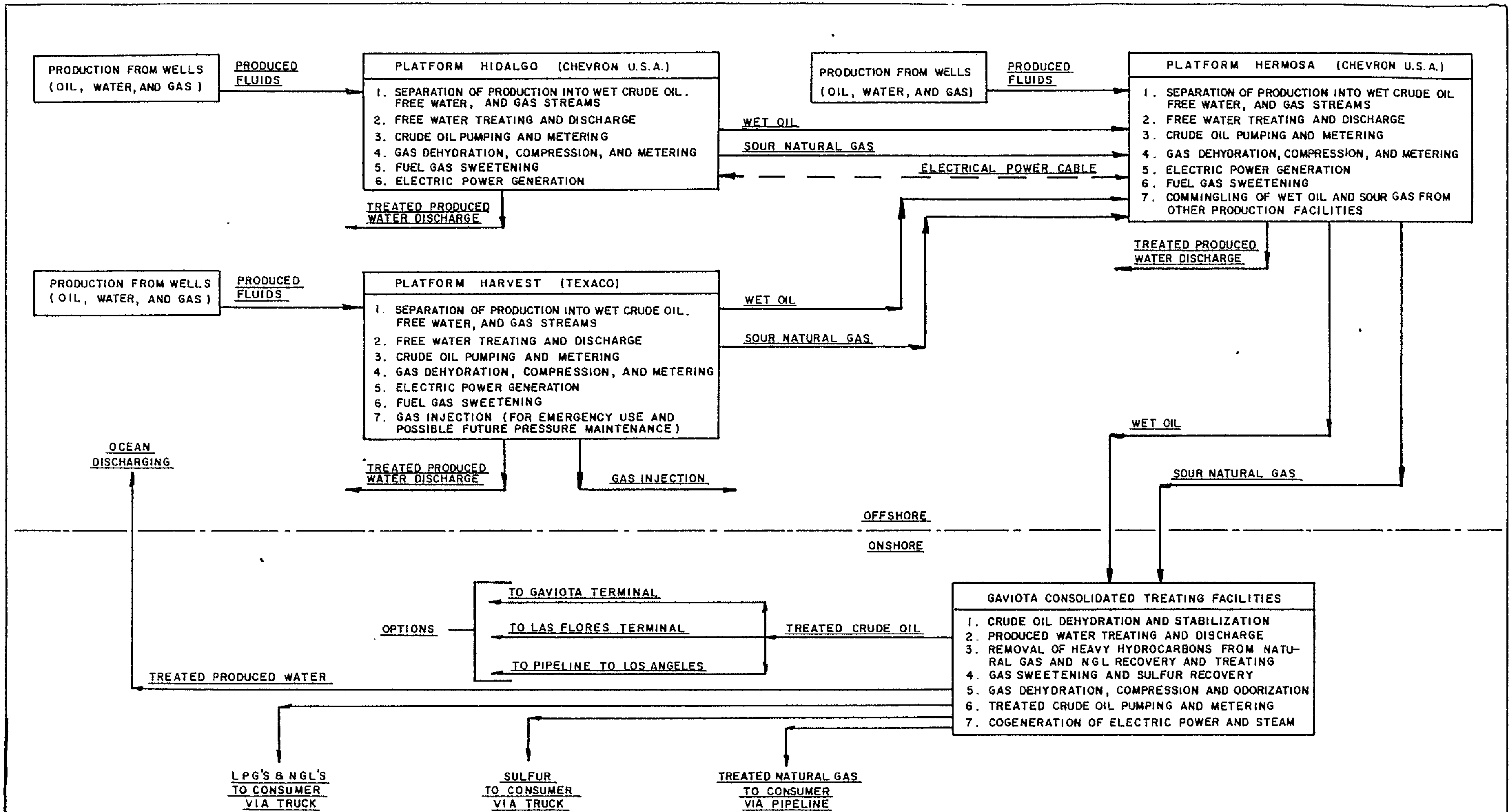


FIGURE 2.1
OVERALL SYSTEMS FLOW DIAGRAM
POINT ARGUELLO FIELD DEVELOPMENT

Table 2.1

GENERAL PLATFORM CHARACTERISTICS

Specification	Platforms: Hermosa	Hidalgo	Harvest
Operator	Chevron	Chevron	Texaco
Co Lessee	Phillips Petroleum, Champlin Petroleum	Phillips Petroleum	Pennzoil Oil & Gas, Sun Oil, Koch Industries
Water Depth (ft)	602	430	670
Well Slots	48	56	50
Estimated Peak Production:			
- Gas (MMSCF/D Year)	28 (1995)	10 (1996)	42 (1988)
- Oil (B/D Year)	27,000 (1989)	20,000 (1992)	46,000 (1988)
Piling Penetration (ft)			
- Main Pilings	294-419	260-300	225
- Skirt Pilings	241-371	260-300	235
Number of Decks	3	3	4
OCS Lease	P 0316	P 0450	P 0315
Location:			
- Latitude	34°27'19"N	34°29'42.06"N	34°28'9.523"N
- Longitude	120°38'47"W	120°42'08.44"W	120°40'46.169"W
- UTM Zone 10	X-7,16,210 ME Y=3,814,870 MN	X=710,971 ME Y=3,819,245 MN	X=713,134.35 ME Y=3,816,441.92 MN
- Lambert - Grid Zone 6	X-674,750 E Y=860,770 N	X=658,540 E Y=875,867 N	X=665,024 E Y=866,235 N
- Loran -	9940 X-27827 9940 Y-41808	9940-X-27813 9940-Y-41838	9940-X-27803 9940-Y-41853

- Pile Installation - 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, which varies for each platform. After the main piles have been driven, the skirt piles will be installed through the skirt pile sleeves and driven to their design penetration. All the main and skirt piles will be grouted to the jacket structure.

- Deck Setting - A support structure will be set and welded to the top of the jacket for support of the various deck modules. Once the support structure has been set, the deck modules, which have the production equipment preinstalled, will be lifted by a derrick barge and set on top of the support structure. These deck modules will then be welded into place. The flare boom, crew quarters, drilling equipment and other miscellaneous equipment will then be lifted into place on the deck modules.

- Deck Modules - Deck modules will be constructed outside the Santa Barbara area. They will have the processing equipment mounted on them with interconnecting piping, wiring, and instrumentation installed and tested. This method of constructing the modules reduces the offshore construction time on the platform.

- Equipment Hookup and Commissioning - After the deck modules have been set, offshore crews will make the necessary structural, piping, electrical, and instrumentation interconnections among modules. They will then test and commission all modules.

The installation of a platform including hookup and testing of equipment will take four to seven months. This will require a work force ranging from 125 to 250 people at any given time with support coming from Port Hueneme, Carpinteria Pier, Ellwood Pier, Gaviota Pier and Santa Barbara Airport.

2.0.2 Drilling Activities

Drilling activities will be in accordance with MMS OCS Order No. 2 or Field Drilling Rules, EPA-NPDES permit conditions, and accepted industry standards. The operations include actual drilling, setting and cementing of casing, and installation of production tubing in the well. Major components of drilling operations are as follows:

- A derrick or mast with equipment to raise and lower the drill bit and casing and to rotate the drill bit.

- A mud system used to control well pressure, lubricate the drill pipe and bit, and return drill cuttings to the surface. Composition of some typical drilling muds are provided in Table 2.2.

Table 2.2

COMPOSITION OF EPA GENERIC DRILLING MUDS

Spud Mud (EPA Generic Mud #5)	lbs/bbl
Bentonite or Attapulgite	10-15
Barite	0-20
Soda Ash/Sodium Bicarbonate	0- 2
Caustic	0- 2
Lime	1/2-1
Lignite	0- 3
Seawater	As needed
Density (lbs/gal)	9.2

Lignosulfonate Mud (EPA Generic Mud #7)	lbs/bbl
Bentonite	10-30
Barite	0-35
Lignosulfonate	2- 5
Caustic	1- 3
Lignite[1]	0- 3
Soda Ash/Sodium Bicarbonate[2]	0- 2
Zinc Carbonate[4]	0- 7
Deterent, Deformer, Lubricants[3]	As approved by EPA
Water	As needed
Fresh Water to Seawater Ratio	1.1
Density (lbs/gal)	9.6

1. Lignite (brown coal) may be used to help reduce filtration (loss of mud liquid phases and as a thinner. Will reduce requirements of lignosulfonate.

2. Soda Ash (Sodium Carbonate) and Sodium Bicarbonate used to treat out calcium contamination in mud after a cement job.

3. Detergent, defomer, and lubricants are used in small amounts as needed under special circumstances.

4. Zinc Carbonate used infrequently to treat out H_2S in mud.

Additionally, sandust, nut shells, mica, cellophane or similar fibrous substances may be used to control lost circulation.

SOURCE: Texaco, Inc., 1984. Responses to California Costal Commission, Consistency Review, prepared for U.S. Department of the Interior, Minerals Management Service.

- A cementing system used to force cement down the well to seal the annulus between the casing and the hole or between concentric casing strings.

- A blowout prevention (BOP) 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 40-100 days to drill and complete. Two drilling crews of 17-20 people will work 12 hours on and 12 hours off, 7 days on and 7 days off. They will be transported to and from the platforms by helicopters or by crew boats.

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.

2.0.3 Production Activities

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.

Once the first production well has been drilled and completed, production activities on the platform will start. Drilling will continue for another 4-6 years, depending on the platform, until all the wells are drilled, at which time the drill rigs will be removed, except for necessary workover activities.

The production equipment and related facilities can be divided into three parts: (1) Production Facilities; (2) Utility Systems; and (3) Support Facilities. Figure 2.2 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 separators, well-clean up separators and, as appropriate, a sweet gas separator.

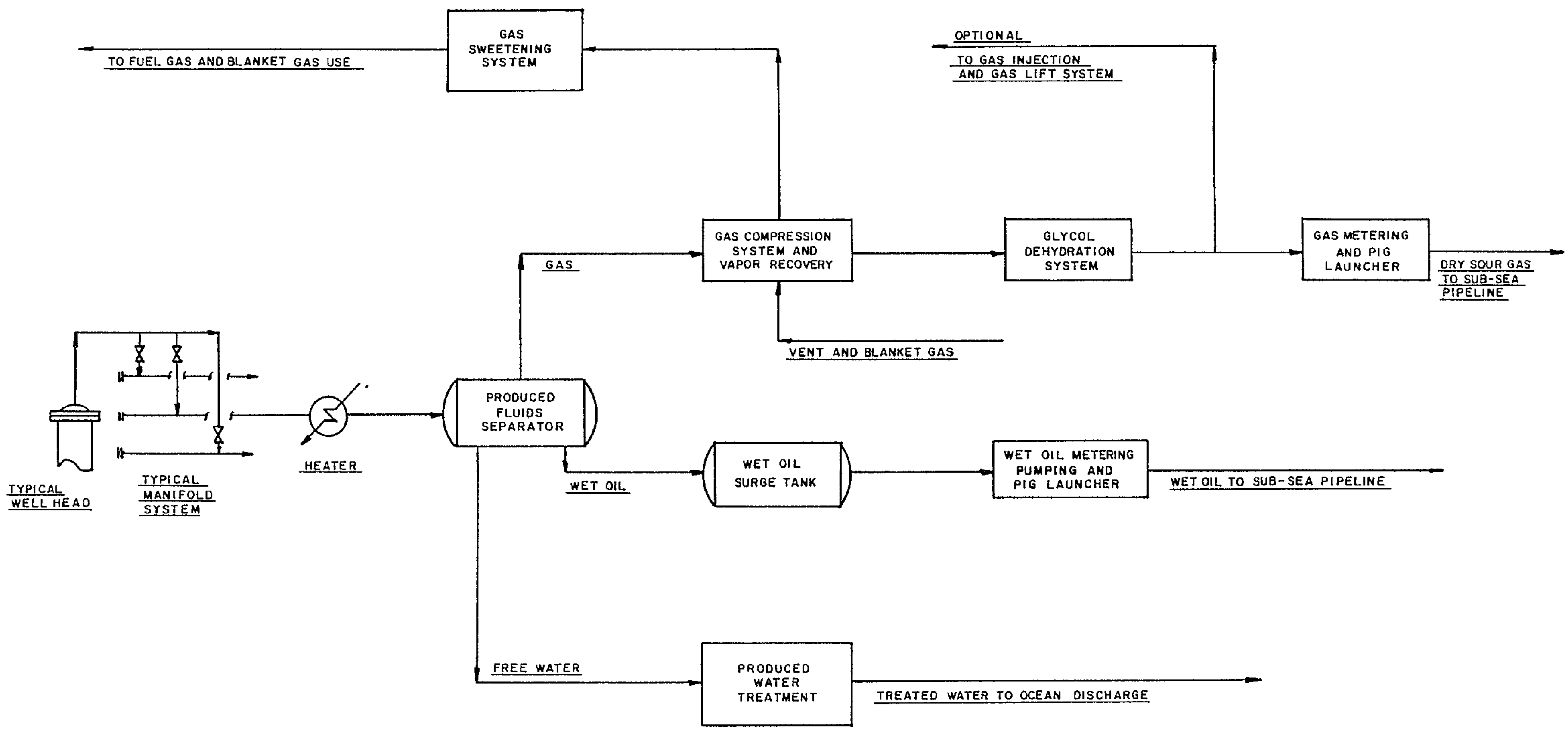


FIGURE 2.2
GENERALIZED PLATFORM
PROCESS FLOW

IMAGE# 8,

- Separators -- Each platform will be equipped with parallel oil and gas separation trains. Each train will have a heater and a three-phase separator for separating gas, oil and water.

- 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.

- Produced Water Handling -- The produced water from the separators will be treated and, after monitoring, discharged to the ocean.

- 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. Vent gas and blanket gas from various low-pressure tanks throughout the platform will be recovered in the gas-compression system. A portion of the gas will be sweetened to remove the hydrogen sulfide and used for fuel gas and blanket gas on the platform. 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 systems for each platform will include an electrical power system, a fuel gas distribution system, a water desalination system, and a waste water treating system. The electrical power generation on Platforms Hermosa, Harvest, and Hidalgo will be provided by gas-fired turbine generators that are equipped with a waste heat recovery system which supplies the heating requirements of the platform. Platform Hidalgo and Platform Hermosa will be interconnected by an electrical sub-sea cable. Standby power on all platforms will be provided by diesel-powered generators. Diesel fuel will be used for power generation during initial platform start-up until fuel gas becomes available from production wells or in emergencies.

Most fresh water requirements for the platform will be obtained from sea water using a desalination unit. A package sewage treatment unit will be incorporated on the platform 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 system, and
- Helicopter landing pad.

2.0.4 Safety and Monitoring Systems/Environmental Protection Measures

The design, construction and operation of the offshore platforms will conform to the requirements of the MMS Pacific Region OCS Orders, as well as the requirements of the applicable EPA NPDES regulations and the appropriate API and other industry standards.

Blow-out prevention equipment will be incorporated into the drilling operations in accordance with the MMS/OCS requirements as described in the subsequent sections on each platform.

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 in subsequent sections on each platform. Any cuttings which cannot be discharged in accordance with EPA's NPDES permit will be disposed of on shore at an approved Class 1 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. Many other safety features will be incorporated into the equipment on the platform. These are detailed in Appendix O.

The electrical energy required for drilling and production operations on the platforms will be produced by gas turbine driven electrical generators, fueled by sweet (sulfur-free) natural gas during normal operations and fueled by low-sulfur diesel fuel oil during start-up operations. To minimize the NOx (nitrogen oxides) emissions from these gas turbines water injection will be used. Both Chevron and Texaco have committed to incorporating water injection techniques to reduce NO_x emissions by up to 70%. A vapor recovery system has been included on the platform to minimize the amount of hydrocarbons which have to be flared. Elevated flare pilots will be continuously burning in order to burn any hydrocarbons or toxic gases which might have to be released during the operation of the platforms. However, these releases will only occur occasionally and are not considered a normal practice.

Water treatment systems will be an integral part of the platforms' production equipment and will be used to treat all water including the produced water so that it is acceptable for discharge into the ocean.

A reliable firewater system is supplied on each platform using a combination of electrically and diesel driven firewater pumps. 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 gas turbine generators; 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 platform.

For oil spill containment, the applicants will have a jointly operated stand-by response vessel to be located at Platform Hermosa until Platform Hidalgo begins drilling, at which time it will be moved to Platform Harvest. This vessel will be 100 to 120 feet long and contain 3000 feet of open ocean boom, a stationary skimmer, advancing skimmers, a 30-foot deployment boat, approved dispersants and dispersant application equipment, 5000-gallon oil storage tank and a supply of sorbent pads. The applicants have also committed to having a 1000-barrel oil storage tank available that could reach the platforms in six hours. A more complete description of the stand-by response vessel and its functions is contained in the discussion of Oil Spill Contingency Plans in Chapter VI.

CHEVRON U.S.A., Inc.

As part of the California Coastal Commission Consistency Certification, the following are project elements either proposed by Chevron or required by the Coastal Commission. Many of these have already been discussed previously in the project description and Impact/Mitigation Chapter of the DEIR/EIS.

Drilling Muds and Drill Cuttings

- Mud additives will be chosen from EPA's approved list and that use of chrome-lingosulfonate will be avoided. Any mud additives used will be approved by EPA under the conditions of the NPDES permit prior to discharge.

- Chevron will barge muds to shore if: (1) the muds contain additives not approved by EPA or (2) the muds contain additives in concentrations beyond those approved by EPA.

- Muds that exhibit a sheen will be considered "oil-contaminated" and will be sent to shore.

- Chevron will conduct a study to evaluate all available measures to mitigate the impact of the disposal of muds and cuttings to the marine environment. Chevron would implement feasible cost-effective measures identified by the Study.

Commercial Fishing

- Chevron will establish and identify to the local fishermen support boat routes from the piers between Carpinteria and Gaviota which will direct the boats outside the 30 fathom curve before proceeding west to the platform and pipeline.

- Chevron will compensate for damaged fishing gear as a result of the project activities, in accordance with general liability laws. It will conduct a study of pipelaying methods and will choose a method which will eliminate anchor scarring or minimize it to the maximum extent feasible. Chevron will conduct a post-construction survey in the construction corridor and will remove any retrievable debris.

- Chevron will notify the fishermen of the traffic routes, construction schedules and location of construction sites to help mitigate the impacts of pipeline and platform construction.

Containment and Cleanup of Crude Oil Spills

Chevron and Texaco will aquire a vessel with similar response capabilities to Mr. Clean II. This will include:

- One 100-120 foot boat

- 3,000 feet of open ocean boom

- 1 - Stationary skimmer (WALOSEP W-3 or equivalent)

- 1 - Advancing mode skimmer ("Offshore Devices" barrier type or equivalent)

- Recovered material storage capacity (includes on-deck storage and 20 percent of the vessel's DWT below decks, the latter being subject to final approval by the U.S. Coast Guard)

- Additional small boat (30 foot or more)

- Dispersant (Exxon's Corexit 9527) and spraying equipment

This boat will be maintained at the platform site until such time as Clean Seas, Inc. purchases and puts into operation Mr. Clean III. At that time, the boat and equipment will be replaced with smaller equipment to handle on-site small spills.

- Clean Seas' vessels will be retrofitted with 1,000 barrels of oil storage capacity.

- Chevron will prepare a paper reviewing dispersant effectiveness and toxicity. This paper will provide the Coastal Commission Staff and other public agencies with a comprehensive list of the available literature on the subject.

- Chevron will develop and participate in an acceptable dispersant toxicity testing procedure, if adequate information is not contained in the literature list. Chevron will endeavor to make this a joint government-industry sponsored project.

Vessel Traffic Safety

- Chevron will install an Automatic Radar Plotting Aid (ARPA) on Hermosa. The ARPA tracks up to 60 ships, tells the radar operator what the closest point of approach between a ship and the platform will be, and how much time there is to the closest approach point. It also displays the speed and course of the ships. An inner and outer guard zone can be selected by the radar operator, and if a ship penetrates the guard zones, both visual and audible alarms are automatically activated.

- The platform will also have a rotary aircraft beacon, blinking five-mile lights on the four corners of the facility, and a two-mile fog horn. The platform will use daytime lighting when visibility is less than three miles.

Geological Hazards

- Chevron's platforms and pipeline facilities will adhere to the state-of-the-art seismic design standards. In addition, Federal requirements call for a third party review of the seismic design criteria and analysis for the platforms as required by MMS OCS Order No. 8.

- The pipelines will be engineered so that it will be supported buoyantly should the seafloor undergo liquefaction due to a large earthquake.

Air Quality

Chevron has proposed mitigation measures to control emissions from the project. Chevron has agreed to install the most effective emission control technologies, performance standards, or emission limitations, other than offsets, which have been achieved successfully in practice in similar offshore applications, or that are used for onshore applications and can be transferred successfully to offshore applications, or that are technologically feasible and cost-effective. Only pollution control technologies which can be approved by the USCG, the American Bureau of Shipping, and/or other agencies as appropriate will be instituted.

Chevron's commitment includes the following specific emissions controls:

- equipping turbine engines, both offshore and onshore, with water injection to reduce NO_x emission by 70 percent;

- recovering waste heat from gas engines and turbines to reduce the need for burning additional fuel in process heaters to meet heat requirements;

- using a gas blanketing and vapor and sulfur recovery system to reduce emissions from the oil and gas processing and storage facilities;

- incorporating a vapor control system on transport ships to reduce hydrocarbon emissions;

- using low sulfur fuel on all vessels to minimize SO_2 emissions;

- instituting an inspection and maintenance program on valve, pump, flange, and compressor seals to minimize fugitive hydrocarbon emissions, and instituting a program to monitor compliance and effectiveness of installed air emissions control systems;

- using low NO_x burners on heaters, sweetened gas fuels and scrubbers on flare burners to reduce NO_x and SO_x emissions;

- using water sprays to minimize fugitive dust during onshore construction activities;

- imlementing applicable control measures on crane and cementing engines on the platform and on supply and crew boat engines, as identified in the Air Quality Task Force Study [Radian, 1982]; and

- using low sulfur gas fuel in the turbines (except during start-up).

Archaeological Resources

Chevron plans to minimize the impacts on archaeological and paleontological resources by using the following mitigation measures during construction. Sites will be avoided where possible. When voidance is not possible, trenching operations will be monitored by a qualified archaeologist and a Native American observer. Test excavations will be carried out within the impact zone at several designated sites prior to construction. Once the testing program is complete, the research potential of the site will be evaluated and proper mitigation measures formulated.

Land Resources

Chevron has committed to minimize adverse impacts due to pipeline construction by compacting and restoring the disturbed terrain along the pipeline route to its original contours and seeding these disturbed areas, where required, with native vegetation. Stream and water course pipeline crossings will be constructed during periods when streams are low or dry, minimizing the need for temporary water diversions.

Disturbed banks of water courses will be restored, and, where necessary, will be reinforced by earth-filled bags or rock. In areas where erosion appears likely from runoff, water diversion terraces will be used for protection of slopes. Additionally, Chevron has stated that no permanent structures, other than the pipelines themselves, will be sited in any environmentally sensitive habitat area.

Construction of the Gaviota facility will avoid all environmentally sensitive habitat areas, including Canada del Cemeterio, Canada Alcatraz, and Canada del Leon. Buffer spaces are provided next to these areas for the protection of existing riparian habitat. All eucalyptus trees that are removed during grading and terracing of the site will be replaced in equal numbers and no trees currently used by Monarch butterflies will be removed. Chevron will also provide for a monitoring program by an entomologist to ensure that the facility construction and operation will have no adverse effect on the Monarch butterflies using the site. Further construction or fill in Canada Alcatraz will not occur and existing roads will be utilized.

Visual and Scenic Resources

To minimize and mitigate visual impacts, Chevron has committed to replace all removed trees with identical species in other location sites to screen the facility from public view. Further, they will use berms and paint colors to screen or mask views from Highway 101 and will plant new, semi-mature trees along the CalTrans right-of-way.

TEXACO U.S.A., INC.

The following list of mitigation measures, agreed upon by Texaco U.S.A., Inc., have been excerpted from the Coastal Commission Preliminary Staff Recommendations on Consistency Certification dated February 23, 1984. The migitations are listed: (a) in addition to any contained in Texaco's DPP and (b) in the order in which they appear in the Staff Recommendations.

Pipeline to Shore

- The hydrocarbons from Platform Harvest will be transported from Platform Hermosa to consolidated onshore processing facilities via a consolidated pipeline.

- Texaco and its partners, Sun, Pennzoil, and Koch, commit to transporting the processed crude oil to refineries or market outlets by regional pipeline, if one is available.

- Platform Harvest producers will not sell oil to other companies as a mean to avoid commitments to transport oil by pipeline. Any oil produced from Platform Harvest that is sold to another company by the Platform Harvest producers will also be transported by pipeline if a pipeline is available with accessible capacity to that purchaser's market.

- Texaco has agreed to condition the pipeline construction plan so that the contractor must place the entire pipeline outside of rocky areas and that the barge anchor lines must be adjusted to avid all rocky areas.

Drilling Fluids and Cuttings Disposal

- Texaco intends to use only EPA approved additives in the muds, in the concentrations approved by EPA, and will barge to shore any muds which fail to meet these criteria. Texaco has stated irrevocably that it will not discharge any muds containing chrome lignosulfonate or diesel.

- Any oily or otherwise contaminated drilling muds will be collected and transported by supply vessel to Port Hueneme, then trucked to an approved disposal site.

- Texaco will conduct periodic site specific marine biological surveys and routine chemical analysis of characteristics of drilling mud discharges and seafloor sediments.

- Texaco is committed to minimizing the impacts associated with Platform Harvest to the maximum extent feasible. If unacceptable adverse impacts are identified, Texaco will coordinate with responsible agencies to develop and implement mitigation measures that will minimize the identified impacts to the extent feasible within reasonable economic and technical limits.

- Texaco has agreed to pre-dilution of drilling muds prior to discharge.

- Texaco agrees to discharge drilling muds at a depth determined by Oceanographic modeling to have the least environmental impact.

Commercial Fishing

- To mitigate conflict with nearshore (setgill netting and trapping) fishing activities, Texaco will establish a vessel access corridor leading from Ellwood Pier out to the 30 fathom contour.

- Texaco has also agreed to: (1) ongoing participation in joint industry workshops and information programs, and the Petroleum Transportation Committee; (2) use of a continuous-welded pipeline to avoid fittings that could snag trawl gear; (3) consolidation of pipeline facilities with Chevron's Platform Hermosa project to minimize the number of seafloor pipeline and amount of construction activity necessary; (4) protection of irregular pipeline surfaces that cannot be avoided to allow trawl gear to pass over the surface without snagging; and (5) equipment identification.

- Texaco has agreed to mitigation measures which will mitigate against the impacts of the pipeline and platform by establishing support boat routes; designing the pipeline to have the least impact on trawlers; discussing potential problems as they arise with the commercial fishermen; and by identifying equipment in the event that it is the cause of damage to trawl gear. Identification simplifies compensation for gear loss or damage.

Mitigation of Spill Impacts

The equipment will be provided through a joint venture of Chevron Platform Hermosa and Texaco and is discussed previously under the Chevron Comments with the Coastal Commission

Vessel Traffic Safety

- Texaco agrees to several additional mitigation measures beyond those proposed in the DPP. One measure includes installing an Automatic Radar Plotting Aid (RPA) on Platform Harvest.

- Texaco also commits to installation of red, flashing obstruction, five-mile lights on the four corners of the facility and a two-mile fog horn.

- Texaco will paint the platform grey or an alternative color in accordance with USCG recommendations to increase the platform's visibility to ocean vessels.

Air Quality

The Platform Harvest design currently includes the following measures:

- Use of platform turbine water injection to reduce NO_x emissions by 75 percent.

- Use of clean burning "sweet" (low sulfur) natural gas as fuel for major platform equipment such as turbine power generators and gas compressors.

- Completion of wells in a formation expected to yield gas naturally low in sulfur for use as platform fuel, and installation of gas processing equipment capable of sweetening high sulfur gas for use on the platform.

- Installation of both high pressure and low pressure vapor recovery systems to prevent hydrocarbon emissions from processing facilities, compressors, tanks, and other platform equipment.

- *Installation of catalytic converters on platform diesel engines* to reduce hydrocarbon, NO_x, and carbon monoxide emissions to a minimum.

- Utilization of waste heat from platform turbines in other applications (such as process heating and domestic heating) to reduce the need for fuel burning equipment and associated pollutant emission.

- Installation of hydrogen sulfide air pollutant monitors.

- Implementation of an inspection and maintenance program designed to require regular checks of all platform equipment, fittings, valves, and flanges to prevent hydrocarbon vapor leaks.

- Implementation of injection timing retard, subject to American Bureau of Shipping and U.S. Coast Guard approval, on all crew and supply vessel diesel engines to reduce NO_x emissions.

Texaco has agreed to install further effective and safe pollution control equipment as identified in the EIS/EIR. Moreover, the ARB and Texaco have agreed to additional provisions to protect onshore air quality. Under this agreement, when the EIS/EIR is complete, representatives of the Coastal Commission, Texaco, ARB, and MMS will determine whether the air quality analysis shows a need for further mitigation; if further mitigation is required, these representatives will identify the extent and precise mitigation measures which Texaco must provide. Texaco has amended its DPP and consistency certification in accordance with the ARB agreement to include this additional mitigation to be specified and carried out through the EIS/EIR.

The following additional mitigations are contained in Texaco U.S.A., Inc. response to the DRAFT EIR/EIS as follows:

- Non-local platform and pipeline construction workers will live onboard their work vessels or in the platform's crew quarters (when complete) during their shifts. During their days off, these workers will be transported to their permanent residences.

  As a result, platform or pipeline construction workers involved in the proposed project will not establish temporary residences in parks onshore. The demand for transient accommodations in Santa Barbara and/or Ventura County will be negligible, if any.

- Relying on the advice of the International Bird Rescue Research Center and various affected government agencies, Texaco has developed a bird and mammal cleaning program which is currently part of its Offshore California Oil Spill Program. Included in the Plan is a listing of on-hand equipment which is required for this activity. Under their plans an emergency cleaning center can be established in an affected area within a few hours.

- Pig launchers on both the oil and gas pipelines at Platform Harvest have been equipped with the following equipment:

  - Pressure guages, range 0-2,000 psi.

  - Mechanical interlocks on access doors which prevent opening when the vessel is under pressure.

  - On the 8" gas pipeline, the pig launcher is repressured through a 4" inlet line.

2.0.5 Energy Use

During the construction phase, energy requirements will primarily include use of diesel and jet fuels for offshore transportation of personnel, equipment and supplies, and for running offshore construction equipment. During the initial drilling phase diesel fuel will be used for crew and supply boat operation. For Platform Hermosa and Platform Harvest, diesel fuel will be required to run the electrical generators until gas production is available for operating the turbines. Hermosa will provide a portion of the power required for Hidalgo's early drilling phase. The electrical generators or diesel drives will supply power for operating the platform cranes, drilling rigs, mud and cementing units, and other support systems. Well drilling activities are expected to last four to six years with the majority of the energy being supplied by the gas turbine electrical generators.

Production operations which require energy are: gas compressors, oil shipping pumps, down-hole submersible pumps, and auxiliary platform operating equipment. Their energy will also be supplied by the gas turbine electrical generators. Diesel and jet fuels required to transport employees and supplies for production and operation are the other major energy use.

2.0.6 Emissions and Effluents

Pollutant emissions and effluents from the proposed platforms will result from installation, drilling, and production activities. Since the emissions associated with construction are defined as a "temporary facility" they are treated separately. 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 machines. Table 2.3 presents the average daily emissions generated by construction and hook-up/commissioning for the three proposed platforms.

The major effluents during the construction and hook-up/ commissioning stage of the project will be related to water desalination and sewage disposal. Table 2.4 provides an estimate of the quantity of effluents that will be generated during the construction and hook-up/commissioning for the proposed platforms.

Drilling and production operations will occur after the platforms have been commissioned. The drilling and production operations on the platforms produce emissions primarily due to the following common emission sources:

- Transportation of workers and supplies to and from the platform;
- Power generation for the operation of the drilling equipment.
- Cranes, fire pumps, emergency generators, etc. operated on diesel fuel;
- The flare pilot; and
- Fugitive emissions.

Gas fired turbine generators on each platform will normally burn produced sweetened natural gas except during the initial drilling period when produced gas is unavailable. During this period, the turbine generators will burn diesel fuel. The use of sweet natural gas as the primary fuel will result in very low levels of SO_2 emissions. Water injection control will also be implemented to reduce turbine NO_x emissions by approximately 70%.

Hydrocarbon vapors will not be vented to the atmosphere on the platforms. In emergencies, hydrocarbon vapors are flared rather than vented. All liquid and gas storage and handling facilities are 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 drilling and production, are presented in Table 2.5. These emissions include all associated mobile sources.

The major effluents from the platforms during drilling and production are presented in Table 2.3.

TABLE 2.3

ESTIMATED PEAK AIR EMISSIONS FOR PLATFORM CONSTRUCTION LBS/DAY

Platform Activity	Average Daily Emissions (lbs/day) CO	VOC	NO_x	SO_2	TSP
1. Hermosa Installation & Hookup/Commissioning	678	284.0	2846	194	231
2. Hidalgo Installation & Hookup/Commissioning	678	284.0	2846	194	231
3. Harvest Installation & Hookup/Commissioning	1054	450	5764	362	326

Source: Emission estimates developed from a number of emission factors sources. For details see Table 4.1.5 of Appendix F part 2.

TABLE 2.4

ESTIMATE OF PLATFORM EFFLUENTS

Operation/Source	Effluent Quantity Hermosa	Hidalgo	Harvest
Installation and Hookup			
Treated Sanitary Sewage (gpd)	2,000	2,000	11,700
Desalination Brine (gpd)	72,000	72,000	67,000
Hydrostatic Test Water on time (gallons)	200,000	200,000	15,000
Drilling Operations			
Drill Cuttings (ft^3 per well)	16,000-17,000	16,000-17,000	17,000
Drilling Mud (bbls per well)	4,000	4,000	2,400
Completion Fluid (bbls per well)	600	600	180
Contaminated Drilling Mud[a] (bbls per well)	0-250	0-250	20
Cement Slurry (gpd)	50	50	—
Production Operation			
Cooling Water (bbls per day)	113,000	113,000	240,000 max.
Deck Draining (gpd)	2,000-3,000	2,000-3,000	250
Treated Sanitary Sewage (gpd)	2,000	2,000	2,200
Desalination Brine (bbls per day)	3,200	1,700	2,900
Produced Water (bbls per day)	100-18,000	100-18,000	11,000
General Refuse[1] (tpy)	—	—	26

[1]Material is taken to shore.

TABLE 2.5

ESTIMATED ANNUAL AIR EMISSION FOR THE PLATFORM
DURING DRILLING AND PRODUCTION (Tons/Year)

	HERMOSA					HIDALGO					HARVEST				
Year	CO	HC	NO_x	SO_2	TSP	CO	HC	NO_x	SO_2	TSP	CO	HC	NO_x	SO_2	TSP
1987	41.9	21.1	76.8	5.7	3.2	41.4	21.0	73.8	5.5	3.0	77.7	47.8	116.2	13.1	4.2
1988	93.5	38.4	91.3	6.9	3.4	37.4	37.4	69.0	5.1	2.9	91.9	66.4	192.1	192.0	4.3
1989	59.1	54.9	98.3	7.4	3.6	37.4	54.0	68.1	5.0	2.9	77.4	63.9	163.3	16.6	3.7
1990	56.0	54.7	94.3	7.1	3.5	55.3	54.8	91.4	6.9	3.3	62.2	61.2	131.8	10.4	3.1
1991	98.8	54.9	97.8	7.4	3.5	58.1	54.9	94.9	7.2	3.3	53.8	59.8	115.0	9.1	2.8
1992	60.5	54.9	100.1	7.6	3.6	59.9	55.0	97.1	7.4	3.4	60.5	60.9	128.5	10.1	3.1
1993	34.6	51.4	45.4	3.6	1.4	34.6	51.8	45.4	3.6	1.4	63.9	61.6	135.0	10.7	3.2
1994	35.0	51.5	45.8	3.6	1.4	35.0	51.8	45.8	3.6	1.4	63.1	61.4	133.7	10.6	3.1
1995	35.7	51.5	46.7	3.7	1.5	35.7	51.8	46.7	3.7	1.4	63.1	61.4	133.7	10.6	3.1
1996	36.2	51.5	47.4	3.7	1.5	36.2	51.9	47.4	3.7	1.5	63.1	61.4	133.7	10.6	3.1
1997	36.4	51.5	47.6	3.8	1.5	36.4	51.9	47.6	3.8	1.5	63.1	61.4	133.7	10.6	3.1
1998	33.6	51.5	46.3	3.7	1.4	35.3	51.8	46.3	3.7	1.4	63.1	61.4	133.7	10.6	3.1
1999	34.4	51.4	45.2	3.6	1.4	34.5	51.8	45.2	3.6	1.4	63.1	61.4	133.7	10.6	3.1
2000	33.9	51.4	44.5	3.5	1.4	33.9	51.8	44.5	3.5	1.4	63.1	61.4	133.7	10.6	3.1
2000-on	33.0	51.3	43.4	3.4	1.4	33.1	51.6	43.4	3.4	1.4	63.1	61.4	133.7	10.6	3.1

Source: Emmission were calculated based on equipment list, useage and emission factors. See Append F, Part 2 for details (Tables 4.2.1, 4.2.2, 4.2.5, 4.2.6 and 4.2.7)

2.0.7 Supply Base and Crew Base Support

The supply and crew support for the three platforms can be broken down into four categories:

- Platform installation;
- Platform hookup and commissioning;
- Drilling; and
- Production.

Table 2.6 gives an estimate of the number of trips per day that each platform will require for crew and supply support. The heaviest activity will be during the installation and hookup/ commissioning phase. Installation of the subsea pipelines during platform installation will increase the crew and supply support needs.

It is assumed that both Texaco and Chevron will use Port Hueneme for their supply support base activities during the lifetime of the platforms. For Chevron, crew based support is assumed to be helicopters out of Santa Barbara Airport during platform installation and hookup, drilling and production. During inclement weather (less than 2% of the year) when helicopter travel is restricted, the crew will be taken to the platforms by boat from Carpinteria Pier. Texaco will have crew based support out of Ellwood Pier during platform installation and hookup. During drilling and production, the crew will be transported by helicopter to the platforms from the Santa Barbara Airport. During inclement weather when helicopter travel is restricted, the crew will be taken to the platforms by boat from Ellwood Pier.

If an industry consolidated support facility is built in Santa Barbara or San Luis Obispo, both applicants have stated that they would use it.

During transportation to and from the platform, the crew and supply boats will burn diesel fuel. When docked, they will use onboard diesel generators to provide power. The helicopters will burn jet fuel during their flights.

Table 2.7 gives an estimate of the average daily emissions for the crew boats, supply boats, and helicopters that will serve the three platforms.

2.1 SPECIFIC PLATFORM HERMOSA DISCUSSION

The three-deck platform will consist of a production/wellhead deck, a drilling deck, a main deck, crew quarters, heliport, and provisions for docking supply boats. The platform will have provisions for landing small crew boats.

TABLE 2.6

PLATFORM CREW AND SUPPLY BASE SUPPORT ACTIVITIES

Platform Category	Crew Boats	Supply Boats	Helicopters
I. Platform Hermosa			
- Installation	1/day	1/day	2/weeks
- Hookup & Commissioning	1/day	1/day	10/weeks
- Drilling	--	1/day	2/days
- Production	--	2/months	2/days
II. Platform Hidalgo			
- Installation	1/day	1/day	2/weels
- Hookup and Commissioning	1/day	1/day	10/weeks
- Drilling	--	1/day	2/days
- Production	--	2/months	2/days
III. Platform Harvest			
- Installation	1/day	4/weeks	3/weeks
- Hookup and Commissioning	1/day	4/weeks	3/weeks
- Drilling	--	3/weeks	1.5/day
- Production	--	2/weeks	1.5/day

Source: Chevron U.S.A., Inc. - Point Arguello Project Development Plan and Environmental Report, Volume 2, Appendix A. (Hermosa ER and Hidalgo ER)

Source: Chevron U.S.A., Inc. - Supplement to Point Arguello Project Development Plan and Environmental Report, Appendix A.

Source: Texaco U.S.A., Environmental Report Platform Harvest Project, Table 2.3.

Supply service out of Port Hueneme, crew support from Santa Barbara Airport.

TABLE 2.7

PLATFORM CREW AND SUPPLY BASE SUPPORT ACTIVITY EMISSIONS
(lbs/day)

Platform/Activity	CO	VOC	NO_x	SO_2	TSP
I. Platform Hermosa					
- Installation/Hookup	207	60	981	55	46
- Drilling	359	101	1660	92	78
- Production	96	36	138	6	9
II. Platform Hidalgo					
- Installation/Hookup	207	60	981	55	46
- Drilling	359	101	1660	92	78
- Production	96	36	138	6	9
III. Platform Harvest					
- Installation/Hookup	127	119	673	37	31
- Drilling	146	40	706	39	33
- Production	106	30	475	26	22

Source: Emmissions were calculated based on expected useage of suport equipment and corresponding emission factors; for details see Appendix F, Tables 4.5.1 thrugh 4.5.9.

The height of the production/wellhead deck above mean lower low water (MLLW) approximates 51 feet. The main deck will be approximately 79 feet above MLLW. The total overall height of the structure, including the drilling rig approximates 250 feet above MLLW.

Hermosa installation is scheduled to start in May 1985 and should last about six months. Initial production is scheduled to start in January 1986. Oil production is expected to peak in 1989 at 27,000 B/D, with gas production peaking in 1995 at 28 MMSCF/D.

2.1.1 Drilling Equipment and Operation

Platform Hermosa will have a maximum of 48 well slots; however, it is anticipated that only 40 production wells will be drilled. The wells will be drilled using two drilling rigs which will be skidded over individual well slots. The drilling equipment and personnel will be provided on a contract basis. The major drilling components on platform Hermosa will include:

- Rig Components - These will include two land-type cantilever masts 152 feet high with 16,500 foot drilling and 1-million-pound hook-load capacities. These masts will be designed in accordance with API Standard 412 for freestanding masts. The draw works will be electrically driven (rated at 1,500 hp) and complete with sand reel and rotary table drive. The hook, travelling block, and crown block will have a load rating of at least 500 tons. The drill string will be 4 1/2" or 5" Grade E and Grade G drill pipe.

- Substructures - The substructures of each rig will be capable of supporting the mast and setback loads. Each will be designed to provide unobstructed clearance for the blowout prevention equipment. Each 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 - A separate mud system will be provided for each drilling rig. Each mud system will be equipped with two mud pumps (about 1,000 hp each) and approximately 2,300 barrels of active and reserve mud tank capacity. A common bulk material handling system will be provided with 3,000-cubic-foot storage capacity for clay and barite materials. Sacks of mud additives (chemicals, lost circulation material, etc.) needed on the platform for drilling will be stored on pallets. The mud and cuttings that are returned from the wells will be separated with high-speed shale shakers, mud cleaners, desilters, and degassers. The shale shakers will be equipped with a cuttings washing system to clean any oil contaminated cuttings before they are discharged to the ocean through a vertical pipe or cuttings chute whose terminus will be about 100 feet below the MLLW. Each well drilled from Platform Hermosa is expected to produce approximately 16,000 cubic feet of drill cuttings. Periodically during drilling, clean water based muds and completion fluid will be discharged to the ocean through the cuttings chute in accordance with OCS Order No. 7. It is estimated that about 4,600 barrels of mud and completion fluid per well will be discharged to the ocean.

- Cementing Unit - One diesel powered dual cementing unit and three 1,000-cubic-foot bulk storage tanks will be provided for well cementing operations.

- Casing Program - Depending on individual well completions, two different casing programs are anticipated. One program will be for wells that are completed with 4" production tubing, and one will be for wells completed with 2 7/8" production tubing. All casing setting depths and cementing will be in accordance with MMS Pacific Order No. 2 and/or field drilling rules. All casing will be designed to exceed anticipated burst and collapse pressure and tensile loads. Production casing, liner, and tubing subjected to sour (sulfide containing) service will be made of controlled hardness quenched and tempered steel.

- 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, but will allow for conversion to electric down hole submersible pumps in the future. The working pressure of each wellhead section will exceed the maximum anticipated pressure imposed on that section.

- Blowout Preventer Equipment (BOP) - Each drilling rig will have separate mud and blowout prevention equipment systems. These blowout prevention systems will be operated and tested in accordance with OCS Order No. 2. Since two different completions are anticipated, two different BOP stacks will be required.

On wells where 4" production tubing is to be used, the low-pressure BOP system will consist of a 29-1/2", 500-psi annular-type blowout preventer and a diverter system. This system will be installed on the 24" conductor and used for drilling to a depth of approximately 2,300 feet below the ocean floor (BOF). At this depth, a 3,000-psi 20" Class IV BOP stack will be installed. This BOP will include an annular preventer, one pipe ram, and one blind ram. This BOP will be used for drilling to various depths depending on individual well completion. After the 13-3/8" casing is landed and cemented, a 5,000-psi, 13-3/8" Class IV BOP stack will be installed. This BOP will include an annular preventer, two pipe rams, and a blind ram. This BOP will be used for drilling to the final well depth.

For wells which are to follow a 2 7/8" production tubing casing program, the same low-pressure BOP stack described above will be used for drilling to a depth of 2,300 feet BOF. A 5,000-psi,13 5/8" Class IV BOP stack, as described above, will then be installed and used to complete the wells. All the BOP stacks will be actuated by pressure which is provided by a hydraulic accumulator. Control stations for the BOP stack will be located both on the drill rig floor and in a remote location.

2.1.2 Production Equipment and Operation

Platform Hermosa will contain production facilities for the initial separation of the produced oil, gas, and free water. A wet-oil emulsion will be sent to onshore processing facilities for final crude treating.

The gas will be dehydrated on the platform and then sent to an onshore processing facility for final treatment. Surplus power from Hermosa will be utilized at Hidalgo to economize on the number of turbines that need to be run to supply power to both platforms. This power will be supplied via a subsea cable. The gas to be used for power generation fuel on the platform will have the H_2S removed by use of an amine (organic nitrogen-containing compound) unit. The H_2S removed from the fuel gas will be injected back into the gas being sent to shore for processing.

It is estimated that the average total sulfur content of the oil will be 3 percent by weight. The anticipated maximum H_2S concentration in the associated gas is approximately 6,000 ppm.

- Oil and Gas Processing Systems - The 40 producing wells on platform Hermosa will be arranged in four rows, with short flowlines connecting each well to a manifold system. Each well will be equipped with a "Christmas tree" valve stack. The manifold system will allow production to be switched between production and test separators. All wells will be equipped with down hole surface controlled subsurface safety valves in accordance with OCS Order No. 5. These subsurface valves will be hydraulically controlled from the platform. The wells will be manifolded so the wells can be isolated for individual testing through one of three test separators. During normal operations all the wells will be 'pooled' into one of two 3-phase production separator trains. A cleanup separator will be provided for the initial unloading of wells to remove mud and water until the well is flowing sufficiently to be diverted into the normal production separators. A simplified block flow diagram and general description of the production facilities are given in Figure 2.1.

  Before leaving the platform, the oil-water emulsion will be metered by double-case positive displacement type meters equipped with a mechanical prover. From the meters the oil-water emulsion will be boosted to pipeline discharge pressures by three electric motor-driven screw-type pumps. Since the oil pipeline to shore is an industry line and has the capacity for other platform production, the shipping pump's discharge pressure will vary, depending on the amount of oil sent to the line and the temperature. The maximum operating pressure for the pumps will not exceed ANSI 600 design pressure (1,480 psig).

Produced gas from the production facilities will be compressed to pipeline operating pressure by electric motor-driven reciprocating compressors. Since the gas pipeline from Hermosa is also an industry line, additional capacity exists for other platforms to tie in. For this reason the gas compressor discharge pressure will vary with throughput.

However, the maximum discharge pressure will not exceed 1,480 psi. Each stage of compression will be equipped with suction scrubbers, discharge coolers, unloaders, and clearance pockets to allow various gas production rates to be handled. Gas volumes consumed as fuel and those delivered to the industry pipeline will be metered with orifice type metering instruments.

Produced free water resulting from the oil separation process will be treated and then discharged to the ocean through a disposal caisson. The free-oil content of the discharge water will meet EPA's NPDES requirements. Oily solids resulting from this water treatment will be pumped to a waste tank for disposal on-shore.

- <u>Utility Systems</u> - Platform Hermosa will generate the power requirements of Hermosa using three 2,500-kW gas-turbine generators along with one stand-by turbine generator. A subsea electrical cable will connect Platforms Hermosa and Hidalgo to provide electricity to Hidalgo during initial drilling. This connection will help reduce emissions and improve energy efficiency by load balancing. The turbines will have diesel alternate fuel capability for early drilling and to facilitate production start-up. Water will be injected into the turbines to reduce NOx emissions by up to 70%.

The platform will house two vapor compression desalination units (one standby) to produce fresh water from sea water for potable and demineralized water systems. A demineralized-water holding tank with an 18-hour capacity will be provided. Potable water will be stored in a 300-barrel storage tank. The drill-water storage capacity will be provided in the jacket legs. This fresh water supply will be used primarily for mixing drilling muds and cement, and will be delivered to the platform by supply boat.

The majority of the process heating requirements will be obtained from the cogeneration system. This system will utilize the waste heat recovered from the turbine drivers on the electrical generators. A small electrical heater has been provided for peak loads above the capacity of the waste heat.

Utility and instrument air will be provided at 125 psi and 100 psi, respectively. This air will be provided by two rotary-screw air compressors that will be electrically driven.

Two salt water systems will be provided for fire suppression, washdown, process cooling, desalination, etc. The fire suppression system will be designed for 2,500 gpm and is a diesel-driven system. An additional system will supply 3,000 gpm for other platform requirements. This system's pumps will be electrically driven.

A packaged sewage treatment unit will be incorporated to process the sewage from the crew quarters building. The effluent from this unit will comply with United States Coast Guard requirements.

2.2 SPECIFIC PLATFORM HIDALGO DISCUSSION

The three-deck platform will consist of a production/wellhead deck, a drilling deck, a main deck, and an upper deck with crew quarters and heliport. Hidalgo installation is scheduled to begin in April 1986, with initial production scheduled to start in January 1987. Oil production is expected to peak in 1992 at 20,000 B/D, with gas production peaking in 1996 at 10 MMSCF/D.

The height of the production/wellhead deck above mean lower low water (MLLW) will be 62 feet, 6 inches. The main deck will be 95 feet, 3 inches above MLLW. The total overall height of the structure, including the drilling rig approximates 260 feet above MLLW.

2.2.1 Drilling Equipment and Operation

Platform Hidalgo will have a maximum of 56 well slots; however, it is anticipated that only 48 of these will be used for production. The wells will be drilled using two drilling rigs which will be skidded over individual well slots. The drilling equipment and personnel will be provided on a subcontractor basis. The major drilling components on platform Hidalgo that are different than Platform Hermosa include:

- Rig Components - These will include two land type cantilever masts 152 feet high with 20,000-foot drilling and 1-million-pound hook load capacities. The mast will be designed in accordance with API Standard 4D for free standing masts. The draw works will be electrically driven (rated at 2000 hp) and complete with sand reel and rotary table drive. The hook, traveling block, and crown block will have a load rating of at least 500 tons. The drill string will be 5" Grade E and Grade G drill pipe.

- Drilling Mud System - A separate mud system will be provided for each drilling rig. Each mud system will be equipped with two mud pumps (approximately 1600 hp each) and approximately 2300 barrels of active and reserve mud tank capacity. The system will include a mud mixing tank, trip tank, and a sand trap tank below the shale shaker. A common bulk material handling system will be provided with 3000-cubic-foot storage capacity for clay and 4000 cubic feet for barite materials. Sacks of mud additives (chemicals, lost circulation material, etc.) needed on the platform will be stored on pallets.

- Cementing Unit - One electric powered dual cementing unit and three 2000-cubic-foot bulk storage tanks will be provided for well cementing operations.

The casing program, wellhead equipment and blowout preventer equipment will be identical to that described for Platform Hermosa.

2.2.2 Production Equipment and Operation

Platform Hidalgo will contain production facilities for the initial separation of the produced oil, sour gas (contains H_2S) and free water.

The oil produced from platform Hidalgo is expected to have a sulfur content of about 2 weight percent with an average gravity of 26°API. The anticipated average H_2S content of the produced gas should be approximately 5,000 ppm.

- Oil and Gas Processing System - The oil and gas processing systems on Platform Hidalgo are similar to those described earlier for Platform Hermosa.

  Produced free water resulting from the oil separation process will be treated and then discharged about 100 feet below the MLLW through a disposal caisson. The free-oil content of the discharge water will meet NPDES requirements. Oily materials recovered by the water treatment process will be pumped to a waste tank for disposal onshore.

- Utility Systems - Platform Hidalgo will generate electrical power using three 2,500 kW gas turbine generators with a fourth available as stand-by. The electrical power generated on Hidalgo will be shared with Hermosa via a subsea electrical cable between the two platforms. This will allow Hidalgo to use electrical power from Hermosa during the initial phases of drilling when gas production is not available to run the turbine generators. Once both platforms are operational they will be able to share each other's electrical production, thus maximizing the operating efficiency of the turbine generators on both platform Hidalgo and platform Hermosa. Water will be injected into the turbines to reduce NOx emissions by up to 70 percent.

  The desalination units process heating requirements and sewage treatment units for Platform Hidalgo will be similar to those described for Platform Hermosa.

  Platform Hidalgo will be equipped with two electric submersible pumps to provide fire water (1,500 gpm/pump) at 100 psi to the deluge system, hose reels, and fire monitors. Platform Hidalgo will also be equipped with one standby diesel powered turbine fire pump to provide fire water (3,000 gpm) at 100 psi in case the electrical pumps fail. Certain process equipment containing combustible fuels will be covered by an automatic deluge system. Each gas turbine driver will have an automatic fire extinguishing system.

2.3 SPECIFIC PLATFORM HARVEST DISCUSSION

Platform installation is scheduled to begin about June 1985 and last about seven months. Drilling is scheduled to begin around January 1986, with oil and gas production peaking in 1988 at 46,000 B/D of wet oil and 42 MMSCF/D of gas.

The four-deck platform will consist of a cellar deck, lower main production deck, upper main production deck, a drilling/quarter deck, heliport, and provisions for docking of crew and supply boats. The platform main decks will be 210 feet long by 100 feet wide. The total overall height of the structure, including the drilling rig approximates 296 feet above MLLW.

2.3.1 Drilling Equipment and Operation

Platform Harvest will have 50 well slots; however, it is anticipated that only 42 wells will actually be drilled, reserving eight slots for possible future use. Thirty-six of these wells will be used for combined oil and gas production; four will be used for sweet gas production; and two will be used for gas injection. Gas injection will be conducted in the event that the produced gas could not be transported off the platform, or if the gas reinjection could enhance reservoir recovery.

Drilling is scheduled to begin in January of 1986 and continue for approximately 48 months into mid-1989. The average measured depth of the wells will be about 11,200 feet, reaching true vertical depths of up to approximately 8,500 feet.

The drilling equipment and personnel will be provided on a subcontractor basis. The major components of platform Harvest that are different from Hermosa include:

- Rig Components - These will include two land type cantilever masts or standard derricks. The first will be 142 feet high with 20,000-foot drilling and 500-ton hook load capacities. The second will be 139 feet high with 15,000-foot drilling and 425-ton hook load capacities. The draw works for both rigs will be electrically driven (rated at 1,400-2,000 hp) and complete with sand reel and rotary table (rated at 500 hp with two gear transmission). The hook, travelling block, and crown block will have a load rating of at least 500 tons for the 20,000-foot rig and 425 tons minimum for the 15,000-foot rig.

- Drilling Mud System - The mud system for each drilling rig will be equipped with two 1,600 hp mud pumps and approximately 700 barrels of active mud tank capacity and 700 barrels of reserve tank capacity. Included with this system will be a mud mixing tank, trip tank, and a sand trap below the shale shaker. The solids-control equipment will consist of double separating screens, desanders, mud cleaners, and a degasser. The shale shaker unit will be equipped with a cuttings washing system to clean any oil contaminated cutting before disposal. A common bulk material handling system will be provided with 4,000-cubic-foot storage capacity for clay and barite materials. Sacks of mud additives needed on the platform will be stored on pallets near the drilling rigs. The mud handling system for Harvest will be similar to that described for Hermosa. Each well drilled from Platform Harvest is expected to produce an average of 17,000 cubic feet of drill cuttings. These cuttings will be washed and periodically discharged to the ocean through a vertical pipe (driller's outfall) whose terminus will be about 300 feet below MLLW. Water based drilling muds will be discharged at an average rate of 120-160 B/D through the drillers outfall. These used drilling muds will be mixed with the 240,000 B/D cooling water requirement prior to ocean discharge.

- Cementing Unit - Two diesel powered dual cementing units and a 7,000-cubic foot bulk storage unit will be provided for well cementing operations.

- Casing Program - The casing program planned for the development wells drilled from Platform Harvest will be similar to the casing program used on Platform Hermosa for the wells completed with 4" production tubing.

- Blowout Preventer Equipment (BOP) - Each drilling rig will have separate mud and blowout prevention equipment systems. These blowout prevention systems will be operated and tested in accordance with OCS Order No. 2. For each well drilled the first BOP system will consist of a 29 1/2" spherical annular preventer and a diverter. A kill line, used for mud injection for killing the well, will be installed in the diverter spool. This BOP will be installed on the 24" conductor and used for drilling until the 18 5/8" surface casing is installed. At this point, a 21 1/4", 5,000 psi Class IV BOP stack is then installed.

This BOP will include a spherical annular preventer, one blind ram, and three pipe rams. The Class IV hook up will require that the BOP be equipped with a 21 1/4", 5,000 psi spool piece with all the necessary piping and valves, including a kill line.

All the BOP equipment will be constructed for service in an H_2S environment. All the BOP stacks will be actuated by pressure which is provided by a hydraulic accumulator. Control stations for the BOP stack will be located both on the drill rig floor and in a remote location. Operation and testing of the BOP equipment will be in accordance with MMS regulations and field rules.

2.3.2 Production Equipment and Operation

Platform Harvest will contain production facilities for the initial separation of the produced oil, sour gas (contains H_2S), and free water. Platform Harvest will also have a separate production system for sweet gas (no H_2S). An oil emulsion and sour gas will be sent to an onshore processing facility via Platform Hermosa for final treating and distribution.

The oil to be produced from Platform Harvest is expected to have a sulfur content of two to five weight percent, and between 8.5° API and 24.5° API with expected average characteristics of 3 percent sulfur and 19° API. The sour gas could have an H_2S content as high as 6,000 ppm.

- Oil and Gas Processing Systems - The 36 oil and sour gas wells on Platform Harvest will be arranged in two 5x5 wellbays (25 slots each), with short flow lines connecting each well to a manifold system. Each well will be equipped with a "Christmas tree" (an arrangement of shut-off valves for shutting in the wells). In addition to the Christmas tree valve arrangement, each well will have a surface controlled subsurface safety valve located at least 100 feet below the ocean floor that can shut the well off. This valve is hydraulically controlled from the platform in accordance with OCS Pacific Order No. 5. The manifold system will also allow the production from each well to be switched between production and test separators.

  During normal production most of the producing oil and sour gas wells will be 'pooled' into the production/separation trains. Each train will have a heater, a three-phase separator, and a production surge tank. Two test separators will also be installed for measuring well production of gas, oil, and free water. A cleanup separator will be provided for the initial unloading of wells to remove mud and water until the well is flowing sufficiently to be diverted into the production or test separators.

  Before leaving the platform, the oil/water emulsion will be metered by double case positive displacement type meters equipped with a mechanical prover. From the meters the oil/water emulsion will be boosted to pipeline discharge pressures by gas turbine driven centrifugal pumps. The oil emulsion will move through a pipeline from platform Harvest to platform Hermosa and then into the industry pipeline from Hermosa to Gaviota. The operating pressure of the wet-oil pumps should not exceed 1,200 psig.

  Produced gas from the production facilities will be compressed to pipeline operating pressures by gas turbine driven centrifugal compressors. The sour gas will be sent to Gaviota via Platform Hermosa. Gas leaving the platform will be metered with orifice type metering instruments. Before leaving the platform a slip stream of gas may be drawn off for sweetening in an amine unit. The sweet gas will be used as turbine fuel and as make-up into the low-pressure buffer gas system. An alternative to sweetening sour gas for turbine fuel is to use the sweet gas wells and production facilities on Platform Harvest to supply the fuel requirements.

Produced free water resulting from the oil separation process will be treated and then discharged 200 feet below MLLW through a disposal caisson. Oily solids resulting from this water treatment will be pumped to a waste tank for disposal onshore.

- Utility Systems - Platform Harvest will generate the power requirements for drilling and production by using four 3.4-mW gas fired turbine generators to supply the platform's maximum power requirement of 11.6 mW. A fifth gas turbine generator is installed as a back-up. Two diesel generators capable of producing 1.5 mW of power (total) will serve as a source of emergency power. Water will be injected into the turbines to reduce NO_x emissions by up to 70 percent.

  The platform will house two vapor compression desalination units to produce fresh water from sea water for potable and demineralized water systems at a rate of 1,260 gallons per hour. The fresh water supply that will be used for mixing drilling muds and cement will be delivered to the platform by supply boat. Certain muds (spud mud, for instance) will be prepared with seawater.

  All process heating requirements will be obtained from the cogeneration system via a hot oil circulating system. This system will utilize the waste heat recovered from the turbine drivers on the electrical generators. Utility and instrument air will be provided at 100 psi by two electrically driven air compressors.

  Platform Harvest will be equipped with one electrically driven and two diesel driven fire water pumps. Each pump will have a rating of 3,000 gpm at 320 feet total dynamic head. Certain process equipment containing combustible fuels will be covered by an automatic deluge system. Each gas turbine driver will have an automatic fire extinguishing system.

  A packaged sewage treatment unit will be incorporated to process the sewage from the quarters building. The effluent from this unit will comply with United States Coast Guard requirements and will be discharged to the ocean at 10 feet below MLLW.

2.4 GENERAL PIPELINE DISCUSSION

All produced oil and gas from the three project platforms, except that required for fuel, will be gathered and commingled at Platform Hermosa via inter-platform pipelines and shipped ashore through industry pipelines to Gaviota.

All the pipelines will be designed, fabricated, installed, tested, operated, and inspected in accordance with all applicable regulations set forth by:

- The American National Standards Institute (ANSI);
- The Department of Transportation (DOT);
- The American Petroleum Institute (API);
- MMS OCS Orders; and
- County of Santa Barbara Requirements for onshore pipelines.

2.4.1 Offshore Pipelines

CONSTRUCTION AND INSTALLATION

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 and an outer layer of concrete to provide density and structural protection. The pipe segments will be transported by barge, truck, or rail to Port Hueneme or directly to the installation site. The pipe will then be loaded onto material barges and transported to a lay barge or stockpiled at a selected staging area for bottom pull installation.

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 in accordance with 49 CFR 195.242.

It is anticipated that all the inter-platform pipelines will be installed using the lay barge method. In this method, individual lengths of precoated pipe are taken aboard a lay barge and inspected for defects before being used in the pipeline. The pipe joints are then welded and the field joints coated to form a continuous string. These activities are conducted on a long, gently curved construction ramp, and the barge moves forward one pipe length as each new joint is added. During installation or move up, the pipe string will pass down the ramp, onto a stinger, and to the ocean floor in an S-curve configuration. Each weld will be 100 percent radiographically inspected. Deployment of the lay barge anchors will require a construction corridor approximately 12 times as wide as the local water depth. Pipelines will be laid in the approximate center of this corridor.

The pipelines will be connected to the platforms through the use of J-tubes and/or risers. These risers and/or J-tubes will be preinstalled on the platform jackets.

The industry or consolidated pipeline from Platform Hermosa to Gaviota will be trenched and buried to a minimum of 3 feet through the surf zone at Point Conception. Additional trenching without backfill, which will place the top of the pipelines below the sea floor, will be carried out to an as yet unspecified water depth beyond the surf zone.

The remainder of the offshore pipelines will be laid along the ocean bottom.

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 pipelines until production begins, pursuant to NPDES permit requirements.

In accordance with MMS OCS Order No. 8, after the offshore pipe-laying operations are completed, a survey using side scan sonar will be conducted, in accordance with the Minerals Management Service, OCS Order No. 8, to verify that the pipeline was not damaged, that it is 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.

All the subsea pipelines will have an automatic block valve on each platform in accordance with MMS OCS Order No. 9. The line from Platform Hermosa to Gaviota will have a remotely operated block valve at the Point Conception landfall, and at two locations between landfall and Gaviota.

The energy required to construct the offshore pipelines includes the transportation of the pipe within the project area, operation of the lay barge, welding of the pipe, and transportation of the workers to and from the job site. It should be noted that the operation of the pipelines does not, of itself, require any additional energy input since the energy requirements for pumping and compression are accounted for in the platform's operating energy requirements.

The estimated crew and supply transportation for the installation of the subsea pipelines is given in Table 2.8.

TABLE 2.8

OFFSHORE PIPELINE CREW AND SUPPLY BASE SUPPORT ACTIVITIES

	Crew Boats	Supply Boats	Helicopters
1. Hidalgo to Hermosa	BWO*	1/day	2/week
2. Harvest to Hermosa	1/day	4/weeks	3/weeks
3. Hermosa to Pt. Conception	BWO	1/day	2/week

*BWO: Bad weather only.

Crew and supply boats will travel from Carpinteria or Ellwood Pier and Port Hueneme, respectively, to the construction site. Helicopter service will be from the Santa Barbara Airport. The estimated air emissions resulting from the construction and installation of the subsea pipelines are given in Table 2.9. These emissions are due to crew and supply transport to and from the work site, and to the following pieces of equipment:

- Barge tugs,
- Lay barge,

TABLE 2.9

ESTIMATED AIR EMISSIONS FOR PIPELINE CONSTRUCTION INCLUDING MOBILE SOURCES

Pipelines	Estimated Construction Duration (Weeks)	Average Daily Emissions (lbs/day)			
		CO	NO_x	SO_2	TSP
1. Offshore (Hidalgo to Hermosa, Harvest to Hermosa, Hermosa to Point Conception)	160	643	4272	213	187
2. Onshore (Point Conception to Gaviota)	200	1440	851	59	272

Source: Emissions were calculated based on information supplied in the development plans submitted by the applicants. For details see Appendix F, Tables 4.1.1 through 4.1.5.

- Welding machine,
- Utility crane, and
- Auxiliary standby generator.

The effluents from construction that will be discharged to the ocean include treated sewage effluent and hydrostatic test water. An estimate of these effluents is given in Table 2.10. All discharges will comply with NPDES permits. All other liquid and general refuse will be shipped to shore for disposal at an approved facility.

TABLE 2.10

ESTIMATE OF PIPELINE CONSTRUCTION EFFLUENTS

	Pipeline origin			
Effluent	Harvest	Hidalgo	Hermosa	Pt. Conception
Treated Sanitary Sewage (gal)	480,000	--	--	--
Desalination Brine (gal/day)	82,040	1,500	1,500	--
Test Water (gal)	85,000	200,000	250,000	300,000
General Refuse (tons)	7.5	10.0	10.0	--

OPERATION

Once the pipelines have been installed and production on the platforms has begun, the oil and gas will be metered volumetrically before being pumped into their respective pipelines. The oil will be moved through the pipelines by electrically driven positive displacement or centrifugal pumps. The gas will be moved by electrically driven reciprocating or centrifugal compressors.

An industry group is finalizing the design of the pipeline integrity monitoring system. This system is the key to the detection of pipeline leakage. The oil pipeline monitoring system is tentatively designed to volumetrically measure the flows at each platform into the pipeline system and compare the sum of these with the total flow leaving the pipeline at Gaviota. A Supervisory Control and Data Acquisition (SCADA) System will monitor all pipelines.

If changes in input and output oil volumes are detected which exceed preset limits, alarms at the Gaviota facility will sound. Appropriate steps will then be taken to assess the nature of the problem and if a leak is suspected the oil pipeline will shut down in compliance with the Pipeline Emergency Response Plan. Also, high- and low-pressure sensors throughout the line will shut down the oil pipeline if pressures reach preset limits. There are currently no plans to meter the oil pipeline flows from Harvest and Hidalgo at platform Hermosa.

Because of the two-phase flow, the gas pipeline will not use volumetric measurement for leak detection. Instead, the gas lines will use low- and high-pressure sensors that will shut the line down if pressures reach preset limits.

During the life of the pipelines, corrosion inhibitors, pipeline pigs (cylindrical devices which move through the pipelines), and instrumented pigs will be used to ensure that the pipelines remain free of potentially harmful deposits, corrosion products, and defects. During normal operation the gas pipelines will require pigging once or twice a day, with the oil pipelines being pigged about once a month.

2.4.2 Onshore Pipelines

CONSTRUCTION AND INSTALLATION

The two onshore oil and gas pipelines will be installed using conventional land pipelaying methods and equipment. The porposed corridor is illustrated on Figures 2.3 and 2.4. The pipelines will be buried with a minimum cover of 5 feet except at the valve box locations where the boxes will protrude 6" above ground. The spacing between the two lines will vary depending on local conditions. In general, lines will be placed as close to one another as possible in order to minimize impacts.

The onshore pipeline construction occurs 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, and
- Revegetation.

Pipeline trenches are anticipated to have a width of 2.5 to 3 feet. Maximum excavation requirements are estimated to be 64 to 78 cubic yards/100 linear feet through most areas. Material excavated during ditching will be stockpiled temporarily alongside the trench within the 100-foot right-of-way. There will be several temporary access roads installed from existing roads to the right-of-way. It is not currently known what will be done with the excess dirt from the pipeline laying operation. Pipe will be stored at a staging area on Chevron's land near Point Conception and at Gaviota. According to the currently proposed alignment, approximately twenty crossings of the Hollister Ranch Road will occur. The Ranch Road will be utilized throughout construction for access to various portions of the alignment.

According to the currently proposed alignment, approximately 20 crossings of the Hollister Ranch Road will occur. The Ranch road will be utilized through construction for access to various portions of the alignment.

Using accepted industry standards, inspectors will inspect the pipeline coating for defects prior to installation. All pipe girth welds will be radiographically inspected per applicable codes. After installation, the pipeline will be pigged and hydrostatically pressure tested to 1.25 times the design maximum pressure. These lines will also be equipped with remotely operated block valves so various segments of the line can be isolated.

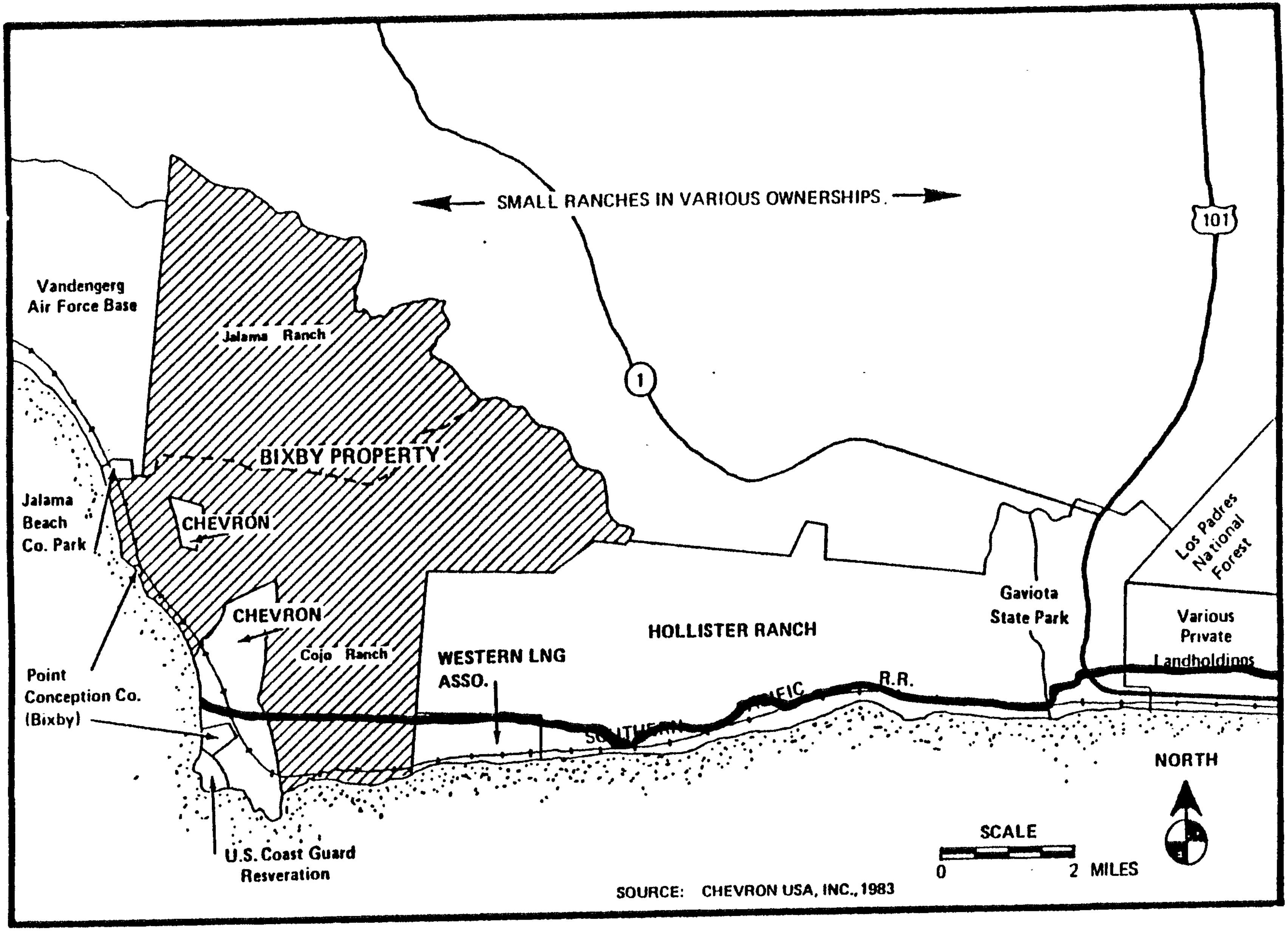


FIGURE 2.3 PROPOSED ONSHORE OIL AND GAS PIPELINE CORRIDOR

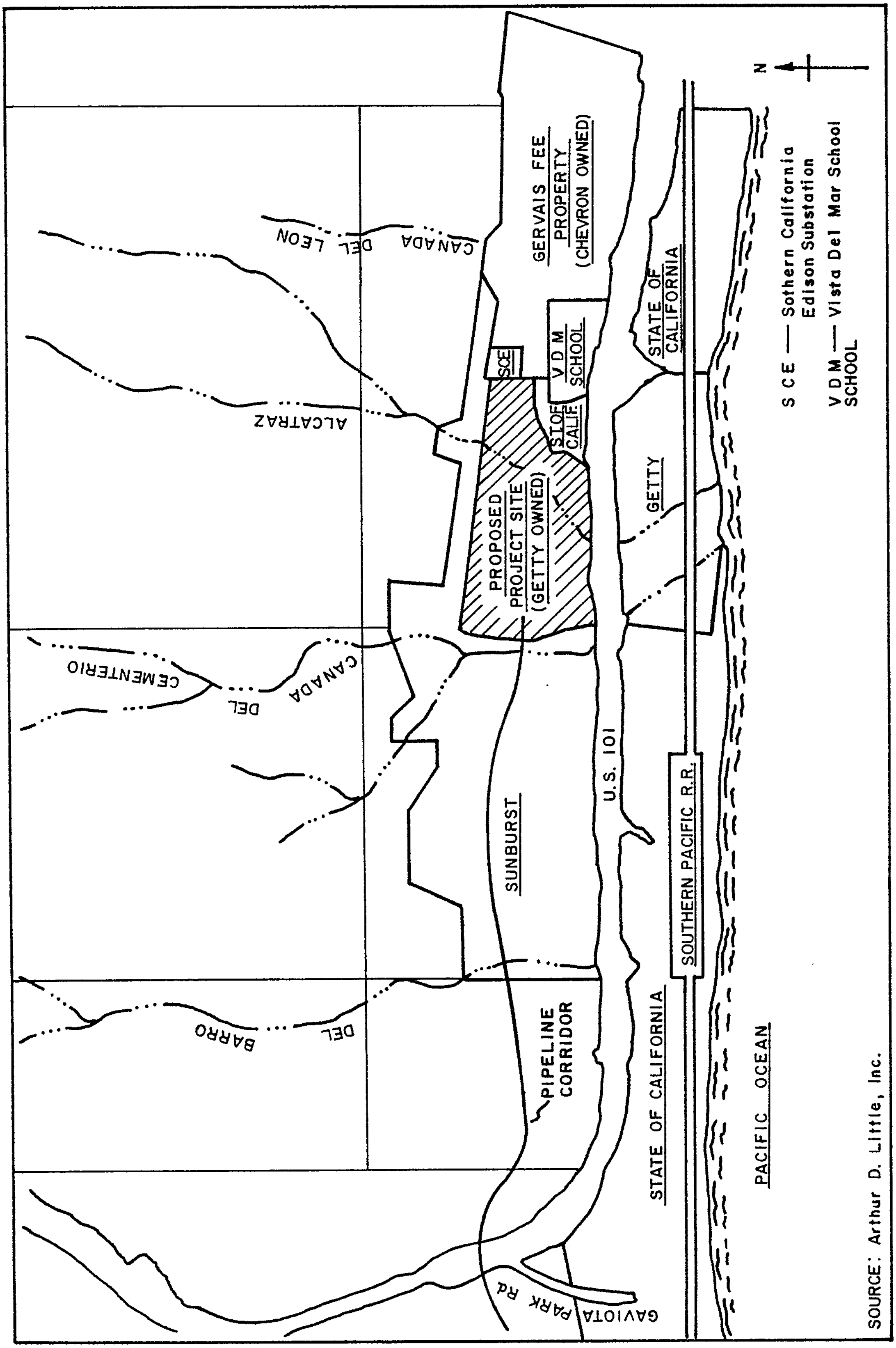


FIGURE 2-4
GAVIOTA PROCESSING FACILITY AREA AND PIPELINE CORRIDOR

The proposed ocean outfall line will extend southward from the water treatment facility, through the Getty marine terminal site and parallel an existing submerged pipeline alignment directly offshore. The submarine line will be sized at 12 inches in diameter and 4800 feet long. The outfall dispersion segment at the terminals of the line will be 12 inches in diameter and 400 feet long. The average diffuser depth will go to 90 feet below the ocean surface. The submarine portion of the outfall line will be installed using the bottom pull/tow technique.

The major energy usage for the onshore construction of the pipelines will be for leveling ditching, welding, backfill, and for material transport. Diesel and gasoline will be the major fuel used for construction.

OPERATION

The operation of the onshore pipeline from the landfall north of Point Conception to the Gaviota processing facilities is as described above for offshore pipelines.

Corrosion inhibitors, pipeline pigs, and instrument pigs will be used to ensure that pipelines remain free of potentially harmful deposits that could affect the integrity of the pipeline and to monitor the condition of the pipe.

2.5 SPECIFIC INTER-PLATFORM PIPELINES DISCUSSION

2.5.1 Hidalgo to Hermosa

The two subsea pipelines from Platform Hidalgo to Platform Hermosa will be used to carry the wet oil emulsion and the produced sour (hydrogen sulfide containing) gas. The length of the oil and gas lines is approximately 4.8 miles. The line profile is a gradual slope from 430-foot water depth at Hidalgo to a 602-foot water depth at Hermosa. The proposed route is shown in Figure 1.2. of the Introduction section.

The oil pipeline from Hidalgo to Hermosa will be a 16-inch line with a design capacity of 100,000 B/D of emulsion. The gas pipeline will be a 10-inch line with a design capacity of 75 MMSCF/D of gas.

Both the pipelines from Platform Hidalgo to Platform Hermosa have excess capacity that could eventually be used to move other platform production to Hermosa via an inter-platform pipeline with Platform Hidalgo. At peak production Hidalgo will produce an estimated 20,000 B/D of wet oil and 10 MMSCF/D of gas. This leaves capacity for at least 80,000 B/D of wet oil and 65 MMSCF/D of gas from other platforms.

Platform Hidalgo is equipped with the necessary risers and/or J-tubes for accomodating production from three other platforms.

The design pressure of the gas line to Platform Hermosa will be 1,480 psig at 100°F and for the oil line, 1,480 psig up to 250°F.

The temperature of the oil in the pipeline is expected to range from 50°F to 125°F. The gas pipeline will have a temperature range of 50°F to 75°F.

The subsea pipelines between Platforms Hidalgo and Hermosa will take an estimated one to two months to install using a work force of about 100 workers. Following installation, mobilization and testing of the line will require approximately one month. Workers will remain offshore on work barges during installation, with helicopter transport of crew to shore supplied as needed.

2.5.2 Harvest to Hermosa

The pipelines between Platform Harvest and Platform Hermosa are estimated to be 3.2 miles long. The wet-oil line will be a 12-inch nominal diameter pipeline designed for a maximum internal working pressure of 1,480 psig at 250°F. The maximum design flow rate for this line is 90,000 barrels of liquid per day, which is well above Platform Harvest's peak production of 46,000 barrels of emulsion per day. This means that even at peak production the pipeline from Platform Harvest to Platform Hermosa could handle up to 44,000 barrels of emulsion per day from other platforms. Platform Harvest has three additional J-tubes that could be used for other inter-platform pipeline hookups.

The gas pipeline will be a nominal 8-inch diameter pipeline designed for a maximum internal working pressure of 1,480 psig at 250°F. The maximum design flow rate capacity of this line will be 50 MMSCF/D. The calculated operating pressure of this pipeline with an anticipated 36 MMSCF/D throughput is 1,000 psig at 110°F. This gas pipeline to Platform Hermosa has at least 14 MMSCF/D excess gas capacity that could also be used by future platforms via an inter-platform pipeline to Platform Harvest.

It is estimated that the subsea pipelines between Platforms Harvest and Hermosa will take approximately seven weeks to complete, using a work force of about 60 workers. Work will be scheduled seven days per week in two 12-hour shifts per day. Work crews will be berthed onboard the barges and work on a two weeks on, one week off basis.

2.6 INDUSTRY PIPELINES

The industry pipelines will be used to move wet oil and gas from Platform Hermosa to the processing/treating facility at Gaviota. These two pipelines will serve as "common carrier" pipelines by moving various platform's production from Hermosa to Gaviota. Both Platforms Hidalgo and Harvest will use these industry lines to move their oil and gas to the Gaviota facility. The design capacity of these industry pipelines is enough to support average peak production from six to nine platforms.

The wet-oil line will have a 24-inch nominal diameter and is sized to handle a peak production rate of 250,000 barrels of wet oil per day. The pipeline will have a maximum working pressure of 1,480 psig at 250°F. Under normal operating conditions the line pressure should not exceed 600 psig, with the oil temperature ranging from 50°F to 150°F.

The gas line will be a 20-inch nominal diameter pipeline designed for handling 120 MMSCF/D of sour gas (gas that contains H_2S). This gas pipeline will be designed for a maximum working pressure of 1,480 psig at 100°F, but during normal operating conditions it should not exceed 1,200 psig and 90°F. Both of these industry lines will be equipped with subsea tie-ins to allow future platforms in OCS and potentially State waters to connect their subsea pipelines to the industry lines going to the Gaviota processing facility.

These industry lines will consist of an offshore and onshore portion. Figure 1.2 in the Introduction shows the offshore route. Platform Hermosa will be equipped with four pairs of risers for subsea pipeline tie-in. These tie-ins will include the necessary valving and piping for receiving pipe scrapers. Three of these risers will be used in the proposed project, leaving one available for future tie-in to another platform. The pipelines will run from Platform Hermosa, approximately 10 miles east to a landfall north of Point Conception. This offshore portion of the industry pipelines will have remotely controlled block valves at both Platform Hermosa and at the Point Conception landfall.

The offshore portion of the industry pipeline will take about four months to complete, using an estimated 100 workers. The work shift for the offshore portion will be 14 days on and seven days off, with two 12-hour shifts per day.

The onshore portion of the industry pipeline will run from a landfall north of Point Conception 16.3 miles to the Gaviota processing facility. As proposed, the pipelines will be installed across the Chevron Gerber Fee property, through the Western LNG, Bixby and Holister Ranch properties. The pipeline route traverses a generally west to east path into Gaviota. These lines will be protected against overpressure by each shipper's pressure relief system located on the platforms. In addition, the gas line will have a pressure relief system at Gaviota. The onshore pipelines will have block valves with remote tie-ins at the Point Conception landfall. These tie-ins could eventually be used for oil and gas production tie-ins, oil heating and pumping, or gas condensate removal.

The installation will require about four months to complete, using about 170 workers, working eight to ten hours per day, and five days per week. The staging areas for construction will be located at Gaviota and Point Conception.

2.7 PROCESSING FACILITIES

The crude oil produced from the Point Arguello field is expected to have an average gravity of approximately 20° API and a relatively high viscosity. The oil, along with the produced gas will be sent via pipelines to the Gaviota Processing facilities where the oil will be treated prior to transportation to refineries and gas will be processed into saleable products. These facilities 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.

2.7.1 Description of Site and Construction Activities

SITE DESCRIPTION

The proposed site of the oil and gas processing facility is near the shoreline of the Pacific Ocean approximately 48 km (30 miles) west of Santa Barbara, California. The site comprises approximately 25 hectares (64 acres) of coastal terrace at the southern edge of the Santa Ynez mountains. The local vicinity of the site is shown in Figure 2.4.

The site is actually comprised of two adjoining parcels. The principal site area is owned by Getty and a portion is leased to Chevron to accommodate their existing gas facilities. The adjoining parcel, known as the Gervais Fee Property is owned by Chevron and is approximately 84 acres in size. Chevron is currently proposing to develop only 5 acres of the Gervais property.

The overall topography on the project site is gently sloping near the highway, rising to relatively steep slopes in the canyons and northernmost portion of the property.

The existing structures onsite include Chevron's gas processing plant, a Southern California Gas Company compression and metering station, a General Telephone switching station, a water well with storage tanks, and a meteorology monitoring station.

The existing gas plant located in the central portion of the project site has been operated by Chevron since 1962 to process its natural gas produced from the Caliente and Gaviota offshore gas fields. The Low Temperature Separation (LTS) section of the plant is capable of handling 30 MMSCF/D. The existing production at the plant is approximately 0.1 MMSCF/D. Gas is compressed and enters the Southern California Gas Company's sales gas line at the project site. No additional sales gas distribution lines will be required to handle the proposed project.

Because of the designated operational characteristics of the existing plant, Chevron will not be able to utilize their existing gas plant on an interim basis until the new plant comes on line. As a result, the existing facilities would be removed and new gas processing facilities will be constructed in modular units.

Figure 2-5 shows the proposed site plan for the oil and gas processing facility. Initially, treating capacity will be installed in 1986 for 60 MMSCF/D of gas and 150 MB/D of oil (Phase I). The site plan is laid out for Phase II operation (in 1988) involving a total capacity for treating 250 MB/D of oil and 120 MMSCF/D of gas.

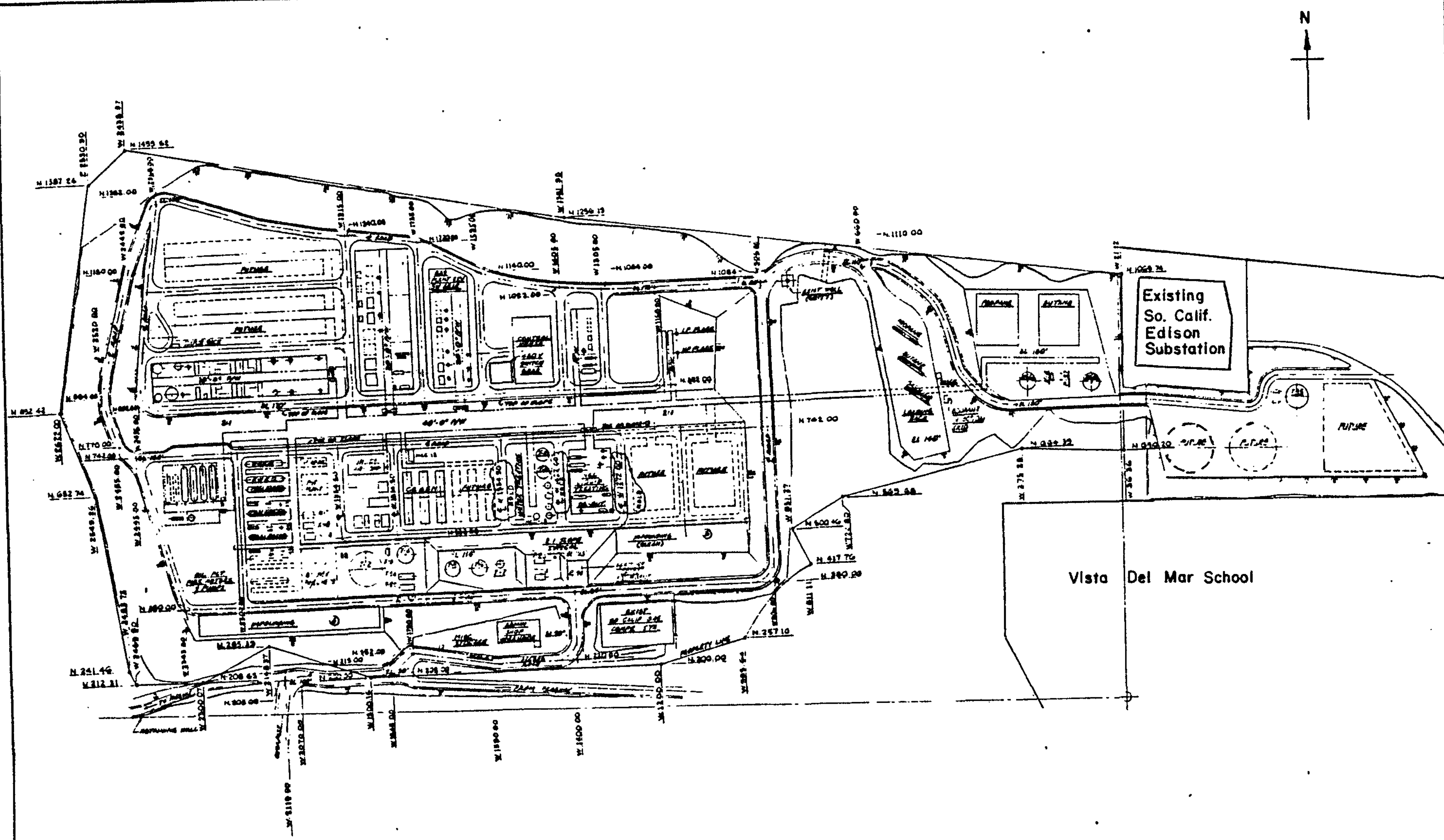


FIGURE 2.5
GAVIOTA PROCESSING FACILITY
SITE PLAN

Source: Chevron U.S.A. Inc.
Dwg. F-10001-A

CONSTRUCTION ACTIVITIES

The oil and gas processing facilities will be constructed concurrently with their support facilities and hence they are discussed together in this section. As previously stated, the facilities will be constructed in two phases:

Phase I: 1985

- Site preparation for both phases.
- Three 50,000-B/D oil processing trains.
- Two 30-MMSCF/D gas processing trains.
- Five cogeneration units.
- Support facilities for both phases.
- Ocean outfall line.
- Highway 101 overpass.

Phase II: 1987

- Two 50,000-B/D oil processing trains.
- One 60-MMSCF/D gas processing train.

The construction phase of the project will include:

- Site Preparation - During this phase the proposed site will have to be prepared to take the processing equipment. A considerable amount of site clearing, leveling, filling, and grading of the land will be required. Chevron has estimated that site preparation will require approximately equal volumes of cut and fill. Any dirt remaining after completion of site preparation work could be stockpiled at Gaviota or sold as fill for other local construction projects. It is currently proposed to construct the facilities on two separate tiers because of the topography of the site. Construction trailers, field offices, temporary storage and construction shops will have to be erected. These temporary structures will be removed when the construction phase of the project is completed.

- Equipment Installation - Most of the process equipment will be built outside Santa Barbara County and shipped via truck or barge to the process site. Both the oil and gas processing plants will be installed using as many preconstructed modules as possible. The equipment modules will then be set in their respective locations and all process piping, utility, electrical, and instrumentation connections made.

- System Commission and Start-up - This is the last phase of construction and involves checking all process equipment for defects and verifying that all equipment is functioning properly.

The construction of the new gas-processing facility will take a maximum of 12 months to complete, with an average of 200 workers on-site.

The oil-processing facility will be constructed concurrently with the gas plant. This facility will take an estimated twelve months to complete with an average of 150 workers on-site.

The construction of the Gaviota oil and gas processing facilities will require an average of 35 truck trips throughout the day to deliver equipment and supplies or haul away debris. Construction worker traffic is estimated to peak at approximately 275 vehicles per day, the majority of which would emanate from the south (i.e., Santa Barbara area). Temporary parking will be provided at the Gaviota site to accommodate construction personnel.

The energy required for constructing the facility, which is expended in the Santa Barbara area, consists of: transportation fuel required for personnel; materials and equipment to and from the site; fuel for operation of the earth moving equipment required for site preparation; and fuel requirements for operation of cranes, welding machines, air compressors, and other portable equipment used in constructing processing facilities. The applicant has not prepared an estimate for the energy requirements for construction. Arthur D. Little, Inc. has estimated the energy requirement for constructing the Gaviota processing facilities as summarized in Table 2.11.

The major emissions produced during the construction of the processing facilities at Gaviota result from the operation of mobile sources, welding machines, cranes, and earth moving equipment, along with the fugitive dust produced during the site preparation phase of the project. The applicant has estimated the emissions from mobile sources during construction and fugitive dust. Appropriate measures will be taken to safeguard adjacent inhabited areas from excessive dust in those instances where it will be necessary. This will be done by periodically applying water through the construction area. The construction emissions are shown in Tables 2.12 and 2.13.

2.7.2 Oil Processing Facilities

PURPOSE OF OIL PROCESSING FACILITIES

The primary function of the oil processing facility is to remove free and emulsified water, and suspended solids from the crude oil stream, thus rendering it acceptable for transportation to a refinery. The facility will also have the capability to reduce the hydrogen sulfide (H_2S) content in the treated crude oil to 20 ppm or less, treat the separated brine (produced water) to make it suitable for ocean disposal, and provide crude oil storage and pumping facilities.

The facilities required to process the oil prior to final shipment to refineries are shown schematically in Figure 2.6 and include:

- Industry wet oil pipeline (from the platforms) receiving system with positive-displacement flow meters for monitoring the flow of oil into the processing facility.

TABLE 2.11

ONSHORE CONSTRUCTION ENERGY USE - GAVIOTA PROCESSING FACILITY
Phase I

Activity	Estimated Construction Duration (Days)	Average Daily Fuel Use Gallons/Day	Total Fuel Use Gallons
Site Preparation:			
Worker Transportation	30-60	116	5,220
Truck Operation	30-60	30	1,350
Construction Equipment Operation	30-60	510	22,950
Oil Processing & Support Facilities:			
Worker Transportation	240	290	69,600
Truck Operation	240	240	57,600
Construction Equipment Operation	240	233	55,920
Gas Processing Facility:			
Worker Transportation	365	770	281,050
Truck Operation	365	240	87,600
Construction Equipment Operation	365	238	86,870
TOTAL			668,160 gal. at 130,000 Btu/gal This contains 0.09x1012 Btu

TABLE 2.12

ONSHORE CONSTRUCTION EMISSIONS SUMMARY
GAVIOTA SITE PREPARATION, OIL PROCESSING AND SUPPORT FACILITIES
Phase I

Activity	Estimated Construction Duration (Days)	Average Daily Emissions (lbs/day)				
		CO	VOC	NO_x	SO_2	TSP
Employee Transportation						
Site Preparation	30-60	62.4	6.6	12.4	0.6	1.8
Construction[a]	240	156.1	16.5	31.1	1.7	4.5
Supply Truck	240	8.6	1.4	13.6	1.8	1.2
Construction Equipment						
Site Preparation	30-60	76.0	23.0	328.0	21.0	25.0
Construction	240	35.0	11.0	150.0	9.0	11.0
Fugitive Emissions	30-60	0.0	0.0	0.0	0.0	23.5

Source: Chevron USA Inc. letter to Mr. R. T. Smith, Santa Barbara County, dated November 28, 1983, Table F-8.

[a]Employee transportation modified to reflect increase of construction workers from 70 to 75 as indicated in Chevron's comments to ADL Project Description draft.

TABLE 2.13

ONSHORE CONSTRUCTION EMISSIONS SUMMARY
GAVIOTA GAS PROCESSING FACILITY
Phase I

Activity	Estimated Construction Duration (Days)	Average Daily Emissions (lbs/day)				
		CO	VOC	NO_x	SO_2	TSP
Employee Transportation[a]	365	416.6	44.0	82.8	4.6	12.0
Supply Trucks	365	8.6	1.4	13.6	1.8	1.2
Construction Equipment	365	35.0	11.0	153.0	12.0	9.0
Total (lbs/day)		460.2	56.4	249.4	18.4	22.2

Source: Chevron USA Inc. letter to Mr. R. T. Smith, Santa Barbara County, dated November 28, 1983, Table F-9.

[a]Employee transportation modified to reflect increase of construction workers from 70 to 200 as indicated in Chevron's comments to ADL Project Description draft.

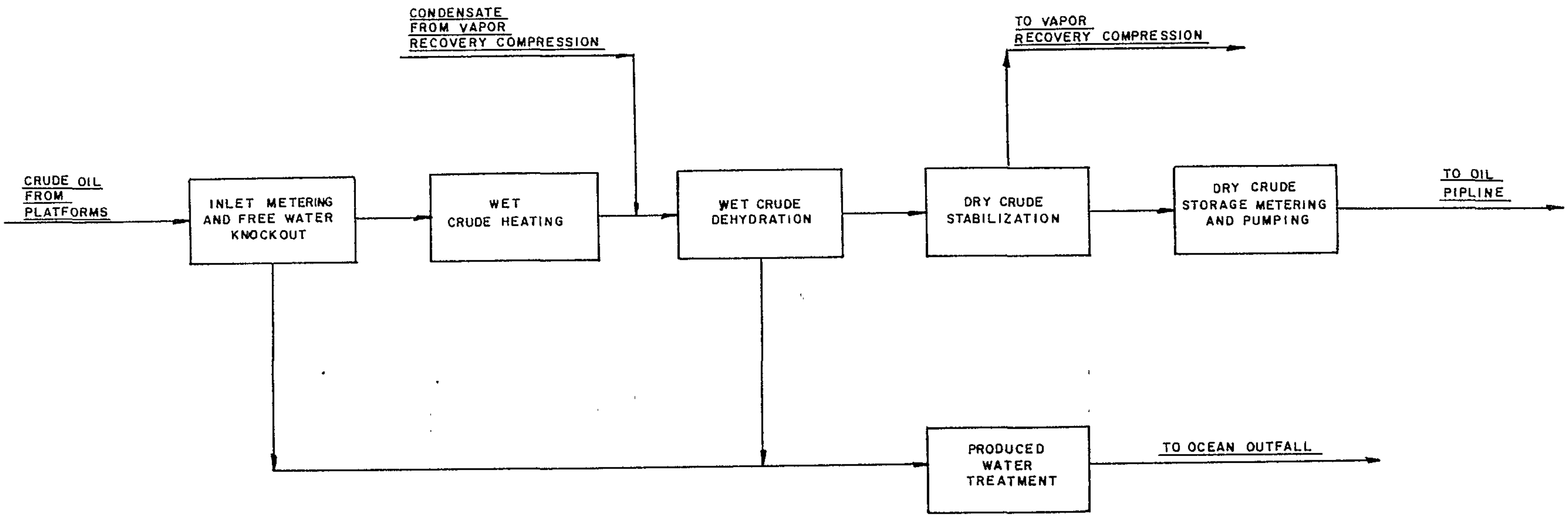


FIGURE 2.6
BLOCKFLOW DIAGRAM OF PROPOSED
GAVIOTA OIL PROCESSING FACILITY

- Free-water knockout vessels used to remove nonemulsified water.

- Wet-crude oil heaters that use heat exchangers and steam produced by the cogeneration facility to heat the crude oil.

- Crude-oil dehydration vessels used for breaking the remaining oil/water emulsions.

- Crude stabilizers used to remove most of the H_2S and light ends from the crude oil.

- Dry-crude oil storage, metering, and pumping.

- Reject-crude oil storage tanks for crude oil that does not meet the required dry-crude specifications (less than 1 percent water).

- Outfall line to dispose of treated, separated produced water.

OPERATIONAL ACTIVITIES

During normal operation the crude oil emulsion and free water will enter the Gaviota facility from the onshore pipeline and will pass through an inlet metering station. The volume of crude reaching Gaviota will be metered and continuously compared to the offshore shipping meters. Differences exceeding preset limits will result in alarms and/or automatic shut-in of offshore facilities as warranted. Emulsion leaving the meter station enters a free water knockout (FWKO) vessel where free-water that has settled out will be removed and routed to the produced-water treatment plant. The oil will then go to the oil dehydration system, where water will be removed from the oil emulsion using a combination of heat, settling time, emulsion-breaking chemicals, and an electrostatic field. The oil is then stabilized in a 20-tray column using sweet gas as a stripping medium to reduce the amount of hydrogen sulfide contain. The stabilizer is designed to reduce the hydrogen sulfide in the crude oil to 20 ppm.

Dehydrated oil will leave the dehydration unit with a water content of less than 1 percent. Any crude with a higher water content will be sent to the reject tank to be reprocessed.

The produced-water treatment system is designed to remove the oil and solids from the produced water and other oily-water streams to such a degree that the water is suitable for ocean discharge through the outfall pipeline. The system includes a 5,000-barrel dirty-water tank, and two 77,000-B/D gas flotation unit to separate any residual oil from the produced water.

After treatment, the produced water will be monitored for water quality, routed to the treated-water surge storage tank and then pumped to the ocean outfall line. If, for any reason, the required water quality, as determined by reference to the Regional Water Quality Control Board Standards, is not achieved, the produced water will be recycled back to the dirty-water tank for further treatment.

Sweet gas will be provided from the gas-treating facility to be used as blanket gas for all atmospheric tanks such as the flotation units, coalescer, and storage tanks. Gas from the crude stabilizers and excess gas from the vapor blanketing system will be compressed and sent to the gas treating facilities.

The major consumers of energy in the oil processing facility include:

- Crude oil charge and shipping pumps,
- Stabilizer overhead and vapor recovery compressors,
- Miscellaneous pumps,
- Fans for air coolers, and
- Steam for heating the crude oil prior to dehydration.

The electrical and steam requirements for the oil processing facility will be supplied from the support facilities and are reported in Section 2.7.4.

Emissions from the operation of the oil processing system will include fugitive emissions from leaking valve stems, flanges, packing glands, mechanical seals, relief valves, etc. The major effluents will include produced water from the water knockout vessels and the crude oil dehydration system. Solid wastes include oil residue from the storage tank bottoms and general refuse. The emissions and effluents from the oil processing facility are reported in Section 2.7.7.

The safety systems and environmental control systems for the oil processing facilities are closely integrated with those of the gas processing facilities and the support facilities. A discussion of these systems for the entire processing facility is presented in Section 2.7.5.

2.7.3 Gas Processing Facilities

PURPOSE OF FACILITY

The primary function of the gas processing facililties is to remove the hydrogen sulfide, NGL's and LPG's from the gas so that it is acceptable for injection into a gas pipeline network. The hydrogen sulfide removed from the gas will be converted to elemental sulfur and then sold. All the LPG's and NGL's wil be treated, sent to interim storage tanks, and then trucked to their final destination.

The facilities that are required to process the sour gas and prepare it for injection into the natural gas pipeline network are shown in Figure 2.7 and include:

- NGL's condensate knockout vessels for removing condensate from the gas stream,

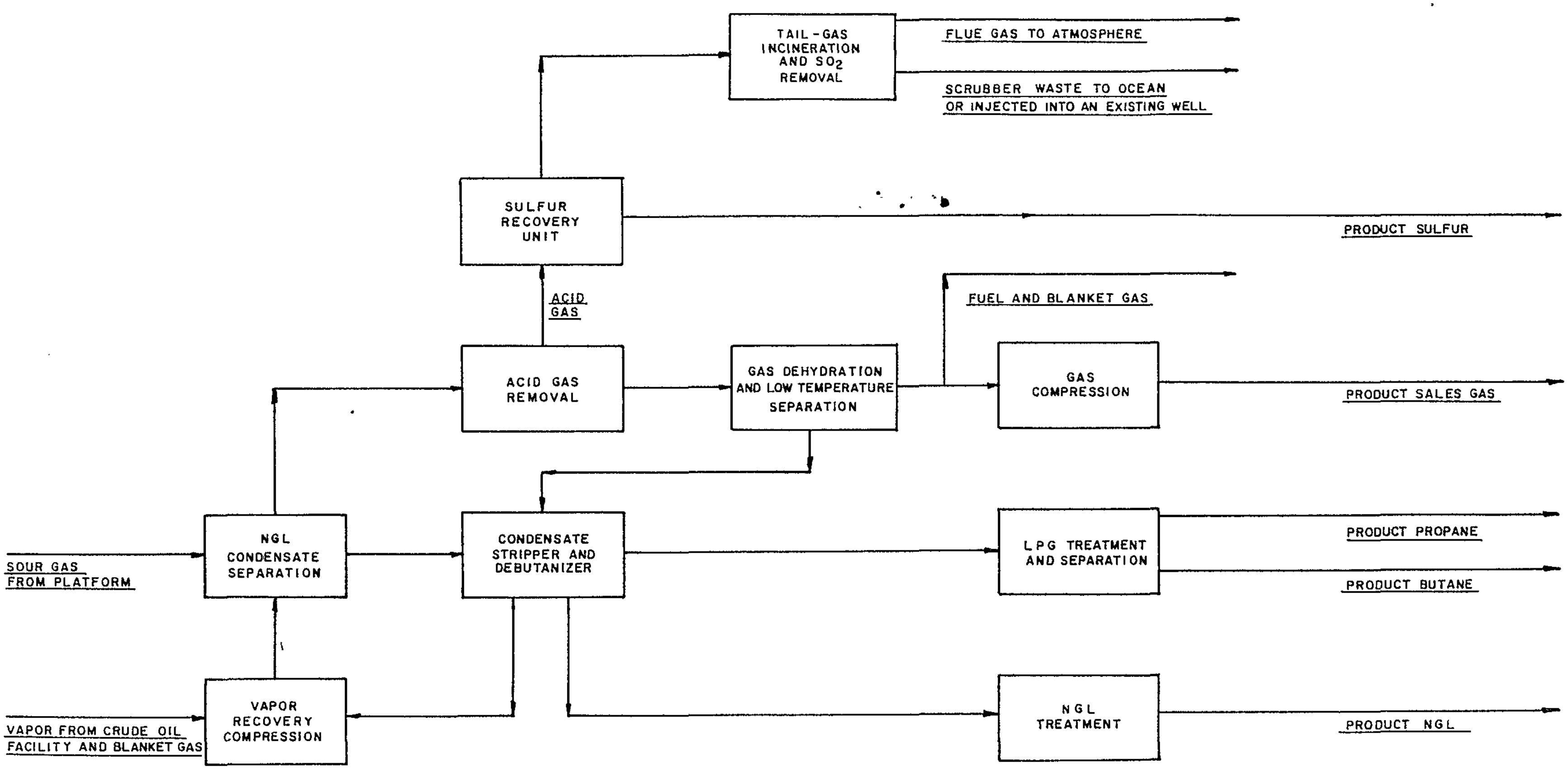


FIGURE 2.7
BLOCKFLOW DIAGRAM OF PROPOSED GAVIOTA GAS PROCESSING FACILITY

- An amine based scrubbing system for removing the H_2S and CO_2 from the gas,
- A glycol dehydration system,
- A low-temperature separation system for removing the NGL's and LPG's 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 NGL's and LPG's, and
- Storage tanks and truck loading facilities for the NGL's and LPG's as well as a storage pit for the produced sulfur.

All tanks in the processing facility which may contain hydrocarbon or H_2S vapors are equipped with a vapor recovery system which substantially reduces the hydrocarbon vapor emissions from the facility. This vapor recovery system also provides a constant vapor blanket over the vessels and thus prevents air from entering the process.

OPERATIONAL ACTIVITIES

Upon entering the facility from the pipeline, the gas stream will pass through an inlet separator or 'slug catcher' which removes any condensed hydrocarbons. These collected hydrocarbons will then be sent to the condensate stripper. Gas from the slug catcher will be sent to the acid-gas removal unit for sweetening. The gas line between the platforms and Gaviota will have to be pigged (cleaned) frequently to remove excess liquid accumulation.

In the acid-gas removal system, both the H_2S and CO_2 will 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 is regenerated and recycled, thereby liberating acid gas which will be processed further in the sulfur recovery facilities. The H_2S content of the sweet gas will have been reduced to about 3-4 ppm as a result of this sweetening process.

The acid gas will be sent to a proprietary sulfur recovery unit (Selectox) where H_2S will be converted to elemental sulfur. The recovery unit will remove approximately 95 percent of the inlet H_2S as sulfur. The remaining acid gas is called tail gas. It is anticipated that approximately 40 tons of sulfur will be generated daily at peak production. The recovered sulfur will be stored as liquid in a sump and then, after degassing, sent to the truck terminal for transport to area markets.

The sulfur plant tail gas and other sulfur containing vent gases will enter the tail-gas incinerator where H_2S is converted to SO_2 and waste heat is recovered as steam. The SO_2 is removed in a caustic scrubbing tower. Vent gas from the scrubber unit will be vented to the atmosphere, whereas the remaining liquids, called scrubbing liquor, will be treated and discharged through the ocean outfall or, as an option, injected into an existing well.

Once the gas has been sweetened, it will be sent to a low-temperature separation unit where it will be dried by direct contact with ethylene glycol, and cooled by a propane refrigeration system which causes the heavier hydrocarbons (propane and heavier) contained in the gas to condense. The ethylene glycol is regenerated and reused. The liquid hydrocarbons will be sent to fractionation towers where they will be separated into propane, butanes, and the heavier natural gas liquids (NGL). The NGL's will be treated in a proprietary unit (Merox) and in caustic treating units to remove residual sulfur compounds. The propane and butanes will be treated by amine and caustic to remove residual sulfur compounds, the propane dried, and both sent to storage. The separated hydrocarbon liquids will be delivered by tank trucks to vendors.

The natural gas from the low-temperature separation unit will be compressed into the gas transmission line. A portion of this sweet gas will be used for fuel in the cogeneration facilities and direct-fired heaters.

The major consumers of electrical energy in the gas processing system include:

- Propane refrigeration compressors,
- Vapor recovery and gas booster compressors,
- Fans for air coolers,
- Air blowers for the sulfur plants and waste incinerators, and
- 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 is produced in the sulfur plants and incinerators. Fuel gas is required for operation of the sulfur plant and for the incinerators. All the energy requirements for the gas-processing facility are supplied from the support facilities and are listed in Section 2.7.6.

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.;

- Periodic releases during changing filter cartridges, charcoal beds, resin beds, and scrapper trap operations; and

- Stack gas emissions from the gas-fired heaters in the sulfur plant.

The liquid effluents from the gas-processing system include sour water, sulfur plant tail-gas scrubber discharges, and spent caustic from the NGL and LPG treating system. The emissions and effluents are reported in Section 2.7.7.

The safety systems and environmental control systems for the gas-processing facility are discussed in Section 2.7.5.

2.7.4 Support Facilities

The function of the support facilities is to provide the utilities, treatment systems and infrastructure required for the efficient and environmentally acceptable operation of the oil and gas processing facilities.

The major facilities to be included in the support facilities are:

- Electrical cogeneration units with heat recovery steam boilers, and a boiler feedwater system,

- Fresh water system,

- Waste water treatment, sewage disposal, site runoff, and impounding basins

- Fire water and fire protection systems,

- Vent and flare systems,

- Instrument and plant air systems,

- Utility distribution systems, and

- Highway 101 overpass.

COGENERATION SYSTEM

The electrical power and steam requirements for the facility will be provided by a cogeneration system that uses gas turbine-driven generators. Waste heat will be recovered from the turbine exhaust and supplemented by natural gas firing for steam generation. The majority of the heating requirements for the facility are supplied by steam. The facility will have five cogeneration units rated at 3.4 MW each. Each of these units is designed to recover 20 MMBtu/hr of waste heat as steam. The facilities electrical system will be tied into the local Southern California Edison (SCE) power grid. This will allow the facility to draw extra power from the grid if needed, or to sell excess power generated by the cogeneration facility.

Produced gas will be the primary fuel source for electric power generation and waste heat steam boilers and fired heaters. When the produced gas is not available, natural gas will be purchased from the local gas company.

The boiler feedwater system is a recyclable water supply system that utilizes freshwater for start-up and makeup requirements. The treatment system includes filters, storage tanks, and a two-stage deionizer process for treating the boiler feedwater. The boiler feedwater treatment wastes will be sent to the ocean outfall for disposal.

FRESH WATER SYSTEM

Fresh water requirements for the facility are divided into two components: (1) potable water and (2) other fresh water utilized in the operation of the facility. Approximately 100,000 to 380,000 gallons/day of water will be used daily for facility needs. A breakdown of the daily facility make-up water requirements are given in Table 2.14.

TABLE 2.14

DAILY FACILITY MAKE-UP WATER REQUIREMENTS AT PEAK PRODUCTION
(gpm)

	Mininum	Maximum
Blowdown	10	40
Turbine Injection for NO_x Control	5	16
Water Treatment Usage	10	12
Potable (includes safety showers)[a]	5	60
SO_2 Scrubber Liquor Makeup	24	35
Utility (steam hose, etc.)[a]	0	50
Steam Condensate Losses	15	50
Totals	69	263

Source: Chevron, USA letter to Joint Review Panel dated May 2, 1984.
[a] Intermittent use only.

Note that project plans currently include recycling some of the boiler blowdown water for treatment and reuse. Chevron proposes to drill one to four groundwater wells to supply fresh water requirements for the facility. These wells are proposed to be located at Chevron's Gervais Fee property in the drainage of Canada de Leon. The well depths are estimated to be 457m (1,500 ft).

WASTE WATER TREATMENT

The waste water treatment equipment is designed to remove the oil and solids from the water to such a degree that the water is suitable for ocean discharge through the outfall pipeline. The waste water treatment system will include:

- A 5,000-barrel dirty-water tank to process produced water;
- Two 77,000-B/D flotation units to separate the residual oil from the produced water and other oily water streams. These flotation units will be equipped with a surface skimmer for removing the residual oil.
- Impounding basins for water runoff with corrugated plate intercepters for removing oil contamination.
- A 3,000-barrel clean water tank for produced water that is suitable for ocean discharge.

Sewage is planned to be treated and disposed of through a sewage treatment plant which is to be constructed on the project site. During construction, portable chemical toilets will be temporarily placed onsite.

Water runoff will be controlled and collected and, if necessary, treated to comply with or exceed applicable federal, state, and local environmental regulations. The essential design strategy is to emphasize reducing the polluting source to minimize the need for cleaning up the discharged water. The drainage system has been designed to handle the 100-year storm.

FIRE WATER AND FIRE PROTECTION SYSTEM

Immediate response fire protection will be furnished primarily by onsite personnel along with the local fire protection agencies providing assistance. The site will be equipped with a fresh-water fire protection system.

The water used for fire protection will be stored in a 12,000-barrel storage tank located on the eastern portion of the site. Two 2,000-gpm pumps will be capable of supplying water at 150 psig to the fire water mains around the facility. One pump will be electrically driven and the other will be a diesel-driven, standby pump. The main fire water pipeline system will consist of one 12-inch line from the fire water pumps and 8- to 10-inch loops around and through the site, thus providing a partially redundant system in case part of the line is damaged. Branch lines coming off the main lines, to provide complete hydrant and hose coverage of the site, will be 6 to 8 inches in diameter. Monitors and hydrants will be positioned strategically to provide complete coverage, with hydrant and monitor spacing as required by the fire code and fire department. The fire water pipeline system will be pressurized at all times.

VENT AND FLARE SYSTEMS

All vessels and tanks will be equipped with emergency overpressure relieving devices in the event that the vapor recovery system can not handle the pressure. Tank safety valves will vent to a low-pressure knockout drum and then to an elevated flare, while pressure vessel safety valves will relieve to a common high-pressure knockout drum and then to flare. Liquids from the knockout drums will be pumped to the dirty oil tank. Relieved gas will be burned by flares equipped with a pilot light system. Pilot gas will be sweet.

INSTRUMENT AND PLANT AIR SYSTEMS

Three air compressors will be provided to supply the processing facility with utility/plant air, and instrument air for operation of the instruments and controls. The instrument air will be dried prior to its distribution around the facility.

UTILITY DISTRIBUTION SYSTEM

A Utility Distribution System will be incorporated into the facilities to allow for the distribution of air, fuel, steam, electrical power, water, and condensate to each of the processing units. Most of these distribution systems will run overhead on piping and distribution racks.

HIGHWAY 101 OVERPASS

An overcrossing will be constructed over Highway 101 to provide ingress and egress to the plant site for vehicular traffic.

Located near the southwestern edge of Chevron's site, the overpass would service both sides of the highway. New on- and off-ramps and a frontage road would be constructed, and the at-grade intersections accessing the existing Getty facility, Chevron facility, and Vista del Mar School would be removed. Access for adjacent property owners would be provided by a frontage road connecting to the overpass. Final design of the frontage reoad/off-ramp location for Chevron's proposed facility is not yet available.

2.7.5 Processing Facilities Safety and Environmental Control Systems

The processing facilities will be designed using the appropriate codes, standards, and specifications required for safe and environmentally acceptable operations. All operations will be monitored and controlled from a centrally located control building. Critical process parameters will be continuously monitored. Alarms will be activated when abnormal conditions occur.

Combustible gas and hydrogen sulfide monitors will be located in areas where gas-handling equipment is installed. Abnormal levels of either gas will cause an alarm to sound in the control room and automatically shut down equipment as appropriate.

Continuous-monitoring fire sensors will be placed in appropriate sections of the facility. Fire detection will result in an alarm in the control room and, in critical areas, activation of automatic fire extinguishing equipment. Certain alarms will result in partial or total shutdown of facility equipment. In most cases, an alarm will precede a shutdown action giving an operator time to correct the condition.

Emergency shutdown of the facility or of individual operating areas will be provided. The shutdown system will be activated by:

- Manual shutdown stations,
- Seismic activity over the design criteria,
- Total power failure, and
- Certain emergency shutdown controls throughout the system.

This emergency shutdown system will be controlled through a series of programmable controllers powered by an uninterruptible power supply which is independent of the plant-wide power system.

In addition to the fire water system described in Section 2.2.4, the facility will have portable fire extinguishers, fire blankets, and hose carts throughout the facility. Proper grading and remote impounding will be used to control the flow of leaking materials from storage tanks and equipment.

A spill prevention control and countermeasures plan, an emergency response plan, and a hydrogen sulfide contingency plan will be prepared to cover the operations at the processing facilities. These plans will be prepared after the final process designs are complete.

The environmental protection measures and energy conservation measures which the applicant is proposing for the Gaviota processing facility include:

- A vapor recovery system for all tanks and vessels to minimize the amount of hydrocarbon released to the atmosphere and/or the amount of hydrocarbons burned in the flare,

- A treating system to remove oil from the produced-water stream to a level acceptable for ocean discharge along with continuous monitoring of this produced-water stream,

- Strict monitoring to minimize fugitive emissions (Federal NSPS),

- The use of heat exchangers and steam produced from the cogeneration system to heat the crude oil prior to dehydration in order to minimize energy usage,

- The use of low-NO_x -forming burners for fluid heaters,

- The use of water injection in the gas turbines to reduce NO_x emissions, and

- The use of incinerators and scrubbers on the sulfur plant tail gas to minimize SO_2 emissions.

2.7.6 Processing Facility Energy Requirements

The major primary energy users in the Gaviota Processing Facility include:

- Gas turbine fuel for electrical generation;

- Auxiliary gas firing for steam generation in the cogeneration units;

- Gas firing of the hot oil heaters in the sulfur plants; and

- Flare pilot burner.

The natural gas required for these users will be supplied from the sweet treated natural gas produced in the facility.

Chevron has supplied data in their application which allows the energy requirements for operating the processing facility to be calculated from facility start-up to the year 2000. These data are based on the facility processing the crude oil, gas condensate and natural gas from the three platforms (Hermosa, Hidalgo, and Harvest) for which applications have been received as well as production from other unspecified platforms in order to operate the processing facility at its design capacity. The total estimated quantities of hydrocarbons processed at Gaviota between 1986 and 2000 and their energy content are shown in Table 2.15.

The energy required to transport personnel and materials used for operating the processing facility for 15 years is shown in Table 2.16.

For the processing of the hydrocarbons listed in Table 2.15, the operating energy requirements are estimated to be 35.85×10^{12} Btu and are detailed in Table 2.17. Adding the energy required for transportation during 15 years and the energy required to construct the facility, the total energy consumed is 36.73×10^{12} Btu. This is 1.1 percent of the total energy projected to be processed by the facility in the first 15 years of its operation.

2.7.7 Processing Facility's Emissions and Effluents

AIR EMISSIONS

There are two sources of air emissions produced by the processing facilities: those generated within the facility itself and the mobile sources required for employee transport to and from the facility and truck transport for moving byproducts and waste materials from the facility.

TABLE 2.15

TOTAL ESTIMATED HYDROCARBONS TO BE PROCESSED AT THE GAVIOTA FACILITY

YEAR	CRUDE OIL IN B/D	GAS CONDENSATE IN B/D	GAS IN MM SCFD
1986	43,011	121	17.7
1987	103,541	171	46.2
1988	150,859	282	85.3
1989	165,749	236	109.1
1990	170,630	193	116.8
1991	150,957	179	119.6
1992	134,451	168	114.1
1993	117,398	157	101.1
1994	103,255	146	89.8
1995	91,556	136	79.5
1996a	79,533	127	71.6
1997a	67,510	121	63.7
1998a	55,487	112	55.9
1999a	43,464	103	47.1
2000	31,441	93	40.1
	1,338,212	2,347	1,157.6
	x 365	x 365	x 365
	488.45 MM bl	0.86 MM bl	422.5 M MMSCF
	@ 6.1 MM Btu/bl[b]	@ 5 MM Btu/bl[b]	@ 1,209.2 Btu/SCF[b]
	2979.5 x 10^{12}Btu	4.3 x 10^{12}Btu	510.9 x 10^{12}Btu

Total Produced Energy to 2000= 3,494.7 x 10^{12}Btu

Source: Crude Oil & Gas condensate from Chevron Application, Vol. 3, Table 2.3-3
Gas from Chevron USA, Inc. letter to Mr. R. T. Smith, Santa Barbara County, dated Nov. 28, 1983, Table F-15.

[a]Crude Oil & Gas Condensate for 1996 to 1999 estimated by Arthur D. Little, Inc.
[b]heating values estimated on a higher heating value basis. The gas heating value is based on estimated composition in 1990.

TABLE 2.16

TRANSPORTATION ENERGY REQUIREMENTS - GAVIOTA PROCESSING FACILITY
15-Year Operation

Worker Transportation:	
100 workers (avg) x 108 miles x 365 days x 15 years=	59×10^6 miles
at 20 miles per gallon and 119,000 Btu per gallon	
$\frac{59 \times 10}{20 \text{ MPG}} \times 119{,}000=$	0.35×10^{12} Btu
Truck Transport:	
NGL's, propane, butane and sulfur deliver to Los Angeles 250 miles round trip	
At Peak Capacity:	
54 trucks per day x 250 miles x 365 days x 15 years=	73.9×10^6 miles
General Refuse, Tank Bottoms and Spent Caustic Trucking for 15 years add about	0.1×10^6 miles
Total Trucking at Peak Capacity	74.0×10^6 miles
Peak Capacity throughput is 170,630 B/D	
Average Capacity for 15 years is 89,210 B/D	
Processing Facility Operating Rate is $\frac{89{,}210}{170{,}630} = 0.52$	
Average Amount of Trucking is Directly Related to Facility Operating Rate	
At Average Capacity:	
Average Trucking miles is $0.52 \times 74 \times 10^6=$	38.5×10^6 miles
Trucking Energy Requirements $\frac{38.5 \times 10}{10 \text{ MPG}} \times 119{,}000=$	0.46×10^{12} Btu
Total Transportation Energy for 15 years=	0.81×10^{12} Btu

TABLE 2.17

ENERGY REQUIREMENTS FOR OPERATING THE GAVIOTA PROCESSING FACILITY
(1986 thru 2000)

Gas Turbine fuel:	
42 unit years x 8670 hours per year x 3,400 Kw per unit x 12,671 Btu per Kwh =	16.2×10^{12} Btu
Auxiliary Gas Firing:	
2,146 x 10^6 Btu per hour total x 8,760 hours per year=	18.8×10^{12} Btu
Hot Oil Heater:	
8.5 x 10^6 Btu per hour x 8,760 hours per year x 15 years x 0.52 operating factor=	0.58×10^{12} Btu
Flare Pilot:	
31.0 x 10^6 Btu per day x 365 x 15 years=	0.17×10^{12} Btu
Total Gaviota Processing Facility Requirements=	35.75×10^{12} Btu
Add Energy for Transportation	0.81×10^{12} Btu
Add Energy for Construction	0.07×10^{12} Btu
Total Energy Consumption	36.73×10^{12} Btu
Total Energy Processed	$3,494.7 \times 10^{12}$ Btu

Energy Consumption is 1.1 percent of Energy Processed

Sources: Chevron USA, Inc. graph for Gaviota cogenerator, heat and power dated February 6, 1984, and letter to Joint Review Panel dated May 2, 1984.

Notes: 1) A unit year is the operation of one 3.400 kw unit for one-year at design capacity.

2) An operating factor is the ratio of the average of the 15-year plant capacity to the design plant capacity.

3) Assume no electrical power sold to the power grid.

The processing facilities' annual emissions are shown in Table 2.18. The emissions were calculated by Chevron for each year between 1986 and 2000 based on the production estimate presented in Table 2.15. Added to Chevron's estimates are the fugitive emissions estimated by Chevron for tank truck loading amounting to 2.7 tons per year of total hydrocarbons. Also added to the emissions are those produced by flaring gas during plant start-up. After plant commissioning is complete, this is expected to occur once every two years and last for 14 days. Chevron has estimated these flaring emissions to average 7.3 tons per year of CO, 1.3 tons per year of THC, 1.3 tons per year of NO_x, 0.2 ton per year of SO_2, and 0.4 ton per year of TSP. The daily emissions from the emergency flaring for a period of 14 days every two years will be one/seventh that of the annual average emissions as stated above.

TABLE 2.18

GAVIOTA GAS, OIL AND SUPPORT PROCESSING FACILITIES ANNUAL EMISSIONS
(Tons Per Year)

YEAR	CO	RHC	NO_x	SO_2	TSP
1986	27	22	55	6	5
1987	44	20	89	10	9
1988	78	36	161	19	16
1989	171.1	111.3	290.2	31.9	15.1
1990	177.5	123.1	306.8	34.0	16.1
1991*	148	69	304	35	30

* Assume throughput will remain at same rate beyond 1991.

Source: Emissions based on Chevron application along with additional information. For details see Appendix F, Section 4.3 and Table 4.3.1.

The mobile emissions required for the operation of the Gaviota processing facilities are reported in Table 2.19. The automobile emissions are based on 100 people on the average going to the Gaviota facility with 10 percent of them sharing rides. The round-trip distance is 120 miles.

The maximum truck emissions from moving sulfur, NGLs, propane, and butane to market and removing general refuse and spent caustic from the facility in 1990 have been estimated by Chevron and are shown in Table 2.19. The average truck emissions were estimated based on the 15-year average of production in the facility being 52 percent of the peak production capacity; hence, the number of truck trips will be decreased to 52 percent of those in the peak year.

The emissions for tank bottom waste transportation will occur for 28 days every 3 years and are as estimated by Chevron.

EFFLUENTS

The effluents from the processing facilities will be combined and disposed of in an ocean outfall line. Tables 2.20 and 2.21 present the applicant's estimate of the quantity and composition of this waste water stream. It should be noted that the steam generator blowdown flow is estimated to have 25,000 mg/L of dissolved solids. The composition of these solids will depend on the composition of the boiler feed water to the boiler system and the boiler feed-water treatment chemicals which are added to the boiler system. This blowdown stream is a result of controlling the solids concentration in the steam drum of the boiler.

Table 2.22 shows the estimated liquid and solid wastes from the Gaviota processing facility which will be disposed of offsite. Hazardous wastes would be transported to Casimalia, and general refuse to Tajiguas.

2.8 PROPOSED PROJECT SCHEDULE

The following describes the schedules for the applicant proposed projects. The installation and operating schedule for each component of the "Point Arguello Project" is given in Figure 2.8.

2.8.1 Construction Activities

The first platform installed will be Platform Hermosa. Installation and hookup is scheduled for May 1985 and should take about six months to complete. Drilling is scheduled to begin in late 1985 with production starting in the first quarter of 1986.

Platform Harvest will begin installation/hookup in approximately June 1985. Drilling is slated to begin in January of 1986, with production starting some time in the first quarter of 1986.

The third platform to be installed will be Platform Hidalgo. Installation/hookup should start around May 1986, with production slated for the first quarter of 1987.

The subsea pipelines will all be installed concurrently with their respective platforms. The Point Conception to Gaviota portion of the industry line will be installed along with the Gaviota processing facility.

Phase I of the Gaviota Processing Facility will begin construction in the first quarter of 1985 and take about 12-14 months to complete. Phase II construction is slated to begin in mid-1987 and will take 9-12 months to complete.

TABLE 2.19

GAVIOTA PROCESSING FACILITIES MOBILE SOURCE EMISSIONS

Automobile Emissions:

Based on 100 people on the average come to Gaviota with 10 percent sharing rides. Round trip distance is 120 miles.

	EMISSIONS IN POUNDS PER DAY				
	CO	THC	NO_x	TSP	SO_2
Automobile Emissions	289.0	30.6	57.8	8.3	3.1
Average Truck Emissions (1986-2000)	70.0	9.9	95.1	11.4	16.3
Maximum Truck Emissions (in 1990)	134.6	19.1	182.8	22.0	31.4
Tank Bottom Waste Truck Emissions (for 28 days every 3 years)	9.8	1.4	13.3	1.6	2.3

Source: Chevron USA, Inc. letter to Mr. R. T. Smith, Santa Barbara County dated November 28, 1983. Comment 27.

Chevron USA, Inc. application to Santa Barbara County, Vol. 3, pp 2-45.

TABLE 2.20

POINT ARGUELLO 1986 MINIMUM WASTE WATER TO GAVIOTA OCEAN OUTFALL

	WATER SOURCE				
COMPONENT	Produced Water (mg/l)	Stm.Gen. Blowdown[1] (mg/l)	Gas.Plt. Water (mg/l)	SO_2 Scrubber[3] (mg/l)	Mix[2] (mg/l)
H_2S	100	(Note 1)	(Note 1)	--	100
NH_4	800			--	800
Na	8,100			57,000	9,300
K	1,040			--	--
Ca	670			14	650
Mg	150			--	150
Sr	50			--	50
Ba	8			--	8
Fe	1			--	1
Mn	2			--	2
Cl	13,500			600	13,000
Br	50			--	50
I	4			--	4
B_4O_7	140			--	100
SO_4	240			21,000	800
SO_3	--			79,700	2,200
SiO_2	200			--	200
Alkalinity	1,100			--	1,100
NO_3	--			10	1
TDS	25,000	25,000	10,000	174,000	29,100
Grease and Oil	10	--	--	--	--
Rate, BWPD	15,500	200	40	450	16,190
LB/HR	226,300	2,900	580	6,500	236,280
Temp, ^oF	95	100	120	180	95
pH	7.5	7.0	7.0	6.8	7.5

[1]The Steam Plant Blowdown Water contains impurities concentrated in the boiler drums. The gas plant wastewater is similar in character to the produced water. The volumes noted include the filtered backwash wastewater.

[2]Approximate concentration of impurities.

[3]The constituents shown for the SO_2 scrubber also contains that for the spent regenerant.

Source: Chevron USA, INc. application to Santa Barbara County, Vol. 3, pp 2-64.

TABLE 2.21

POINT ARGUELLO 1989 MAXIMUM WASTE WATER TO GAVIOTA OCEAN OUTFALL

COMPONENT	WATER SOURCE Produced Water (mg/l)	Stm.Gen. Blowdown[1] (mg/l)	Gas.Plt. Water (mg/l)	SO_2 Scrubber[3] (mg/l)	Mix[2] (mg/l)
H_2S	100	(Note 1)	(Note 1)	--	100
NH_4	800			--	800
Na	8,100			57,000	8,500
K	1,040			--	1,000
Ca	670			14	650
Mg	150			--	150
Sr	50			--	50
Ba	8			--	8
Fe	1			--	1
Mn	2			--	2
Cl	13,500			600	13,000
Br	50			--	50
I	4			--	4
B_4O_7	140			--	100
SO_4	240			21,000	450
SO_3	--			79,700	850
SiO_2	200			--	200
Alkalinity	1,100			--	1,100
NO_3	--			10	1
TDS	25,000	25,000	10,000	174,000	26,500
Grease and Oil	10	--	--	--	--
Rate, BWPD	50,000	550	120	550	51,220
LB/HR	729,800	8,030	1,750	8,030	747,610
Temp, ^{o}F	95	100	120	150	95
pH	7.5	7.0	7.0	6.8	7.5

[1]The Steam Plant Blowdown Water contains impurities concentrated in the boiler drums. The gas plant wastewater is similar in character to the produced water. The volumes noted include the filtered backwash wastewater.

[2]Approximate concentration of impurities.

[3]The constituents shown for the SO_2 scrubber also contains that for the spent regenerant.

Source: Chevron USA, INc. application to Santa Barbara County, Vol. 3, pp 2-65.

TABLE 2.22

GAVIOTA PROCESSING FACILITIES
LIQUID AND SOLID WASTES - DISPOSED OF OFFSITE

	Volume Per Year (Peak Capacity)	Volume Per Year (Avg. Capacity)	Disposal Site Classification
General Refuse Solution	468 cubic yards	244 cubic yards	Class II
Tank Bottoms[1]	972 cubic yards	3 years	Class I or Class II-I
Spent Caustic and Mercaptans[1]	24,000 gallons	12,500 gallons	Class I
Diethanolamine Solution (DEA)	4,200 gallons	2,200 gallons	To Custom Reclaimer
Spent Dessicant, Resin Beds, etc.	1,200 bbls	600 bbls	?

Note: Average capacity based on 52 percent of peak capacity.

Source: Chevron USA, Inc. application to Santa Barbara County, Vol. 3.

(1) Considered hazardous or toxic.

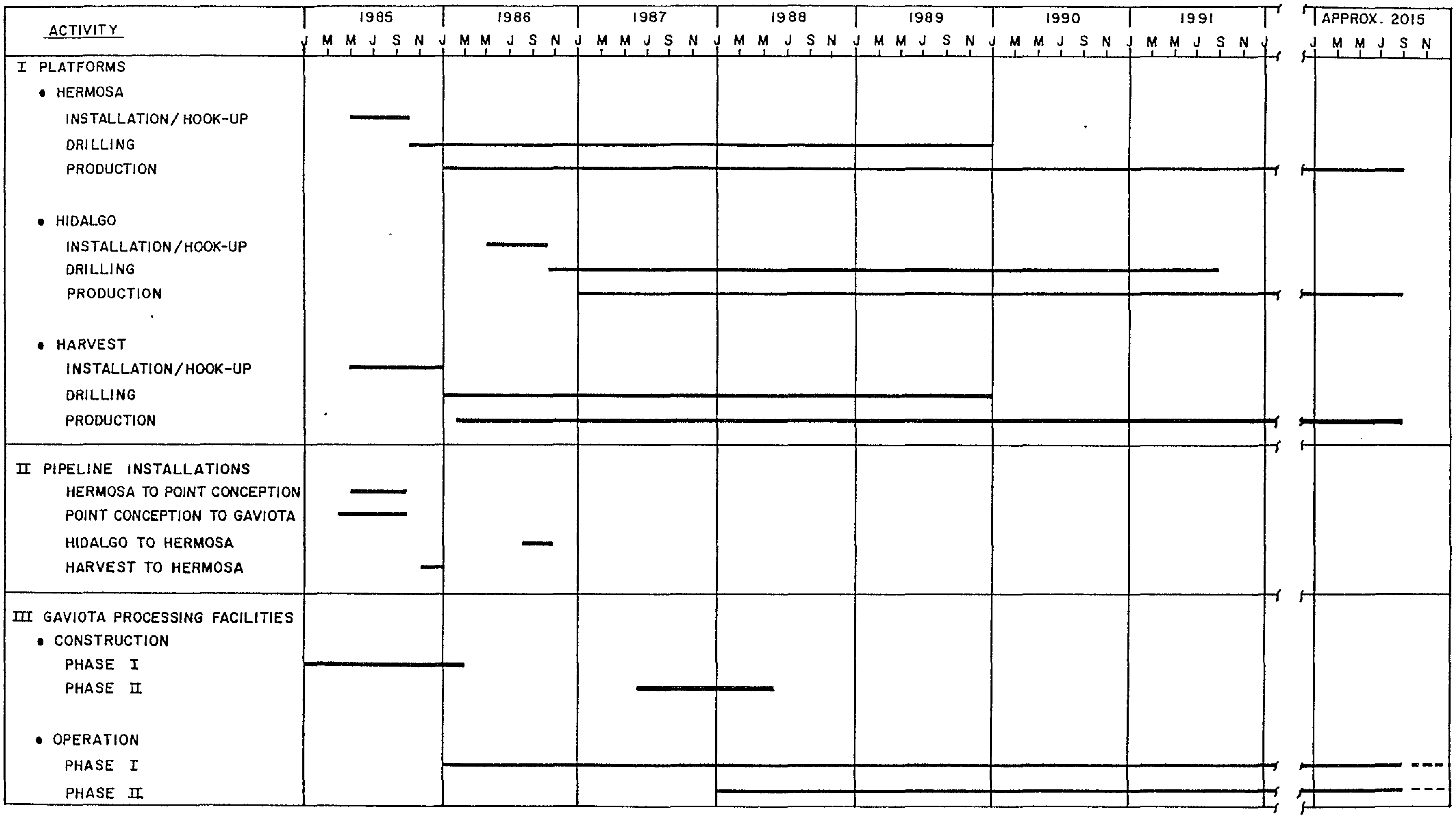


FIGURE 2.8
PRELIMINARY DEVELOPMENT SCHEDULE FOR PROPOSED PROJECT

2.8.2 Operation and Abandonment

The platforms are estimated to have a production life of 30 to 35 years. Thus they should cease producing gas and oil around the years 2015 to 2020. 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 sent to an offshore site for disposal. Jacket legs and pilings will be cut off at least 6 feet below the mud line. The jacket will 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 platform, at which time they will either be used to transport oil and/or gas from other platforms, or they will be filled with water and capped. The onshore portion of the industry pipeline from Point Conception to Gaviota will be used for the life of the Gaviota processing facility. At that time the line either will be used to transport oil and gas as part of some pipeline system, or will be abandoned and sealed.

The lifetime of the Gaviota facility will exceed the expected lifetime of the project platforms because of other production platforms in the Southern Santa Maria Basin. Table 2.15 gives the estimated daily oil and gas that the Gaviota facility will process each year. This Table includes production from new platforms that are not part of this project. The producing life of the Southern Santa Maria Basin is estimated to be 30 to 35 years, at which time the Gaviota facility would most likely be disassembled and transported away. The site would be revegetated and restored.

2.9 TRANSPORTATION OF PRODUCTS

The final products from the Gaviota processing facility will include crude oil suitable for feed to refineries, gas that will go to the natural gas distribution system, and the following byproducts:

- Propane;
- Butane;
- NGL (Natural Gas Liquids); and
- Sulfur.

Each of these products will be transported separately and in various ways as described below.

2.9.1 Crude Oil Transportation

Both Chevron and Texaco have committed to moving their oil via pipeline to the south (i.e., Los Angeles Basin). Chevron currently plans to refine their Arguello crude at its El Segundo refinery. Chevron and Arco have committed to studying a coastal pipeline route to Los Angeles. Chevron has stated their position regarding crude oil transportation in their November 4, 1983, letter to Mr. Michael L. Fischer of the

California Coastal Commission and Texaco in a March 5, 1984, letter to Mr. Randall T. Smith of the County of Santa Barbara. As of this writing, there are no details available on the route or design specifications for the pipeline to Los Angeles, nor is such a pipeline part of these projects. However, it is not envisioned that this crude oil pipeline could be operational before 1990.

Therefore, both Applicants are proposing to use the existing Getty Marine Terminal located at Gaviota until the pipeline to Los Angeles is operational. The existing Getty Marine Terminal would be capable of handling up to 70,000 B/D of crude oil with only minor modifications.

If, because of permitting or environmental reasons, a pipeline to Los Angeles cannot be built, then both Chevron and Texaco are proposing to move their crude oil via a consolidated marine terminal. Their preferred location for a consolidated marine terminal would be the Getty terminal located at Gaviota.

Getty has proposed to expand their terminal to accommodate tankers ranging from 30,000 to 300,000 dead weight tons (dwt). As proposed, this facility would have a crude oil storage tank farm located north of Highway 101 and east of the present Getty Gaviota facility. It is estimated that the total storage capacity could be as much as 2.74 million barrels. If the Applicants were to use the Getty facility on a short- or long-term basis, their crude oil from the Gaviota processing facility would have to be pumped via a pipeline to the Getty Marine Terminal tank farm.

If both the pipeline to Los Angeles and the expanded Getty Marine Terminal are not built, the Applicants might use the proposed marine terminal at Las Flores Canyon. This marine terminal would provide onshore storage and marine loading facilities capable of loading approximately 350,000 barrels of crude oil per day. If the Applicants used this facility their crude oil from the Gaviota processing facility would have to be shipped via a pipeline to the Las Flores storage tanks.

2.9.2 Gas Transportation

After the gas has been cleaned (i.e., H_2S gas removed) and processed at Gaviota, it will be metered and then compressed to gas pipeline pressures for distribution in Southern California Gas Company's pipeline system or some other gas distribution system.

2.9.3 Byproduct Transportation

The products produced from the gas cleanup stage include sulfur, natural gas liquids (NGL), and liquefied petroleum gas (LPG). All these products have interim storage tanks onsite from which the products are loaded into trucks for movement to their final destinations. The storage tanks include:

- Five 105,000-gallon pressure vessels for propane storage (LPG);

- Five 105,000-gallon pressure vessels for butane storage (LPG);
- Two 5,000-barrel dome roof tanks for NGL storage.

The loading facilities for the byproduct liquids have three docks with each dock having two loading bays. These will provide two loading bays per liquid byproduct. All butane, propane, and NGL will be loaded onto tank trucks by gravity feed. All trucks will use a vapor balance line back to the tank to reduce the amount of hydrocarbon vapor emissions.

Liquid sulfur will be degassed and then pumped into a covered pit near the sulfur recovery plant for tank truck loading. Once the facility is in full operation it is estimated that the following truck pickup of byproducts will be required:

- 16 truck trips per day for butane;
- 19 truck trips per day for propane;
- 16 truck trips per day for NGL; and
- 3 truck trips per day for sulfur.

These rates are based on peak production levels of 250,000 B/D of wet oil and 120 MMSCF/D of gas, which last only a few months. The estimated daily emissions for the truck transportation of NGLs, propane, butane, and sulfur from the Gaviota facility to market are estimated in Table 2.19.

2.10 AREA STUDY

The overall area under study includes the three leases proposed to be developed (OCS-P 0316, -P 0450, -P 0315) and the 22 other leases shown in Figure 1.1.

It is anticipated that in order to develop the study area that an additional five platforms could be installed as shown in Figure 1.1. All five hypothetical platforms are proposed to use subsea pipelines to move their oil and gas to the industry lines from Platform Hermosa to the Gaviota processing facility. The hypothetical platforms are assumed to tie into other platforms which in turn tie into Platform Hermosa or into Platform Hermosa directly. The two hypothetical near-shore platforms in leases OCS-P 0452 and OCS-P 0317 are hypothesized to use the subsea pipeline tie-ins on the industry pipelines from Platform Hermosa to the Gaviota processing facility.

Water depths within the Area Study leases range from 200 to 2400 feet. Conventional, fixed-platforms like Platforms Hermosa, Harvest and Hidalgo have been installed in water depths of 1000 feet. Beyond that depth, however, 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:

- 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 then launched over the end of the barge and floated in the water. By means of controlled flooding, the jacket will be 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.

- Deep Water Platforms: One advanced design platform 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, and 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. This platform design is relatively insensitive to the increased cost due 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 the TLP's requires that a drilling template and the tether foundations be installed prior to the arrival of the hull.

- Another type is the guyed tower design. This structure, like the TLP, is a compliant structure (i.e., free to move in the lateral direction). 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 is attached weights that will keep the cables taut. Under normal weather conditions these weights rest on the ocean floor. However, when rough weather conditions are encountered, the weights will lift off the ocean floor and allow the tower to tilt. This type of structure will allow steel jacket platforms to be placed in over 1000-foot depths and require that piles be driven into the ocean floor as anchors for the guide wires.

The Minerals Management Service (MMS) has estimated the total resources of this study area to be approximately 400 million barrels of oil. The MMS has estimated that one new platform will be brought on each year starting in 1989, with the final platform being brought online in 1993. It is assumed that each of the eight platforms in the Area Study will produce about 50 million barrels ~~of oil~~.

The energy use and emissions from each of these hypothetical platforms would be similar to the energy use and emissions given for the three platforms covered in this project description. Table 2.23 presents a projected buildup of drilling activity and oil and gas production rates for the eight-platform development assumed for the Area Study.

TABLE 2.23

Development and Production Activity Parameters for Study Area

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Platform Installations	2	1	1	1	1	1	1				
Development Wells											
Hermosa (48)		11	11	11	7	2	2	2	2	--	--
Harvest (50)		12	12	12	6	2	2	2	2	--	--
Hidalgo (56)		--	11	11	11	9	6	2	3	3	--
(154)		23	34	34	24	13	10	6	7	3	--
Future Platforms (200)		--	--	8	16	24	32	34	28	22	16
Total for area (354)		23	34	42	40	37	42	40	35	25	16
Oil Production, MB/D											
Hermosa		10	15	23	27	27	25	20	15	10	10
Harvest		15	27	46	30	21	18	15	13	12	11
Hidalgo		--	8	11	18	18	20	20	15	15	10
		25	50	80	75	66	63	55	43	37	31
Future Platforms		--	--	15	40	69	107	95	91	80	72
Total for area		25	50	95	115	135	170	150	134	117	103
Gas Production, MMCF/D											
Hermosa		2	8	11	17	21	21	23	24	26	28
Harvest		18	27	42	34	28	26	24	22	21	20
Hidalgo		--	--	2	4	6	8	8	9	10	10
		20	35	55	55	55	55	55	55	57	58
Future Platforms		--	--	10	54	62	65	59	46	33	21
Total for area		20	35	65	109	117	120	114	101	90	79

Note: Some of the figures shown here have been revised slightly by subsequent updates. The table presents the basis assumed for determining environmental consequences.

Sources: Price Waterhouse survey, March 22, 1983.
Letter from Texaco to R.T. Smith, March 26, 1984.
Arthur D. Little estimates.

The onshore facilities that are part of this project have been sized and will be installed to allow all future production from the Area Study to be processed.

A further discussion of the Area Study has been presented in Section 1.~~2~~3 of this report.

III. PROJECT ALTERNATIVES

3.0 INTRODUCTION

This section of the document sets out the project alternatives required by NEPA (Section 1502.14) and CEQA (Section 15126 (d)). Additional discussion of the alternative impacts and mitigations required by the above referenced sections is included in Chapter V, Environmental Consequences and Mitigation Measures, so that the project impacts, alternative impacts and related mitigations can be reviewed concurrently in one place.

Alternatives to the Area Study are not considered since no direct mitigation or permit approvals are involved.

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 of the Arguello Field. Present activities on the Gaviota, Las Flores, Ellwood, and other onshore processing sites would continue, but there is no assumed expansion as proposed in the various present development applications. This provides a consistent basis against which to measure the impacts of the other alternative Arguello and cumulative development scenarios. Present oil-related activities in the Santa Barbara Channel would also continue.

3.2 PIPELINE ALTERNATIVES: OFFSHORE ROUTE FOR WET-OIL AND SOUR-GAS PIPELINES FROM PLATFORM HERMOSA TO GAVIOTA

The applicants have proposed a route for the pipelines carrying wet oil and sour gas from Platform Hermosa that would come ashore north of Point Conception and then run onshore eastward to Gaviota. The alternative eliminates almost all of the onshore portion of the proposed route. It would follow an offshore route from Platform Hermosa directly to Gaviota. Both routes are shown on Figure 3.1. Location of the Santa Ynez fault is also shown.

For the onshore and offshore routes, the distances from Platform Hermosa to Gaviota are approximately the same, about 26 miles. The pipeline sizes would also be the same: 24" and 20", respectively, for the wet-oil and sour-gas lines. With the offshore route, almost all of these lines would be enclosed in concrete, whereas only the 10-mile offshore section for the proposed route has concrete covering. The offshore gas line may require more compression to overcome condensate formation. The offshore oil line may also require more power for pumping -- in addition to overcoming more heat losses. With the onshore route, there is flexibility to reduce power requirements. This flexibility is provided by fittings for future tie-ins to equipment, if needed, to remove condensate from the gas line and to heat the crude flowing in the wet-oil line.

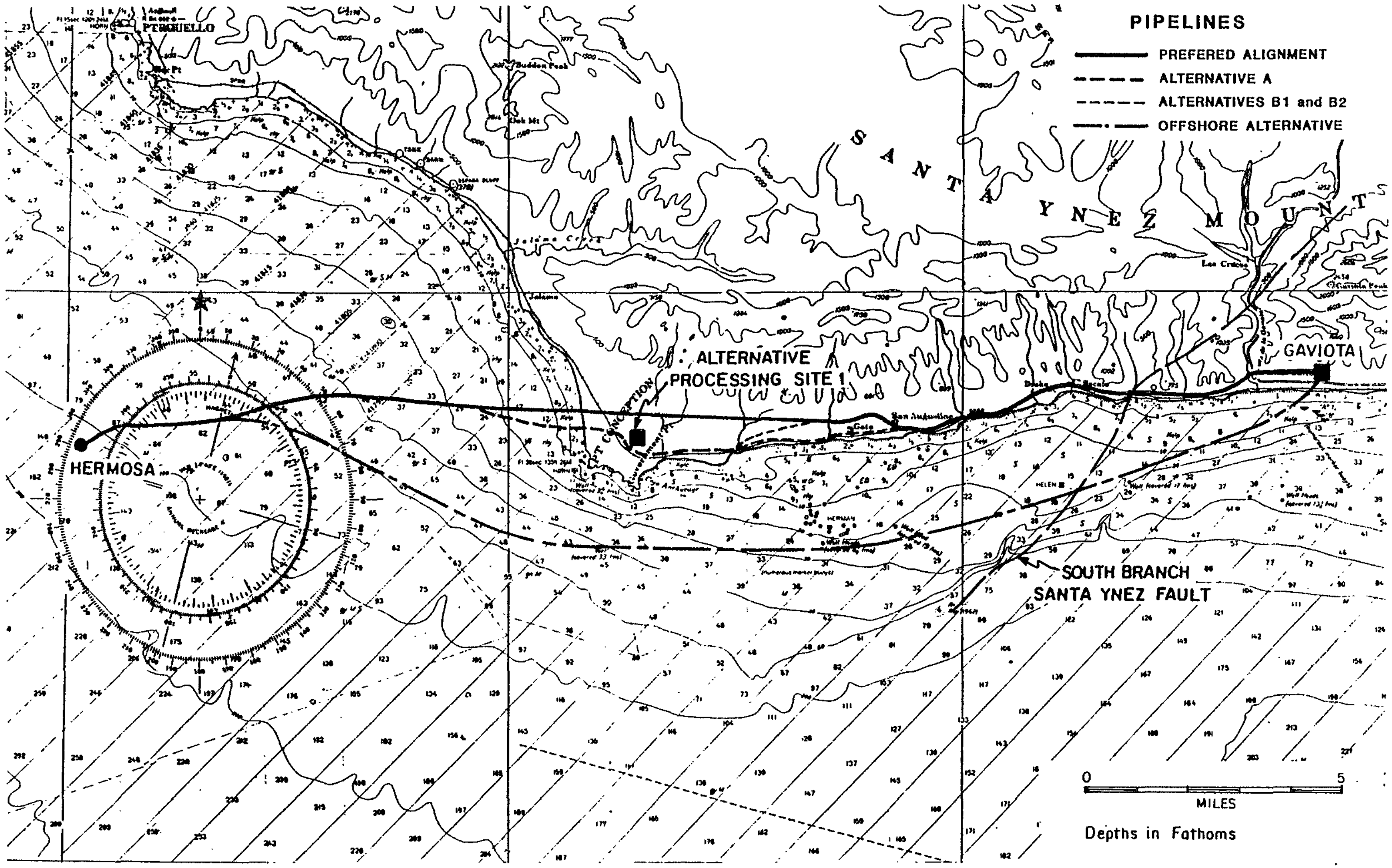


FIGURE 3.1 PROJECT COMPONENTS AND ALTERNATIVES

3.3 ALTERNATIVES FOR LOCATING ONSHORE PROCESSING FACILITIES

Several sites can be considered as alternatives to Gaviota for locating the oil and gas treating facilities. The one specified for this report is the site owned by Chevron at Point Conception. Others include sites previously screened and evaluated in the Santa Barbara County Oil Transportation Plan (OTP) for suitability as potential tank farm locations. General characteristics for all the sites are summarized in Table 3.1. Their locations are shown on Figure 3.2.

Chevron owns 1500 acres of simple fee property in a relatively remote area near Point Conception (see Figure 4.10.5-3). The assumed location of the alternate site is shown on Figure 3.1. This alternative site has essentially no infrastructure. Access to the site would have to be provided by developing the Jalama Road. A new power line would be required. Adequate sources of fresh water have not been identified at this time. As shown on Figure 3.1, the site is close to the landfall for the wet-oil and sour-gas lines from Platform Hermosa. Locating the processing facilities here minimizes the onshore portion of the sour-gas line. The sweet natural gas is assumed to follow the same pipeline route to Gaviota to tie into the grid system. The treated crude oil could be pipelined to tank farm locations, e.g., at Gaviota or Las Flores.

Based on review of the OTP and field information collected for the project, all the other sites listed in Table 3.1 appear to have disadvantages that exceed those of the Gaviota site. Therefore, these sites were not given further detailed study. The critical offsetting factors for each site are discussed in Section 3.7.

3.4 ALTERNATIVES FOR TRANSPORTING LPG AND NGLs

Two possible alternatives to truck delivery, pipeline and rail, were evaluated based on assumptions outlined below. Transportation by truck provides delivery of the products directly to consumers without intermediate terminaling. While not precluding direct delivery, it is more likely that the pipeline or rail alternative modes will require use of existing terminals with subsequent delivery to consumers by truck.

TABLE 3.1

PRELIMINARY DATA ON POTENTIAL PROCESSING SITE LOCATIONS

	Gaviota	Point Conception	Aminoil	Eagle Canyon	Las Varas Canyon	Las Llagas Canyon	Las Flores	Canada de Venadito	Tajiguas Canyon
I. Engineering									
- Land Availablity	Adequate								
- Land Terrain	Hilly	Flat	Relatively Flat	Hilly	Relatively Flat	Relatively Flat	Rolling Terrain	Rolling Terrain	Flat
- Available Infrastructure	Good	Poor	NA	NA	NA	NA	NA	NA	NA
II. Safety									
- Proximity to Population Centers	Close to School	Far	Relatively Close	Relatively Far	Relatively Far	Relatively Close	Relatively Far	Relatively Far	Relatively Far
- Onshore Sour Gas Line Length (miles)	16.3	1	32.9	31.7	32.4	30.7	28.1	27.2	25.1
III. Air Quality									
- Natural Ventilation	Good	Good	Good	Good	Poor	Poor	Good	Good	Good
- Proximity to Other Emission Sources	Near	Far	Near	Far	Far	Far	Near	Far	Far
IV. Hydrology									
- Fresh Water Supply (acre/ft/yr)	45	Limited	Goleta,WD	Fair	Fair	Fair	Fair	Limited	Fair
- Natural Drainage	Good	Fair	Fair	Good	Good	Good	Good	Good	Good
V. Geology									
- Soil Conditions	Fair	Good	NA	NA	NA	NA	Fair	NA	NA
- Number of Faults On-site	0	1 or 2	0	2	1	1	0	0	0

TABLE 3.1 (Continued)

PRELIMINARY DATA ON POTENTIAL PROCESSING SITE LOCATIONS

	Gaviota	Point Conception	Aminoil	Eagle Canyon	Las Varas Canyon	Las Llagas Canyon	Las Flores	Canada de Venadito	Tajiguas
VI. Ecological Constraints									
- - Marine	Limited	Potentially Significant	Potentially Significant	Potentially Significant	Limited	Limited	Limited	Limited	Limited
- Terrestrial	Locally to Regionally Significant	Regionally Significant	Limited	Potentially Significant	Potentially Significant	Regionally Significant	Regionally Significant	Potentially Significant	Limited
VII. Land Use									
- Current Land Use	Processing Facility	None	Processing Facility	Agri-culture	Agri-culture	Agri-culture	Proposed Proc. Fac.	Prime Agriculture	Prime Agriculture
- Pipeline Distances (miles):									
o wet oil (onshore)	16.3	0.0	32.9	31.7	32.4	30.7	28.1	27.2	25.1
o dry oil (to Gaviota)	0.5	16.3	16.6	15.4	16.1	14.4	11.8	10.9	8.8
o sour gas (onshore)	16.3	1.0	32.9	31.7	32.4	30.7	28.1	27.2	25.1
o sweet gas (new)	None	NA	NA	NA	NA	NA	NA	NA	NA
o outfall (onshore)	0.5	0.25	0.0	1.0	2.3	1.5	1.0	1.1	1.1
VIII. Visual Impacts (miles visible from road)	High Visible from Road (1.6 mi)	Low Not Visible from Road	High Visible from Road (1.9 mi)	Medium Visible from Road (.17 mi)	Low Not Visible from Road	Low Not Visible from Road	Low Not Visible from Road	Low Not Visible from Road	Medium Visible from Road (.16 mi)
IX. Cultural Resources									
Native American Resources	Highly Sensitive	Highly Sensitive	Sensitive	Sensitive	Sensitive	Sensitive	Sensitive	Sensitive	Sensitive
Archeological Sites	Highly Sensitive	Highly Sensitive	Sensitive	Sensitive	Sensitive	Sensitive	Sensitive	Sensitive	Sensitive

1 Excludes Canada de la Pila which has been dropped by Board of Supervisors from further consideration.

2 Source: Oil Transportation Plan, Santa Barbara County, 1984.

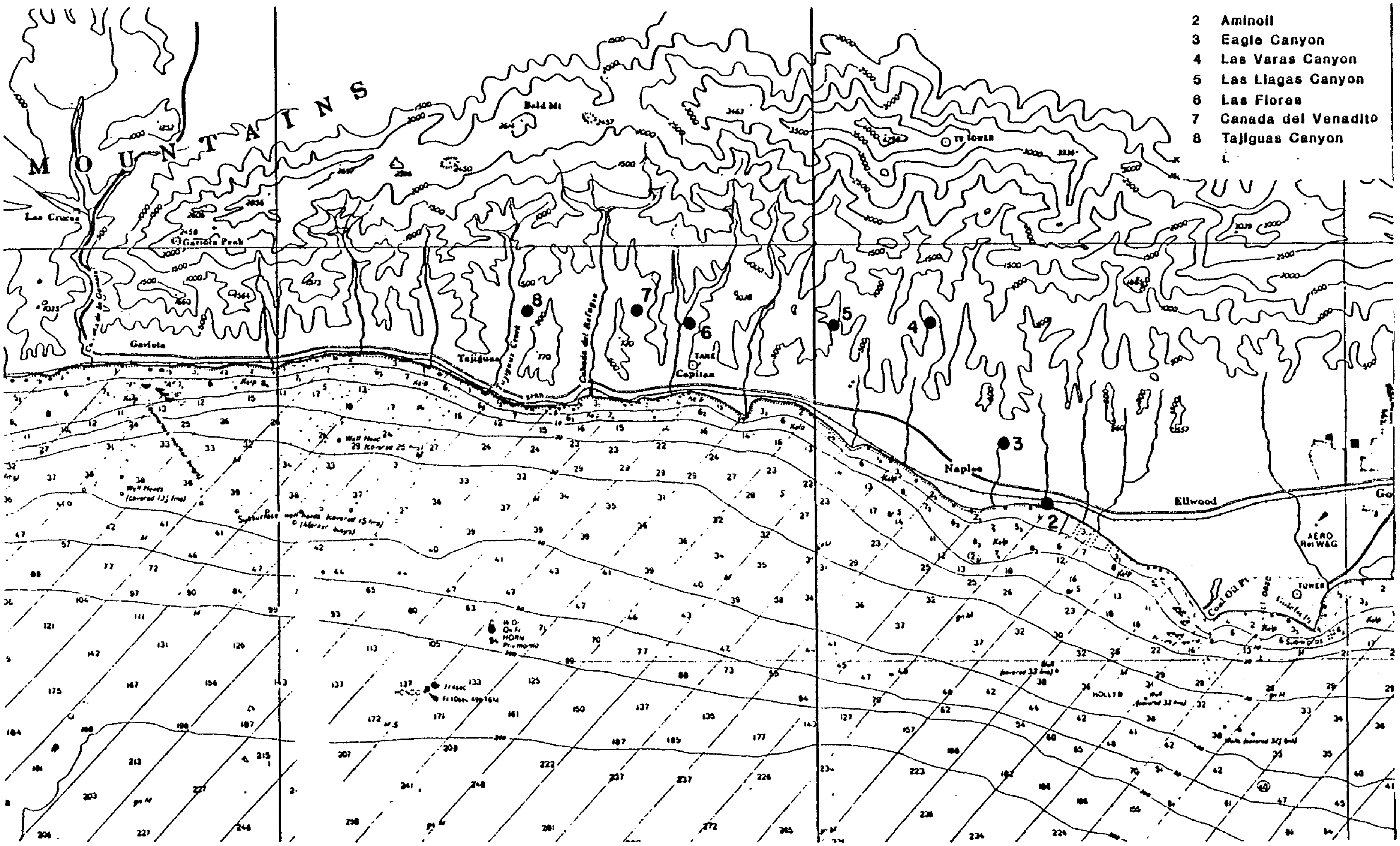


FIGURE 3.2 LOCATION OF ALTERNATIVE SITES FOR ONSHORE PROCESSING

IMAGE# 6,

The LPG and NGL product pipeline assumptions are:

- The LPG pipeline would be piggybacked on one of the crude oil pipelines proposed to Los Angeles or Bakersfield; i.e., it would be constructed and installed in parallel with the crude pipeline. This would be a single pipeline in which either 1) the propane and butane would be batched, or 2) these two products would be pumped as a blend.

  With either case, the NGLs would be injected into the crude flowing by pipeline to Los Angeles or Bakersfield.

- The LPG would follow the same route as the crude pipeline to some point near Bakersfield or along the route to Los Angeles where it could connect to an existent terminal.

- There would likely be an interim period of perhaps two to three years after the Gaviota treating plant started operation before a crude pipeline system to Los Angeles or Bakersfield could be completed. During this period, the propane and butane would still require truck delivery. However, the peak volume of these products during this period would be roughtly 50 percent of the peak volumes indicated above. It may be possible to inject the NGLs into the crude during this period. Further evaluation would include an estimate of whether or not the crude can still remain within its limits on vapor pressure for transport by tanker. If not, interim truck delivery will be required for the NGLs too.

The assumptions for shipment of these products by rail are:

- A siding would be installed parallel to the existing tracks running through the Getty Gaviota site on the south side of Route 101.

- The rail car loading racks would be equipped with a vapor recovery system similar to the system proposed for truck loading.

- The rail cars containing LPG would be transported to existing terminals within about 150 miles of Gaviota.

- NGLs might be injected into the crude transported by pipeline. In addition to avoiding rail transportation for this increment of volume, injection into the crude pipeline eliminates the need for a receiving rail terminal that would be able to accommodate the NGL in addition to the LPG.

3.5 ALTERNATIVE PORT LOCATIONS FOR OFFSHORE SUPPORT

The applicants propose to support their offshore activities from a supply base at Port Hueneme and to operate a helicopter service from Santa Barbara airport for the platform crews. When weather precludes helicopter transport, crew boats would be operated from Carpinteria (Chevron) and Ellwood (Texaco). The alternatives to be considered are as follows:

- Both crew and supply base at Elwood;
- Both crew and supply base at Gaviota; and
- Crew base at Carpinteria and supply base at Port Hueneme.

Figure 3.3 shows the routes that would be used by the crew and supply boats from the above ports.

3.6 ALTERNATIVES NOT CONSIDERED FOR FURTHER ANALYSIS

All of the above alternatives are listed in the Notice of Preparation for this report. This list also included other alternatives which have either been dropped from detailed evaluation or are being addressed in other sections of the EIR/EIS. Alternatives involving consolidation of onshore processing facilities are covered under cumulative impacts (Chapter VI). Smaller scale alternatives (e.g., alternatives to various design aspects of some project components) are evaluated as mitigation measures in Chapters V and VI.

The alternatives given no further detailed analysis are discussed below:

- Alternative Platform Locations - The locations for the three platforms, as proposed, are dictated by reservoir and sea floor 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. Hypothetical locations for the five future platforms, identified by the MMS for the Area Study, are only intended to represent the level of future activity. (Refer to Section 2.1.)

- Subsea Completions - From a reservoir engineering standpoint, subsea completions do not present a practical alternative to any of three platforms proposed by Chevron and Texaco. The reasons include:

  - This technology is still under development for application to oil production at the water depth at the Arguello Field.

  - Hermosa is the central platform for the Arguello Field providing the location for receiving oil/gas production from the other platforms and feeding the single set of pipelines to the onshore treating facilities at Gaviota. This platform cannot be replaced by a subsea completion system.

  - Subsea completions are basically satellite systems that still require conventional platforms to provide facilities for initial separation of oil, gas, and water. Therefore, replacement of

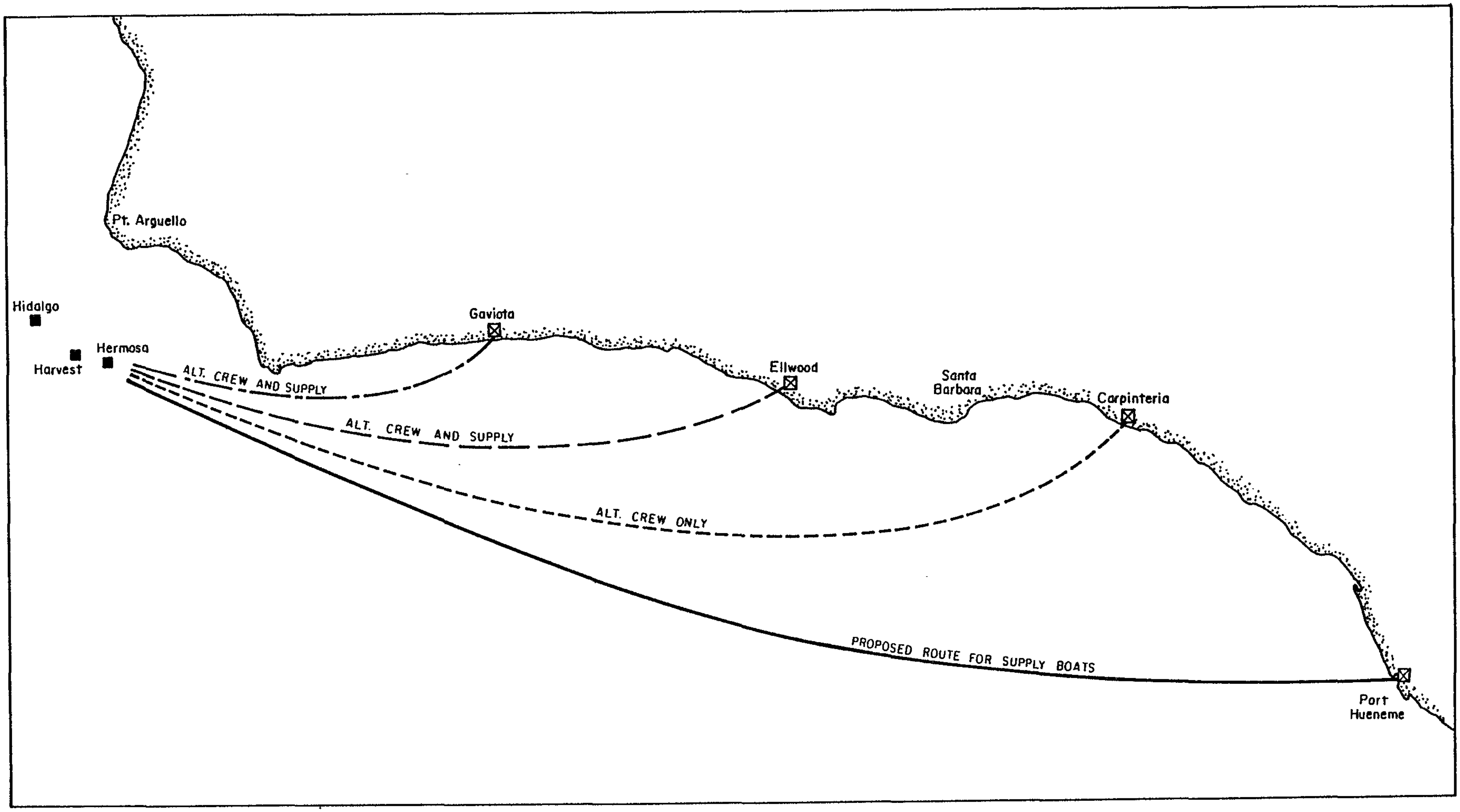


FIGURE 3.3 ALTERNATIVE ROUTES FOR CREW AND SUPPLY BOATS

platforms Hidalgo and Harvest would require long production flow lines to Hermosa and increasing the size of Hermosa to accommodate the additional volumes of oil, gas and water to be separated. This length to flow lines for the highly viscous Arguello crude does not appear feasible.

Furthermore, sub-sea completions have overriding environmental disadvantages because all of the development drilling and well servicing would have to be carried out by drill ships. Compared to platforms, drill ships have higher air emissions and are considered more prone to accidents.

- Reinjection of Formation and Process Waste Water - Reinjection was initially considered as a potential alternative to the proposed discharge into the ocean through a 5000 foot-long outfall pipeline. However, based on analysis of available information, it appears that reinjection may be neither necessary nor viable as an alternative for these reasons:

  - There is no present evidence that the proposed ocean discharge would create unmitigable impacts.

  - The feasibility of reinjection cannot be determined without extensive geologic data and analysis.

  - Because of the uncertainty on sustaining reinjection, even if it appears feasible, the outfall pipeline would still be installed for standby ocean discharge. Construction of this line would result in adverse impacts to Kelp bed 31.

  - Reinjection, if feasible, can still be considered as a potential mitigation if and when chemical contaminants contained in the discharge water reach unacceptable levels.

- Alternative Sites for Onshore Processing Facilities - The Santa Barbara County Oil Transportation Plan (OTP), January, 1984) identified eight sites of about 60 acres along the South Coast between Gaviota and Ellwood as potential marine terminal tank fram locations. The exclusionary criteria used in screening sites included constraints on: landslide potential, terrestrial biology impact, visual impact, cultural resource impact, air quality impact, safety, recreation impact, and land use. Information derived from the OTP and supplemented by additional literature investigation was used to evaluate the potential suitability of these sites for oil and gas processing. This analysis, although limited, identified offsetting environmental circumstances judged sufficient to eliminate all the sites from further study as potentially preferable alternatives.

In general, all eight sites are east of Gaviota. Locating the processing facilities there would increase the length of the buried onshore pipeline containing high-pressure sour gas. The furthest locations, Aminoil and Eagle Canyon, would add about 16 miles to this line. Also, most of these sites would result in overlapping wet-and dry-oil pipelines to achieve terminal connections. These logistical factors lead to inconsistencies with State and County planning policy on consolidating treating plants, tank farms, and marine terminals. Specific major disadvantages found for each site, other than the Point Conception site (1), are discussed below:

2.	Aminoil	Site is adjacent to coast and existing oil and gas facilities. Additional facilities would have high visual impact. Has no advantage compared to Gaviota.
3.	Eagle Canyon	Zoned for agriculture and considered a prime agricultural area. The site exhibits signs of landslides and soil creep, indicating potential slope instability. North and south site boundaries are corssed by the Eagle and Las Varas faults, although no recent seismic activity has been recorded.
4.	Las Varas Canyon	Approximately one-half of this site is agricultural preserve. The terrain is anticipated to cause occurrences of poor ventilation of airborne emissions. The north and south site boundaries are crossed by faults (not currently considered active). Nine residences are within 1/2 mile of the site.
5.	Las Llagas Canyon	Extensive cut and fill of slopes would be necessary to accommodate facilities, increasing the risk of erosion and slumping. Site contains, or is adjacent to, biological habitats of exceptional regional value and would represent significant impact potential greater than proposed site.
6.	Corral/Las Flores	Use of site by Chevron is pre-empted by Exxon's application to install treating facilities for Santa Ynez production in Las Flores and adjoining Corral Canyons. There is insufficient suitable area to add facilities for Chevron's consolidated production capacity. Alternatives covered under Cumulative Impacts include co-locating treating facilities for the smaller volume of Coal Oil Point production at Las Flores. (Refer to Section 6.0.) Site contains biological resources of exceptional regional value.

7.	Canada del Venadita	Site is currently used for grazing and avocado orchards. Valley bottom surrounded by rolling hills exhibits high scenic quality. Access to the canyon is across toes of landslides on both sides of the canyon.
8.	Tajiguas Canyon	Site is an agricultural area terraced for the existing avocado orchard. Five residences are within 1/2 mile of site. The area has potential for containing archaeological materials on the flatter areas and may be coincidental with an ethnographic Chumash village or use area.

IV. ENVIRONMENTAL AND REGULATORY SETTING

4.0 INTRODUCTION

This chapter describes 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 (e.g., recovery from 1983 storms and El Nino) and human activities (e.g., facilities presently permitted but not constructed). Such changes are discussed where applicable 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, such as the tri-county area for socioeconomics, the coastal strip south of the Santa Ynez Mountains for terrestrial biology, and the traffic corridors between Gaviota and Long Beach for System Safety and Reliability. See the text and accompanying figures in the remainder of this chapter for further definition of these areas by discipline.

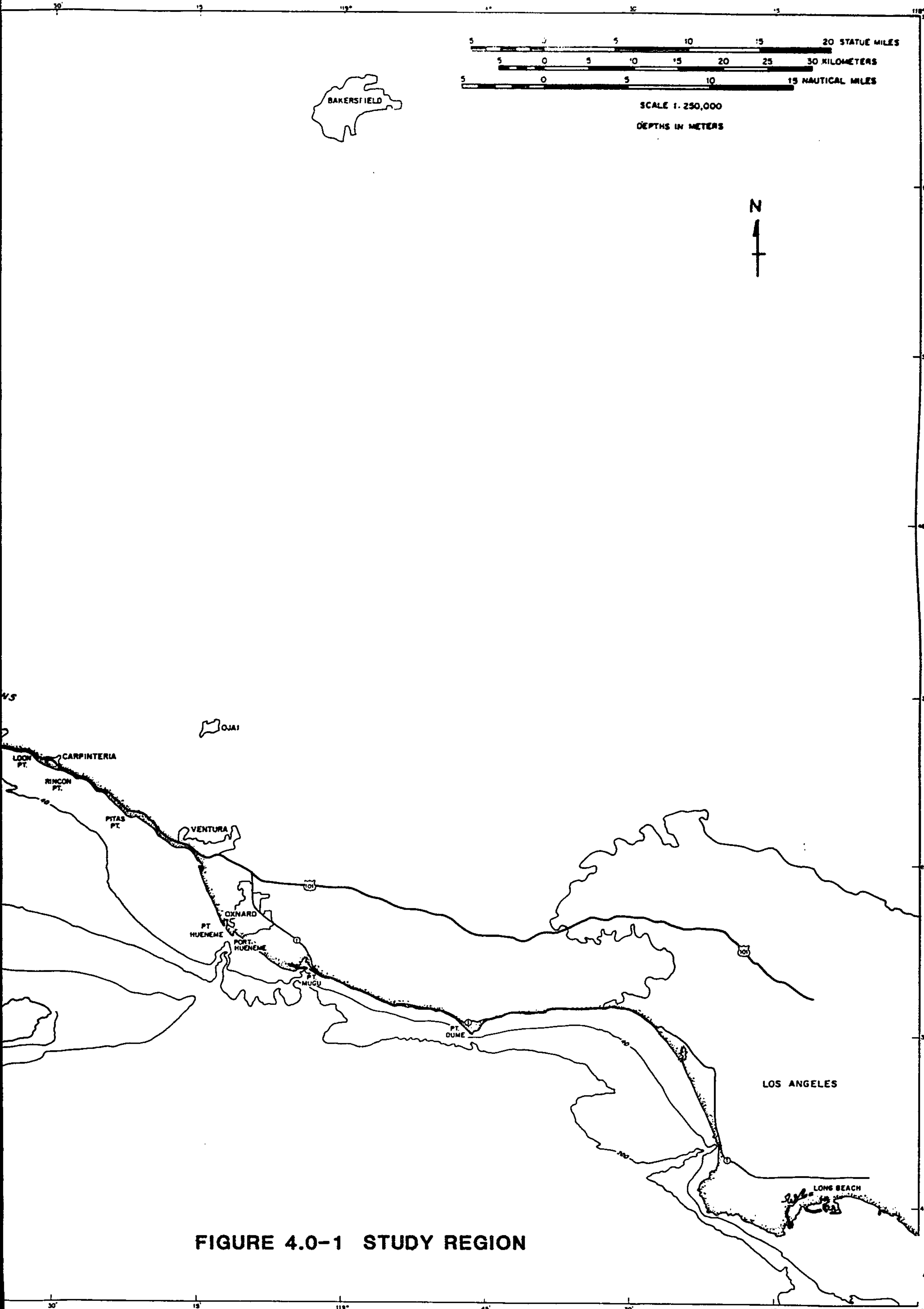
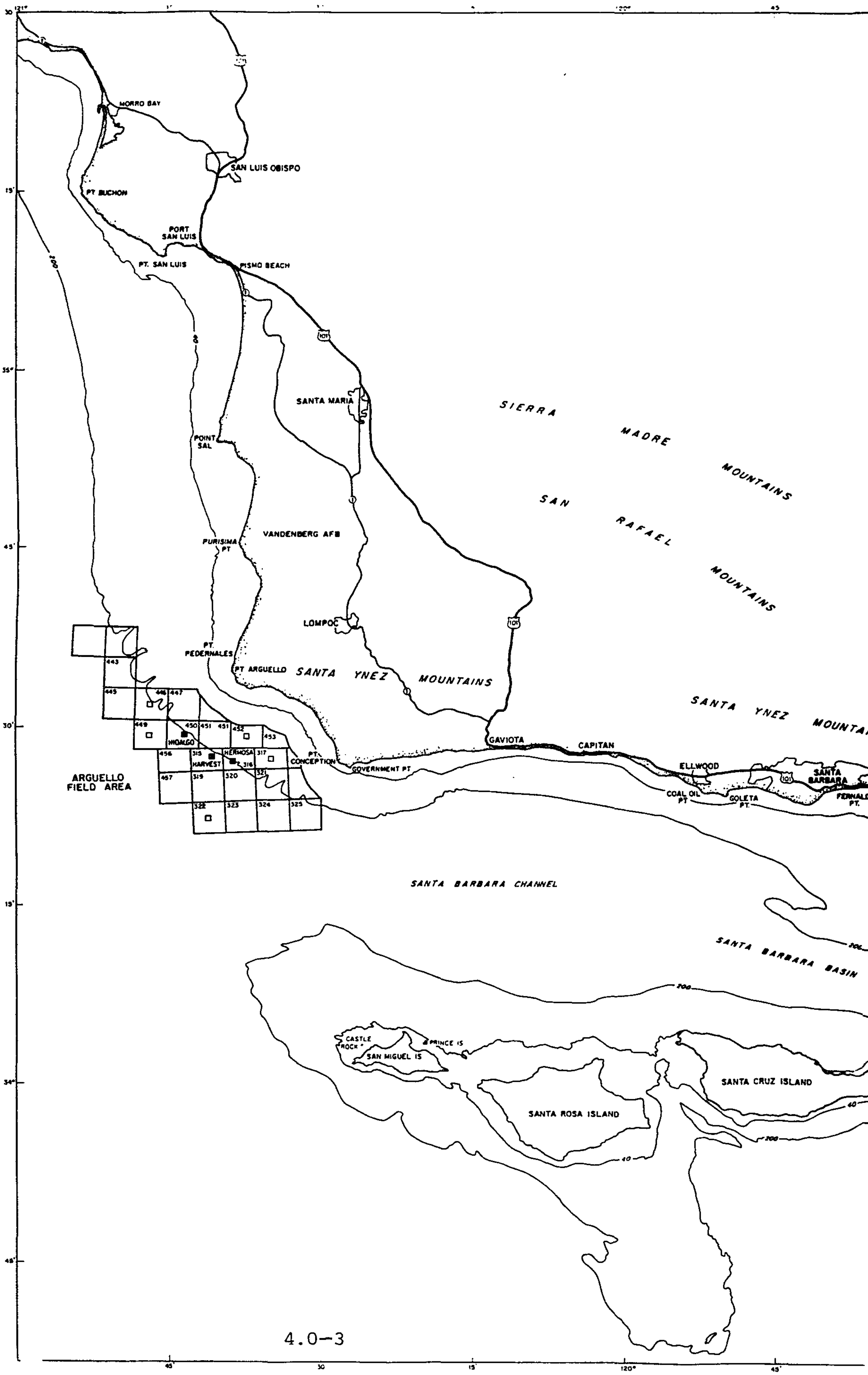


FIGURE 4.0-1 STUDY REGION

Arthur D. Little, Inc.


MORRO BAY
SAN LUIS OBISPO
PT BUCHON
PORT SAN LUIS
PT. SAN LUIS
PISMO BEACH
SANTA MARIA
POINT SAL
PURISIMA PT
VANDENBERG AFB
LOMPOC
PT. PEDERNALES
PT ARGUELLO
SANTA YNEZ MOUNTAINS
SIERRA MADRE MOUNTAINS
SAN RAFAEL MOUNTAINS
GAVIOTA
CAPITAN
ELLWOOD
SANTA BARBARA
COAL OIL PT
GOLETA PT.
PT. CONCEPTION
GOVERNMENT PT
HIDALGO
HARVEST
HERMOSA
ARGUELLO FIELD AREA
SANTA BARBARA CHANNEL
SANTA BARBARA BASIN
CASTLE ROCK
PRINCE IS
SAN MIGUEL IS
SANTA ROSA ISLAND
SANTA CRUZ ISLAND

4.1 GEOLOGY

4.1.1 Overview

When compared with other areas of the North American continent, the geology of the California coastal region, including that part which encompasses the project area, can be characterized as dynamic and rapidly changing in terms of geologic time. This dynamic character is visually reflected in the rugged topography of the California Coast Ranges and may be experienced during earthquakes, which themselves are evidence of crustal rock adjustment to changing stresses.

The geologic study region considered in this report is shown in Figure 4.1-1, and includes the Western Transverse Ranges, the southern portion of the California Coast Ranges province, and the Central California Continental Borderland. The primary focus of this section is on consideration of the three leases where platforms are proposed (OCS-P0315, -P0316, -P0450), which together with the offshore pipeline corridor constitute the offshore project area; and the onshore pipeline corridor and processing facility site at Gaviota, which constitute the onshore project area. This section describes the geologic setting, faults, seismicity, and other geologic considerations pertaining to this region, the project area, and the leases of the Area Study as shown in Figure 1-1. For a more detailed discussion, the reader is referred to Appendix E.

4.1.2 Geologic Setting

REGIONAL SETTING

Geologic History

The geologic history of the Transverse Ranges and offshore area is traceable for more than 100 million years, and indicates recurrent periods of tectonic activity interspersed with periods of relative quiescence. It is noteworthy that many of the structural and geomorphic features present in the Santa Barbara Channel today were slowly developing and affecting sedimentation throughout much of the Pliocene Epoch.

Physiography/Bathymetry

The major onshore physiographic provinces proximal to the Arguello Field are the California Coast Ranges to the north and the Western Transverse Ranges to the east (Figure 4.1-1). The offshore region resembles the California Continental Borderland south of the Western Transverse Ranges province [Schell, 1979]. The principal features which surround the Arguello Field area include the Mainland Shelf, the Arguello Slope, the Inner Continental Slope, the Arguello Plateau, Arguello Canyon, Santa Lucia Bank, and the Santa Maria Basin. The field itself straddles the boundary between the Mainland Shelf and the Arguello Slope. Each of these areas is described in detail in Appendix E.

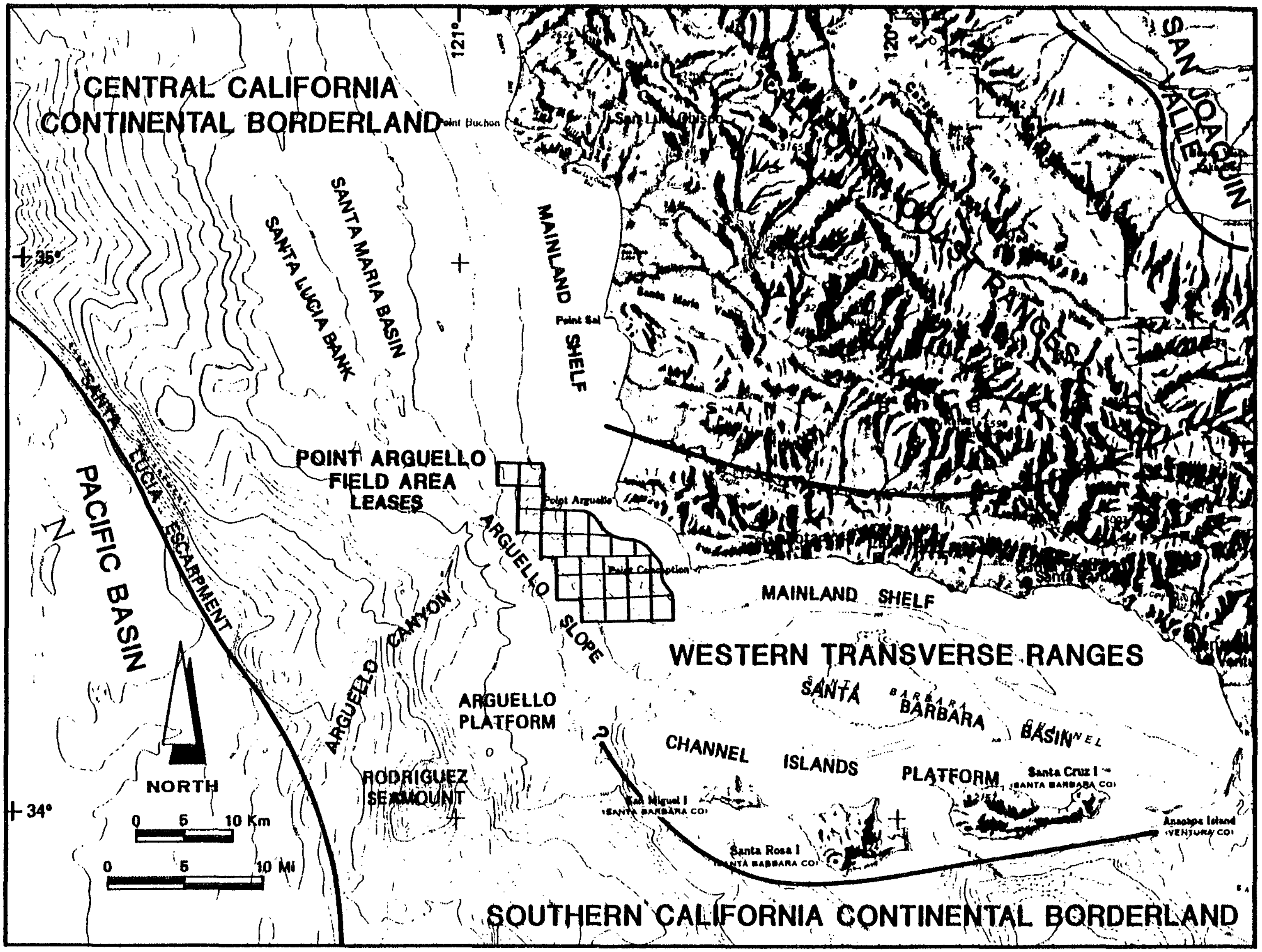


FIGURE 4.1-1 PHYSIOGRAPHIC MAP, ARGUELLO FIELD REGION

Stratigraphy

Figure 4.1-2 shows the principal stratigraphic units in the Arguello Field Area. In summary, sedimentary strata in the project area range in age from Cretaceous to Holocene. The section is generally 3000 to 4500 m (9800 to 15,000 ft) thick, varying from interbedded turbidite sandstones and shales to a thick section of siliceous shale. The shallowest and youngest sediments consist of generally flat-lying silty clays of Holocene and latest Pleistocene age, which extend as a thin veneer over an eroded surface on folded and faulted Miocene, Pliocene, and Pleistocene sediments. These overlying strata probably represent sediments deposited during the last glacial cycle and since the last sea-level transgression, which began about 17,000 to 20,000 years ago, and are thickest in regions of abundant sediment supply, e.g., at the mouths of the Santa Maria and Santa Ynez Rivers [Payne and others, 1979].

The Plio-Pleistocene sediments are predominantly siltstones and clayey silts, with occasional scattered thin sands and lime stringers, and become more sandy toward the base. All of these sediments unconformably overlie the upper Miocene-lower Pliocene Santa Margarita-Sisquoc Formation of shales and siltstones. In turn, the Santa Margarita-Sisquoc Formation unconformably overlies approximately 700 m (2300 ft) of upper Miocene siliceous shale (Monterey Formation). The Monterey is the principal reservoir rock for the Arguello Field. These brittle sediments are excellent for the generation of fracture permeability when tectonically stressed. The lower Miocene Point Sal Formation (i.e., basal Monterey) consists of silty shales with minor amounts of sand, which rests unconformably on the Cretaceous in the Arguello Field area. These older sediments, where penetrated to date, consist of interbedded conglomerates, sands, and shales [Chevron, 1983].

Structure

The geologic structure surrounding the Arguello Field area is reflected in the physiography. The major structural elements are the Santa Ynez Uplift, the Santa Barbara Basin, the Santa Maria Basin, and the Santa Lucia Bank Uplift (Figure 4.1-1). The project area lies west of the Santa Ynez Uplift, between the Santa Barbara Basin and the Santa Maria Basin/Santa Lucia Bank Uplift.

The Santa Ynez Uplift is essentially a faulted anticline whose folds and faults trend east-west along the major fault, the Santa Ynez. On this fault the Santa Ynez Range on the south block is displaced upward and eastward relative to the north block [Dibblee, 1978]. Movement on this fault is discussed in later sections. The Santa Barbara Basin to the south is comprised of south-dipping strata which extend continuously from the south flank of the Santa Ynez Range. Below the shelf and slope of the Santa Barbara Basin, strata are folded into several small anticlines such as the Molino and Hondo Trend, both of which serve as hydrocarbon traps.

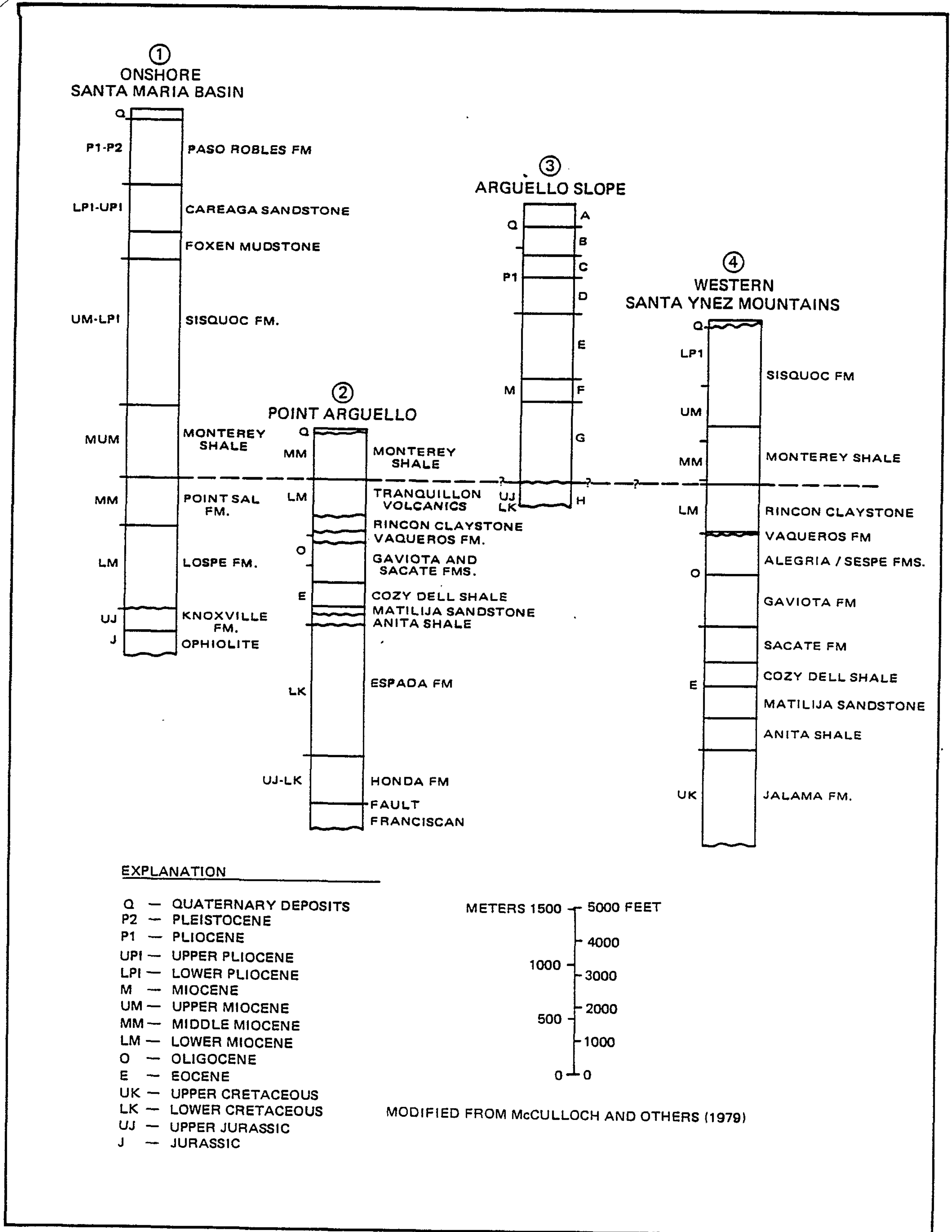


FIGURE 4.1-2 STRATIGRAHIC COLUMNS, ARGULLO FIELD REGION

North and northwest of the project area, the structural trend is dominantly north-northwesterly as exhibited offshore by the Santa Lucia Bank and the Santa Maria Basin, and onshore by the California Coast Ranges. These features are bounded by major faults of the same trend, such as the Santa Lucia Bank Fault and the Hosgri Fault offshore and the Rinconada Fault onshore.

The Santa Maria Basin has an onshore portion which forms a triangular wedge between the northwesterly-trending California Coast Ranges and the east-west trending Transverse Ranges. The transition between these two areas is reflected in the structural trends within the onshore wedge, which gradually change from east-west to northwest-southeast.

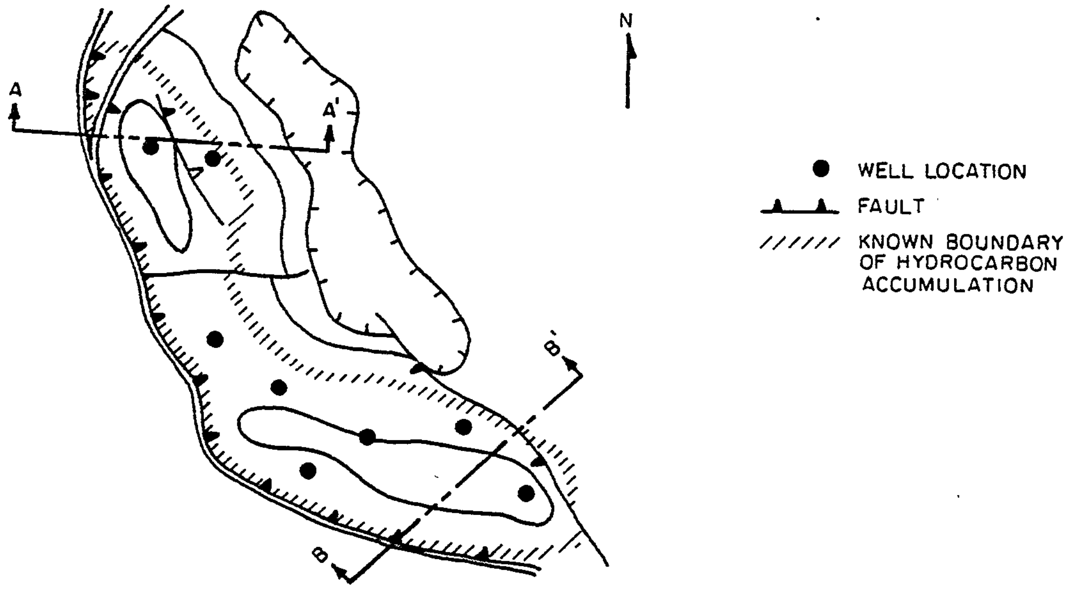
The major trapping structure of the Arguello Field is a doubly plunging northwest-southeast anticline which appears to extend about 10 km (6 mi.) across five Federal leases OCS: -P 0320, P0316, P0325, P 0450, and P0451. Both the southwest and northeast flanks of this anticline are bounded by reverse faults which dip to the north and to the south, respectively. A plan view (Figure 4.1-3a) and two profiles (Figure 4.1-3b and c) illustrate the field's geologic setting.

PLATFORM HERMOSA

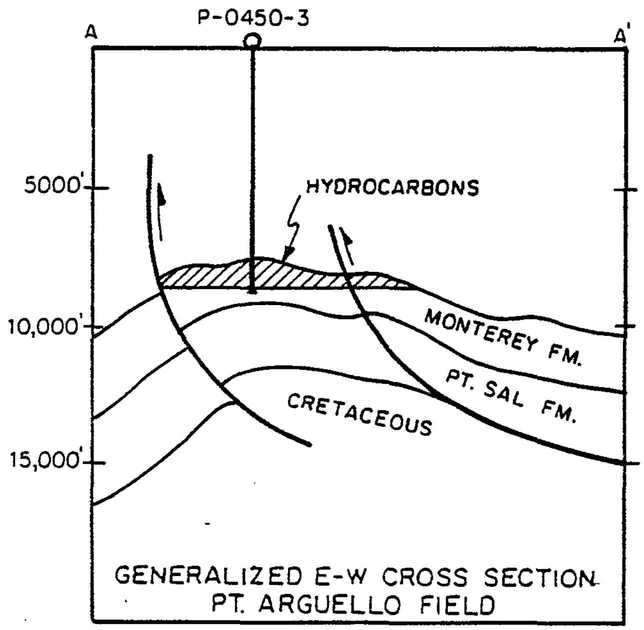
Platform Hermosa would be sited in 183 m (602 ft) of water on OCS-P 0316, located on the Arguello Slope (Figure 1-1). The seafloor in the immediate vicinity is generally smooth, with a southwest slope of 3° (5 percent). Features which interrupt this regular topography include Pleistocene outcrops ranging from 0.6 m to 4 m (2 to 13 ft) in relief, discontinuous downslope-trending elongate depressions, postulated gas vent craters, anchor drag scars, and a previous drill site. These features are discussed further in Section 4.1.5. In general, the stratigraphic section at the Platform Hermosa site is consistent with the regional description. The Holocene interval varies in thickness between approximately 3 and 7.5 m (10 and 25 ft) over the platform site area, except in the elongate depressions where presumed Plio-Pleistocene materials have been exposed. No shallow faulting has been mapped at the site.

PLATFORM HIDALGO

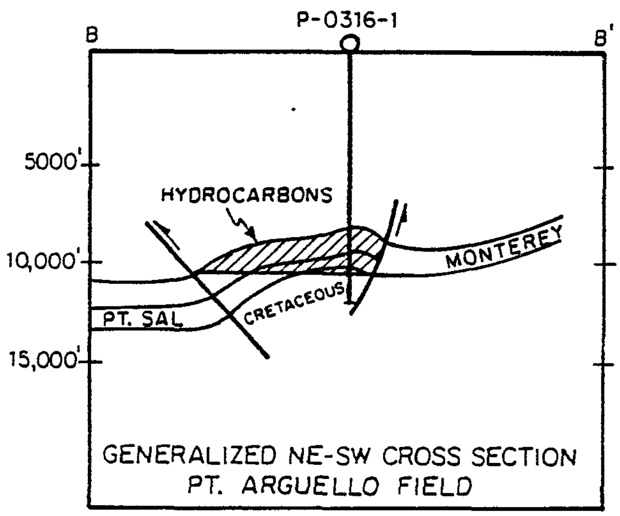
Platform Hidalgo would be sited in 131 m (430 ft) of water on OCS-P 0450, located at the transition between the Mainland Shelf and the Arguello Slope (Figure 1-1). The seafloor exhibits a southwesterly gradient which increases from a maximum of 0.7° (1.2 percent) in the extreme northwest corner of the lease to approximately 3.5° (6.3 percent) in the southwestern half of the block. Numerous seafloor features are present, especially in the eastern half of the lease, and include postulated gas vent craters and elongated, downslope-trending depressions. The general regional stratigraphic section described for the area is also applicable at this platform site. Here, the non-indurated deposits are about 4 m (13 ft) thick and consist primarily of mud. Structurally, the slightly undulatory shallow strata are interrupted by occasional channeling and by several small, high-angle reverse faults. These features are addressed in Section 4.1.3 and 4.1.5.



(a). Generalized structure map, Pt. Arguello field



(b)



(c)

Generalized cross-sections

FIGURE 4.1-3 GENERALIZED GEOLOGIC STRUCTURE MAP AND CROSS-SECTIONS OF POINT ARGUELLO FIELD

PLATFORM HARVEST

This platform would be in 204 m (670 ft) of water on OCS-P 0315, situated at the edge of the Mainland Shelf (Figure 1-1). The average slope over the block is 3° (5.3 percent) to the southwest, varying from 2° (3.7 percent) in the southwest to 3.4° (6 percent) in the northeast. The seafloor over the lease is generally smooth; however, the northeast corner where the platform would be sited has scattered elevated seafloor features and numerous elongate depressions which commonly trend downslope. Different interpretations have been offered about the nature of the elevated features. McClelland [1983] suggests that they are most likely related to tar seeps, although it is also possible that they consist of lag deposits of coarse-grained materials. The general stratigraphic relationships described for the region remain applicable in this area. In addition to the regional geologic structure described above, one fault was noted on the seismic data in this lease by McClelland [1983]; however, the shallowest strata cut by this fault appear to be 150 to 210 m (500 to 750 ft) below the seafloor.

PIPELINE ROUTE TO SHORE

Offshore

The proposed pipeline route to shore extends eastward across the upper Arguello Slope from the Platform Hermosa site to the shelfbreak at 116 m (380 ft) below sea level, and continues across the Mainland Shelf for 6 nautical miles to landfall at a canyon north of Point Conception. Slopes, generally to the southwest, average less than 1° (2 percent) on the shelf, and 3° (6 percent) on the Arguello Slope. On the whole the seafloor is smooth, although numerous isolated outcrops, tar mounds, and small depressions locally alter the shelf. On the slope, several discontinuous depressions trend downslope. The regional stratigraphic setting as described above also applies over the pipeline route. Soils encountered during the pipeline exploration program were clays, silts, silty sands, and clean sands. The silt deposits were mostly encountered in water depths exceeding about 84 m (275 ft). The cleaner sands were generally in less than 84 m (275 ft) of water, and seem to be loose to medium-dense in place [Dames and Moore, 1982]. Within about 1.2 km (4000 ft) of shore the sands are very thin and underlain by a terrace of siltstone. Structurally, the Mainland Shelf along the pipeline route overlays a series of folds which are offshore continuations of folds in the Western Transverse Ranges province. At the Platform Hermosa location these folds have a definite northwesterly orientation. This deformed nature of the Tertiary section is the predominant structural characteristic along the proposed pipeline route, though the folding does not appear to have influenced the Holocene and Pleistocene interval. In general, geophysical records reveal little evidence of active or potentially active faulting along the route [Dames and Moore, 1982].

Littoral Zone

The pipeline would cross to land north of Point Conception at a westerly draining arroyo cut into 14 to 23 m (45 to 75 ft) bluffs. The site is an exposed outer coastal beach, 45 to 60 m (148 to 197 ft) wide, and consists principally of sand, although scattered cobbles are also present. The angle of inclination is 3° (5 percent).

Onshore-Point Conception to Gaviota

The proposed onshore facilities would be sited almost entirely on a rolling coastal terrace lying between the foothills of the Santa Ynez Mountains on the north and a seacliff and narrow beach to the south. The terrace width ranges from less than 30 m (98 ft) to over 1.2 km (0.75 mi), and its elevation varies from 12 to 50 m (40 to 164 ft) above sea level. It slopes to the south at a moderate gradient of 3° to 6° (5 percent to 10 percent) and is dissected by north-south oriented intermittent and perennial streams. The stream valleys are relatively narrow, steep-sided canyons on the higher elevations of the terrace, which then widen perceptably as they cross the terrace to the sea. The coastal terrace terminates abruptly to the south at seacliffs that stand 12 to 30 m (40 to 98 ft) above a narrow beach.

From landfall to the eastern boundary of the Hollister Ranch, slopes within the pipeline corridor average approximately 14° (25 percent), but range from flat to nearly vertical. From Hollister Ranch to Gaviota, it traverses land with slopes averaging 6° to 14° (10 percent to 25 percent). At the edges of south-draining canyons, however, slopes of 31° (60 percent) to near vertical would be encountered.

The regional stratigraphic relationships are also applicable along the onshore pipeline route. The coastal terrace is capped by a thin veneer of horizontally bedded Quaternary alluvial deposits, underlain, in some places, by nearshore Pleistocene beach deposits. These deposits overlie the Tertiary Sisquoc Formation from the landfall to the South Branch of the Santa Ynez Fault just west of Alegria Canyon. From here eastward to about Gaviota, the Monterey directly underlies the terrace deposits. The Rincon Formation underlies the easternmost part of the pipeline route and the Gaviota facility.

Some relatively minor folds and faults oriented parallel to the regional east-west structural grain are evident in places along the route, the most predominant being anticlinal flexures near the mouths of Las Flores Canyon and Canada de Alegria. The axial trace of a somewhat larger synclinal fold crosses Point Conception on a trend slightly north of west from near the proposed marine pipeline landfall to Little Cojo Bay. The most significant structural feature in the onshore portion of the project area is the South Branch of the Santa Ynez Fault, which crosses the pipeline route just west of Canada de Alegria.

INTER-PLATFORM PIPELINES

The pipeline connecting Platform Harvest to Hermosa trends up the slope before turning southeastward. It continues, at water depths of 130 m (420 ft.), for approximately 2500 m (8200 ft.) before turning down the slope to Hermosa. The pipeline from Hidalgo to Hermosa heads immediately southeastward from Hildago, at depths of about 115 m (380 ft.) before turning downslope to Hermosa. On the whole the seafloor is smooth along both corridors, though there are instances of bedrock outcrops and associated channel-like depressions. The regional stratigraphic setting is applicable to these corridors.

GAVIOTA FACILITY

Offshore

The Dames and Moore Seafloor Features Map (Dames and Moore, 1983) for the marine outfall line indicates that the seafloor offshore from Gaviota is interrupted by a number of features, including submerged rock outcrops, a large zone of ripple marks, possible gravel lag deposits, three extensive anchor drag scars, and some as yet uninterpreted intense magnetic anomalies. The areal distribution of these features as mapped by Dames and Moore is fairly continuous parallel to the shoreline. Stratigraphically, the nearshore seafloor is comprised of Holocene and late Pleistocene non-indurated sediment unconformably overlying the Sisquoc Formation and the Pliocene Pico-Repetto Formation. The structure offshore Gaviota is primarily a homocline of Tertiary strata dipping 70° to 75° to the south. These strata are folded into a syncline just offshore, and then folded upward again into the Molino anticlinal trend near the shelfbreak.

Littoral Zone

A streamcut in the coastal bluffs forms the site for the outfall shorecrossing over a protected outer coastal beach 107 m (350 ft) wide. The angle of inclination for this beach has been measured at 4.6° (8 percent). Particle size distribution over the slope decreases seaward, from rounded boulders to cobbles and further to scattered cobble and sand. As is common to an area of natural tar seeps such as the Santa Barbara Channel, small tar balls are abundant at the wash line and on most rocks at the 1.2 to 2 m (4 to 6 ft) heights.

Onshore-Processing Facility Site

The proposed project would occupy approximately 70 acres on the coastal terrace, north of Highway 101. Slopes here range from approximately 1° to 36° (2 to 75 percent). Three drainages -- Canadas del Cementerio, del Leon, and Alcatraz -- either bound or cross the project site. Geologic units found in the immediate vicinity of the facility include, from oldest to youngest, the Oligocene Sespe, the Miocene Vaqueros, Rincon, and Monterey Formations, and alluvium. Structurally, the project site is located along the south flank of an east-west striking, south-dipping homocline of the Santa Ynez Range. Locally the site appears to lie near the hinge of a flexure that increases the dip of the bedding to as high as 85° near the Vaqueros-Sespe contact, compared with 50° north of the site and 70° south of the site. There are no mapped faults or obvious surface expression of faulting in the project area. Linear drainages trending north-south out of the mountains may reflect jointing commonly found perpendicular to bedding.

ALTERNATIVES

Offshore Pipeline

The offshore pipeline alignment extends eastward across the upper Arguello Slope from the Platform Hermosa site to the shelfbreak at 116 m (380 ft.) below sea level, and continues along the Mainland Shelf to Gaviota. Slopes, which are southwesterly to the west of Point Conception and are southerly to the east of Point Conception, average less than 1° (2 percent) on the shelf, and 3° (6 percent) on the Arguello Slope. Geologic interpretation of the side scan sonar indicates that the seafloor exhibits numerous outcrops, tar mounds, gas vent craters and small depressions [Dames and Moore, 1983]. Subsequent visual observation during the biological survey of the pipeline route clarified this interpretation. Reported outcrops were observed in several cases, to be depressions formed by biological activity. "Tar covered mounds" were not observed during the biological survey, though small pieces of tar were observed [revs. communication, M. Warhurst). The regional stratigraphic setting is applicable.

Soils encountered during the exploration program were clays, silts, silty sands, and clean sands. The silt deposits were mostly encountered in water depths exceeding about 84 m (275 ft.) of water, and seem to be loose to medium-dense in place [Dames and Moore, 1983]. Close to shore the sands are very thin and underlain by a terrace of siltstone. The route crosses the SBSY fault.

4.1.3 Faults

REGION

This section addresses the active and potentially active faults of the Arguello Field region. Figure 4.1-4 is a structure map of the faults which show evidence of late Quaternary displacement. Faults significant to project facilities from the standpoint of both potential for displacement of the ground surface and shaking from earthquakes are listed and classified as to activity in Table 4.1-1. Fault lengths, and earthquake magnitude estimates made as part of this project, are also presented. Faults are considered active if they have evidence of displacement or seismicity within the last 11,000 years (Holocene Epoch). Faults which have evidence of displacement older than 11,000 years but younger than about 2 million years are classified as

Table 4.1-1

Summary of Significant Faults and Associated Maximum Earthquakes For The Project Area[1]

	Activity[2]	Fault Length (km)[3,4]	Maximum Expected Magnitude	Maximum Credible Magnitude
Santa Lucia Bank Fault	PA-A	114	7.1	7 1/2
Unnamed Faults on Santa Lucia Bank	PA-A	80	7.0	7 1/2
Offshore Lompoc Fault	A	20	6.3	6 1/2
Offshore Purisima Fault	PA			
Hosgri Fault	PA-A	135	7.2	7 1/2
Pt. Conception (F-1) Fault Zone	A	20	6.3	6 1/2
Santa Ynez Fault (with South Branch)	PA-A	134	7.2	7 1/2
Santa Ynez River Fault	I			
Pacifico Fault	I			
Santa Rosa Island Fault	PA	47	6.7	7
Santa Cruz Island Fault	PA	65	6.9	7
Postulated North Channel Slope Fault	I			
Mid-Channel Fault	PA			
South Channel Fault	I			
Big Pine Fault		70	6.9	7 1/4
San Gabriel Fault		137	7.2	7 1/4
Arroyo Parida-Santa Anita Fault	PA	52	6.75	7
More Ranch Fault	A			
Rinconada Fault (northern segment)	PA	185+	7.4	7 1/2
Cuyama, Ozena & Panza Faults, etc.		30-40	6.7	6 3/4
San Andreas Fault	A	1,130	8.2	8 1/4
White Wolf-Pleito Fault		95	7.0	7 3/4
Garlock Fault		250	7.5	7 3/4
Erburu Fault	PA	2	-	5
Molino Fault	A	9	5.9	6

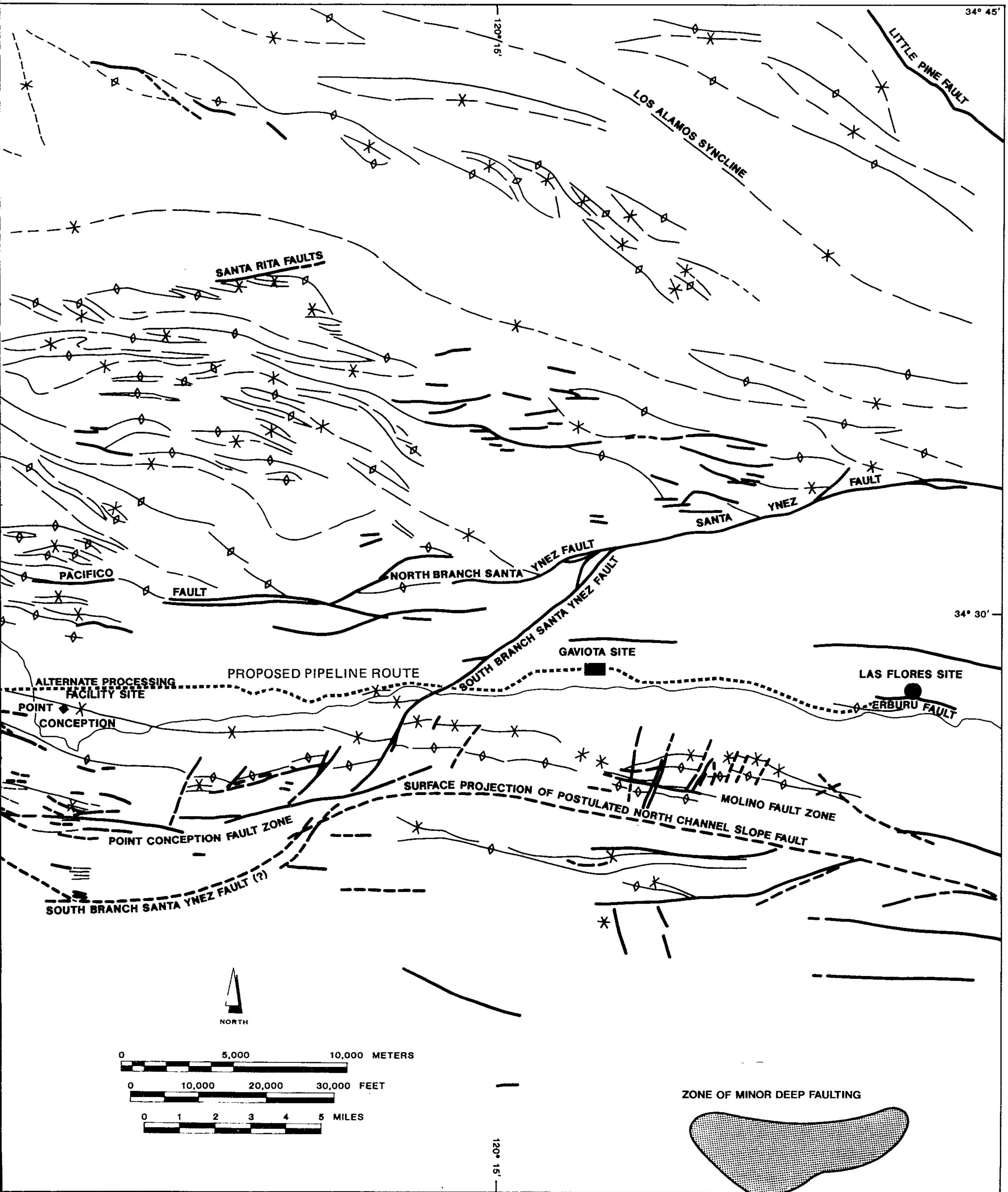
NOTES:

1 Additional discussion of classification of faults and methodology use to calculate earthquake magnitudes can be found in Appendix E.

2 A - shows evidence of displacement or seismicity within the last 11,000 years (Holocene Epoch); active. PA - shows evidence of displacement older than 11,000 years, but younger than about 2 million years; potentially active. I - inactive.

3 Magnitude estimated directly from Slemmons (1982) length-magnitude relationship.

4 Magnitudes are surface-wave magnitudes, M_S.



34° 45'
120° 15'
LITTLE PINE FAULT
LOS ALAMOS SYNCLINE
SANTA RITA FAULTS
SANTA YNEZ FAULT
NORTH BRANCH SANTA YNEZ FAULT
PACIFICO FAULT
SOUTH BRANCH SANTA YNEZ FAULT
34° 30'
GAVIOTA SITE
PROPOSED PIPELINE ROUTE
ALTERNATE PROCESSING FACILITY SITE
LAS FLORES SITE
POINT CONCEPTION
ERBURU FAULT
SURFACE PROJECTION OF POSTULATED NORTH CHANNEL SLOPE FAULT
MOLINO FAULT ZONE
POINT CONCEPTION FAULT ZONE
SOUTH BRANCH SANTA YNEZ FAULT (?)
NORTH
0 5,000 10,000 METERS
0 10,000 20,000 30,000 FEET
0 1 2 3 4 5 MILES
ZONE OF MINOR DEEP FAULTING

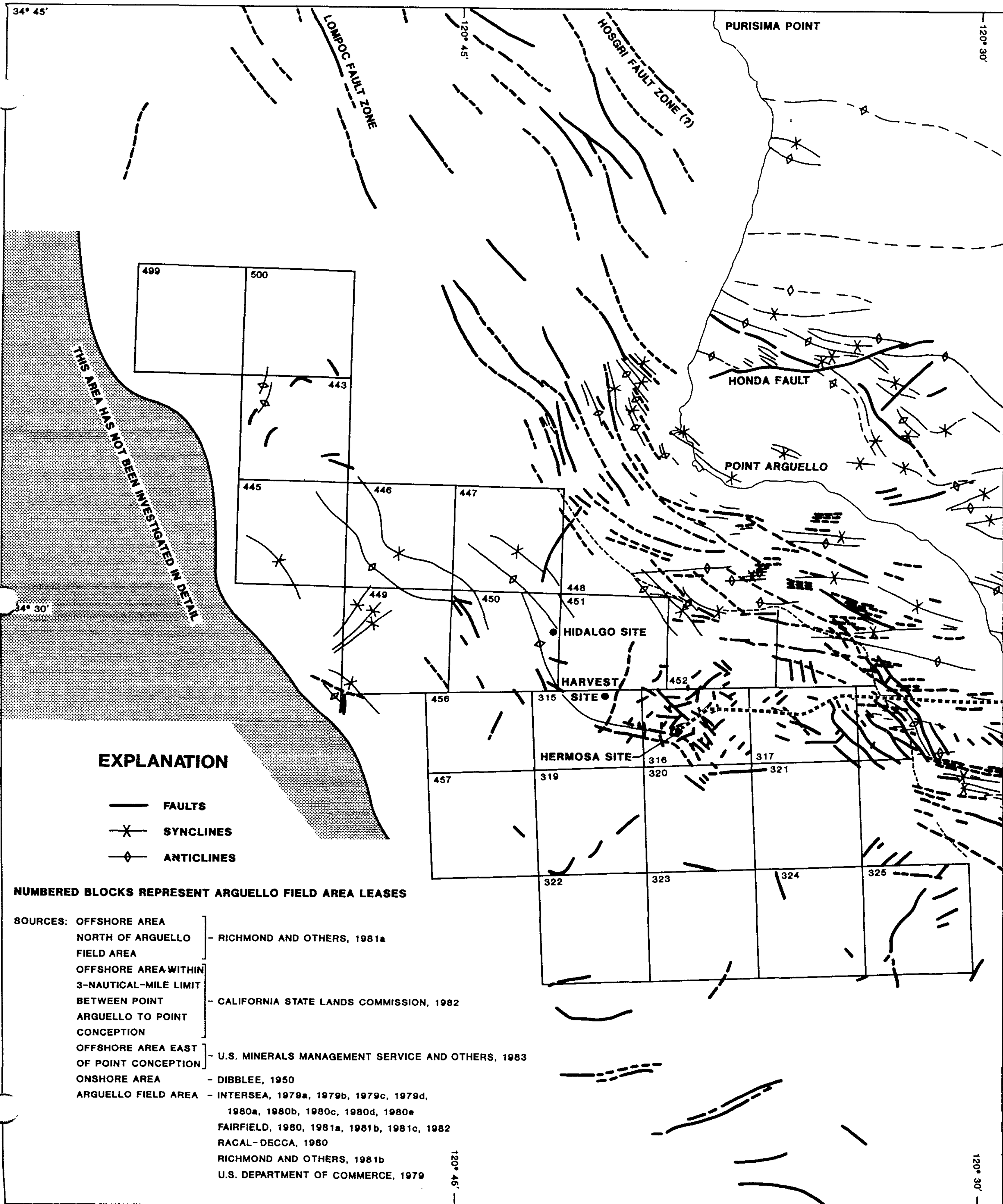


FIGURE 4.1-4 GEOLOGIC STRUCTURE MAP, ARGUELLO FIELD REGION

potentially active. 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. Additional discussion regarding evidence for classification of these faults and others listed in Table 4.1-1 is included in Appendix E.

Hosgri Fault

The Hosgri Fault is a zone of complex, braided and branching fault segments along the eastern edge of the Offshore Santa Maria Basin. Much controversy has been generated regarding the extent, nature, and earthquake-generating capacity of this fault zone. Most of the arguments center on whether the Hosgri Fault 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 and others, 1980], but the poor spatial correlation of epicenters on seismicity maps does not support that speculation. (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 Hosgri Fault Zone [Wagner, 1974; Payne and others, 1979], indicating that it is at least potentially active and likely to be active.

Offshore Lompoc Fault

The Offshore Lompoc Fault is a relatively small reverse fault just northwest of the Arguello Field Area. The total length of the fault zone is 20 km. Although no seafloor displacement has been proven, numerous geomorphic features, apparent stratigraphic displacements, and gas seeps suggest this fault may be a younger feature. According to Richmond and others (1981a), the Offshore Lompoc Fault cuts into the seafloor, and appears to offset the seafloor along half of its length. This evidence suggests that this fault should be classified as active.

Point Conception (F-1) Fault Zone

This fault zone extends from southwest of Point Conception 20 km to a point offshore from the mouth of Alegria Creek. It is interpreted to intersect and offset the South Branch of the Santa Ynez Fault [MESA[2], 1982]. Separation on the fault is north-side-up reverse along fault planes dipping 55 to 70 degrees to the north.

As mapped, the Point Conception Fault Zone consists of three major en echelon segments: the western (F-1A), the central (F-1B), and the eastern (F-1C) faults. Several minor fault splays in the western portion of the zone are unnamed [MESA, 1982]. Although there is no evidence for Holocene activity along the central segment, the eastern and western segments have been active as recently as the Holocene.

Santa Ynez Fault

The Santa Ynez 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 km (90 mi). 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 3 ways into a north branch, a south branch, and a Santa Ynez River branch. The north branch extends due west from the split for about 6 km. There is no evidence of Quaternary movement on the Santa Ynez River or the north branch of the Santa Ynez Fault, but the south branch appears to have been active in the Late Pleistocene. There is also speculation of Holocene displacement offshore. Based on this, the South Branch of the Santa Ynez Fault (SBYSF) is assumed to be active.

San Andreas Fault

The San Andreas Fault forms the boundary between major crustal plates, and these boundaries are commonly the source of large earthquakes. Despite the great distance between the fault and the site area, the active San Andreas Fault has the potential to generate long-period vibrations which may affect tall structures such as offshore oil platforms.

Molino Fault

The Molino Fault is a series of high angle reverse faults about 9 km (6 mi) in length which form the southern boundary of the Molino Trend. Both WESTEC [1980] and MESA [1982] indicate that the seafloor has bowed or arched along at least a portion of this trend. These geologically recent disturbances may indicate Holocene activity, and therefore the Molino Fault is considered active.

Erburu Fault

This fault is a 2 km (1.5 mi) normal fault along the southern margin of the Santa Ynez Range between El Capitan Beach on the east and Refugio Beach on the west. The fault trends east-west, and the fault plane dips to the north, with the south block displaced up relative to the north block [Dibblee, 1950]. Ziony and others [1974] indicate that the feature is of late Quaternary age based on its youthful geomorphic expression. Although there is some degree of controversy surrounding this interpretation, we conservatively assume the fault to be potentially active.

Minor Faults in the Vicinity of the Arguello Field

The numerous block-hazards surveys in the area show several short, small displacement faults. Few of these faults are mapped the same way by the various overlapping surveys, suggesting that they are not major continuous features. Although some are shown as displacing the seafloor, they frequently are not evident on deeper horizons, implying a relation to slumping of surficial sediments. These minor faults are discussed in more detail as they affect the proposed facilities.

PLATFORM HERMOSA

No faults were identified from geophysical (Dames and Moore, 1982) data within 580 m (1900 ft) of the proposed platform location. Though other surveys have suggested that short faults may exist in the lease block (as shown in Figure 4.1-4), the Dames and Moore (1982) data are considered by responsible agencies to be more reliable an form the basis for the interpretations presented here. To the west and northwest of the proposed site, four discontinuous faults were mapped (Figure 4.1-5). Interpretations suggest the latest movement along these faults to be Plio-Pleistocene in age. These inferred faults can be traced laterally from 500 to 875 m (800 to 1400 ft), and do not trend toward the platform site, indicating that surface displacement at the site is unlikely.

PLATFORM HIDALGO

Three small, high-angle reverse faults occur in the eastern portion of Lease OCS-P0450 in the vicinity of the proposed platform location. Only one of these faults displaces the seafloor. It is considered active [Fairfield, 1981], but is located about 1100 m (3600 ft) south of the proposed platform location, and trends in an east-west direction away from the site (Figure 4.1-5).

PLATFORM HARVEST

One fault was noted on the geophysical data in the vicinity of the Platform Harvest site (Figure 4.1-5). This normal fault trends toward the north-northeast. The shallowest strata cut by this fault are about 150 to 230 m (500 to 750 ft) below the seafloor, and therefore it is considered to be inactive [McClelland, 1983].

PIPELINE ROUTE TO SHORE

Offshore Faults

A number of faults have been identified in this area, (Figure 4.1-4) but only two cross the the pipeline route (Figure 4.1-6). Those faults which are not observed along adjacent track lines, and are expressed only in pre-Holocene strata, are considered to have negligible potential for surface diplacement across the pipeline. Another broad zone of faulted and fractured Tertiary age rock is located approximately 8 km (5 mi) west of Point Conception. None of the faults identified in this zone exhibit seafloor expression or offset the Quaternary. Hence the potential for surface fault displacement across the pipeline in this area is also highly unlikely.

Two faults inferred from the geophysical data do cross the proposed pipeline route. These faults are located about 12 km (8 mi) west of Point Conception near the Platform Hermosa site, and do not appear to displace the seafloor.

Onshore Faults

Two potentially active faults are mapped near the proposed onshore facilities -- the South Branch of the Santa Ynez Fault (SBSYF) and the Erburu Fault (Figure 4.1-4).

The SBSYF crosses Alegria Canyon just north of the ranch road and can be recognized by the contorted bedding visible in the western road cut. If a 7.5 magnitude earthquake is assumed to be possible on this fault, empirical displacement-earthquake magnitude relationships [Slemmons, 1982] suggest that displacement during such an event could amount to 4 to 5 m (13 to 16 ft). Such a large displacement may be inappropriate, however, based on comparison to recent earthquakes in a tectonic environment similar to that of the Western Transverse Ranges. Ground ruptures associated with the 1952 Kern County earthquake (M_L=7.2) and the 1971 San Fernando earthquake (M_L=6.4) amounted to as much as 2 m (6 ft.). Also, the South Branch does not appear to be a fault characterized by large, frequent ground ruptures. Although the total displacement of the Main Branch of the Santa Ynez Fault may total several kilometers, the total cumulative post-Tertiary displacement on the South Branch appears to be no more than a few hundred meters. This suggests a history of small and infrequent surface displacements.

The Erburu Fault is a minor feature and hence is probably not capable of generating an earthquake any greater than the general background seismicity (M = 5.0). It may even be aseismic, as seen with other small faults in the Ventura area described by Yeats and others [1981]. However, the orientation of this fault is compatible with the north-south compressional tectonic regime of the Western Transverse Ranges, and it also seems similar to several faults offshore. Therefore, unless direct evidence to the contrary can be found, the Erburu should be considered to have a potential for at least small ground displacement.

INTERPLATFORM PIPELINES

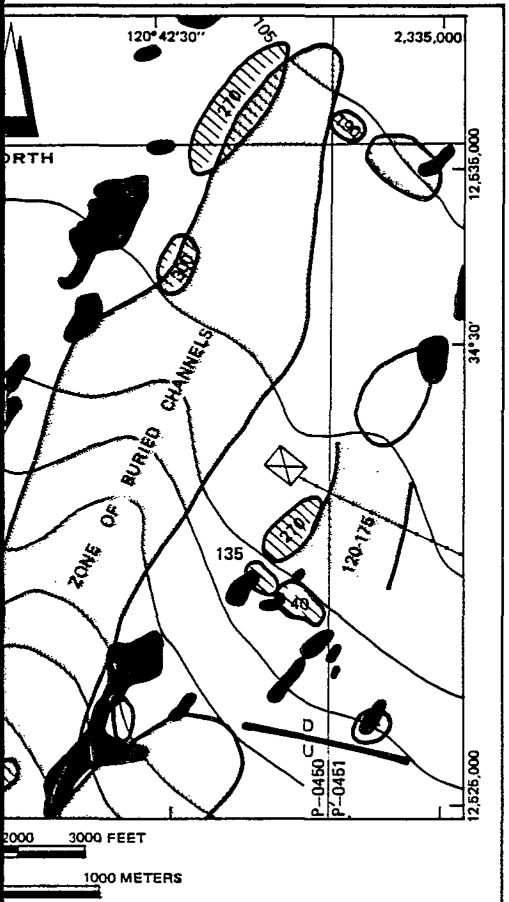
The pipeline corridors do not cross any known active or potentially active faults. The buried fault described in the Platform Harvest discussion above is crossed by both corridors. This fault is considered inactive.

GAVIOTA FACILITY

There are no mapped active or potentially active faults at the Gaviota Facility. The nearest such faults are the SBSYF which is about 4 km (2.5 mi) to the northwest, and the Molino Fault which is 4.5 km (2.7 mi) to the southwest in the offshore region.

ALTERNATIVES

There are no mapped active or potentially active faults at the Point Conception alternative processing facility site. The offshore pipeline route is close to and north of the Point Conception Fault Zone, and crosses the offshore extension of the SBSYF.



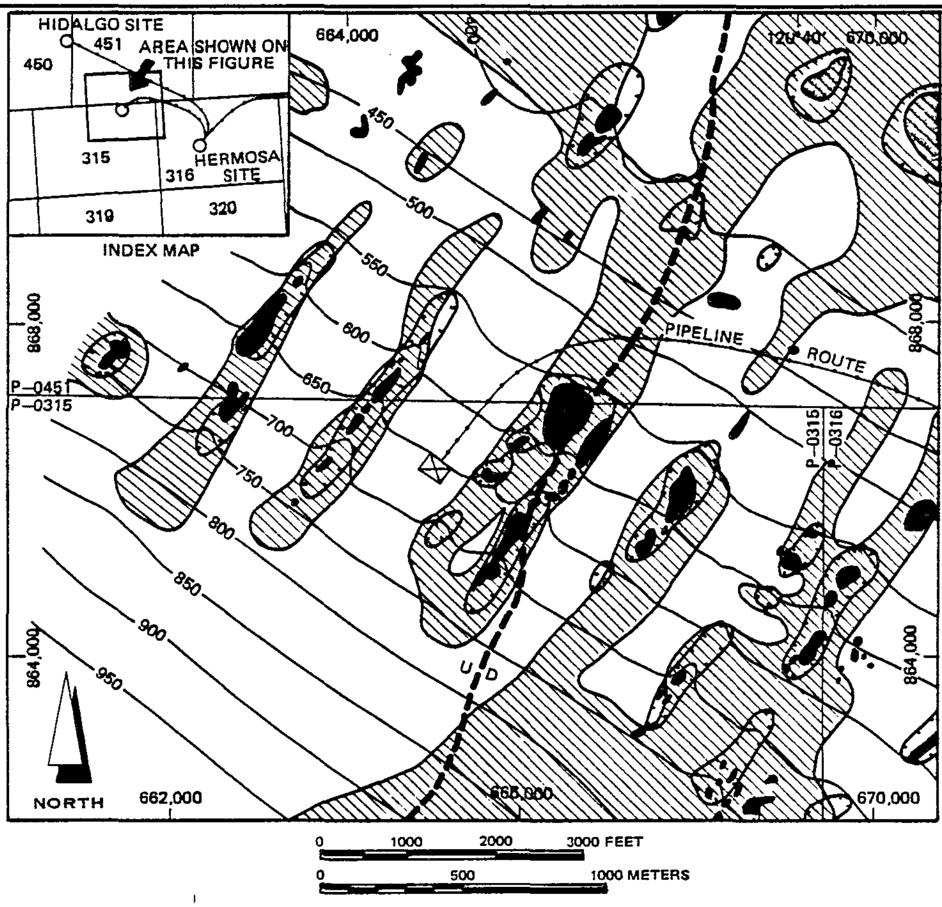
MBER INDICATES DEPTH BELOW
FLOOR MEASURED IN TWO-WAY
RAVEL TIME IN MILLISECONDS

CK

NOTES:

1. MODIFIED FROM FAIRFIELD, 1981
2. COORDINATE SYSTEM IS UTM ZONE 10 IN FEET

TFORM HIDALGO SITE

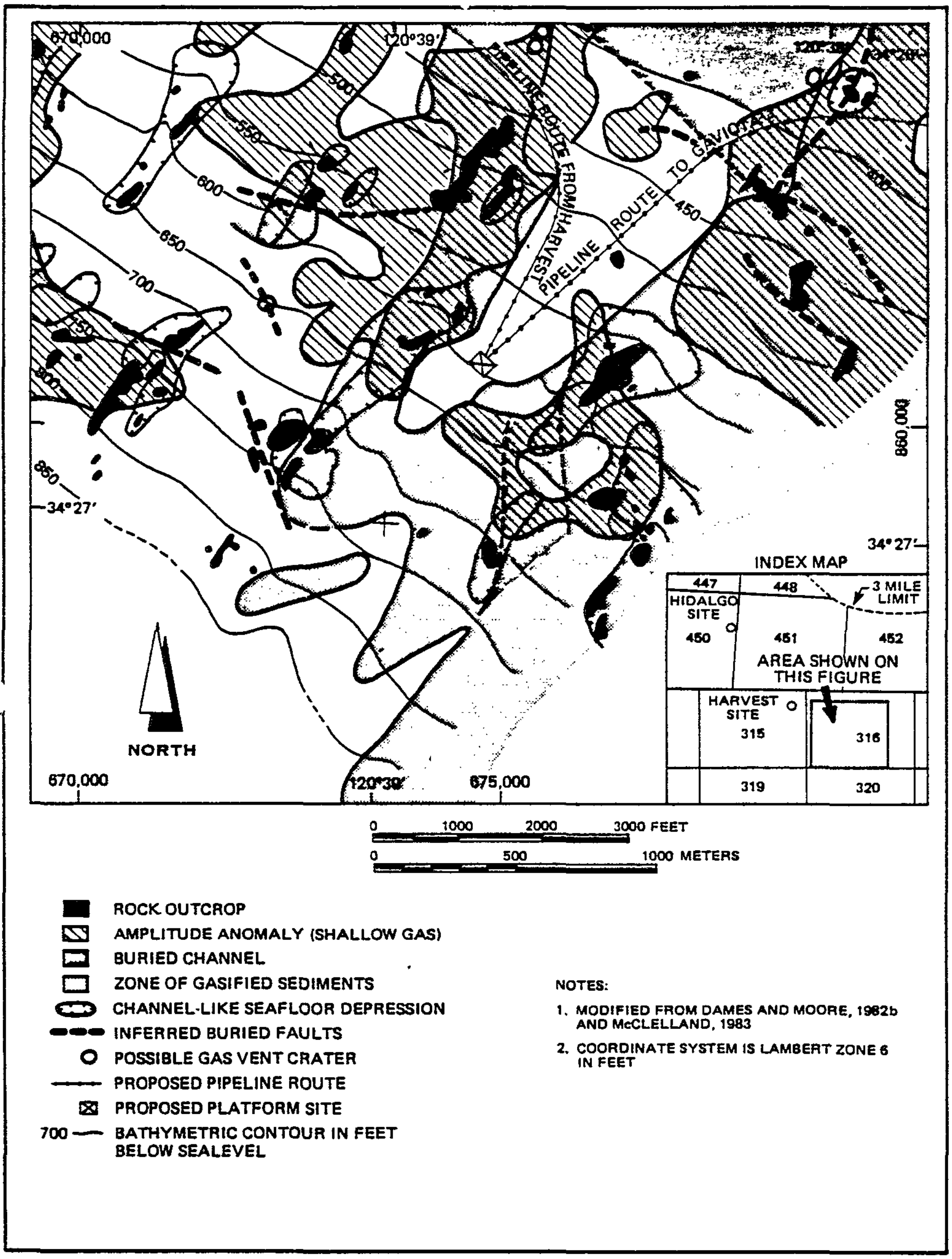


CHANNEL–LIKE SEAFLOOR DEPRESSION
ELEVATED SEAFLOOR FEATURE
SEDIMENTARY ROCK OUTCROP
AMPLITUDE ANOMALY (SHALLOW GAS?)
BURIED FAULT; U INDICATES UPTHROWN SIDE, D INDICATES DOWNTHROWN SIDE.
PROPOSED PLATFORM SITE
PROPOSED PIPELINE ROUTE
550 BATHYMETRIC CONTOUR IN FEET BELOW SEALEVEL

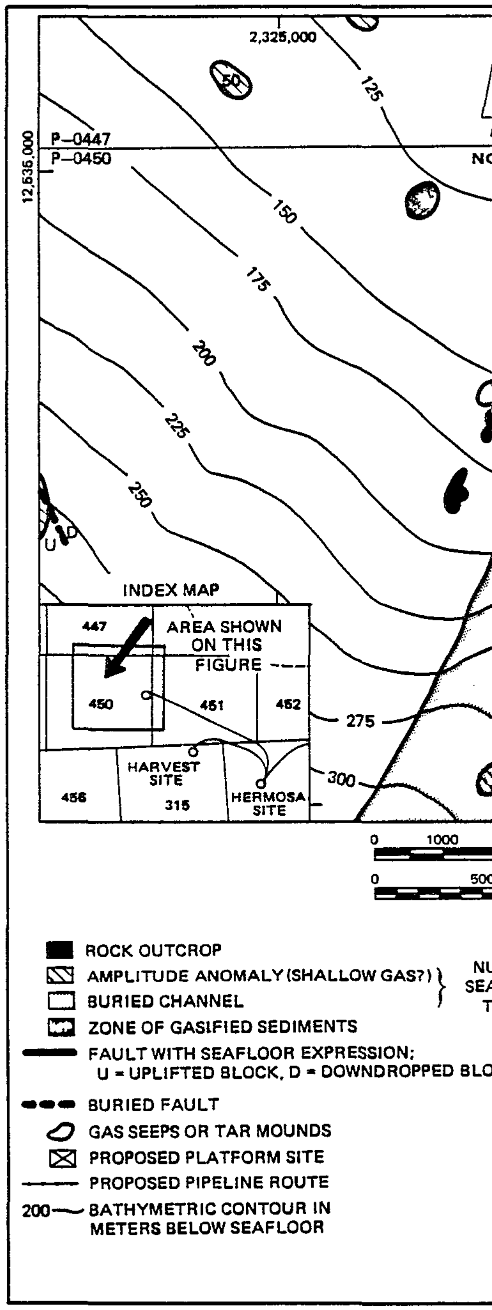
NOTES:

1. MODIFIED FROM McCLELLAND, 1983
2. COORDINATE SYSTEM IS LAMBERT ZONE 6 IN FEET.

GEOLOGIC CONSTRAINTS MAP, PLATFORM HARVEST SITE

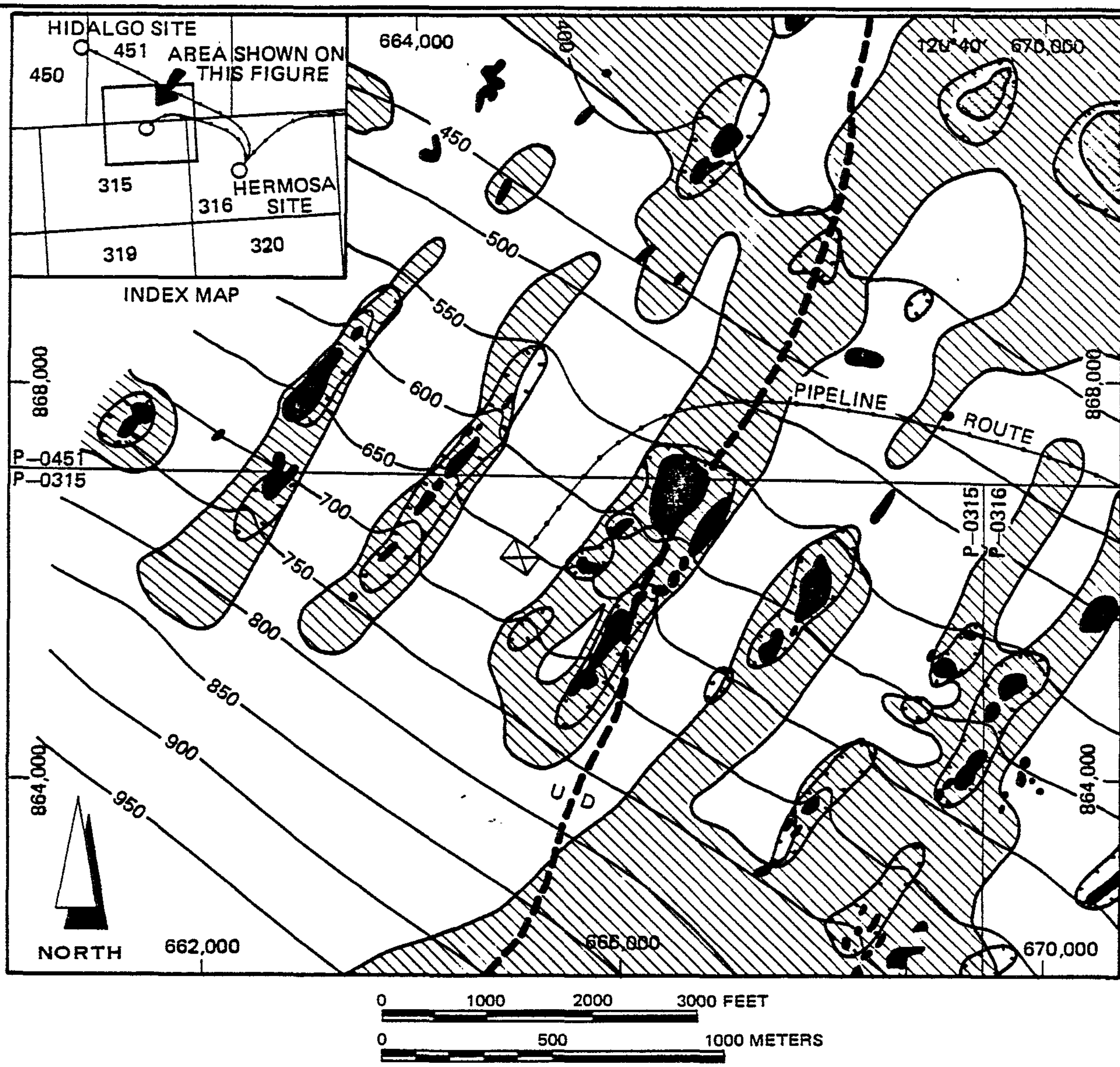


GEOLOGIC CONSTRAINTS MAP, PLATFORM HERMOSA



GEOLOGIC CONSTRAINTS MAP, PL

FIGURE 4.1-5 GEOLOGIC CONSTRAINTS: PL



CHANNEL—LIKE SEAFLOOR DEPRESSION

ELEVATED SEAFLOOR FEATURE

SEDIMENTARY ROCK OUTCROP

AMPLITUDE ANOMALY (SHALLOW GAS ?)

BURIED FAULT; U INDICATES UPTHROWN SIDE, D INDICATES DOWNTHROWN SIDE.

PROPOSED PLATFORM SITE

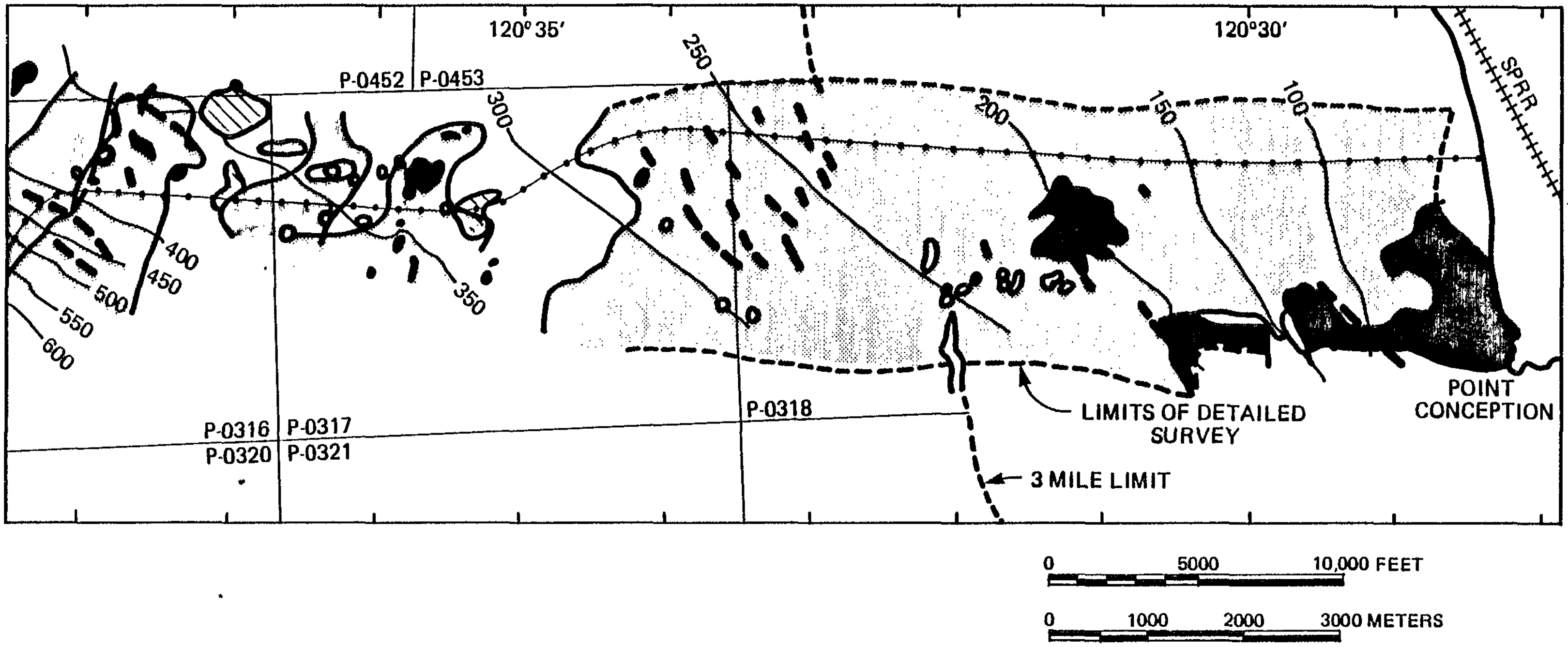
PROPOSED PIPELINE ROUTE

—550— BATHYMETRIC CONTOUR IN FEET BELOW SEALEVEL

NOTES:

1. MODIFIED FROM McCLELLAND, 1983
2. COORDINATE SYSTEM IS LAMBERT ZONE 6 IN FEET.

GEOLOGIC CONSTRAINTS MAP, PLATFORM HARVEST SITE



ROCK OUTCROP

AMPLITUDE ANOMALY (SHALLOW GAS ?)

BURIED CHANNEL

ZONE OF GASIFIED SEDIMENTS

TAR MOUNDS AND POSSIBLE GAS VENT CRATERS

INFERRED BURIED FAULTS

300 BATHYMETRIC CONTOUR IN FEET BELOW SEALEVEL

PROPOSED PIPELINE ROUTE

NOTES:

1. MODIFIED FROM DAMES AND MOORE, 1982a

FIGURE 4.1-6 GEOLOGIC CONSTRAINTS MAP, PROPOSED OFFSHORE PIPELINE ROUTE

4.1.4 Seismicity

REGION

Earthquake History

Earthquake epicenters in the Point Arguello Field Area are shown on Figure 4.1-7. Notable features of the seismicity in this area 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 in the area is readily correlated to known faults [Schell, 1979]. This may be due to long recurrence intervals for major faults in the area, or to the poor location accuracy of seismographic networks in the area.

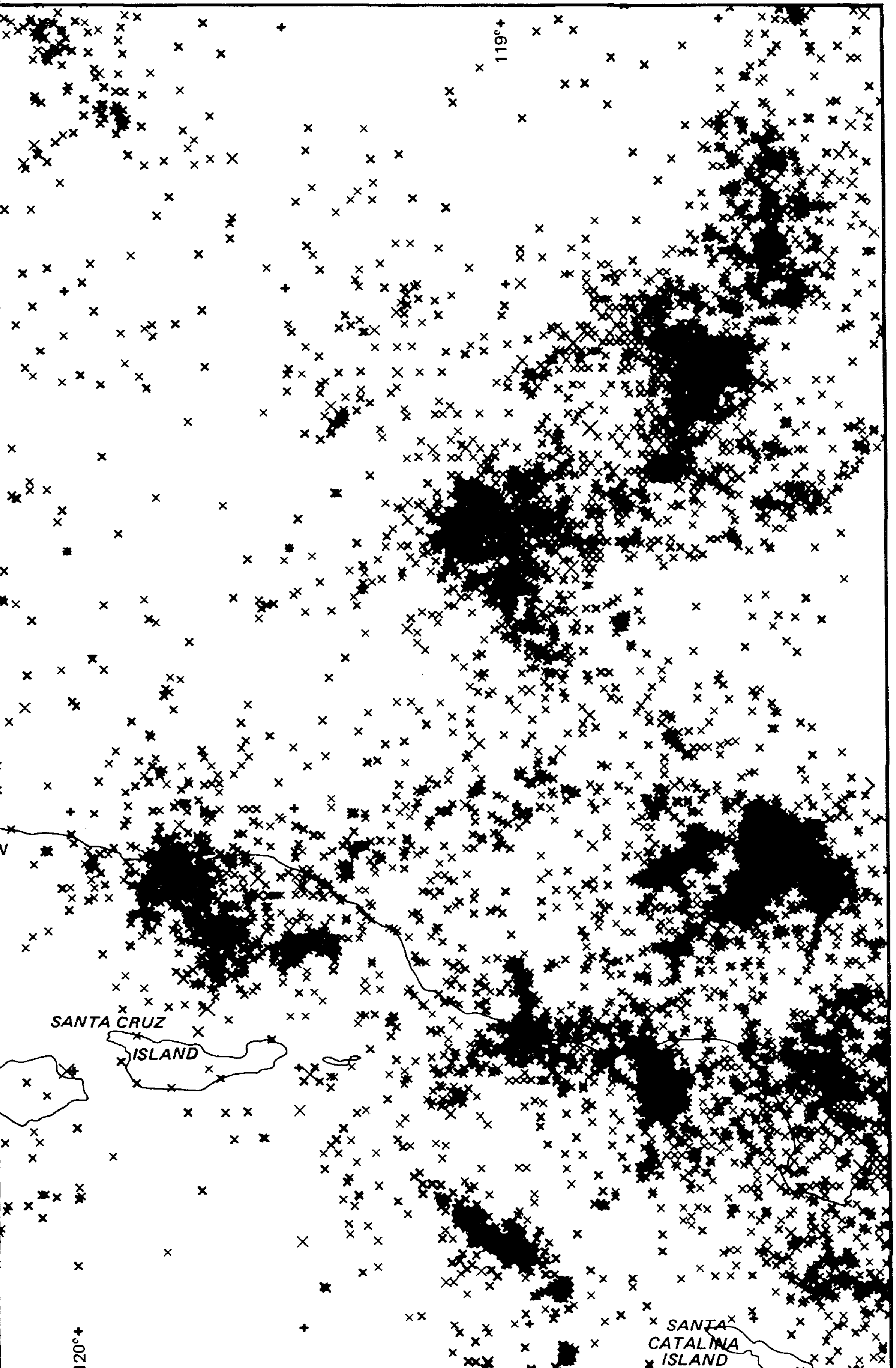
The largest earthquakes in the Conception-Arguello area were the 1812, 1857, and 1927 earthquakes. The 1812 shock probably occurred within the Western Transverse Ranges province [U.S. Geological Survey, 1976; Topozada and others, 1980]. The magnitude and epicenter of this event are poorly known, but 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) 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 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 and others, 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.

Maximum Earthquakes

Table 4.1-1 lists conservative estimates of the maximum earthquakes considered capable of occurring on active and potentially active faults in the study region. These values are based on such seismological data as maximum historical earthquakes and on geologic data such as fault-length and fault-displacement parameters.

PLATFORMS HERMOSA, HIDALGO, AND HARVEST AND INTER-PLATFORM PIPELINES

Figure 4.1-7 shows that the earthquakes in proximity to the three platform sites have been events of a magnitude less than 4. A few more distant events are in the magnitude 4 to 5 range. The earthquakes are randomly scattered in the vicinity of the Arguello Field, and do not indicate any zones of intense seismicity or any seismically active


119°
SANTA CRUZ ISLAND
SANTA CATALINA ISLAND
120°

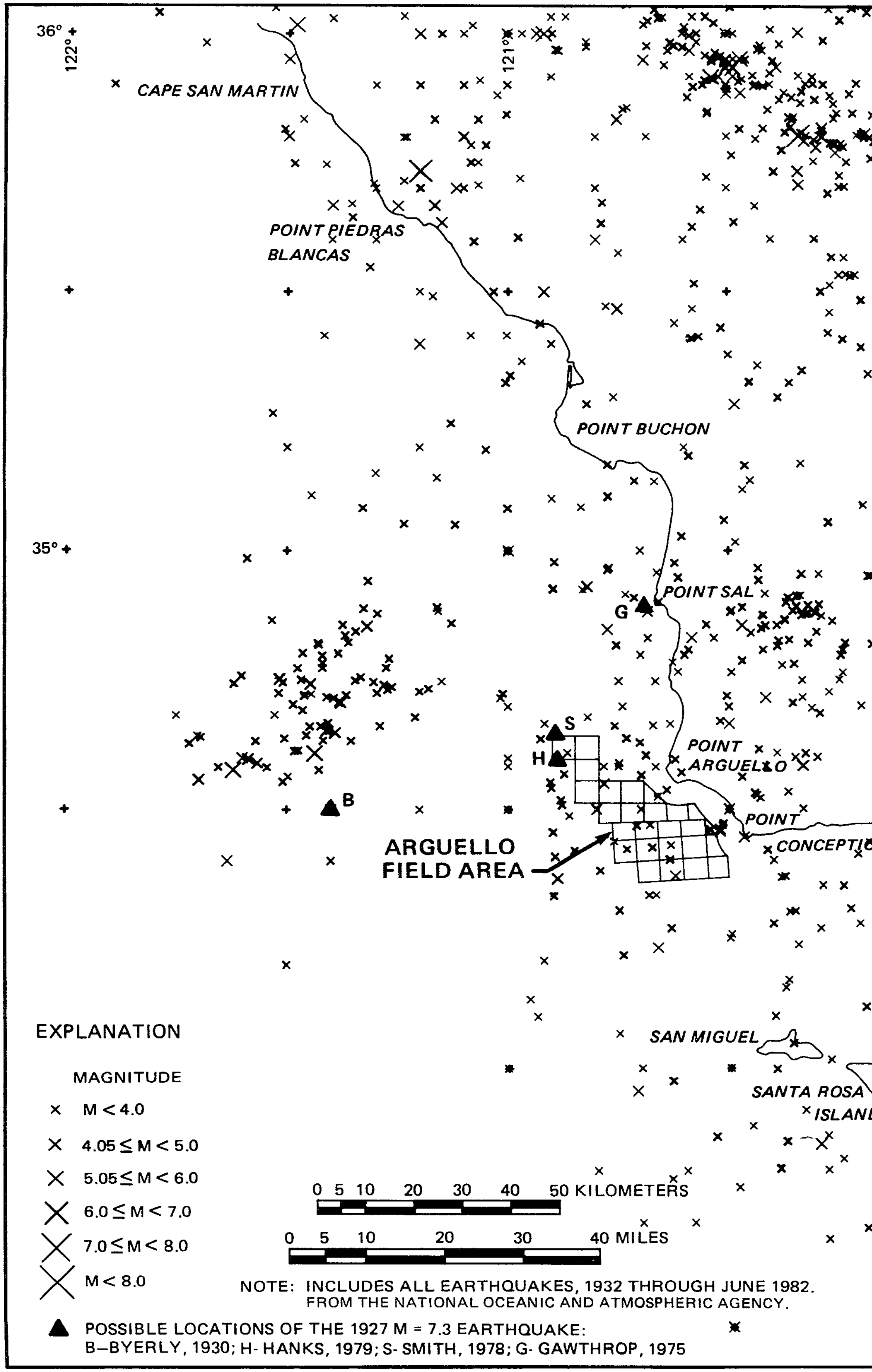


FIGURE 4.1-7 REGIONAL SEISMICITY MAP

faults. Their random distribution suggests they are typical of the background seismicity as seen in other parts of California. In contrast, areas of active faulting are shown by dense clusters of earthquakes on Figure 4.1-7. The earthquake of most concern to the platform sites is the 1927 event of magnitude 7.3.

PIPELINE ROUTE

The seismicity discussion above for the three platform sites is also applicable to the pipeline route. Figure 4.1-7 shows that earthquakes in proximity to the route are of a magnitude less than 5. The earthquakes of most concern for the pipeline route are the 1927 event and the 1812 event of unknown magnitude.

GAVIOTA FACILITY

Figure 4.1-7 shows the location and magnitude of historic earthquakes in the vicinity of the Gaviota facilities. There have been no earthquakes in proximity to this site. The nearest event was of a magnitude less than 4.

ALTERNATIVES

The seismicity discussion above for the three platform sites is generally applicable for the alternatives. The Point Conception site is in a slightly more active area than the Gaviota site. The alternative offshore pipeline alignment does not differ significantly from the proposed alignment with respect to seismic characteristics.

4.1.5 Other Geologic Considerations

OFFSHORE

In addition to the geologic history, physiography/bathymetry, geologic structure, stratigraphy, and seismicity, several other geologic factors of the Arguello Field area must be considered in order to determine the impact of the proposed project. These include gasified sediments, shallow formational gas, tar mounds, slope stability, erosion, liquefaction, and the nature of the seafloor and shallow subsurface which might lead to differential settlement or subsidence, such as buried channels and rock outcrops. Each of these geologic phenomena is defined in Appendix E. The discussion here focuses on their proximity to proposed project facilities. Figure 4.1-5 maps potential geologic constraints in the vicinities of the platforms, while 4.1-6 addresses the pipeline route.

Platform Hermosa

Zones of possible shallow gas accumulation are mapped in the vicinity of the platform however, there is no evidence for significant gas accumulations in near-surface sediments directly beneath the proposed site. Also, three possible gas vent craters have been mapped in the Hermosa study area, although none of these features is found within about 700 m (2400 ft) of the proposed platform site.

The angle of the seafloor slope near the platform is 3° to 3.5° (5 percent to 6 percent) and should be stable under static conditions for the design life of the structure. McClelland Engineers has indicated that if surface acceleration during a seismic event was 0.3g, there would be a potential for downslope movement of the soft Holocene clay. McClelland Engineers [1982] has performed tests on the soft near-surface sediments which have indicated that downslope creep, if it were to occur, would be minimal and restricted to the uppermost soft clay layer. In addition, the clayey silts and silty clays at the site are not considered to be susceptible to scour. Finally, although near-surface samples collected in the vicinity of the site indicated the presence of potentially liquefiable soils, similar samples obtained directly at the platform site were not found to be susceptible to liquefaction.

Two types of seafloor features in the vicinity of the site which may be considered indicative of instability are the "contorted area," an irregularity in surface contours approximately one mile southeast of the site, and the elongate, channel-like depressions found at several locations on the slope. The stratigraphy of the "contorted area" is sufficiently different from that of the site that this slump feature cannot be considered an indication of potential instability at the site. A definitive interpretation for the development of the depressions has not been determined, but an erosion mechanism seems unlikely because they are not continuous channel-like features.

Platform Hidalgo

Numerous elevated seafloor features are present south of the proposed platform site and in the northwest quadrant of OCS-P 0316. Except for one elevated feature about 960 m (3200 ft) east-northeast of the proposed Platform Hidalgo site, all of these features occur along the Arguello Slope. Shallow seafloor depressions commonly surround these areas of sedimentary rock outcrops and elevated seafloor features. Where these depressions occur southwest of the shelf break, they generally trend downslope.

Gas seeps and mounds related to near-surface gas are observed scattered throughout the vicinity of the platform site [Fairfield, 1981c], but none of these seeps was noted in the immediate platform area [Chevron, 1983]. In addition, the Pleistocene-Pliocene sediments contain shallow gas zones in the vicinity of the platform site, although no shallow gas was noted during the drilling of three exploratory wells in the block.

A zone of buried channels occurs just west of the platform site trending south-southwest and generally aligned with the surface channel within the block. Another smaller buried channel is observed east of the platform site. There is no evidence of normal seafloor slumping or other large mass movements in this block.

Platform Harvest

Irregular bottom features detected in the vicinity of the Platform Harvest site are discontinuous channel-like southwest-trending depressions. Intersea Research Corporation [1980a] suggested that these depressions are areas of erosion caused by gravity-controlled downslope movement of surficial sediments, however slide masses at the base of the features have not been identified. Another possible mechanism might be sediment liquefaction because of earthquake shaking, especially since the susceptibility of seafloor materials for seismically-induced movement has been noted by Woodward-Clyde Consultants [1983]. Often these depressions surround an elevated hard bottom area, which suggests that minor seafloor scour is active adjacent to the outcrops. Also gas is commonly present beneath these channel-like depressions. The depth of the gas varies, but beneath the platform site it is most prominent within and below a horizon approximately 23 m (75 ft) below the seafloor.

Pipeline Route To Shore

There is a general pattern to the distribution of hydrocarbon seep features found in the pipeline route area. The gas vent features predominate in the western portion of the survey area, with most located above or adjacent to zones of shallow gas and/or gasified sediments. The tar mounds and tar-covered outcrops are found only in the eastern half of the area. In most cases, no thinning of the Holocene overburden was apparent in the vicinity of these mounds [Dames and Moore, 1982], suggesting that they have formed through upward migration of hydrocarbons through the Holocene sediments. The distribution of gasified sediments below the proposed pipeline route is almost continuous [Dames and Moore, 1982].

A group of buried channels is present in the western portion of the route near the shelfbreak. They trend approximately north-south and appear to be oriented near normal to bathymetric contour. In several instances, individual younger channels can be seen within older channel deposits. A small, laterally discontinuous possible buried channel has also been mapped on the slope to the southeast of the Hermosa site (Figure 4.1-5).

Interplatform Pipelines

The pipeline corridors are routed through areas where shallow gas and gasified sediments are inferred to be present from geophysical records, and where rock outcrops and shallow depressions have been mapped. The characteristics of the depressions and associated occurrences of gas are discussed in the Platform Harvest paragraph above. The routes do not cross any outcrops or depressions. The routes do not cross any known areas of seafloor instabilities or mass movements.

ONSHORE

Soils

The onshore project components traverse soils of approximately 16 distinct series, which range in texture from loamy sands with some dune areas, to clays. Clay soils encountered in the project area are considered expansive, with a high potential for volumetric changes as a result of wetting and drying cycles. As for soils, slopes are also quite variable, as noted in the geomorphology description for the pipeline route (Section 4.1.2).

Erosion

Erosion hazards include loss of soil by sheet erosion, gully erosion, and wind erosion. Sheet and gully erosion are a function of soil and slope characteristics. Slopes greater than 15 percent have a high potential for erosion regardless of soil type. Soils susceptible to erosion on less steep slopes include the Conception series (gullies), the Lopez-Santa Maria Complex (hills and shallow gullies), the Milpitas series (sheet erosion), and the Milpitas-Positas complex (sheet erosion). In the immediate project area, the Conception soils occur from landfall east as far as Wood Canyon, and again roughly from Canada del Gato to Canada de Santa Anita. The Milpitas and Milpitas-Positas series occur in a limited area near the Gaviota site. Other soils in which gullying or rilling is evident include the Ayar and Zaca clays, and the Botella and Nacimiento soils.

Slope Stability

Unstable slopes can fail by a variety of mechanisms including landslides, creep, liquefaction, and undercutting. Some instances of landslide failure have been noted along the pipeline route from Point Conception to Gaviota with the least stable area near Gaviota Creek. Between Gaviota and Las Flores, extensive slide areas exist, especially in the vicinity of Las Flores. Areas underlain by the Rincon formation are least stable, and can fail by rotational slumps on any slope. Areas underlain by the Monterey and Sisquoc formations tend to fail on south-facing slopes where the slope angle exceeds the angle of dip of the bedding planes.

Cliff Retreat

Cliff retreat is an active process in the project area. Measured rates of retreat of sea cliffs in the Santa Barbara coastal area average 6 inches (15 cm) per year [Seismic Safety and Safety Element for Santa Barbara County, 1979]. Retreat of the cliffs is a phenomenon that occurs more by failures of slabs or large blocks at one time than by gradual loss of material, and is affected by numerous factors, including degree of fracturing and consolidation of sediments, slope, groundwater and surface water flow, undercutting by wave action, vegetation, and human and animal traffic.

4.1.6 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 (15CFR930), the OCS Land Acts (30CFR250), and the Department of Interior OCS Orders 1-12, in particular orders 2 and 8. Department of Transportation regulations (e.g., 49CFR192, 49CFR195) govern aspects of construction and design of oil and gas pipelines. The OCS Lands Act (30CFR250) 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 or origin; provides for supervision of drilling operations at all times to ensure compliance with regulations, orders and NTSs; 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 basically requires what is known as the Platform Verification Program, an integral part of the review and approval process for Development and Production Plans.

The MMS Platform Verification Program is administered by MMS, and is a mandatory program to evaluate the structural adequacy of fixed or bottom-founded platforms or other structures. MMS authority derives from the Outer Continental Shelf Lands Act (30 CFR 250). The Program requires approval of MMS of the Development and Production Plan, Platform Design, Platform Fabrication, and Platform Installation. These are prepared by the applicant. The latter three are reviewed by the Certified Verification Agent (CVA) who is recommended by the applicant and approved by MMS, as third-party reviewer of applicant plans. The program objective is to provide maximum assurance of structural integrity of OCS platforms against environmental and operational conditions to which they may be exposed, using state-of-the-art, performance based standards. As such, MMS approval of each of the four phases listed above would incorporate mitigations necessary to reduce hazards to insignificance.

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 if soil can support platforms (MMS, 1983a).

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 81-3, 82-2, and 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 format. NTL 82-2 addresses minimum requirements for

OCS pipeline route hazard surveys for topics similar to those described for 81-3. 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

The South Central Coast Air Basin that may be impacted by air emissions from the project includes Santa Barbara County and portions of Ventura County. 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. Both 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).

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 Santa Barbara County Air Pollution Control District (SBAPCD) New Source Review (NSR) Regulations, the SBAPCD Prevention of Significant Deterioration Regulations (PSD), and the USEPA 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 (30CFR250). The specific regulations that are applicable to the proposed projects are described below.

4.2.2 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 concentation limits that are never to be exceeded. Table 4.2-1 summarizes the current Federal and State standards.

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	0.5 ppm[J] (1310 ug/m^3)	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

A Standards from California Air Resources Board.

B National standards, other then 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^{o}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 L-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 new California 1-hour SO_2 standard (adopted October, 1984) is 655 ug/m^3 (.25 ppm).

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 (30CFR 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.

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)	$3400\ D^{2/3}$

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 4.2-2
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: 30CFR250.57

VOC emissions are reviewed differently. Since emitted VOC's 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) Nonattaiment 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 Best Available Control Technology (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.

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*BACT is defined as follows (40 CFR 52.21): Best available control technology means an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Clean Air Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, 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 for control of such pollutant.

TABLE 4.2-3

MAXIMUM ALLOWABLE INCREASES[a]

Class I Areas	Maximum Allowable Increase (ug/m3)
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: 40CFR52.21

Prevention of Significant Deterioration Regulations

The EPA Prevention of Significant Deterioration (PSD) regulations apply to certain facilities located onshore and within the 3-mile limit. This includes the proposed onshore terminal 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 authority for regulating nonattainment pollutants in Santa Barbara County has been delegated to the State by EPA through approval of the Santa Barbara County nonattainment area plan (47 FR 19330). Santa Barbara County APCD Rules and Regulations are discussed later.

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.

Santa Barbara 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 Air Pollution Control District.

Santa Barbara County recently adopted 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 requires Best Available Control Technology (BACT). BACT review levels for carbon monoxide are 20 pounds per hour or 150 pounds per day;

TABLE 4.2-4

EPA MONITORING EXEMPTION LEVELS

Pollutant	Averaging Period	Concentration (ug/m3)
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	1-hour	0.04
Total Reduced Sulfur	1-hour	10
Reduced Sulfur	1-hour	10

[a] Increase in VOC emissions of 100 tons per year.
[b] No exemption level specified.

Source: 40CFR52.21

Table 4.2-5

SANTA BARBARA COUNTY AIR POLLUTION CONTROL DISTRICT (APCD) AIR QUALITY INCREMENTS (IN ADDITION TO INCREMENTS ESTABLISHED BY CLEAN AIR ACT)

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

Source: Rule 205.C, County of Santa Barbara

* 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/m^3 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% per year over 10 years or the life of the project, whichever is less. APCD's consent shall not be unreasonably withheld provided that the 10-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.

(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.

This increment and mitigation requirement shall be reviewed if CARB or EPA develop an increment or other alternative with supporting technical rationale. 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; or

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 under the applicant demonstrater 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:

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.

4.2.3 Existing Air Quality

The South Central Coast Air Basin that may be impacted by air emissions from the proposed projects as well as from additional future projects for the region includes Santa Barbara County and portions of Ventura County. Ambient air quality within the region is generally good with the exception of the pollutants ozone (O_3), carbon monoxide (CO) and total suspended particulates (TSP). The Santa Maria portion of Santa Barbara County currently does not meet the TSP Federal standards and has been designated as nonattainment. Because levels of CO have exceeded the standards in the City of Santa Barbara, the designation of nonattainment has been made for the populated coastal area. However, recently monitored values show improvement such that redesignation of attainment is being considered. The entire county has been designated nonattainment for ozone, although the Northern portion of the County is being considered for redesignation to attainment. All other criteria pollutant concentrations in the County are below the national standards and have been designated as attainment.

Ventura County is in attainment of the standards except for the one-hour O_3 standard and the TSP standards in more populated areas.

The emissions inventory for Santa Barbara County is summarized in Table 4.2-6, along with the major contributors. The table shows that the major sources are motor vehicles and petroleum production for most of the pollutants. Agricultural operations that generate fugitive dust are major sources of particulate matter in the County.

Air above the Federal waters of the OCS off Santa Barbara including the Point Arguello Field is unclassified as to the attainment of the standards. There are no air quality data for the Arguello Field 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 and Gaviota by the California Air Resources Board in 1980. The observations, which are summarized in Table 10.7 of Appendix F, indicate that the reactive hydrocarbon levels ranged from 0.07 to 0.24 ppmC. Table 10.8 of Appendix F indicates that levels in the east channel at Point Huemene have reached as high as 1.4 ppmC during south and east winds. There has been no quantification of emissions of hydrocarbons due to natural seeps. However, the measured ambient levels that are reported above would presumably include contributions from seeps and have been included as part of the initial conditions in the photochemical model calibrations.

4.2.4 Site-Specific Data

Ambient air pollutant concentrations have generally been monitored by the California Air Resources Board (CARB) and the County Air Pollution Control Districts (APCD's). Figure 4.2-1 shows the locations of monitoring stations in 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.

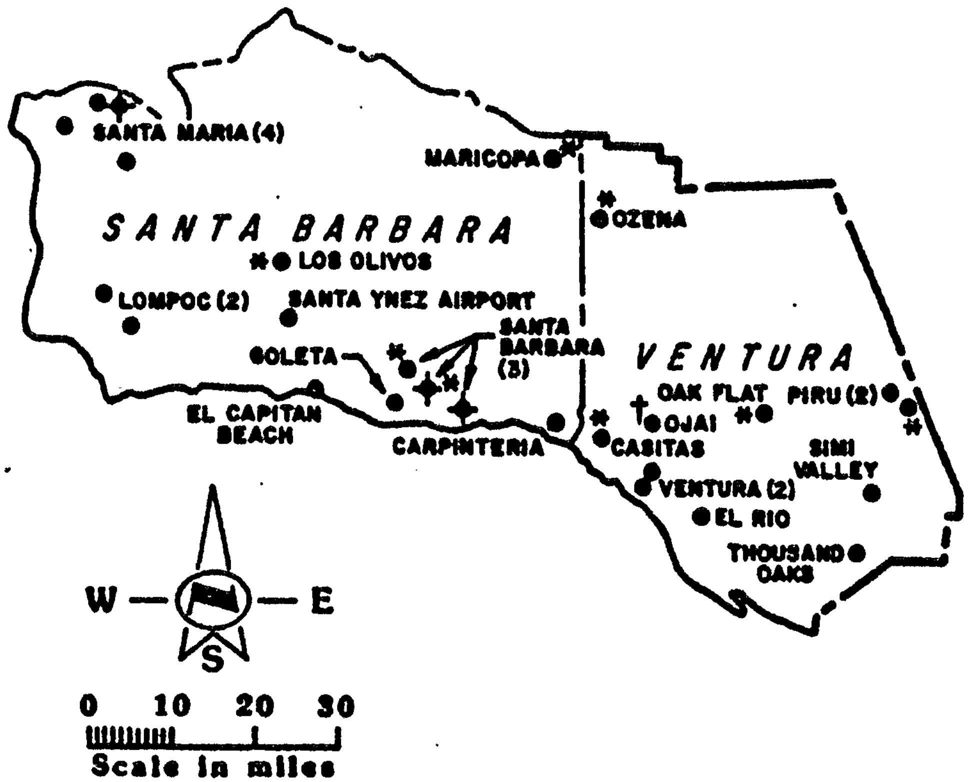
TABLE 4.2-6

EMISSIONS INVENTORY FOR SANTA BARBARA COUNTY (1979)

	CO	NO_x	SO_2	TOC	PM
Emissions (Tons/yr)	76,098	18,768	3,384	22,393	23,773
Largest Contributor	Motor Vehicles (81%)	Motor Vehicles (53%)	Petroleum Production (59%)	Motor Vehicles (40%)	Agricultural Operations (53%)
Second Largest	Residential (7%)	Petroleum Production (14%)	Motor Vehicles (19%)	Petroleum Production (15%)	Motor Vehicles (31%)

Source: Santa Barbara AQMP

Figure 4.2-1
Air Quality Monitor Stations in Santa Barbara and Ventura Counties



Source: California Air Reource Board.

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 F. The distribution of O_3 is more regional compared with primary inert pollutants. Table 4.2-7 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 in Santa Barbara and Ventura Counties for each of the years. However, 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 4.2-8 and 4.2-9. Exceedances of the Federal ozone standard have occurred infrequently, less than 3 percent of the days at all monitors except at the Ojai Valley. Exceedances 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 are summarized in the photochemical model calibration portion of the impacts section (Section 5.2.2) and are described in detail in Appendix F. Specific air parcels were followed along trajectory paths that pass over the locations of the proposed facilities in the modeling effort. Ozone levels along the trajectories were calculated and adjustments were made to the model parameters to match calculated values to observed data. The model results, as described in detail in Appendix F and summarized in Section 5.2.2 show reasonably good agreement between observed and calculated ozone levels. High ozone levels were estimated to occur over water as well as over land under certain meteorological conditions.

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 4.2-10. Sulfate levels are also summarized. This table includes data for the most recent four years. Annual average data requested for Refugio Beach and Corral Canyon do not include an entire year of data. The reported indices 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

Table 4.2-7

MAXIMUM ONE-HOUR AVERAGE OZONE CONCENTRATIONS*
(ppm)

Location	1980	1981	1982	1983
Ventura	0.13	0.15	0.16	.17
Ojai	0.18	0.20	0.19	.17
Santa Barbara-State Street	0.16	0.24	0.11	.06[b]
Santa Barbara-Cathedral Oaks Rd.	0.19	0.17	0.11	.16
Goleta - N. Fairview	0.19	0.18	0.14	.15
El Capitan Beach	0.12	0.11	0.15	.14
Lompoc - G St.			0.10	.08[c]
Santa Ynez Airport	0.09[a]	0.11	0.11	.12
Santa Maria - E. Main	0.09	0.10	0.10	.08

[a] Data for 9/80 through 12/80.
[b] Data for 1/83.
[c] Data for 1/83 through 4/83.

*Federal Standard 0.12 ppm, California Standard 0.10 ppm.

Source: California Air Quality Data; Annual Summaries published by the California Air Resources Board, Technical Services Division.

Table 4.2-8

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	0/0[b]
Santa Barbara- Cathedral Oaks Rd.	1/3	2/6	0/0	3/7
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[c]
Santa Maria - E. Main	0/0	0/0	0/0	0/0

[a] Data for 9/80 through 12/80.
[b] Data for 1/83.
[c] Data for 1/83 through 4/38.

Source: California Air Quality Data; Annual Summaries, Published by California Air Resources Board.

Table 4.2-9

DAYS/HOURS ABOVE 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	0/0[a]
Santa Barbara- Cathedral Oaks Rd.	9/21	5/18	3/5	9/27
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[c]
Santa Maria - E. Main	0/0	1/1	1/1	0/0

[a] Data for 9/80 through 12/80
[b] Data for 1/83.
[c] Data for 1/83 through 4/83.

Source: California Air Quality Data; Annual Summaries, Published by California Air Resources Board.

TABLE 4.2-10

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)	18 ppm	13 ppm				
Santa Barbara (State Street)						
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[A]	207 ug/m^3			19 ug/m^3[C]		
Corral Canyon[B]	207 ug/m^3			8 ug/m^3[C]		
Sulfur Dioxide (SO_2)						
Ventura	104 ug/m^3		31 ug/m^3	8 ug/m^3		
Santa Barbara (State Street)	78 ug/m^3		31 ug/m^3	5 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	5 ug/m^3		
Corral Canyon[B]	45 ug/m^3		42 ug/m^3	10 ug/m^3[C]		
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 [B]			60 ug/m^3	33 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
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.

Source: Summaries of Air Quality Data, California Air Resources Board.

[A] Refugio Beach period of record 11/21/74 to 1/14/75.
[B] Corral Canyon period of record 3/31/75 to 8/4/75 and 10/21/75 to 1/1/76 (NAWC, 1976).
[C] The data do not reflect an entire year of observations, and the reported annual average may vary from what is actually observed.

levels of the primary pollutants would be distributed non-uniformly. This assumption is noted in Table 4.2-10, 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 1-hour average concentrations did not exceed the Federal (35 ppm) or State (20 ppm) standards. However, the 8-hour standards were exceeded a few days in Santa Barbara. The Santa Barbara County Air Quality Attainment Plan projects attainment of the CO 8-hour standard by 1984 with the progressive reduction in auto emissions. 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 1-hour levels of NO_2 have approached the California State standard. However, the annual average levels are well below the Federal standard.

Atmospheric particulates, measured as total suspended particulates (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 4.2-10, show exceedences 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 4.2-10, 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 4.2-10 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 specitic 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 are reported in Chapter V, Section 5.2.

4.2.5 Meteorology

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.

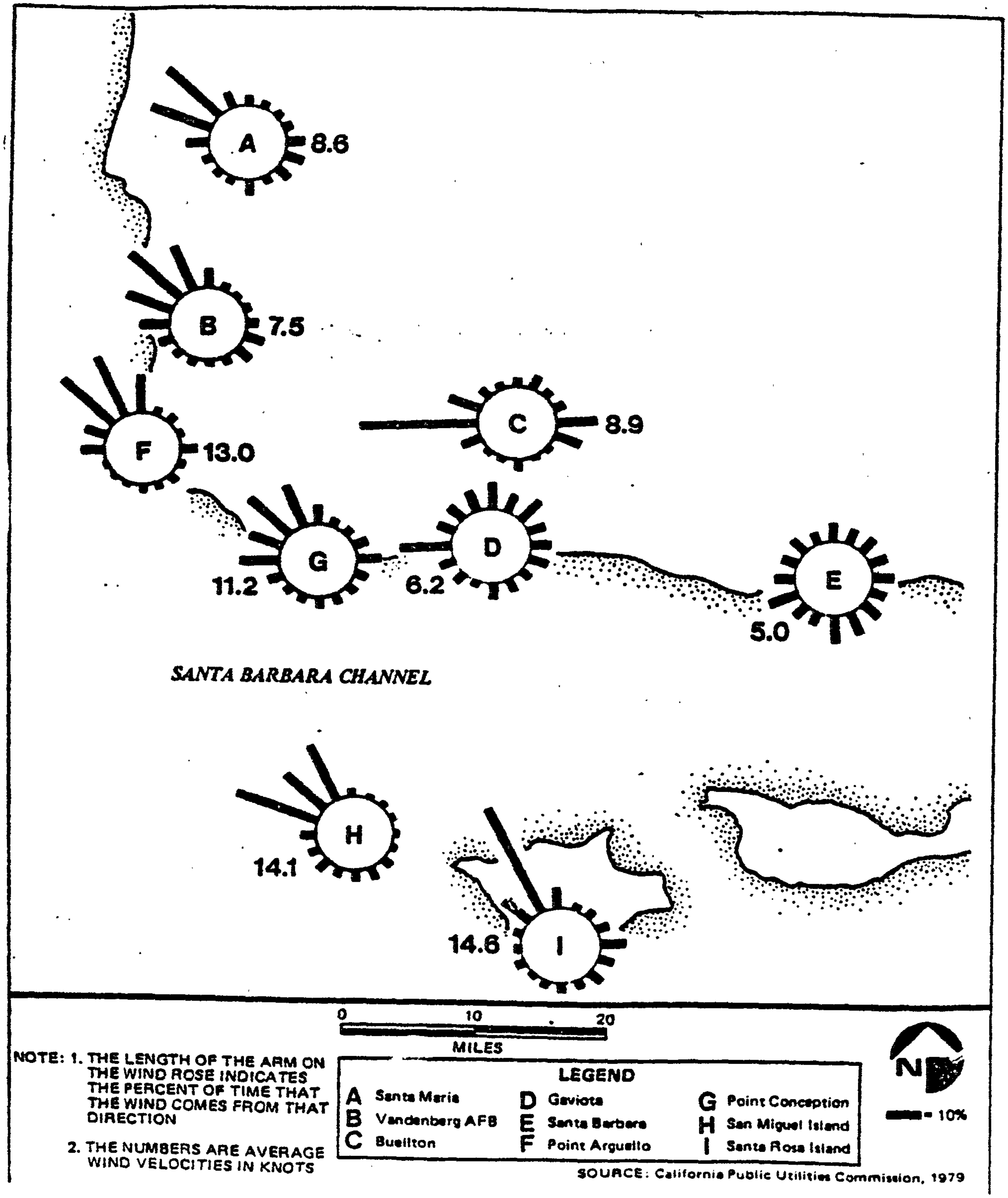
The climate of the Santa Barbara County coastal region is classified as Mediterranean. It is characterized by partly cloudy, cool summers without significant precipitation and mostly clear, mild winters during which precipitation falls with passing storms. This climate is controlled primarily by a combination 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 at 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 a wind regime characterized by relatively light sea breezes in the afternoon and strong downslope winds at night. The coastline mountain range causes a decrease in the occurrence of northwest winds in the channel as compared with Point Conception. The strength of the northwest flow on the coastline depends on the wind velocity across the top of the mountain barrier and the pressure differences on either side.

Fog and low clouds often form in the layer of marine air over the ocean during the evening. This fog also typically forms on the coast and inland valleys 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: (1) periods of low clouds/fog associated with dominance of the Pacific High; (2) periods of clear skies, cool nights, and warm days associated with continental flow; and (3) 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 to the Santa Barbara area under what is termed post-Santa Ana conditions. This is usually the cause of 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

Figure 4.2-2
Annual Average Wind Frequencies in the Region



SOURCE: California Public Utilities Commission, 1979

TABLE 4.2-11

PERCENTAGE FREQUENCY OF OCCURRENCE
OF STABILITY CLASSES

Pasquill Stability Class	Point Arguello	Corral Canyon
A	0.3	4.2
B	4.1	14.0
C	11.0	12.4
D	57.3	24.3
E	8.6	6.4
F	18.4	38.5

Calculated from stability wind roses for indicated sites.

TABLE 4.2-12
TEMPERATURES IN THE VICINITY OF THE PROJECT[a]

Location		
A. Daily Mean Maximum	Annual	Extreme[b]
Platform Honda A	63	90
San Miguel Island	62	102
Point Arguello U.S.C.G.	65	104
Santa Barbara Airport	70	101
Santa Barbara	72	108
Cachuma Dam	77	112
B. Daily Mean Minimum		
Platform Hondo A	55	39
San Miguel Island	51	31
Point Arguello U.S.C.G.	51	30
Santa Barbara Airport	48	26
Santa Barbara	49	20
Cachuma Dam	43	22

[a]Temperature in °F.
[b]Extreme maximum or minimum recorded during the period of record.

Source: U.S. Department of Commerce, 1964; Dames & Moore, 1978.

a marine climate, while the temperatures recorded at Cachuma Dam, located in the interior San Ynez Valley, indicate continental controls. Point Arguello is situated on the west-facing coast north of Santa Barbara, with temperatures only slightly less marine-dominated than those at San Miguel Island.

Santa Barbara and Santa Barbara Airport, on the south-facing coast between the ocean and the south slopes of the Santa Ynez Mountains, experience higher maximum temperatures, lower minimum temperatures, and more continental influence than the two coastal stations discussed above (Table 4.2-12). At Santa Barbara, the highest mean maximum temperature (79°F) occurs in September, and the lowest mean minimum temperature (40°F) occurs in January. Temperatures at Santa Barbara Airport are slightly cooler. Cold air drainage off the mountain slopes contributes to the lower minimum temperature during the winter. Available temperature records for Platform Hondo A are also summarized in Table 4.2-12. The temperatures are relatively cool with little variability, indicating that temperatures at Platform Hondo A are dominated by marine influences.

Precipitation

Average annual precipitation varies markedly over relatively short distances within the region, primarily because of topographic effects. Relatively high elevation stations (Santa Barbara T.V. Peak, Pine Crest) in the Santa Ynez Mountains receive an average of more than 25 inches of precipitation per year (Table 4.2-13). Santa Barbara receives slightly more precipitation (17.6 inches) than Santa Barbara Airport (15.6 inches).

Precipitation in the region varies widely from year to year. At Santa Barbara, annual precipitation is 8.7 inches or less about once every 10 years; it can also be more than 28 inches one year in 10.

Severe Weather

Thunderstorms in the project area are infrequent. Fewer than three occur annually at Santa Barbara Airport [U.S. Naval Weather Service, 1969]. Thunderstorms in the area are generally associated with active cold fronts or cold lows in winter or with the transport of tropical moisture into the region in late summer or early fall. The winter of 1982-83 was one of the most severe winters in local history.

Rosenthal [1972] reported on occurrences of other types of severe weather in the region. He indicated that tornados are rare in California, with an estimated return period for a tornado striking the same location of one in 20,000 years for the Los Angeles area and about the same in other parts of the State. He also reported that water spouts have been sighted over the Santa Barbara Channel.

Remnants of tropical storms formed off the West Coast of Central America have affected this region on more than one occasion. However, winds and precipitation associated with these storms have been only moderate [National Oceanic and Atmospheric Administration, 1976-1978].

TABLE 4.2-13

PRECIPITATION IN THE VICINITY OF THE PROJECT[a]

Station Location[b]	Station Elevation[c]	Annual[a]
Point Arguello	64	11.96
San Miguel Island	540	14.26
Santa Barbara Airport	9	15.55
Santa Barbara	100	17.63
Pine Crest	1000	26.79
Santa Barbara TV Peak	4000	32.99

[a] Average precipitation in inches from Elford et al., 1965; U.S. Department of Commerce, 164.

[b] See Figure 4.2-2 for locations.

[c] Feet above mean sea level.

Intersea [1982] conducted an oceanographic and meteorologic study of extreme conditions for input to the design of Platform Harvest. The Intersea investigations of extreme weather conditions were based on shipboard meteorological observations over the 30-year period from 1943 to 1972. Yearly extreme wind conditions were assumed in order to form an extreme-value series and these were plotted to estimate recurrence intervals. Based on this analysis, Intersea [1982] estimates a 1-year recurrence interval of 35-knot 1-minute winds, a 25-year recurrence of 46-knot 1-minute winds, and a 100-year recurrence of 50-knot winds. These values are expected to be low as a result of ship avoidance of known storm areas and the intermittent nature of shipboard observations. Intersea [1982] suggests a 1.5 times wind-speed adjustment factor be applied to the calculated wind speeds to obtain approximate 3-second gust speeds. The probable direction of the highest winds is from the west-northwest [Intersea, 1982].

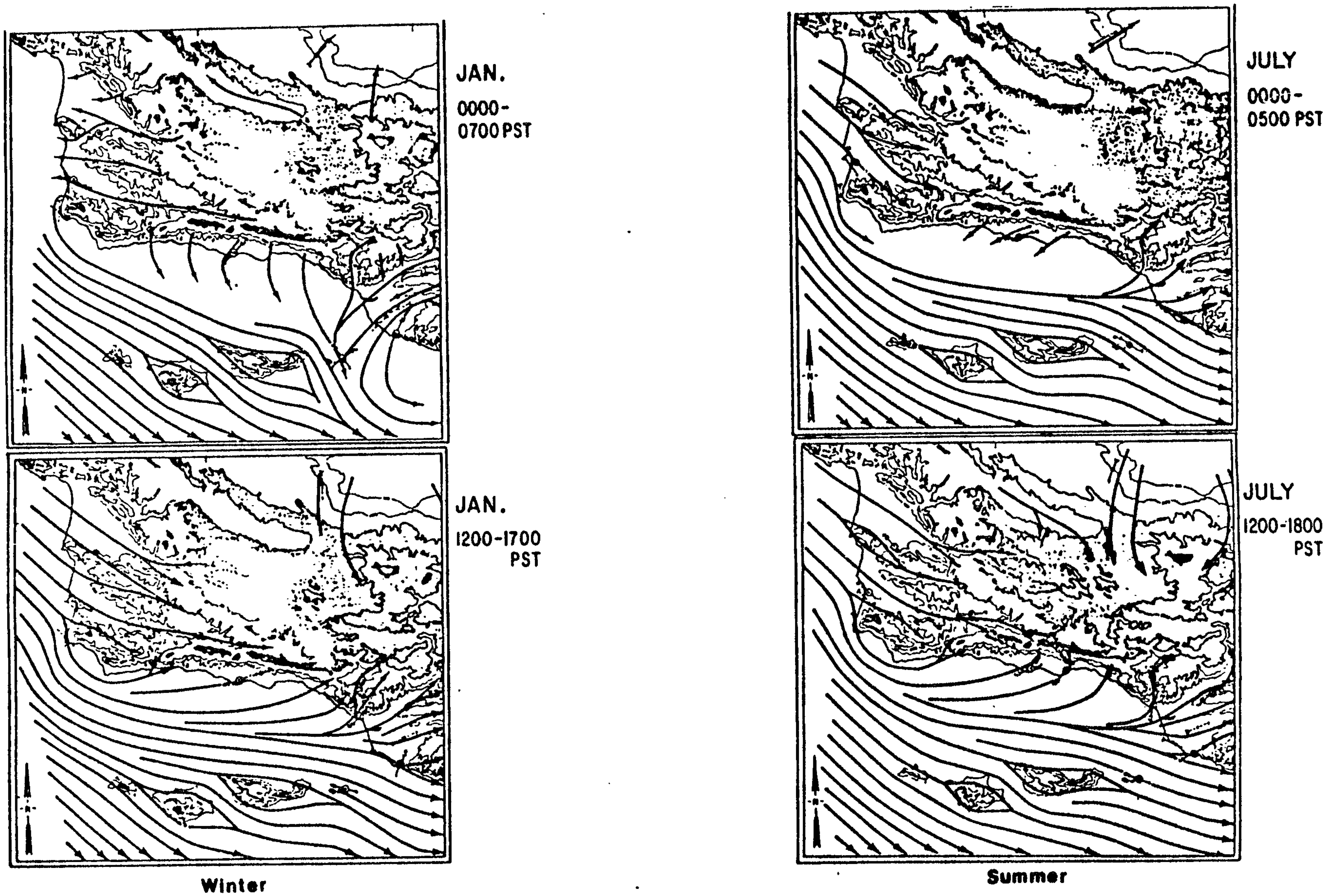
LOCAL WIND DATA

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 4.2-3 depicts plots of daytime and nighttime streamline analyses (winter and summer seasons) for the region. The plots show that 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 4.2-3

TYPICAL REGIONAL WIND FLOW: SUMMER AND WINTER



Source: DeMarrais et al., (1965)

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4.3 ONSHORE WATER RESOURCES

4.3.1 Surface Water

OVERVIEW

The surface water setting of the South Coast of Santa Barbara County is dominated by the east-west trending Santa Ynez Mountain range and the associated coast line. In the project area, the coastal plain is narrow and surface water drainages are limited to the distance between the crest of the mountain range and the shoreline. Therefore, most drainages are short, steep, and small. Only the larger drainage basins exceed 4,000 acres. The underlying geology also controls the shape of the drainage basins. Where a basin is underlain by hard sandstones, the canyons are narrow and steep and tend to be brushy. In areas underlain by softer siltstone and shale formations, the topography is more open and rolling and tends to be grassy. Surface water drainage courses and basin boundaries in the project area are shown in Figure 4.3-1.

Gaviota Creek, which is west of the proposed processing facility site and would be crossed by the pipeline, marks a change in the topographic expression of the Santa Ynez Mountains. Immediately to the east of Gaviota Creek elevations along the crest average 2,400 feet and increase eastward. West of Gaviota Creek the crest averages about 1,400 feet in elevation. The drainage basins in this western region are correspondingly smaller than those to the east with sizes generally 1,000-2,000 acres. Gaviota Creek itself cuts the crest of the Santa Ynez Mountains in the vicinity of the Santa Ynez fault and drains an area of about 12,000 acres.

Most streams in the area are either ephemeral (flowing for short times in direct response to rainfall) or intermittent (flowing through or just past the end of the rainy season). Only the larger drainages are perennial (flowing throughout the year) throughout their length, although some drainages are perennial in the upper reaches. Classification of individual streams by flow characteristics and indication of special features or uses in the watersheds are included in Table 4 of Appendix G and in Table 3.2-1 of Appendix J.

The rainy season generally lasts from November through April. Rainfall is strongly controlled by the elevation rise of the Santa Ynez Mountains. West of Gaviota, average annual rainfall is less than 16 inches at the coast and increases to 20-22 inches along the crest of the mountains. East of Gaviota, rainfall is 16-18 inches at the coast and increases to 28 inches at the higher elevations.

In the following sections, three general issues have been considered in developing baseline surface water descriptions for the project area: water quantity (streamflow), sediment loading, and surface water quality.

GAVIOTA FACILITY

The Gaviota site occupies a portion of lower coastal plain, between the drainages of Canada del Cementerio and Canada del Leon. Canada Alcatraz runs through the middle of the site (Figure 4.3-2). The three drainages are relatively short and steep and run to a ridge top with an elevation of 1,600 feet about a mile north of the site. Average annual rainfall on the site is about 16 inches and about 19 inches at the top of the ridge. Portions of the drainages have been altered and channelized downstream from the site, on the south side of U.S. 101, to accommodate existing facilities.

Average annual runoff values for the drainage basins in the project area were estimated using the results of Miller and Rapp [1968] which suggest that on average in the study region about 20 percent of rainfall becomes runoff to streams. These results and details of the calculations for each stream are included in Technical Appendix G, Section 1. The three previously mentioned drainages that cross or are adjacent to the site have small average annual runoff values ranging from 58 to 130 acre-feet/year (AFY). They are considered to be ephemeral in their lower reaches, and intermittent at higher elevations.

Sediment loading for streams is a complex function of overall watershed characteristics, which include soil type, slopes and slope stability, precipitation and vegetative condition. In Southern California, the dominant factor affecting sediment loadings in non-agricultural watersheds is the occurrence of fire. Within the last five years, a fire occurred on portions of the Gaviota site, in the drainage of Canada del Cementerio. While there have been no measurements of sediment loading for streams in the project area, estimates of sediment yields have been made [USGS, 1974] which relate yield to wildfire conditions for a storm with a recurrence interval of about 50 years, as follows:

Wildfire Condition	Sediment Yield Per Unit Acea	
	(Yds^3/mi^2)	($Yds^3/acre$)
1. No historic burn in 10 years prior to storm	4,900	7.7
2. 100 percent burn 4.5 years prior to storm (typical design condition)	10,400	16.3
3. 100 percent burn in dry season immediately preceding wet season with major storm	14,700	23.0

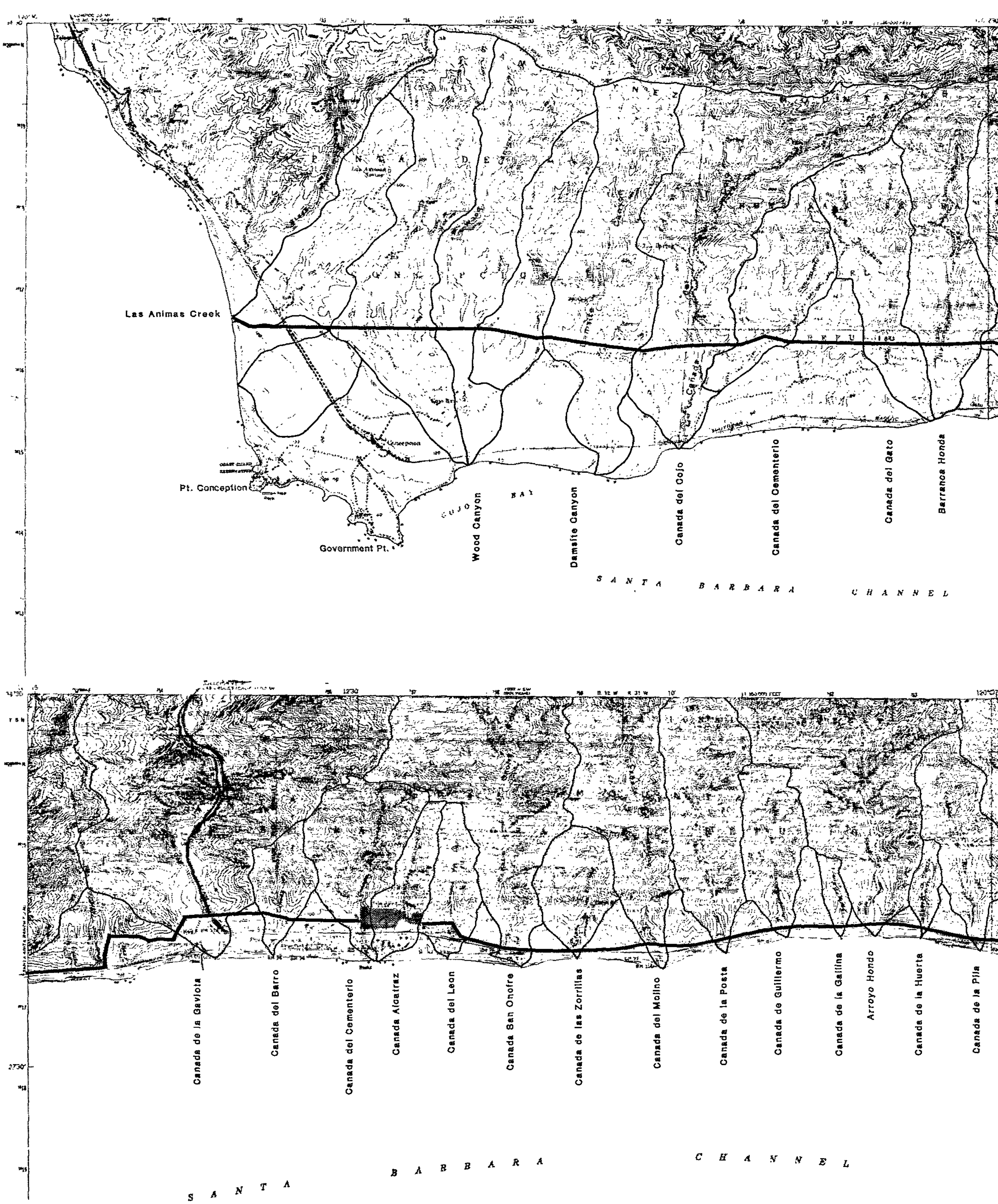
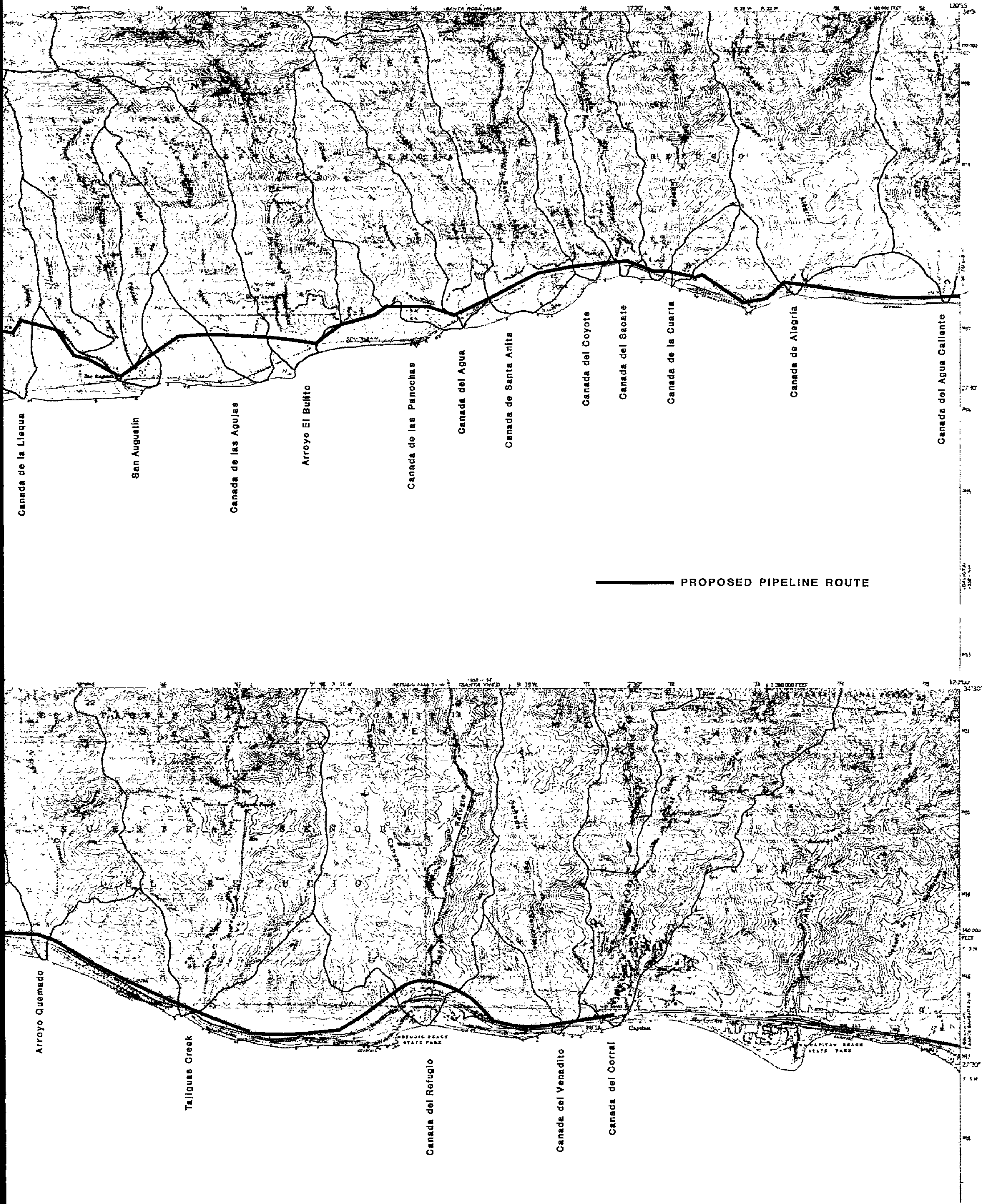


FIGURE 4.3-1 SURFACE WATER DRAINAGE B



OUNDARIES IN THE PROJECT AREA.

Figure 4.3-2

Streams and Drainage Basins in the Project Vicinity

Figure 4.3-2

Streams and Drainage Basins in the Project Vicinity

Examination of data on long-term sedimentation rates in debris basins in watersheds in similar mountain areas in Ventura County and Los Angeles County indicates that over a 25- to 50-year period the average annual sediment yield ranges from 8 to 10 percent of the total sediment yield in condition 2 above, or about 1,000 cubic yards per square mile. This relationship generally holds for watersheds of one to five square miles (600-3200 acres). The watersheds tributary to the site are smaller than this, and so may deviate slightly from this relationship.

Measurements of water quality in the area have been few. The most complete set of water quality analyses for the study region is provided by Miller and Rapp [1968]. Their data are thought to be generally representative of surface-water quality in the project area because of similar geologic conditions. Surface water from watersheds in the study region is generally calcium sulfate/calcium bicarbonate-type water. Miller and Rapp [1968] show no striking variations in the chemical character of surface waters in the region. Waters are suitable for most irrigation and agricultural uses, but only marginally suitable for domestic uses because of moderately high sulfate and total dissolved solids content which tend to exceed U.S. EPA [1979] drinking water standards of 250 and 500 ppm, respectively.

PIPELINE ROUTE - POINT CONCEPTION TO GAVIOTA

The proposed pipeline route comes ashore at the mouth of a drainage basin headed by Las Animas Springs (Figure 4.3-1). Between there and the proposed project site at Gaviota, the pipeline route crosses 23 drainages. The drainages are small, ranging from 84 up to 2,250 acres. Most begin near the crest of the Santa Ynez mountains at elevations of less than 1,600 feet and flow south to the ocean. Small reservoirs have been constructed on several of the streams. Rainfall ranges from less than 16 inches near the coast to 22 inches in the higher elevations. The climate near Point Conception shows a stronger maritime influence than the rest of the South Coast with more days of fog, lower temperatures, and consequently, a lower evaporation rate.

The estimated average annual streamflows for the drainages crossed by the pipeline route range from 20 to 600 AFY. Of the streams crossed by the pipeline, those with the largest drainage basins are likely to be perennial, at least along part of their length, and include Wood Canyon, Canada del Cojo, Arroyo del Bulito, Canada de Santa Anita, Canada de Alegria, and Canada del Agua Caliente.

Sediment loads have not been measured in any of the streams along the pipeline route. Sediment loading characteristics are assumed to be similar to those derived for the Gaviota site, though some of the drainages have been disturbed by agricultural development, including avocado orchards on steep slopes and cultivated fields, and are likely to be yielding much higher volumes of sediment. Such drainages include Wood Canyon, Canada del Cojo, Arroyo San Augustin, and the area from Arroyo del Bulito to Canada de Santa Anita.

Water quality along the pipeline route has not been measured but would be expected to be similar to regional conditions as noted in the description of the Gaviota site.

PIPELINE ROUTE - GAVIOTA TO LAS FLORES

The optional pipeline route extension would run from the Gaviota facility site to Las Flores/Corral Canyon. Drainage basins in this area tend to be larger than between Gaviota and Point Conception and extend to higher elevations at the crest of the Santa Ynez Mountains. Rainfall averages 16 to 18 inches near the coast to over 28 inches at the crest of the mountains in the eastern part of the area.

The pipeline would cross 14 drainages from Canada San Onofre to Corral Canyon inclusive. Of these 14 drainages, six are likely to be perennial: Canada San Onofre, Arroyo Hondo, Arroyo Quemado, Tajiguas Creek, Canada del Refugio, and Canada del Corral. The areas of these 14 drainages range up to 5200 acres on Canada del Refugio, which also has the largest estimated average annual runoff of approximately 2000 AFY.

The natural sediment loading conditions would be similar to those described for the project site. Agricultural development is more extensive in this area than west of Gaviota. Developed drainages include Arroyo Quemado, Tajiguas Creek, Canada del Refugio, and Arroyo Hondo. Canada de la Pila contains the Tajiguas landfill site which would also result in increased sediment yields.

Few surface water quality data for this area are available. One complete chemical analysis of surface water from Corral Canyon above its confluence with Las Flores Canyon is reported in the available literature [USGS, 1974]. Additional analyses of surface waters in adjacent watersheds are available in Miller and Rapp [1968]. These data are thought to be generally representative of surface water quality in the region, as described in the discussion of the Gaviota site.

ALTERNATIVES

The alternative processing facility site is located north of Point Conception on a broad plain consisting of marine terrace deposits. Drainage on the surface of the plain is ill-defined but generally to the south to a small unnamed drainage that enters the ocean just north of Government Point. Some areas of internal drainage result in small pools during the rainy season. No permanent streams or other water bodies are at or near the site. The nearest major drainage is the west branch of Wood Canyon about 2,000 feet northeast of the site. Average annual rainfall is less than 16 inches. With respect to sediment yields, the water erosion hazard on the coastal terrace is slight to moderate, but the wind erosion hazard is severe if the vegetation is removed [USDA, 1981]. Sediment loading characteristics of the terrace do not resemble those of the rest of the project area but would be expected to be slight, except in areas of active gullying. Water quality in the vicinity of the alternative site has not been measured.

The alternative onshore pipeline routes cross the same drainages as the preferred route, though somewhat closer to the coast.

APPLICABLE REGULATIONS, RULES AND STANDARDS

Discharges to surface water from the site and injection of wastewater would have to 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 could contribute to erosion. Maintenance of biological productivity is required by Section 30231 of the Act, through means which include 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 (consistently with existing conditions), 3-15 (grading operations), 3-16 (sediment control), and 3-18 (runoff control).

4.3.2 Groundwater

OVERVIEW

The Ellwood-Gaviota area has neither a high degree of groundwater development (SAI, 1984) nor great potential. Long-term groundwater yields available at the Gaviota processing facility site are estimated to be 45-60 AFY, assuming that groundwater is available from formations underlying the three surface drainages which cross the site. Water quality within the project area is variable. Some developed wells have produced nonpotable water because of high dissolved solids and hydrogen sulfide concentrations.

PHYSICAL FRAMEWORK AND PARAMETERS

Hydrostratigraphic Units

Hydrostratigraphic units refer to the layering of sediment and rocks in the subsurface viewed from the standpoint of their abilities to supply water. The geologic strata of the Ellwood-Gaviota area consist primarily of sandstones, siltstones, shales and alluvium (sediments deposited by running water). Table 4.3-1 describes the lithology, water-bearing characteristics and hydrostratigraphic classification of the principal geologic units in the Ellwood-Gaviota area. The principal water-bearing units presently utilized are the alluvium, the Vaqueros and the Sespe Formations. The Vaqueros Formation is considered to be the best aquifer. Alluvium is considered to yield moderate quantities of

Table 4.3-1

GEOLOGIC UNITS AND THEIR WATER BEARING CHARACTERISTICS
(MODIFIED FROM MILLER AND RAPP, 1968)

Geologic age		Geologic formation	Thickness (feet)	Lithologic Character	Water-bearing Characteristics	Hydrostratigraphic Characteristics
Quaternary	Pleistocene and Recent	Alluvium	0 - 100±	Clay, silt, sand and some gravel; underlies flood plains of stream valleys	Yields small to moderate quantities of water to wells	aquifer
Tertiary	Miocene	Monterey Shale	1,200 - 2,000	Predominantly siliceous shale, some clayey shale, sparse limestone; of marine origin	Yields more than 100 gpm to wells in areas where siliceous shale is highly fractured; in large part only slightly permeable	confining bed local aquifer
		Rincon Shale	1,500 ±	Massive mudstone, generally bluish-gray; weathered slopes commonly show slump structures and landslides; of marine origin	Almost impermeable; no wells are known to tap this formation. Acts as confining bed for water in underlying sandstone formations	confining bed
		Vaqueros Formation	25-300 ±	Sandstone and conglomerate; of marine origin	Yields small to moderate quantities of water to wells	aquifer
	Eocene and Oligocene	Sespe Formation	2,000 - 2,800	Sandstone and minor shale and siltstone of marine origin, conglomerate of nonmarine origin	Yields small to moderate quantities of water to a few wells	local aquifer
	Eocene	Undifferentiated formations	3,500 - 4,000	Sandstone, shale, siltstone, and some conglomerate; mostly of marine origin	Yield small to moderate quantities of water to a few wells	local aquifer

water where present along the South Coast, but is not present in extensive enough deposits at the Gaviota site to be a water supply source. The Monterey shale shows some water supply potential where highly fractured but is generally only slightly permeable. The Rincon and Monterey shales where not fractured act as confining beds (layers of material which are essentially impermeable to the passage of water).

Hydraulic Parameters

Two hydraulic properties of a material are important when evaluating its water supply potential: ability to transmit water (called transmissivity, or hydraulic conductivity) and ability to store water (called specific yield or storage coefficient).

In the Ellwood-Gaviota area most of the groundwater occurs in consolidated rocks and movement is through fractures, intergranular spaces and along bedding planes. Testing to determine hydraulic properties has generally not been extensive. Transmissivity estimates have been based on step-drawdown tests of supply wells and laboratory testing of drill cores. Transmissivity values for the Vaqueros Formation range from approximately 7 ft^2/day in the western part of the Ellwood-Gaviota area [Westec, 1983] to approximately 330 ft^2/day in the eastern part [SAI, 1984]. A step-drawdown test of the Upper Brinkman well (5N/32W-3502, Alegria Formation) yielded a transmissivity estimate of approximately 40 ft^2/day. There have been no determinations of storage properties during hydraulic testing.

Flow System

Existing water level data indicate that the movement of groundwater along the south flank of the Santa Ynez Range is in general south from the mountain crest toward the ocean. Miller and Rapp [1968] indicate that the hydraulic gradient is 0.04 to 0.06 (ft/ft) in the steeper topography north of the stratigraphic contact between the Vaqueros sandstone and the Rincon Shale, and is approximately 0.01 (ft/ft) south of this contact. Water level data at the Gaviota site are consistent with the interpretation of the general flow pattern southward from the mountain toward the ocean.

In Santa Barbara County, groundwater recharge is taken as an upper limit on the perennial yield which can be expected from wells located in a watershed. For the analysis of available groundwater resources at the proposed Gaviota facilities, the surface area contributing to groundwater recharge is estimated to be 650 acres. On the basis of precipitation data developed as part of the surface water analysis for this project, and estimates of recharge as a proportion of rainfall [Miller and Rapp, 1968]; long-term average groundwater recharge at the Gaviota site is estimated to be 45-60 AFY.

Groundwater recharge is balanced by an equivalent amount of groundwater discharge to springs, streams, the ocean and wells. No springs discharge to streams in the three site watersheds. Groundwater discharge to streams is reported to occur south of the stratigraphic contact between the Rincon shale and Vaqueros Formation [Miller and Rapp, 1968], but also acts to supply baseflow to upper reaches of project site streams. During periods of flood flow, however, stream infiltration may recharge groundwater. Exclusive of groundwater which is withdrawn by wells, the remainder of the groundwater flow discharges to the ocean, and helps control the dynamic balance of the boundary between fresh and saline water. In coastal areas, sea water intrusion of aquifers, in response to pumping, may be a problem. In the Gaviota project area, the sandstone aquifers appear to be protected by the nearly impermeable Rincon shale that lies between these potential water supply units and the saline water of the ocean. However, salt water might intrude if these aquifers are hydraulically connected to the ocean. The nature and location of discharge to the ocean are not known, but are postulated to occur along faults running parallel to the coastline, such as the Molino Faults.

Several water users currently exist on the watersheds under consideration, including the Getty facility, Vista del Mar School, the existing Chevron processing facility and the Gaviota Village gas station and restaurant. These uses are estimated to total 20 AFY, as compared to availability of 45-60 AFY.

GROUNDWATER QUALITY

Groundwater in the Ellwood-Gaviota area tends to have a high concentration of dissolved solids, is generally hard, low in sodium and high in calcium and magnesium. Concentrations of sulfate, chloride, fluoride and total dissolved solids (TDS) are variable, but exceed drinking water standards in many wells in the Ellwood-Gaviota area [U.S. EPA, 1975; U.S. EPA, 1979; Miller and Rapp, 1968]. Dissolved solids content in particular appears to be a limiting factor for groundwater use. Westec [1983], in summarizing salinity characteristics of wells in the area from Gaviota to Las Flores, noted that nearly all well water showed TDS above the secondary drinking water standard of 500 ppm. Water from the Vaqueros and Sespe Formations is generally of higher quality than other formations and relatively uniform in quality, exceeding the standard by an average of about 150 ppm.

ALTERNATIVE SITE

Groundwater in the vicinity of the alternative processing facility site at Point Conception is less plentiful, less accessible and of poorer quality than at the Gaviota site. Precipitation is generally less than at Gaviota, implying smaller volumes of recharge per unit area. The Vaqueros Formation outcrops over two miles north of the site [Dibblee, 1950] and based on dip observations would be expected to underlie the site at depths of several thousand feet or more. Wells completed in formations overlying the Vaqueros have been marginally productive when in alluvial materials, but dry or oily in lower formations. Quality of water from producing wells on the Bixby properties was rated by SWA Group [1978] as poor to marginal, with TDS generally greater than 1000 mg/L.

APPLICABLE REGULATIONS, RULES 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.

REFERENCES TO CHAPTER IV

4.3 ONSHORE WATER RESOURCES

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4.4 MARINE WATER RESOURCE

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 Appendix H. Unless otherwise referenced, all data given here are from that Appendix.

Relative to the high energy environment (i.e., strong winds/waves/currents) of the Humbolt area of Northern California, the physical oceanography in the Study Region is characterized by an area of relatively low energy - the Santa Barbara Channel - and an area of moderate energy - the waters off Point Conception/Point Arguello where the oil platforms will be located. 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 is associated, in part, with the fact that the platform sites are at the crossroads of two current systems, and 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 (and thus water movement) patterns are reflected in 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, nor do any major river outfalls affect the region. Several oil production platforms are located to the south in the Santa Barbara Basin; their effect on water quality near the project sites is unknown but probably negligible. 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

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. Certain features of the shoreline and sea floor in the area (i.e., the Point Arguello-Point Conception headlands) 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 cm/sec) is quite broad and reaches to within a few kilometers of the shore at Point Conception. The Davidson Current (speeds up to 15-30 cm/sec) flows northward closer to shore; all or part of its 80-km 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 the Southern California Counter Current (speeds up to 35-40 cm/sec). 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.

Within the Santa Barbara Basin (the western half of the Santa Barbara Channel) the persistent currents are not well defined but appear to generally follow a counterclockwise movement with an occasional eastward-flowing current close to shore at Gaviota.

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 to the near-surface area), and (4) current/density stratification interceptions leading to vertical currents in the basin (producing an "over-turning" of the basin 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 m, current strengths may weaken considerably.

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. Estimates of the net transport southward around the Point Conception headlands range from zero to 180,000 cu yd/yr.

Tides

The tides in the Study Region have a mean high water of about 4.6 feet (1.5 meters) above Mean Lower Low Water; the highest recorded tides are about 8 feet (2.4 meters) [Texaco, 1983]. -Tide-induced currents, with speeds up to 25 cm/sec, contribute an oscillatory component to the local currents at depths less than a few hundred feet.

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 outside of the Santa Barbara Basin is from the northwest. These Pacific waves, after refraction and diffraction, enter the Santa Barbara Basin. The duration of severe waves is approximately four days for waves exceeding 1 m in height, 1.4 days for waves exceeding 3 m and one day for waves exceeding 6m.

Tsunami

Tsunami (seismic sea waves) are important in near-shore and littoral regions where the wave's destructive force would be felt. A discussion of the sources and probability of recurrence indicates that although 100-year and 500-year tsunami runups are about 3 m and 7 m, respectively, at latitudes of the project region, waves from severe storms are usually higher and the higher figures should be used for design purposes.

Bathymetric Effect on Waves

The shape of the seafloor and coastline in the Study Region will modify the approaching waves' 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

Hydrographic 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 and high salinity, and summer-fall with higher temperatures and lower salinities. Little variation is seen in either parameter at depths below 100 m in the Santa Barbara Channel.

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 result in a density gradient between them and the less dense surface waters. 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. This results in a thin layer of strong density gradients near the surface which approximate a classical thermocline [SAI 1983, P11-8ff].

CHARACTERISTICS OF PROJECT SITES

Platform Sites

The platform sites lie about 10 miles (16 km) to the west of Point Conception in waters that are 400-700 feet (120-210 m) deep. This position will be affected by the major currents described above -- the California current, and the Davidson current as it emerges from the western end of the Santa Barbara Basin. Tide-induced currents will be less important than in near-shore areas (except near the bottom).

Limited current data for the Point Conception/Western Santa Barbara Channel area indicate: (1) surface currents quite variable in direction but often towards the southeast and northwest (average speed 26 cm/sec); (2) mid-depth currents, around 300 feet, consistently leading west northwest (average speed 15 cm/sec) and (3) bottom currents consistently leading southeast (average spped 7.7 cm/sec.) [Hansen and Joy, 1981; Joy and Hansen, 1972]. Other data from current meters located 5-15 km south of Point Conception have shown (for the April-June 1983 period) mean surface currents of 20-30 cm/sec with a westerly heading [SAI, 1983 p11-22]; as measured by the current meters 10-20 km offshore, current velocities at the 65-m depth were not significantly less than those at the surface.

Data provided (or referenced) above for waves and hydrography should be pertinent for the platform sites.

Pipeline Route

The Platform Hermosa-to-Point Conception subsea pipeline route lies in an area that, in general, is characterized as described above. It is more important (for this pipeline) to have detailed information on the currents, waves, and littoral regime near the shore landing point. Such data, except for some wave data described in Appendix H are generally not available.

Gaviota Site, Offshore

As mentioned above offshore currents at Gaviota generally flow in a westerly direction as part of the counter-clockwise flow within the Santa Barbara Basin. However, a certain degree of variability, including easterly flow at some times, may be presumed. Limited subsurface current meter data from the inshore Point Conception mooring indicates a net westerly flow of about 16 cm/sec; and equally long record of surface currents collected near Santa Barbara indicates a net westward flow of about 3 cm/sec [Hendricks, 1984]. Data on current velocities near the proposed sub-sea outfall (1220 m offshore at a depth of 50m) are lacking. Adequate data on tides, waves, and sediment transport are also lacking.

CHARACTERISTICS FOR THE AREA STUDY

The characteristics of the 25 lease tracts are essentially similar to those described above for the Study Region.

DATA GAPS AND RECOMMENDATIONS

The existing baseline information describing the physical oceanography in the Study Region is lacking in several areas, especially in data that provide probabilistic information on expected current directions and velocities as a function of location, depth and season. A summary listing of important data gaps and associated recommendations is provided in Appendix H. The extent of the data gaps results in uncertainties relating to expected waste water discharge trajectories and oil spill trajectories. However, the unavailability of this information does not preclude a reasonably accurate impact assessment.

4.4.3 Chemical Oceanography

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, ocean salinity, typically 33.2-34.3 o/oo, (o/oo = parts per thousand) is more an indicator of water mass movement than of water quality. Average baseline salinity values have been fairly well established (see Appendix H); however, the variability of the salinity within the Study Region is not well documented.

Temperature

Temperature, like salinity, is subject to the influence of near-shore upwelling in the Study Region. Near-shore 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 200 m deep; temperatures at this depth remain fairly consistent near 9° C in the Study Region.

Dissolved Oxygen (DO)

It should be noted here that DO is a key water quality parameter since certain minimum levels are necessary to sustain aquatic life. The main feature of water-column dissolved oxygen is that it is usually at a maximum (5-6 ml/L*) at the surface and decreases with depth; reported near-shore values of DO at the 200-m depth are about 2 ml/L. Further offshore, at depths below 350 m, DO values can be as low as 1 ml/L; upwelling can bring more of this oxygen-poor water to the near-shore Study Region areas, especially in the May-July period. Existing anthropogenic and natural (e.g., seeps) 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.

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, Mn, Zn, Cu, Co, Mo, V, 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 significant amounts of ammonia, this becomes an area where impacts will be analyzed. Vertical profiles of nutrient concentrations in the water column are opposite to those of 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. 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. Within the Study Region the periods of highest turbidity correspond to the periods of highest upwelling and highest primary production. (River runoff can also have a significant, more local

*For DO, 1 ml/L = 1.43 mg/L.

impact.) Within this region, Secchi depths* range from 10 to 20 m. Within the Santa Barbara Basin, other data on light transmission show near-shore surface turbidities resulting in 60-70 percent light transmission per meter.

pH/Alkalinity

Ocean pH values in the Study Region (off Point Conception) are about 7.8-8.1 [SAI, 1983]. Changes in pH are indicative of water movement or other factors resulting in changes in salinity, photosynthetic activity, and CO_2 respiration or loss to the atmosphere. The higher pH values are generally associated with higher photosynthetic activity (consumption of 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 interest in the Study Region because of their role (in low concentrations) as essential nutrients and/or (at high concentrations) as toxic agents. The metals of interest include barium (Ba), chromium (Cr), cadmium (Cd), copper (Cu), zinc (Zn), mercury (Hg), lead (Pb), silver (Ag), and nickel (Ni). A number of studies (described in Appendix H) provided data on the concentrations of these metals in the water column, sediments and biota, and explain the sources, fate and transport in the marine enviroment.

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.) 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 available data 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 wastewater discharges around Los Angeles. The data also indicate that the Study Region is within the area affected by anthropogenic discharges into the Southern California Bight. Within most regions, concentrations of metals in the sediments are higher in the benthic sediments than in the intertidal sediments; this is presumably due to particle size difference (i.e., a preference for the metals to associate with smaller particles).

*Secchi depths, a measure of turbidity, are the depths at which a standard (Secchi) disc can be seen from the surface.

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. 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 chemical species such as ammonia and sulfur are desired but not currently available.

Organics

Within the Study Region, organics may enter the water column from municipal and industrial wastewater 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 mg/L 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. 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. Several studies cited in Appendix H indicate total dissolved hydrocarbon concentrations are in the range of 0.2-3.5 ug/L; another source (also cited in Appendix H) indicated levels up to 16 mg/L in the waters off Point Conception, a value over 4,000 times the previous high value cited (3.5 ug/L). The 16.5 mg/L value, it was suggested [SAI, 1983, p. 12-18 ff], may have been affected by oil originating from a natural seep.

Organics of low water solubility will tend to adsorb on suspended and bottom sediments; thus sediment concentrations of such organics (e,g., naphthalene) are of interest. The available data again show high variability with, for example, total hydrocarbon concentrations in surface sediments ranging over five orders of magnitude (1-40,000 mg/kg, dry wt.).

Sediments

Suspended sediment concentrations in the Study Region are typically 1·mg/L in the near-shore, surface waters. Higher levels are found near the bottom sediments (and after storms) while lower levels (0.5 mg/L) 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. Sediments sampled 23 miles (37 km) north of the proposed Platform Harvest site at a depth of 220 m had a mean sediment 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 or heavy metal and organic concentrations were provided above.

Within the Santa Barbara Basin, sedimentation rates are estimated to be 2 mm/yr except in flood years when higher rates are possible.

CHARACTERISTICS OF PROJECT SITES

The characteristics of the chemical oceanography near the project sites (platforms, pipelines, Gaviota site offshore) are basically the same as described above. Additional sediment data for these sites are desirable.

CHARACTERISTICS FOR THE AREA STUDY

The characteristics of the chemical oceanography for the area study are basically the same as described above.

DATA GAPS AND RECOMMENDATIONS

A summary listing of important data gaps and associated recommendations to improve the data base for chemical oceanography is provided in Appendix H. High-priority data gaps are associated with the concentrations of heavy metals and organics in sediments, and with the locations and seepage rates of natural oil seeps in the area. Additional data on the concentrations of heavy metals and organics in fish and benthic biota are of medium-high priority. None of these data gaps relate to "essential" information for which NEPA requires a worst-case analysis.

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 required by the general permit are given in Appendix H.

The submerged, offshore discharge from the Gaviota processing plant is in State waters. Discharge limitations on this effluent may be 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.]; (2) the California "Ocean Plan" and/or (3) Section 30262 (f) of the California Coastal Act [California Coastal Commission, 1982]. The current regulations associated with the Clean Water Act and the California Coastal Act do not allow the discharge of produced waters under most conditions; but present practice of the Regional Water Quality Control Boards is to permit such discharges. Details on effluent limitations associated with the California Ocean Plan are provided in Appendix H.

In addition to the above, other federal, state, and local agencies will have some control (e.g., 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

Chemical/Element	Concentration in ug/L: EPA Criteria 30-d avg.	EPA Criteria Max.	Toxic Levels Acute	Toxic Levels Chronic	Reference
Inorganics					
Arsenic (trivalent)	63	120	—	—	1
Arsenic (pentavalent)	—	—	2300b 5-50c	—	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	500-700	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.

Source: (1) Federal Register, 49 (26):4551 (Feb. 7, 1984). (2) Federal Register, 45 (231):79318 (November 28, 1980).

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4.4 MARINE WATER RESOURCES

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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. Figure 4.5-1 illustrates 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;

- The nearshore area off Gaviota where the proposed processing facility outfall would discharge;

- The nearshore and coastal areas between Government Point (Cojo Bay) and Point Arguello, which include the closest mainland coast to the proposed platforms, and the proposed landfall point of the project wet oil and gas pipelines;

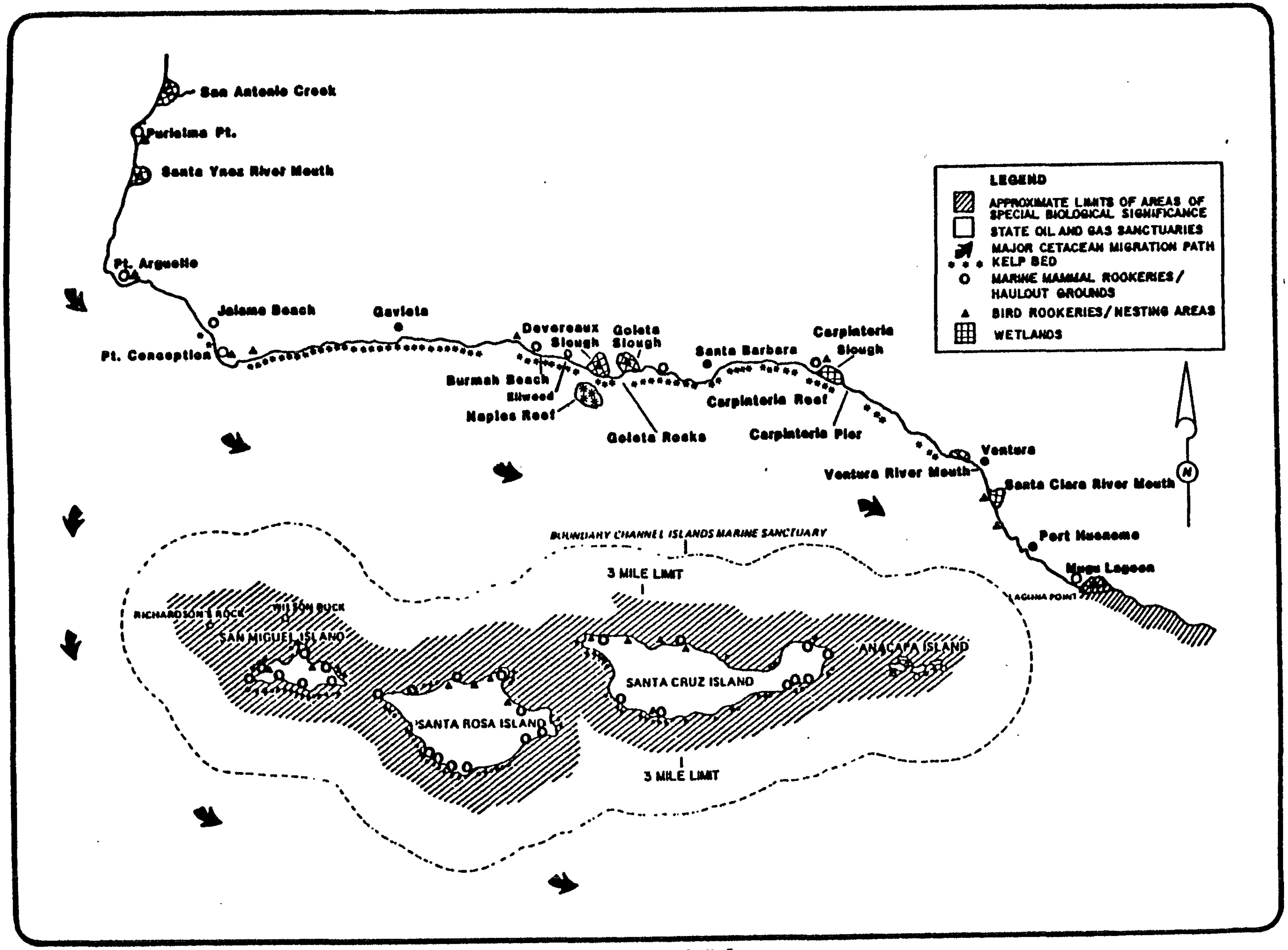
- San Miguel Island, the nearest of the Channel Islands to the proposed facilities; and

- The nearshore areas off Port Hueneme, Carpinteria and Ellwood, where proposed supply and emergency crew vessel traffic would originate.

There is general consensus that offshore Gaviota represents the beginning (moving west and north) of a unique transition zone between southern (warm temperature) and northern (cold temperature) marine biota, and that the region supports a number of invertebrate species whose range is restricted to the transition zone.

Overall, 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 deep-ocean marine biological sampling.

Many previously undescribed species occur in benthic samples obtained from the deeper waters in the Region. While this phenomenon is routinely expected, one or more of these may eventually be judged scientifically significant should it prove to be restricted to this biological transition zone.



Source: MBC Applied Environmental Sciences

Figure 4.5-1
Marine Biological Features of the Study Region

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.

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 can be applied to any of the communities discussed below, the Stipulation reads as follows:

(a) If the Regional Manager (RM) has reason to believe that biological populations or habitats exist and require protection, he shall give the lessee notice that the lessor is invoking the provisions of this stipulation and the lessee shall comply with the following requirements. Prior to any drilling activity or the construction or placement of any structure for exploration or development on lease areas including, but not limited to, well drilling and pipeline and platform placement, hereinafter referred to as "operation," the lessee shall conduct site specific surveys as approved by the RM and in accordance with prescribed biological survey requirements to determine the existence of any special biological resources including, but not limited to:

(1) Very unusual, rare, or uncommon ecosystems or ecotones

(2) A species of limited regional distribution that may be adversely affected by any lease operations

If the results of such surveys suggest the existence of a special biological resource that may be adversely affected by any lease operation, the lessee shall: 1) relocate the site of such operation so as not to adversely affect the resources identified; 2) establish to the satisfaction of the RM on the basis of the site specific survey, either that such operation will not have a significant adverse effect upon the resource identification or that a special biological resource does not exist. The RM will review all data submitted and determine, in writing, whether a special biological resource exists and whether it may be significantly affected by lessee's operations. The lessee may take no action until the RM has given lessee written directions on how to proceed.

(b) The lessee agrees that if any area of biological significance should be discovered during the conduct of any operations on the leased area, the lessee shall report immediately such findings to the RM and make every reasonable effort to preserve and protect the biological resource from damage until the RM has given the lessee directions with respect to its protection (MMS, 1983b).

4.5.2 Characteristics of the Study Region and Project Areas

INTERTIDAL COMMUNITIES

The two principal types of intertidal habitat in the Study Region are rock headlands/shelves 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 [Woodward-Clyde, 1982]. The intertidal zone of the mainland in the Study Region is comprised mainly of sandy beach areas, while the Santa Barbara Channel Islands shoreline is dominated by rocky cliffs and small bays. Because of their relative rarity and scientific and educational value, rocky intertidal areas are designated as Environmentally Sensitive Habitat Areas (ESH) by the Santa Barbara County Local Coastal Plan.

The Channel Islands and the area between Point Conception and Ellwood are the two areas identified by the Plan as rocky intertidal ESHs that are closest to the offshore facilities proposed for Point Arguello Field development. 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.

Point Conception Pipeline Landfalls

Observations of fauna associated with various tide levels at the proposed (preferred) shorefall of the pipelines from Platform Hermosa revealed a reported paucity of organisms [Dames & Moore 1983]. Their study occurred after a period of severe winter storms and during the El Nino episode, which may have affected the resulting observations. Previously, the rocky headland biota to the south of the proposed site was investigated and found to be typical of that previously observed for the region [Littler and Littler 1980]. The rocks in the high-tide and splash zones were covered with tar, believed to be indicative of the activity of seeps from around the exposed bedrock spines that extend locally into the ocean.

Gaviota Outfall Site

The proposed corridor for the produced water outfall at Gaviota crosses a coarse sand pocket beach already crossed by more than 10 existing pipelines. Exposed boulders and bedrock were heavily tarred during Dames & Moore's 1983 observations, and little drift kelp was present on the beach. The beach fauna collected in October 1983 was limited to a single juvenile sand crab. These observations are consistent with the El Nino episode and winter storm damage to the local kelp bed. Flora and fauna associated with the rocky headlands bracketing the beach over several observation periods are detailed in Section 4.5 of Appendix I.

BENTHIC COMMUNITIES

Basic Habitat Types

Two 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 scattered inhomogeneously throughout the Region.

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). The two subtidal reefs called out in the LCP are located off Naples and Carpinteria, respectively, both of which are near locations of proposed project support vessel activities. (See Figure 4.5-1.)

Rocky reefs in deeper waters 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. Although the deep reef features lack official protected status, they are emphasized in administrative reviews of prospective development (MMS, 1983b).

Benthic communities in the area of 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 Hermosa and related pipelines [Dames & Moore, 1983], Platform Harvest and related pipelines [Nekton & Kinnetics, 1983], and Platform Hidalgo and related pipelines [Engineering Science, 1983]. Figure 4.5-2 summarizes the locations of known hard-bottom features near the proposed platforms and pipeline routes. See Appendix I, Section 4.5 for detailed discussion.

Proposed Platforms and Interconnecting Pipeline Sites

All the identified species representative of the soft-bottom benthic infauna near the three proposed platforms are widespread along the southern California coast. As is usual for mainland sites [Fauchald and Jones, 1979a], deposit feeding species dominated the community although many suspension feeding species (particularly Amphiodia spp.) were very common. Biomass values from the Platform Hidalgo area indicated a standing crop averaging 134 gm/m2, intermediate between southern and northern California values [Engineering Science, 1983] and near the 151 gm/m2 value recorded at shelf depths off Point Conception [Fauchald and Jones, 1979b].

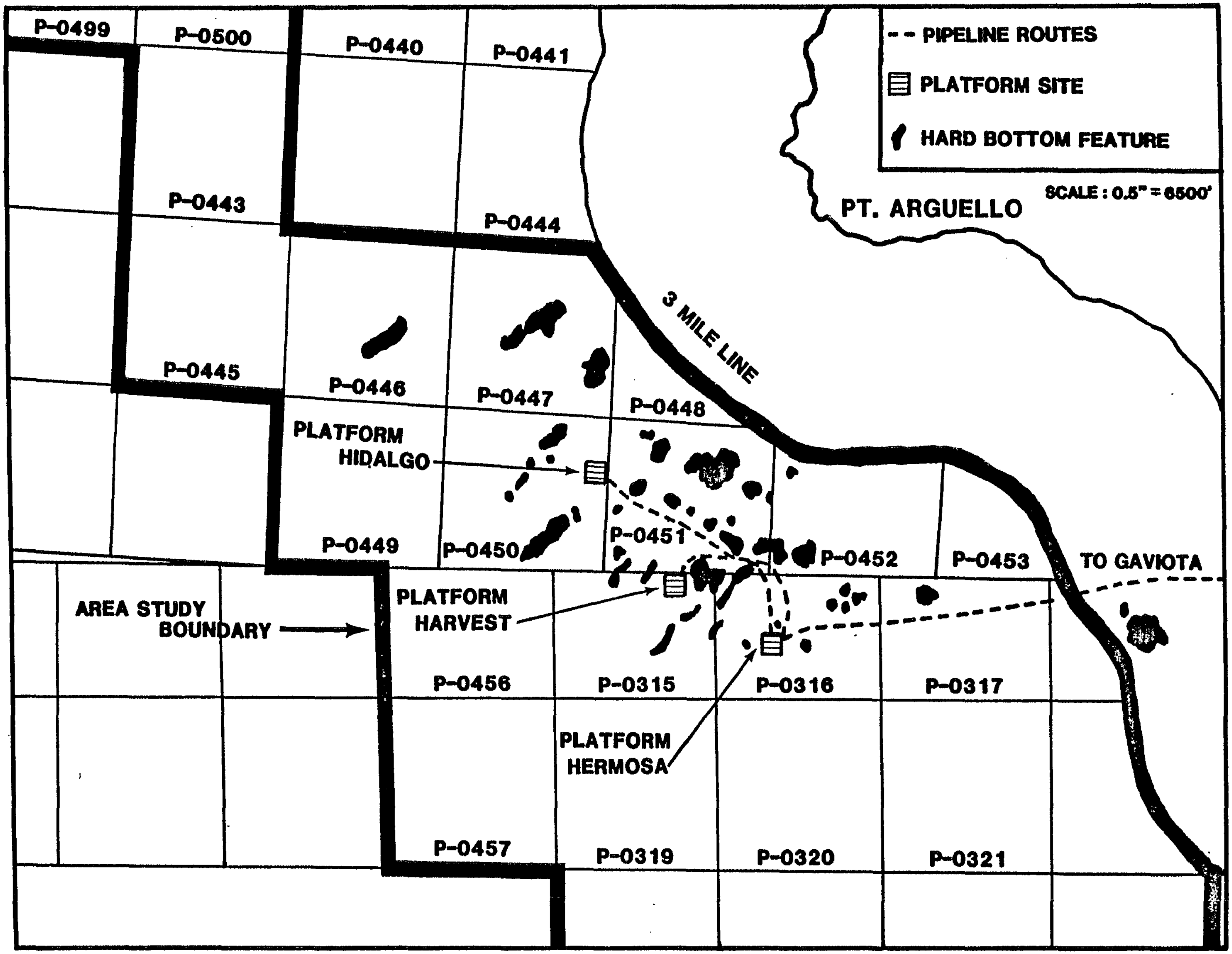


Figure 4.5-2 Summary of known hard bottom features in the vicinity of Platforms Hidalgo, Harvest, Hermosa, and along proposed pipeline routes. (Sources:Dames and Moore 1982, 1983a; Nekton and Kinnetic Laboratories 1983 and U.S. Minerals Management Service).

The infaunal community described here and in the site-specific reports is not innately unusual other than for its location in a previously poorly explored area. Although a number of its constituents are currently undescribed, the same species have tended to appear in several sampling efforts and there is no evidence at this time that they are particularly rare.

There is little general information on the hard bottom fauna at these depths. What exists [Nekton, 1981, Lissner and Dorsey MS] suggests that the fauna observed near the platform sites is similar to that at equivalent depths elsewhere. In previous cases, no data on habitats corresponding to the undercut and vertical face habitat found on some of the hard-bottom features in the study area were presented. It is quite possible that the ahermatypic coral community dominated by the branching white Lophelia californica, observed and sampled by Nekton and Kinnetic [1984], has not previously been investigated. This does not, however, mean that the community is unique to the area or of special biologic significance. It may only reflect the paucity of sampling effort expended to date on hard bottoms in the depth range of the present investigations. Lophelia californica is, for instance, widely distributed and the present records are only noteworthy because sampling of its primary habitat is so difficult [Dr. Eric Hochberg-Santa Barbara Museum of Natural History, personal communication to MBC, 1984].

Other Pipeline Routes

The characteristic fauna along the pipeline route from Platform Hermosa to shore was composed of wide ranging species found throughout the Southern California Bight. No unique or particularly unusual organisms were observed in the soft bottom communities, although depths of occurrence along the pipeline route for some species differed from typical population bathymetric distributions in other areas.

Approximately 12 hard bottom features with 2 feet or higher relief were found within 5000 feet of the centerline in this predominantly soft bottom pipeline corridor. Most of these features were 1-10 acres in area, with the exception of an approximately 200-acre feature about 2-2.5 miles from the landfall. Trends in hard bottom epibiota community structure with movement along the pipeline corridor into shallow water were: 1) rapid disappearance of coral and echinoderm communities typical of platform depths (not observed above 300 ft), 2) increase in species diversity from 300 to 200 ft followed by declines in the shoreward higher energy zone, and 3) a decline in amount of exposed hard bottom habitat towards shore. Nearshore hard bottom is subjected to sand scour and intermittent sand burial unless it is high relief. At 60 feet, hard substrate was more extensive than at 90 feet, but still relatively low relief. Sand scour was still a factor, but enough sheltered substrate was available to support red abalone [Haliotis rufescens] and other characteristic species.

The soft bottom epibiota of the outfall pipeline corridor is quite similar to that in other areas. Some elements more common to the south were not present in the nearshore zone off Gaviota. These absences are likely a result of the relatively recent removal of the kelp beds normally found in the area. No natural raised profile, hard bottom substrate was found in surveys of the immediate vicinity of the outfall pipeline corridor or the terminus of the proposed outfall [Dames and Moore 1983b].

Geological side-scan sonar data indicate that the alternative pipeline corridor from Platform Hermosa to Gaviota contains the same relatively small hard-bottom features as the proposed corridor in its first 2-3 miles from the platform site shoreward. Biological communities found on these features are similar to those described for the proposed pipeline route (personal communication, M. Warhurst, 1984). Continuing toward Gaviota beyond that point, the alternative route centerline is within 5000' of approximately 10 more raised profile (greater than 2' relief) features, mostly in the 1-10 acre size range, until it is offshore of Point Conception. One of the features in this stretch has about 70 acres of raised profile rock. Thereafter, the alternative route centerline passes within 1000' of one large (at least 5000' x 2000') raised-profile reef extending out to the 140' depth off Gato/San Augustine. Dames & Moore [1983c] reported the latter feature to be tar-covered. Community characterizations of the biota of the raised profile features near the alternative route are similar to those documented at other sites in corresponding water depth along the proposed route for purposed os this analysis.

KELP COMMUNITIES

Figures 4.5-3 and 4.5-4 illustrate the historical extent of kelp beds in the areas near proposed project facilities. North of Point Conception to Espada Bluff lies Bed 33 (Figure 4.5-3). This bed has historically been the smallest in area of the 33 beds leased by CDF&G [R. McPeak, Kelco, personal communication to MBC, 1984]. Aerial mapping of Bed 33 by Kelco in 1982 indicated that the Macrocystis canopy is concentrated in the Jalama Beach region.

Adjacent to the proposed outfall site, at Gaviota there has existed kelp bed 31 (see Figure 4.5-4) that historically has been part of the most extensive mainland beds in the Southern California Bight [Hodder and Mel 1978]. The kelp beds of the Gaviota region are unique in that they exist almost entirely on a sandy bottom. Although these kelp beds had historically exhibited little seasonal variations [North 1971, Hodder and Mel 1978], the winter storms and warm water El Nino episode of 1983 resulted in the loss of the entire kelp canopy in the Gaviota region [W. J. North, personal communication to MBC, 1984].

Because of the subtidal sand substrate in the Gaviota region, the kelp bed understory community, is not well developed. Though the species composition reported in the diver surveys of the area [Dames and Moore, 1982] was similar to that reported for the kelp beds occurring on reefs and rock substrates in the region [Dames and Moore 1977, MBC and CDF&G 1981], fish densities may be less in kelp beds with sand substrate because of a reduction in underlying reef habitat.

Important kelp beds have historically existed around two of the three other potential offshore support bases for the proposed projects:

Ellwood and Carpinteria. The present importance of the Ellwood beds has been increased by the concentration of commercial harvesting there with the loss of the beds around Gaviota. While there are major kelp beds near Carpinteria, they are not in the immediate vicinity of the crew boat pier. The supply base area at Port Hueneme has no significant beds [W. North, personal communication to ADL, 1984].

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

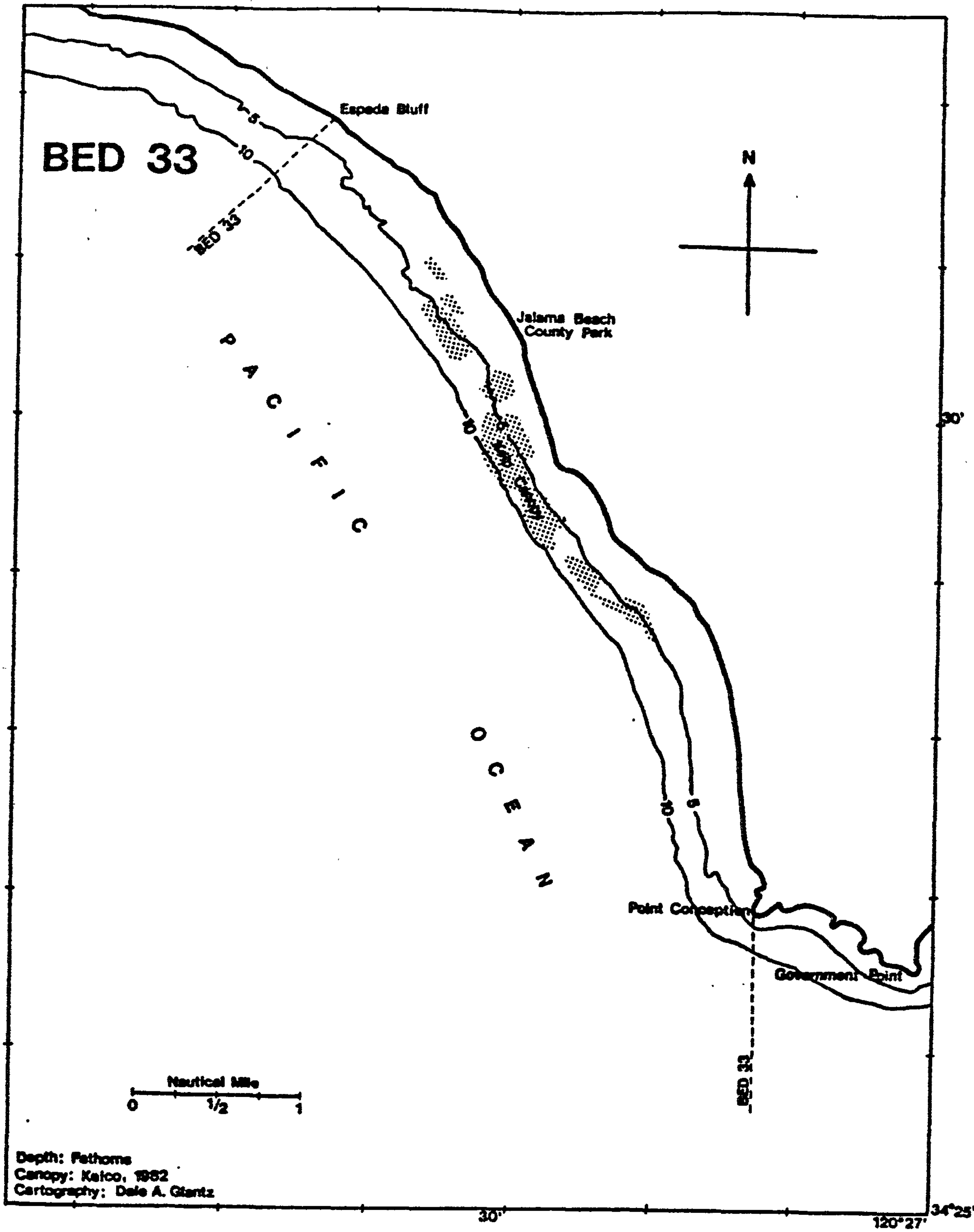
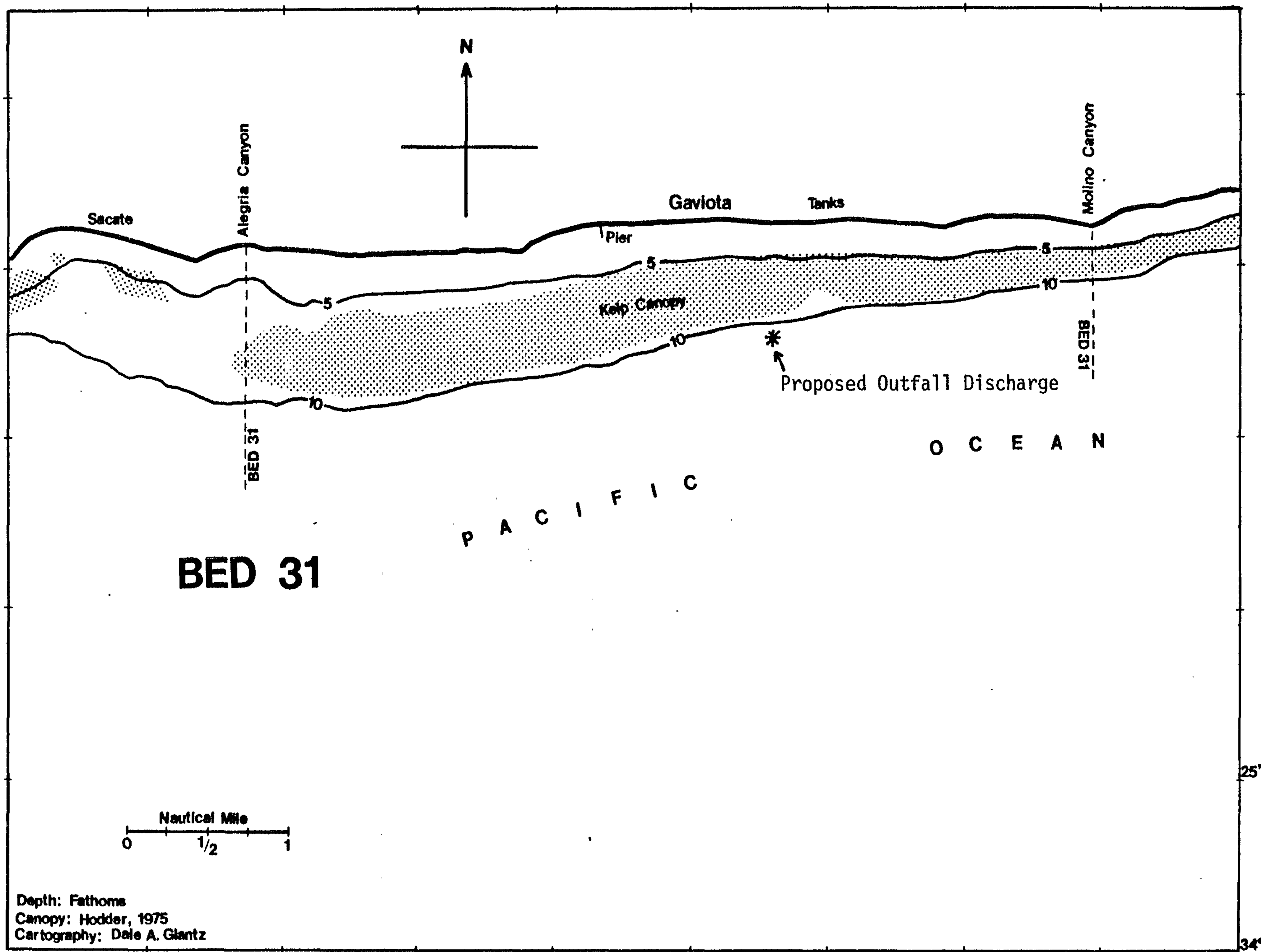


Figure 4.5-3 Recent Presence of Kelp Canopy from Point Conception to Espada Bluff (Kelco Co., Inc., 1984, and MBC Environmental Sciences)



Source: Kelco Co., Inc.

Figure 4.5-4
Historical Kelp Canopy off Gaviota

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-m thick band of copepods has recently been discovered at a water depth of abut 450 m across the Santa Barbara Basin [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 wide-spread, 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.

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 spring 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 over most of the year in the plankton in the waters south of Point Conception [MBC/CDF&G, 1982], with larval densities decreasing with distance from shore in the referenced study. Abalone and sea urchin larvae are also expected in the nearshore zooplankton throughout the Study Region.

Results from a variety of studies in the Study Region [Chambers Consultants and Planners, 1980, Iamberry and Warrick, 1978 B, MBC/CDF&G 1982] show a broad tendency for the commercially important northern anchovy larvae to represent 70-85 percent of the long-term average icthyoplankton catch. The larvae of other commercially-valued species (California halibut and English sole) are sometimes among the 20 most abundant species out of the approximately 100 captured in the surveys.

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, 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 greatest abundance in the Santa Barbara Channel in recent years in the shallow waters (less than 50 fathoms) near the mainland and the northern Channel Islands (see Appendix I, Section 4.5.6). Species historically recorded in relatively high concentrations near the locations of proposed project facilities are Pacific bonito, Pacific barracuda, yellowtail and white seabass [Squire, 1983]. Most of these reports between 1974 and 1978 were of schools concentrated in the nearshore waters between Point Conception and Gaviota.

Of the latent 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.

Demersal (Bottom-Associated) Species

The rocky intertidal zone north of Point Conception supports an extremely diverse intertidal fish fauna. In one study [Burge and Schultz 973], 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. A recent survey [Cross 1982] of rocky intertidal fishes between La Jolla and Ventura reported only 10 species as occurring in tide pool and rocky/cobble habitats. 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 lacking on the intertidal fishes of the Channel Islands, but the physical characteristics of the area suggest it may also lack the microhabitats present in the mainland areas north of Point Conception.

The predominant demersal fishes which occur in less than 100 feet of water in the Santa Barbara Channel south of Point Conception have been listed by MMS [1980b]. A total of 27 species or groups of species are associated with rocky bottoms, while 17 species or species groups predominate on soft bottoms.

Data are less complete for shallow-water species north 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 comparable 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 m). A transition assemblage apparently occurs over the next 300 feet, with a deeper-water group predominating below about 600 feet [Dames & Moore, 1982]. Fewer data are available for characterization of the deep demersal communities in the southern Santa Maria Basin, but the otter trawl sampling results near the proposed project sites were characterized by Dames & Moore as similar to those reportedly previously in their SYU unit survey [1982].

Figure 4.5-5 provides information on the distribution of demersal nekton species of commercial importance in the Study Region by indicating some of the historical trawling grounds. Rockfish and halibut are the two principal species of commercial importance near the proposed project sites. (See Sections 4.10.1 and Appendix N, Part One, 5.10.1 which identify species and areas of importance to the fishery in more detail.)

Table 4.5-1. Seabird and other breeding species and breeding areas in the Santa Barbara region.

Species	Food Items	Foraging Areas	Breeding Areas in in the Southern California Bight
Leach's storm petrel	fish, molluscs, crustaceans, garbage	open ocean; rarely close to shore	San Miguel Island
Ashy storm petrel	small fish, cephalopods, larval stages of spiny lobster, "oil" (regurgitated from adults)	no data; probably cold waters of California current	San Miguel and Anacapa Islands
black storm petrel	garbage from ships, fish, squid, larval stages of spiny lobster	primarily warm waters	Channel Islands Anacapa Island
brown pelican	primarily northern anchovy; Pacific saury, blacksmith, grunion	inshore feeders; adjacent to breeding colonies and roosting areas; in Channel Islands along mainland coast	Anacapa, Santa Barbara Island Scorpion Rock
double-crested cormorant	less preference for crustaceans and amphibians; freshwater and marine fish-sculpins, stickleback, flounder, smelt, pipefish, surfperch, sardines, and shrimp; shiner perch, rockfish, Serranidae, unid, pink surfperch senorita, blacksmith. Midwater fish species that inhabit littoral waters particularly in kelp beds. Shallow water fishes	nearshore areas; bays, rivers on mainland. Food found within a few miles of breeding colonies or further if local food supply is poor	Santa Rosa, Anacapa, Santa Barbara Islands
Brandt's cormorant	benthic and nektonic fish; large and small fish of limited commercial value. Channel Islands: from regurgitated samples and pellet samples, 34 species of fish with variation among different roosts-rockfish, blacksmith	littoral waters, on and over shallow parts of continental shelf, dense kelp beds and open water, midwater on the bottom; mainly within vicinity of breeding colonies; never more than a few miles from land	All Channel Islands
pelagic cormorant	mainly fish; crustaceans and polychaete worms	nearshore waters in vicinity of breeding colonies during breeding season-rarely more than a few miles offshore	Northern Channel Islands, Point Conception region
black oystercatcher	California mussels; limpets, chitons, crabs	rocky intertidal	Channel Islands Point Arguello
western gull	mainly fish; squid, surfperch, northern anchovy, saury; rockfish, euphausids, placental material and garbage; opportunistic; varies with prey availability	inshore waters near colony for fish; or dispersal to mainland coastal dumpsites (Tajiguas Dump, Santa Barbara Transfer Station for Santa Maria population; Palos Verdes/Southwest Botanic Garden for Santa Barbara Island colony	All Channel Islands
common murre	fish, crustaceans, and cephalopods	offshore open waters, foraging over long distances and to considerable depths	none at present, previously on San Miguel Is
pigeon guillemot	mainly fish	nearshore waters adjacent to breeding colonies; rarely more than one nautical mile offshore	northern Channel Islands, Point Arguello region

Table 4.5-1 (cont)

Species	Food Items	Foraging Areas	Breeding Areas in in the Southern California Bight
Xantus' murrelet	larval fish; primarily northern anchovies, Pacific sauries, and rockfish. Anchovies may be very important in breeding success	offshore in immediate vicinity of breeding islands; western more oceanic waters adjacent to colonies. Disperse widely after breeding	San Miguel, Santa Rosa, Santa Cruz, Anacapa Islands
Cassin's auklet	small fish, pelagic crustaceans Southern California Bight: (regurgitated food items) euphausids, amphipods, larval fish (northern anchovy, rockfish, sanddabs, various other species); seasonal variation in in prey observed	avoids inshore areas but no preference for water depth or distance from shore; disperse directly out to sea from colonies (N and W of San Miguel Island) rarely south possibly in relation to food availability; forages in large flocks	San Miguel and Anacapa
rhinoceros auklet	small fish and cephalopds	no data	possibly at Point Arguello
peregrine falcon	seabirds (i.e. phalaropes)	nearshore waters of mainland	Purisima Point
California least tern	northern anchovy, deepbody anchovy, jacksmelt, topsmelt, grunion, shiner perch, killifish, and mosquito fish	inshore lagoons/estuaries; offshore to approximately 3 miles	open expanses of mudflats, dirt, sand. Santa Maria River Santa Ynez River, Purisima Point, San Antonio Creek, Santa Maria River mouth, Ormond Beach, and Mugu Lagoon
snowy plover	infaunal crustaceans, polychaete worms beetles/flies in freshwater habitats	sandy beaches/mudflats/estuaries/ shores of ponds and swamps	sandy beaches; Pt. Arguello region
light-footed clapper rail	shorecrabs, snails, clams, isopods, insects, small fish	mudflats and saltmarshes	saltmarsh (cordgrass habitat) Goleta Slough, Mugu Lagoon Carpinteria Marsh
Belding's savannah sparrow	insects, vegetation	saltmarsh	saltmarsh (pickleweed habitat) Carpinteria marsh, Mugu Lagoon, Goleta Slough

Source: Bent 1962, Hunt et al. 1981, MMS 1984

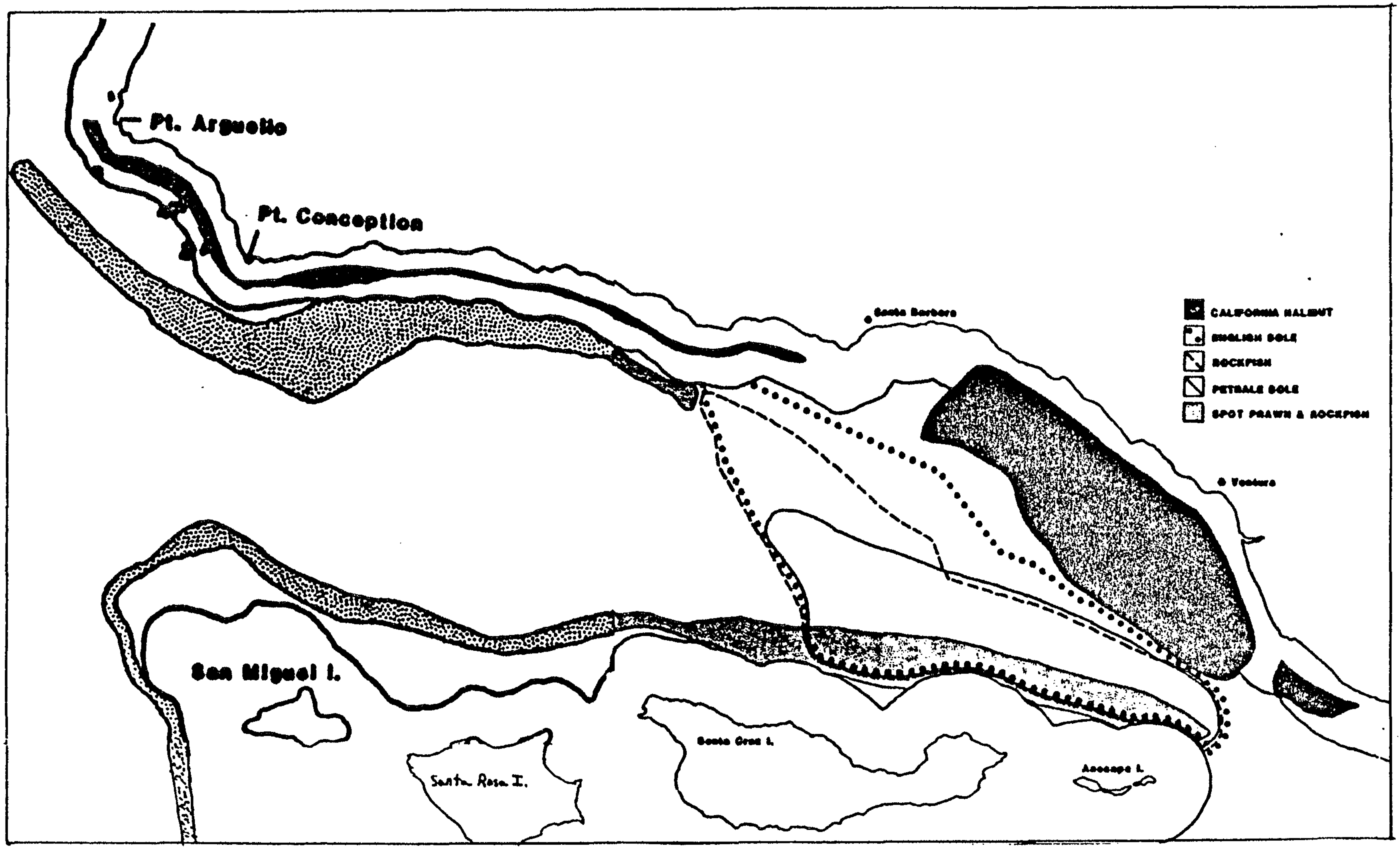


Figure 4.5-5

Commercial Trawling Areas in the Study Region

Source: MMS 1983

MARINE-DEPENDENT BIRDS

Seabird nesting and roosting sites are designated an Environmentally Sensitive Habitat areas (ESH) to be protected from disturbance by the Santa Barbara County Local Coastal Plan (LCP). Table 4.5-1 summarizes information on the distribution and ecology of marine-dependent birds in the Study Region.

Few seabirds breed in coastal mainland habitats from Morro Bay south to Point Conception because of human disturbance [Chambers Consultants and Planners 1980], however, there are established colonies at least at Point Arguello [P. Lehman, personal communication to ADL, 1984].

The rocky cliff areas of Point Conception about 1-2 miles south of the proposed pipeline landfall have supported breeding populations of pelagic cormorant, pigeon guillemot and possibly rhinoceros auklet [Sowls et al, 1980]. The passages and waters of the coast immediately adjacent to and including Point Conception and northern Channel Islands are particularly important for migrating seabird and waterfowl species [Lehman, personal communication to ADL, 1984]. South of Point Conception, mainland breeding colonies have been essentially eliminated from the Study Region by a combination of human disturbance and lack of suitable habitat.

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.

MARINE MAMMALS

Table 4.5-2 summarizes recent marine mammal siting data for the portions of the Study Region closest to the proposed project sites.

Cetaceans

The entire Study Region is utilized by cetaceans in all seasons. Resident gray whales are now found year-round in small numbers in the Region. The Study Region portion of the migration routes of the large whales is shown in Figure 4.5-6. All of these whales are endangered or threatened species. 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 km). 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 ADL, 1984]. Other smaller cetaceans are resident year-round, including grampus and dolphins, and are protected by the Marine Mammal Protection Act with its prohibition against taking for other than scientific research and public display (by permit), incidental taking relative to commercial fishing, and other specific purposes by special authorization.

Southern Sea Otter

The majority of individuals of this Federally-listed threatened

Table 4.5-2. Gaviota/Point Conception/Point Arguello project area marine mammal data.

Species	Sightings on Land	Sightings at Sea	Season
Southern sea otter		1 individual at Point Arguello Boathouse breakwater, 1978[1]	Spring
		3 individuals at Point Buchon, May 1980[2]	
		1&2 individuals, 29 sightings, Little Cojo Bay[5]	Autumn, winter, spring, summer
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
		1-75; OS and T/SALM and Platform Hondo A SYU area, SAI 1983[6]	Summer, winter
		Present Hollister Ranch[7]	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
		Common inshore, Little Cojo Bay[5]	Autumn, winter, spring, summer
	Hauled out on Drake's Beach Spring 1976[6]	1-5 individuals/km^2 South of Point Conception	
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; >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
		1 individual, offshore SYU[6]	Winter
Common dolphin		135 individuals; Platform Hidalgo survey;[4]	
		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 1 individual offshore SYU area[6]	Winter, spring, summer, autumn
Dall's porpoise		5-78 individuals; 100-1000+ fms[2] PA-PC 1-20: 1 mi offshore Gaviota	Summer
		2 sightings Platform Hermosa survey[3]	Summer
		Pods of 4-8 individuals, 3 occasions; SYU[6]	
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
		Present, migrating upcoast, inshore Holister Ranch[7]	Spring
		69; inshore, Little Cojo Bay, 1980-1981[4]	Winter-Spring
		Present, SYU[6]	Winter
Humpback		6-10 individuals; (Purisma Pt) 100 fms[2]	Autumn
Blue whale		2-5 individuals; (Purisma Pt) 100 fms[2]	Summer
Finback		2 individuals; Platform Hidalgo survey[4]	Autumn

*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] MBC, Fish & Game 1982
[6] SAI 1983
[7] Dames and Moore 1977
[8] Woodhouse and Strickley 1982

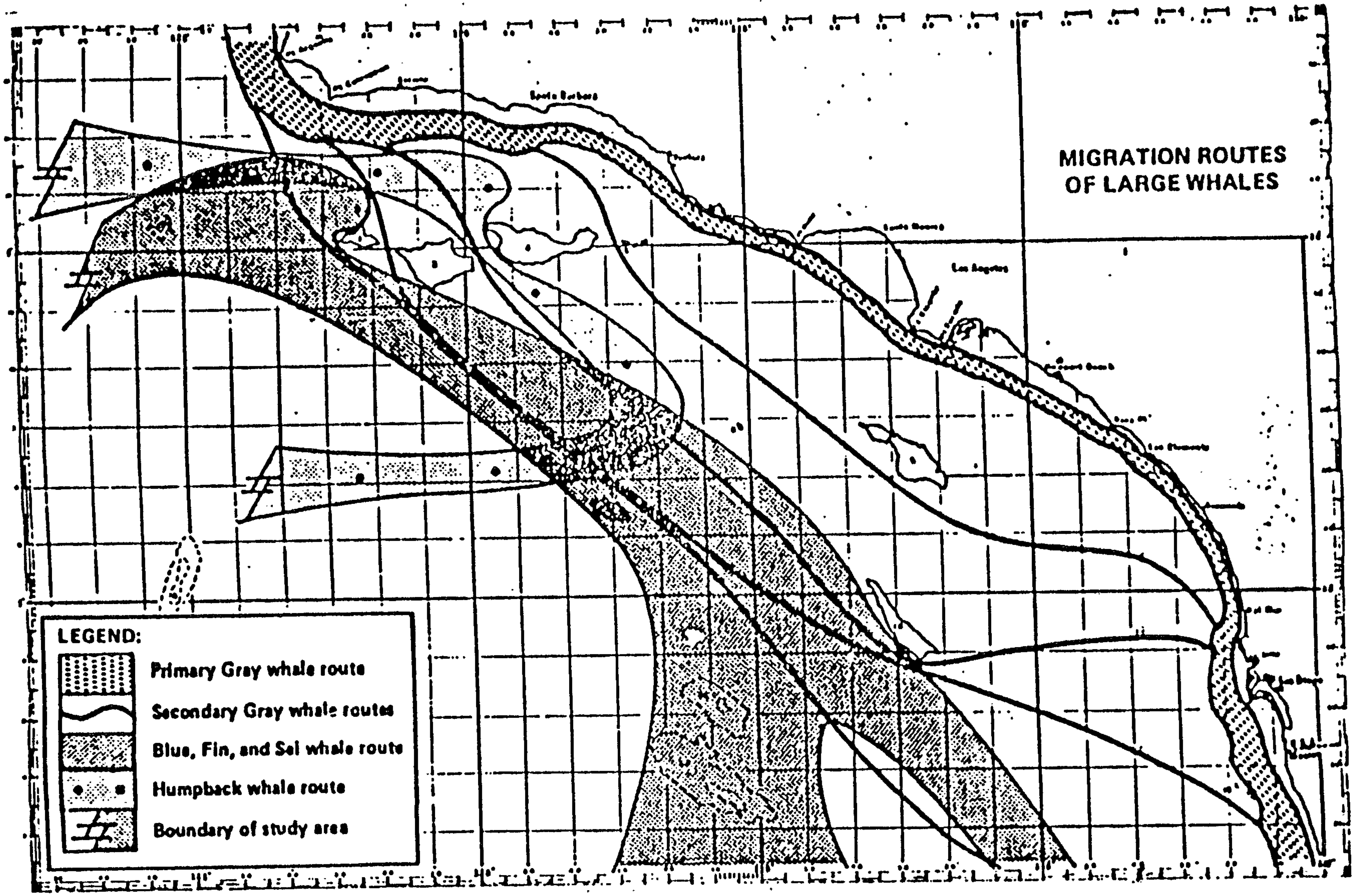


Figure 4.5-6 Migration route of large whales. (Source: Dohl et al. 1981).

species occur north of the present Study Region. However, groups of 4-5 have been sighted occasionally in the Cojo Bay region, and annually there are reports by reliable observers of individuals in the vicinity of Ellwood and Coal Oil Point (see Table 4.5-2).

Pinnipeds

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. Specific areas in the County which are listed in the LCP and located near proposed project facilities or activities are harbor seal rookery and hauling grounds at and near Point Conception, Naples (Burmah Beach) and Carpinteria. (See Figure 4.5-1 here and Table 67 in Appendix I.) Harbor seal haulouts are observed frequently in the stretch between Point Conception and Jalama Beach, including the proposed pipeline landfall.

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. One of these is the northern fur seal, a candidate species for Federal listing. The transient Guadalupe fur seal, a candidate for Federal listing, also utilizes the islands at its present northerly range extreme. Figure 21 in Appendix I depicts the usage of San Miguel Island for breeding by pinnipeds.

Section 4.5.10 of Appendix I contains additional data on marine mammal distribution and abundance in the Study Region.

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. 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.

ASBS 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 unacceptable (BLM Lease Sale 80).

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 I. The discussion below focuses on those areas closest to proposed project sites, which are summarized in Table 4.5-3.

Siva [1976] identified several specific sites between Point Conception and Ventura which have special value as pinniped hauling-out areas or avian foraging or breeding areas or marshes. Areas identified by Siva were Point Conception, Burmah/Naples Beach, Goleta Rocks, Standard Oil Company Carpinteria Pier (pinniped haul-out areas), and Goleta Slough, Carpinteria Marsh, and the Santa Clara River Mouth (bird habitat and marsh). The Santa Clara River mouth supported active least tern breeding colonies in 1983 [Marty Pletcher, CDF&G, personal communication to MBC, 1984].

The Channel Island National Marine Sanctuary contains some highly productive waters, mammal and seabird habitat and bottom communities incuding an area of purple coral. Table 74 in Section 4.5.10 of Appendix I 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.

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 4.5-4. 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 and all marine mammals are protected under the Marine Mammal Protection 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 through Ventura County, with one pair released from Gaviota Peak [Steve Lanoy, CDF&G personal communication to MBC, 1984]. Southern bald eagles are rare in the region, mostly occurring farther south and inland. Least terns breed at the Santa Maria River mouth, Purisima Point and Santa Ynez River sand beach/dune habitats and at several locations near Port Hueneme; they forage widely in the nearshore coastal area 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] and forage in the region's estuarine habitats [Sowls 1981]. California brown pelicans occur throughout the central coastal areas, breeding only on Anacapa and Santa Barbara Islands and Scorpion Rock. California black rails, and Belding's Savannah sparrows nest in Morro Bay coastal saltmarsh/estuarine habitat [MMS 1983] with these marshes the last known regional breeding site of the rail [Lehman, 1982].

Table 4.5-3 Areas of special biological concern in the Santa Barbara Channel region. (Information sources: US/BLM 1981, US/MMS 1984, US/FWS 1981, COC 1980, VC 1979, SBC 1979 and 1982).

Area	Designation(s)	Characteristics
Point Arguello to Point Conception	[1]SBC Environmentally Sensitive Habitat	Pristine rocky headlands; relatively undisturbed intertidal areas; sea otter populations
Point Conception	SBC Environmentally Sensitive Habitat	Area of concentration for migrating birds; staging area for migrating gray whales; harbor seal haul out area; relatively undisturbed rocky intertidal habitat; important biogeographic area
Government Point to Ellwood	SBC Environmentally Sensitive Habitat; Recommended for Preserve Status	Relatively undisturbed intertidal rock areas; extensive kelp beds; harbor seal haul out areas
Ellwood		Unique boulder shield beach; harbor seal haulout and rookery
Naples Reef	SBC Environmentally Sensitive Habitat	Diverse and productive subtidal reef community; long-term research area of UCSB Marine Science Institute
Burmah Beach	SBC Environmentally Sensitive Habitat	Harbor seal haul out and rookery area
Coal Oil Point	SBC Environmentally Sensitive Habitat	Rocky intertidal area; subtidal oil seep ecosystem study area (University of California)
Devereaux Lagoon	SBC Environmentally Sensitive Habitat (University of California)	Wetland habitat; high intensity bird utilization; coastal dune habitat; ecological reserve
Goleta Point	SBC Environmentally Sensitive Habitat	Rocky intertidal habitat; harbor seal haul out area
Goleta Slough	SBC Environmentally Sensitive Habitat	Extensive marsh/estuarine habitat; high intensity bird utilization including endangered light-footed clapper rail and Belding's savannah sparrow
More Mesa	SBC Environmentally Sensitive Habitat	Harbor seal haul out area
Carpinteria Marsh	SBC Environmentally Sensitive Habitat	Extensive marsh/estuarine habitat; high intensity bird utilization including endangered light-footed clapper rail and Belding's savannah sparrow
Carpinteria Oil Pier	[2]SBC and COC Environmentally Sensitive	Harbor seal haul out and rookery area
Carpinteria Reef	SBC and COC Environmentally Sensitive	Important rocky intertidal and subtidal marine habitat
Ventura River Mouth	Environmentally Sensitive Habitat	Estuarine habitat
Santa Clara River Mouth	VC Environmentally Sensitive Habitat;	Estuarine/marsh habitat; high intensity bird utilization including endangered least tern and Belding's savannah sparrow
McGrath Lake	[3]VC Environmentally Sensitive Habitat	Fresh water marsh and coastal dune habitats
Mugu Lagoon	VC Environmentally Sensitive Habitat	Extensive marsh/estuarine habitat; high intensity bird utilization including endangered least tern; harbor seal and California sea lion haul out area

Source: SAI, Inc. 1983

Key: SBC - Santa Barbara County; COC - City of Carpinteria; VC - Ventura County

[1]Santa Barbara County Environmentally Sensitive Habitats defined in "Santa Barbara County Land Use Plan 1982, Section 3.19-Environmentally Sensitive Habitats"

[2]City of Carpinteria Environmentally Sensitive Habitats defined in "City of Carpinteria Local Coastal Plan 1980, Section 3.9-Environmentally Sensitive Habitats"

[3]Ventura County Environmentally Sensitive Habitats defined in "Ventura Coaunty Land Use Plan 1983"

Table 4.5-4. Marine-associated species of special interest.

Species	California Distribution	Status[1]
BIRDS		
American Peregrine falcon *Falco peregrinus anatum*	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 californicus*	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 coturniculus*	Santa Barbara, Ventura, Orange and San Diego County coastal marshes	SR,SP
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 japonica*	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 lutris nereis*	Santa Cruz south to Pismo Beach	SP,FT
northern fur seal *Callorhinus ursinus*	Offshore and San Miguel Island	FC
FISH		
tidewater goby *Eucyclogobius newberryi*	Coastal lagoons of California	FC
REPTILES		
leather-backed turtle *Deremochelys coriacea sechlgeli*	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

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

See Terrestrial Biology Section 4.6 for other species.

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 (rare south of Farallon Islands), sei and sperm whales. The most abundant species, the California gray whale, migrates nearshore during its annual migration to Baja California. Two candidate species for Federal listing, the Guadalupe fur seal and Northern fur seal, occur on San Miguel Island, with the latter a breeder there. See the marine mammals discussion above and in Section 4.5.10 of Appendix I.

The southern sea otter presently occurs within its southernmost population ranges between Point Conception and Point Piedras Blancas (see Section 4.5 of Appendix I). Occasional individuals are seen in the Point Conception-Point Arguello region [MBC/CDF&G 1982, Chambers Consultants and Planners 1980] and in Cojo Bay just east of Point Conception. The southernmost group of migratory male otters (about 60 individuals) have been regularly observed south to Point Arguello in recent years [Woodhouse, personal communication to ADL, 10/84].

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].

BIOLOGICAL RESIDUES OF CONTAMINANTS

The most important kind of baseline in this category of data is "site specific," or actual measurements of contaminant residues in the region of concern. Data of this nature are not broadly available for the Study Region at this time. A number of studies have included evaluations of species (primarily mussels) from sampling stations in the Study Region (Coal Oil Point, and the North Coast Area above Point Conception are examples). In general, the trace metal concentrations found were within typical ranges for areas removed from urban contaminations. Differences between organisms from more remote coastal sites and areas of oil seeps or platforms have not been significant [Martin, et al, 1978]. It must be noted, however, that it may be difficult to apply those studies for baseline use, given the high degree of variability inherent in such evaluations (e.g., species, tissue, methodology sediment contamination of samples, etc.) See data gaps and recommendations below and in Appendix H for further discussion.

4.5.3 Data Gaps and Recommendations

Data gaps are discussed in summary form in Part 5 of Appendix H and on the last two pages of Appendix I. It is acknowledged that the missing information could make this analysis more precise, but its absence does not preclude a reasonably accurate impact assessment.

The following data gaps are considered the more significant among the several remaining in the marine biology baseline.

- Monitoring of present and near-term kelp bed recovery off Gaviota would provide an accurate reference point against which to measure project impacts.

- Because of changes that may have occurred in the last five years, a pre-construction survey of seabird nesting and roosting activity between Point Conception and Point Arguello would document distribution and abundance in the aftermath of the El Nino episode and provide better information to help quantify and mitigate project impacts.

- See Section 5.5.5 of the EIR/EIS for discussion of the rationale for and elements of a long-term program of observation, sampling and analysis of selected benthic physical and biological conditions around proposed platform and pipeline locations, beginning in the pre-construction period and continuing during project construction and operations.

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4.6 TERRESTRIAL AND FRESHWATER BIOLOGY

4.6.1 Overview

The coastal areas west of Gaviota, and north from Point Conception to the mouth of the Santa Maria river are some of the last undeveloped open areas in coastal southern California; they provide relatively undisturbed stands of coastal sage scrub, riparian woodland and grassland. These relatively undisturbed open areas offer the type of high quality wildlife habitat essential for the continued survival of wide-ranging carnivores like mountain lions, bobcats, and black bear.

The Study Region (illustrated in Figure 4.6-1) also represents both southern and northern distributional limits for a number of plant and wildlife species. Rich habitat diversity has resulted in a relatively diverse assemblage of amphibians, reptiles and land mammals. Similarly, 417 bird species have been recorded in Santa Barbara County through January 1984; about 250 of these have been observed in the Study Region.

The potential pipeline routes, and processing facility site alternatives are located in areas that are basically representative of the habitats in the open space remaining in the Study Region. Some aspects of these sites that are of particular importance to terrestrial biota are summarized below:

- The pipeline routes cross numerous streams with associated riparian and/or wetland habitat. These have been designated as Environmentally Sensitive Habitats (ESH) by the County of Santa Barbara.

- The Gaviota processing facility site contains three of the above noted ESHs, and similarly protected Butterfly Trees. It is at least proximate to suspected raptor roosting and/or nesting sites.

- The southern alternative proposed pipeline landfall crosses sensitive coastal plant communities.

- The Point Conception alternative processing facility site contains habitat that likely supports large migratory and bird passage in fall and spring (see Apendix J, pg 1-23). The site and surrounding area are significant to the remaining undeveloped open area in Southern California.

For the purposes of this section of the analysis, the Project Area is defined as the proposed pipeline corridor between Point Conception and Gaviota, the proposed processing facility at Gaviota, and proposed onshore staging and support areas.

4.6.2 Characteristics of the Study Region

TERRESTRIAL COMMUNITIES

Vegetation

The Study Region supports shrub or modified grassland communities over most of its area, with woodland or forest communities restricted to the moister and/or cooler environments of the mountains (especially crests, north-facing slopes, and ravines) and to the banks of perennial or intermittent streams. A combination of factors over time has served to increase the areal extent of grassland and shrub communities at the expense of forest and woodland communities in underdeveloped areas of the Study Region. These factors include: 1) a trend toward a warmer and more arid climate over geologic time, 2) changes in the frequency and perhaps scope of fire since the advent of aboriginal and European man in the area, 3) grazing, and 4) other agricultural practices including land clearing.

Over 40 plant species are restricted in distribution (endemic) to the Study Region and about 45 plant species reach their southern or northern mainland distributional limits in the region. Thirty-seven species in the region, many of which are endemic, have been listed by the California Native Plant Society as rare or endangered. All of these are summarized in Appendix J, Section 2.1.

Plant Communities

The basic plant community types in the Study Region are described below and important biological features including areas supporting regionally rare botanical resources are noted in Figure 4.6-1. (Major sources for this information are summarized in Technical Appendix J, Section 1.1.)

Coastal Beach and Dune - These communities occupy sandy beaches and foredunes above the high-water mark along the immediate coast. They are especially well represented along the North Coast (Santa Maria River mouth south to Point Conception) which contains some of the best developed and preserved examples in the State. They are poorly represented along the South Coast. Representative species are sensitive to trampling by people and off-the-road vehicles (ORVs) and are being invaded and displaced by introduced species such as ice plant and beach grass. Several rare or endangered species including surf thistle and beach spectacle pod are restricted to this community type or shared with adjacent coastal scrub vegetation.

Coastal Scrub - There are three distinctive phases of this community type. These 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 exposure to

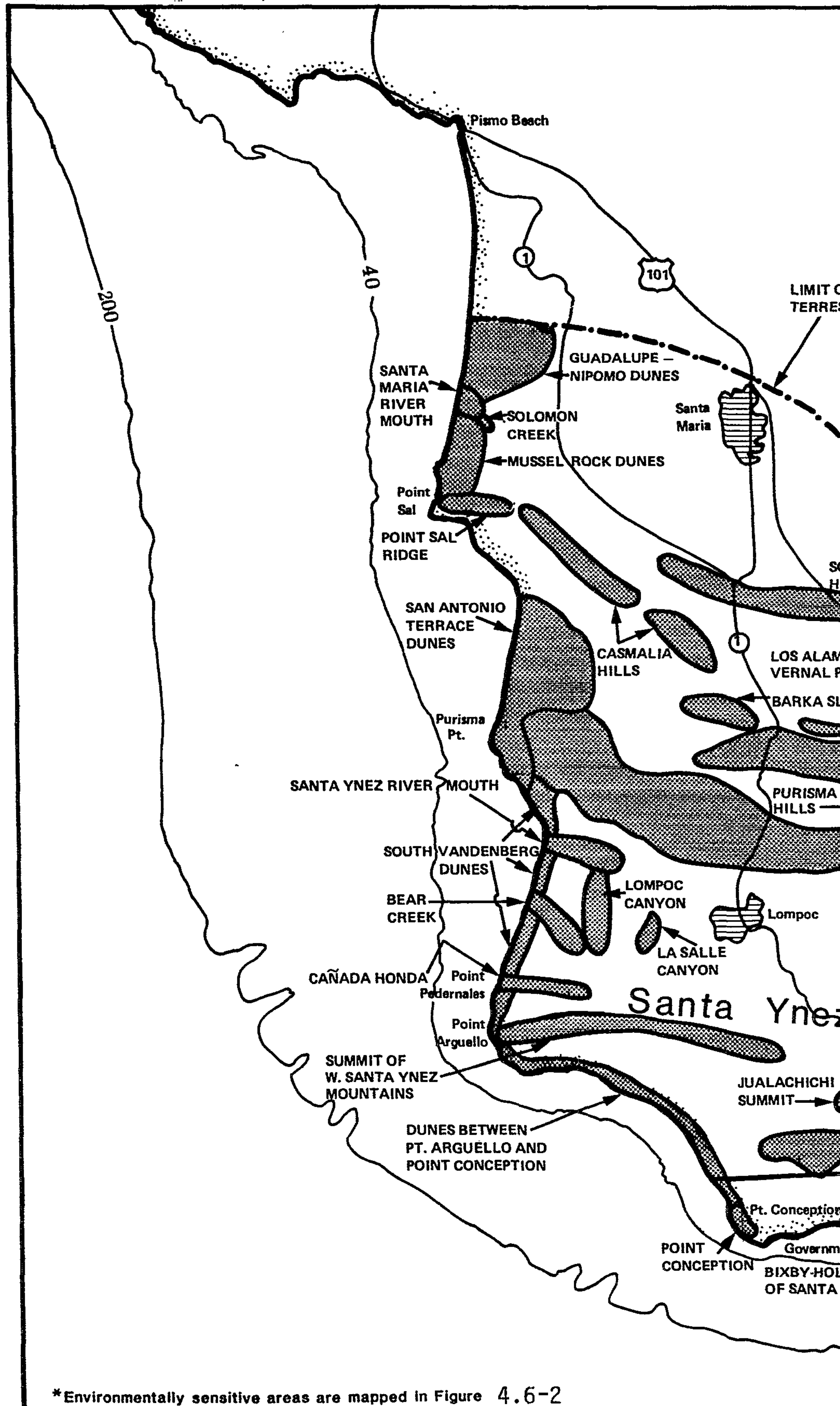
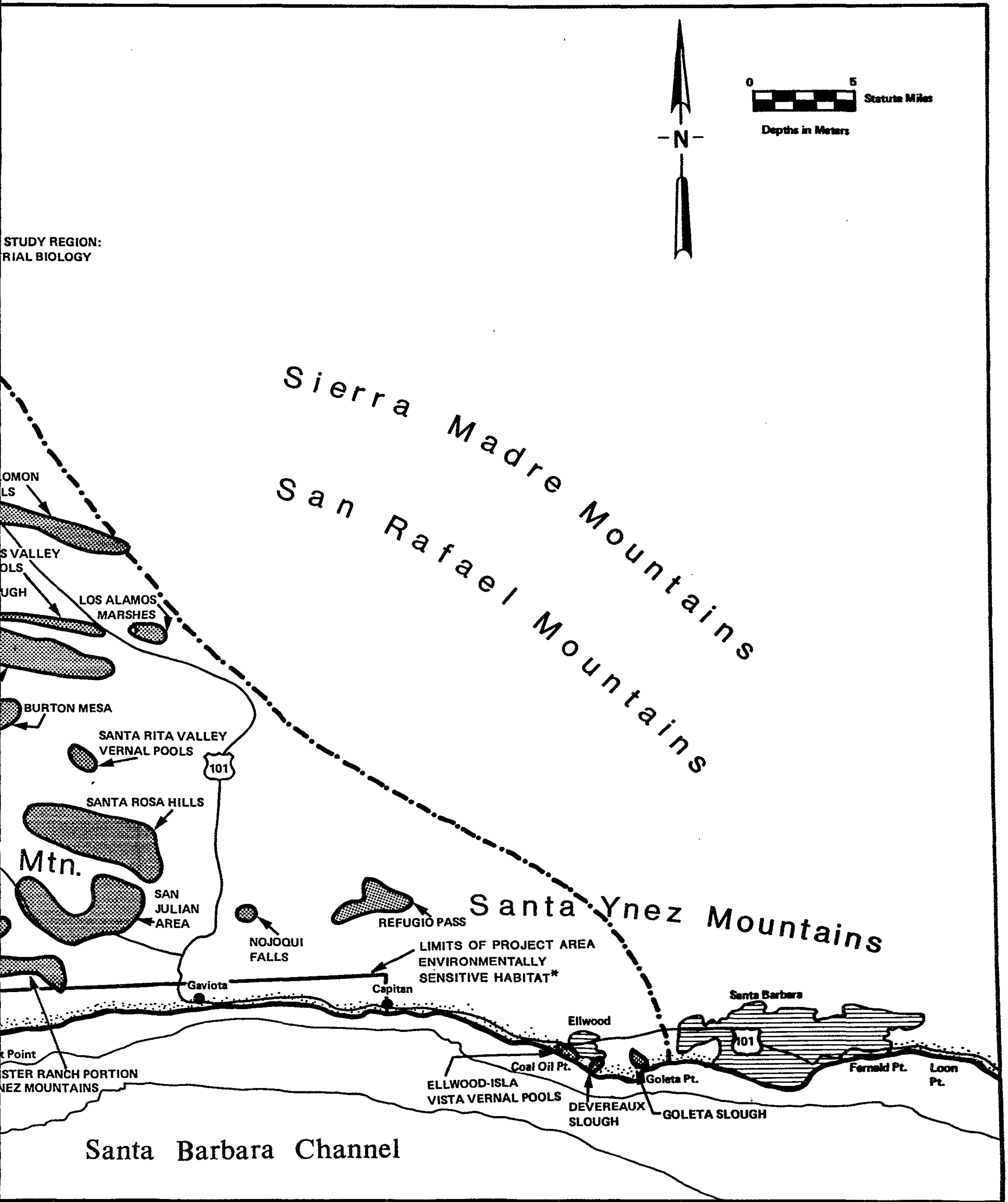


FIGURE 4.6-1 TERRESTRIAL BIOLOGY STUDY



REGION (Including Areas Supporting Regionally Rare Botanical Resources) high, salt-laden winds tend to prevent continuous vegetative cover and favor succulent species. There are a few endemic species in this community type. It is well-represented on the South Coast and in rocky areas on the North Coast.

Coastal Dune Scrub is confined to sandy semi-stabilized dunes and behind dunes on the coast. It is dominated by shrubs, half shrubs and herbs with a high proportion of endemic species, including rare or endangered species. It is well represented north of Point Conception, and absent from the South Coast.

Coastal Sage Scrub is dominated by shrubs such as coyote bush, coastal sagebrush, and black or white sage. It occurs on terraces, on canyon sides, and in foothills and can extend well inland from the coast. Several endemic species are associated with this type, but they have restricted ranges compared to the overall distribution of coastal sage scrub. Most of the species have pioneer characteristics and invade disturbed areas such as roadsides, old fields and chaparral burns. Much of the grassland along the South Coast probably was coastal sage scrub originally. Grazing is a major ongoing stress.

Chaparral - This community type is widespread in the Project Region, dominating large areas of the mountain ranges and sandy and shaley terraces and mesas in the lowlands (e.g., Burton Mesa). It is dominated by fire-adapted woody shrubs. Several endemic species that are associated with post-fire stages or specific localities are State listed as rare and endangered (e.g., Lompoc yerba santa and Santa Ynez false lupine).

Grasslands - These communities are widespread on foothills, coastal plains and terraces and (formerly) in valley bottoms. The native bunch grass types are now confined to a few small remnant patches. Most grasslands are dominated by introduced annual grasses, with native wildflowers as associates. Some areas were originally dominated by woody vegetation, but grazing and frequent fire after clearing tend to maintain the grassland. Some areas do have scattered cover of reinvading woody species. Grasslands have few endemic or rare or endangered species as predictable associates.

Oak Savanna and Woodland - Lower coastal slopes, valleys, and canyons contain scattered or a nearly continuous cover of coast live oak with grassland or coastal sage scrub dominating the intervening areas. Valley oaks dominate savannas on deep soils in inland valleys like the Santa Ynez Valley. Foothill woodlands include mixed evergreen forest and coast live oak forest. The geographic scope of these communities has been reduced because of climatic changes and more recently because of human influences. Oak reproduction over large areas is almost non-existent and oaks are protected by county policy.

Forests - These communities are dominated by broad-leaved evergreen trees or conifers. Their occurrence in the Study Region is restricted to small areas including mountain crests, north-facing slopes, and patches of unusual soil that discourage competing vegetation. Examples include Purisima Hills, San Julian area, San Rafael Mountains, among others.

Coastal Wetlands - Well developed coastal wetlands (estuarine, fresh or salt water) are characterized by salt- and fresh-water marsh species. Examples are found at the mouths of the Santa Maria River, San Antonio Creek and Santa Ynez River on the North Coast and at Devereaux and Goleta Sloughs on the South Coast. The mouths of smaller rivers have limited estuarine vegetation. This habitat is very sensitive to sedimentation, water pollution, terrestrial or marine oil spills, trampling and human activities that alter the influx of fresh or salt water. There are a few endemic and other protected species in the Study Region. These habitats are protected by the Coastal Act and by county policy because of their ecological importance, sensitivity, and limited areal extent.

Fresh-water Wetlands and Riparian Habitat - These upstream habitats range from floodplain and riparian woodlands, and forests dominated by willows, sycamores and cottonwood, and other trees and shrubs, to various emergent and submergent aquatic species that vary from place to place. There are many small areas of this habitat type in the Project Area. Along the south coast, riparian woodlands tend to intermix with oak woodland. These habitats are much reduced in the Study Region because of human activity. Stream and riparian habitat are protected by Santa Barbara County policy because of their habitat value and importance as a buffer against flooding and erosion.

Seeps and Pools - These include vernal pools, seeps, and other fresh water marshy habitats. Natural vernal pools are infrequent in the Study Region but contain several endemic flowering plants, including rare and endangered species. (A manmade vernal pool was observed in the Project Area.) All of these habitats are ecologically important for wildlife and as traps and filters for sediments and pollutants, and are protected by Santa Barbara County policy.

Ruderal Vegetation - These are disturbed habitats (e.g., roadsides, vacant lots) vegetated by weedy colonizing species which depend on repeated disturbance for their existence.

Agriculture and Other Modified Habitats - Livestock graze over most of the Study Region. Vegetable and truck crops are grown on major floodplains (Santa Maria and Santa Ynez River Valleys). These floodplains are also reportedly the largest center in the world for flower seed production [Shipman, 1972]. Avocado and lemon orchards are found on foothill slopes and stream valleys on the frost-protected South Coast. Grape vineyards are found in the interior valleys, terraces and lower foothills. Other planted species that are not strictly agricultural include plants used in landscaping and for windbreaks. These may or may not be species of regional origin. Stands of planted eucalyptus or cypress would fall into this category.

Wildlife

In general, wildlife communities are determined by available habitat. The latter is represented by plant communities. As habitats are altered, wildlife populations may become stressed, depending upon how adaptive species are to change.

The location of Santa Barbara County and its rich habitat diversity have resulted in a relatively diverse assemblage of birds, amphibians, reptiles, and mammals. Its location as a north-south coastal crossroads, and its history of comparatively low development pressure have contributed to the large number of bird species observed and the remaining populations of large carnivores such as the mountain lion. Study Region wildlife, discussed by associated habitat type, is summarized below from more detailed descriptions in Technical Appendix J. Tables 4.6-1 and 4.6-2 provide very general summaries that are indicative of species diversity in the various habitats discussed below.

Wildlife of Coastal Beach and Dune Habitat - The sandy beach and dune areas are significant for large numbers of shorebirds and gulls, as well as feeding land birds. The most protected dune/beach area is at Vandenberg Air Force Base, and it supports breeding populations of some typical bird species (Brewers Blackbird, House Finch). Much of the sandy beach habitat is on the South Coast, however, and heavily impacted by recreational use. This has likely contributed to the decline of breeding populations of the Snowy Plover and the endangered Least Tern.

The rocky coastal areas found along the northern coast support characteristic nesting species including Pelagic Cormorant, Pigeon Guiellmot, with wintering populations of Wandering Tattler, Black Turnstone, and surfbirds, among others.

Coastal beach and dune habitats support a subset of reptiles, amphibians and mammals characteristic of coastal sage scrub (see below).

Wildlife of Coastal Sage Scrub Habitat - This habitat type is extensive along the North Coast, but is also significant on Hollister Ranch on the South Coast. The latter support breeding populations of bird species which are rare to the coastal area such as the Greater Roadrunner, Loggerhead Shrike, Rufus-Crowned Sparrows, Phainopepla, and Black Chinned Sparrow. The habitat type supports scarce populations of amphibians, but many species of reptiles (lizards and snakes). It also supports many species of small mammals (shrews, rats, mice), with occasional use by the larger carnivores including coyote, fox, bobcat and others.

Grassland Habitat - Extensive native grassland areas are now rare along the coastline largely because of alterations through human activity. However, the substantial areas of altered grassland continue to support the Savannah Sparrow and Western Meadowlark, and raptors such as the Northern Harrier, Burrowing Owl and Black-shouldered (white-tailed) Kite. The raptor populations are undoubtedly due to the fact that even the modified grassland habitat continues to support large numbers of

Table 4.6-1

THE NUMBER OF BIRD SPECIES KNOWN OR EXPECTED TO OCCUR IN HABITATS IN THE STUDY REGION[1]

Habitats	Total Number of Bird Species
Coastal Sage Scrub	64
Grassland	71
Riparian Woodland	110
Oak Woodland	89
Planted Trees/Agriculture	113
Marsh (Fresh- and Salt-water)	104
Chaparral	53

[1] For full species list, seasonal and abundance status, and list of observations, see Appendix J, Table A-2, HDR Systems, Inc.

Table 4.6-2

THE NUMBER OF AMPHIBIANS, REPTILES, AND MAMMALS KNOWN OR EXPECTED TO OCCUR IN HABITATS IN THE STUDY REGION AND PROJECT SITES

General Habitats and Project Sites	Number of Species[2] Amphibians	Reptiles	Mammals
Coastal Bluff and Sage Scrub	3	11	25
Chaparral	3	13	29
Grassland	3	7	17
Riparian Woodland	8	12	25
Oak Woodland	6	10	27
Agricultural	3	4	16
Pipeline: Pt. Conception to Gaviota	7	21	37
Processing Facility: Gaviota	3	15	29
Pipeline: Gaviota to Las Flores Canyon	6	21	34
Alternative Processing Facility at Pt. Conception	3	7	22

[1] For details see Technical Appendix J, Table A-1, A-3, HDR Systems, Inc.
[2] Includes "rare" as well as "common", "possible", and "expected" as listed from sitings and literature. (Bat species not included due to lack of data.)

rodents. Similarly, it continues to support populations of carnivores such as coyote, weasel and badger (though declining) still appear to be common on Hollister Ranch and around Point Conception. Grasslands support few species of amphibians, but sizeable numbers of reptiles.

Wildlife of Chaparral Habitat - This is probably the most widespread plant community in Santa Barbara County, even though apparently absent from the immediate vicinity of project sites. Characteristic lower-elevation chaparral birds include California Quail, Greater Roadrunner, Annas and Costa's Hummingbirds, Bewicks Wren, and California Thrasher, among others. Amphibians are uncommon because of the arid character of the habitat, but chaparral supports a reasonable diversity of reptiles. It also supports many spcies of small mammals, and hence a number of large, wide-ranging carnivores. These include grey fox, coyote, bobcat, striped skunk, and the ringtail and mountain lion. The ringtail is a fully protected species in California. The mountain lion is listed as a nongame mammal by the California Department of Fish and Game, with a moratorium on hunting.

Wildlife of Oak Woodland Habitat - Areas of oak woodland are much reduced in the Study Region. Along the South Coast, oak woodland is found principally in foothill canyons. Characteristic bird species include the Band-tailed Pigeon, localized populations of Screech Owl, Acorn Woodpecker, Scrub Jay, Plain Titmouse, Bushtit, Orange-crowned Warbler, and some additional seasonal inhabitants. Because the environment is moist, there are comparatively diverse populations of amphibians as well as reptiles. Oak woodlands attract a relatively diverse assemblage of small mammals, plus coyote, grey fox, racoon, skunk, bobcat, feral pig, mule deer, ringtail and an occasional foraging mountain lion.

Wildlife of Riparian Woodland Habitat - Riparian woodland habitat has been much reduced in Santa Barbara County and exists now only in disjunct (or isolated) form along stream courses. The remaining habitat continues to support diverse bird populations including numerous migrant landbirds. However, losses of this habitat have likely contributed to the local total loss of breeding populations of the Yellow-billed Cuckoo, Long-eared Owl, Willow Flycatcher, and Wilson's Warbler. Others such as Cooper's Hawk, Swainson's Thrush, and the Yellow-breasted Chat are now rare in the county. Warbling Vireos and Yellow Warblers are also uncommon and restricted to this habitat for breeding. Similarly, the population of a number of riparian habitat dependent amphibians, reptiles and mammals has declined significantly. These include California newts, red-legged frogs, foothill yellow-legged frogs, western pond turtle, and ringtail and grey squirrels.

Wildlife of Closed-cone Pine Forest Habitat - Located in the northern part of the project region, this habitat is very localized. No unique wildlife populations are found in this habitat, and wildlife species found utilizing these forests are species commonly found in surrounding habitats.

Wildlife of Coastal Wetland Habitat - Coastal wetlands have been severely reduced in size, number and condition. (Five principal ones remain, as noted on Figure 4.6-1.) These marshes support reduced numbers of waterbirds and continue to support large concentrations of migrant and wintering herons, shorebirds, gulls and terns, and are essential to their continued occurrence in the region. Habitat loss has significantly reduced populations of the federally endangered Clapper Rail (Sandyland slough) and state-endangered Belding's Savannah Sparrow. Federal and state endangered Brown Pelicans still roost in the delta marshes of the Santa Maria and Santa Ynez Rivers. In general, mammal and reptile abundance and diversity are low and amphibians are absent (because of salt water).

Wildlife of Freshwater Wetlands - These wetlands have also been greatly altered, reduced and degraded, while some new ones, associated with farm ponds, flooded fields, and sewage ponds have been created. These attract waterfowl and very large numbers of shorebirds. The diversity of other terrestrial vertebrate species within this habitat is quite low.

Wildlife of Modified Habitats - Extensive agricultural operations, urbanization and suburbanization have resulted in the loss of much habitat, especially grassland, coastal sage scrub and riparian habitat. However, exotic plantings and the addition of numerous flowering trees and winter-blooming species such as eucalyptus have provided new habitat for many species of birds, some (like the cowbird), and wintering roost for the Monarch Butterfy.

Plant communities vary in their ability to recover from disturbance and stresses. The same is true for wildlife species. This will be the focus of further discussions in the section on consequences.

AQUATIC ENVIRONMENTS AND BIOTA

Aquatic systems in the region are primarily streams and rivers, with the largest being the Santa Ynez River, which drains the inland side of the coastal mountains. Most streams that drain the seaward side of the mountains are located in canyons. Flows are heavily influenced by the annual precipitation regime of winter rains, with many streams becoming intermittent during the dry summer and fall months. Considerable acreage in watersheds has been cleared in recent years for agriculture and urban expansion. Erosion of cleared areas has added substantially to the sediment load in associated streams during periods of heavy runoff, and has increased turbidity and altered substrate characteristics and/or thickness. Benthic invertebrate communities can be changed through such sediment influxes, with the elimination of less tolerant species. Domestic livestock has also influenced stream characteristics through the trampling and foraging activities of cattle. Impoundments have altered stream flow characteristics, and indirectly, faunal communities. Water quality in these habitats varies with location and season, and is generally moderately to very hard.

The predominant fresh water organisms present in aquatic habitats of the region are insect larvae, although annelid worms, mollusks, crustaceans (Table 4.6-3) and fish may be present (in addition to algae and vascular aquatic plants). Few of the fish presently found are native to the area. They include introduced game species such as rainbow trout, bass, sunfish and catfish. Natural rainbow trout were self-sustaining at one time. They once migrated up larger streams, such as the Santa Ynez River, to spawn, but dams and diversions have eliminated these runs. Steelhead rainbows occasionally enter smaller coastal streams during periods of high runoff [Cooper, 1984; SAI, 1983]. Other native species found in some streams include stickleback, prickly sculpin, and tidewater goby, which can range from fresh to marine waters [Sasaki, 1984; Wells and Dana, 1975]. The goby is being considered for listing as a federal endangered species by the U.S. Fish and Wildlife Service.

San Onofre and Corral Creeks have resident trout populations, with past sitings (within the last 10 years) in Santa Anita, Gaviota, Dos Pueblos, Eagle, Tecolote, Ellwood, Mission, Arroyo Hondo, Tajiguas, Arroyo Quemado, and Refugio Creeks. There are barriers or disturbances to fish movement on the last four streams (Sjovold, 1984).

Impoundments are generally characterized by many of the same aquatic invertebrates that are found in streams, but also contain species intolerant of flowing water. Fish are often stocked in impoundments for private or public sportfishing. Vernal pools, because of their temporary nature, do not support as large a variety of aquatic animals as do more permanent waters, although productivity may be high for the small number of species present. The pool observed near Point Conception in January, 1984, contained dense zooplankton populations and lesser numbers of insect larvae. These pools are also important for the reproduction of some amphibians, such as the Pacific treefrog.

RARE, THREATENED OR ENDANGERED SPECIES

Rare, threatened and endangered species are protected by either or both the Federal Endangered Species Act of 1973 [as updated 50C7R 17.11 and 17.12, January 1982], the California Native Plant Protection Act of 1977, and the California Endangered Species Act of 1970 [California Administrative Code, Title 14, Section 670.2 and 670.51]. CEQA (January 1984) provides additional protection for unlisted species that meet the "rare" or "endangered" criteria defined in Section 15380 of that act. Table 4.6-4 illustrates the state or federally listed rare, threatened or endangered plant wildlife and fish in the Study Region or Project Area. An additional 21 plant species and one fish species are under review for federal listing as threatened or endangered species. These include the tidewater goby, soft-leaved paintbrush, surf thistle, black-flowered figwort, and Hoffman's nightshade that were observed or could occur in the Project Area. (See Table 2.5.1-1 in Appendix J.)

Several additional "listings" of rare or threatened species that could be protected under CEQA are included below (there is some overlap with federal and state lists):

TABLE 4.6-3

TYPICAL AQUATIC FAUNA OF COASTAL STREAMS BETWEEN POINT CONCEPTION AND SANTA BARBARA

Scientific Name	Common Name	UNNAMED 1	UNNAMED 2	DAMSITE CREEK	COJO CREEK	BARRANCA HONDA	GAVIOTA CREEK	SAN ONOFRE CREEK	REFUGIO CREEK	CORRAL CREEK
Platyhelminthes	Flatworms								X	X
Annelida	Segmented Worms					X			X	X
Arthropoda	Arthropods									
Cladocera	Water Fleas					X				
Ostracoda	Seed Shrimp				X	X				X
Isopoda	Aquatic Saw Bugs				X	X	X			
Amphipoda	Scuds, Sidewinners				X		X			
Colembola	Springtails				X	X				
Plecoptera	Stoneflies	X		X	X					X
Ephemeroptera	Mayflies			X	X	X	X	X	X	X
Odonata	Dragonflies, Damselflies			X	X			X		X
Hemiptera	True Bugs			X	X	X		X		X
Megaloptera	Alderflies, Dobsonflies									X
Trichoptera	Caddisflies	X	X	X	X	X		X		X
Coleoptera	Beatles	X	X	X	X	X	X		X	X
Diptera	Flies, Midges	X	X	X	X	X		X		X
Mollusca	Mollusks	X	X		X	X				X
Chordata	Chordates									
Osteichthyes	Bony Fish				X		X	X	X	X

Source: Wells and Diana, 1975; Dames & Moore, 1971 and 1982; SAI, 1983; field observations on January 17, 1984 by HDR.

Table 4.6-4 State or Federally listed rare, threatened or endangered plants, wildlife, and fish in the Study Region or Study Area (Page 1 of 2).

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 on slopes above Study Area
Santa Barbara False-lupine	-	E	Chaparral, west slopes, Santa Ynez Mts.; not expected in Study Area
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
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 4.6-4 State or Federally listed rare, threatened or endangered plants, wildlife, and fish in the Study Region or Study Area (Page 2 of 2).

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, east along South Coast to Goleta.

Project Area: Vicinity of pipeline corridor and facilities sites; Point Conception to Corral/ Las Flores Canyon.

Source: Table 2.5-1 in Appendix J.

- "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 Rare Plant list of the California Native Plant Society (1980, 1981, 1982).

The species listed by each of these are found in tables in Section 2.4 of Appendix J. Species documented or expected in the Study Region such as the California newt, red-legged frog, anadromous steelhead trout, ringtail, western gray squirrel, badger, mountain lion, black-shouldered (white-tailed) kite, willow flycatcher, yellow warbler, and a number of additional bird species are protected in this manner.

AREAS AND SPECIES OF SPECIAL IMPORTANCE

The proposed project falls entirely within the coastal zone on the North Coast Planning area, and potentially the Gaviota Coast Planning area. Pursuant to the Coastal Act of 1976, environmentally sensitive habitat areas within the coastal zone have been mapped by the County of Santa Barbara [Local Coastal Plan, 1982]. Categories of terrestrial features designated as environmentally sensitive habitats include: dunes, wetlands, native grasslands, vernal pools, butterfly trees, Black-shouldered (white-tailed) kite habitat, seabird nesting and roosting areas, native plants and streams. These are illustrated in Figure 4.6-2.

The release of Peregrine falcon pairs from Gaviota Peak makes the grassland foraging areas in the vicinity of Gaviota an added area of potential biological significance.

4.6.3 Characteristics of Project Sites

PIPELINE CORRIDOR

Terrestrial Communities and Wildlife

The northern pipeline corridor from Point Conception to Gaviota transects plant communities characteristic of the South Coast (Figures 4.6-1 and 4.6-2). Communities transected by the pipeline include an excellent example of coastal bluff scrub at the landfall, introduced grassland, coastal sage scrub, agricultural land, and riparian habitat, oak woodland habitat and wetlands in arroyos. The latter three community types represent a major portion of the environmentally sensitive habitats associated with the 26 streams along the pipeline route. Chaparral and forest types are not transected by the alignment. [WESTEC, 1983; Dames & Moore, 1977; Fletcher, 1983; Abbott, et al, 1976].

Oak and sycamore dominated riparian areas are more common along the proposed optional pipeline corridor from Gaviota to Las Flores/Corral Canyon, because riparian communities are less well developed (west of Gaviota compared to east of Gaviota). This in turn is related to the fact that the crest of the Mountains in the western region is lower (approximately 1500 feet vs 2500 feet) and set back farther from the coast, and the western riparian environments are less well watered. However, many more of the riparian habitats east of Gaviota are extensively impacted by agricultural activities, primarily avocado cultivation [HDR in SAI, Inc., 1983; Woodward Clyde Consultants, 1984].

The major plant and animal species in these communities are discussed briefly under descriptions of terrestrial communities and wildlife, Tables 4.6-1 and 4.6-2, the Project Region, and in more detail in Appendix J, Section 3. (Results of site-specific field visits from January to June, 1984 are summarized in Table 5.6-1 Chapter V of this document, and Table 5.2.1-3 in Section 5 of Appendix J.)

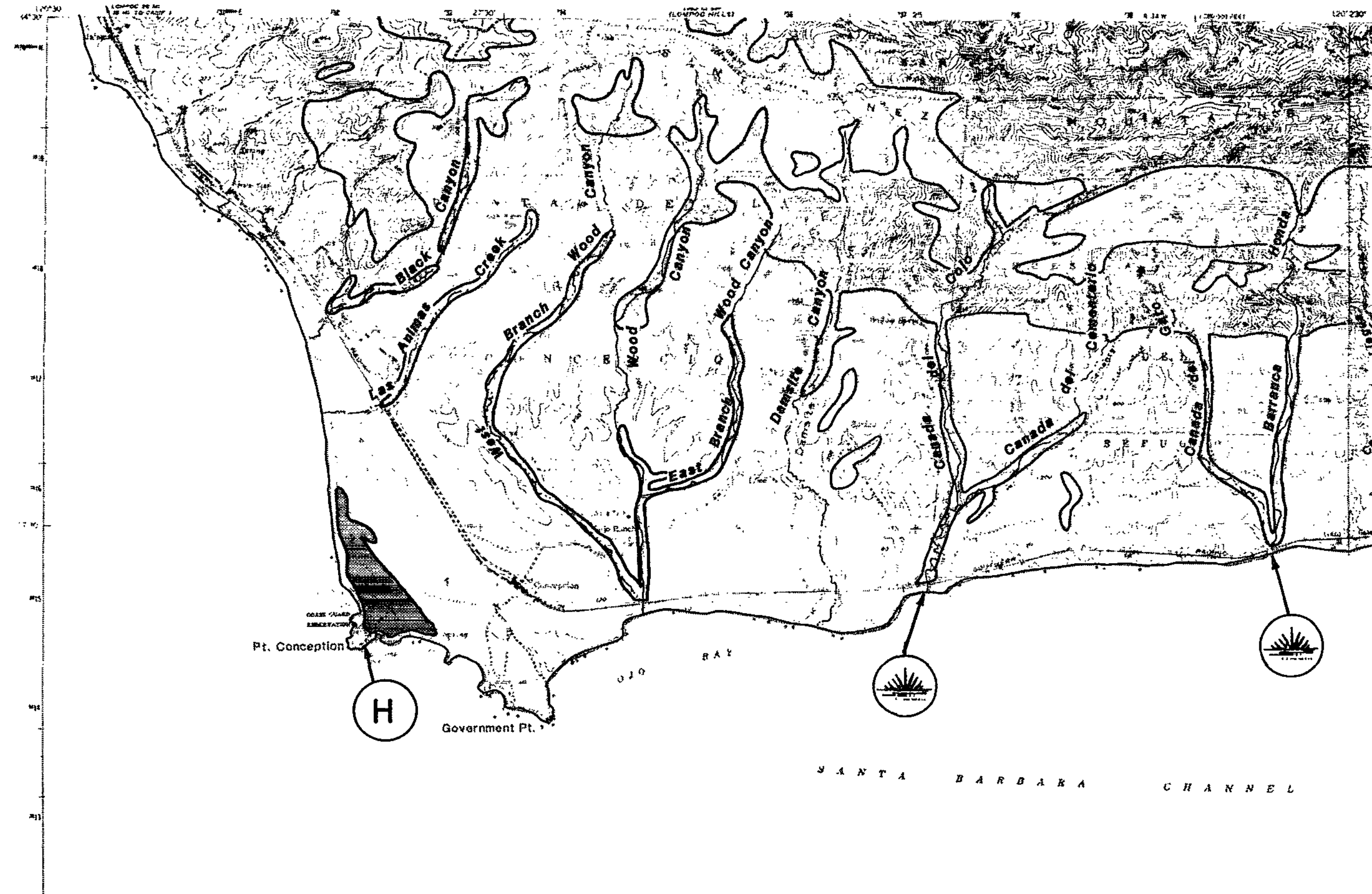
AQUATIC ENVIRONMENTS AND BIOTA

Aquatic environments along the proposed pipeline corridor between/Point Conception and Gaviota are primarily small coastal streams. Of the 26 streams along the proposed route, 10 have intermittent flow (USGS topographic maps; see Section 4.3). Initial field observations in January, 1984 indicate that some streams listed as temporary by USGS probably have flow year-round. During this field reconnaissance, 19 streams were sampled at least once, with additional sampling in lagoons as appropriate. (See Section 3.1.3 in Appendix J.) Tidewater gobies were found in samples from four lagoons during this survey (Table 5.6-1), and historically existed in five others in the Project Area (see Appendix J).

The optional pipeline route from Gaviota (San Onofre Creek) to the Las Flores/Corral Canyon site would cross 14 coastal streams of which six are designated as perennial on USGS maps. These streams are similar to those between Point Conception and Gaviota although the gradient generally becomes lower near the coast as one progresses toward the east. Fish are present in several of the streams, with rainbow trout reported in Corral Creek and San Onofre Creek. Mosquito fish and Arroyo Chub have been collected in Refugio Creek. The stream crossings in this option were not included in the sampling program for this project.

AREAS AND SPECIES OF SPECIAL IMPORTANCE

The proposed pipeline route crosses a number of county designated "Environmentally Sensitive Habitats" [Local Coastal Plan, 1982] as well as habitats that have special biological significance. These latter habitats include perennial and intermittent stream crossings (and riparian habitats that are potentially sensitive). These sites are summarized in Figure 4.6-2 above. (The results of field work on these sites are summarized in Table 5.6-1 of Chapter V and discussed in Section 5.0 of Appendix J.)



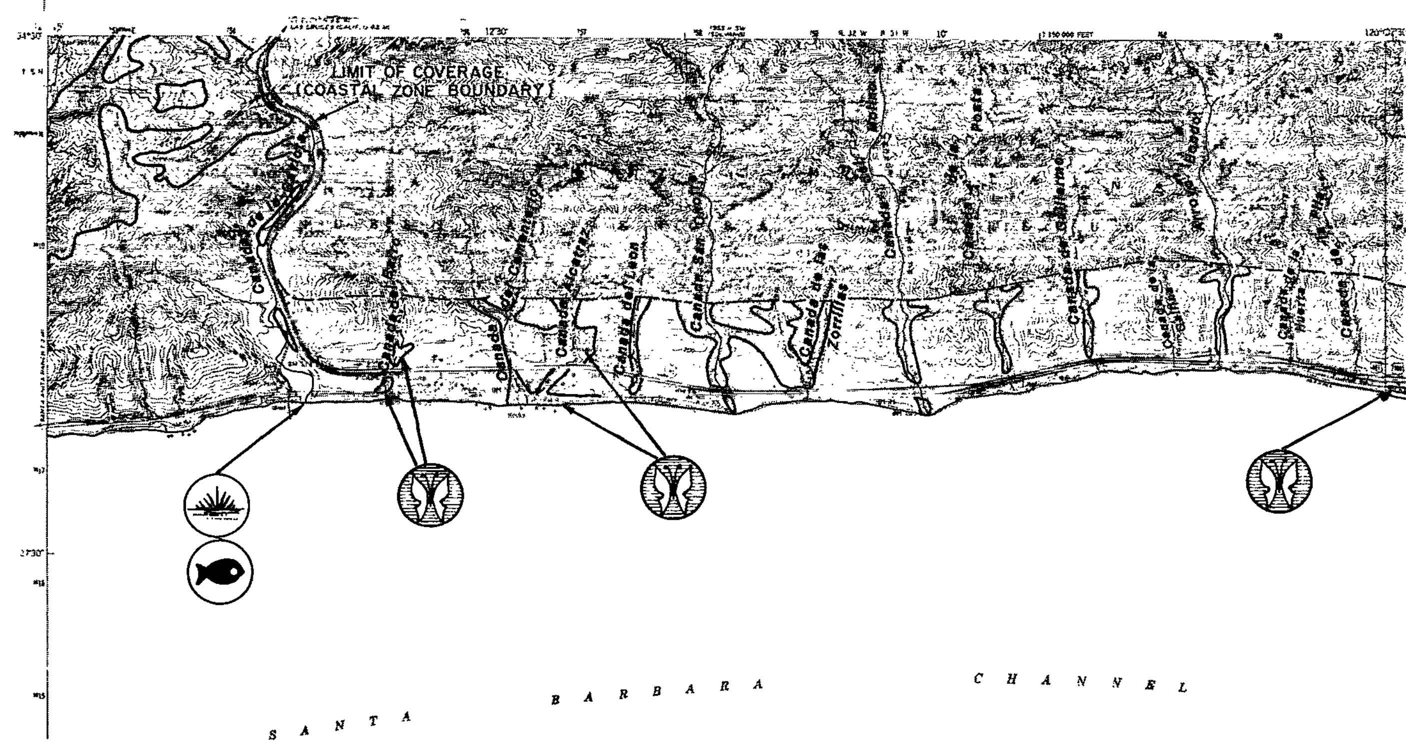
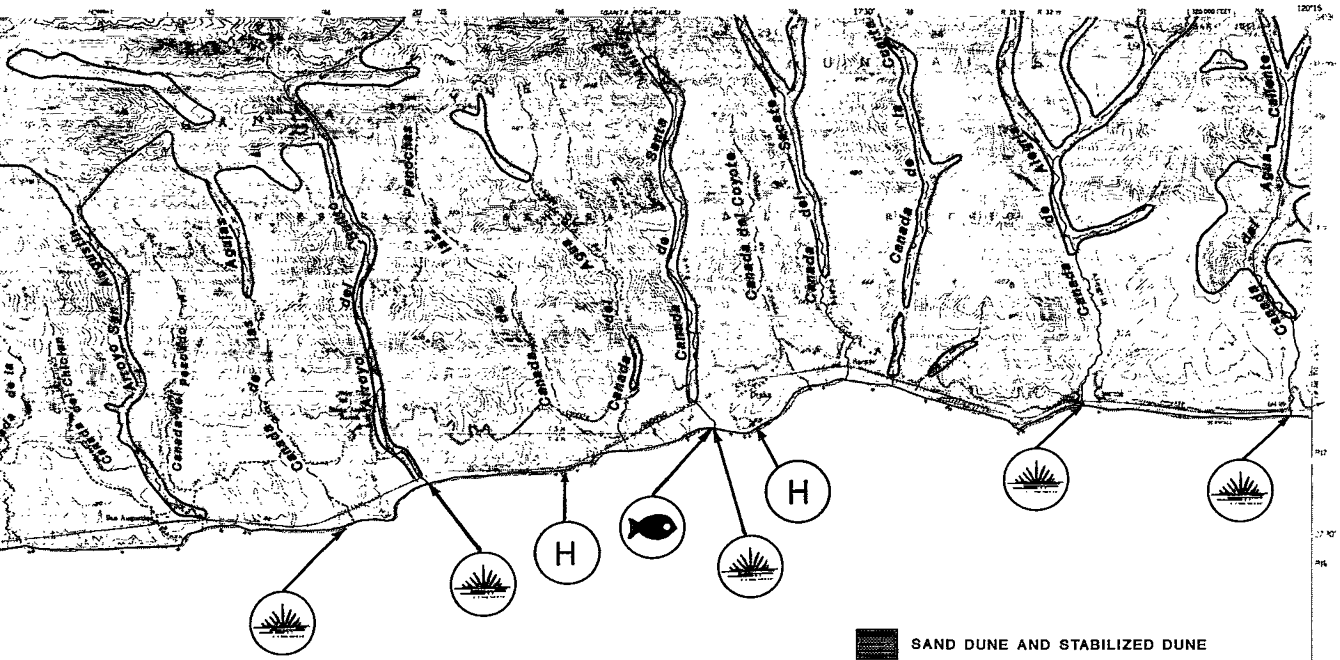


FIGURE 4.6-2 LOCATION AND EXTENT OF DESIGNATED ENVIR



SAND DUNE AND STABILIZED DUNE

WOODLAND (Includes Riparian, Oak Woodland, and Eucalyptus Woodland)

COASTAL LAGOON

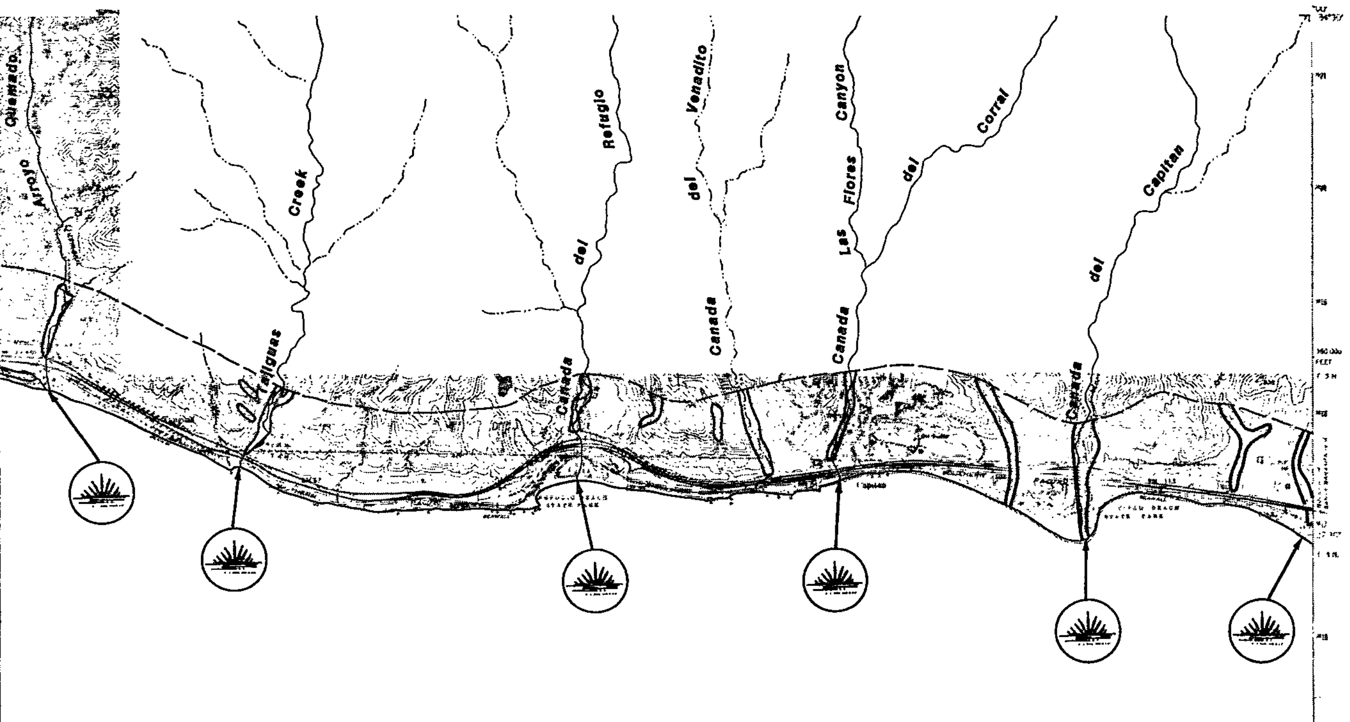
H MARINE MAMMAL HAULOUT AREA

ANADROMOUS FISH STREAM

BUTTERFLY TREE

Source: County of Santa Barbara Local Coastal Program (no date)
Coastal Resources: Environmentally Sensitive Habitat Areas.

Note: Additional Information and Updates Provided in Text.



ONMENTALLY SENSITIVE HABITAT IN THE PROJECT AREA.

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Relatively large expanses of grassland with limited human disturbance represent the required foraging habitat used by such locally declining species as the Black-shouldered (White-tailed) kite, Northern Harrier, Peregrine and Prairie Falcons, Short-eared Owl, and Grasshopper Sparrow, badger and mountain lion. Much of this grassland still exists in the Point Conception vicinity.

Riparian woodland is generally considered the wildlife habitat of greatest importance to the most sensitive species found along the pipeline corridor because it has high wildlife carrying capacity compared with other habitats of the area. This habitat serves to support an even higher diversity and density of birds during winter and migration periods in locations where it is surrounded by lower quality wildlife habitats, e.g., citrus and avocado groves. [Brinson et al, 1981; Lehman, 1982, 1983; Collins, 1983].

GAVIOTA PROCESSING SITE

Terrestrial Communities

The Getty Gaviota site contains coastal bluff, annual grassland, ruderal riparian woodland, eucalyptus woodland, and coastal sage scrub and abuts Chaparral vegetation types [WESTEC and MARMAC, 1983; WESTEC, 1983; HDR in SAI, Inc. 1983]. Three wooded drainages of the Santa Ynez Mountains transect the site. All three are designated as Environmentally Sensitive Habitat by Santa Barbara County [the Coastal Plan, 1982].

- In the Canada Alcatraz drainage, there is a dense, self-reproducing eucalyptus woodland. A few coast live oaks remain.

- Canada del Cementerio is vegetated with eucalyptus woodland with riparian vegetation at its mouth and upstream from the project site.

- Canada del Leon supports native woodland vegetation which is dominated by coast live oak with scattered willows.

A fourth wooded ravine transects the site but does not extend north to the mountains. This is primarily a eucalyptus woodland. (These areas are diagramed in Figure 5.6-2 in the consequences section.)

Alcatraz and Cementerio Creeks are apparently marginally perennial, and appear to support limited biota, but may be dry in some years.

There was no evidence that the site supported regionally rare or declining avifauna. However, several species of roosting or nesting raptors use the site. Turkey vultures, Red-tailed Hawks, Red-shouldered Hawks, Cooper's Hawks and Great Horned Owls have been observed on the site, with evidence of regular use by at least Turkey Vultures and Red-tailed Hawks.

Areas and Species of Special Importance

No rare, threatened or endangered species are known or expected to occur on the Getty-Gaviota site. However, a number of areas are of special biological significance:

- All three canyons on the site have been designated as Environmentally Sensitive Habitat by the County of Santa Barbara, and the fourth (unnamed) ravine has several of the characteristics that typify the other three canyons.

- Communal winter roosts of Monarch Butterfly have been documented in Canada del Cementerio in eucalyptus trees south of Highway 101 [Hogue, 1974]. They also occur in portions of Canada Alcatraz and the wooded ravine north of 101. These are known as butterfly trees and are protected by the policies of the County of Santa Barbara under the Coastal Plan, [1982]. Large congregations of monarchs occupied the southern portions of the "fourth ravine" and the western border of Canada Alcatraz during January 1984 site visits.

- At least six turkey vultures were seen proximate to some of the eucalyptus on-site in January 1984 with some signs of local roosting activity. The site is one of a few roosting sites along the South Coast of Santa Barbara county [Lehman, 1982]. Additionally, caves in the cliffs visible from the site are potential nesting sites but there have been no confirmed nesting records for this species along the South Coast in over 50 years.

ALTERNATIVE ONSHORE PROCESSING SITE

Terrestrial Communities

The alternative facility site at Point Conception is vegetated almost entirely by non-native species. The predominant habitat is nonnative grassland. Rows of planted cypress and a few pines, several other exotics and native oaks represent the woody species present, mostly at site borders. The planted cypress form a windbreak, but also serve as migratory bird habitat. At least two significant species, the Black-shouldered (White-tailed) kite and Northern Harrier were observed in areas immediately bordering it. The only aquatic habitat at the alternate site is a manmade vernal pool. This contained zooplankton and insect larvae in January 1984 and had disappeared by March, 1984.

Areas and Species of Special Importance

The planted cypress trees at this strategic position along the coast have been noted to support an exceptionally large and diverse number of migrant landbirds during the spring and fall (see Appendix J, page 1-23). It is believed that this location may represent a premier coastal California locality for migrants. The isolated nature of this site and the adjacent hills may make this area important to the small populations of mountain lion, and badger believed to still inhabit the Point Conception area.

Any further serious consideration of the alternative Conception-Gaviota pipeline route would require special attention to be given to the dune habitat of the southern landfall. Similarly, serious consideration of the Gaviota-Las Flores pipeline option should be accompanied by a field effort comparable to the one conducted for the proposed route.

4.6.4 Applicable Regulations, Rules and Standards

The applicable rules and regulations discussed here are those that were promulgated to protect biological resources.

At the federal level, a number of species in California that might be located in the Study Region are protected by the Endangered Species Act of 1973 [as updated 50 C7R 17.11 and 17.12 January, 1982]. These have been summarized in Table 4.6-4.

The Endangered, Rare or Threatened Animals of California [Endangered Species Act, 1970, California Administrative Code, Title 14, Section 670.5] and California Native Plant Protection Act of 1977, provide similar protection at the state level. The species listed or known for possible occurrence in the Study Region include five not protected at the federal level (Table 4.6-4). CEQA provides additional protection for species that are not listed, but which meet criteria of "rare" or "endangered" as defined in Section 15380 of the Act.

In addition, the California Fish and Game Regulations list 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 (listed in Section 2.5 of Appendix J).

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 (ESH) areas within the Coastal Zone (Figure 4.6-2). 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" but possibly requiring modification in the future. The regulations outline siting requirements, development restrictions and prohibitions, and impact mitigation requirements for different types of Sensitive Habitats.

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4.7 CULTURAL RESOURCES

4.7.1 Introduction

In identifying the cultural resources in the areas that may be impacted by the proposed project, it is important to first define the geographic boundaries of investigation. Two specific study areas have been identified for this investigation: a regional study area, and a project area that focuses on a smaller geographical area within the larger regional study area.

The onshore regional study area is defined as extending from Point Conception to Ellwood Canyon from the high tide line roughly to the first prominent and protective ridge. The offshore regional study area consists of the Southern Santa Maria Basin and the Western Santa Barbara channel. These study areas are considered to be the regional areas within which direct, indirect, and cumulative impacts (e.g., area development buildout scenarios) will occur.

The project area, as distinct from the larger regional study area, is defined to be those areas within or immediately adjacent to elements of the proposed project and its alternatives, including the Point Conception to Gaviota pipeline corridor, and the proposed offshore platforms and pipeline corridors, including adjacent areas that may be affected by anchoring activities.

As a class of resources considered in planning for and assessing impacts resulting from a proposed project, cultural resources are defined to include: 1) prehistoric and historic archaeological sites and artifacts of aboriginal origin; 2) ethnographic sites and areas of concern identified in historic literature or by contemporary Native American descendants; and 3) European-American structures of historic or architectural significance and properties, districts, or archaeological sites with historic significance.

The above definition was developed for purposes of planning and impact assessment and includes resources covered by a variety of state and federal laws including those pertaining to Native Americans. The definition used here is thus a modification of the "classic" definition of significant cultural resources presented in Section 301(5) of the National Historic Preservation Act: "...any prehistoric or historic district, site, building, structure or object included in or eligible for inclusion of the National Register; such term includes artifacts, records, and remains which are related to such a district, site, building, structure, or object."

PREHISTORIC AND HISTORIC REOSOURCES

Most of the cultural resources within the western Santa Barbara Channel region are archaeological sites which are associated with either Native American or European-American activity.

Onshore: Prehistoric and Historic Archaeological Sites

The majority of the archaeological sites in the western Channel region were formed before European colonization and are the primary source of information about the development of Native American societies. The most frequently observed artifacts on the surface of archaeological sites include refuse from stone toolmaking and sharpening, stone tools or stone tool fragments, heat-altered rocks, ash, bone, and shell fragments. Below the surface of many of these prehistoric archaeological sites are the remains of hearths and ovens, as well as soil disconformities associated with residential and sacred structures, ovens, storage facilities, and burials.

Because sites are built up over time, it is usually possible to distinguish different periods of occupation at the same site. Archaeological sites formed during and after the Spanish colonization of California usually can be easily distinguished from those formed before colonization. Historic archaeological sites frequently contain iron artifacts, pottery, porcelain, glass, coal, and other materials not used in the area before Spanish contact.

Many of the archaeological sites within or near the proposed pipeline and facility locations were occupied by relatively large populations for very long periods of time. For this reason, these sites are internally complex and contain the remains of structures and cemeteries occupied during different time periods.

Onshore: Historic Resources

Historic cultural resources encompass a wide variety of resources including European-American archaeological sites, places, or districts of local historical significance, and architectural properties. European-American archaeological sites contain material remains associated with European societies that began the exploration and colonization of North America in the 16the century. In California, the exploration (1769) to the beginning of the 20th century. Places or districts of local historic significance are usually associated with archaeological remains. Architectural properties with historic significance include single standing structures and districts that have historic, aesthetic or thematic associations with local tradition.

Offshore: Prehistoric and Historic Archaeological Sites and Resources

A wide variety of cultural resources have been found underwater off the shores of California. These include prehistoric artifacts, submerged archaeological sites and historic buildings, downed aircraft, and shipwrecks [Macfarlane, 1982]. Artifacts, the most numerous resources located to date, have been deposited beneath the sea by several factors, including cliff erosion of archaeological sites, ceremonial discards,and accidental loss as a result of overturned aboriginal canoes (tomols). Prehistoric sites have been found an ancient landforms now buried beneath California near-shore waters off Malibu and La Jolla. Similar sites could potentially occur in the project area. However, the geological conditions necessary for site preservation are largely absent and there is, at best, only a low probability of their being found (MacFarlane, 1982]. Shipwrecks, in contrast, are relatively numerous because of the area's long history of seafaring activity and the hazardous sailing conditions around Point Conception and Point Arguello [State Lands Commission, 1982]. In general, the study area is one of the most sensitive areas off the entire Santa Barbara coast.

NATIVE AMERICAN ETHNOGRAPHIC SITES AND AREAS OF CONCERN

Ethnographic sites are prehistoric and/or historic cultural resources which have been identified in consultation with Native Americans of the area. Many have aboriginal placenames and may include: prominent topographic features, residential and cemetery sites, mineral deposits, plant gathering places, and sacred places. The majority of the ethnographic sites in the Santa Barbara Channel region were recorded by J.P. Harrington over 50 years ago. In the intervening period, the significance of these sites to contemporary Native Americans may have changed. In addition, a number of more recently evolved ethnographic sites and areas of concern have come into existence in the last two decades as a result of the cultural growth and unique persistence of local Chumash descendants.

Most local Native American descendants are actively involved with the preservation of cultural resources and Native American heritage. There are several major areas of heritage concern to contemporary Native Americans: 1) native flora and fauna including local natural raw materials; 2) sacred areas; and 3) archaeological sites containing human remains, burials and associated artifacts.

4.7.2 Cultural Resources in the Regional Study Area

ONSHORE: PREHISTORIC AND HISTORIC REOUSRCES

All known recorded archaeological sites in the study area are listed in Technical Appendix K, Cultural Resources.

The general coastal area lying between Point Conception and Canada del Corral contains archeological materials representing all of the major periods in the history and prehistory of the Santa Barbara region. In relation to surrounding areas within the larger Santa Barbara Channel, however, this stretch of coast has seen little systematic archaeologic investigation. Also, reinvestigation of previously studied sites by modern archeaologists using more rigorous methods usually results in substantially larger site boundaries than these recorded in the early investigation.

In those portions of the regional study area that have been subjected to systematic archeological reconnaissance, the density of discrete sites is relatively high. There is therefore, good reason to believe that areas which have, to date, seen only limited investigation will be found to contain equally dense concentrations of sites when more thorough reconnaissance and testing have been computed.

Horne et al, (1983) present a fairly current summary of the archeaology between Point Conception and El Capitan. Included in this document are lists of known historic Chumash villages and placenames, historic and prehistoric resources within the study area and a summary of cultural resource studies conducted. The list of resources in the regional onshore study area as reproduced in Appendix I of Technical Appendix K indicates the region contains a fairly abundant and diverse archaeological record.

ONSHORE: EURO-AMERICAN HISTORIC RESOURCES

Systematic, regional inventories of historic European-American cultural resources have not been conducted outside the urban centers of Santa Barbara County. To date, the emphasis of historic site inventories has been the landing points of early explorers, locations of the churches and quadrangles of the Spanish missions, and the evaluation of the architectural significance of urban adobe and Victorian buildings. Very little work has been conducted to identify and study the types of sites representative of different historic periods. Historic archaeological research has traditionally emphasized mission quadrangles and related rancho adobes, with little attention given to outlying mission facilities, small homesteads, or the settlements of early immigrants.

The few historic site inventories of the Santa Barbara Channel mainland region that have been completed are not systematized in a central data clearinghouse. As a result, most of the historic data are archival and unpublished. Early tour guides of Santa Barbara County [Roberts, 1886; Gidney, 1901; Heath, 1904] and general histories of the area include discussions of historic sites within long un-indexed narratives [Gidney e al, 1917; Phillips, 1927; Spalding, 1957; Ritchey, 1966]. Official listings of publicly recognized historic sites, including the National Register of Historic Places and the California State Historical Registered Landmarks, do not represent even a modest sample of existing historic sites.

In view of these constraints, the identification of historic sites in the regional study area was based largely on a review of select publications and early maps.

Several early comprehensive maps of the Santa Barbara Channel mainland region during the 18th and 19th centuries were consulted. These maps indicated historic structures, cultivated fields, ports, roads, and ship landings. County historic summaries were also used for specific site information (Thompson and West, 1897; O'Neil, 1939; Writers Program, 1941). Valuable information was also obtained from Santa Barbara historian Richard Whitehead who made his copies of early disenos (land grant maps) available for study. Official lists that were consulted were the National Register of Historic places (U.S. Department of the Interior, 1981), California Historic Landmarks and California Inventory of Historic Resources (California Department of Parks and Recreation, 1976, 1979), and Santa Barbara County Historic Landmarks (Santa Barbara County, n.d.).

The documented historic sites within the pipeline corridor vicinity include individual structures, properties, communities, ports, and roads from the Spanish Rancho, and American periods (1782-1900). See Technical Appendix K, Table 2.1-1- for a listing of these sites.

There are three rancho headquarters associated with early land grants that are found in the study area: Rancho Canada del Corral, Rancho Neustra Senora de Refugio, and Rancho Punta de la Conception. Those ranch houses are imporatant examples of the architecture of the Rancho Period, and the archeological remains associated with these ranches may contain information about the operation of the ranches. The anchorage at Cojo and the coves west of Gaviota were used as ports for a successful contraband trade which flourished during the Spanish and Rancho periods. Structures and archaeological sites dating to the settlement of California by farmers and homesteaders during the American Period include the original Point Conception lighthouse, and several small ranches and farms at the mouths of canyons. The Gaviota and Ortega wharves are associated with the early trading network of 19th century California.

OFFSHORE: PREHISTORIC AND HISTORIC REOUSRCES

Numerous submerged artifacts of aboriginal origin have been recovered in the Santa Barbara Channel. Those reported finds appear to be associated with: (1) cliff erosion of an onshore site; (2) fishing village locations and surrounding waters; (3) submerged village sites on relictual landforms; (4) purposeful deposition in connection with ceremonial practices; and, (5) accidental or random loss (e.g., loss from overturned tomols or plank canoes) [Hudson, 1976; Stickel, 1977; U.S. Department of the Interior, Bureau of Land Management, 1978; MacFarlane, 1980].

All submerged artifacts seaward of the surf zone reported by Hudson [1976, 1980] have been associated with rocky seafloors or reefs at depths of 15-90 feet whereas artifacts in the surf zone have been found on sandy substrates. Although both of these conditions exist in the project area, generally the seafloor will into possess aboriginal artifacts. (See

Technical Appendix K for a detailed discussion on this point.) Where isolated artifacts may occur, they are usually dissociated from their original place of deposition and thus are of little value as cultural resources.

Sixteen marine localities where aboriginal artifacts have been found are known to occur in the study area. Most of these localities are near Point Conception, which may indicate a high frequency of accidental loss or ceremonial deposition in that area, or may reflect a greater sampling of the ocean floor of that area by commercial and pleasure divers. One of these marine localities appears to be the result of cliff erosion of an onshore prehistoric archaeological site. Two of the marine localities appear to be the result of ceremonial deposition or accidental loss.

The presence of recorded shipwrecks in the study area as determined from the comprehensive nautical literature survey of the Southern California Bight by the U.S. Department of the Interior, the Bureau of Land Management (1978). The identification, loss date and loss situations of each recorded shipwreck in the study area are presented in TAble 2.2-2 of Technical Appendix K. As discussed in the appendix, only three of the listed shipwrecks are potentially significant because of age and actual or expected physical condition.

NATIVE AMERICAN ETHNOGRAPHIC RESOURCES

Information on most Native American ethnographic sites in the study area were compiled and recorded by ethnographer John P. Harrington between 1910 and 1935. These sites represent prehistoric and historic cultural resources identified by consultation with the local Chumash populations at that time. Most of the ethnographic sites identified in existing literature are placenames. The general significance and Chumash placenames has been discussed by Applegate [1974] and many other scholars who have attempted to organize these placenames [Brown, 19678; King, 1969, 1975; Applegate, 1975; Heiser, 1975' Whitehead and Hoover, 1975; Klar, 1977; Craig, 1978]. The list of known ethnographic sites in the study area is derived from many of these secondary sources and from the Harrington field notes.

Over the past 15 years, the Santa Barbara Chumash have become increasingly aware of the effects construction may have on cultural resources. During that same period, the Native American community has also become more active in making clear its concerns for these resources, and has developed a level of organization that has made the Chumash successful in having these concerns taken into account in the planning and implementation of construction projects in the area. Although there is a certain amount of diversity of feeling as to which concerns are of highest priority, there is general agreement in the community that these concerns include:

- Native American participation in all phases of cultural resource management:

- Protection of human burials and associated artifacts;

- Protection of plant, animal, and other natural resources;

- Protection of sacred places.

4.7.3 Onshore Cultural Resrouces in the Project Area

Records and Literature Search

The site records and literature search at the UCSB Archaeological Inventory in early 1984 identified 34 recorded sites in or immediately adjacent to the proposed pipeline corridor from Point Conception to the Gaviota facility, the optional extension pipeline corridor from the facility east to Corral/Las Flores Canyon, and Chevron's Gaviota facility.

These sites can be grouped into three classes - 1) sites that were previously identified by field inspection as being in the pipeline corridor and within the Gaviota facility area of direct disturbance, 2) sites recorded in official site form records as being within the zones of disturbance, and 3) sites recorded as within 300 ft of the pipeline corridor. In order to identify whether sites in classes (2) and (3) above were in the project's direct impact zone, a field program was conducted (See Section 3.3, 3.3.5)

Previous Investigations

In support of Chevron's Point Arguello development projects, Westec Services, Inc. conducted two surveys (1982, 1983) and a limited testing program (1984) at the Gaviota facility and along the proposed and alternative pipeline corridors.

Westec's initial survey in 1982 located 11 archaeological sites between the landfall alternatives north of Government Point and Canada de la Gaviota and three areas of archaeological interest in and west of Chevron's existing facility at Gaviota. In 1983, Westec surveyed a revised corridor from the landfall to the Gaviota facility as well as the optional extension corridor from the facility east to the edge of Corral/Las Flores Canyon. A total of 14 sites were located in the 1983 surface survey; subsequent realignments reduced this to nine. Eight of these were tested and the results discussed in Westec (1984); the ninth could not be tested due to access denial.

EIR/EIS Investigations

A field and laboratory research project was conducted by the office of Public Archeology (OPA) at OCSB and Arthur D. Little in support of the EIR/EIS. Detailed discussions of the methodology and results of the study are provided in Appendix K.

The field project focused on three main objectives:

- Collection of additional background data
- Completion of archaeological surface survey in previously unsurveyed portions of the proposed pipeline corridor
- Sensitivity zone and site boundary testing to define the presence and extent of cultural resources at selected areas within the pipeline corridor and Gaviota facility.

Meeting these objectives involved a mix of methodological approaches, including a combination of literature and archival research, geomorphological and historical land use studies, surface reconnaissance, and subsurface testing using shovel test pits.

The program focused only on the proposed project; the onshore extension was not investigated.

At the time the draft EIR/EIS was proposed, portions of the proposed pipeline corridor had not been surveyed due to realignments of the pipeline corridor after completion of the Westec survey, or due to lack of access permissions. Slightly over 5 mi of the 16.3 mi long preferred corridor had not been previously surveyed and another 0.75 mi had been covered with dense vegetation which prevented systematic survey.

A surface reconnaissance was conducted on previously unsurveyed portions of the pipeline corridor, as well as those portions of the pipeline corridor reported by Westec as containing dense vegetation. One small portion of the corridor on the west terrace of Gaviota Creek was inadvertantly omitted from the survey; this area will be surveyed if the proposed pipeline corridor is chosen for construction. However, identification of archaeological sites within the proposed pipeline corridor is problematic on the basis of surface survey alone, especially under conditions of poor surface visibility. Recent studies along the Santa Barbara coastal strip (Neff, 1983; Erlandson et al., 1984) have indicated that surface survey alone may result in the systematic exclusion of sites buried under sediments on valley floors and in one case on a marine terrace where little/no surface evidence existed to suggest the presence of these sites. Surface survey techniques have also created a bias against the identification of Early Period sites. This bias exists due to the fact that many Early Period sites along the coastal strip are small and contain low densities of chipped stone and faunal remains. In cases where sites are evaluated on the basis of numbers of artifacts without reference to age, there is a tendency to determine that these sites are not important. This results in the systematic loss of one entire segment of the settlement system. It is also more difficult to identify these sites in the field due to their smaller size and artifact density. Surface survey alone, particularly in areas of poor visibility, is ineffective in locating such sites.

In order to minimize reconnaissance biases, a shovel test pit program was conducted in 4 areas of high archaeological sensitivity to locate sites. Those areas of high sensitivity were defined as any area with a mapped archaeological site located within 300 ft of the pipeline centerline. Sites within 300 ft were chosen because site boundaries are often larger than shown on site survey records, sites are often larger than surface indications suggest, and sites are often located near one another, particularly along ridges and marine terraces, especially near major drainages.

Cultural Resources in the Proposed Pipeline Corridor and Facility

Twenty archeological sites two historical roads and ten isolated artifacts or features were located by survey and STP investigations. Because these investigations only sampled the project area, the actual number of sites in the zone of direct impact will likely be much higher.

As Table 4.7.2 indicates, the project area contains such prehistoric sites as major villages, special use sites like quarries and a wide variety of sites generally described as temporary camps.

SBA-1876 — This special use site was located near the landfill and exhibits evidence and the production and use of chipped stone tools.

SBa-1874 — This is a small quarry used for obtaining Monterey chert from natural outcrop from cobbles and boulders.

SBa-152S — This site tested by Westec (1984) seems to be a lithic workshop where subsurface chert exposed by erosion was provided for chipped stone tool manufacture.

SBa-1479 — This is a lithics scatter located near several major sites. A fragmented sandstone bowl and chert flakes was found within the proposed corridor.

SBa-1875/H — This site contains a localized deposit of historic materials such as cast iron stone fragments, bottles, shell and burned deer bone. This site is most likely a historic dump.

SBa-1877	This site contains both historic and prehistoric materials. Historic materials include shell, ceramics, glass and bone. The prehistoric materials include chipped stone tool manufacture and use.
SBa-1494	This is a prehistoric village composed of two units. 1494A is the largest portion of the site and contains the majority of STP artifacts. 1494B, which is the only part of this site in the corridor, contains fewer materials including lithic tools and debris and small amount of bone and shell. A C-14 data for 1494A indicates the site was occupied 1340 ± 70 years BP.
SBa-1871	This is a low to medium density scatter of chipped stone shell. Limited amounts of historic materials were also found.
SBa-1873	This lithic scatter contained evidence of chipped stone tool production and processing of foods with ground stone implements.
SBa-1493	(in realignment corridor) This is a low density lithic and shell scatter.
SBa-1491	This is the site of a large village, probably that of the historic village of Kastayit. At least two descendants of residents are now living. This site contains abundant and varied assemblage of lithic shell and bone artifacts. Although no evidence of burials exist, burials are possible in the corridor. The site has been dated by C-14 analysis and the resultant date of 220 ± 70 years BP which substantiates the is site as ethnohistoric period. The great size, density and diversity of materials clearly marks this as a major Chumash village.
SBa-1658	Much of this major village seems to have been destroyed by railroad construction or lost to sea cliff erosion. Intact portions of the site in the corridor suggest lithic tool manufacture and use of shellfish. C-14 dating indicates the site was occupied 1080 ± 70 years BP.
SBa-1807	This site is a large early village with dense deposits of chipped stone, shell and bone artifacts. This is a rare resource. Burials are possible.
SBa-1879(X-5)	This site may represent a small, perhaps seasonally occupied, Middle or Late Period fishing village. It may be substantially disturbed, however. Burials are possible.

SBa-1878(X-3) This temporary camp contains evidence of chipped stone tool production and processing of foods including plants and shellfish.

SBa-1808 This site may be a village but additional field work would be required to substantiate site type.

SBa-1747 The site could also be a village but additional field work would be required to substantiate this claim. Very little material is in the corridor.

SBa-1507 This is a large low density lithic scatter.

SBa-1555/H The site contains both prehistoric and historic materials. Prehistoric materials contain evidence of manufacture or use of chipped stone tools and limited use of shell and faunal resources. The historic materials are relatively abundant and represent the remains of historic Alcatraz, a town built in 1899.

SBa-94,95 "Alcatraz East". This cluster of sites at the mouths of Cematario and Alcatraz Creeks are permanent or semi-permanent villages which have been somewhat disturbed to severely disturbed in this century.

Isolates located during OPA's field program include prehistoric and historic artifacts, as well as isolated features such as historic corrals. Prehistoric artifacts identified include Monterey, Franciscan, chert flakes, a hammerstone, a metate fragment and a biface fragment. Clustering of some isolates suggests that unrecognized archeological sites may lie hidden beneath dense surface vegetation. Historic isolates include a ceramic fragment and a cache of 20 railroad spikes. Technical Appendix K provides more information on these isolates.

Archaeologically Sensitive Areas in or near the Pipeline Corridor

Sensitive areas noted here are areas with a reasonably high potential for containing unrecorded archaeological sites. Canyon bottoms described previously as sensitive are not repeated here.

The cultural resource field program investigated, as mentioned earlier, only a select sample of the project area. Based on the archeological survey, the STP investigation. The historic land use and geomorphological studies, it is possible to predict the locations of sites in areas that have not yet been examined. Such areas would be investigated as part of the mitigation program. Sensitive areas include canyon bottoms, marine and stream terraces, and the locations of historic construction activities.

In general, terraces adjacent to drainages are the most sensitive landform in the project area. Indeed, over 99 percent of all sites reported here were either in canyon bottoms or on adjacent terraces, including both low lying stream terraces. Sites found near the project area which may be indirectly affected on which further testing may show lie in the corridor are as follows:

SBa-1844

This site lies south of the corridor on a northwest-southeast trending ridge near the west fork of Wood Canyon ("West Wood").

The site is exceptionally large with minimum dimensions of 800 mx 85 m. There are two main midden areas with abundant cultural materials in a dark soil matrix. Materials include local and exotic chipped stone shell and a metate fragment. A number of round and rectangular depressions were noted on the surface; the rectangular ones clearly look like minor grading cuts. The circular depressions may or may not be house pits.

The site is clearly one of the most important sites found in the Point Conception area. Its great size, extensive midden development, diversity of raw materials and tools, as well as its location in the interior suggest it is a rare type of archaeological resource not previously known in the area. Within a mile of the site lies SBa-203 and 541, two major habitation sites at the mouth of Wood Creek.

SBa-1872/H

The site is a former Southern Pacific Railroad (SPRR) railhead and currently consists of a series of standing corrals, loading pens, a scale house, and a surrounding scatter of historic glass and metal. It is one of the better preserved railheads in the general area.

SBa-1872/H seems to partially overlap SBa-1495, a previously recorded prehistoric site. The corridor adjacent to SBa-1495 was not considered sensitive because it was recorded as being more than 300 ft. from the pipeline centerline. The OPA survey indicates that SBa-1495 as well as SBa-1872/H may easily extend into the corridor.

SBa-1495

This site was partially reexamined during OPA's surface reconnaissance of SBa-1872/H. OPA noted shell fragments on surveyed portions of the site. A few Monterey chert flakes were noted south of SPRR by King and Craig (1978). This site may or may not extend into the corridor but it is well within 300 ft of it and should be considered sensitive. It is situated on a marine terrace overlooking the floodplain of San Augustin Creek.

SBa-1883

This site was surface collected by Spanne (1969). The site was revisited and officially recorded by OPA archaeologists in September 1984. The site report indicates the site consists of a sparse surface scatter of chipped stone flakes and chunks (Monterey chert) and several manos. Fossilized whale vertebrae were also noted. The site covers approximately 6,700 m^2 and is situated on a high marine terrace overlooking Canada de La Llelgua. The site is well within 300 ft of the corridor centerline.

Cultural Resources in the Optioanl Extension Pipeline Corridor (Gaviota to La Flores)

No fieldwork was conducted along this corridor for this EIR/EIS and it is clear that research similar to that conducted along the proposed corridor would reveal more sites than are currently known. Known sites include major villages, a midden site, and a number of lithic and shell scatters. Table 4.71 lists the sites records along the optional extension. Technical Appendix K presents more detailed information on these sites.

OFFSHORE PREHISTORIC AND HISTSORIC RESOURCES

Since various studies have previously inventoried the marine cultural resources in the area, the approach used for this project was to comprehensively review those pertinent works (Horne, 1982, 1983; Dames & Moore, 1982, 1983; Intersea, 1979a, 1980a,b; and McClelland, 1983; c.f. The California State Lands Commission, 1982) for the greater project area. The results of the information obtained from these studies were compared and contrasted with the general studies of cultural resources for the region (Stickel elt. al., 1978; Hunter, n.d.) Next, the remote sensing-geophysical data (side-scan sonar, magnetometer, and subbottom profiles) were reviewed and the results documented. Independent review of the data by Arthur D. Little resulted in general agreement with results reported by Horne and McFarlane in the reports submitted by the Applicant.

While the intact preservation of prehistoric former village sites on the now-inundated coast is unlikely due to the erosive effects of the transgression of the sea during late Pleistocene and earlier Holocene times, a number of important but isolated bottom-founded artifacts have been discovered in the project area. These were found on the sea floor in less than 100 ft. (30m) of water. These have consisted of stone mortars (Hudson 1976; Stickel 1977) and a charmstone (Hudson 1979). There have been no such isolated finds in the deeper water areas of this project. Therefore, most of the offshore surveyed area is not as sensitive for archeological sites since it is in deeper water. Isolated artifacts from capsized Chumash canoes, or the like, may still be present, however.

Historic cultural resources, mainly shipwrecks are more likely to occur in deeper water then prehistoric cultural resources. The most pertinent general references are those that of Stickel et al (1978; for the Point Conception area and south and eastward), Hunter (n.d. for areas north of Point Conception), and the more recent update for the Point Conception area by Horne and Barnette (1982).

Shipwrecks are to be expected in the study area due to their general distribution (cf. Stickel et al. 1978; Mineral Management Service 1984). Shipwrecks are also to be expected in this project area due to the documented historic usage of such areas as Cojo anchorage, the 1885 Point Conception lighthouse, the more recent Point Arguello Lighthouse, and the Arguello and Espada landings near Pedernales Point.

Platform Hermosa

Two geophysical surveys have been conducted which cover the Platform Hermosa site. The first lease-wide survey was conducted by Intersea Research Corp. in 1979 (Intersea 1979a). In 1982 a combined geohazards and cultural resources survey was conducted for the proposed platform site per MMS requirements [Dames and Moore, 1982, Horne, 1982]. These reports identified one anomaly on line 03-200 "which is almost certainly a shipwreck" [Horne, 1982: c-11]. Two other, less clear, but nonetheless possible shipwreck anomalies were also identified in Horne's report [Horne, 1982].

Platform Harvest

A cultural resource survey of the platform site (and interconnecting pipelines) was required by MMS for Platform Harvest. Survey data collected included side-scan sonar magnetometer, and sub-bottom profiles (Horne, 1983). For this report Horne reviewed the multi-system geophysical data and felt there was adequate coverage although he did note that the "...adequacy of the side scan sonar and magnetometer data decreased with increasing depth" and he felt that the data would not probably indicate the locations and natures of seafloor features in the deeper areas.

While carefully noting the presence of previous drilling sites, soil boring locations, anchor drag marks and natural features of depressions, scour marks, outcrops and rises all of which can be the source of "anomalies" in geophysical data, Horne (1983) did note three unaccountable targets. He recommended that those targets either be further investigated in order to identify them or be avoided as possible cultural resources during construction activities.

Platform Hidalgo

A similar geohazard/cultural resource survey was conducted for Platform Hidalgo per MMS requirement as was done for the other proposed platforms (McClelland, 1983).

The geophysical records for this platform were found to be of good general quality and adequate for cultural resources review. Some 30 anomalies were found in the data and all but one of which was identified as having geologic features or was related to previous oil development activity. MacFarlane (183:E-10) recommended that this one unidentified anomaly (potential shipwreck) be mitigated by its avoidance during construction or alternatively to have it properly identified by further investigation.

Offshore Pipelines

None of the offshore pipeline segments contained evidence of any anomalies that could be potential cultural resources.

NATIVE AMERICAN CONCERNS

The Chumash Indians in the Point Arguello project region have become increasingly aware of cultural resources and their management during the last decade, as have other members of American society. Many Chumash believe they have a special relationship to what they perceive to be their cultural resources.

As a consequence, it is particularly important to them that they be involved in the planning of cultural resource management from the very inception of a project. They want to be consulted about all the cultural resources to be impacted (not just archaeological resources), and they want to contribute to planning the management of those resources. Some Native Americans insist that Chumash Indian monitors should have equal status with the archaeological field director, and that the monitor should have the authority to halt surveys, excavations, and/or construction.

The Chumash people are concerned about both archaeological and nonarcheological cultural resources. The concerns include the following, in roughly descending order of intensity of feelings:

- Protection of sacred sites, including the protection of burials.

- Avoidance of unnecessary impacts to archaeological sites.

- Protection of plan, animal, and other natural resources.

All cultural resource sites are, to a greater or lesser degree, sacred to the Chumash Indian people. The most sacred are those which might be described as "power sites"; those that are closely associated with the supernatural in one way or another. The prime example of a very sacred site is Point Conception. Other sacred sites include burials, ancient ports, tomol (ocean-going vessel) building sites, historic village sites, and other (e.g., asphalt) natural resource gathering sites, and archaeological sites.

The Chumash are unanimous in their attitude toward burials. It is their opinion that burials should be left in place, if at all possible, with minimal or no analysis. If the burial is in jeopardy of destruction, it and the associated grave goods should be moved to a secure place and reburied with appropriate ceremony.

4.7.4 Applicable Regulations, Rules and Standards

The legal framework which mandates the consideration of cultural resources in project planning is complex and wide-ranging. County, state and federal governments have developed laws and regulations that are applicable to the proposed project and its alternatives. The principal ones are describe below after first discussing the agencies involved, including those which have jurisdiction over cultural resources that may be affected.

AGENCIES

Minerals Management Service (MMS)

This agency is the lead Federal agency responsible for cultural resources in Federal waters (i.e., those farther than 3 mi offshore) where the drilling platforms will be located. MMS must therefore comply with federal legislation protecting OCS cultural resources. MMS is responsible for issuing and enforcing the cultural resource stipulation placed on each OCS lease.

State Lands Commission

This agency is responsible for cultural resources that may be affected on State lands in waters within 3 miles of California's coastline. Portions of the offshore pipeline are in State waters.

California Coastal Commission

The Commission is responsible for implementing the policies of the Coastal Zone Conservation Act of 1972, including those pertaining to cultural resource investigation conducted for impact analysis purposes including those pursuant to CEQA, NEPA, and the National Historic Preservation Act (NHPA).

California Department of Parks and Recreation

The California Department of Parks and Recreation has certain regulations concerning the construction of projects on state park lands. Specifically, the Department must be notified of any proposed project which might occur on State parks land. There must be a justificaiton for failure to avoid state parks land, and the Department must make an evaluation of significance, impacts, and mitigation procedures for the project. In accord with these regulations, the Department has been notified of any lands affected by the proposed project.

Native American Heritage Commission

Chapter 1.75, Section 5097.9, of Division of the California Public Resources Code provides for the establishment of a Native American Heritage Commission. This commission is empowered to make recommendations toward the protection and preservation of sacred places on private land and is empowered to bring legal action to protect archaeological sites and sacred places on private land and is empowered to bring legal action to protect archaeological sites and sacred places located on public land. This commission may become involved in the resolution of disputes which may arise regarding any reburial areas along the pipeline corridor.

Santa Barbara County

During the preparation of the EIR/EIS, the County has assumed lead agency responsibility for cultural resources that may be affected onshore.

Advisory Council on Historic Preservation (ACHP)

The Advisory Council was established as an agency of the U.S. Government in 1966. The division known as the Office of Review and Compliance enforces agency compliance with the Council's procedures, comments on Environmental Impact Statements, and advises federal agencies on cultural resource issues. The Council guidelines, 36 CFR 800, define the Council's functions. Principally, the Council must be afforded opportunity to comment on any federal project having an effect on cultural resource. If the effect is adverse, the Council is party to the execution of a Memorandum of Agreement, which details the actions to be taken by the Agency with the concurrence of the appropriate State historic Preservation Office, to avoid or mitigate the adverse effects on the cultural resources.

State Historic Preservation Officer (SHPO)

The SHPO is a key participant in the historic preservation system and is consulted and involved at every step in the federal compliance process. The SHPO is responsible for a wide range of activities including supervision of the State Historic Preservation staff, ensuring that nominations are prepared and submitted to the National Register, supervision of an environmental review process to ensure that historic properties are considered in federal planning, participation in the compliance activities of federal agencies under the procedures of the Advisory Council, and supervision of comments on environmental impact statements. Impacts to cultural resources in the coastal zone must be mitigated in accordance with guidelines set by the SHPO. The SHPO is a political appointee of the governor, and the minimum requirements for the staff are that it include a professional archaeologist, historian, and architect or architectural historian.

APPLICABLE LAWS AND REGULATIONS

Historic Preservation Legislation

The development of a system of historic preservation laws and regulations spans the last 75 years. Especially over the past 15 years, these statues have been developed into a well-defined set of procedures for the protection of significant historic properties.

The Antiquities Act of 1906 was the first piece of historic preservation legislation. It expressed concern over the destruction of important historic and archaeological properties by nonprofessionals, and it established a system of permits for conducting archaeological studies on federal lands. Penalties were specified for noncompliance. Some antiquities permits issued under this was are still in effect, though new permits are now being issued under the Archaeological Resources Protection Act of 1979 and its implementing regulations (43CFR Part 7).

A great deal of archaeological survey and excavation was conducted during the 1930s under the public works programs designed to pull the United States out of the Great Depression. Much of this work involved excavations at sites that were to be flooded by reservoirs. After World War II, dam construction proceeded all across the country, and numerous archaeological excavations were conducted in conjunction with this construction. This led to the passage of the Reservoir Salvage Act of 1960, which authorized expenditure of Federal funds for archaeological salvage at federally funded reservoir projects. In 1975 the Archaeological and Historical Preservation Act amended the Reservoir Salvage Act. This act deals with the preservation of data, not the preservation of historic properties as physical entities. It authorized expenditure of up to 1 percent of the construction cost of a federal action for the purpose of data recovery.

Another set of laws and regulations was conceived from a broader notion of historic preservation. The Historic Sites Act of 1935 declared that it is national policy to "preserve for public use historic sites, buildings, and objects of national significance." The National Historic Preservation Act of 1966 has provided a broader base for thee implementation of this preservation goal. The act established a National Register of Historic Places and the Advisory Council on Historic Preservation. Section 106 of this act requires that federal agencies consult with the Advisory Council prior to the National Register. Eligibility is determined through consultation with local Native Americans, archaeologists, and other experts as well as with the State Historic Preservation Office (SHPO). The procedures for eligibility determination, as well as for determination of possible adverse effect (36 CFR 800), include the submission of an identification of possible eligible sites to the SHPO in a preliminary case report. The ultimate determination of no effect, no adverse effect, or adverse effect will be made through on-going consultation with local experts and the SHPO.

The Advisory Council regulations entitled "Protection of Historic and Cultural Properties" (36 CFR 800), provide an explicit set of procedures for a federal agency to meet its obligations under the National Historic Preservation Act and Executive Order 11593. In brief, these include an obligation to identify all properties that are eligible for the National Register and that may be impacted by the project, a requirement to evaluate the probable effects of the project on those National Register properties, and a requirement to avoid impacts or to develop other mitigation measures to offset any adverse effects to these properties.

The National Environmental Policy Act

The stated purposes of the National Environmental Policy Act (NEPA) are:

> To declare a national policy which will encourage production and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish the Council on Environmental Quality .

This law established the requirement that any major federal actions significantly affecting the quality of the human environment be preceded by a detailed analysis and report on those effects. Such a report is called an Environmental Impact Statement (EIS). NEPA states explicitly that it is a 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." While NEPA includes the concerns of the historic preservation legislation already discussed, it is also broader in its scope. It calls for a "systematic, interdisciplinary approach" that makes use of the "natural and social sciences." Thus through the implementing guidelines of the Council of Environmental Quality (CEQ), Social Impact Assessments have come to be a required element of an EIS. A Social Impact Assessment would include consideration of what has been referred to here as intangible cultural resources as well as social, demographic, and economic issues.

American Indian Religious Freedom Act and Related Legislation

The American Indian Religious Freedom Act ((P.L. 95-341) of 1978 calls for the protection and preservation of the rights of Native Americans to exercise their traditional religions. These rights include but are not limited to "access to sites, use and possession of sacred objects, and the freedom to worship thorough ceremonials and traditional rites." The law further enjoins the President to direct federal agencies to protect and preserve Native American cultural rights and practices. This law is taken into consideration in the evaluation of the significance of sacred sites inthe project area, in the determination of impacts of those sites, and in the recommended mitigation procedures.

Specific mandates for consultation regarding archaeological remains protected under this legislation are attributable to:

- The State Office of Historic Preservation which must review and approve data recovery mitigation programs;
- Recent revisions to the Public Resource Codes (LSecs. 7050.5, 4097.98, and 5097.99) which protects human remains in archaeological sites;
- Local planning guidelines including County guidelines for data recovery mitigation; and
- Federal law and guidelines outlined in a subsequent section, Federal Cultural Resource Compliance Procedures.

State Laws, Policies, and Guidelines

There are many well-organized and relatively powerful Indian groups and reservations in California. Through the efforts of these groups, a number of protections afforded by Federal law have recently been instituted in state law. In addition, cultural resource protection was included in the scope of general environmental legislation of the last decade such as the California Environmental Quality Act and the Coastal Zone Conservation Act.

California Environmental Quality Act -- The California Environmental Quality Act (CEQA) of 1970 sets forth the state's policies for environmental protection. This act provides for the identification of resources through the preparation of environmental impact reports. It further provides that the loss of resources be avoided or mitigated. The text of the original law and the amendments to it include cultural resources and areas of historic importance as part of the environment. CEQA provisions regarding archaeological resources affected by discretionary projects have been modified by Section 21083.2 of the Public Resource Code, commonly referred to as AB952. This law, besides placing limitations on the development and implementation of archaeological mitigation plans, requires a lead agency to make a two-step determination: 1) whether a project will have a significant effect on archaeological resources and 2) whether such resources are "unique" (see Section 1.3).

Impacts to Resources that are not Unique and do not Require Mitigation Measures -- The assessment of impacts and the development of mitigations in this document are consistent with CEQA, as amended by Section 21083.2. Mr. Roy Gorman, Chief Counsel of the Coastal Commission, has noted in a recent (3-84) letter to Santa Barbara County (among others) that AB 952 did not amend the Coastal Zone Conservation Act of 1976, and that archaeological activities in the coastal zone, including the development and implementation of mitigation plans, are not affected by AB 952 directives.

The CEQA amendment which addresses most specifically Native American cultural values and concerns is the 1980 change in Item II, 20 in Appendix I, Environmental Checklist form. Point (b) of this item reads: "Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?" Point (c) reads: "Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?" Both of these points refer specifically to the kinds of concerns addressed in this report, which is compiled in fulfillment of CEQA requirements.

Coastal Zone Act and Coastal Commission Guidelines

The Coastal Zone Conservation Act of 1972, Section 27402 provides that the state should protect coastal resources by avoiding irreversible and irretrievable commitments of coastal zone resources. The section on archaeological and historical resources addresses these areas of concern. The State Coastal Act policy pertinent to archaeological resources states:

> 30244. Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

Provisions recommending Native American consultation are also included in the ordinance.

"Coastal Commission Guidelines" (1981) have been prepared which include (1) guidelines related to mitigating impacts of coastal development and (2) guidelines for the conduct of archaeological studies themselves. With regard to impact mitigation, the Guidelines affirm that (1) all resources that may be affected are to be located through surface survey and, if necessary, subsurface testing, (2) further work, including the excavation of test units, is conducted in order to define site boundaries and composition, and to evaluate site significance, and (3) at the completion to testing, the potential project impacts are assessed and a mitigation plan prepared.

As mentioned, mitigation limitations specified in CEQA, as amended, do not apply in the coastal zone. Mitigations in the Santa Barbara Coastal Zone customarily achieve the highest levels of professional activity (i.e., those comparable to mitigations associated with mitigating impacts of federal projects).

Santa Barbara Coastal Plan

The Local Coastal Plan was approved by the Santa Barbara County Board of Supervisors in 1980 and partially certified by the State Coastal Commission in 1981. Those areas of concern to Native Americans and set forth in the local coastal plan are within the sections certified by the State Coastal Commission. Local policies with regard to archaeological resources include requirements that project designs 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).

SHPO Checklist Guidelines

The SHPO has published a series of checklists to evaluate the adequacy of archaeological testing programs, site significance and uniqueness evaluations, and of mitigation reports. These checklists were used in evaluating the adequacy of previous research in the project area [WESTEC 1983 and 1984] and in determining the need for and design of additional fieldwork.

Santa Barbara County Cultural Resource Guidelines (1983)

These guidelines primarily describe how the "uniqueness" of an archaeological site is to be determined, as required by CEQA, as recently amended by Section 21083.2 of the Public Resources Code.

Santa Barbara County Prehistoric Archaeological Project Requirements (1980)

This document defines various types of archaeological projects that may occur in the County and specifies professional qualifications for archaeologists, requires Native American participation in subsurface testing, describes minimally acceptable procedures for various activities, defines the scope of required reports, and so on. This document was utilized in evaluating the adequacy of previous investigations along the pipeline corridor and at the Gaviota facility [WESTEC 1983, 1984] and was considered in planning the archaeological fieldwork begun in June 1984.

California Senate Concurrent Resolution No. 43, Chapter 87

This act resolves in concurrence with the Assembly, "That all the agencies of the State, with their present staff and facilities, are hereby required to cooperate in current efforts with State and private agencies by reporting all archaeological discoveries of Indian culture in this state to the Division of Beaches and Parks .... and when feasible and consistent with the reasonable exercise of powers of such agencies, to preserve such findings."

California Senate Bill 297

The California Senate Bill 297, passed in 1982, addresses the disposition of Native American human burial and skeletal remains. The bill amends various sections of the State's Government Code, Health and Safety Code, and Public Resources Code. The regulations, as amended, 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 items associated with them. The regulations also provide for the punishment of vandals, and establish procedures for encouraging private property owners to comply with the recommended treatment of burials. Finally, the codes as amended stipulate specific procedures to be implemented if, during construction of a project, a Native American burial is discovered. All of these statutes and their consequent stipulated procedures are taken into consideration in the evaluation of impacts and the recommendations of mitigations in this report.

Other Guidelines and Directives

The Requirements and Procedures for Assessing Ethnic Cultural Resources and Concerns, a set of guidelines developed by Susan E. Brown for the County of Santa Barbara, are followed in the production of this report and the guidelines for protecting and preserving Native American cultural resources, published by the United Chumash Council of Santa Barbara County, are taken into consideration in the procedures described herein.

UNIQUENESS AND SIGNIFICANCE: CONCEPTS IN ENVIRONMENTAL LEGISLATION

Compliance with numerous legal directives and guidelines (e.g., CEQA, as amended; Coastal Commission Guidelines; E.O. 11593; NEPA; NHPA, as amended; 36 CFR 800) necessitates evaluating the value of cultural resources. The value of a resource is central to management decisions regarding resource disposition (i.e., resource preservation, mitigation, or condemnation). If a property is of no value, it need not be preserved, enhanced, or salvaged [King, Hickman, and Berg, 1977]. The concept of resource value was developed on the federal level when the National Register of Historic Places was created by the National Historic Preservation Act. Properties that are on, nominated to, or eligible for listing on the National Register are termed significant; only they are recognized as being of value and worthy of protection from federally caused impacts.

The concept of resource protection and its corollary, resource significance, filtered from the Federal government down to states, counties, and even cities. With respect to California legislation, CEQA and the Coastal Act were directly stimulated by policies, goals, and concerns of NEPA and other Federal examples of environmental legislation. In order to implement CEQA policies and to make the difficult choices of cultural resource management (which sites to preserve, which to lose), California archaeologists and state and local agencies utilized federal criteria for assessing cultural resource significance. These criteria (used by the federal government to determine National Register eligibility) specify that 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

- that are associated with events that have made a significant contribution to the broad patterns of our history; or

- that are associated with the lives of persons significant in our past; or

- 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

- that have yielded, or may be likely to yield, information important in prehistory or history.

The general applicability and comprehensive scope of these criteria all not explicitly recognized by, among others, the California Coastal Commission Guidelines which specify that:

> a site's significance is determined on the bais of site integrity, research potential, ethnic and historical value, and the potential for public appreciation [1981:3].

These criteria have recently been embodied in CEQA, as amended by PRC 21083.2, and the County of Santa Barbara [1983:12-15]. which limit mitigation protection to unique resources, defines these resources as:

> "an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:
>
> 1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information (emphasis added).
>
> 2) Has a special and particular quality such as oldest of its type or best available example of its type.
>
> 3) It is directly associated with a scientifically recognized important prehistoric or historic event or person." (PRC 21083.2[g]).

4.8 AESTHETIC ENVIRONMENT

4.8.1 Overview

The scenic resources of Santa Barbara County's coastline are of considerable value both in terms of providing a pleasurable environment for the local populace and in stimulating tourism. The coastline between Point Conception and Ellwood is characterized as an area of unique scenic features, heightened by the contrasts between the ocean, foothills and the coastal terrace. Farm houses and small orchards frequently occur in the canyon bottoms and arroyos. Along the shorelines, sandy beaches alternate with rocky headlands interrupted only by pocket of industrial or recreation development.

The aesthetic environment surrounding the project area can be separated into two major components:

- Visual setting, and
- Ambient noise levels.

In the remaining portions of this section, each component is discussed in more detail.

4.8.2 Visual Setting

THE STUDY REGION

The study region has been defined to include all important travel routes or use areas within view of the proposed project and associated activities (Figure 4.8-1). The region extends south from Ocean Beach County Park to Point Arguello, then east from Point Arguello to Eagle Canyon. The Ocean Beach-to-Point Arguello segment is bounded on the north by the Santa Ynez River, to the east by the low foothills of the Santa Ynez Mountains, and extends west to the shoreline. From Point Arguello to Eagle Canyon, the region is bounded on the north by the crest of the Santa Ynez Mountains and extends south to the shoreline.

DEFINITION OF TERMS

A visual resource is 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. In the establishment of the visual conditions of an area or region three attributes are relevant: Visual character, visual sensitivity, and visual quality.

The visual character of the resource is a descriptive inventory of the natural 1) landforms, 2) water surfaces, 3) vegetative patterns, and

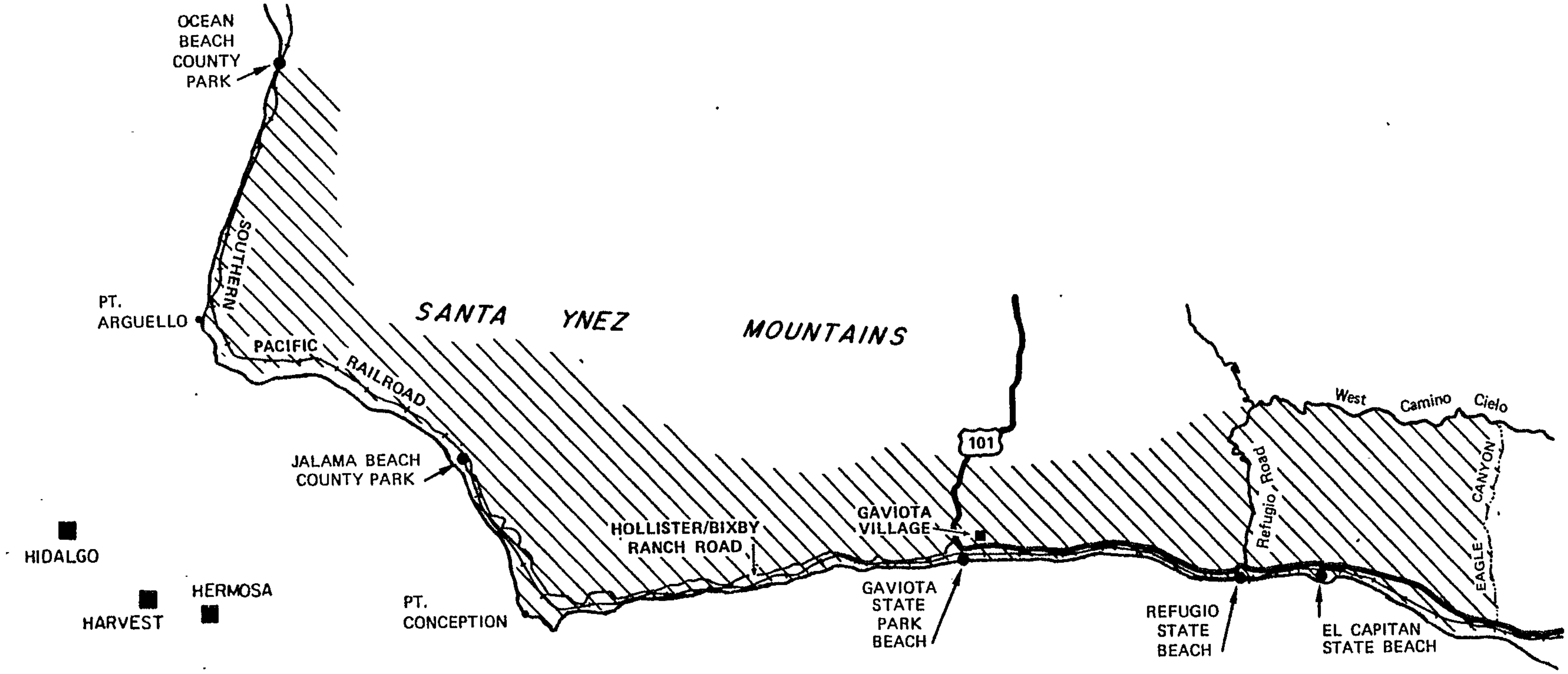


Figure 4.8-1 The Study Region Relevant to Visual Impact Analyses.

4) man's cultural modifications, that lend to the landscape its distinguishing characteristics. Visual sensitivity indicates 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 is the overall attractiveness of the resource, a function not only of the appeal of inherent characteristics, but also of the effect on the resource of features that have been introduced and which appear incongruous.

4.8.3 Visual Character of the Study Region

Visual character is the identification of the visual resources and is described in terms of those features 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).

LANDFORMS

The region lies within the coastline landscape province. Nearly all of the region defined in this study lies in the transverse range province, with points north of Point Arguello lying in the coast range province. The transverse range trends east-west, while the coast range is oriented northeast-southwest.

The dominant feature of the transverse range is the crest of the Santa Ynez Mountains, which is characteristically rugged and steep, and forms an ever-present, scenic backdrop for northerly directed views within the region. Nearly three-fourths of the land in the Santa Ynez Mountains in this eastern stretch is steeper than 30 percent.

The steeper slopes are V-shaped, being sharply incised by the short reaches of numerous steep drainages, about half of which extend less than 3.5 miles inland. Except for the Talama Creek drainage north of Point Conception and several drainages north of Point Arguello, all drainages from the Santa Ynez mountains are oriented north-south.

Other common landforms are the gently rounded foothills which give way to the coastal terrace (also called the coastal plain) sweeping to bluffs overlooking narrow sandy beaches. At Point Conception, the terrace extends well over 1 mile inland to the foothills. Two to three miles west of Gaviota some stretches have pratically no terrace at all. From Gaviota to Goleta the plain is generally 1,000 to 2,000 feet wide, while half of the terrace from Gaviota to Point Conception is wider than 3,000 feet.

The shoreline within the study region is narrow, sandy beaches broken occasionally by promentories and backed by bluffs about 50 feet high leading to the coastal terrace. Although, occasionally characterized by rocky headlands, they are somewhat less spectacular than the spires and rocky shoals of the northern California coast.

VEGETATIVE PATTERNS

The two main vegetative types within the study region are the chaparral of the steeper mountain slopes and the disturbed grasslands of the foothills and coastal terrace. Chaparral is characteristically low growing at mid-slope and along ridges and is muted in color; patterns created by the numerous species comprising this vegetative type are subtle and serve more generally as a visual backdrop highlighting conspicuous rock outcrops.

The vegetation of the coastal terrace and foothills within the region generally has been disturbed by decades of grazing and clearing and, more recently, through cultivation. Coastal sage scrub is abundant only on some steep dry slopes. Because there is almost no transition between the chaparral covered slopes and grasslands, the two vegetative types meet in a sharply defined edge.

The numerous canyons and ravines within the study region, which bisect the grasslands of the terrace and foothills, support stands of oak and riparian woodland, as well as other wetland plant life. Most conspicuous in these drainages are coast live oak in low elevation canyons and ravines, and white alder, western sycamore, black cottonwood, red willow, yellow willow, arroyo willow and California bay laurel at the higher elevations.

Historically, grazing has been the dominant agricultural activity in the region. Irrigated cropland and dry farming also occur, but in limited areas.

Although limited, these occurrences of irrigated and nonirrigated cropland have a disproportionate influence on the landscape character west of Gaviota for two reasons. First, the croplands form conspicuous patterns of introduced species. Second, the croplands' disproportionate influence west of Gaviota invariably occur close to the only travel routes through the area (Hollister Ranch Road and the Southern Pacific Railroad). The travel routes traverse the coastal terrace where there is little vertical relief and where agricultural modifications are not screened from view.

East of Gaviota, extensive avocado and citrus groves occur, but west of Dos Pueblos Canyon these groves tend to be inconspicuously situated within canyons removed from primary views. From Jalama Beach County Park to Ocean Beach County Park, the land appears to be little modified, exhibiting vegetative patterns primarily natural in appearance and reflective of the pre-grazing era.

WATER FEATURES

The study region is a semi-arid area dissected by numerous small, intermittent and ephemeral streams which flow during the winter and spring. These channels are inconspicuous features of the landscape more notable for the associated vegetative pattern and landforms, than for their direct scenic contribution. Bodies of fresh water are limited to agricultural impoundments, which are also inconspicuous.

The Pacific Ocean, readily seen from most vantage points, offers a seemingly limitless expanse which serves as a setting for the distant Channel Islands when they are visible. Near at hand, the dynamics of wave action are blocked from view for most observer positions by the intervening bluffs.

CULTURAL MODIFICATIONS

Most of the study region from Gaviota to Ocean Beach County Park are uninhabited and, as noted, are used primarily for cattle ranching, with some crop production also occurring. As noted, practices associated with cattle ranching have, over many years, modified the natural vegetative patterns of the area. Many grass species have been introduced to grazed areas and the distribution of some shrub species has been sharply reduced. Orchards and tilled fields have imposed new forms upon the land, with fences, wind breaks and decorative plantings being features notably characteristic of ranch lands.

The Southern Pacific rail line is an occasionally prominent feature when viewed from Hollister Ranch Road. This, as well as the ranch road, is expressive of the development of agricultural areas and is, therefore, treated as an accepted characteristic of the region.

From Gaviota to just west of Eagle Canyon, the predominant character is that of open, agricultural land used primarily for grazing. In recent years avocado orchards have expanded considerably. Crop production is the dominant, visible land use near the mouth of Dos Pueblos Canyon. From there to the east, the landscape becomes increasingly urban in character, with a mix of residential, commercial, industrial and institutional land uses finally predominating near Tecolote and Winchester Canyons, and hence on to Goleta.

4.8.4 Visual Sensitivity

Visual sensitivity is the relative degree of public interest in the visual resource and concern over changes in the quality of that resource (BLM, 1978; USFS, 1977). The degree of interest and concern has not only to do with public attitudes, but also with the frequency of viewing. Sensitivity is judged as occurring at one of three levels of intensity:

Level 1 - Frequent viewing by a highly concerned and interested public;
Level 2 - Intermediate viewing frequency, concern and interest; and
Level 3 - Infrequent viewing and low concern and interest.

Since the public experiences the landscape from travel routes and use areas, the assessment of sensitivity is specific to those observer positions. Sensitivity, then, is "mapped" by designating the sensitivity level of each key travel route and public use area.

METHODOLOGY

In selecting the approach to use in estimating sensitivity levels of key travel route and use areas, consideration was given to both the

Bureau of Land Management (BLM) and U.S. Forest Service (USFS) methodologies. The approach taken herein is largely the same as that used by the USFS apart from some specific modifications required to adapt it for environmental impact analysis. (See Technical Appendix L, Part 2 for a complete discussion of modifications.)

The approach starts with identifying key travel routes and public use areas as being either primary or secondary in importance. A third category of "tertiary" importance was added to better address the conditions in the study region. The criteria used for key travel route and public use area importance were:

- Primary travel routes and use areas are those used by the public that are of national or regional importance, with high-volume use throughout much of the year.
- Secondary travel routes and use areas are those used by the public that are of local importance with low-volume use that may occur seasonally.
- Tertiary travel routes are those routes primarily serving private land uses or that are otherwise unavailable for general public use.
- Tertiary use areas are those that are privately owned and others to which the general public seldom has access.

The second step is to determine what proportion of the public has a "major concern" over visual quality. For this study the following guideline was used:

> The part of the public having a major concern over visual quality includes the majority of those: driving or bicycling for pleasure; hiking scenic trails; using recreational areas, summer home tracts, resorts, and tourist attractions; and living in residential areas, a primary attribute of which is the surrounding scenic quality.

KEY TRAVEL ROUTES AND PUBLIC USE AREAS

Travel Routes

Primary Travel Routes - In identifying key travel routes and public use areas, consideration was given only to those potentially affected by the proposed project and its alternatives. Using this approach, U.S. Highway 101 and the Southern Pacific Railway were identified as being primary travel routes.

Secondary Travel Routes - Secondary travel routes include West Camino Cielo and Refugio Roads. West Camino Cielo is a highly scenic, two-lane, partially paved road running east-west from Highway 154 to Refugio Road along the crest of the Santa Ynez Mountains. The USFS intends to improve this road and encourage its use for pleasure driving by the public [Holcomb, 1984]. Refugio Road is a scenic mountain route, two-lane and paved, extending north from Highway 101 at its intersection near Refugio State Beach to Santa Ynez 15 miles north.

Tertiary Travel Routes - The Hollister/Bixby Ranch road is of tertiary importance. Access is permitted only to property owners or their assignees. The segment serving the Hollister Ranch residential development is assumed to receive considerably more traffic than that serving Bixby Ranch, which is undeveloped except for the ranch itself.

Use Areas

Primary Use Areas - Primary public use areas within view of elements of the proposed project, associated activities, or the alternatives are:

- Jalama Beach County Park
- Gaviota State Park Beach
- Refugio State Beach
- El Capitan State Beach

Each of these beaches have well-developed sites for camping, picnicking, and recreational vehicle use, with comfort and convenience facilities. Major activities occur primarily from May through September.

Of the four, Gaviota State Park Beach is the closest to the proposed site for the Chevron onshore oil and gas processing facility (about 1.3 miles to the west). Undeveloped State park land along the bluffs adjoins the east and west boundaries of the Getty facilities due south of the proposed Chevron site. The stretches of beach adjacent to the Getty property do not have designated access from the highway.

Jalama Beach is a 28-acre facility with 0.3 miles of ocean frontage about due east of the proposed sites for Platforms Hermosa, Hidalgo, and Harvest. As with the other beaches mentioned, this beach is also developed for camping, picnicking, and recreational vehicle use. The park is remote, being accessible only along Jalama Road, a 15-mile, winding route connecting with Highway 1 about 4 miles south of Lompoc.

Secondary Use Areas - Ocean Beach County Park, northwest of Lompoc, is of secondary importance. Although it is isolated from most communities, it is one of two beaches readily available to Lompoc residents (Jalama Beach being the other), and is probably a locally important resource.

The small commercial development just west of the site for Chevron's processing facilities, Gaviota Village, commands a broad view of both ocean and mountains. Apart from the public rest area just south of Gaviota Pass, this development offers the only convenient stop along the highway between Gaviota and Goleta. A restaurant, gift shop and gas station are the extent of the development.

Tertiary Use Areas - Vista del Mar School, located on a 10-acre parcel abutting the site for the Chevron processing facilities, accommodates a current enrollment of 79 kindergarten through 8th graders. The school area, while accessible to the general public, would not ordinarily be visited by anyone other than attendees and school staff. Further details on the characteristics of the Vista del Mar School can be found is Section 4.9.10.

Public Concern

State and County policies protecting views to the ocean and along the coast [California Coastal Act, 1976; Santa Barbara County, 1982a,b] reflect a high level of general public concern over visual qualities of coastal areas. Much of the public choosing to travel or recreate along, or live near, the coast west of Santa Barbara presumably do so for the currently protected scenic values found there. For example, traffic increases along U.S. Highway 101 by about 50 percent on weekends [Caltrans, 1982], presumably as a result of recreation or tourist oriented traffic. Also, most Amtrak passengers are highly interested in the scenic qualities along the South Coast [Black, 1984].

Sensitivity Level Ratings

Based on the available information and data on frequency of viewing and public attitudes about the views, Table 4.8.1 presents viewing sensitivity levels for each key travel route and public use area identified. Except for the Hollister/Bixby Ranch Road, Vista del Mar School and Gaviota Village, all travel routes and use areas discussed are rated as Sensitivity Level 1, indicating frequent viewing by a highly concerned and interested public. The ranch road and school are comparatively less sensitive primarily because the general public does not have access to the road and infrequently enters the school grounds, though the public is permitted access to the school. Sensitivity at Gaviota Village is rated as Level 2 because many would use the restaurant and gas station regardless of the surrounding scenic qualities; apart from one gas station at the mouth of Canada de la Pila, there are no such facilities between Gaviota and Goleta along the highway.

4.8.5 Visual Quality

DEFINITION

The quality of the visual resource (i.e., its overall attractiveness,) relates to two factors, one of which is the appeal of its inherent (characteristic) features. Visual appeal has been defined by several federal agencies as the diversity of features within the field of view [USFS, 1974; BLM, 1978; SCS, 1978]. Where the landforms, vegetation, water surfaces and cultural modifications are highly varied and create striking patterns, the area is thought to have strong appeal. The term used to measure this visual diversity is Visual Resource Variety.

Table 4.8.1

Sensitivity Level For Key Travel Routes and Use Areas

	Sensitivity Level
TRAVEL ROUTE	
U.S.Highway 101	1
Southern Pacific Railway	1
Refugio Road	1
West Camino Cielo	1
Hollister Ranch Road	2
Bixby Ranch Road	3
USE AREAS	
Jalama Beach County Park	1
Gaviota State Park Beach	1
Refugio State Beach	1
El Capitan State Beach	1
Ocean Beach County Park	1
Gaviota Village	2
Vista del Mar School	2

The other aspect of visual quality, termed Visual Resource 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 is critical to any subsequent analysis 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, incongrous and draw attention away from inherent, aesthetic properties of the area.

METHODOLOGY

Visual Resource Variety

For consistency, visual resource variety was assessed based on views from the same key travel routes and use areas as were considered in the analysis of sensitivity (Section 4.8.4). Variety was scaled according to the range of diversity found within the character type. Visual diversity was rated according to several factors associated with the observer position. Of importance was the predominant direction of view and view duration.

Based on the approach outlined here and detailed in Technical Appendix L, Part 2, each key travel route and use area were classified into one of the following three variety classes:

Variety Class A - Features that are distinctively diverse, highly interesting and the overall patterns they create are strongly defined, commanding attention and often creating a sense of composition.

Variety Class B - Features that are moderately diverse and interesting, and the overall patterns they create are moderately well defined.

Variety Class C - Features that show minimal deversity; the overall patterns may not be readily discerned. Generally, the landscape appears monotonous.

Visual Resources Condition

The basis for identifying uncharacteristic features in the study region is the information in Section 4.8.3, where inherent elements of the visual resource were described. Significant factors include the magnitude, distribution, and visibility of uncharacteristic elements that have been, or under current trends are expected to be, introduced to various fields of view. Those factors, along with aspects of design (form, color, texture, line), influence how conspicuous and incongruous the subject features are. The perception of visual conditions is also influenced by the circumstances under which they are viewed. The more direct and prolonged the views, the more the feature may be studied and subtleties noticed.

Also important are the experience the public has with an area, the frequency with which the resources are viewed, and the expectations held regarding their appearance. A public thoroughly familiar with an area is likely to notice subtle departures from established visual character than one-time visitors.

Taking the above approach, views from each segment of the travel routes and from each use area, were rated as being within one of the six classes of visual condition listed in Table 4.8-2.

Composite Ratings of Visual Quality

Together, the evaluations of visual resource variety and visual resource condition serve to characterize the overall quality of views from important travel routes and use areas in the region. Only views from routes and use areas potentially affected by the project, the Area Development Buildout, or the alternatives were considered. These routes and areas were identified in Section 4.8.4.

Table 4.8-3 is a visual resource quality matrix that relates variety class and visual condition determinations to measure the overall visual quality. The table is a simplified way to integrate the conditions of

Table 4.8-2
Visual Condition Rating Guidelines

Visual Condition Class		Guidelines
VC-1		All features within the field of view appear to be characteristic of the region.
VC-2	a)	Features appearing incongruous (out of place, incompatible) are evident but would often be overlooked by the casual viwer (inconspicuous due to such factors as size, distance, distribution, context, screening, or the predominant orientation of views);
	b)	Or, introduced features, though uncharacteristic and attracting some attention appear similar enough to features inherent to the area to be regarded as fully compatible wity them.
VC-3	a)	Uncharacteristic features appear incongruous, are not easily overlooked, and may attract attention, but are visually subordinate to inherent features;
	b)	Or, uncharacteristic features compete for attention to the point of co-dominance, but are similar enough to inherent features to be regarded as moderately compatible with them.
VC-4	a)	Uncharacteristic features appear incongruous and compete for attention (are distracting and co-dominant) with those that are inherent to the area;
	b)	Or, uncharacteristic features demand attention (are visually dominant) but are moderately compatible with features inherent to the area.
VC-5		Uncharacteristic features appear incongruous and dominate the field of view; the primary character of the area may be subdued by comparison and difficult to recognize.
VC-6		Uncharacteristic features appear incongruous and so dominate the field of view, due to their size and/or distribution, that the character of the area is unrecognizable or does not appear to be the same as that for the rest of the region.

Table 4.8.3

Visual Resource Quality Matrix

Visual Resource Variety	Visual Resource Condition Classes [1]					
	1	2	3	4	5	6
Class A[2]	I[3]	I	II	III	IV	V
Class B	II	II	III	IV	V	VI
Class C	III	III	IV	V	VI	VI[3]

1 Defined in Table 4.8-2

2 Class A: Distinctively varied; Class B: Moderately varied; Class C: Minimally varied.

3 Visual Resource Quality Classes I-VI are in descending order of quality. The rating reflects the inherent diversity and interest in the landscape as well as the degree to which distracting, incongruous elements have intruded upon the views.

Note that a change in condition from Class 1 to Class 2 does not affect overall quality. By definition, Visual Condition Class 2 occurs where there are incongruous elements, but they would be overlooked by most of the public. Therefore, the quality of the landscape would not be altered.

Also note that the inherent attractiveness of Variety Class A landscapes is such that their quality is judged never to fall below Class IV.

the landscape with its inherent appeal to arrive at general conclusions regarding its overall quality. For further detail on the use of this table see Technical Appendix L, Part 2.

4.8.6 Visual Quality of Views from Sensitive Receptors in the Study Region

The quality of views from important travel routes and use areas has been summarized in Figure 4.8-2. Figure 4.8-2 covers the part of the region most relevant to this study, that part from El Capitan State Beach nearly to Jalama Beach. In the paragraphs below, the quality of the views at sensitive receptor locations are briefly highlighted (see Technical Appendix L, Part 2 for a detailed discussion.

EAGLE CANYON TO GAVIOTA

From Eagle Canyon to Gaviota, the alignments for U.S. Highway 101 and the Southern Pacific Railroad (SPR) are relatively straight, except in the vicinity of Refugio Beach. Apart from a few instances, the quality of views from the highway and railroad are about the same, given the proximity of their alignment. In spite of the speed of travel, viewing in the general direction of travel (east-west) is moderately sustained. Lateral viewing, from the highway, though, is frequently interrupted by roadside plantings, cut banks, adjacent hills, and occasionally by railroad trestles. For most of the route, the highest quality views are dominated by the crest of the Santa Ynez Mountains and rugged outcrops at the lower slopes. Foothills merge with the coastal terrace in a generally undramatic transition, and the coastline is seldom seen. Except for those at Gaviota, and those at the mouth of Las Flores Canyon, onshore facilities associated with oil and gas development and processing are sited away from the primary direction of highway views, often in canyons. Views from the railroad are affected to a greater degree because the route crosses by or through several developments.

The highest quality views occur at the east end of the study region from Eagle Canyon to Las Llagas Canyon. Here the coastal plain is broad, views expansive, and the Santa Ynez Mountains conspicuous. For some stretches of rail and highway routes scenic quality is affected by the direction of travel. Other high-quality views occur between Tajiguas Creek and Arroyo Hondo (Westbound lanes), between Canada de Zorrillas and Canada del Leon (either direction), and from Gaviota Pass to Canada del Barro. (See Figure 4.8.2.)

Views from El Capitan and Refugio State Beaches are oriented toward Platform Hondo A and the OS&T and are therefore more affected by these features than are highway and rail views. Because of the platform and OS&T, and because the coastline is not highly dramatic, views are intermediate in quality.

Gaviota State Park Beach currently has a somewhat industrial appearance because of the high trestle crossing the park. Seaward views are partially blocked by an existing pier, and the coastline is of minimal appeal. Visual quality here is comparatively low.

GAVIOTA TO JALAMA BEACH COUNTY PARK

As for the Eagle Canyon-to-Gaviota section of the Study Region, the Gaviota to Jalama Beach to Southern Pacific Railroad alignment offers a sequence of relatively straight stretches. By contrast, the Hollister/Bixby Ranch Road follows the contours of the land, and therefore has a highly winding route. Whereas rail views are sustained and predominantly oriented east-west, those from the ranch road are often interrupted by landforms and vary more widely in orientation.

The most salient characteristics of this part of the region are the often unobstructed, wide views extending many miles in the distance; the generally broad coastal terrace; the even, low, rounded foothills that generally block significant views of the Santa Ynez Mountains; and the occasional highly picturesque ranches. (Point Conception, though remarkably scenic, is not visible either from the rail line or the ranch road.) It is the expansiveness of the landscape, its undeveloped agricultural character, and the manicured appearance of its grazed, fenced, and tilled fields that are the most visually appealing aspects of the area.

Where the coastal terrace is narrow and the foothills block views inland, visual quality is lowest; this situation occurs from the Hollister Ranch entrance gate to Canada del Sacate, and again from Black Canyon landfall to Jalama Beach. Some of the most scenic and picturesque lands in the region occur in between, notably the ranch in Canada de Santa Anita, the Hollister Ranch headquarters area, and San Augustine Ranch.

Where residential development occurs on the coastal terrace or at the brow of the low foothills, it is somewhat visually intrusive, if not to the residents, at least to rail passengers familiar with the area and sensitive to these recent changes. These structures are not sited in a way characteristic of ranch dwellings, which are typically located within valleys near the most arable land and sources of water. As viewed by ranch residents, these hill-top and terrace-sited structures would probably not be objectionable. Though co-dominant with established characteristics of the land, these dwellings are compatible in form and scale with ranch structures. Therefore, their impact, as seen from the rail line, is not great.

Texaco's platforms Helen and Herman affect rail-based views to a greater degree than those from the ranch road the relatively straight alignment and sustained viewing. The platforms, though close to shore (in state waters), are separated sufficiently from each other to be subordinate relative to features included in the total breadth of available views. Views of the platforms from the ranch road are brief due to intervening hills and road alignment.

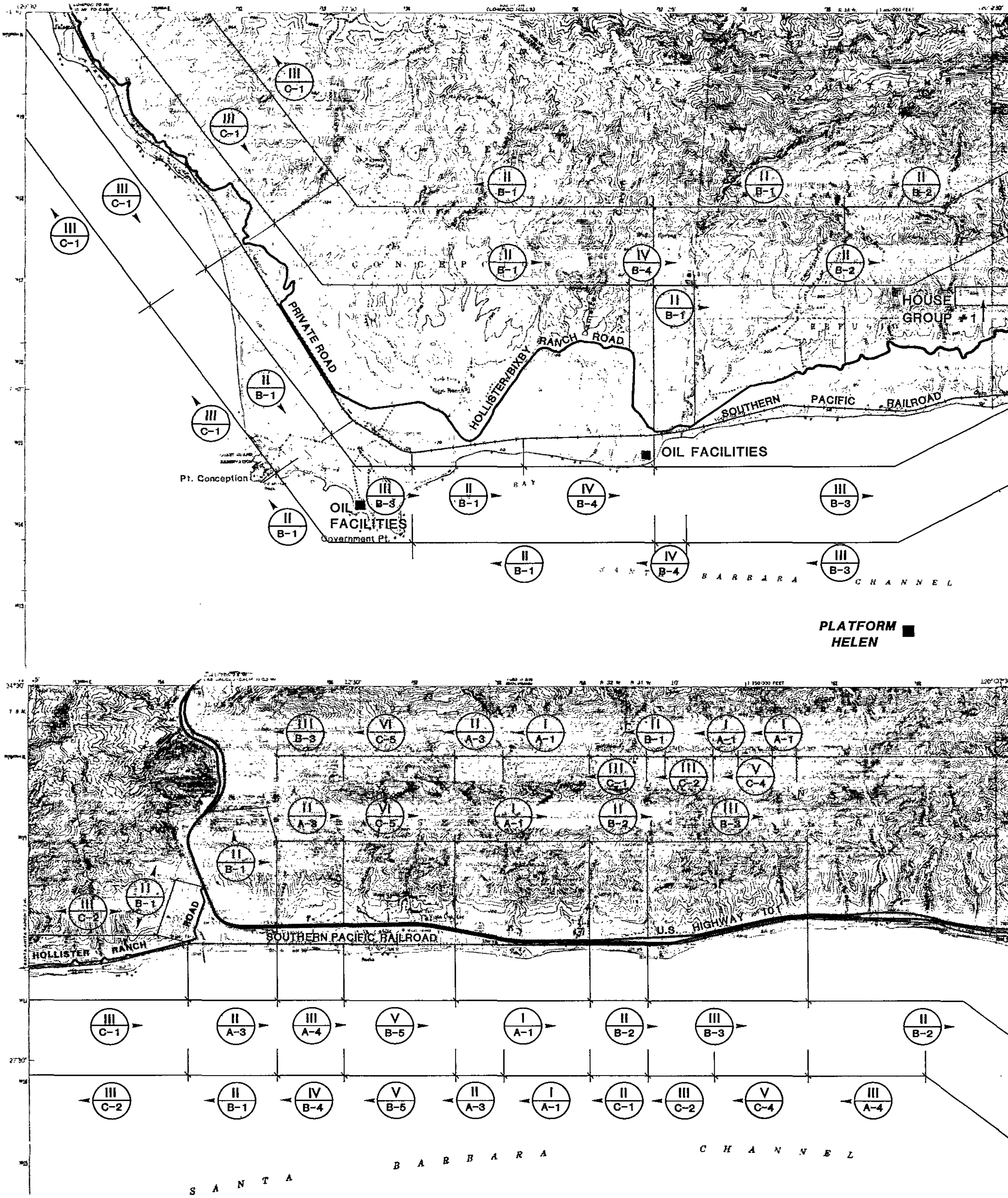
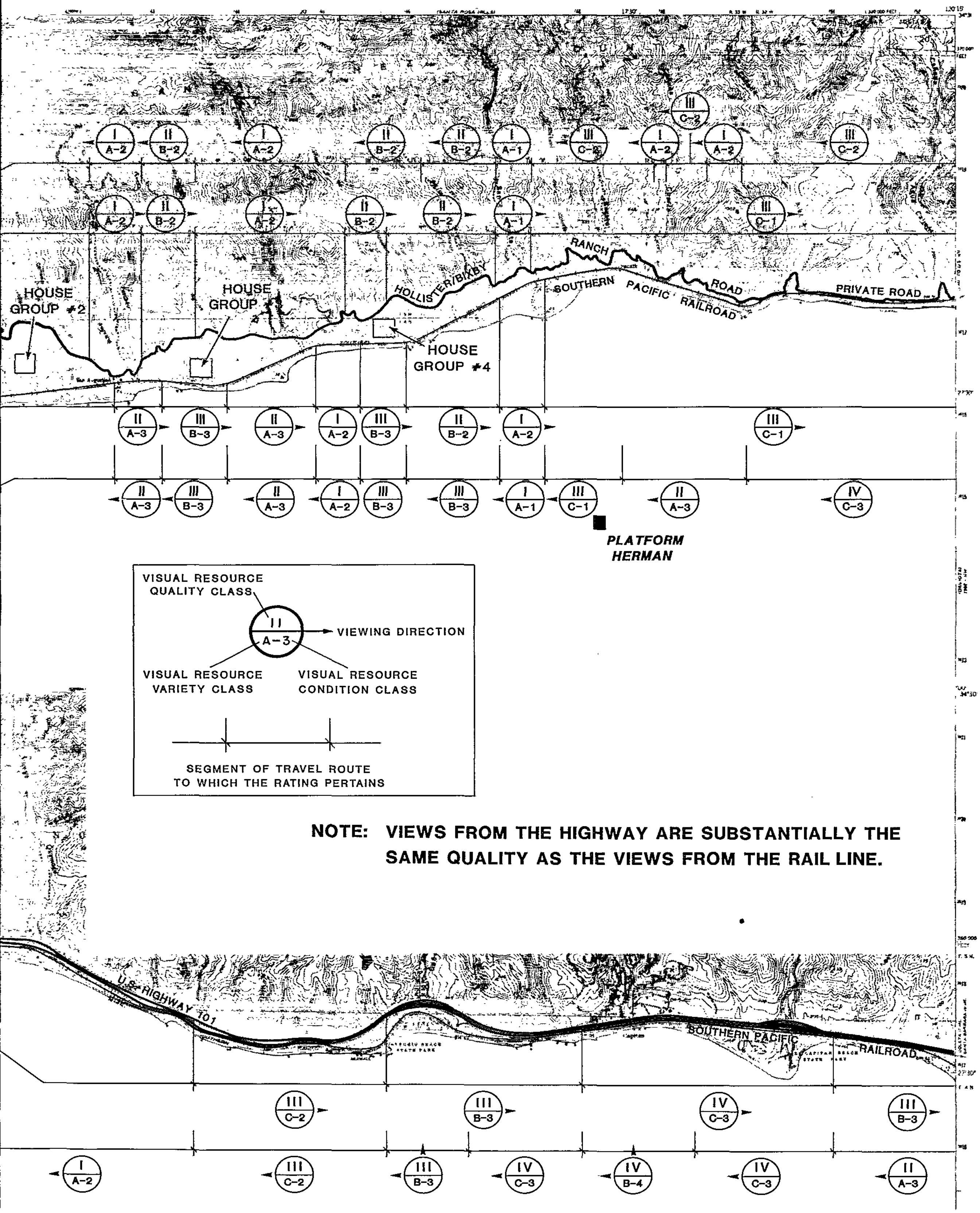


FIGURE 4.8-2 GRAPHIC SUMMARY OF EVALUATIONS OF VISUAL RESOURCE



NOTE: VIEWS FROM THE HIGHWAY ARE SUBSTANTIALLY THE SAME QUALITY AS THE VIEWS FROM THE RAIL LINE.

QUALITY, BASED ON VISUAL CONDITIONS AND VARIETY CLASS RATINGS.

Arthur D. Little, Inc.

Union Oil's storage tank on the point south of Canada del Cojo affects railbased views more than those from the ranch road due to topography and rail alignment. The other Union facilities, at Government Point, affect views only from a limited stretch of the east-bound rail line. The Coast Guard facilities, at Point Conception are similar in scale, form and clustering to ranch structures and, along with the lighthouse, are a picturesque component of the coastline.

ONSHORE PROCESSING FACILITIES

Because of the importance of the visual impacts associated with the proposed site for onshore processing facilities and its primary alternative, attention is directed here to the visual qualities of the two sites.

The overall topography is gently sloping with elevations ranging from 120 ft above mean sea level (MSL) near U.S. 101 to 240 ft above MSL at the northernmost perimeter of the property. The terrace is dissected by four north-south trending drainages: Canada del Cementerio, Canada Alcatraz, Canada del Leon, and Canada San Onofre. At the higher elevations, the streams form relatively narrow canyons that widen substantially as they cross the terrace and approach the sea. The site is flanked to the north by the rugged Santa Ynez Mountains, the exposed bedrock strata of which are dramatic features of inland views.

Disturbed grassland characterizes the majority of the Garvais property, fairly well developed riparian vegetation occurring along the drainages of Canada del Leon and Canada San Onofre. Vegetation on the 59-acre western parcel comprises dense streams of eucalyptus, largely in Canada Alcatraz, and Canada del Cementerio, as well as grassland and coastal sage scrub.

Onsite structural elements include the existing Chevron gas plant, Southern California Gas Company's compression station, water storage tanks, a well pumping and monitoring station, and access roadways. These facilities and associated access roadways are all situated on the eastern half of the 59-acre parcel. The western portion does not currently accommodate any structures, although there are a large graded pad and an access road.

The majority of the surrounding area is undeveloped except for the adjacent Getty-Gaviota oil and gas facilities across the highway from the project site, a Southern California Edison (SCE) substation, and Vista del Mar School, the latter two being east of the project site.

Important off-site views are those from U.S. Highway 101, the Amtrak train, Gaviota Village, and Vista del Mar School. Views inland from Gaviota State Park Beach are blocked by topography. Traveling west on the highway from Canada de las Zorrillas to Canada San Onofre, some of the most attractive scenery in the Study Region are found. Views north of the highway take in a striking grove of oaks at Canada de las Zorrillas, the grass/chapparral patterns of the foothills, and dramatic exposed bedrock strata of the Santa Ynez Mountains (Figures 4.8-3 and 4.8-4).

Figure 4.8-3 Oak grove and rock outcrops of Canada de las Zorrillas seen from westbound lanes of Highway 101.

Figure 4.8-4 View just east of Canada San Onofre from westbound lanes of Highway 101.

After passing Canada San Onofre, the views remain dominated by rugged ridges and rock outcrops of the Santa Ynez Mountains, but also feature stands of eucalyptus, roadside plantings, and the ocean (Figures 4.8-5 and 4.8-6). Views of the site are intermittent, being screened by plantings in the highway right-of-way, and occur for about 30 seconds when traveling 55 mph. Stands of eucalyptus, screen all existing structures on the project site from view. The SCE substation is conspicuously in view, however, being an uncharacteristic feature that is subordinate to the adjacent rock outcrops of the Santa Ynez Mountains (Figure 4.8-5). The school is a compatible structure and does not adversely affect visual quality, but the jet plane on the playground is a noticeable anomaly. Overall quality is Visual Resource Quality Class II for views along the stretch of highway.

As a driver approaches to a point just east of the school, views are closed in by groves of eucalyptus as well as by Getty's large storage tanks south of the highway (Figure 4.8-7). Visual variety is minimal and the views are dominated by the industrial appearance of the tanks. Contributing to the industrial appearance of the area are the de-butinizer and de-ethanizer, partially visible immediately north of the Chevron site entrance for a 1 to 2 second view. However, these facilities, being transverse to the direction of travel and largely screened by vegetation, are probably not noticed by most highway travelers.

Proceeding west on the highway, travelers see the attractive Gaviota Village, a commercial facility which is co-dominant, uncharacteristic of the agricultural setting, but compatible (Figure 4.8-8). Overall quality of this viewshed is Class III.

Eastbound highway views are similar to westbound views. Opposite to Gaviota Village, though, a small part of the Chevron gas processing facilities is visible (the de-ethanizer stack, Figure 4.8-9), with Gaviota Village being the most noticeable structure. Getty's tanks dominate views opposite the entrance to the Chevron site, with the Chevron towers being glimpsed to the north. Just past Vista del Mar School (traveling east), the views of the exposed bedrock are relatively unobstructed (Figure 4.8.10).

Rail views are assumed to be similar to highway views, except where the rail line crosses the trestle south of Getty's facilities, and passes by the former Texaco facilities west of there. Because the trestle is higher than the highway, passengers are exposed to the Chevron and Getty sites to a greater degree than are highway travelers. The Texaco facilities, though not seen from the highway, are readily seen from the rail line.

Figure 4.8-5 View of Gervais Fee property, SCE substation, and jet plane play structure of Vista del Mar School from westbound lanes of Hwy 101.

Figure 4.8-6 View from same position as in Fig. 4.8-5 but oriented to the southwest toward the Getty Marine Terminal.

Figure 4.8-7 Just east of Vista del Mar School views to southwest are blocked by Getty's storage tanks.

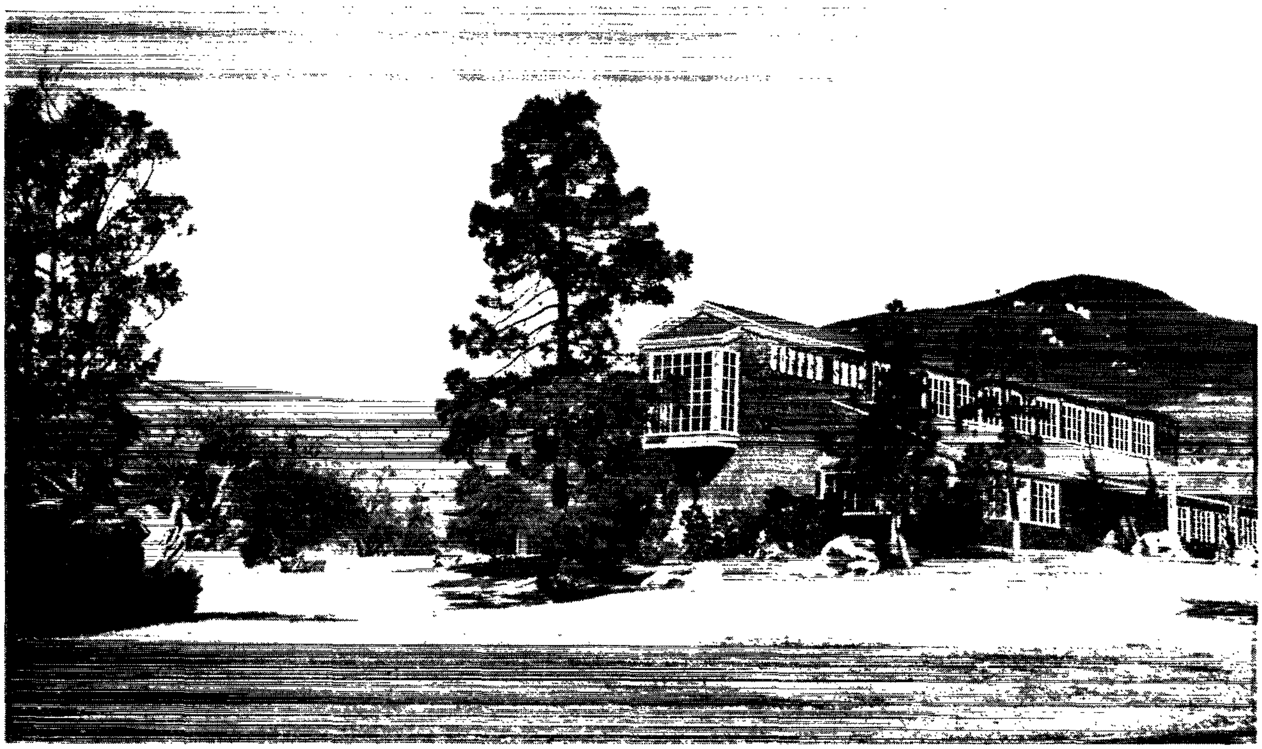


Figure 4.8-8 Gaviota Village, west of Chevron's Gaviota site for onshore processing facilities.

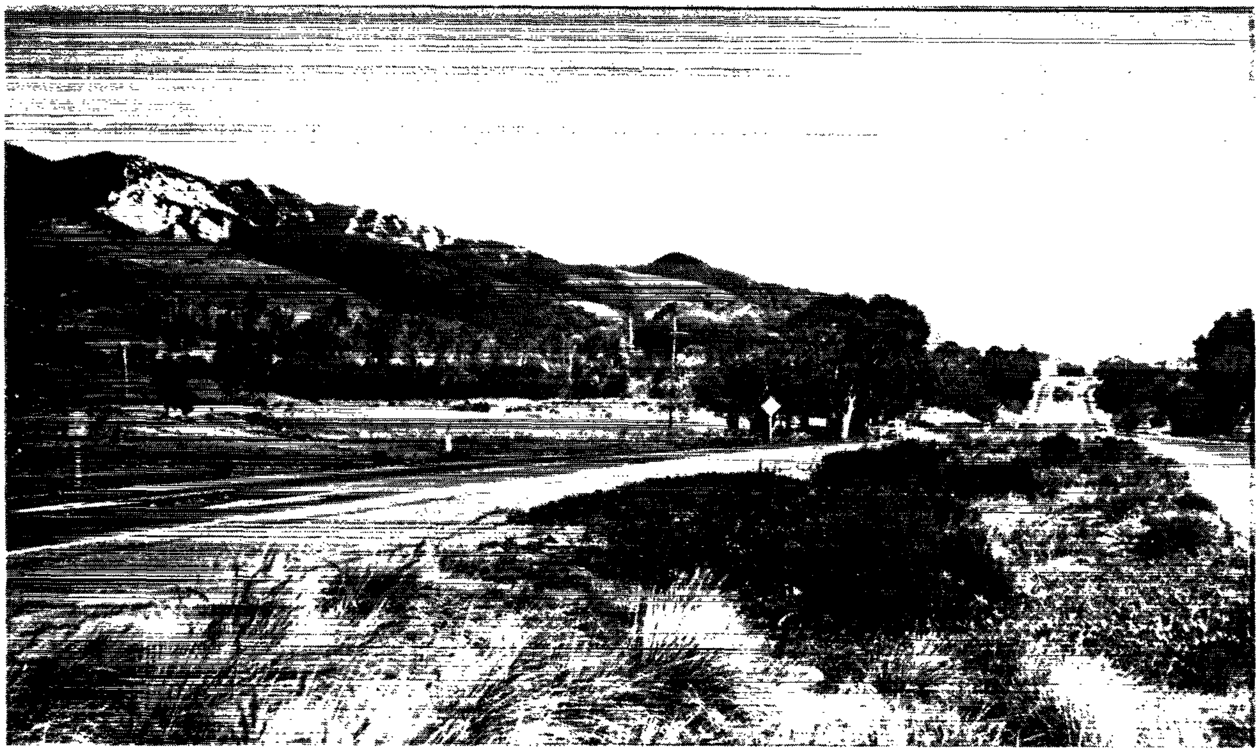


Figure 4.8-9 Chevron's Gaviota site for onshore processing facilities seen from median strip across from Gaviota Village.

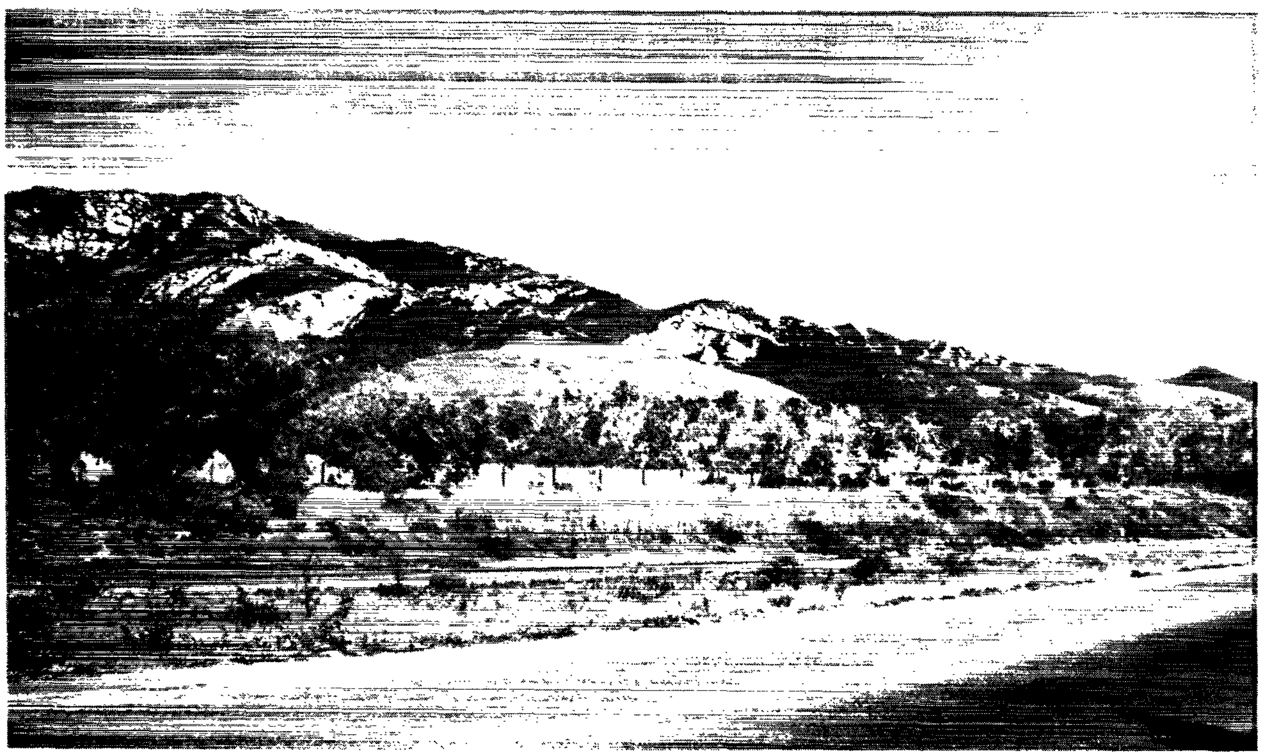


Figure 4.8-10 View to northeast seen from Hwy 101 just east of Vista del Mar School.

With respect to Vista del Mar School, views to the north, west and south are either blocked by stands of eucalyptus or dominated by Getty's storage tanks or SCE's substation. Minimal visual variety in the viewshed and the domination by industrial facilities indicate that these views are low in quality (Class VI). However, views to the northeast, east, and southeast are of a highly varied landscape that includes both mountain and ocean vistas (Class I).

From Gaviota Village itself, the quality of views is similar to that for views from the highway opposite the village. Getty's storage tanks are partially in view from this vantage point, but are subordinate features in the landscape. Overall, the view can be considered Quality Class II, given the variety of the scene.

POINT CONCEPTION ALTERNATIVE SITE FOR ONSHORE PROCESSING FACILITIES

The alternative site for Chevron's onshore oil and gas processing facilities is northeast of Point Conception and within the 1,500-acre Chevron Garvais Fee property. Located on the coastal terrace near Cojo Ranch, the site is flat and sparsely vegetated (Figures 4.8-11 and 4.8-12). Overall, the view from the area can be considered Quality Class II.

4.8.7 Applicable Regulations, Rules and Standards

As mentioned previously, an important factor used to measure visual quality is the attitudes of the public toward the preservation of visual resources. These public attitudes are perhaps best expressed in the official state and local policies adopted as part of regional and community comprehensive plans. This section sets forth those policies to describe the local public attitudes toward visual resource protection.

Public policies related to visual resource preservation which pertain to the project area are contained in California State Law, Santa Barbara County Comprehensive Plans, and the County Local Coastal Plan and are summarized below:

CALIFORNIA COASTAL ACT

The California Coastal Act of 1976 was adopted after state voters approved the Coastal Conservation Act [Proposition 20] in 1972. A key factor that led to the passage of this landmark legislation was the visible deterioration of the coastal environment because of development pressures of a growing population [Santa Barbara County, 1982].

Section 30251 of the Act is pertinent to Visual Resource Preservation:

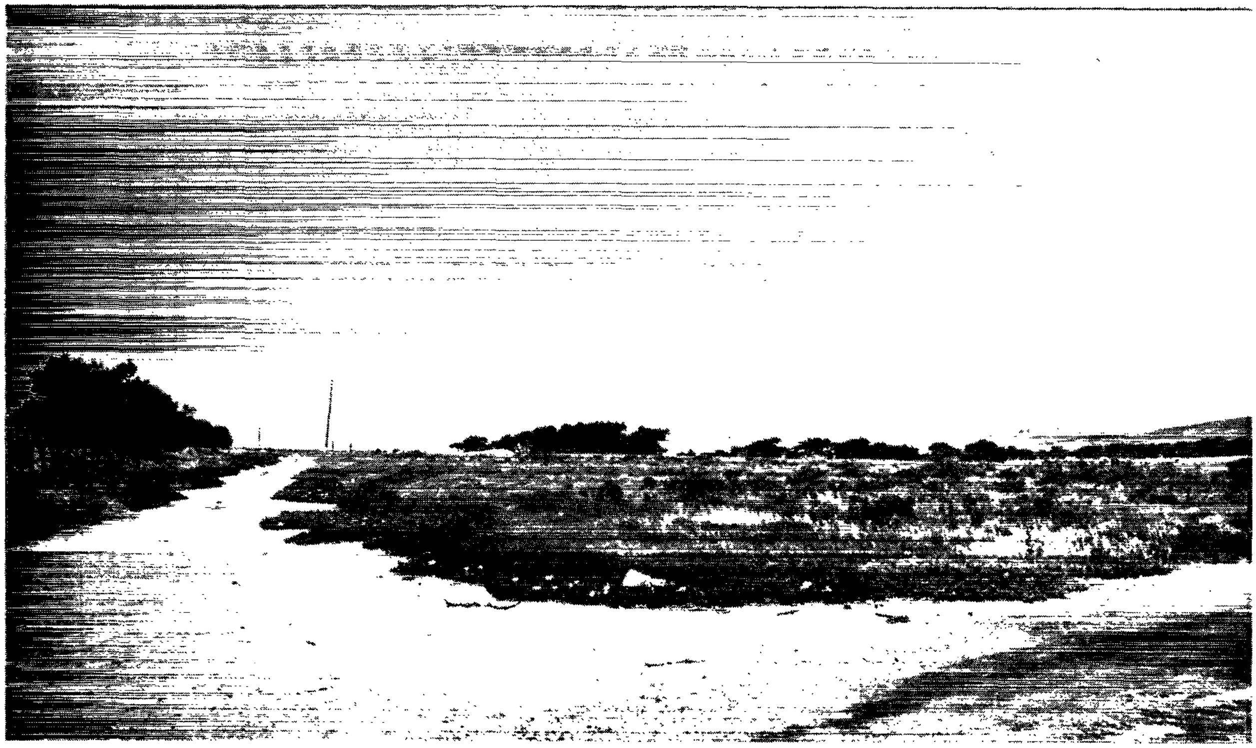


Figure 4.8-11 Alternative site near Pt. Conception for onshore processing facilities, looking northwest.

Figure 4.8-12 Alternative site near Pt. Conception for onshore processing facilities, looking southwest.

> The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.

SANTA BARBARA COUNTY LOCAL COASTAL PROGRAM (LCP)

As required by the State Coastal Act, Santa Barbara County, in 1980 developed the Santa Barbara County Land Use Plan and in 1982 its Coastal Zoning Ordinance (CZO). As a result, the County now has jurisdiction over development in the generally 3,000-foot-wide coastal zone. In citing the importance of the coastline visual resources, the LCP stated, in part:

> "The scenic resources of Santa Barbara's coastal zone are of incalculable value to the economic and social well-being of Santa Barbara County. The beauty of the Santa Barbara coastline is world-renowned; it is the basis of the County's strong tourist and retirement economies and is a source of continuing pleasure for the local populace. The visual resources of the coastal zone include its beaches, sand dunes, coastal bluffs, headlands, wetlands, estuaries, islands, hillsides and canyons, upland terraces and plains, and its rivers and streams. These resources are vulnerable to degradation through improper location and scale of building development, blockage of coastal views, alteration of natural landforms by poor cutting, grading and filling practices, and by poor design or placement of roadside signs and utility lines. The primary concern of the coastal Act is to protect views to these scenic resources from public areas such as highways, roads, beaches, parks, coastal trails and accessways, and vista points."

In support of Section 30251, the LCP contains several policies related to visual resources. Those policies which would apply to the Chevron project are summarized below:

> Policy 4-2: All "industrial" projects shall be required to submit a landscaping plan to the County for approval.

> Policy 4-3: In areas designated as rural on the land use plan maps, the height, scale, and design of structures shall be compatible with the character of the surrounding natural environment, except where technical requirements dictate otherwise. Structures shall be subordinate in appearance to natural landforms; shall be designed to follow the natural contours of the landscape and shall be sited so as not to intrude into the skyline as seen from public viewing places.

Policy 4-6: Signs shall be of size, location, and appearance so as not to detract from scenic areas or views from public roads and other viewing points.

Policy 4-7: Utilities, including television, shall be placed underground in new developments in accordance with the rules and regulations of the California Public Utilities Commission, except where cost of undergrounding would be so high as to deny service.

Policy 4-8: The County shall request the State of California to designate that portion of Highway 101 between Winchester Canyon and Gaviota State Park as a "scenic highway."

The general visual resource protection policies in the preceding section are intended to protect the County's scenic quality. The View Corridor Overlay designation is a special tool which is intended to give additional protection to areas where there are views from a major coastal road to the ocean. Highway 101, which parallels the ocean throughout much of the South Coast, affords many thousands of travellers scenic ocean vistas. Protection of this visual resource, a view corroridor to the ocean, requires special treatment. Therefore, all areas in the county where there are views from Highway 101 to the ocean are shown on land use maps with a View Corridor Overlay designation. All development in these areas shall be reviewed by the County Board of Architectural Review for conformance to the following policies:

Policy 4-9: Structures shall be sited and designed to preserve unobstructed broad views of the ocean from Highway 101, and shall be clustered to the maximum extent feasible.

Policy 4-10: A landscaping plans shall be submitted to the County for approval. Landscaping when mature, shall not impede public views.

Policy 4-11: Building height shall not exceed one story or about 15 feet above average finished grade, unless an increase in height would facilitate clustering of development and result in greater view protection, or a height in excess of 15 feet would not impact public views to the ocean.

The last three policies cited do not apply to the proposed gas and oil processing facilities because they lie outside the County's View Corridor overlay, which is entirely south of Highway 101 in this area. It would apply only to any proposed development in the shoreline area.

Several sections of the County Coastal Zoning Ordinance (CZO) are pertinent. Section 35-154 states, in part, that "the following regulations shall apply to onshore processing facilities for offshore oil and gas development:

- No Preliminary or Final Development Plan shall be approved unless the Planning Commission also finds, in addition to other conditions, that: "The proposed facility is compatible with . . . the scenic resources of the surrounding area." (Section 35-154.4d)

- The installation shall be visually compatible with the potential surroundings by use of any or all of the following measures, where applicable: buffer strips, depression, natural or artificial screen planting and landscaping continually maintained; camouflage and/or blending colors." (Section 35-154.4-d)

- Section 35-87.7 of the CZO requires that no building or structure shall exceed a height of 45 ft, while Section 35.87.7 presents requirements for landscaping/screening for all developments within the Coastal Department Industry zone. This section states, in part that: "Areas where stored materials or equipment exceed a height of six feet shall be land scaped . . . to provide continuous screening to an approximate height of not less than 20 ft nor more than 40 ft where mature."

COUNTY ZONING

Under the CZO the Getty-owned portion of the project site is zoned for Coastal Development Industry (M-CD) and the Gervais property is zoned for Agriculture (AG-II-320) with a minimum of 320 acres per dwelling. This latter zone would require changing to M-CD to permit the proposed project.

4.8.8 Ambient Noise and Vibration Levels

The existing noise and vibration levels in the proposed project area are primarily the result of the major highway and rail transportation systems and facilities which traverse the South Coast of Santa Barbara County, and, to a lesser extent, the marine and air transportation activities associated with existing offshore exploration and development. The proposed expansion of the processing facility at Gaviota is adjacent to U.S. Highway 101 and less than one-quarter mile north of the Southern Pacific main coastal line.

In November, 1982, noise and Highway 101 traffic counts were measured simultaneously in support of the application for the proposed project. Measurements were taken at two noise-sensitive sites in the vicinity of the Gaviota facility: at the Vista del Mar Union School directly east of the proposed facility and on the Gaviota Village property directly west of the proposed facility. These noise measurements indicated that the average sound levels (equivalent continuous A-weighted sound levels) in terms of LEQ were 65.3 dB at the school site and 61.9 dB at the Gaviota Village property. The corresponding values for the time-weighted average Community Noise Equivalent Level (CNEL) were 67.2 dB and 63.8 dB, respectively.

Noise contours were also developed, using modeling techniques, for both highway and railroad traffic sources, based on a total traffic count of 16,000 vehicles/day, including 16.6 percent heavy trucks, and an assumed railroad traffic of six freight and two passenger trains/day. The noise contours resulting from this modeling effort estimated a CNEL of 65.9 dB at the Vista Del Mar Union School site, which is in reasonable agreement with the value based on the measured data.

Because of this traffic noise, residences, parks, and beach areas close to Highway 101 are generally exposed to noise levels close to, or somewhat higher than, the maximum levels recommended by federal standards or by the City of Santa Barbara Noise Element. The U.S. Department of Housing and Urban Development specifies that residential areas are compatible with ambient noise levels of LDN (CNEL) equal to 65 dB or less. The U.S. Environmental Protection Agency identifies noise levels of 55 dB or above as interfering with or annoying for outdoor activities and areas such as parks and beaches. The City of Santa Barbara Noise Element calls for outdoor noise levels in residential areas to be less than 55 dB. According to these criteria, schools, residences, and outdoor activity areas near major highways, such as along Highway 101, are significantly impacted by the noise levels generated by traffic sources.

Approximately 1.3 miles west of the proposed Gaviota facility, U.S. Highway 101 turns north through Gaviota pass; however, the Southern Pacific railroad line continues along the coast to Point Conception and beyond. Along this mostly undeveloped portion of the proposed project area, which will contain the oil and gas pipelines from the Point Conception landfall to the Gaviota facility, it is likely that ambient noise and vibration is predominantly due to the railroad activity. Surf and wind noise sources would contribute to the ambient noise levels, particularly close to the shoreline. Although measured data are not presently available along this coastal area, the ambient noise levels are likely to be well below federal, county, or city noise limits.

Several daily helicopter flights operate from Santa Barbara Airport in support of the offshore oil facilities and for other industrial activities in the project area. The air traffic requirements for these operations keep overflights away from residential areas, but do include flight patterns close to the Goleta Beach County Park.

Crew and supply boats servicing the offshore oil activities are based primarily in Carpenteria and Port Hueneme. On some occasions, these vessels follow a course close to and parallel to the shoreline, which can produce significant noise effects on coastal areas.

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4.8 AESTHETIC ENVIRONMENT

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4.9 SOCIOECONOMICS

4.9.1 Overview

This section describes in broad socioeconomic terms the quality of life in the region and local areas surrounding the proposed project. The spatial distribution of the population and the economic activity in the areas in the vicinity of the proposed project help define the socioeconomic Region of Influence (ROI) of the project. Given available data, the ROI is defined along county boundaries and is limited to those areas in which the efforts of the project are likely to be significant. In this study, the ROI is defined as the tri-county area of Santa Barbara, Ventura, and San Luis Obispo, California (Figure 4.9-1). A large portion of the region is rural and devoted to low-density land uses.

The discussion below focuses on nine elements of socioeconomic activity to describe the current environmental setting:

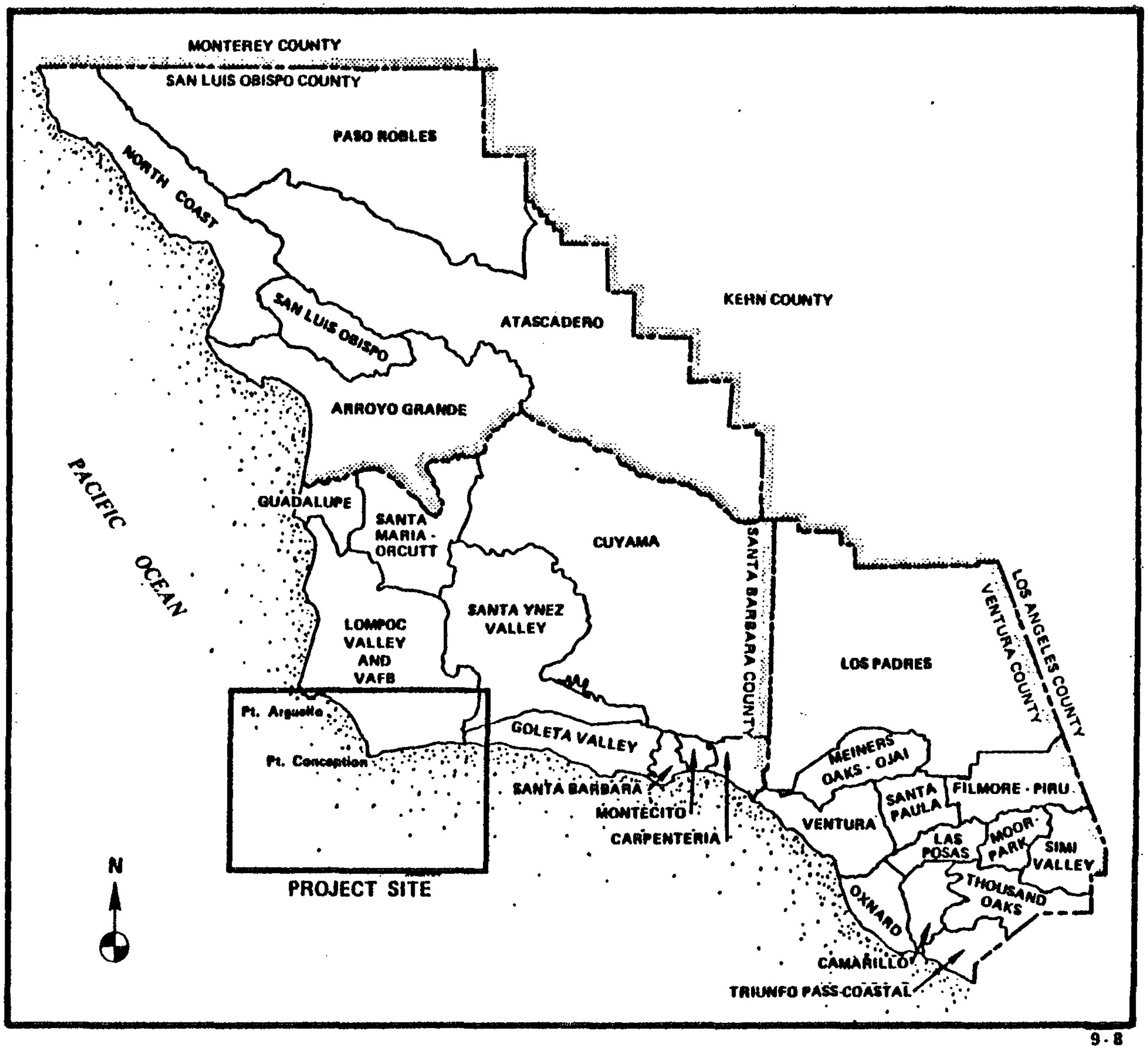
- Regional Growth
- Housing
- Services/Utilities
- Tourism
- Public Finance
- Public Hazards
- Energy
- Onshore Support Activity
- Vista del Mar School

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. These types of projects, would include, for example, the Santa Barbara Business Park or the Hollister Business Park. Significant new regional projects will be incorporated as part of the cumulative impact analysis. The basic information presented below should be considered as most representative of a historical extension of the past without any major events/projects included.

4.9.2 Regional Growth

FIGURE 4.9.1

TRI-COUNTY REGION AND LOCAL AREAS



LOCAL SETTING

Santa Barbara

Population for the County in 1980 was estimated at 298,660 as reported in the 1980 United States Census, 1983. In 1983, estimated population stood at 314,718. Over the period 1970 to 1980, population in the County has grown at an average annual growth rate of 1.4 percent.

Unemployment in Santa Barbara County in 1983 was 7.5 percent, up from an annual average of 6.1 percent for 1980. Total employment in 1983 stood at 155,108, up 11 percent over 1980 levels.

Real personal income in Santa Barbara County in 1983 was estimated to be $4,233.5 millions (1983 dollars). This level has grown at more than 2.9 percent per year since 1970.

Ventura

Population in Ventura in 1983 was estimated at 565,610, and growing at an average annual rate of 3.1 percent since 1970.

Employment in the County was estimated to be 241,800 while the unemployment rate was calculated to be 9.9 percent. This unemployment rate is up more than 3 percentage points from a 1980 level of 6.7 percent.

Real personal income in millions of 1983 dollars for Ventura County was $6,890.4 in 1983, and has been growing at a 4.8 percent rate since 1970.

San Luis Obispo

The population of San Luis Obispo is estimated at 169,770. Since 1970, population has been growing at an average compound rate of 3.6 percent per year.

The unemployment rate was 6.7 percent in San Luis Obispo County in 1983, down from 7.1 percent in 1980. Total employment in the County in 1983 was close to 69,050 residents.

Real personal income for San Luis Obispo County in 1983 was estimated to be $1,812.3 million (1983 dollars) and has been growing at a 5.1 percent rate since 1970.

Table 4.9.1 presents selected historical population and economic indices for the three counties.

TABLE 4.9-1

SELECTED HISTORICAL POPULATION AND ECONOMIC INDICES
SANTA BARBARA, VENTURA, AND SAN LUIS OBISPO COUNTIES

	Santa Barbara County				Ventura County				San Luis Obispo County			
Year	Population	Real Personal Income*	Employed Labor Force	Unemployment Rate	Population	Real Personal Income*	Employed Labor Force	Unemployment Rate	Population	Real Personal Income*	Employed Labor Force	Unemployment Rate
1970	264,324	$2,916.0	94,980	5.3%	381,400	3,758.1	131,901	6.5%	106,600	$ 948.5	35,687	4.4%
1975	280,406	3,334.3	111,317	7.9	440,700	4,811.0	161,532	9.2	130,700	1,261.5	44,763	7.2
1980	298,660	3,893.6	139,700	6.1	529,174	5,243.5	217,200	6.7	154,200	1,630.9	60,000	7.1
1981	303,191	4,011.0	144,600	6.3	537,900	6,381.6	226,700	7.3	160,100	1,651.6	62,500	6.9
1982	309,272	4,021.9	144,850	7.9	551,594	6,508.5	235,800	10.4	165,594	1,715.8	65,200	8.4
1983	314,718	4,233.5	155,108	7.5	565,610	6,890.4	241,800	9.9	169,770	1,812.3	69,050	6.7
CAGR**												
1970/83	1.4%	2.9%	3.8%	--	3.1%	4.8%	4.8%	--	3.6%	5.1%	5.2%	--

* In millions of 1983 dollars.

** Compound Annual Growth Rate

Source: Population for Santa Barbara County is taken from Resource Management Department; Santa Barbara County 1970-81. Estimates for 1982 and 1983 are derived using Area Planning Council long range forecasts (APC, 1983). Population for Ventura and San Luis Obispo counties is from Dept. of Finance, State of California. Personal Income for the 1970-81 period is from the Bureau of Economic Analysis, Dept of Commerce. Estimates for 1982-1983 are derived using actual state of California personal incompe provided by the California Dept. of Finance. The labor force and unemployment rate data are from the Employment Development Department, State of California Health and Welfare Agency.

COUNTY PROJECTIONS

Santa Barbara County

The general outlook is for slow but sustained growth for the economy of Santa Barbara County between 1984 and 2000. Overall economic development is significantly constrained by limited water availability and limited land development with consequent limited construction of new housing. These concerns severely restrict population growth despite auspicious economic growth potential in the South Coast and North County areas over the period through the year 2000. This may be summarized in the following key points and in the figures shown in Table 4.9-2:

- Incorporating the County-Cities Area Planning Council [Area Planning Council 1983] population projections as the effective constraint in the forecasts, population is expected to increase at an average compound rate of only 0.7 percent per year to the year 2000.

- Employment is projected to grow at an annual rate of 1.3 percent between 1983 and 2000. Employment is constrained in large part by the available local labor supply, which is limited by the constraints on population growth.

- Real personal income, adjusted for inflation, grew at an average annual rate of 2.9 percent between 1970 and 1981. However, during the forecast period, 1983-2000, the forecast indicates a 1.3 percent annual growth rate in income.

- Inflation in 1983 was about 2.2 percent for the local area. Long-term forecasts peg inflation at 5 to 7 percent, averaging slightly over 6 percent for the majority of the period to 2000.

Ventura County

Ventura County will experience more rapid growth over the period through the year 2000 than Santa Barbara County. Table 4.9.2 summarizes the economic and population outlook for the county.

- Ventura County is forecast to have more rapid population growth than Santa Barbara County and about the same growth as San Luis Obispo Counth. The relative absence of constraints on population growth and business development by local governments is reflected in the projections of economic activity in the county.

- The total employment is expected to rise an average 1.9 percent a year between 1983 and 2000.

TABLE 4.9-2

SELECTED PROJECTIONS OF POPULATION AND ECONOMIC INDICES
SANTA BARBARA, VENTURA, AND SAN LUIS OBISPO COUNTIES

	Santa Barbara County				Ventura County				San Luis Obispo County			
Year	Population	Real Personal Income*	Employed Labor Force	Unemployment Rate	Population	Real Personal Income*	Employed Labor Force	Unemployment Rate	Population	Real Personal Income*	Employed Labor Force	Unemployment Rate
1983	314,718	$4,233.5	155,108	7.5%	565,610	$ 6,890.4	241,800	9.9%	169,770	$1,817.3	69,050	6.7%
1985	325,900	4,238.6	165,842	6.2	592,563	7,613.5	253,410	9.0	178,329	1,975.0	74,647	5.6%
1990	341,000	4,580.0	180,626	5.8	568,925	9,262.5	288,502	7.9	199,135	2,393.4	86,940	5.1%
1995	349,600	4,909.0	188,354	5.8	710,303	10,894.9	312,581	7.5	216,198	2,832.6	96,936	4.9%
2000	354,000	5,266.0	191,961	6.0	763,217	12,691.3	333,579	7.7	233,254	3,308.0	106,378	5.2%
CAGR**												
1983-2000	0.7%	1.3%	1.3%	--	1.8%	3.7%	1.9%	--	1.9%	3.6%	2.6%	--

* In millions of 1983 dollars.

** Compound Annual Growth Rate.

Source: Projections by Applied Economic Systems, April 1984.

- Unemployment in Ventura County has historically been high, averaging about 8 percent . Forecast rates will exceed this average through 1985 and decline thereafter at about 7.5 to 7.9 percent.

- Real personal income will grow at an average rate of 3.7 percent per year over the period 1983-2000.

San Luis Obispo County

The economy of San Luis Obispo County is small, diverse, and quite distinct from the Santa Barbara or Ventura economies. In 1980, for example, 49 percent of the population in Santa Barbara County was employed. In contrast, only 39 percent of the San Luis Obispo population was employed. Of the total employment base, propietors account for 13 percent. The figure is just 8 percent in Santa Barbara.

The outlook for economic activity in San Luis Obispo County indicates moderate recovery from the 1980-1983 recession and an optimistic outlook through the 1980s and into the 1990s. Table 4.9-2 highlights the economic and population outlook for the County.

- Population growth in the 1980-1990 decade is pegged at an average 2.6 percent per year, slowing to 1.6 percent in the following ten years.

- The unemployment rate, (6.7 percent in 1983) is forecast to decline steadily to 5.6 percent in 1985 and 5.1 percent by 1990.

- Real personal income will increase at an average annual rate of 3.6 percent over the period 1983-2000.

SUB-COUNTY POPULATION PROJECTIONS

Santa Barbara County

Within each of the three major counties, population growth and related levels of economic activity will vary. Table 4.9-3 displays for major locals within each county, the projected level of population growth. See Technical Appendix M, Socioeconomics, for more detailed discussion on sub-regions within the individual counties.

4.9.3 Housing

LOCAL SETTING

Santa Barbara

The three-county region had a housing stock of approximately 364,000 in 1980. In the discussion below we describe the current housing stock within each major county.

Table 4.9-3

LOCAL AREA BASELINE POPULATION PROJECTIONS

Santa Barbara County	1983	1985	1990	1995	2000	Compound Annual Growth Rate (1983 -- 2000)
Carpenteria	15,917	16,137	16,541	16,675	16,709	0.29%
Montecito	9,267	9,323	9,426	9,460	9,469	0.13
Santa Barbara	78,684	79,740	80,906	82,016	83,016	0.32
Goleta	70,090	70,456	71,127	71,350	71,406	0.11
Santa Ynez	15,549	16,600	17,900	18,200	18,500	1.03
Lompoc/Vandenberg	49,094	52,200	55,600	58,400	58,400	1.03
Santa Maria/Orcutt	70,306	72,265	83,124	86,958	90,121	1.47
Guadalupe	4,619	4,835	5,176	5,342	5,479	1.01
Cuyama	1,192	1,200	1,200	1,200	1,200	0.04
Ventura County						
Camarillo	46,008	48,189	53,561	5,720	62,004	6.06
Fillmore-Piru	14,078	14,616	15,942	16,969	18,026	1.46
Las Posas	3,315	3,528	4,052	4,458	4,876	2.30
Los Padres	513	532	580	617	655	1.45
Meiners Oaks-Ojai	26,881	27,693	29,693	31,242	32,836	1.18
Moorpark	9,639	10,316	11,983	13,274	14,603	2.47
Oxnard	152,602	159,377	176,058	188,973	202,273	1.67
Santa Paula	24,576	25,115	26,443	27,471	28,530	0.88
Simi Valley	86,058	89,518	98,037	104,633	111,425	1.53
Thousand Oaks	113,164	121,761	142,930	159,319	176,198	2.64
Triunfo Pass-Coastal	1,128	1,179	1,306	1,404	1,504	1.71
Ventura	87,649	90,737	98,339	104,225	110,286	1.36
San Luis Obispo County						
Arroyo Grande	47,625	50,045	55,929	60,754	65,577	1.90
Atascadero	27,131	28,864	33,076	36,531	39,984	2.31
North Coast	31,624	33,824	39,172	43,558	47,942	2.48
Paso Robles	18,649	19,511	21,607	23,326	25,044	1.75
San Luis Obispo	44,741	46,085	49,351	52,030	54,707	1.19

Source: Forecast 82, for Santa Barbara County; Applied Economic Systems, 1983.

The total housing inventory for Santa Barbara County as of 1980 was 114,720 units. The County-wide household size was 2.62 persons in 1980, as compared to 2.73 persons per household in 1975 and 2.99 in 1970. This reflects a growing change in the average family size and occupancy characteristics of the County.

Since 1980, housing stock in Santa Barbara County has increased at an average annual rate of 1.4 percent. This growth rate is significantly lower than the average annual 3.3 percent that occurred between 1970 and 1980. However, this is consistent with the declining rate in population growth in recent years. Total housing units in the county were estimated at 119,499 in 1983 [Pauley, 1984].

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 between 1.3 and 5 percent, depending upon the coastal area. Generally, the South Coast communities of Santa Barbara, Summerland and Montecito experience the highest vacancy rates.

Ventura County

Ventura County had a housing stock of almost 173,000 occupied units in 1980 of which 65 percent were owner-occupied and almost 80 percent were single unit structures. Vacancy rates were low for both rental and owner-occupied units averaging 5 percent for rentals and 2.6 percent for owner-occupied.

San Luis Obispo County

San Luis Obispo County had just over 58,000 occupied housing units in 1980 of which almost 70 percent were single unit structures and 60 percent owner-occupied. The vacancy rate for rental units was 5.4 percent and 3.1 percent for owner occupied units. Almost 24 percent of the county stock of occupied housing units are located in the City of San Luis Obispo where the proportion of single units make up about 54 percent of the occupied housing units.

4.9.4 Services/Utilities

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 will be affected the most. Table 4.9-4 presents a partial list of the agencies and facilities that would be affected by population growth.

LOCAL SETTING

This section provides a brief overview of current service and utility conditions available. Descriptions of each infrastructure component are presented. The following discussion is concerned primarily with Santa Barbara County and the urbanized coastal section of Ventura County.

Table 4.9-4

UTILITIES AND SERVICES BY AGENCIES, COMPANIES, AND FACILITIES

UTIILITIES	SOUTH COAST	NORTH COUNTY	VENTURA
Electricity	- Southern California, Edison	- Pacific Gas & Electric	- Southern California , Edison
Natural Gas	- Southern California, Gas Company	- Southern California, Gas Company	- Southern California, Gas Company
Water Supply	- Goleta County Water District - City of Santa Barbara - Montecito Water District - Summerland Water District - Capinteria Water District - La Cumbre Mutual Water Company - S.B. County Water Agency	- City of Santa Maria - City of Guadalupe - Southern California Water Co. - City of Lompoc - Park Water Comany - Buellton Comm. Service Company - Solvang Muni Consv. District	- Calleguas Muni Water District - Casitas Muni Water District - Pleasant Valley County Water District - Channel Island Beach Community Service District
Sanitary Waste	- Isla Vista Sanitary District - City of Santa Barbara - Goleta Sanitary District - Montecito Sanitary District - Carp.-Summerland	- Santa Maria Sanitation District - Lompoc Sanitary District - Solvang Muni Imp. Service Dist.(29) - Laguna County Sanitation Dist. - Buellton	- Ventural Regional County Sant. Dist. - Ventura Avenue Sanitary District - North Coast County - South Coast County
Waste Disposal	- Browning-Ferris Indust. - Marborg Disposal Company - Channel Disposal Compamy	- Browning-Ferris Indust. - Marborg Disposal Company	- E.J. Harrison & Sons, Incorporated - Ventura Rubbish Service
SERVICES			
Fire Protection	- SB County Fire Department - City of SB Fire Department - Carp.-Summerland F.P.Dist. - Mission Canyon F.P.Dist. - Hope County F.P.District - Montecito F.P. District	- SB County Fire Department - Santa Maria Fire Department - Lompoc Fire Department - Orcutt F.P.District - Los Alamos F.P.District	- Ventura County Fire Department - Ventura City Fire Department - Oxnard Fire Department
Police Protection	- SB County Sheriff - Santa Barbara City Police - Capinteria Police Department	- SB County Sherriff - Lompoc Police Department - Santa Maria Police Department	- Ventura County Sherriff - City of Ventura Police Department - City of Oxnard Police Department
Education	- Santa Barbara County Schools	- Santa Barbara City Schools	- Ventura County Schools
Health Care (Acute Care)	- SB Cottage Hospital - Goleta Valley Comm. Hospital - St. Francis Hospital - Pinecrest Hospital - Santa Barbara City Hospital	- Marian Medical Center - Lompoc Hospital District	- Oxnard Community Hospital - St. John's Hosptial - Port Hueneme Adventist - Ventura County Medical Center

South Coast refers the Santa Barbara, Goleta, Carpinteria, Summerland, and Montecito planning areas.

North County refers to the Santa Ynez, Lompoc/Vandenberg, Santa Maria/Orcutt, Guadalupe, and Cuyama planning areas. Ventura refers to the southewestern portion of Ventura County, including the cities of Ventura, Oxnard, and Port Hueneme.

F.P.Dist. - Fire Protection District.

Source: Applied Economic Systems, May 1984.

Electricity

Electrical power is provided by Pacific Gas and Electric Company in the northern portion of Santa Barbara County. Southern California Edison Company serves the rest of Santa Barbara County and Ventura County. Electrical power is easily provided as needed.

The project area is served by Southern California Edison Company. An existing 16-kV distribution line serves the Gaviota Coast and the oil and gas processing facilities at the Getty property.

Natural Gas

Natural gas is supplied to communities by Southern California Gas Company. Gas is provided as needed. The project area and existing platforms use gas generated during the production of oil.

Water Supply

Fresh water is provided by many districts and municipalities among the three counties. Water is a particularly critical resource in Santa Barbara and Ventura Counties. In portions of both counties current water usage exceeds the safe yield of present water supplies in the developed underground water basins. The overdrafting of groundwater is causing an estimated 40,000 acre-feet per year deficit in Santa Barbara County and a 60,000-80,000 acre-feet per year deficit in Ventura County. Current population projections will continue to deplete available and projected water supplies unless alternative sources are developed, the water supply deficit is projected to increase to 73,000 acre-feet per year in Santa Barbara County and 73,000-93,000 acre-feet per year in Ventura County by the year 2000 (Blayney-Dyett, 1981).

Existing oil and gas processing facilities at the Getty site rely on wells for fresh water. Platforms use desalinized salt water. Some bottled water is purchased from local distributers. The crew boat supply base at Port Hueneme relies on the municipal water supply there to a very small degree. For more discussion see Section 4.3 (Onshore Water Resources).

Waste Water Treatment

Waste water treatment is handled by several agencies in each county. Most of the current facilities are adequate for the present population and anticipated baseline growth. In Ventura County, sewer system capacities are severely limited in the populated areas along the coast (Ventura, Oxnard, and Port Hueneme). Additional population growth will cause additional stress [Blayney-Dyett, 1981].

Current onshore and offshore oil facilities use septic tanks and EPA approved methods of ocean discharge as a means of waste disposal.

Solid Waste Disposal

The disposal of general refuse type waste is conducted by a mix of private companies and municipal agencies. In San Luis Obispo County refuse is collected and disposed of by the South County Sanitation District which operates a landfill with a future life of about 25 years. Multiple land fill sites exist in both Santa Barbara and Ventura counties and several new sites are currently proposed. 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. The Tajiguas site presently receives 650 tons per day of waste, with a projected lifetime until the year 2000.

Drilling muds from offshore oil activities are currently disposed of at sea. Other oily wastes are brought to shore and disposed of in the approved Class I disposal site at the Casmalia land fill. that facility receives some 12,000 yds^3 pf material annually, and is projected to remain active until 2060.

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 Santa Barbara County anticipates the need for expansion to be able to accommodate future development west of Santa Barbara [Santa Barbara County Fire Dept., March 1984].

The project site at Gaviota is currently served by onsite fire protection equipment provided by Getty and Chevron [Chevron, 1983]. The County of Santa Barbara serves the general needs of the area with stations in Lompoc, Buellton, Los Alamos, Santa Ynez and three stations in Goleta. All stations are within 15-28 miles of the project site.

Police Protection

All three counties have their own County Sheriff's Department along with several city police departments. The level of service is adequate for the current population. The Gaviota area is currently the responsibility of the California Highway Patrol and the Santa Barbara County Sheriff.

Education

Numerous school districts including San Luis Coastal Unified School District, and Lucia Mar Unified School District in San Luis Obispo County, provide elementary and secondary levels of education. Several private schools also provide elementary and secondary education. Higher education is provided by several colleges and universities in the three counties. 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 have been shut down because of significant drops in enrollments over the last ten years. The situation in Ventura County was similar until about 1978 when enrollments began rising again. Currently, there is overcrowding in the Oxnard and Port Hueneme districts.

The project area at Gaviota is served by the Vista del Mar Union School District with only one school (Vista del Mar). The school is located just north of Highway 101 directly adjacent to the proposed onsite facility. Current enrollment consists of 79 pupils from kindergarten through the 8th grade. All of the children are bused in from neighboring ranches. More detailed information concerning the school may be found in Section 4.9.10.

Health Care

Numerous acute health care facilities and other hospitals provide adequate service for the present population. For most of Santa Barbara County, the number of hospital beds per capita exceed California planning standards.

The project site is currently served by facilities in Lompoc, Solvang, Santa Maria, and Santa Barbara. Combined, the facilities total 11 hospitals, 1320 beds, and have an aggregate occupancy rate of 60 percent. Medical emergencies on the platforms are currently served by helicopters dispatched from the Goleta Valley Community Hospital [Chevron, 1983].

COUNTY PROJECTIONS

Projections of incremental increases in utility and service demands for each of the counties is displayed in Table 4.9.5 for the selected years of 1985, 1988 and the year 2000.

4.9.5 Tourism

LOCAL SETTING

The leading retail sales sector in the Santa Barbara economy is tourism. In 1983, nearly 25 percent of the total retail business in the South Coast metropolitan area was attributable to tourists (Schniepp, 1983). Visitor expenditures in motels and hotels, restaurants, food stores, shopping, and other services have been rising since 1970, peaking in 1983 at a record $241 million. It is estimated that total visitor expenditures in the County of Santa Barbara exceeded $350 million in 1983 and that tourist services generated over 8,000 jobs country-wide [Economic and Business Development Department, 1984].

The counties of San Luis Obispo and Ventura are tourist attractions, but to a much lesser extent than Santa Barbara County. In recent years, however, San Luis Obispo has been increasing its share of state tourism in terms of visitor expenditures. It is estimated that 25 percent of the economic base in the country is attributable to tourism [Garth, 1984]. The estimate of tourist expenditures in the country reached approximately $250 million in 1983. It is estimated that tourism accounts for over 6,000 jobs in the County of San Luis Obispo.

Table 4.9-5

BASELINE PROJECTION OF ADDITIONAL UTILITY AND SERVICE DEMANDS OVER 1983 LEVELS BY COUNTY

Category	1985	1988	2000
Water Demand: Acre-ft/yr (1)			
Santa Barbara County	1,184	3,070	7,085
Ventura County	4,830	14,994	40,667
San Luis Obispo County	872	3,583	12,406
Waste Water: 1000 gal/day (2)			
Santa Barbara County	654	1,696	3,914
Ventura County	2,668	8,282	22,464
San Luis Obispo County	482	1,979	6,853
Police: Personnel (3)			
Santa Barbara County	11	29	67
Ventura County	46	143	387
San Luis Obispo County	8	34	118
Fire Protection: Personnel (4)			
Santa Barbara County	9	24	56
Ventura County	38	118	320
San Luis Obispo County	7	28	97
Education: Enrollments (5)			
Santa Barbara County	1,015	2,631	6,073
Ventura County	4,140	12,852	34,857
San Luis Obispo County	33	134	463
Health Services: Hospital beds (6)			
Santa Barbara County	23	58	135
Ventura County	92	286	775
San Luis Obispo County	19	77	266

Notes:
(1) .21 acre-feet/year per capita (urban use)
(2) 116 gallons/day per capita
(3) 2 personnel per 1000 population
(4) 1.65 personnel per 1000 population
(5) 18 school age children per 100 population
(6) 4 beds per 1000 population

Source: Applied Economic Systems, May 1984.

As compared to the South Coast area of Santa Barbara County which has over 3,600 hotel and motel rooms for visitors, the entire County of Ventura has only 1,100, about half of which are non-transient [Smith, 1984]. Total visitor related expenditures in 1981 were estimated at $176 million and only 4,310 jobs were estimated to be related to tourism.

PROJECTIONS OF TOURISM

Santa Barbara County

Total visitor expenditures in Santa Barbara County will rise 16 percent in 1984 to $281.8 million. Expenditures by visitors adjusted for inflation will grow 4.4 percent annually to 1990 and 3.3 percent thereafter to the end of the century. Table 4.9-6 below highlights these points.

TABLE 4.9-6

TOURISM PROJECTIONS FOR THE SOUTH COAST AREA OF SANTA BARBARA COUNTY

Year	Number of South Coast Rooms	Total Visitor Expenditures*	Overnight Visitor Expenditures*	Visitors Per Day	Overnight Visitors Per Day
1985	4,100	$ 312.45	$170.09	25,394	8,082
1990	4,900	519.19	264.47	38,017	10,043
1995	6,400	781.40	377.45	41,642	12,922
2000	6,900	1168.12	564.00	53,619	15,162
CAGR** 1983–2000	3.8%	9.4%	8.3%	5.1%	4.4%

*Total and Overnight Visitor Expenditure in millions of current dollars.

**Compound Annual Growth Rate in percent.

San Luis Obispo County

Few new facilities in San Luis Obispo County are being planned to expand the tourist industry. It is assumed that tourism in San Luis Obispo County will grow at a nominal pace for the rest of the decade beyond.

Ventura County

Ventura County is currently planning expanded hotel and motel facilities for visitor and conference use. By 1988, the number of rooms in the county could double, if the regulatory permit process proceeds on schedule [Smith, 1984].

4.9.6 Public Finance

OVERVIEW

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 more 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.

REVENUES

Property Taxes

In June of 1978, Proposition 13 limited the property tax rate to 1 percent of full market assessed valuations in all California counties. As a result, revenues from property taxes dropped significantly.

Property tax limitations enacted by Proposition 13 and subsequent California legislation have restricted the annual increase in property tax levies on individual tax-payers. Increases in taxes on property on current tax roles are limited to 1-2 percent annually with inflation of property values the sole source of the increase. Other factors, however, may cause total county property tax levies in a particular year to rise more rapidly than this 1-2 percent limit [Visel, 1983]:

1) Transfers of property which lead to a reassessment at the market value (as indicated by the sale price), which can mean a substantial rise in tax payments for properties whose values have increased since they last changed hands.

2) Newly constructed property improvements which may be taxed for the first time, triggering property tax revenue increases associated with an expanding tax base.

3) Newly discovered mineral resources which may be taxed for the first time, again raising revenues as the tax base expands.

Under certain conditions, large increases in property tax revenues may lead to a reduction in State support of local education or cuts in local property taxes. Proposition 4, the so-called "Gan initiative," limits the rise in total (property and other) tax collections by the county general fund to the increase in population and prices [Steineger and James, 1983]. Local decisionmakers would be likely to grant an overall property tax reduction to avoid the loss in state revenues. The County of Santa Barbara currently has a revenue cushion of about $5.5 million. If revenue gains from expansion of the property tax base were to exceed this cushion, offsetting state or other local revenue reductions would imply a net revenue gain less than the initial property tax revenue increase alone.

Sales Tax

The California sales tax rate is currently 6 percent. The gross county share of the sales tax rate is 1 percent. From this 1 percent allocations are made to the various jurisdictions in the county, including the county itself.

Bed Tax

The transient occupancy or "bed tax" is a local tax on revenues (room rental receipts) received by motels and hotels within county or city jurisdiction. In Santa Barbara County the rate is 8 percent. For Ventura and San Luis Obispo Counties the rates are 8 percent and 6 percent, respectively.

Other Revenue Sources

The sum of property taxes, sales tax, the bed tax, and other taxes gives total tax revenue. Other revenue sources include licenses and permits, fines, forfeits and penalties, interest, intergovernmental revenues (from state and federal governments), charges for current services, and miscellaneous revenues.

Expenditures

The major expenditure categories include general government, public protection, public ways and facilities, health and sanitation, public assistance, and education, recreation, and cultural services. Only partial public protection and some health and sanitation expenditures are incurred by the special districts. All other expenditures are attributable to the general, special revenue, and capital projects funds.

For a detail discussion on the current fiscal position of each of the countries in the tri-county area see Section 6 of Technical Appendix M (Socioeconomics).

PROJECTIONS OF FISCAL CONDITIONS

Baseline forecasts of county government finances for the tri-county area are presented, in Table 4.9-7.

Santa Barbara County

Baseline projections were prepared for revenues by source and expenditures by type to determine aggregate total revenues and expenditures for Santa Barbara County. A net fiscal position is calculated as revenues less expenditures, called the surplus.

Total county government expenditures will rise at an average 2.3 percent per year through the end of the century. Beyond 1986, these projections indicate large and growing structural surpluses. The principal reasons for these surpluses are: 1) the assumption of dampened long-term population growth, consistent with water resource limitations,

Table 4.9-7

PROJECTED GOVERNMENTAL REVENUES AND EXPENDITURES BY COUNTY
1983-2000
(THOUSANDS OF 1983 DOLLARS)

Santa Barbara County

	Total Revenues	Total Expenditures	Net Surplus (or Deficit)
1983	$131,190	$134,964	$(3,774)
1985	151,648	152,708	(1,060)
1990	178,463	177,551	912
1995	198,247	192,370	5,877
2000	216,020	200,156	15,864
CAGR* 1983-2000 (Percent)	3.0%	2.3%	--

Ventura County

	Total Revenues	Total Expenditures	Net Surplus (or Deficit)
1983	$213,865	$203,549	$10,316
1985	234,983	226,535	8,446
1990	286,195	283,130	2,064
1995	326,686	326,946	(260)
2000	371,524	372,073	(548)
CAGR* 1983-2000 (Percent)	3.3%	3.6%	--

San Luis Obispo County

	Total Revenues	Total Expenditures	Net Surplus (or Deficit)
1983	$ 68,326	$ 69,906	$(1,581)
1985	79,332	75,034	4,298
1990	99,774	87,486	12,287
1995	118,146	97,698	20,448
2000	137,315	107,905	29,410
CAGR* 1983-2000 (Percent)	4.2%	2.6%	--

*Compound Annual Growth Rate

Source: Applied Economic Systems April 1984 and 2) simultaneous optimism regarding employment and income gains, despite labor force and water constraints. If population grows more rapidly than currently forecast, or if constraints on job and output growth are too severe for the employment and income projections to materialize, these surpluses will not occur.

These projections are predicated on continuation of the structural revenue and expenditure relationships observed during the past decade. Changes in the county's fiscal structure could alter these forecasts substantially. For example, altered tax rates or tax base definitions could either increase or reduce revenues from the levels shown. Changes in service levels would raise or lower outlays, and modifications to key intergovernmental transfer mechanisms also could have significant effects.

Ventura County

Total revenues are expected to grow at an annual average rate of 3.3 percent through the year 2000. County expenditures are projected to grow at an average annual rate of 3.6 percent from $203.5 million constant 1983 in 1983 to $372.1 million by the year 2000. This results in projected moderate surplus in the short term to small to moderte deficites in the long-term assuming the historic revenue rates and expenditure patterns remain unchanged through the forecast period.

San Luis Obispo County

Total revenues for the County are projected to grow at an average annual rate of 4.2 percent through the year 2000. Total expenditures are forecast to increase at a 2.6 percent rate from $69.9 million (in constant 1983 dollars) in 1983 to $107.9 million by the year 2000.

Significant structural surpluses are evident in the County's fiscal structure indicating large potential for either a future reduction in local tax rates or increasing service standards through larger local expenditures.

4.9.7 Public Hazards

The tri-county region, and particularly Santa Barbara County, has long been a center for a wide range of military activities, including testing, training and operations. However, the tri-county region also offers a wide variety of outdoor recreational experiences, including camping, hiking, and boating.

The Channel is an area of potential conflict between OCS oil and gas development and operations of the Western Space and Missile Center at Vandenberg Air Force Base (VAFB). Launch sites at VAFB are used for space missions requiring high orbital inclinations, such as polar or near polar orbits. These missions are launched to the south from VAFB to avoid flight over land areas not under military control. Debris from normal or aborted launches can consequently fall into offshore waters, with associated hazards to activities or structures in exposed locations. See Section 4.10.3 for more detail.

Existing onshore facilities may pose a hazard for the state beaches that are near by.

Recreational boating and fishing occur with low frequency in the waters near the proposed offshore facilities, less than areas nearer established harbors. Sports fishermen occasionally approach within several hundred feet of existing platforms throughout the Channel, on the premise that hook and line fishing is enhanced by the underwater relief offered by platform supports and other sub-sea structures.

4.9.8 Energy

In 1981, consumption of energy of all forms in California totaled 6.3 quads (6.3 x 10^{15} Btu) which was roughly 8 percent of the total U.S. consumption for that year [CEC, 1983b]. The primary forms of energy were oil and natural gas. The 620 million barrels of oil consumed in California in 1981 were used mostly in the transportation sector. Roughly 30 percent of California total energy use is in the form of natural gas.

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 [CEC, 1983b]. Increases are due to Elk Hills production, thermally enhanced oil recovery, and OCS activity. During this period, the California crude being produced has become increasingly more viscous or "heavy." Natural gas is California's other major energy source. Over 80 percent of the gas is drawn from out-of-state sources.

Energy consumption in the United States during 1982 totaled approximately 35 million barrels per day of oil equivalent (MMBDOE). 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 the energy consumed in the United States in 1982 was domestically produced, the highest level of domestic energy reliance in nearly a decade. The decline in oil imports is the result of both a large decrease in domestic energy consumption and an increase in overall domestic production between 1977 and 1982.

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" [CEC, 1983b]. This strategy remains a central part of subsequent Biennial Reports. Progress has been made toward a more secure energy future for California. 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 remains in jeopardy because of potential 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 [CEC, 1983b]. It notes, for example, that important environmental considerations remain unresolved with respect to OCS oil and gas activities. The gas supply situation is seen to be improving because of conservation and price-dampening effects on consumption. Specific recommendations made by the Commission with respect to oil and gas resources include the following:

1. A determination be made whether the State should impose a severance tax on oil production.

2. The California PUC should support utility efforts to review contracts for low-cost Canadian gas.

3. The PUC should not permit further utility company investment in the Alaskan Natural Gas Transportation System or LNG terminals until it is shown clearly they are needed and are cost effective.

No specific guidance is given by the Commission with respect to the extent or timing of OCS oil and gas activities. However, 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.

4.9.9 Onshore Support Activity

PRESENT CONDITIONS OF SUPPLY/CREW BASE

Materials such as pipes, tubulars, chemicals, water, cement, fuel and supplies for work crews, as well as the crews themselves, must be transported to platforms from shore. In addition, waste materials must be transported to shore from the platforms. These needs are generally supplemental to the oil production activity, comprising the immediate support industry for oil facilities. A significant support industry has developed in the tri-county region as a result of recent activity. However, the region does not have an adequate supply base [PTC, 1983]. This stems primarily from the 100 percent capacity utilization of the current base at Port Hueneme and the distance this base is from the newer developments in the western Santa Barbara Channel and Santa Maria basin.

Port Hueneme

With the exception of crew transport from Ellwood Pier and Carpinteria Pier, most supplies and wastes are transported to and from Port Hueneme, approximately 8 hours away from drilling sites in the Western Santa Barbara Channel. The port has 1,800 feet (549m) of wharfage with six designated berths, an entrance channel length of 2,300 feet (701m), and an entrance channel width of 330 feet (100m). Depth in the harbor and alongside wharves is 35 feet (11m) at mean low water. The port can accommodate ships up to 825 feet (250m) long. There are 50 acres of paved open space for harbor-related activities and two 39,000-square-foot warehouses with office space and an administration building.

These warehouses are 65 percent leased by oil companies and offshore contractors.

This port is presently used by about 60 supply boats servicing 16 offshore platforms in the channel, and conditions there "have become increasingly crowded over the past years" [PTC, 1983]. Currently the port is supplying some 9 million gallons of water per month for offshore operations. Moreover, offshore cargos (tubulars, mud and cement) rose from 105,104 metric tons in 1981 to 126,390 metric tons in 1982, and diesel fuel requirements rose from 38,780 meteric tons in 1981 to 66,569 metric tons in 1983 [PTC, 1983].

The prospect of a more local supply base is complicated by the fact that a great deal of fresh water are needed in the oil development process. It has been estimated that as much as 638,000 gallons per year is needed to support an exploratory well and 591,000 gallons per year is needed to support a development well [PTC, 1983]. Such requirements could place a significant burden on local water supplies if a supply base were located on the South Coast of Santa Barbara County, as that area is already beset with water shortage problems [Area Planning Council, 1983].

Ellwood Pier

Onshore support services for Chevron's project are currently planned to originate from the Ellwood Pier. Project personnel, small materials and supplies will be transported by supply and crew boats from the Ellwood Pier [Chevron Point Arguello Field Environmental Report, 1983]. This Ellwood facility accommodates a several-acre site operated by Aminoil U.S.A. and ARCO. The pier currently maintains parking for industry-related personnel.

SUPPORT INDUSTRY

As noted above, materials such as pipes, tubulars, chemicals, cement, water, fuel, and supplies for work crews are needed to support offshore oil development activity. The industries producing these materials, as well as the transport industry itself and other service-related businesses, thus constitute the immediate support industry for oil development activity. The following industries may be identified as the major offshore oil development support industries: 1) chemical products manufacturing, 2) basic steel products, 3) construction, mining and oilfield machinery, 4) petroleum refining and related products, 5) maintenance and repair construction and 6) wholesale trade.

The demands for the products of these industries from offshore oil development activities are expected to increase substantially in the next ten years. Potential bottlenecks may appear in some of these industries if they cannot expand their capacity fast enough to increase their outputs to meet the increasing demands, and more imports from outside the tri-county region may occur.

BASELINE PROJECTIONS

Port Hueneme

Port Hueneme is currently planning to expand its commercial facilities through acquisition of 18 acres of land from the Navy and what is now referred to as the Navy Wharf Number 2. This wharf and adjacent land is immediately across from the 1800-foot commercial pier (Dock 1). The facilities to be acquired are a 650-foot deep draft wharf and the adjacent 18 acre storage yard. Over the next five years the Port plans to extend this wharf another 700 feet and build modern terminal facilities alongside. The expanded facilities could handle at least 80 percent more vessels [Port of Hueneme Newsletter "Wharf and Land Acquisition Authorized, " Fall 1983].

Ellwood Pier

Ellwood Pier is currently undergoing repair of damage sustained in the 1981-1982 storms. The Ellwood Pier would be available for transport of some supplies but heavy and/or particularly bulky items would be transported from the Port Hueneme facilities.

Support Industry

While expanded marine transport facilities at Port Hueneme are being considered, some support industry facility expansion plans (warehouses, distribution centers) do include locations in the Santa Barbara area -- both along the South Coast and in the North County. However, with the proposed expansion of Port Hueneme facilities and the continued role the Port wil play in supporting offshore oil development activities, local support industry expansion plans to more westernly locations appear less viable. Although definitive plans necessarily depend upon permitting agencies' input, industry has indicated a preference for North County locations.

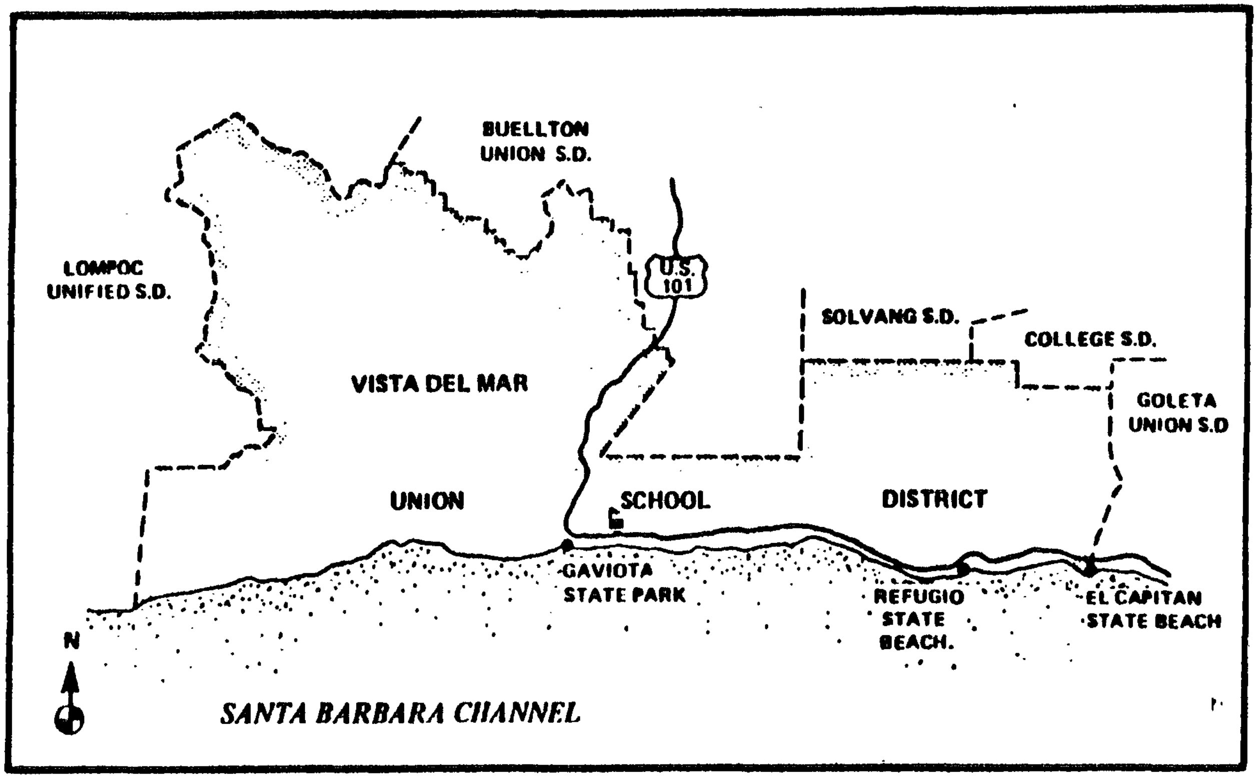
4.9.10 Vista del Mar School

CURRENT LEARNING ENVIRONMENT

The Vista del Mar Union School is located approximately 18 miles west of the urban fringe (18.3 miles west of the Hollister - 101 interchange), and just a few hundred feet north of U.S. Highway 101. It is the only school in the Vista del Mar Union School District, serving a widely spread and sparsely populated area from El Capitan ranch park on the east to San Juliano ranch on the west (Figure 4.9-2). Las Cruces, Hollister Ranch, Tajiguas, and Hondo Canyon all provide students for this school, with a total current enrollment of 79 kindergarten though 8th graders. The district is bounded on the west by the Lompoc Unified School District, on the north by Buellton Union, Solvang, and College school districts, and on the east by Goleta Union School District.

FIGURE 4.9-2

VISTA DEL MAR UNION SCHOOL DISTRICT
AND NEIGHBORING DISTRICTS (s.d.)



8-1

The school itself is picturesque. It consists of two main buildings with white stucco walls and red tile roofs, and is similar in design to many of the Spanish style structures in downtown Santa Barbara. It was built in 1926 at the current site, which also contains a few smaller buildings of the same style on the westernmost part of the school grounds. This other property is used, among other uses, as the principal residence of the school's maintenance personnel.

The school grounds are relatively peaceful, despite their proximity to the highway and neighboring industry. Highway sounds are somewhat muffled on the hill, and the noise is intermittent. Overall noise levels at the property were recently measured [Chevron, 1983, Section 4.11], and the measurements revealed an average Community Noise Equivalent Level there of 67.2 dB. From inside the main building, the noise is hardly noticeable.

While the front entrances face the south, classroom windows focus to the north. The southern (ocean) sides of the buildings have windows, but they are very high and are obscured by the Spanish style awnings covering the sidewalks. Views from the classrooms, therefore, are mainly of the mountains to the north, and of the electrical substation. Views of the oil-related activity in the channel and the storage tanks across the freeway are only available to the students during recess; from the younger children's play yard immediately south of the buildings; and from the basketball, volleyball, and associated asphalt facilities just east of the buildings.

CURRENT ENVIRONMENT

Twice in the last five years, the schoolgrounds were evacuated because of natural gas leaks at the neighboring recharge station [Briton, 1984]. These occurred during times when school was out of session, and therefore inconvenienced only the residents (including the school maintenance personnel). That station is also an occasional source of noise at the property.

The area is particularly susceptible to brush fires, and the school was again evacuated two years ago because of a fire that approached from the west and was contained just before it reached the large grove of eucalyptus trees on that side of the property. The school was used as a comman post by the fire department at the time. That portion of Highway 101 was closed, and there was a general concern over the possibility of explosions of the oil tanks across the highway as well as at the gas recharge station.

The at-grade crossing of Highway 101 used for access to the school grounds is often a problem for the school bus drivers. All 79 students usually arrive and depart on these buses, with some occasionally driven to school by parents; none of the children walk to school on a regular basis.

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4.10 OTHER USES

In the process of describing the current environmental setting there are a number of other uses of the study region that need to be addressed over and above those discussed thus far. These "Other Uses" include: commercial fishing and kelp harvest, transportation, military activities, recreation, and coastal land use and ownership.

In the sections below the current environmental setting is described for each of these other uses.

4.10.1 Commercial Fishing and Kelp Harvest

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, but the industry in the Study Region is still characterized by the combination of small vessels designed for inshore fishing, and by fishermen enmeshed in a web of association and market relations, and frequently kinship.

At present, Kelco Co. of San Diego (a Merck Co. subsidiary) is the only firm harvesting kelp in the Santa Barbara Channel. Beds in the Santa Barbara Channel have been harvested regularly by Kelco Co. since the early 1940s, and up to 62 percent of the commercial harvest in the State reportedly comes from the Channel in some years [McPeak, 1983].

DEFINITION OF THE STUDY REGION

The Study Region for commercial fishing and kelp harvest is physically defined by the area shown in Figure 4.10-1, and from a socioeconomic standpoint, includes consideration of fleets and landings in the following ports: Santa Barbara, Morro Bay, San Luis/Avila, Ventura, Channel Islands, and Port Hueneme. Fishermen from all of these ports make regular use of the Region, while fishermen from more distant ports only fish there occasionally.

THE REGIONAL FISHING FLEET

Morro Bay

Morro Bay currently hosts approximately 130 commercial fishing vessels. Between 75 and 80 vessels are salmon/albacore trollers, some of

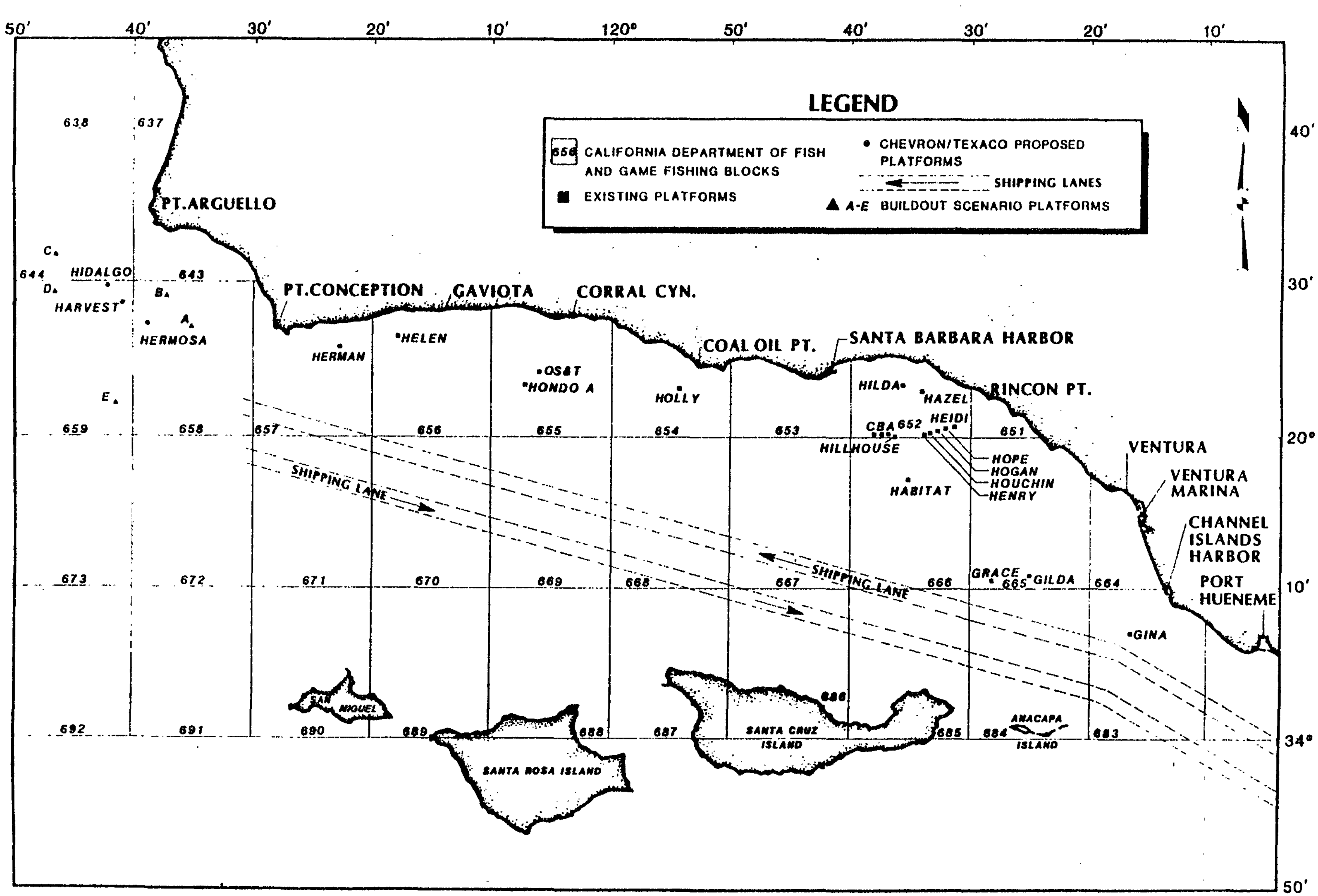

Figure 4.10-1
Study Region for Commercial Fisheries

which fish anywhere along the coast, including outside the region; 60 of these fish predominantly in local waters. About 20 trawlers (drag boats) fish throughout the region and land their catch at the nearest port. Approximately 17 vessels engage in fisheries involving stationary gill nets (set gill nets), while another five or six boats fish with drift gear (drift gill nets). The remainder of the Morro Bay fleet is composed of small hook and line boats and crabbers. The boats in these latter categories tend to fish closer to their home port than those in the previous categories.

Port San Luis

There are more than 180 commercial vessels in Port San Luis, including about 60 salmon/albacore trollers, 10 trawlers, 8 set gill net boats, 10 drift gear boats, 5 crabbers, and about 30 small hook and line boats. The remainder of the fleet includes small vessels able to use several types of gear.

Santa Barbara

Santa Barbara represents the principal port of the Region. Of the 200 local commercial boats, just over half operate as full-time fishing vessels. Approximately 30 fish for abalone and about 50 are engaged in the sea urchin harvest. Thirteen trawlers currently drag (mostly in the Study Region) for bottomfish, shrimp, and sea cucumbers. An estimated 30 vessels operate set gill nets. About 20-30 use drift gear for such species as shark and swordfish; many of the drift net fishermen also engage in the harpoon fishery. Approximately six salmon/albacore boats from Santa Barbara seasonally fish the entire West Coast. Finally, there are about 12 crabbers, 13 lobster boats, and six hook and line boats within the Santa Barbara fleet. The remainder of the fleet is composed of nonfishing commercial vessels.

Channel Islands

About 75 commercial vessels are present within the Channel Islands Marina. Of this number, approximately 40 are engaged in the sea urchin harvest. The remainder of the fleet is divided among set and drift net boats, hook and line boats, crabbers, and swordfish hunters.

Ventura

The number of vessels present varies because most are seasonal visitors. Sixty-seven boats are registered. Most types of gear are represented, including an active set of gill net fleet, drift gill netters, crab and lobster trappers, abalone/urchin divers, drager and hook and line boats.

PRINCIPAL TYPES OF FISHING ACTIVITY

Purse seining occurs throughout the Study Region exclusive of the shipping lanes, while lampara nets are fished in shallow areas (less than 150 feet [46 m]). Species sought include mackerel, bonito, anchovy, and squid. Aerial surveys of pelagic species over the period 1962-1978 indicate that mackerel and bonito are most abundant around Santa Cruz and Anacapa Islands and along the north side of the Channel [Squire, 1983]. Anchovy occur predominantly in the eastern portion of the Channel with some along the north side of the Channel out to Point Conception. Nearshore areas outside the kelp beds are often more productive for purse seining than offshore areas, especially at the western end of the Channel. For example, 54 percent of the 1981 mackerel harvest landed in Port Hueneme was reported from block 656, which includes Gaviota.

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 m) depth contour, all along the coast and around the Channel Islands. Deeper sets in water up to 600 feet deep are becoming more common. Nets cannot be set within 750 feet (229m) of any pier, jetty, wharf, or breakwater. Target species include seabass, rockfish, barracuda, halibut, and several varieties of shark. Drift nets are regularly used in the Santa Barbara Channel to fish for barracuda, seabass, thresher shark, swordfish, and occasionally, bonito. The areas generally fished are located adjacent to the shipping lanes (on both sides) between Santa Barbara and Point Conception. Some drifting also occurs on the south side of the Channel Islands and in the Santa Maria Basin. The west end of the Santa Barbara Channel is one of the prime areas for drift net fishing.

Drag nets are used in the Santa Barbara Channel and around Point Conception to fish for the many varieties of rockfish and sole, California halibut, sea cucumbers, prawns and shrimp. Incidental catches of other species are also made, including sablefish (blackcod), sharks, and other bottomfish. California Fish and Game regulations limit dragging to beyond 3 miles (5 km) from shore, except for halibut which may be taken to within 1 mile (1.6 km) of shore. Shelf and slope areas are fished to depths of about 1,000 feet (300 m). Dragging for prawns and shrimp occurs from Point Conception to Carpinteria, along the north side of the Channel Islands, and over reefs between and west of Platforms Hogan and Grace. Rockfish areas are primarily at the west end of the Channel from Point Arguello to Sacate and around San Miguel and Santa Rosa Islands. Dragging for sole is in the eastern end of the Channel with some along the north side of San Miguel and Santa Rosa Islands. Halibut dragging occurs between Point Arguello and Point Conception, Sacate and Tajiguas, and Carpinteria and Port Hueneme.

The primary hook and line fishery in the Santa Barbara Channel is "drop lining" for "Pacific red snapper", which occurs throughout the Channel over the continental shelf, but some rock piles are of primary importance.

Trolling is used to harvest salmon, albacore, bonito, and until their recent depletion, barracuda. Salmon trolling within the Channel occurs primarily within 1 mile (1.6 km) of shore near the kelp between Gaviota and Point Conception while albacore and bonito trolling takes place in open water throughout the Channel wherever these fish can be found.

Both spiny lobster and three species of rock crab are trapped in the Santa Barbara Channel. Traps are placed in water less than 180 feet deep) along the mainland and around the islands. The nearshore area in blocks 656 and 657 are prime rock crab fishing grounds in the Study Region, and lobster congregate near Point Conception as they migrate along the coast (See Chapter VII of Response to Comments volume, pages 7-218 through 7-221).

Swordfish are harvested with gill nets and harpoons in the Santa Barbara Channel from late May to November. They follow the warm counter-current north, coming close to shore at Point Dume where they head west to the islands. Swordfish are found in the Channel, but most are attracted to the south side of the archipelago.

Within the Study Region, abalone are mainly harvested along the mainland coast 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.

Urchins are harvested along the mainland coast and around the Channel Islands to depths of about 60 feet. The large red urchin (Strongylocentrotus franciscanis) makes up most of the harvest, although a few purple urchins (S. purpuratus) are taken as well. 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.

The kelp harvest in and near the region is concentrated in leased-bed areas off Carpinteria and Summerland and from Refugio to Point Conception, and in unleased beds off Ellwood. Within these areas, present locations of emphasis are beds 26 and 27 off Goleta Pier and U.C.S.B., which suffered relatively less damage than other areas from the combination of winter storm damage and El Nino waters in the recent past.

Mariculture is a relatively new and developing enterprise in southern California, and several mariculture operations are now present in the Santa Barbara Channel [MMS, 1983]. Abalone are the primary species being reared with research areas located in the nearshore waters off Point Conception, Gato, Goleta, Santa Barbara Point, and Port Hueneme as well as off San Miguel Island and Santa Cruz Island. Other species being raised include cockles off Gato, kelp in Goleta Bay and at Ellwood pier, lobsters (proposed) at Point Conception, rock scallops at Santa Barbara Point, and mussels off Summerland. Since few protected coastal areas, such as bays, are available for mariculture along the Santa Barbara Channel coastline, oil platforms provide a location for several of these operations. The cultured organisms may grow directly on submerged portions of the platform (e.g., mussels), or the platform may provide support for cages or special habitats used in the mariculture operation.

COMMERCIAL HARVESTS FOR THE REGION

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 drift gill netting and trawling may occur in more than one block but may be reported for only one block.

Urchins, mackerel, anchovy, rockfish, squid, and albacore are the largest volume landings, and most of these landings are "cannery fish." Harvest data for the 10-year period 1973-1982 are presented in Table 4.10-1 for the species that numerically dominate the catch. 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 has also been a major decline in the white sea bass fishery, which dropped from almost 80,000 pounds in 1972 to 16,000 pounds in 1981.

Catch reports for the fish blocks in the project area are shown in Table 4.10-2 for 1977 and 1981, the most recent years available at this level of detail. These data suggest that nearshore areas fished with set gear and by diving are much more productive of locally landed value than offshore areas. Rockfish are the primary species caught in offshore areas near the proposed platforms Hermosa, Harvest, and Hidalgo locations; most are taken by dragging. 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. Blocks 656 and 657 are both reported to be very productive. Respectively, they would contain the locations of the Platform Hermosa pipeline landfall and the Gaviota processing facility. The table shows the typical range of year-to-year variation of catch by block for certain species. Note in particular the wide range for pelagic species such as swordfish, shrimp, mackerel and bonito. 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.

Proposed facilities would cross and be adjacent to the Gaviota kelp bed, which typically produced about 15 percent of the State-wide harvest prior to 1983. [McPeak, 1983].

ECONOMICS OF THE FISHERY

The volume and dollar value of the annual commercial harvest for the Region vary considerably (Table 4.10-3), with the value generally increasing. For most species, the majority of the harvest has been landed in Santa Barbara. Notable exceptions are cannery fish (e.g., mackeral and anchovy) which are landed primarily in Port Hueneme. 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), rockfish ($1.3 million), mackerel (41.6 million), shrimp ($1.5 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% of the harvest generally 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]. What is particularly significant about fishing in Santa Barbara, is that fishermen and fisheries dependent

TABLE 4.10-1

Commercial fish landings (in thousands of pounds) reported for the Study Region ports from 1973 through 1982[1].

Species/Groups	1973	1974	1975	1976	1977	1978	1979	1981	1982
Urchins	3,444	6,893	7,188	10,467	13,066	10,095	13,816	17,713	13,338
Mackerel	18	655	0	3,967	11,339	8,819	10,980	17,022	11,663
Anchovy	33,428	36,063	50,871	38,627	29,563	13,419	17,234	20,047	14,282
Rockfish	3,869	3,982	4,779	5,844	5,540	4,971	5,814	5,171	6,538
Albacore	3,326	1,128	1,496	1,733	1,084	3,511	1,833	2,171	320
Abalone	2,041	1,626	1,411	1,058	901	812	639	713	794
Lobster	59	47	55	81	49	165	110	118	123
Crab	297	343	709	595	508	697	629	734	813
Shark	45	70	96	242	428	795	505	673	960
Halibut	138	113	186	406	296	267	371	674	545
Sole	917	930	1,442	1,188	1,183	1,106	1,226	1,048	1,006
Shrimp	9	200	241	92	1,230	106	442	1,584	923
Squid	1,489	3,832	5,117	3,388	5,366	2,584	15,902	4,908	3,094
Salmon	328	234	156	211	195	406	101	116	210
Swordfish	95	109	95	11	73	335	60	115	198
Total	52,709	59,494	76,157	69,075	71,150	49,911	73,077	74,043	56,320

[1]1980 data are not available; the 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 1973-76.

TABLE 4.10-2

Commercial fish landings (in pounds) for blocks 644 and 656-659 in 1977 and 1981.

Species	1977					1981				
	644	659	658	657	656	644	659	658	657	656
Urchins		3,940*		15,520	139,190		16,130*	17,350	350,995	150,330
Abalone[1]	41		2,793	23,254	4,337			1,388	43,285	2,854
Lobster		538*		361	14		117*	17	21,504	910
Crab		47*		14,694	23,081			6,355	174,003	14,817
Swordfish		293							1,653	
Shark (drift)[2]					2,439			9	12,285	2,845
Seabass, white	656			12,265	6,522	6	29	226	2,854	4,377
Shark (set)[3]	229		18	2,833	12,184		8*	2,542	21,940	24,161
Halibut	470			2,095	26,236	1,504	31	3,156	51,833	44,726
Sole[4]	32,069			29	192			60	664	602
Shrimp[5]					991			1,048	1,613	24,860
Rockfish	122,519	8,893	34,522	7,519	18,344	54,208	25,525	39,460	14,942	2,902
Mackerel[6]	3,438				55			898	1,111	9,168,902
Bonito				53,267	92,462			14,262	2,713	11,300
Other	30,455			3,871	45,610	23,608	2,269	407	4,337	11,300
Total	189,877	13,711	37,333	135,708	317,657	79,326	44,109	87,178	705,732	9,464,886

[1] All species

[2] Thresher and bonito

[3] Soupfin, leopard, angel, blue, cow, sevengill, brown smoothhound, and unspecified

[4] English, petrale, rex, Dover, sand, and unspecified

[5] Ridgeback shrimp, spot prawn, and Pacific Ocean shrimp

[6] Pacific, jack, and unspecified

*Reporting error; areas fished for these species are not in this block

Source: California Department of Fish and Game, unpublished data.

TABLE 4.10-3

ANNUAL COMMERCIAL FISH HARVEST FOR THE STUDY REGION AND SANTA BARBARA FROM 1977 THROUGH 1982

Year[1]	Santa Barbara Lbs.	Santa Barbara $	All S.B. Region Ports[2] Lbs.	All S.B. Region Ports[2] $	S.B. as % Area Lbs.	S.B. as % Area $
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%
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%

[1] 1980 not available.

[2] Port Hueneme, Ventura, Oxnard, Santa Barbara, Avila, Grover City, San Luis, and Morro Bay + incidental small landings at Pismo Beach, Gaviota, Lompoc, Santa Maria, etc.

Source: California Department of Fish and Game, unpublished data.

businesses are extraordinarily dependent on the local resources. The fishermen harvest year-round for a variety of species which are not usually caught in volume elsewhere; consequently, major portions of the catches are generally sold directly to local fresh-fish markets, processors and restaurants which have no alternative competitively-priced sources of supply [M. Wagner, personal communication to ADL, 1984].

REGULATORY AND INSTITUTIONAL SETTING

A number of State and Federal regulations that apply to commercial fishing and the oil and gas industry affect the interaction of the two industries.

The California Department of Fish and Game regulates areas that can be fished, including depth limits (shallow for abalone harvest), distance off shore for dragging (by species or group), exclusions for fishing near piers and breakwaters, and open seasons.

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 the proposed platforms. The boundaries of these zones are 500 m (1620 feet) from the outer projections of the platforms. All vessels are excluded from these zones except: 1) vessels less than 100 feet (30 m) 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 m) in length, they would not be excluded from the areas.

The MMS issues orders, stipulations and regulations on OCS leases which are designed to mitigate impacts to fishing from OCS oil and gas activities. Specifically, lease stipulations entitled "Wells and Pipelines" require that pipelines, unless buried, have a smooth-surface design or be protected such that trawl gear can pass over the line without snagging, damaging the structure or the fishing gear. The Fisheries Training Program stipulation 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. 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 Fisheries Contingency Fund. The Fisheries 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 NMFS administers these funds.

The California Coastal Commission, through its consistency review for all offshore and marine facilities and permitting process for those facilities within State waters, may impose conditions designed to minimize impacts to the commercial fishing industry. Coastal Act Section 30231 protects marine organisms used for commercial purposes and Section 30234 protects 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 funded by the California Coastal Offshore Operators Group (C-COG) and acts as a clearinghouse for information about both industries, notifies fishermen of oil related activities (e.g., seismic surveys and tanker traffic changes), and facilitates filing of damage claims by fishermen.

4.10.2 Transportation

ONSHORE TRANSPORTATION

U.S. Highway 101 provides the major north-south link within this region. 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 is controlled by multi-purpose traffic signals. The local regional transportation plan [City and County of Santa Barbara, 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, sections of roads designated in the Circulation Element of the Comprehensive Plan as two-lane expressway and close enough to receive some level of project-related travel include State Highway 1 linking Las Cruces and Lompoc, and proceeding northward through Orcutt and Guadalupe to and beyond Arroyo Grande; State Highway 154 from Santa Barbara northwestward to the vicinity of Santa Ynez and a terminus at its junction with U.S. 101; State Highway 246 from Santa Ynez to Lompoc and westward to the Pacific Ocean at the small community of Surf; and State Highway 135 from U.S. 101 near Los Alamos, westward to meet with sections of four-lane divided highway serving the Vandenberg Air Force Base vicinity, and then northward through Santa Maria to a second terminus with U.S. 101 (Figure 4.10-2).

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, State Highway 118 eastward through the Simi Valley to the San Fernando Valley, and State Highway 126 eastward to a link-up with Interstate 5, a major north-south freeway.

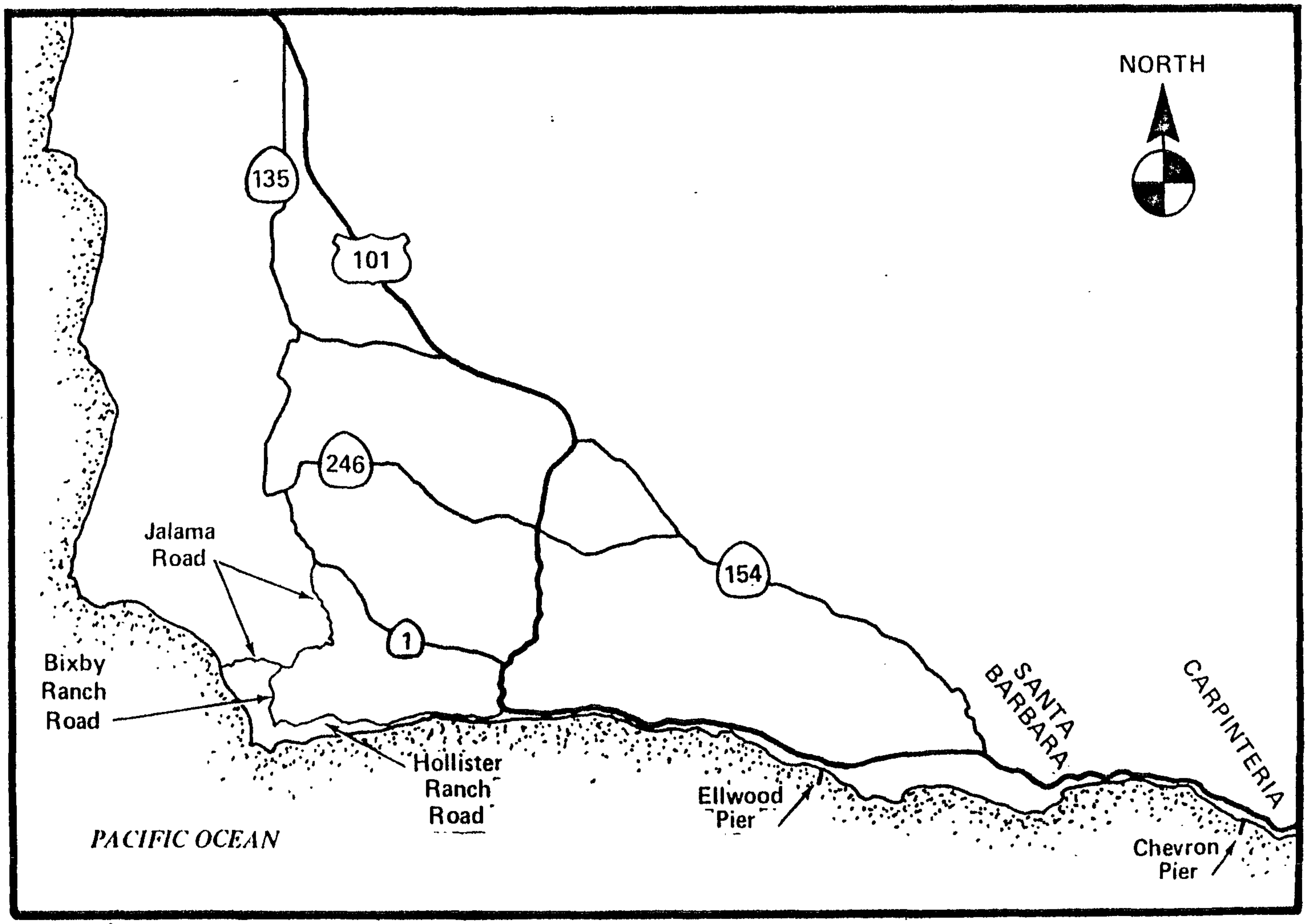

Figure 4.10-2 **Santa Barbara County roadways.**

Local Roads and Existing Traffic Levels

The development of a 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.

Gaviota Vicinity - The major roadway at the proposed Gaviota site is U.S. Highway 101. In this area U.S. 101 is a four-lane expressway with two 12-foot lanes in each direction separated by a landscaped median. Access to U.S. 101 is at grade with through median left turn areas. Intersections in the immediate vicinity of the proposed onshore facilities are those serving Vista Del Mar School, the existing facilities, and the Gaviota store and restaurant. Other important intersections are the Gaviota State Park/Hollister Ranch Road at grade intersection with U.S. 101 and the U.S. 101/State Highway 1 exchange at Las Cruces.

Buellton - The Buellton area is considered for analysis because of the likelihood that construction workers would reside in the lower housing cost areas of northern Santa Barbara County. The U.S. 101/State Highway 246 intersection is the closest intersection to the proposed site and could show effects of project related traffic centers. There are currently no traffic congestion problems except on weekends when visitor usage of Solvang is up.

Lompoc - A construction staging area of pipeline construction would be located near Pt. Conception with access off of Jalama Road via State Highway 1. The alternative site is in the same location. Workers approaching from locations in northern Santa Barbara County would use State Highway 1. The intersection of State Highway 1 and State Highway 246 would show the heaviest constructions of traffic.

Elwood - The Elwood Pier is a potential location for crew boat access to the offshore platforms. Access to the pier is off U.S. 101 at grade with left turn storage. Hollister Avenue provides secondary access to the vicinity.

Goleta - Hollister Avenue is a major east-west road through the community of Goleta, roughly paralleling U.S. 101 to the north. For much of its length, Hollister Avenue is designated in the Circulation Element of the Comprehensive Plan as an artrial, i.e., a divided four-lane road with intersections at grade, and partial control of access. The purpose of such roads is to ".. serve as the highest type of facility carrying local traffic within communities. With emphasis on through traffic carrying capability, these roads serve as principal access routes to shopping areas, places of employment, community centers, recreation areas, and other lanes of assembly."

Santa Barbara - Project-related traffic is likely to move through Santa Barbara on U.S. 101 in order to access activity sites along the South Coast of Santa Barbara County. Through Santa Barbara, the U.S. 101 roadway is a four-lane freeway with a four-block downtown section interrupted by traffic signals. See Table 3-2 of Technical Appendix N for a summary of existing conditions on U.S. 101.

Carpinteria - Another potential site for a staging base is the existing pier at Carpinteria. The Carpinteria Pier is located in the City of Carpinteria at the southern terminus of Dump Avenue, south of the Southern Pacific Railroad line. This narrow, unstriped, two-lane road meets Carpinteria Avenue at a stop sign-controlled "T" intersection. Freeway interchanges with U.S. Highway 101 are located at Casitas Pass Road (State Highway 224) west of the pier access road and at Bailard Avenue to the east.

There are two parking areas off Dump Avenue south of the railroad line for use by oil company employees (about 100 spaces) and contractors (about 120 spaces). There are railroad gates and flashing warning light devices at the Dump Avenue/Southern Pacific Railroad track crossing.

Port Hueneme/Oxnard - Supply boats (and some crew boats) supporting offshore construction and production activities will use Port Hueneme Harbor as a base of operations.

The Port Hueneme and Oxnard city arterials likely to be used by project-induced traffic to reach Port Hueneme 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.

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 Fifty-fifth Steet, Channel Islands Boulevard, and Pleasant Valley Road; and Victoria Avenue at Channel Island Boulevard [Geneovese, 1984].

Air Traffic

The air traffic in the Santa Barbara area is related primarily to operations from the Santa Barbara Municipal Airport near Goleta. This airport has about 230,000 landings and take-offs yearly, including 27,000 commercial flight operations and over 200,000 private aircraft operations. Commercial air carriers serving the airport include Wings West, Imperial, United, and American Airlines. Helicopter operations include several flights per day for support of offshore oil facilities. Vehicle parking space is in very short suply at the airport.

The primary flight patterns utlize a north-south runway system, so some approaches and departures are over the coastal waters and Goleta Beach County Park. The offshore airspace from Vandenberg AFB south to the Point Conception area is designated as restricted for altitudes above 500 feet; flights in this airspace above 500 feet must be scheduled and coordinated through the Vandenberg AFB Control Center. As a result, most of the helicopter flights traversing this airspace are flown at altitudes below 500 feet.

OFFSHORE TRANSPORTATION

The Santa Barbara channel traverses the offshore area south of the proposed Chevron/Texaco development. The traffic in and near the Channel is generated by the Ports of Los Angeles, Long Beach, and Port Hueneme and by the anchorages of Estero Bay, Port San Luis, Point Conception, Gaviota, Santa Barbara, Carpinteria, Ventura, Mandalay Beach, and El Segundo. However, over 90% of these vessels are traveling to or from the Ports of Los Angeles or Long Beach. The general marine traffic throughout this area is composed of the following types of carriers: liquid bulk (28.5%), container (20.4%), break bulk (25.1%), dry bulk (13%), and other (12.1%). For many years the frequency of vessel traffic has been approximately one ship per hour in either direction.

In addition to the general marine activity, a significant number of crew boats and supply boats service the existing offshore structures, exploratory vessels, pipelines and subsea completions in this offshore area. They travel the near-shore area while on their specific routes. It has been estimated that the crew boat traffic from Ellwood Pier and supply boat traffic from Port Hueneme total approximately 30 and 40 one-way transits daily, respectively.

Approximately 93% of the vessels in the Santa Barbara Channel use the vessel Traffic Separation Scheme (TSS) which presently extends from the Los Angeles-Long Beach harbor area northward to a point south of Point Conception (Figure 4.10-3). This is an internationally sanctioned set of traffic lanes which has been established for marine safety. The lanes in the Channel are one nautical mile wide and the separation zone is two nautical miles.

In 1979, the U.S. Coast Guard conducted a Port Access Route (PAR) study that recommended the extension of the TSS to the west of Point Conception and north to latitude 35 degrees N. This would serve to route traffic around the area of the Chevron/Texaco project. In late 1983, the USCG was notified that the International Maritime Organization (IMO) had turned down their application for the extended TSS. Their decision was based upon the lack of adequate aids to navigation; however, the placing of several platforms off Point Conception may provide sufficient fixed aids to navigation. The USCG is re-examining this and other alternatives for further consideration of this extension.

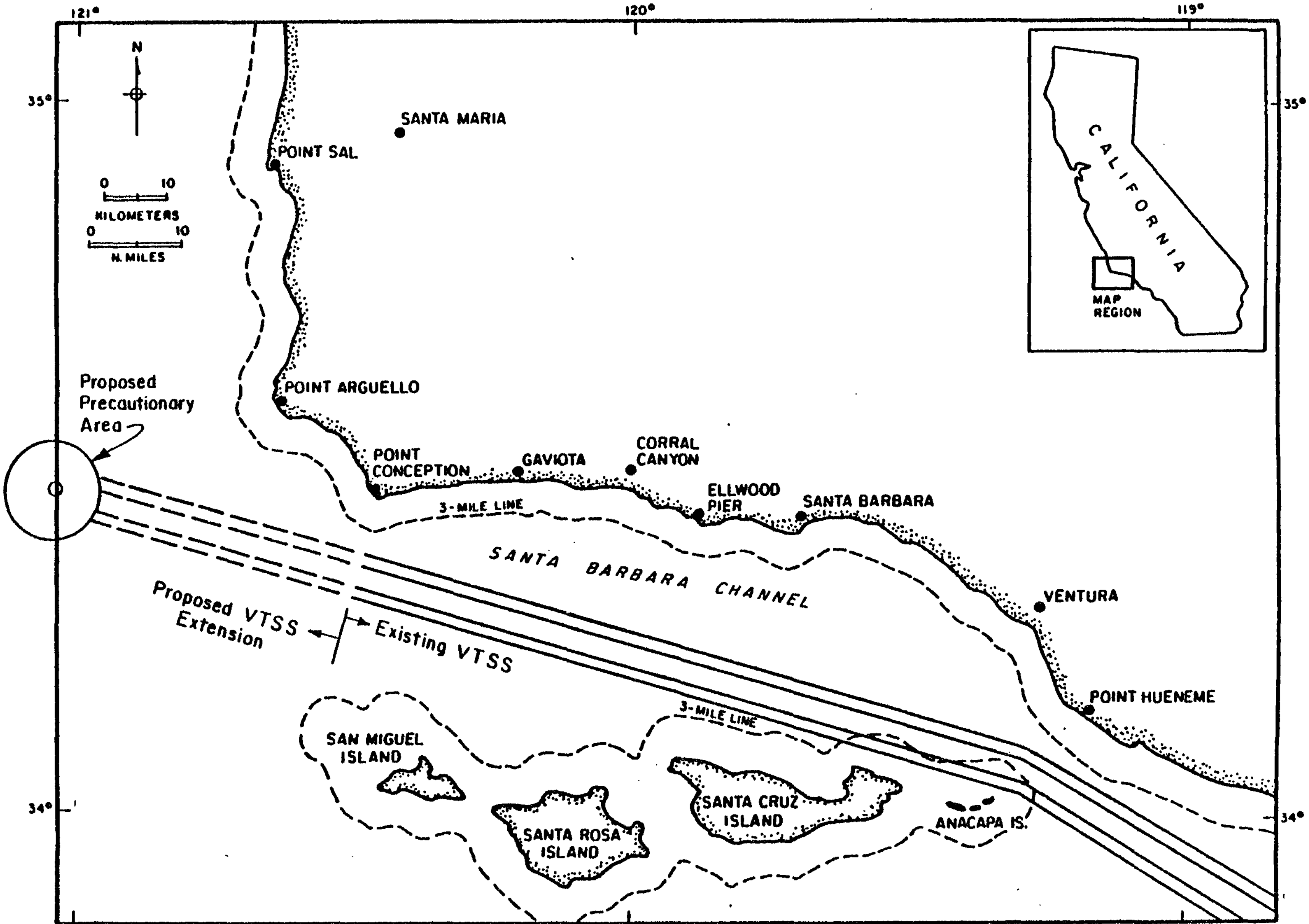

FIGURE 4.10.3 **SANTA BARBARA CHANNEL VTSS**

4.10.3 Military Activities

The surface and subsurface waters and surrounding airspace above the coastal waters of cental California are used intensively for military-related operations. The area immediately within the vicinity of the proposed project components are within the Pacific Missile Test Center (PMTC) operated from Point Mugu and the Western Space and Missile Center (WSMC) located at Vandenberg Air Force Base (VAFB). The primary activities in this area includes: 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; and space launches. Additional military operations planned for the near future are those in conjunction with the Air Force Space Shuttle Vehicle Flight System.

Space vehicles launched at Vanderberg fly over various sectors of the project area, depending upon the required launch azimuth. During such overflights, the area beneath the flight path may be subject to hazards resulting from falling debris and jettisoned components. Launch vehicles on polar azimuths customarily jettison booster rockets into or near the project area, but the probability of any of these elements hitting offshore facilities is extremely rare.

In recognition of the potential overflight hazards associated with launch operations, Western Test Range Danger Zones have been established downrange from several VAFB space launch complexes. A hazard corridor encompassing the flight path and a contiguous caution zone are also in effect for each launch. By order of the commander of the Western Space and Missile Center (WSMC), all hazard corridors must be cleared of non-essential personnel, and all essential personnel must be sheltered in facilities capable of providing safety from potential fragment or blast impacts. A launch corridor may be closed for as long as 72 hours for any individual launch; postponements and reschedulings may result in such closure as frequently as three or four times a month.

Other military uses of the coastal waters in the vicinity of the offshore project facilities include a military dumping site and a submarine transit lane. Lease-P 0315 is about 40 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. Submarine Transit Lane Sierra Venus is located 26 nautical miles to the west of the Lease.

The project region has been identified as an important military operating area possessing the necessary criteria for an effective space flight program. It has also been recognized as containing petroleum resources, the development of which is an important national objective. The potential for conflict between the utilization of the area for both purposes has been acknowledged in previous OCS leasing programs (Lease Sale 48, 53, and 68), and the controlling interest of military activities has been incorporated by Minerals Management Service (MMS) of the U.S.

Department of the Interior into lease stipulations Nos. 1-A and 2 for certain leases, including OCS-P 0316. These stipulations, discussed in Addendum C of Technical Appendix O, control vessel traffic in designated areas, include "hold harmless" conditions and requirements, and reserve the right of the United States to suspend offshore operations temporarily for national security reasons. Prior to a vehicle launch, provisions for control of air and marine traffic, for stabilization of platform operations, and for personel shelter and evacuation measures are coordinated by the WSMC, U.S. Coast Guard, MMS, and the platform operators. A Platform Contingency Plan delineating evacuation plans, shelter operations for essential personnel, action timelines, and damage control procedures has been prepared for Platform Hermosa and approved by the MMS. A similar plan is being finalized for Platform Harvest and is in preparation for Platform Hidalgo.

4.10.4 Recreation

Considerable attention has been lavished on recreation and tourism in Santa Barbara County in recent years. Projections of recreation demand have been produced by a variety of sources. The California Department of Parks and Recreation has developed county-level projections of recreation demand, numerous studies of demand and facilities in the south coast area have been conducted over the past few years. (See list of references at the end of this chapter.)

Included in these studies are state plans and projections and several studies in support of offshore oil development projects. Because of the quality of work in this area, the description of the environmental setting is based largely on a review of other reports. In reviewing this section, the reader is also encouraged to review the following sections which relate to recreational activities: Atmosphere (Section 4.2), Aesthetic Environment (Section 4.8) and Socioeconomics (Section 4.9).

ONSHORE RECREATIONAL ACTIVITY

There are 21 State parks in San Luis Obispo, Santa Barbara and Ventura Counties. These offer a wide variety of recreation opportunities including swimming, sunbathing and surfing at the beaches, boating, fishing, camping, biking and off-road vehicle use. Figure 4.10-4 shows the location of many of the beaches and parks in the vicinity of project activities.

In addition to the State parks, Los Padres National Forest provides camping, fishing, biking, and wildlife viewing (including the endangered California Condors). This national forest covers much of the northern half of Ventura County and much of Santa Barbara County.

Inland lakes (Lake Casitas and Cachuma Reservoir) are popular fishing and sightseeing attractions. Lake Casitas will host several Olympic events requiring some development. Publicity from these events may result in increased use of that area.

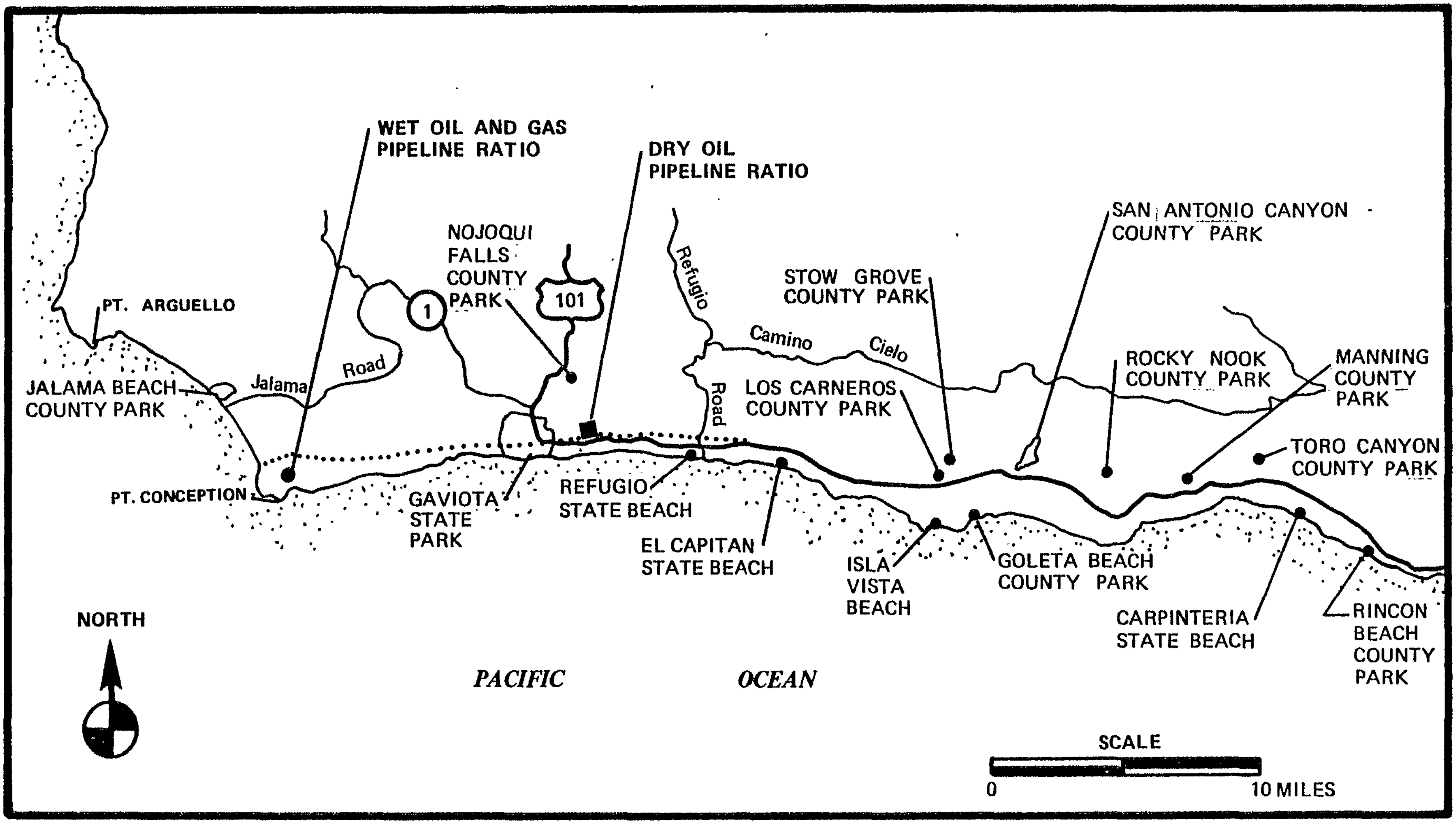

FIGURE 4.10-4 State and County Parks and Beaches Within the Coastal Area of Santa Barbara County

There are a number of county and city recreation areas: parks, city and county beaches, athletic fields and swimming pools. Numerous leagues and tournaments provide opportunities for competitive sports such as softball, baseball, soccer, football, basketball, and tennis.

In short, the tri-county area offers a rich variety of recreational opportunities. Given the relatively low population of the area, the fine weather and the proximity of mountains and beaches, residents and visitors enjoy year-round participation in all sorts of activities. The recreation opportunities in the tri-county areas are probably unsurpassed.

The primary factors influencing quality of recreation are population and site quality. Population levels determine demand while the recreational experience is dependent on site quality.

Increased population (demand) results in competition for recreational sites, crowding, and greater wear and tear on facilities. Indirectly, over-demand is often associated with vandalism, litter and other behavior that can reduce the quality of the recreation experience. This assessment of present and future demand is a key component of an assessment of impact on recreation resources.

Baseline estimates of demand for the State parks and Santa Barbara County parks for the years 1982 through 2000 are shown in Table 4.10-4. For a detailed breakout of these projections by individual State Park and County Park, see Tables 2-2 and 2-3 in Technical Appendix N, Part 3. These projections indicate that attendance levels are not likely to saturate those facilities. In terms of site quality, many of the beach sites are already developed. The Santa Barbara and Goleta Beaches, El Capitan and Gaviota are either in an urban setting or adjacent to railroad tracks or trestles. While possessing a certain beauty and appeal, the developed recreational sites along the coast are hardly pristine. They attract campers (including RVs), fishermen, surfers, sunbathers, swimmers, divers, and picnickers.

The beach sites have been subjected to oil spillage in the past, and Coal Oil Point, Goleta Beach, and to a lesser extent, other beaches in the area are subject to pollution by tar and oil from natural seeps. Most of the beach sites have picnic tables, concession stands and so forth.

The Santa Barbara County Local Coastal Plan (Santa Barbara County, 1982) recommends provision of "vertical access corridors" to the beaches at Canada del Molino and Canada San Onofre to the east of the Getty property. A vertical access corridor is defined as "easement to connect public road to beach, bike racks, possibly a few parking spaces, light recreational use."

Table 4.10-4

PROJECTED RECREATIONAL ATTENDANCE AT STATE PARKS
AND SANTA BARBARA COUNTY PARKS
1983 - 2000
(Thousands)

	1983	1985	1990	1995	2000	Annual Growth Rate (Percent)
State Parks in the Tri-Counties	8,529	8,907	9,735	10,363	10,967	1.5%
Santa Barbara County Parks	5,536	5,733	6,029	6,150	6,227	0.7%

Source: Applied Economic System, April, 1984.

Application of this policy could potentially improve access to beach areas eastward of the present developed portion of the Gaviota Beach State Park. Additionally, the local coastal trail from Goleta to Gaviota is envisioned in the Land-Use Element of the Comprehensive Plan (Santa Barbara County, 1980). Planning for sections joining the University of California at Santa Barbara (UCSB) to El Capitan, and from Refugio to Arroyo Quemado is in process [Santa Barbara County, 1982]. Access by bike trail to the beaches adjoining the Getty property appears unlikely in the near future owning to the planning emphasis on other sections.

OFFSHORE RECREATIONAL FISHING

Sport fishing in California occurs along the coast, in bays and estuaries, and in inland waters such as lakes and streams. To establish the environmental setting for this project, only marine recreational fishing is of concern. Marine sport fishing is a recreational activity of economic and aesthetic importance in southern California, with both local residents and tourists participating. It extends from the shallow nearshore areas to depths of 600 ft (180 m) or more. Five types of recreational fishing predominate: shoreline, pier and jetty, partyboat (commercial passenger fishing vessel), private boat, and skindiving. Information on the partyboat fishery is 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 detailed information on their activity.

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. Boat fishing is concentrated around major harbors and several of the offshore islands. 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.

Sportfishing provides considerable net economic benefit to California. If an assumed value of $2 to $4 per day and 11,910,000 marine angler days for 1970 are used, the net economic value ranges from about $24 million to $48 million. 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.

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. Partyboats had the lowest participation level. 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 Park, 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. Activity is generally concentrated in or next to kelp beds. Skindiving takes place from the shoreline, private boats, and partyboats. Most diving occurs in kelp beds or rocky reef areas to depths of about 60 ft (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. 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 and Santa Cruz Islands.

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 mi (3-5 km) of shore along the coast, except in the Santa Barbara-Carpinteria area where fishing extends 4 to 5 mi (6.5-8 km) offshore to include several of the oil platforms and Fourmile Reef. Kelp bass and halibut are fished along kelp beds while rockfish are caught out to the 300 ft (90 m) depth contour. 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.

For the period 1975 through 1980, the number of anglers remained fairly constant while the catch has fluctuated from about 8,600 to 12,000 fish. Both catch and number of anglers have increased since the mid-1960s.

The economic value of recreational fishing in the Santa Barbara Channel can be estimated using a value of $24 per day for shoreline fishing and $49 per day for boat fishing. 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 million ($7.8 million for shoreline and $13.2 million for boat).

4.10.5 Coast Land Use and Ownership

EXISTING PLANS AND POLICIES

This section sets forth existing California State and Santa Barbara County plans and policies that would affect the proposed projects. The entire project (pipelines, and oil and gas processing facilities) would lie within the Santa Barbara County coastal zone and be subject to the policies and regulations of the County's Local Coastal Program (LCP). This section also sets forth county comprehensive plan policies and zoning regulations that would apply to the project.

California Coastal Act

The California Coastal Act of 1976 established the California Coastal Commission which, through the Federal Coastal Zone Management Act, has the authority to review proposed projects for consistency with the California Coastal Management Plan where they would affect the use of land and water in the coastal zone. The coastal zone is measured from the mean high tide line inland from 3,000 feet to as much as three miles.

The Act, through a series of policies, places highest priority on the preservation and protection of natural resources and prime agricultural lands. Other coastal policies reflect the issues of public beach access, low- and moderate-income housing, recreation, marine environment, visual resources, archaeological resources and coastal dependent energy and industrial development.

Article 6 of Chapter 3 (Section 30250 et Seq) of the Coastal Act addresses the location and design of developments within the Coastal zone. In addition, the concept of consolidations of developnent is also addressed, and is of particular importance to Santa Barbara County with respect to industrial facilities. The article also provides that coastal-related development should be accommodated within reasonable proximity to the coastal-dependent uses they support. A coastal dependent project is defined as development which "requires a site on, or adjacent to, the sea to be able to be functional at all." [PRC Section 30101.]

Santa Barbara County Local Coastal Program (LCP)

Each of the cities and counties along the California coast is required by the Coastal Act to prepare an LCP. The LCP consists of "a local government's land use plans, zoning ordinances, zoning district maps, and implementing actions which, when taken together, meet the requirements of, and implement the provisions and policies of (the Coastal Act) at the local level" [PRC 30108.6]. The land use plan means the "relevant portions of a local government's general plan, or local coastal element, which are sufficiently detailed to indicate the kinds, location, and intensity of land uses, the applicable resource protection and development policies and, where necessary, a listing of implementing actions." [PRC 30108.5]. The zoning ordinances and district maps are the legal tools for implementing the land use plan. In addition, the local land use plans are required to consider uses of more than local importance [PRC 30501 (c)]. Such uses include major energy facilities. The local government, in issuing coastal development permits after certification, must make the finding that the development is in conformity with the approved LCP. Any amendments to a certified LCP will have to be approved by the State Coastal Commission.

After certification of the LCPs, the State Coastal Commission continues to exercise permit jurisdiction over certain kinds of development (i.e., development in the State Tidelands), and continues to hear and review amendments to certified LCPs.

The Santa Barbara Local Coastal Plan (LCP) was approved by the State Coastal Commission in March 1981 and its Coastal Zoning Ordinance (CZO) was approved in August 1982. It contains 182 specific policies related to such topics as hazards, visual resources, industrial and energy development, recreation, and environmentally sensitive habitats.

Figures 4.10-5 and 4.10-6 show the location of the several land use designations in the area of the South Coast between the pipeline landfall (about two miles north of Point Conception) to just east of El Capitan State Park. These designations include those for community facilities, industry, commercial, residential, agriculture, recreation and land under federal jurisdiction. The Santa Barbara County LCP gives priority to pipeline transshipment of oil by permitting pipelines in all land use designations.

The land use designations set forth in the LCP are implemented by the CZO. In addition to compliance with these applicable policies and the representative zoning district requirements, the CZO of the LCP requires that proposed developments to comply with general development standards and overlay zone district requirements.

County Comprehensive Plan

Because the adopted LCP supersedes the Comprehensive Plan, and because nearly all of the proposed project lies within the Coastal Zone, no general description of the Plan is given here. The only exception to project occupancy of the Coastal Zone would be something less than

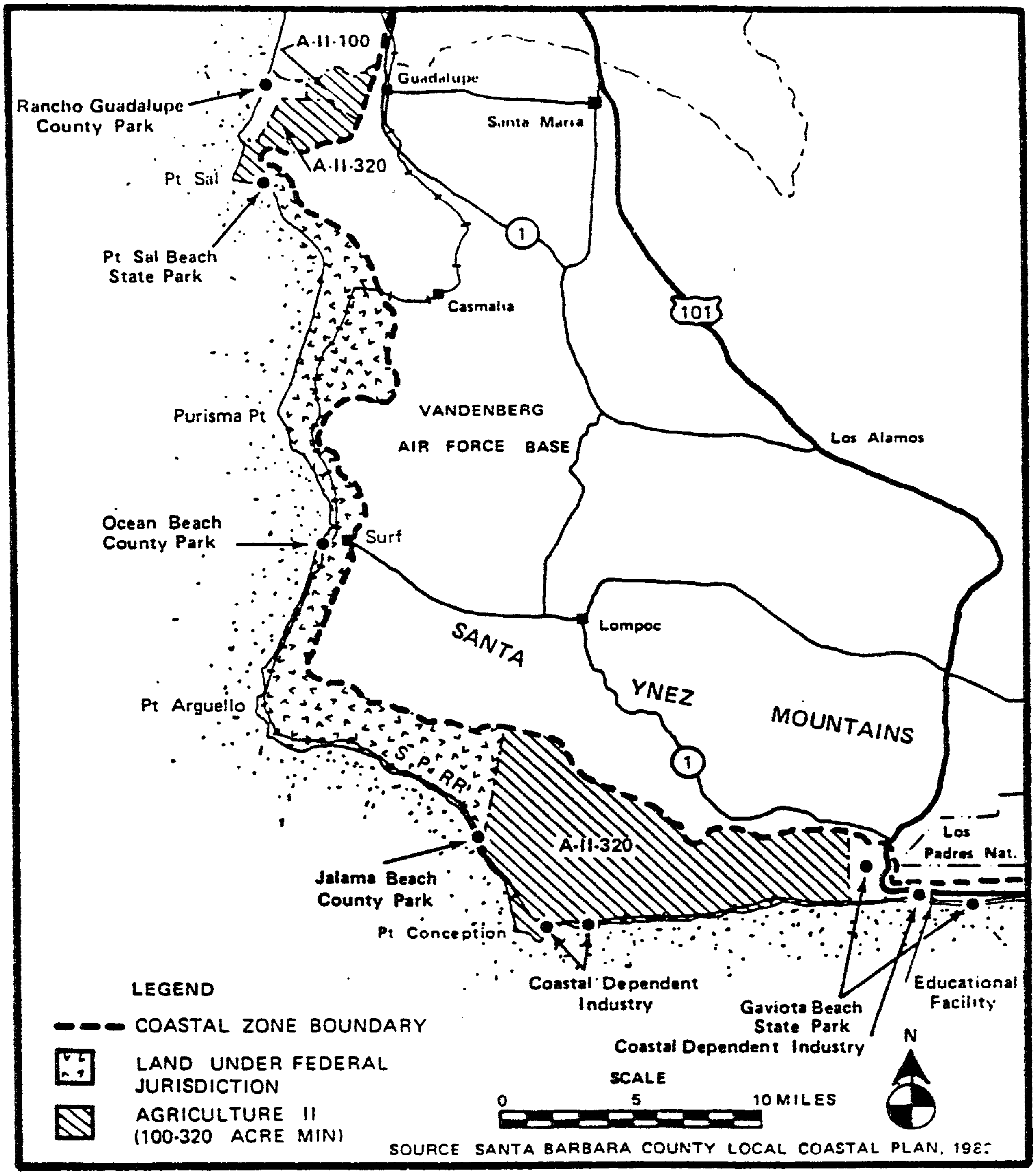

FIGURE 4.10-5 Generalized land use plan, North Coast planning area. County of Santa Barbara local coastal program.

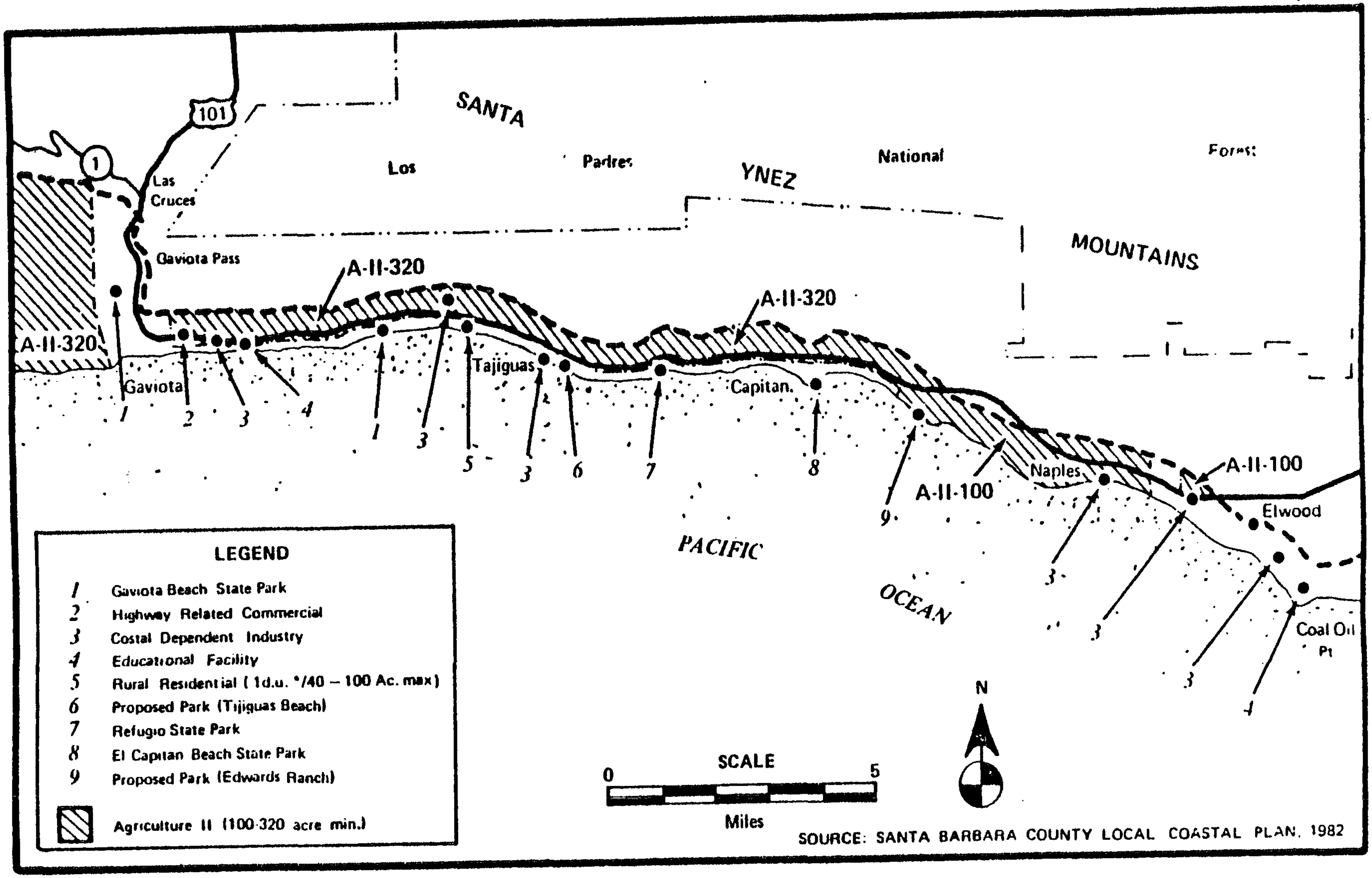

FIGURE 4.10-6 Generalized land use plan, Gaviota Coast planning area. County of Santa Barbara local coastal program.

2,000 feet of proposed dry-oil pipeline that would extend north of the 3,000-foot-wide Coastal Zone at Las Flores Canyon. This area is shown on the land use plan as AG-II-100 with a petroleum resource industry overlay. The property is currently subject to a classification change request by Exxon to permit their proposed oil processing and expanded gas processing facilities.

PLANS, POLICIES AND PROGRAMS OF VENTURA COUNTY, AFFECTED CITIES, SCHOOLS AND DISTRICTS

Ventura County

In March 1976, the Ventura County Board of Supervisors and the Ventura County Local Agency Formation Commission adopted the County Guidelines for Orderly Development. This was a cooperative effort of the county and the cities of the county. City spheres of interest were adopted to "allow and encourage cities to exercise municipal responsibility" in those areas, and to encourage urbanization within the cities.

The Board adopted 11 policy positions which would assure that proposed development within city spheres of interest would be as nearly consistent with the cities development policies as possible. Annexation to existing city or county service districts was also preferred to creation of new service districts.

In March of 1982 the Ventura County Board of Supervisors adopted the Ventura County Air Quality Management Plan, the primary objective of which was "to demonstrate reasonable further progress toward attainment of National Ambient Air Quality Standards for ozone and total suspended particulates," which were frequently exceeded. State standards of other pollutants were also exceeded.

In addition to many proposed controls of both stationary and mobile sources, the plan also sets forth maximum population growth forecasts accommodatred by the adopted emission allocations plan, for each of the three air quality areas in the county; Ojai Valley, North Half, and South Half, for the years 1979 through 1985. In the South Half area, where the Chevron project would have the greatest impact on population, the plan forecasts permissible growth of 3.3 percent per year between 1979 and 1985. Residential projects would be found to be consistent with the plan if the anticipated resulting population would fall within the annual anticipated population increases.

In July 1980 the Board of Supervisors adopted the 208 Areawide Water Quality Manaement Plan: 1979-1980 (208 refers to Section 208 of Public Law 92-500, which provides funding for water and waste treatment planning). It contained a population/land use forecast plan. The countywide total population adopted for the year 2000 was 811,305, which would be an annual growth rate of just over 2.4 percent, and would be a continuation of trends that were current at that time.

Because of the higher than originally expected growth in the western part of the county, as revealed by the 1980 census, it became necessary to upgrade the 1985 forecasts. The 1985 forecast of the plan was revised in March of 1982 with a reallocation of that year's population among the county's 14 growth and non-growth areas. Because forecasts for most of the growth areas were increased and the forecast for the forecast years that followed 1985 (1987, 1990, 1995, and 2000) remain unchanged, the present adopted policy actually shows reductions in population after 1985 in seven growth areas. The implication here is that unless there is considerably slower growth than was expected in some areas such as Thousand Oaks, Camarillo, and Simi Valley, the 811,305 total will be exceeded before the year 2000.

Updated in June 1984, the Ventura County General Plan Housing Element sets forth goals related to preservation of housing, rehabilitation, housing opportunities, (income levels), diversity, and housing equality (racial, sex, etc.). These goals would be implemented with objectives, policies, and programs set forth in the housing element. Included in the report is data on 1980 median housing values, and median gross rentals, by County Census Division.

City of San Buenaventura (Ventura)

The Ventura City Council, in August of 1979, adopted a resolution amending the phasing plan of the City's comprehensive plan that would assure that the City would attain their goal of restricting total city population to 89,000 in 1985, 93,000 in 1990, and 111,000 in the year 2000, and at the same time assure that the City would receive only the most desirable residential development. These population limits were established in order to help in achieving and maintaining the National Ambient Air Quality Management Plan.

In addition, the August 1979 resolution adopted an annual allocation schedule to distribute the potential maximum growth into each file year period. The schedule allocates a population of about 820 persons per year through FY 1987-88 with allocations beyond that year to be made annually.

The third part of the resolution established a project evaluation program that would assure that the City allocated residential opportunities to only those projects which would most likely "minimize air pollution and other environmental impacts, minimize capital improvement expenditures, and otherwise have a beneficial effect on the City." The evaluation program generally exempts residential developments of less than four units (other exemptions relate to in-fill projects, replacement housing, low-income housing, and senior citizen residential care facilities. All other developments must apply for inclusion in the ensuring year's allocation, and must complete a scoring system application which assures the goal set forth above.

Projects are awarded points for resolution of concerns related to public services (sewer water drainage, etc.), environmental impact, and project design. Bonus points are also awarded for senior citizen housing, rental housing, and low-moderate income housing. The projects presented to the City between September 1 and October 30 of each year that quality for the highest number of points would be awarded the opportunity to develop in the City of Ventura.

Finally, the council resolution requires annual review of the annual accounting schedule and the project evaluation "to ensure that all land use decisions are in conformance with the adopted population figures."

City of Oxnard

The City of Oxnard is committed by policy to restrict growth to the limits set forth in the County's Phasing Policy and the 208 plan discussed above. However, growth has continued at a very rapid pace in Oxnard. As a result, the 1979-80 forecast of 130,500 in the Onxard growth area (includes unincorporated area) by 1985 had to be updated, in 1982, to 136,576 (see Table A). Between April 1, 1980 and January 1, 1984 the city grew from 108,195 (U.S. Census) to an estimated 121,066 (Calif. Department of Finance) a rate of 3.0 percent per year.

Readopted in December of 1980, the Oxnard Housing Element sets forth goals and policies for the improvement of housing conditions in that city. Included in the housing element is a report of housing needs in Oxnard. Of the 28,884 units reported in the 1975 census 5,240 (18.1 percent) were occupied by families who were paying more than 25 percent of their income for housing. Also, 4,853 (16.8 percent) were very overcrowded (over 1.5 persons per room). In addition, 1,800 (6.2 percent) were judged to be in substandard condition. A 1979 survey placed the number of substandard units at 1,930 (Table VI-2, of Oxnard Housing Element).

The Federal Home Loan Bank of San Francisco reported in their September 1983 Housing Vacancy Survey, that there were 504 vacant units in the Oxnard area; this is equal to 1.2 percent of the 40,932 units estimated at that time (zip code areas 93030 and 93033). This Oxnard area includes more than just the city of Oxnard. City-only data are not available for that relatively current date.

Oxnard School District

Growth of the Oxnard School District is also constrained. Because of the shortage of classrooms, 11 of the district's 15 schools are on year-round sessions and two new schools are needed to hold the present school population per classroom ratio. Four new schools would be required to phase out year-round education (Oxnard School District Superintendent letter to Oxnard City Manager, July 3, 1984).

EXISTING LAND USE AND ZONING DESIGNATIONS

The project site (Getty-owned portion) is designated as Coastal Dependent Industry (M-CD) under the County's LCP. The adjacent Gervais property is designated as Agricultural (AG-II-320) with a minimum lot size of 320 acres per dwelling. At the time that the land use and zoning designations were applied to the various parcels within the Coastal Zone, only those currently in use as coastal-dependent oil and gas facilities were designated as such in the LCP. Any new coastal-dependent industrial facilities proposed for a site that is not within the M-CD designation will require an amendment to the LCP. Therefore, the use of the Gervais property for the proposed rerun tanks will require an amendment to the LCP and a corresponding zone change to M-CD. In addition, the rezone requires a Development Plan to show details of the need and appropriateness of the change in use.

The proposed onshore pipeline corridor to Gaviota is within the LCP's North Coast Planning Area. The North Coast area from Jalama Beach to Gaviota State Park, which includes the proposed onshore pipeline corridor, with the exception of Hollister Ranch, is designated primarily as Agriculture II (AG-II-320), requiring minimum parcels of 320 acres. Vandenberg AFB, located north of Jalama Beach, is under federal jurisdiction and thus is not subject to local land use controls. Union Oil's processing facility on the Chevron property at Government Point is designated as Coastal Dependent Industry (M-CD) as is the marine terminal at Little Cojo Bay. Recreation is the remaining land use designation for the North Coast, including a small parcel at Jalama Beach County Park.

The proposed Gaviota oil and gas processing plant, the optional pipeline to and from the oil storage and terminal facilities at Las Flores, is located in the Gaviota Coast Planning Area. The Gaviota Coast Land Use Plan denotes various uses on the ocean side of U.S. 101 as primarily AG-II-320 for the area north of U.S. 101. In the vicinity of the proposed oil and gas facility site, Gaviota State Beach, including San Onofre and Molino Beaches, is identified as recreational. A small parcel adjacent to U.S. 101 and approximately 0.5 mile west of the Getty-Gaviota site, where a restaurant and service station are located, is designated as Highway Commercial.

The optional onshore pipeline route, from Gaviota to Exxon's crude oil storage and transport facilities at the Las Flores Canyon, will parallel the Southern California Gas Company right-of-way and traverse areas designated as recreation and rural residential. At the junction of Las Flores Canyon the pipeline route will deflect northward to Exxon's Las Flores site. At this point in the coastline, the Coastal Zone north of Highway 101 is designated AG-II-320. The Exxon property in the Las Flores Canyon/Corral Canyon area is designated in the Santa Barbara County Comprehensive Plan as A-II-100 with a Petroleum Resource Industry overlay zone.

RESOURCE OVERLAP DISTRICTS

The County has zone overlay districts which apply to certain resources centers. Portions of the proposed project area incorporate one of these overlays, the Environmentally Sensitive Habitat (ESH) Overlay District.

The purpose of the Environmentally Sensitive Habitat (ESH) Overlay District is to "protect and preserve areas in which plant or animal life are either rare or especially valuable because of their role in the ecosystem which could be disturbed by human activities and development [Santa Barbara Coastal Zoning Ordinance, 1981]. Several habitat types are presented in the LCP, although the Overlay Zone itself does not distinguish between each type. In the North Coast area, ESH overlays exist at the rocky points and intertidal areas offshore Point Conception and Government Point.

The view corridor (VC) overlay is intended to provide additional protection to areas where there are views from a major coastal road to the ocean. U.S. Highway 101 parallels the ocean through most of the Santa Barbara County coastline and affords scenic ocean vistas to thousands of travellers. Therefore, all portions of the coast where unobstructed views of the ocean are available from Highway 101 are designated as a VC overlay [Santa Barbara County, 1982].

The Point Conception area is regarded as a valuable scenic resource; however, because of the lack of public roadways in this area no view corridor overlaps are in effect. Because the project-related facilities proposed to be constructed at Gaviota, and potentially at Las Flores, are on the landward side of Highway 101, they are not subject to the overlay designation. Only the pipeline would fall within this area.

CURRENT LAND USES

This section describes the existing land uses and land-use designations in Santa Barbara County with emphasis on the South Coast and the vicinity of the proposed project where potential land-use impacts are most likely to be felt.

Santa Barbara County

The site for the proposed project is located on the South Coast of Santa Barbara County halfway between the western and eastern extremities of the county which extends from Point Arguello on the west to the Santa Barbara/Venture County line on the east. The most densely populated and developed portion of the County is located about 18 miles east of the project site along a narrow 26-mile stretch of coast extending to the

.Ventura county line. This area includes the cities of Santa Barbara and Carpinteria and the communities of Goleta, Isla Vista, Montecito, and Summerland. Other developed areas in the county include the Santa Ynez Valley, located 10 (aerial) miles north of the project site on the other side of the Santa Ynez Mountains, and the cities of Lompoc and Santa Maria located farther to the northwest.

Ninety percent of the approximately 1,383,000 acres in the county are devoted to non-intensive land uses. The largest single land-use activity in Santa Barbara County is the Las Padres National Forest which covers approximately 44 percent of the central and eastern county. This National Forest provides protected watershed for reservoirs in the Santa Maria and upper Santa Ynez Valleys as well as extensive recreation and limited grazing and mining.

Over 70 percent of the remaining 982,000 acres are in private agricultural cultivation and grazing uses. Vandenberg Air Force Base on the western coast of Santa Barbara County covers 10 percent of the non-National Forest land in the county. The remainder of the county area is devoted to urban and transporation uses.

Southern Santa Barbara County contains a varied and scenic physical environment, ranging from coastal bluffs and beaches to inland mountains, forests, and parks. These natural features offer extensive opportunities for sightseeing and recreational activity. In addition to the 1,160 slip harbor and other recreation facilities in the City of Santa Barbara, there are four State beaches and parks, and 13 county beaches and parks along the coastal area of southern Santa Barbara County.

South Coast

The South Coast of Santa Barbara County is that portion of the county south of the crest of the Santa Ynez Mountains. It includes a coastal strip approximately 60 miles long from Point Conception on the west to Ventura County on the east and 3 to 8 miles in width. It can be examined from west to east as three progressively more developed sections: 1) Point Conception to Gaviota; 2) Gaviota to Ellwood; and 3) Ellwood to Ventura County.

Point Conception to Gaviota

This largely undeveloped, 16-mile stretch of coast was inaccessible to the general public until the mid-1970s when portions of the Hollister Ranch were subdivided and sold as 100-acre or larger rural estates. The few residences along this coast are reached via a narrow, paved road which accesses U.S. Highway 101 at Gaviota State Park. The only other significant developments between Point Conception and Gaviota are the Coast Guard lighthouse at Point Conception, an oil field just east of Point Conception, and the Southern Pacific Railroad which traverses the entire length of the county's coast. A very controversial liquified natural gas (LNG) facility has been proposed for Cojo Bay just east of Point Conception. That proposal is presently inactive (because of the proponent's request for postponement).

Jalama Beach County Park is located 4.3 miles south of Lompoc and 5 miles north-northwest of Point Conception. This 28 acre park is situated between the Southern Pacific Railroad line and the ocean, on an isolated, undeveloped stretch of coastline. Recreational activities include horseshoes, surfing, and shore fishing with playground, 105 camping sites, and picknicking facilities also available. Approximately 90 percent of overnight usage is by out-of-county visitors; day use represents about two-thirds of the total usage, and about 50 percent of this usage is by local people.

Nojoqui Falls is located 1.5 miles east of U.S. Highway 101 near Gaviota Pass. This is one of Santa Barbara County's most popular day-use-only parks, with 82.5 acres of picnicking facilities and hiking trails. The largest waterfall in the county is located along Nojoqui Falls Trail. The park also contains softball fields, volleyball courts, horseshoe pits, and play areas for children.

Land ownership in the Point Conception area consists primarily of the Bixby and Hollister Ranch properties as shown on Figure 4.10-7. The Bixby property lies to the east and south of Vandenberg, totalling approximately 26,000 acres. The ranch is used primarily for cattle grazing with less than 100 acres in irrigated agricultural production. The 14,400-acre Hollister Ranch, lying beneath the crest of the Santa Ynez Mountains, encompasses the shoreline from Cojo Ranch east to Gaviota State Park. The Hollister Ranch was subdivided in 1977 into approximately 135 parcels of a minimum size (100-acre) for ranch estates. At present, approximately 50 residences have been constructed with associated roadways, reservoirs and ancillary structures. The Hollister Ranch includes 100 acres committed to irrigated agriculture (i.e., avocados and flower production) and an estimated 1,000 acres of dry farming such as oats and barley, with remaining portions of the ranch utilized for grazing.

South of Point Conception and encompassing Government Point is the 1,500-acre Chevron Gerber Fee property. The property is largely undeveloped except for 6.2 acres at Government Point which currently accommodates Union Oil Company and gas processing facilities. The Union facility has been in operation since 1970 and currently handles approximately 150 B/D of oil and 100 MC/D of natural gas. An associated 50,000-barrel storage tank and a multi-point offshore mooring and loading system are located east of Government Point at Cojo Bay.

Getty-Gaviota to Ellwood

This sparsely developed 18-mile stretch of coast includes the proposed project site approximately 10 miles east of Gaviota. U.S. Highway 101 and the Southern Pacific Railroad line extend along the entire coast east of Gaviota. The dominant land uses along this middle portion of the South Coast are transportation, coastal recreation, rural residential, petroleum and natural gas production, agriculture, open space. Recreational uses in the area are primarily ocean-oriented. Existing facilities include three State beach parks: Gaviota, Refugio, and El Capitan.

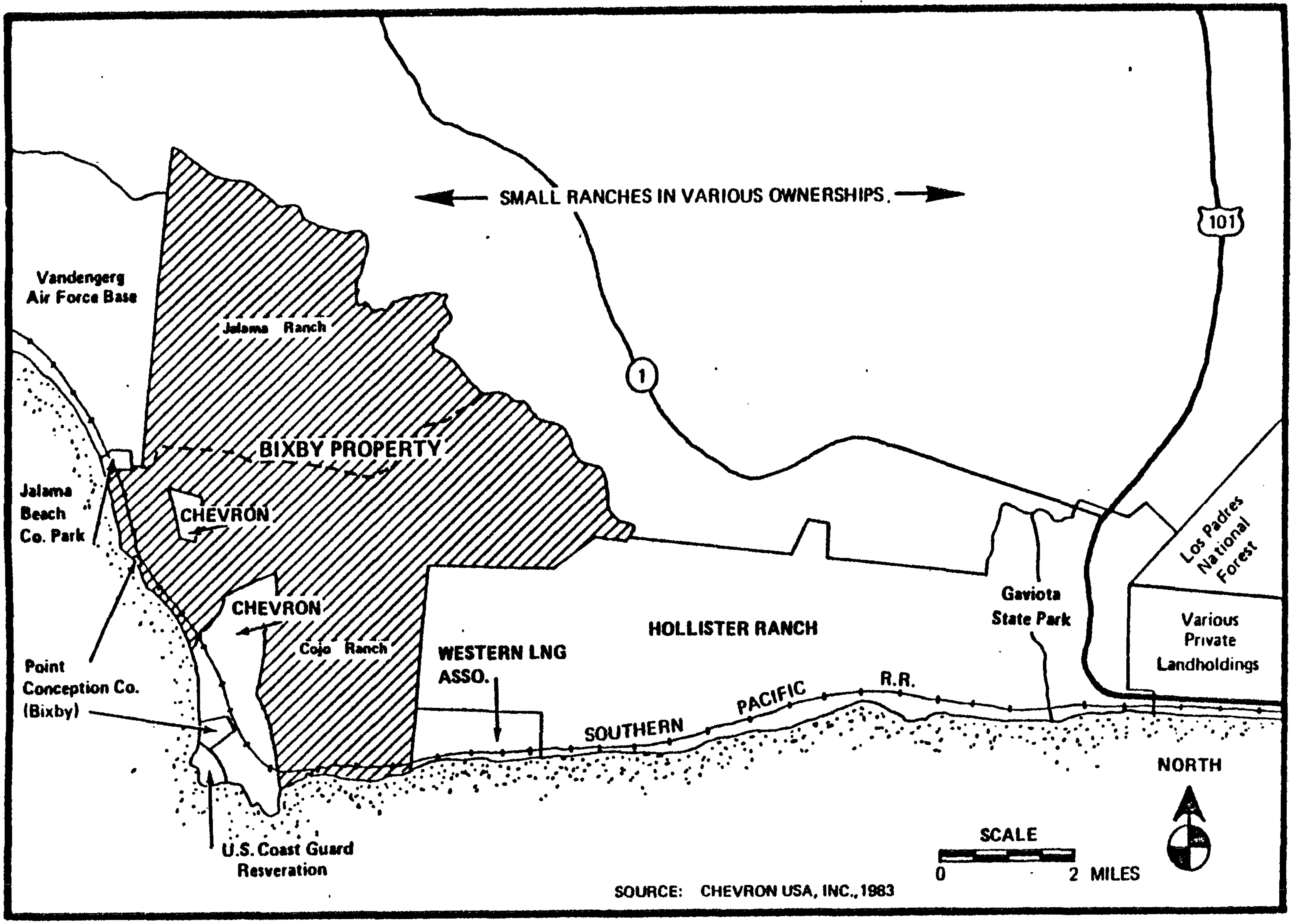

FIGURE 4.10-7. Land ownership in the Point Conception area.

Residential development west of Ellwood is limited to scattered single-family residences on large parcels of land, most of which are associated with farming operations. Commercial development is limited to an area of highway commercial use at Gaviota. This commercial complex, which consists of a restaurant, gift shop, and gas station, is operated by Sunburst Farms, Inc.

Agricultural use east of Gaviota to El Capitan consists primarily of tree crops with some field and row crops and pastures. East of El Capitan State Beach, agricultural development is more extensive, with tree crops covering relatively large areas. Several major land holdings are under Agricultural Preserve status.

The major industrial activity along the coast between Gaviota and Goleta is petroleum and natural gas production. Five oil and gas processing facilities, two marine terminals, as well as some onshore oil production are located in this segment of the coastline. The majority of these facilities were constructed in the 1960's to handle production from the State tidelands. Briefly, these include:

- Shell Molino Facility - Gas processing facility located at Canada de Huerta, north of Highway 101

- Getty-Gaviota - Gas processing facility just east of Sunburst Farms

- Phillips Tajiguas Gas Facility - Gas processing plant located west of Tajiguas Creek and south of Highway 101

- Shell Capitan - Onshore oil production and processing facilities at the base of Canada del Corral

- Aminoil Ellwood Facility - Onshore oil production and processing facilities located south of Highway 101 and west of Eagle Canyon, and a marine terminal at Coal Oil Point

- ARCO Ellwood Facility - Oil and gas processing facility near Ellwood

- POPCO Las Flores - Gas processing plant located in Las Flores Canyon about 1.0 miles north of Highway 101.

Ellwood to Ventura County

East of Ellwood to Montecito, urban uses predominate. Goleta is an unincorporated urban-surburban agricultural area that functions partly as a suburb of Santa Barbara to the east and also provides services for the University of California, Santa Barbara campus, located on Goleta Point, and other major employers in the Goleta Valley. The City of Santa Barbara lies between Goleta and Montecito and is a fully urbanized area. Montecito is a low-density, rural and estate residential area immediately east of Santa Barbara. From Montecito to Carpinteria, land uses are primarily rural residential and agricultural, with some coastal recreation near Carpinteria. The City of Carpinteria is a small, primarily residential area with supporting urban services and a state beach park. From Carpinteria to the Santa Barbara/Ventura County border, land uses are predominately rural residential and agricultural.

Project Vicinity

The existing Getty Marine terminal, located 1.2 miles east of Gaviota, is the site of the proposed project. The property comprises approximately 87 acres and is bisected by Highway 101. The southern parcel (32.2 acres) accommodates several storage tanks leased by ARCO and Chevron. ARCO also has a small oil processing facility on the property. The marine terminal itself includes a pumping station and five-point mooring.

Directly north of the Getty Marine Terminal is Chevron's existing processing plant. Small quantities of existing processed gas are injected into the Southern California Gas Company pipeline at a compressor and metering station located immediately south of the gas plant, adjacent to the facility access road. Other facilities on the parcel include a General Telephone switching station, water storage tanks, a small solar unit, and a well pumping and monitoring station. A relatively large unused graded pad is located on the eastern margin of the property. The eastern portion of the parcel, which is dominated by the eucalyptus stands, is essentially undeveloped.

The existing terrain onsite is gently sloping near Highway 101 and rising to relatively steep slopes in the canyons and northernmost portion of the property. Elevations range from 100 to 200 feet above mean sea level, with an average slope of 9.7 percent.

The Chevron-owned Gervais Fee property located further to the east is vacant of any structural uses except for an SCE powerline, which forms the northern boundary of the parcel, and a fence around the southern and western site perimeters. An unimproved access roadway also parallels the southern boundary. The site is not now nor has it recently been in agricultural production, and previous use of the property was probably associated with livestock grazing. Approximately 5 acres of the Gervais Fee property is proposed to accommodate future return tanks for the oil processing facility. The remainder of the parcel is proposed by Getty to be used for an oil storage tank farm.

The overall character of the adjacent and surrounding land uses is rural and oriented primarily toward recreational, highway, and limited commercial and institutional uses. The Vista Del Mar School, accommodating a daytime population of approximately 49 people, is located on a 10-acre parcel between the northern Getty parcel and the Gervais property. Access to the school is obtained off of Highway 101. Approximately 200 feet north of the school and segregating the two project sites is the Southern California Edison Gaviota Substation.

A significant percentage of the surrounding area is comprised of property owned by the State of California. Most notable is the Gaviota State Beach Park, 1.3 miles to the west of the project site. An extension of the park also extends along the shoreline, encompassing both sides of the Getty property. The State recently acquired the site of the former Texaco gas processing facility adjoining the Getty property to the west, and may eventually increase the total park acreage to include this property. Figure 4.10-8 shows property ownerships in the vicinity of the project.

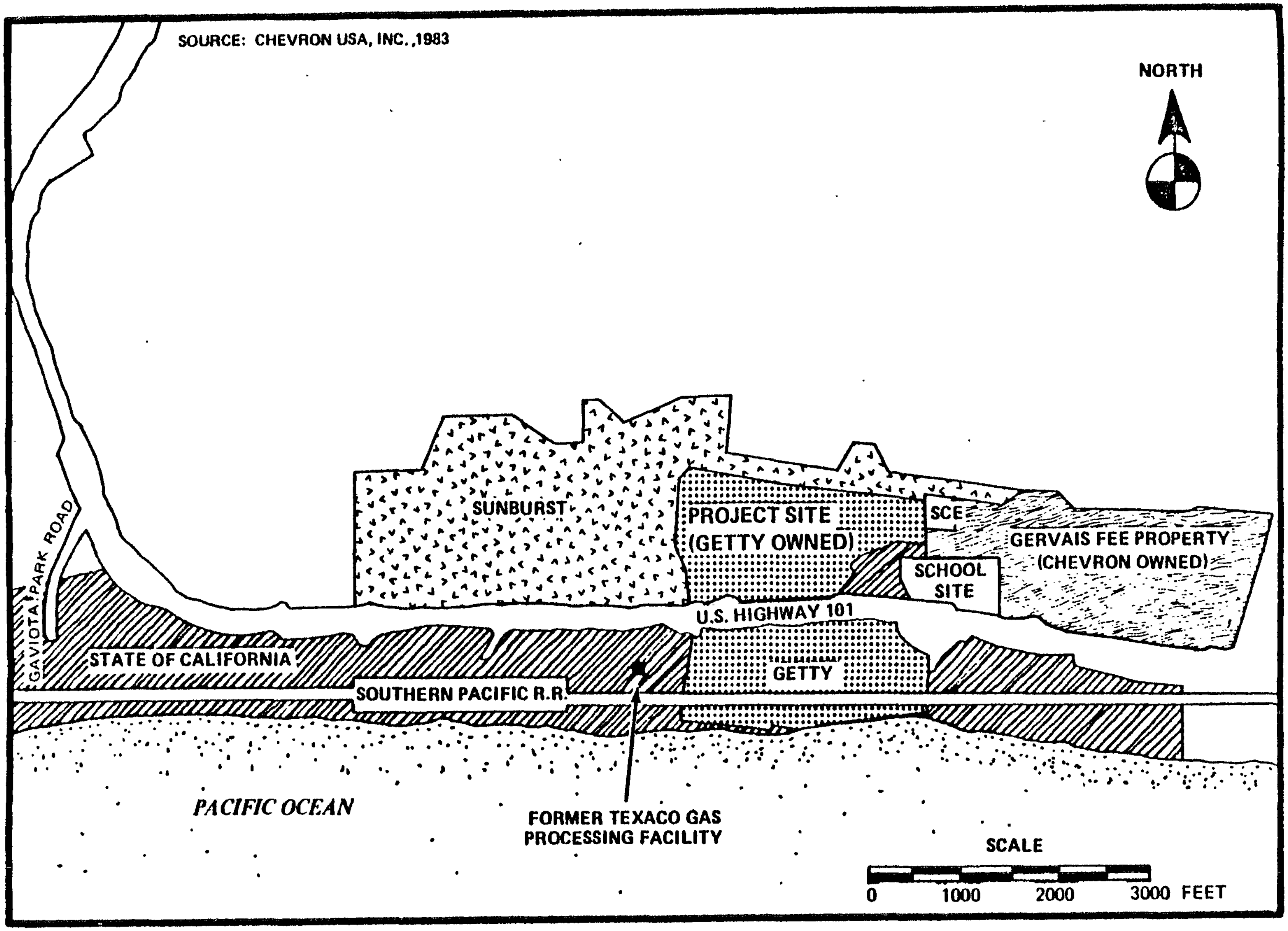

FIGURE 4.10-8 **Property ownerships in the vicinity of the project.**

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5.1 GEOLOGY

Geologic hazards and constraints on the project are discussed in Sections 5.1.1 to 5.1.7. Impacts of the project on the geologic environment are discussed in Section 5.1.8. Also included here is the classification of each impact according to its level of significance. These assignments are based on the size of the area affected, the duration of the effect, the likelihood of occurrence, and the potential for direct release of hydrocarbons. Short-term geologic impacts are considered here to coincide with the duration of the project activity of interest. Long-term impacts would extend beyond the activity, and especially beyond the useful life of the facilities. Local impacts would be associated with the immediate vicinity of a project component. Regional impacts would extend beyond the project area, and have the potential for creating adverse impacts on facilities or structures unrelated to the project.

Only geologic conditions which are anticipated to have the potential to affect the project are discussed. Other processes which have been considered in the analysis and not discussed here include uplift/subsidence from geotectonic forces, cliff retreat, and rock outcrops in the offshore area.

5.1.1 Faults

INTRODUCTION/METHODS

Faults constitute a hazard or constraint for the proposed project 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. For ground displacements, impacts resulting from faulting which cause rupture of a pipeline are considered Class II. Impacts which cause damage but no rupture are considered Class III.

Of the faults in the Arguello Field area described in Section 4.1.3, those which may have a direct impact on the project facilities and alternatives are the South Branch of the Santa Ynez Fault (SBSYF), small faults along the offshore portion of the pipeline route, and the Erburu Fault (see Figure 4.1-4). The principal constraint which these faults impose is their potential for surface rupture at crossings, which could cause the pipelines to break and release hydrocarbons into the environment.

IMPACTS

Impacts on Project Components

The onshore pipeline alignment crosses the trace of the potentially active SBYF just west of Alegria Canyon. Based on comparison to the 1971 San Fernando earthquake, displacements of 1 to 2 meters (3 to 6 feet) are typical for faults capable of generating an earthquake of 6.5 to 7.5 magnitude in this seismotectonic environment [USGS, 1971], and are enough to break buried pipelines [Steinbrugge et al, 1971; McCaffrey and O'Rourke, 1983]. This constraint is considered significant but mitigable (Class II).

Several short faults are interpreted to occur in the offshore project areas and the Area Study leases. None of the potentially active or active faults is directly beneath the platforms; thus there is no hazard from surface rupture. Several faults occur along the proposed pipeline route to landfall but these are short discontinuous features, and the route avoids most of them (Dames and Moore, 1982a) as indicated in Figure 4.1-7. Seafloor displacements on these are anticipated to be small (i.e., less than one foot). Such displacements would induce stresses in a pipeline of a lesser magnitude than stresses which it would experience during laying operations, and are therefore considered adverse but not significant (Class III).

The Erburu Fault transects the Las Flores pipeline extension near Canada del Corral. Based on its short length, any surface displacement would most likely be less than one foot and small enough to be accommodated in design of such a crossing. No detailed design information is currently available and thus the potential for impacts can only be recognized and not quantitively assessed. The constraint is considered potentially significant but mitigable (Class II); i.e., any anticipated displacements can be accommodated with proper design of a crossing.

Impacts on Area Development

No major active or potentially active faults transect the Area Study leases. Minor seafloor faults such as those described above are likely to be encountered, though they will probably be small enough not to preclude development of the Area Study leases.

Impacts on Alternatives

The alternative offshore pipeline alignment from Platform Hermosa to Gaviota crosses the offshore portion of the SBSYF. Total displacements offshore are similar to those onshore [Dames and Moore, 1983]. Maximum displacements from the MCE or the SBSY are estimated to be the same offshore as onshore (see Section 4.1.3). Impacts are considered significant but mitigable.

MITIGATION MEASURES

Project

Two general measures can be taken to mitigate surface rupture potential from faults: avoidance by relocation of the facilities, and design to withstand the expected ground displacement. The greatest and most obvious potential for surface fault rupture occurs where the pipeline crosses the SBSYF. With appropriate trench design and backfill material, the pipeline should be able to undergo fault displacement without rupture.

Analyses conducted as part of this project suggested displacements of 1-2 m can be anticipated along the SBSYF. Such displacements can be accommodated in pipeline design. Dames & Moore, (1984a) recommended specific design measures for the crossing, including use of a cohesionless backfill to minimize resistance of material surrounding the pipe, trench geometry and grading considerations to control patterns of failure, and placement of filter fabric and subdrains to maintain the desirable properties of the backfill. Their design displacement value of 1 m is within the range suggested here, though at the low end. Adoption of Dames & Moore recommendations would mitigate potential Class II impacts to Class III for any displacements up to 1 m, and would likely mitigate impacts associated with displacements in the 1-2 m range to Class III.

If the pipeline is extended to Las Flores Canyon it should be designed to withstand expected displacements on the Erburu Fault. Surface displacements associated with minor offshore faults should be small (less than one foot) and no special mitigation measures would be required. An additional mitigation measure for all facilities would be field examination after the occurrence of local strong earthquakes.

Area Development

No major active or potentially active faults are known within the Area Study leases. Displacements along small faults should be similar to those for minor faults along the offshore pipeline route.

Alternatives

The offshore alternative route is on the Mainland Shelf, and would cross the offshore extension of the SBSYF. Displacements for the offshore portion of the SBSYF are probably similar to those onshore, based on current understanding of the fault. An unconstrained pipeline without any special design features should be capable of withstanding displacements up to about 1 m. Potentially higher displacements on the offshore SBSYF could be accommodated by the oblique crossing of the fault. An offshore crossing of the SBSYF should not represent a significantly different hazard with respect to pipeline rupture when compared to the onshore crossing.

5.1.2 Seismicity

INTRODUCTION/METHODS

The methodology for performing seismic-hazard analyses and seismic design is detailed in Section 2.1.2 of Appendix E. 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.

IMPACTS

Impacts on Project Components

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. See Appendix E for details. It is reasonable to expect that peak ground accelerations (PGAs) between about 0.15 and 0.30 of the acceleration of gravity (0.15g-0.30g) are likely to occur in the Arguello Field Area with an average recurrence interval of about 200 years, and PGAs of 0.40g-0.60g will occur every several thousand years. These values are regional in nature and do not account for site-specific conditions.

Chevron has developed seismic design criteria of 0.15g for the PDE, and 0.30g for the CDE. Texaco values are 0.15g and 0.285g, respectively. 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 Section 4.1.6 for additional details.

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 4.1-2 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. An indication of the ground motion that the three platform sites and the Gaviota processing facility might experience during the MCEs for the closest sources for earthquakes of a given magnitude (e.g., 6.5, 7.0, 7.5, 8.25), is provided in Table 5.1-2. These 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 Table 5.1-2.

Impacts on Area Development

Because of the regional nature of seismicity, the ground motions experienced by future facilities development would be similar to those discussed above for the proposed project. Variations will generally depend on the distance between future facilities and the seismic sources.

TABLE 5.1-1

GROUND MOTION ESTIMATES FOR THE PROJECT AREA

Reference	Location	T(Yrs)	PGA(g)	PGV(cm/s)
Thenhaus and others (1980)	Pt. Arguello Area	100	0.15-0.20	15-20
		500	0.30-0.50	30-40
		2500	0.50-0.60	40-50
Dames & Moore (1980)	Pt. Conception (Western LNG)	100	0.25	
		200	0.28	
		1000	0.33	
		2000	0.41	
		3000	0.43	

Note: PGA = peak ground acceleration
PGV = peak ground velocity
T = average return period

TABLE 5.1-2

ESTIMATES OF PEAK GROUND ACCELERATION (PGA) AND PEAK GROUND VELOCITY (PGV) AT PLATFORM SITES AND PROCESSING FACILITY

Fault	MCE	Platform Hermosa			Platform Hidalgo			Platform Harvest			Gaviota Processing Facility		
		Distance(km)	PGA(g)	PGV(cm/s)	Distance(km)	PGA(g)	PGV(cm/s)	Distance(km)	PGA(g)	PGV(cm/s)	Distance(km)	PGA(g)	PGV(cm/s)
Hosgri	7½	29	0.20	42	25	0.23	50	28	0.21	44	51	0.10	14
Offshore Lompoc	6½	26	0.13	16	20	0.16	21	24	0.14	17	58	0.05	4
Point Conception	6½	16	0.20	26	22	0.15	19	18	0.18	23	7	0.37	38
San Andreas	8¼	115	0.05*	15*	116	0.05*	15*	116	0.05*	15*	85	0.08*	16
Santa Ynez (with South Branch)	7½	31	0.18	39	36	0.15	33	33	0.17	36	3.5	0.83*	181*
South Channel	7	27	0.16	26	32	0.13	21	28	0.15	25	44	0.09	10

Notes: 1) The PGA and PGV values were estimated using the following equations from Joyner and Boore (1981):

$$\log_{10} PGA = 1.02 + 0.249M - \log r - 0.00255r \quad \text{where } r = (d^2 + 7.3^2)^{1/2},$$

$$\log_{10} PGV = -0.50 + 0.489M - \log r - 0.00256r \quad \text{where } r = (d^2 + 4.0^2)^{1/2}, \text{ and}$$

M = moment magnitude,

d = shortest distance to the fault in kilometers

These equations provide median estimates of PGA and PGV. The PGA equation, applicable to soil and rock sites. The PGV equation is applicable to soil sites, was used for the platform sites; an analagous PGV equation for rock sites was used for the Gaviota facility; this equation is identical to the one above except the constant -0.50 is replaced by -0.67.

2) The asterisks (*) after certain ground-motion values indicates and extrapolation beyond the magnitude and (or) distance ranges of the accelerogram data used by Joyner and Boore (1981) to derive these equations.

Design levels for facilities in the northern lease blocks probably will be controlled by the Offshore Lompoc or the Hosgri fault, whereas facilities in the southern blocks may be controlled by the Point Conception Fault zone or Santa Rosa Island Fault. All facilities will include evaluation of a magnitude 8 1/4 earthquake on the San Andreas Fault, as required by the MMS Platform Verification Program.

Impacts on Alternatives

Seismic-design criteria would be higher for the offshore pipeline alignment, which would trend significantly closer to the Point Conception Fault Zone than the preferred alignment. Dames and Moore (1983) has recommended a design acceleration of 0.25g, based on characteristics of the SBSYF. This would control design over values related to the Point Conception Fault Zone. Design criteria for the facilities, if placed at the alternative site at Point Conception, which is further from the SBSYF and closer to the Point Conception Fault Zone, would be less stringent than criteria appropriate to the Gaviota site.

MITIGATION MEASURES

Seismic design criteria and related design elements are examined and are applied as part of the Platform Verification Program. No additional mitigation measures are discussed here.

5.1.3 Shallow Gas and Hydrocarbon Seeps

INTRODUCTION/METHODOLOGY

Proposed project facilities have generally been sited to avoid occurrences of gasified sediments, shallow gas and seeps. Gas-related features which could have impacts on the project include gasified sediments along the Mainland Shelf portion of the pipeline route, and shallow gas zones in the vicinity of the platform sites. Any condition which could lead to rupture of a pipeline is considered Class II. Any conditions which could damage the pipeline but not cause rupture is considered Class III.

IMPACTS

Impacts on Project Components

Gas-charged sediment zones are considered potentially hazardous 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. Gas-saturated sediments underlie large portions of the Mainland Shelf along the pipeline routes (Figure 4.1-6), and could have an impact on pipeline foundation stability. However, the very slight slope of the shelf and the distributed nature of the pipeline load suggest that any foundation instabilities would be minor and would not constitute a hazard of rupture to the pipelines. Impacts are considered Class III.

Shallow formational gas can lead to blowouts if pressure conditions greatly exceed hydrostatic. While shallow formational gas is widespread throughout the Arguello Field and occurs close to all three platform sites, drilling operations to date in southern and south-central California and in the several exploration wells already drilled in the Arguello Field have anticipated these zones and have been properly equipped to drill them safely. In addition, numerous wells have been drilled in the Point Conception area and in the Santa Ynez unit, and no pressure conditions greatly exceeding normal have been noted.

Impacts on Area Development

The Area Study leases have ubiquitous zones of gas-saturated sediments, shallow formational gas, and gas and tar seeps. The distribution of these features is detailed in Section 1.5.2 of Appendix E.

Impacts on Alternatives

The offshore alternative pipeline alignment would traverse areas of gasified sediments, as well as zones of shallow gas, and areas of elevated seafloor features in the western portion of the route. No other alternative would involve any change to constraints associated with the proposed project.

MITIGATION MEASURES

No mitigation measures beyond those required by existing regulations and incorporated into the project are considered necessary.

5.1.4 Buried Channels

INTRODUCTION/METHODS

Channels cut by present-day seafloor currents or by ancient streams during past periods of low sea level result in two types of constraints on the project: active seafloor channels and buried channels. The emphasis of this section is on buried channels. Impacts related to seafloor channels are discussed in Sections 5.1.5 and 5.1.7.

IMPACTS

Impacts on Project Components

Buried channels represent zones of potentially variable load-bearing capacity which can lead to differential settlement. As described in Section 4.1.5, no buried channels underlie the proposed platform sites. The proposed pipeline route to shore traverses two buried channels. The tops of these channels range in depth from 15 to 90 meters (50 to 300 feet) below the seafloor, and therefore they should have no impacts on the pipelines.

Impacts on Area Development

As described in Section 4.1.5, buried channels occur regularly in the Area Study leases, generally beneath the Arguello Slope, and will be of special concern to future facilities sited on the slope. In addition, the shelf areas can be underlain by small buried channels.

Impacts on Alternatives

Two major buried channels are present along the shelf-edge in the western portion of the route, in that part of the route which is coincident with the preferred alignment.

MITIGATION MEASURES

No mitigation measures are required for proposed project facilities.

In the Area Study leases, buried channels are common and may affect the foundation stability of heavy facilities, and are best avoided, if possible.

5.1.5 Slope Stability -- Offshore

INTRODUCTION/METHODS

Seafloor instability refers here to any seafloor sediment failure which results in downslope mass movement, including slumps, slides, flows, creep, and liquefaction. (Each of these is described in Appendix E.) Areas with evidence of previous instability have a high potential for future activity, and thus would impose a constraint on project development. Areas without evidence of previous seafloor instability may also pose a hazard if conditions are similar to those with evidence of previous instability.

IMPACTS

Impacts on Project Components

No areas of seafloor instability are known to directly underlie the proposed locations of platforms. No impacts from this source are expected.

In some zones within the project area, particularly in the nearshore portions of the pipeline route in water depths of 75-275 feet, the seafloor sediment includes a significant component of sand. These saturated cohesionless soils may be susceptible to liquefaction under dynamic loading conditions. If liquefaction were to occur, the sediments under and surrounding the pipeline could settle, spread laterally, or flow downslope, resulting in unsupported spans of pipeline or the buoyant rise of the pipeline to the surface.

Impacts on Area Development

Slope instabilities must be considered in development in the Arguello Field area. For example, in the southern Area Study leased, an extensive area of seafloor slumps and slides exists. See Figure in Appendix E. Seafloor channels are generally not suitable for future production or development facilities, not only because of the potential for downslope sediment movement, but also because of the steep slopes, the potential for differential settlement, and erosion.

The greatest potential impact of these features to offshore project facilities would be loss of foundation support. In addition, contrasts in load-bearing capacity within failure zones, as well as between the zones and the surrounding deposits could contribute to differential settlement.

Impact on Alternatives

The offshore pipeline alternative from Platform Hermosa to Gaviota traverses several areas of potentially unstable materials; in particular, the portion of the route from east of Platform Hermosa to landfall. In this region, the unconsolidated sediments are primarily clean sands which could liquefy completely in the event of an earthquake. In addition, two submarine canyons are located south of the corridor on this segment, and may be areas of rapid infilling of loose sediment. Offshore slope stability constraints would be greater for this alternative than for the preferred alignment.

MITIGATION MEASURES

Since no methods are currently in use for stabilization of unstable materials in deep-water environments, such zones should be avoided unless it can be demonstrated that no hazard exists. For example, in the southern portion of the Area Study, seafloor slumps and slides should be avoided unless geotechnical testing can demonstrate adequate stability conditions.

MMS requirements and regulations address concerns identified here, and no further mitigations appear necessary.

5.1.6 Slope Stability - Onshore

INTRODUCTION/METHODOLOGY

Failures of unstable slopes are considered here as geologic constraints on the project. Destabilization of slopes as a result of project activities is discussed in Section 5.1.8, as impacts of the project on the geologic environment. Impacts were evaluated through review of previous work in the area, evaluation of materials supplied by the applicant, examination of aerial photographs, and field work.

IMPACTS

Impacts on Project Components

Slope Failures - The slope stability problem of most concern is landslides, which can occur in bedrock and weathered material of the Rincon, Monterey, and Sisquoc formations. Existing slides are concentrated in the Rincon formation in the Gaviota Canyon area, and in the Monterey Formation east of Arroyo Hondo on the optional extension. The potential for landslides is greatest on any slope in the Rincon and on oversteepened, south-facing slopes in the Monterey and Sisquoc. 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 5-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 route, 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 threat 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 biweekly pipeline maintenance checks well in advance of any hazard of rupture. In addition, creep is mainly a surficial phenomenon, and would be unlikely to affect pipelines buried to 5 feet or greater. Impacts are classified as adverse but not significant (Class III).

At the Gaviota site, underlying materials are mostly Rincon and various Quaternary deposits. Rincon materials are acknowledged to be prone to landslide and difficult to use as foundation material, and therefore constitute a constraint. Dames and Moore [1982] has recommended alternating layers of clays and sands during construction of filled areas, over excavation of old landslides and underneath roadways, and special foundation precautions (e.g., use of drilled cast-in-place concrete piles) to account for the undesirable properties of those materials. Impacts are classified as potentially significant but mitigable (Class II).

<u>Adverse Soil Conditions</u> - Soils in the onshore region which develop from the Monterey, Sisquoc and Rincon formations are frequently expansive and tend to shrink and swell during dry and wet periods. These soils could cause foundation stability problems. Potential impacts can be compensated for with careful geotechnical consideration, and so are categorized as significant but mitigable (Class II). Compressible and collapsible soils are not known to be extensive in the project area.

<u>Impacts on Area Development</u>

The pipeline and Gaviota facilities would be sized to accommodate the full anticipated production from the Arguello Field Area. Therefore, no additional or different impacts related to onshore slope stability are anticipated.

Impacts on Alternatives

The alternative site at Point Conception is also located on terrace deposits. Thus the potential for impacts associated with slope and foundation instability at the Gaviota site would be avoided.

MITIGATION MEASURES

Dames & Moore (1984a) has made a number of recommendations regarding mitigation of slope stability constraints on the pipelines, including avoidance or deeper burial in debris slides in West Wood Canyon, Damsite Canyon, Canada del Cementerio, Arroyo el Bulito, and rerouting to avoid a large slide area on the west side of Gaviota Canyon. Some of these recommendations have been adopted or rendered obsolete by recent realignments, including partial avoidance and deeper burial in the vicinity of the slide area in Gaviota Canyon, a feature of particular concern. Other of Dames & Moore's (1984a) recommendations have not been explicitly adopted by the applicant. Adopting their additional recommendations into pipeline design would mitigate slope stability constraints to Class III.

5.1.7 Erosion

INTRODUCTION/METHODOLOGY

Areas of active erosion are considered potential geologic constraints on the project. Project activities which may result in increased erosion, sediment loading to streams or initiation of gullying are considered as project impacts on the geologic environment and are addressed in Section 5.1.2.

Erosion in the offshore area appears to occur mainly in well-expressed, identified seafloor channels. Erosion onshore can occur on any slope, but is most dramatic as stream incision and gullying. Impacts were evaluated through review of previous work in the area, evaluation of materials supplied by the applicant, examination of aerial photographs, and field work.

IMPACTS

Impacts on Project Components

Headward erosion of active gullies could lead to undermining of pipeline support, sagging, buckling, and possible rupture. Any condition which could lead to rupture of a pipeline is considered Class II. Any conditions which could damage the pipeline but not cause rupture is considered Class III. Calculated rates of gully advance indicate that for the proposed alignment, several gullies can be expected to advance past the pipeline during the life of the project. A gully of particular concern is advancing up an arroyo immediately west of Damsite Canyon.

Along some stream channels, erosional processes could expose buried pipelines unless special precautions, such as deeper burial, are taken during construction.

Impacts on Area Development

The pipeline and Gaviota facilities would be sized to accommodate the full anticipated production from the Arguello Field Area. Therefore, no additional or different impacts related to erosion and cliff retreat are anticipated.

Impacts on Alternatives

The potential for erosion in active seafloor channels would be the primary erosion-related concern associated with the offshore alternative alignment. Potentially active channels are associated with the upper portion of the Conception Submarine Fan Province (USGS, 1974) along the assumed alignment, southwest of Gaviota.

MITIGATION MEASURES

Relocating the pipeline at least 150 feet north of the head of the gully west of Damsite Canyon would prevent potential loss of foundation support. This gully should be carefully monitored during biweekly inspections, and erosion control measures taken if warranted.

Using the recommendations of Dames & Moore (1984) for pipeline design would ensure pipeline integrity at individual stream crossings where spanning is not recommended (see Terrestrial Biology and Surface Water discussions for location of spanned streams).

5.1.8 Impact of Proposed Project and Alternatives on the Geologic Environment

IMPACTS OF PROJECT COMPONENTS

This section addresses aspects of the project 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-development /production phase 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 area. Anchor scars from lay barges would be created. Sediment disturbance and redistribution associated with all phases of the platform from installation through abandonment should be limited to a small 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.

During the production phase of Arguello Field development, considerable quantities of fluids will be removed from the subsurface rock formations. Experience in other oil fields, for example, the Wilmington Oilfield near Long Beach, California, and the Ventura Oilfield, 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 at the Arguello Field (see Appendix E) suggests that subsidence at the Arguello Field would not be a problem.

The impacts of the pipelines on the environment relate primarily to construction and installation, particularly trenching and burial operations. The offshore impacts relate primarily to the region in water depths less than 60 meters (200 feet). As a whole, the combined 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 and could not be reconstructed to original conditions. (See Surface Water, Section 5.3.1 for additional discussion). Potential impacts are rated as Class II.

At Gaviota, construction activities could lead to increased erosion. These impacts are discussed in Section 5.3.1. If current plans are implemented to divert surface runoff water to a collection trough above cut slopes, runoff could be expected to produce gullies similar to those threatening the SCE access road. This impact is rated as significant but mitigable (Class II).

IMPACTS OF AREA DEVELOPMENT

Area development should not result in any different impacts, but it 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 Arguello Field is susceptible to ground subsidence from removal of hydrocarbons, additional wells would compound the problem. As discussed earlier, however, such subsidence is not expected to be significant and would be either arrestable or reversible by water flooding or reinjection. 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.

IMPACTS OF ALTERNATIVES

A facility at the Point Conception alternative site would require about the same level of construction as the Gaviota facility though less grading and more access route preparation would be required. Disturbances associated with erosion at stream crossings would be eliminated if the offshore alternative pipeline route were selected.

MITIGATION MEASURES

At locations where notching of oversteepened stream banks could not be reconstructed, spanning of crossing would mitigate impacts to Class III. See Figure 5.3.1 and Terrestrial Biology discussion for locations.

If the recommendations of Dames & Moore (1984) for construction of Gaviota facility to control erosion are adopted, erosion impacts would be largely reduced to Class III levels.

If runoff collected by the protective trench at the top of the slope at the Gaviota site is diverted to the retention basin or otherwise controlled, the potential impacts from gully initiation at the discharge points would be mitigated to Class III.

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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 below presumes that Chevron's platforms will be installed when evaluating the Texaco project. Similarly, the Area Study of the Southern Santa Maria Basin buildout assumes that the Chevron and Texaco projects will exist. The onshore processing facilities would be common to each of these offshore developments, but the throughput at the onshore facility could vary depending on assumptions about the Area Study.

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 project,
- Incremental concentrations resulting from the proposed Chevron project,
- Incremental concentrations resulting from the proposed Texaco project, and
- Incremental concentrations resulting from five additional platforms 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 emission 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.

SIGNIFICANCE CRITERIA

The significance criteria that were used in the air quality analysis were based on definitions in regulations of DOI, EPA, ARB and Santa Barbara APCD. 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 DOI significance levels and to Federal and Santa Barbara County Prevention of Significant Determination (PSD) levels. If the increments for the OCS facilities exceed the DOI significance levels (Table 4.2-2), the impacts would be considered significant. For the onshore facilities, if the increments exceed the Federal or County PSD levels, the source would be significant.

- If a total concentration (incremental from the projects plus the background) exceeds a State or Federal standard, the project impact can be considered significant.

- For a nonattainment pollutant, such as ozone, if the project emissions contribute to additional exceedences 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.

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 F.

INERT POLLUTANTS

The air quality impacts of the non-reactive, or inert, pollutants -- NO_2, CO, SO_2, and TSP -- 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 is used to estimate hourly ground level concentrations from point source (stack) emissions at both onshore and offshore locations. The modifications to both of the basic models include provisions for treating 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 Gaussion dispersion algorithm found in PTMOCS. The use of both modified models was 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 estimation included modeling emissions for the following cases:

- The maximum production rates of Platform Harvest,
- The maximum production rate of Platforms Hermosa and Hidalgo,
- The maximum processing throughput at the Gaviota onshore facility site,
- Equivalent throughput and emissions at the alternative onshore facility site at Point Conception,
- The maximum production rates of the three project platforms plus the five Area Study platforms, and maximum processing throughput at the Gaviota site,
- The maximum construction emissions for each of the first three cases above, and
- Upset conditions causing unusually high platform or processing-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 of air parcels over the emission sources and toward the grid of receptors. Details on the selected wind directions and receptor locations are contained in Appendix F. Meteorological parameters were chosen that correspond to conditions related to the greatest impacts from the project. 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 Point Arguello to represent overwater meteorological regimes. STAR data derived from observations taken at Corral Canyon and Platform Hondo A were used to represent air regines in the channel, including the near shore area at Gaviota.

The other model used for modeling inert pollutant impacts is MPTER. This model was applied specifically to evaluate maximum shoreline impacts of the project platforms plus the five Area Study platforms. This evaluation is necessary to satisfy Department of Interior (DOI) OCS air regulations, applicable to offshore developments three 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 Air Force Base along with the corresponding twice a day mixing height data was considered the most appropriate complete set of data for use in MPTER. All eight platforms (three for the proposed projects plus five area study platforms) in their aggregate peak production years were utilized in the MPTER modeling, and the emissions inventory reflects total annual emissions from all eight 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 eight km and a variable "height."

Five basic trajectories were developed for evaluating photochemical pollutant impacts. Appendix F outlines the methodology 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 shown together on Figure 5.2-1. For each of these trajectories a specific set of meteorological parameters and initial pollutant concentrations was established based on observed data. The combinations of these trajectories and initial conditions permit a range of concentrations that can be predicted at key locations for the region.

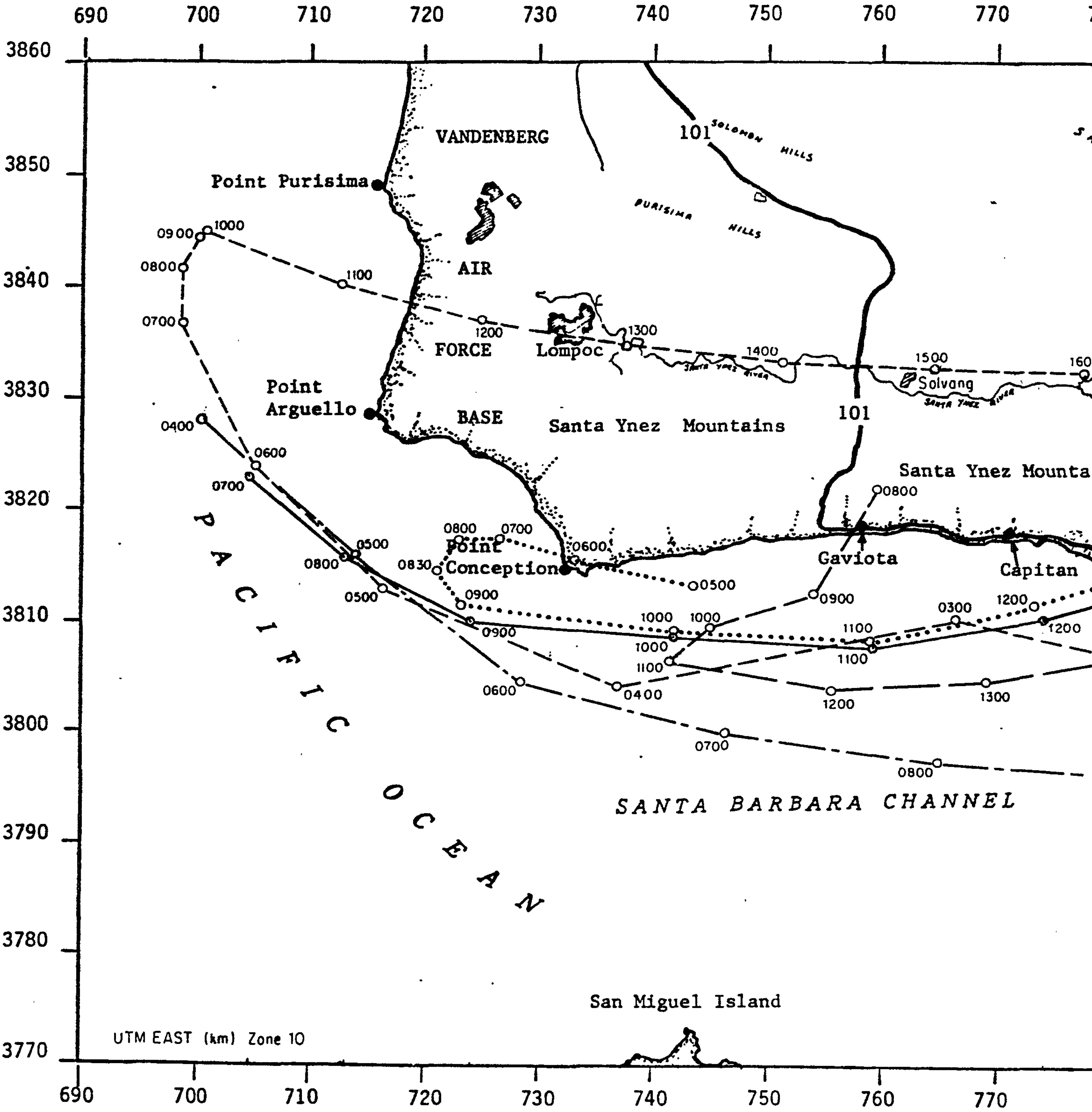


FIGURE 5.2.1 AIR PARCEL TRAJECTOR

Trajectory 1 corresponds to the "breakdown phase" of Santa Ana winds. Initially, southeasterly winds bring pollutant laden air into the Santa Barbara Channel region. The northwesterly progress of these winds slows by mid to late morning, at which time developed sea breezes promote flow of this air onto shore and into inland areas of the Santa Ynez Valley during late morning and into the afternoon. This wind flow pattern was observed approximately 13 times in 1981.

Trajectory 2 is designed to study the impacts of the project-related offshore sources on the Santa Barbara area. This trajectory begins with northwesterly flow incident to the outer channel areas, moving down-channel with light westerly winds in the outer channel through late morning, and finally flowing onshore obliquely under light sea breezes during mid-afternoon. The combination of predominant northwesterly flow followed by onshore flow in the midday is very common for the channel area, occurring up to 20 percent of the time. However, specific trajectories that include air parcels sweeping out project emissions and entering onshore at the same location may occur less than 10 percent of the time.

Trajectory 3 was developed to evaluate the impacts from the project-related Gaviota onshore processing facility. Early morning drainage winds out of the Santa Ynez range progress southwestward to the western end of the channel and mix with westerly air flow in the outer channel area. Mid-afternoon sea breezes then bring this air onshore and into Santa Barbara. The drainage flow off the mountains is very common; however the occurrence of southwesterly flow is reduced considerably during strong northwesterly flow in the channel.

Trajectory 4 was developed to study project-related impacts on the Ojai area. The long trajectory pathway begins with a moderately high wind speed from the northwest in the Point Conception region. Air parcels follow a trajectory down the Channel toward the Ventura area where, by midday, they are entrained in flow up to the Ojai Valley. Wind speeds are reduced in the overland areas because of vertical mixing and because of direction changes. It is similar to Trajectory 2, but begins with moderately strong northwest winds which result in a path farther offshore. The influence of terrain-induced sea breezes are not evident until the air parces is entrained in flow up the Ventura Valley. Because of the predominant northwesterly flow, this trajectory can occur as frequently as Trajectory 2.

Trajectory 5 was designed to investigate air quality impacts of the proposed alternative onshore facility at Point Conception. The trajectory begins with nocturnal flow from the east moving over the Point Conception area. This easterly nocturnal flow is entrained into the predominant northwesterly flow west of the Channel. During midmorning, the air flow is down the Channel and is finally entrained into the Santa Barbara area by midafternoon. This trajectory would occur under post-Santa Ana conditions similar to Trajectory 1 and may occur as frequently.

All five trajectories were calibrated to actual ambient observations by using emissions and meteorological data that were recorded for specific days in 1980 and 1981. Because the trajectories were developed based on actual meteorological and air quality observations for given days over a two-year period, it can be assumed that they routinely occur at least several days a year. 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 .005 ppm, or if the maximum and minimum predicted values bracketed the monitored concentrations. Details of the calibration runs are given in Appendix F. Background levels (initial conditions) of reactive hydrocarbons, NO_x and O_3 are also described in Appendix F.

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 Santa Barbara APCD 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 facility. 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 one-hour emission rates for each of the phases that were described in the "cases to be analyzed" section earlier in Section 5.2, were calculated for the simultaneously operating sources. These worst-case emission scenarios were based on maximum normal operations. For upset conditions, such as control or process equipment failure, separate emissions were calculated as input to specific upset condition model runs. It was determined that peak construction emissions would occur in 1985. It was also determined that peak production emissions for Texaco would be 1988 and for Chevron the peak production emissions from the two platforms, Hermosa and Hidalgo, would be 1992. Detailed short-term average emission rates for all of the scenarios are given in Appendix F.

Emissions were also estimated for upset conditions. These scenarios include the most likely device failures that 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. Details of the upset scenarios along with the expected failure rates are given in Appendix F. 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 F.

In the photochemical modeling, the TRACE model was calibrated for each of the five 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

INERT POLLUTANTS

The maximum one-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 different time averages are exceedingly complex and the power law correction factors may be considered as conservative 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 model 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. In order to accomplish this an extensive meteorological and pollutant or tracer monitoring program would be required. 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, and may be considered as averages of worst case levels.

Table 5.2-1 summarizes the results of the PTMOCS model runs. These results were based on the maximum construction and production related emissions for the proposed Chevron and Texaco projects, including the onshore facility at Gaviota. NO_x concentrations were calculated by the ozone limiting method assuming an ambient ozone concentration of 0.13 ppm. For construction emissions the California one-hour NO_2 Standard is predicted to be exceeded during several operations. The maximum increment reported in Table 5.2-1 is expected to occur near the shore at Gaviota during construction of the outfall discharge line. Additional exceedances are predicted to occur near Gaviota during construction of the onshore facility and the onland portion of the pipeline. Exceedances

TABLE 5.2-1

SUMMARY OF WORST CASE SHORT-TERM AMBIENT AIR CONCENTRATIONS
(ug/m^3)

Pollutant	Average Period	Maximum Increment Construction	Maximum Total Construction	Maximum Increment Peak Production	Maximum Total Peak Production	PSD Standard	Most Sringent Ambient Air Standard
NO_2	1-hr	689	896	619	826	100-470	470
CO	1-hr	1286	2431	1709	2854	10,000	40,000
	8-hr	697	1842	940	2085	2500	10,000
SO_2	1-hr	222	274	761	813	-----	1310
	3-hr	162	204	546	588	512	1300
	24-hr	88	98	304	314	91	365
TSP	24-hr	1822	1882	132	192	37	260

are also predicted to occur near Point Conception during construction of the offshore pipeline and during construction of Platform Harvest. The TSP 24-hour Standard is predicted to be exceeded near Gaviota as a result of construction of the onshore facility and onland pipeline.

Table 5.2-1 indicates that during peak production the predicted maximum short-term concentrations estimates would comply with the ambient air standards except for the predicted hourly NO_2 concentrations. The predicted total level of NO_2 is approximately 1.8 times the California one-hour standard.

With respect to the PSD standards, the predicted increment for NO_2 is estimated to be six times the County minimum increment allowance of 100 ug/m^3. It is 2.4 times the increment that would cause the ambient standard of 470 ug/m^3 to be exceeded, if the background of 207 ug/m^3 were included. For SO_2 the increments are from 1.1 to 3.3 times the allowed levels and for TSP the increment is predicted to be 3.6 times the standard. All of the contributions to the maximum increments are due to emissions from the onshore facility.

The maximum concentrations occur at elevated locations a few hundred meters north of the Gaviota onshore facility. The situations producing the maximum short-term average concentratins are characterized by light onshore winds (1 meter/sec speeds) accompanied by very stable atmospheric conditions. A mixed (unstable) layer of air can generally occur at the surface during the day. However, onshore flow at night will not result in a mixed layer. The pollutant emissions can thus be entrained in a layer of very stable air. The principal contributions to the maximum concentrations are emissions from the cogeneration units, the auxillary heater and the sulfur recovery plant, in which the plumes impinge on the nearby hillside.

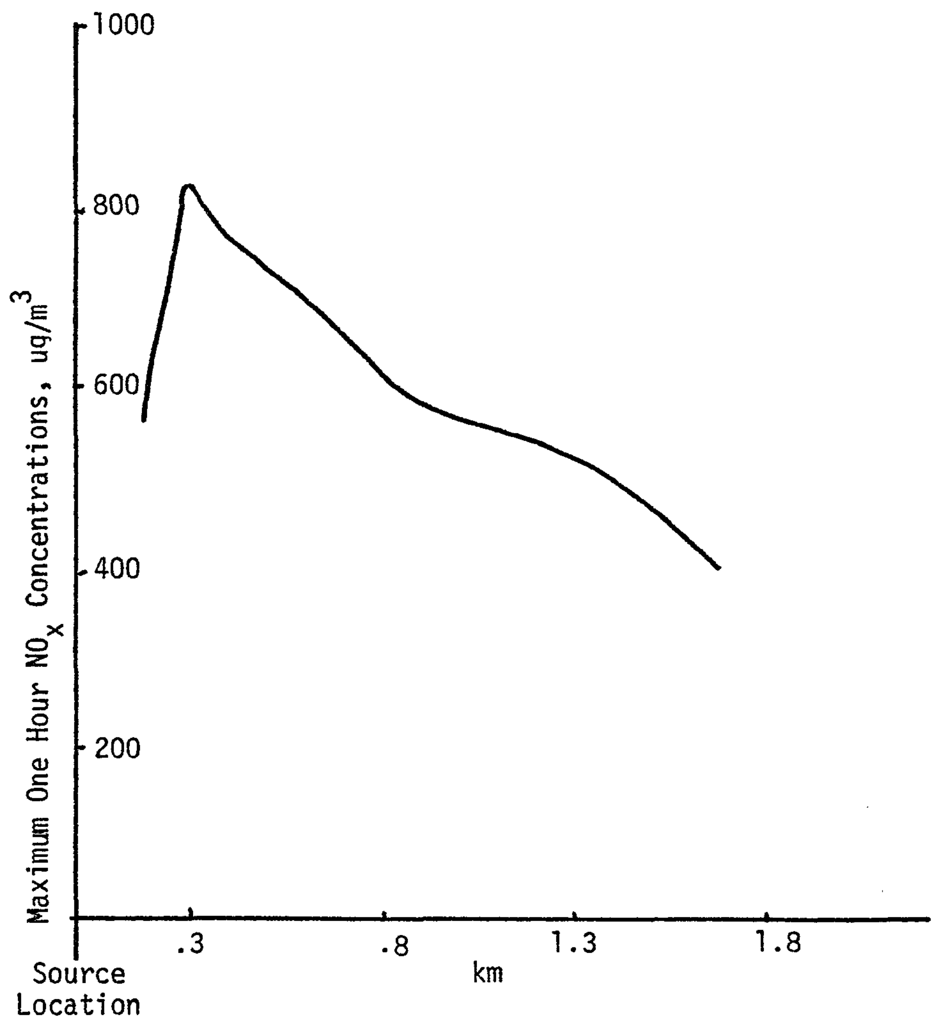
The predicted NO_2 concentration as a function of the downwind distance north of the Gaviota facility for the maximum increment is plotted in Figure 5.2-2. It shows that the predicted concentration increases rapidly until the terrain reaches the height of the plumes of the cogeneration units, and then the concentrations decrease to levels below the standard within one mile of the facility, thus indicating that the impact is highly localized. However, the regulations do not take into consideration the extent of a region that would exceed a standard before acknowledging a standard violation. It should also be pointed out that the predicted NO_2 increment exceeds the ambient standard without consideration of a background level. The results of the modeling are conservative because of the use of the COMPLEX II algorithm in PTMOCS. This is consistent with the worst case analysis approach that is recommended by the EPA guidelines.

The maximum concentrations would be much lower for other wind directions in which the surrounding terrain is not elevated above the facility. The predicted levels would not exceed the standards west, south, or east of the plant. Thus, the maximum levels would be highly localized to part of the hillside.

The maximum TSP level is predicted to exceed the allowed PSD increment by almost a factor of four. However, the total concentration, including the background, is not expected to exceed the ambient air

Figure 5.2-2

Predicted NO_2 Concentrations as a Function
of Downwind Distance North of the Gaviota Facility



standard. The main contributors to the high increment are the auxillary heater and the sulfur plant exhausts. The maximum would occur immediately north of the plant, approximately 150 meters downwind at elevated terrain.

Shoreline fumigation was found to produce considerably lower results, because emissions from the onshore facility, which are the main contributor to the maximum increments, would be initially diluted in the unstable atmosphere.

The CDMOCS model was used to calculate annual average concentrations of the inert pollutants. In order to streamline the analysis, a computer run was made which included all of the future emission sources for the area. This included both project and nonproject sources that are described in the cumulative impact sections (Sections 6.0 and 6.2). If the predicted levels from this computer run would not exceed the annual standards, then it could be assumed that the project only sources would not result in standard violations. If exceedences would occur, then the nonproject sources could be backed out of the emissions, and the impacts from the projects only could be estimated by running the model again.

The results of the CDMOCS run containing all of the future sources, both project and nonproject, are summarized in Table 5.2-2. They indicate that because there were no predicted standard violations, there would be no violations due to the projects alone. The results of the modeling indicate that there will be no annual average standard exceedance for the cumulative scenario also.

The MPTER model, as described earlier in the section, was run to calculate maximum increments from all the proposed offshore platforms, including the five in the Area Study in order to test for DOI significance levels. The results of the MPTER model runs are summarized in Table 5.2-3. All levels for the maximum production scenario are considerably less than the DOI allowed increments. Consequently, additional mitigation of inert pollutant emissions from the offshore platforms would not be required during normal operations. Details of the MPTER model analysis are given in Appendix F.

PHOTOCHEMICAL POLLUTANTS

The maximum ozone values predicted by TRACE for each of the trajectories is given in Table 5.2-4. This table summarizes three basic sets of runs that were carried out for each trajectory. They include:

(1) Baseline calibration runs in which adjustments are made so that the model reasonably predicts monitored values for given days.

(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 project runs to estimate the combined effects of the projects and future baseline sources.

TABLE 5.2-2

PREDICTED MAXIMUM ANNUAL AVERAGE CONCENTRATIONS
DUE TO PROJECT AND FUTURE NONPROJECT SOURCES (ug/m^3)

Pollutant	Maximum Increments	Total Concentration	Standard
NO_2	17	36	100
SO_2	3	4	80
TSP	1	34	75

TABLE 5.2-3

MAXIMUM CONCENTRATIONS (ug/m3) FROM 8 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	23.5	2000	1169	40,000	----	----	----	----
3-hour	----	----	----	----	4.4	25	46.4	1300	----	----	----	----	----	----	----	----
8-hour	----	----	----	----	----	----	----	----	6.2	500	1151	10,000	----	----	----	----
24-hour	----	----	----	----	0.6	5	10.6	365	----	----	----	----	0.06	5	61	250
Annual	0.5	1.0	19.5	100	0.03	1.0	0.03	80	----	----	----	----	0.02	1.0	33	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	19.3	2000	1164	40,000	----	----	----	----
3-hour	----	----	----	----	4.3	25	43.3	1300	----	----	----	----	----	----	----	----
8-hour	----	----	----	----	----	----	----	----	5.2	500	1150	10,000	----	----	----	----
24-hour	----	----	----	----	0.3	5	10.3	365	----	----	----	----	0.01	5	60	260
Annual	0.2	1.0	19.2	100	0.02	1.0	0.02	80	----	----	----	----	0.01	1	33	75

TABLE 5.2-4

MAXIMUM ONE-HOUR OZONE CONCENTRATIONS FOR THE PROPOSED PROJECTS COMPARED WITH THE PRESENT AND FUTURE BASELINES* (ppm)

Trajectory	Present Baseline	Future Baseline	Chevron Project	Chevron and Texaco Project
1	.103	.101	.105	.112
2	.106	.107	.109	.108
3	.101	.103	.103	.103
4	.111	.111	.121	.118

*Federal Standard 0.12 ppm, California Standard 0.10 ppm.

The table shows that the proposed projects cause maximum incremental ozone concentrations ranging from 0.001 to 0.011 ppm above the future baseline levels with the greatest increments occurring in Santa Ynez for Trajectory 1 and in Ojai for Trajectory 4. Meteorological data in support of the development of Trajectory 1 indicate that this air flow pattern has occurred 13 times over the 1980-81 period of record. Trajectory 4 is expected to occur more frequently, because the meteorological data supporting the trajectory development included predominant northwesterly flow, and the modeling analysis utilized clean over-water initial conditions which usually occur. Trajectories 2 and 3 which involve air pathways from the platforms to Santa Barbara and from the onshore facility to Santa Barbara respectively show little or no increases in ozone levels. These predicted levels can be considered as means of maximum values for a given trajectory and the uncertainties in the predicted values could result in levels that are greater than or less than those predicted. The use of the mean of a maximum predicted value in evaluating impacts is consistent with NEPA and CEQA in that reasonable worst case impacts should be considered. The use of three significant figures in reporting the model results is consistent with the predictability of the model which was discussed under model calibrations (page 5.2-8) and is useful in determining whether a predicted concentration level is greater than the corresponding two-digit number, even though the actual level may not be specifically defined. The calibration of the model was considered acceptable if the predicted level was within .005 ppm of the observed level.

In all of the trajectories the predicted levels are expected to exceed the state standard of 0.10 ppm without or with the project, but only in Trajectory 4 is the Federal standard predicted to be exceeded.

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. Also the predicted values must be evaluated with respect to other issues such as exposure to toxic or odorous pollutants, effects on visibility, and material damage.

INERT POLLUTANTS

In the analysis of impacts of the projects 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 in the region. Additional emissions that would occur after the Chevron/Texaco projects are included in the cumulative analysis.

The annual emissions for each of the proposed Chevron and Texaco platforms were compared with the DOI exemption levels. All three platforms were found to be below the limit requiring further analysis. However, the combination of these proposed platforms along with the five additional Area Study platforms were modeled using MPTER to test for significance levels. Two scenarios were considered in the analysis, the first being platform construction and installation, and the second one being drilling and production. Drilling and production was considered a single scenario because it was assumed that both activities would take place simultaneously during a portion of the project. The results (Table 5.2-3) show that none of the significance levels for the four criteria pollutants are expected to be exceeded for both construction and production. These incremental levels will also not lead to exceedence of the Federal standards.

Maximum Short-term Impacts from Onshore and Offshore Project Construction

During construction the emissions may result in maximum one-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 site. However, 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. The probabilities of the occurrences of high impacts would thus be lower than conditions involving continuous emissions such as plant operations.

Production Impacts

The maximum short-term impacts during production from either the Texaco or the Chevron platforms would occur as a result of emissions at the onshore Gaviota facility. At the onshore facility the expected maximum short-term emissions are not expected to change when either the Texaco or Chevron platforms are at peak production. Consequently, the maximum short-term impacts of the inert pollutants would be the same for both peak production years. At the location of maximum concentration, the offshore platforms do not contribute to the predicted level.

The maximum short-term concentrations, Table 5.2-1, indicate that the most significant impacts are due to the 1-hour NO_2 concentrations. The maximum value, including background, are predicted to exceed the California standard. The principal contributors to the maximum NO_2 levels are the cogeneration units and the fired heaters. The maximum NO_2 increment is 1.8 times the level allowed under the new Santa Barbara County PSD regulations and exceeds the California 1-hour ambient standard without consideration of background. Table 5.2-1 shows that the maximum concentrations of CO, SO_2, and TSP are below the ambient standards, ranging from 21 to 86% of the allowed levels, the increments for SO_2 and TSP are predicted to exceed the allowed PSD increments.

PHOTOCHEMICAL POLLUTANTS

Results of the TRACE model indicate that the maximum one-hour ozone level during production at the Chevron platforms would exceed the Federal standard in Ojai and would approach the Federal standard during production by both the Chevron and Texaco facilities. The predicted levels are not expected to exceed the Federal standard under the future no project condition. However, there will be exceedances of the Federal standard in Ojai under different meteorological conditions in which the projects do not contribute to the ozone levels. 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 any one 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 that can lead to ozone formations.

VISIBILITY IMPACTS

The EPA regulations require that the impacts of visibility impairment due to the projects at PSD Class I areas be evaluated. The nearest area is the San Rafael Wilderness which is approximately 38 km northeast of the Gaviota site. 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 NO_x and SO_2 emissions, indicate that there would be no perceptible visibility impairment in the San Rafael Wildness.

OTHER POLLUTANTS

Toxic pollutants such as hydrogen sulfide are not expected to be emitted under normal operations because these gasses would be stripped from the gas streams. Under upset conditions the gasses would be incinerated. Other trace toxic pollutants such as metals or polycyclic organic matter (POM) can be emitted as a result of diesel fuel combustion. However, diesel engines will be used only for a short time during start-up or under emergency conditions and also from trucks at the Gaviota site which operate only during entry and leaving the site.

Odorous vapors such as hydogen 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 threshholds are also extremely low. Thus nuisance odors may occasionally occur in the immediate vicinity of the onshore facility at Gaviota, such as at the nearby Vista del Mar School.

OFFSET REQUIREMENTS

The new Santa Barbara APCD Rule 205.C [3.b.(2.)(a)] requires that sources at the onshore facility in which the net emissions of reactive hydrocarbons, nitrogen oxides, sulfur oxides or particulate matter exceed 10-pounds per hour. The emissions in Table 4.3-2 of Appendix F indicate that both reactive hydrocarbons and (16-lb/hr) nitrogen oxides (70-lb/hr) exceed the 10-pound limit.

Chevron has proposed that the net emissions for the onshore facility be considered lower by using cogeneration emission credits. The excess electrical power generated at Gaviota would be transmitted to the grid of the region, and cogeneration emission credits should be allowed under Section 41605 of the Health and Safety Code. Emission credits for the turbines, which are involved in cogeneration, can be counted in the offset calculation. It is estimated that the cogeneration turbines will produce 16.8 kilowatts of excess power for the grid. The equivalent emissions that would be offset from the combined SCE and PGE plants can thus be subtracted from emissions at Gaviota and the net emissions can be presented as:

	NO_x	RHC
Onshore Emissions (lb/hr)	70	16
Power Plants (lb/hr)	17	5
Net emissions left	53	11

The reactive hydrocarbon net emissions would result in levels above the 10-lb/hr limit requiring further emission reductions.

For NO_x the net emissions exceed the 10-lb/hr limit and would require additional offsets. Chevron has proposed that their Carpenteria plant be equipped with additional controls and that the additional emission reductions be credited to the offset. However, Rule 205.C requires that the offset credits must be within 15 miles of the new source or must show through modeling to result in a net improvement in air quality around the new source. Since neither condition applies in this case, the offset emissions at Carpenteria could not be credited and additional emission offsets will be required.

Chevron will be required to submit an application for permission to construct and operate the Gaviota facility to the Santa Barbara APCD. As part of the permit process, these issues and details on offset credits will need to be negotiated.

ACID FOG

Fog water acidity has recently become an area of 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.

Table 5.2-5 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

TABLE 5.2-5

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/m^3)	High 24-hour Nitrate Levels (ug/m^3)
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.

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 (Section 2.0.7 and 2.7.7) are less than 0.01% of the baseline emissions (Section 4.2) for Santa Barbara County. It may be inferred that pH levels due to additional project emissions will not change significantly. 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.

5.2.4 Upset Related Impacts

Upsets are usually the result of process equipment failure. They are usually 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 turbine generators, compressors, shipping pumps, gas sweetening units, sulfur removal plants and sulfur dioxide scrubbers. The frequency magnitude and duration of flaring events have been 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 F.

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 due to failure of compressors.
- Flaring upset at the onshore facility due to an amine unit failure.
- Flaring upset at the onshore facility due to a sulfur plant failure.

Table 5.2-6 shows the maximum predicted one-hour ozone concentrations that would occur as a result of upsets at Platforms Hermosa or Hidalgo, Harvest and at the onshore facility. This table shows that the maximum increase in ozone would occur in Trajectory 4 at Ojai as a result of upsets at Platform Harvest. The Federal standard may be exceeded both at Ojai and in Santa Ynez as a result of platform upsets. It must be pointed out that in order for the predicted high ozone levels to occur under upset conditions the meteorological conditions that would lead to high ozone values must occur during the upset event. The probability of this simultaneous occurrence would be very low.

TABLE 5.2-6

MAXIMUM OZONE CONCENTRATIONS (PPM) FOR FUTURE BASELINE AND PROPOSED PROJECTS UNDER UPSET CONDITIONS

Trajectory	Future Baseline	Chevron Upset (Hermosa)	Texaco Upset (Harvest)	Onshore Facility
1	.101	.108	.126	--*
2	.107	.109	.108	--*
3	.103	--*	--*	.103
4	.111	.127	.151	--*

*Not applicable for the particular upset.

California Standard 0.10 ppm.
Federal Standard 0.12 ppm.

For inert pollutants the primary upset conditions would result in increased levels of sulfur dioxide during flaring episodes. This includes upsets at the offshore platforms and at the onshore facilities. Other pollutant emissions are not expected to change significantly. Table 5.2-7 summarizes the maximum concentrations that could occur under the previously identified upset scenario. The table shows that impacts that would occur at the plaforms would not lead to SO_2 standard exceedances, although the DOI significance levels for 3-hour and 24-hour averages may be exceeded. However, upsets at the onshore facility, either an amine unit failure or a sulfur plant failure could lead to high SO_2 levels immediately bordering the facility. This can occur at elevated terrain north of the Gaviota site. Locations immediately east, west, or south of the onshore facility would not result in levels nearly as high as those predicted north of the facility because the terrain is not elevated. The predicted maximum 3-hour concentration at Vista del Mar School under this upset condition is 1500 ug/m^3 or 15 percent over the Federal standard. Measures to mitigate the potentially high SO_2 impacts during upset conditions are discussed later in the mitigation section. The high impacts would occur only if the worst case meteorological conditions (low speed onshore winds) would take place during an upset event.

A failure rate for the sulfur plant is estimated to occur up to four times a year based on operating data for similar equipment. These data have been compiled from Arthur D. Little, Inc. files. Since low speed onshore winds occur three percent of the time there could be a 12 percent chance that a high SO_2 impact would occur.

5.2.5 Area Study Specific Impacts

For the additional development of the Arguello field it was assumed that at the time of the maximum production throughput, there would be five additional platforms. The buildout of the five additional platforms was based on information provided by the MMS concerning platform locations, timephasing, level of activity, and likely throughputs. The peak throughput of the Arguello Field was assumed to occur in 1991, with the Gaviota onshore facility handling the processing. Details on the platform locations, emissions inventories, and the platform phasing are given in Appendix F.

The emissions for the onshore facility at Gaviota were assumed to be the same as in the Chevron/Texaco project case, because the same peak throughputs would be processed. Emissions for the additional offshore platforms were developed for model inputs and maximum short-term concentrations of ozone and inert pollutants were calculated.

TABLE 5.2-7

MAXIMUM SHORT-TERM CONCENTRATIONS OF
SO_2 DUE TO UPSETS AT PLATFORMS AND ONSHORE FACILITY
(ug/m3)

	Increment Concentrations	Total	Standard
Upset at Chevron Platform	235 (1 hr)	287	1310
	172 (3 hr)	214	1300
	94 (24 hr)	104	365
Upset at Texaco Platform	590 (1 hr)	642	1310
	431 (3 hr)	473	1300
	236 (24 hr)	246	365
Amine Failure at Onshore Facility	6095 (1 hr)	6147	1310
	4084 (3 hr)	4126	1300
	508 (24 hr)	518	365
Sulfur Plant Failure at Onshore Facility	32490 (1 hr)	32542	1310
	23718 (3 hr)	23760	1300
	5897 (24 hr)	5907	365

The maximum ozone levels as a result of the Area Study buildout are summarized in Table 5.2-8. They indicate that there will be little change in ozone levels as compared with the future baseline. This may occur because of the configuration of the platform locations. There is little opportunity for a single air parcel to entrain emissions from a number of platforms. Therefore, there is little opportunity for additional photochemical reactions to occur to cause higher ozone levels. However, the geographic extent of ozone impacts may increase inthe Area Study scenario.

The maximum short-term concentrations of the inert pollutants were determined by using the PTMOCS model, and they indicate that the maximum levels are the same as the Chevron and Texaco projects. The maximum levels are due to the onshore facility at Gaviota which has the same emission rate as in the project only case. The maximum levels reported in Table 5.2-1 would be applicable to the Area Study Case.

TABLE 5.2-8

MAXIMUM OZONE CONCENTRATION (PPM) FOR FUTURE BASELINE AND AREA STUDY SCENARIOS

Trajectory	Future Baseline	Area Study
1	.102	.115
2	.107	.110
3	.103	.103
4	.111	.113

California Standard 0.10 ppm
Federal Standard 0.12 ppm.

5.2.6 Project Alternatives

The case that was analyzed in detail was the alternative onshore processing facility at Point Conception. The source emissions for the onshore facility were estimated by the same methods as was used for the facility at Gaviota and were utilized in the models PTMOCS and TRACE.

MODELING RESULTS

Inert Pollutants

The predicted maximum short-term pollutant concentrations from the combined emissions of the three offshore platforms and the alternate Point Conception facility are shown in Table 5.2-8a. The maximum concentrations are lower than those predicted for the Gaviota facility, because the terrain near the site is less steep near the Point Conception site than at Gaviota.

TABLE 5.2- 8a

PREDICTED MAXIMUM SHORT-TERM CONCENTRATIONS (ug/m³)
FOR THE ALTERNATE ONSHORE FACILITY AT POINT CONCEPTION

Pollutant	Average Period	Texaco & Chevron Production	PSD Increment	Total Concentration	Ambient Standard
NO_2	1-hr	316	100-470	523	470
CO	1-hr	349	10,000	1494	40,000
	8-hr	192	2,500	1337	10,000
SO_2	1-hr	123	----	175	1310
	3-hr	90	512	132	1300
	24-hr	49	91	101	365
TSP	24-hr	30	37	90	260

The impacts are not as localized. However, the maximum one-hour concentration of NO_2, although lower than at Gaviota, is predicted to exceed the California Standard of 470 ug/m3 by 10 percent. None of the other maximum concentrations are predicted to exceed the State or Federal standards. In summary, maximum concentrations from the alternate onshore facility would result in lower levels and would be less localized because of the differences in the terrain compared with the Gaviota site.

Photochemical Pollutants

The TRACE model was run using Trajectory 5 to predict pollutant concentrations resulting from emissions at the alternate Point Conception onshore facility. The maximum predicted ozone concentration compared to the future baseline is:

Trajectory No.	Future Baseline	Maximum Ozone Concentration
5	.109 ppm	.123 ppm

The predicted level for the alternate site is greater than the value for the Gaviota site, and exceeds the Federal standard.

The other alternate onshore sites that have been identified in Section 3.3 would result in impacts similar to those predicted for the Gaviota site. In all of the alternate sites the maximum concentrations of the inert pollutants would be confined to elevated terrain surrounding the onshore facility. The magnitudes of the maximum concentrations would vary depending on the slopes of the hillsides and the distances of the emission sources from the elevated terrain. The pollutant background levels would be higher at the alternate sites that are located in areas that are closer to populated areas such as those east of Gaviota.

Maximum ozone levels due to the alternate onshore sites would vary depending on the specific air parcel trajectory and the relationship of other sources to the trajectory path. In most cases, the maximum ozone impacts for these alternatives would probably involve air drainage from the land over the facility, flow offshore and then return flow onland, similar to Trajectories 3 and 5 that were used for the Gaviota and Point Conception sites.

5.2.7 Mitigation Measures

For the offshore platforms, both Chevron and Texaco have committed to the utilization of emission controls that would result in net emissions well below the exemption levels which require further analysis. Additional modeling analyses 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 to further reduce inert pollutant emissions. The committed emission controls are included as part of the project application and are described in detail in the Project Description. Chevron has committed to using Best Available Control Technology (BACT) for the onshore facility.

The following controls were included for the offshore and onshore facilities in the modeling analysis:

- Turbine generators would be operated with natural gas containing less than 6 ppm H_2S;
- Water injection will be used in the turbines to control NO_x emissions by approximately 70 percent;
- Waste heat will be recovered from turbines to reduce heating demands;
- Flares will be used to incinerate accidental releases of process gas;
- Caustic scrubbers will be utilized to remove SO_2 from flare exhausts;
- Vapor recovery will be used on storage tanks;
- An inspection and maintenance program will be implemented to minimize fugitive leaks at connections and valve stems; and
- During construction of the onshore facility, water sprays would be used to reduce fugitive dust.

The modeling results described in Section 5.2 indicate that under normal operating conditions with the committed control technologies in place, significant air quality impacts can still occur. Thus, additional control measures would be required to mitigate the significant impacts. These additional mitigation measures and their effectiveness in reducing significant impacts are summarized in Table 5.2-10. In some of the proposed mitigation measures, there would be a demand for additional electrical power from the grid, thus resulting in increased emissions at a power plant supplying the grid. However, there would be a significant reduction in ambient air concentrations at the elevated terrain near Gaviota by purchasing electric power and not operating cogeneration units.

5.2.8 Meteorology

The impacts of the projects on general climate and meterology 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 5.2-9

POTENTIALLY SIGNIFICANT AIR QUALITY 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
			ATMOSPHERE		
Proposed Projects (Individually and Combined)	1.	Emissions during grading and construction at the onshore site may result in a violation of the 24-hour TSP Standard	Local, short term	Additional TSP control plans needed for excavating and grading the site	Significant; may still exceed the 24-hour TSP standard
	2.	Potential to exceed the California one-hour NO_2 standard as a result of construction of the pipeline, the Gaviota facility and pipeline, and the Gaviota outfall	Local to regional (limited to coastline), short-term	Modify construction schedules to minimize overlapping of equipment emissions	Significant; may still exceed the standard because construction schedule could not be adjusted in a practical way
	3.	Potential to exceed California one-hour NO_2 standard near Gaviota due to operation of the onshore facility	Local, occasional exceedence of short term standard during life of project	Replace cogeneration units at Gaviota with electrical power from the grid. The steam-producing boiler will have to be expanded, but there will be a net reduction of NO_x emissions for the facility and a resultant reduction in short term NO_2 impacts	Significant; may still exceed standard. Detailed site specific modeling would be required to more accurately define extent of the increment
	4.	Potential to exceed the short-term SO_2 standards (1-hr, 3-hr, 24-hr) during onshore sulfur recovery plant failure at Gaviota. This can occur even after incinerating the H_2S and scrubbing the SO_2	Local, high levels can occur at elevated receptor near the onshore facility only when onshore winds occur during the failure	Supply clean gas to incinerator to increase exhaust gas flow rate and raise plume height	Significant, Maximum concentrations would be reduced but SO_2 short-term standards may still be exceeded. Also pollutant maximum, although lower than unmitigated consequence, may occur farther downwind in areas containing the peregim falcon

TABLE 5.2-9 (Continued)

POTENTIALLY SIGNIFICANT AIR QUALITY IMPACTS AND MITIGATION/MEASURES
CLASS II: AIR QUALITY IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANCE

Source		Description of Impact	Scope	Partial Mitigation Measures	Residual Impact
Proposed Projects (Individually and Combined)	1.	NO_x and HC emissions from offshore platforms and support activities may contribute to violations of the ozone standard and hinder the reasonable further progress of attaining the standard	Southern Santa Barbara and Ventura Counties	Reduce NO_x emissions at platforms by replacing electric generators with power from the grid through land lines. Because NO_x/HC emission offsets	Insignificant, can lead to additional ocean bottom impacts from cable installation. May be insignificant depending on offset locations.
				Secure NO_x/HC emission offsets	
	2.	Violation of the short-term SO_2 standards (1-hr and 3-hr) during onshore sulfur recovery plant failure at Gaviota. This can occur after incinerating the H_2S and scrubbing the SO_2.	Local, high levels can occur at elevated locations near the onshore facility only when onshore winds occur during the failure.	Maintain spare standby stages at the sulfur plant.	Insignificant, may be a delay in start-up time of standby states.
				Maintain additional auxilliary SO_2 scrubber as standby to reduce SO_2 emissions	Insignificant
Area Study Platforms		Same as 1 above except that the ozone levels may occur in a broader area than the projects only case	Southern Santa Barbara and Ventura Counties	Same as 1 above	Insignificant, cable network can be a problem and ocean bottom would be disturbed

High temperature exhausts from the onshore facility can produce a small heat island immediately surrounding the facility. However, it would be rapidly dissipated a short distance from the facility and would have little effect on circulation patterns.

5.3 ONSHORE WATER RESOURCES

5.3.1 Surface Water

INTRODUCTION/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.

In order to determine significance, some subjective judgments must be made. Water quality is the only one of the three surface water concerns in which defined limits such as drinking water standards or toxicity to fish are available. Firm estimates of water quality impacts are possible only when known concentrations or quantities of pollutants are available, as for an outfall or discharge. When unknown concentrations of an assortment of pollutants are being considered, as would be contained in runoff, the assessment of impacts moves away from the absolute. In either case, the water quality impact is significant if water quality falls below the applicable drinking water standard in a potable water supply or if the concentration of some contaminant is increased to a level that adversely affects fish or other aquatic life. This would include downstream water bodies and groundwater if they represent potential water supply sources. In both cases, there is a requirement for existing or potential beneficial or instream uses; that is, if there is no potential for domestic use of the water supply or no existing biota, the impact is lessened or nonexistent.

In the project area, the determination of significance of sediment loading depends upon projected effects of sediment in downstream areas. In some instances, increased turbidity and subsequent decreases in light transmission could have significant (Class II) impacts on biotic elements as well as aesthetics. This would most commonly occur in still water or where construction takes place in a perennial stream. When the sediment load occurs as a result of periodic storm runoff, significant impacts would occur if: the stream channel became clogged with sediment or culverts became blocked, potentially causing flooding; sediment in the stream channel resulted in the destruction of aquatic habitat and biota; or sediment resulted in the infilling of reservoirs reducing their useful life.

Streamflow impacts could be significant in two ways, both dependent upon conditions downstream. If, as a result of increased runoff, streamflows were increased to a degree that caused downstream flooding, the impact would be rated as significant. A significant impact would also result if a project were to so reduce streamflows that an otherwise perennial stream became intermittent, or flows were reduced such that biological productivity could not be maintained.

IMPACTS OF PROJECT COMPONENTS

Gaviota Facility

The Gaviota facility would be placed between the drainages of Canada del Cementerio and Canada del Leon and would span Canada Alcatraz. Approximately 33 acres of the site would be disturbed. Cut-and-fill slopes would be constructed at 2:1 (horizontal to vertical) and would cover about 18 acres. Runoff from the facility would be directed to three retention basins, from these to a runoff treatment plant and then to Canada del Cementerio.

The proposed project could affect streamflows in two ways: the addition of impervious surfaces, leading to increased runoff and higher peak flows in downstream areas, as well as potentially reduced recharge and base flow to streams during low flow periods; and the alteration of drainages through the capture and transport of runoff from Canadas Alcatraz and del Leon to Canada del Cementerio as a result of collection and impoundment.

If increased flow resulting from increased impervious area subject to the design storm (100-year recurrence interval) were to enter Canada Alcatraz uncontrolled, the increase in peak flow downstream would be less than 10 percent. Because of routing to retention basins and controlled rate of discharge, the actual peak runoff would be slightly reduced in both Canadas Alcatraz and del Cementerio. There would therefore be no significant impact from increased peak flows. In addition, the project's drainage retention and treatment systems would be adequate to prevent uncontrolled or untreated runoff from reaching the natural drainage system.

The estimated average annual soil loss from unprotected 2:1 cut-and-fill slopes would be about 250 tons per acre and 4400 tons from the site. If the slopes were to be constructed as depicted by Dames & Moore (1984b) the annual soil loss would be 180 tons per acre or 3,200 tons from the site. These losses would be temporary for the period during construction and could result in clogging or infilling of the stream channel. After construction, retention basins would function as sediment traps for runoff. If construction were to take place during the rainy season, October through March, temporary sediment retention basins would be required by County Ordinance 1756. In addition, affected streams drain almost directly to the ocean and are mostly ephemeral, limiting the area of impact. Therefore, the impact of sediment loading is considered to be adverse but not significant (Class III). See Section 5.6.2 for discussion of impacts of construction on biota.

Water quality could be affected either through incorporation of pollutants in runoff from the site or by accidental spills of materials to be handled on the site. Runoff from the site could become contaminated through the inclusion of small amounts of spilled oil or other material from the process areas of the facility. If runoff retention and treatment systems function as designed, the possibility of contaminated water reaching the natural drainage system would be minimal. Water quality impacts from rainfall runoff are considered to be adverse but not significant (Class III).

As determined in the system safety analysis (see Appendix O), accidental spills on the site would range up to 700 barrels of dry oil in the process area from process equipment, and up to 60,000 barrels of dry oil from the rupture of containment vessel. Details of likelihood of spills from various types of failures are presented in Technical Appendix O. Small spills would be contained onsite even during rainfall events by the runoff control system. The retention area around the dry-oil reject tank (the source of a 60,000 barrel spill) is designed to contain 85,000 barrels and would contain the spill of the tank contents. Therefore, from these sources, the risk of water quality contamination is small. Other accidental events that could affect water quality include leakage from the produced-water outfall line and the dry oil pipelines to the storage tanks and the marine terminal.

Pipeline from Point Conception to Gaviota

There would be little effect on streamflow from increased flows as a result of pipeline installation. Rainfall runoff could increase slightly as a result of vegetation removal from the pipeline corridor. The increased runoff from about 2 to 9 acres of disturbed ground in watersheds ranging from 300 to 2,000 acres would be negligible (Class III). After the disturbed area became revegetated, the runoff would return to previous levels.

During construction, the burial of the pipelines across perennial streams would entail impoundment or diversion of streams during actual construction at the crossings over a period of 5 to 10 days, though the applicants' procedure for burial is not well defined. Impoundment of the stream would result in the cessation of streamflows downstream from the pipeline crossing. For the streams between the landfall and Canada de San Augustin (Wood, Damsite, Cojo, Gato, Honda, and Llegua), considerable lengths of stream bed, from 3,000-6,000 feet in each drainage, would be affected.

Diverting the streamflow around the construction area would allow for continued flows in downstream reaches. In this case, the only area affected would be the immediate stream channel. Even so, there would be some disruption of streamflows. The impacts on streamflows are therefore rated as short-term regionally significant (Class II) if the streams are to be impounded and Class III if temporary diversions are used.

The wetlands at the crossings of Alegria and Agua Caliente could be severely affected. In order to keep water out of the construction area, the wetlands would have to be drained or temporarily dammed on both sides of the construction corridor. In either case, there would be a major disruption of the surface water resource (local Class II impact).

With respect to sediment loading, the pipeline disturbed area would be a linear feature that would pass through many drainage basins. The amount of disturbed area in any single basin would be relatively minor with respect to the basin as a whole. The most likely conditions for severe erosion are long steep slopes in areas of terrace deposits. These conditions occur in many of the drainages crossed by the pipeline, and in most of these, the pipeline goes directly up the slope. Increased sediment loads could be up to 400 to 500 tons to a single stream if the disturbed area is not rehabilitated before the rainy season. Impacts are rated as potentially long-term regionally significant (Class II). See Section 5.6.2 for discussion of impacts of construction on biota.

The applicant's geotechnical consultant [Dames & Moore, 1984a] has suggested that no special treatment is necessary for backfilling the trenches on slopes less than 5 horizontal to 1 vertical (20 percent) in deposits other than bedrock. In many areas along the pipeline route slopes exceed 20 percent and will need special treatment during backfilling to prevent erosion. Even in areas of bedrock where slopes are 40 percent or greater there could be a tendency for erosion because the pipelines proceed directly up the slope.

The current plan for burial of the pipelines at stream crossings would result in notching of the channel bank where the streams 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 stream. The concentrated runoff could increase the already high erosive hazard and lead to gullying and exposure of the pipeline. Burial of pipelines would be considered Class II impact, mitigable by spanning.

During construction, there would be considerable disturbance within the stream channel. Loose, disturbed soil would be readily available for transport even by the low-volume summer flows of the perennial streams. This sediment, mostly silts and clays, would be carried downstream, resulting in turbid flows and deposition in downstream areas. Impacts are rated as short-term Class II. (See Section 5.6 for a discussion of impacts to aquatic organisms.)

While the major pollutant during pipeline construction would be sediment, other potential pollutants include diesel fuel and engine oil from the contruction equipment. Introduction of these pollutants into any perennial waterbody, by any means, would cause water quality impacts. During the summer months when the construction is scheduled to occur, the streamflows would be low, and the impacts would be severe for a short time. Aquatic organisms affected by such spills could recolonize from unaffected portions of the streams so the impacts would be adverse but not significant (Class III).

Disposal of hydrostatic test water for the pipelines in the ocean outfall at Gaviota would have no surface water impacts. If either of the pipelines leaked, there would be a slight chance for the hydrostatic test water to reach one of the streams with a consequent degradation of the water quality. This would result in an adverse but not significant impact because of the transitory nature of the impact (Class III).

During operation, a pipeline rupture could result in a spill greater than 6,100 barrels of oil (see Appendix O for details on likelihood of various spills). A spill of this magnitude into any of the perennial streams or water bodies would result in significant impacts to that system (local Class II), including containment of oil-water emulsion in the streamflow, deposition of non-soluble fractions along the stream channel, and dissolution of the soluable fraction. See Section 5.6.2 for discussion of impact of accidents and catastrophic events on biota. In this context, the streams along the pipeline route can be comparatively evaluated. Those streams with perennial flow would be more sensitive to oil spills than streams with intermittent flow. Streams on Bixby Ranch where the pipeline stream crossing is farther from the ocean would have a longer reach of stream that could be affected.

IMPACTS OF AREA DEVELOPMENT

The pipelines and Gaviota facility would be sized to accommodate full production from the Arguello Field. No additional or different impacts related to surface water resources are anticipated.

IMPACTS OF ALTERNATIVES

Impacts at the Point Conception site which differ from those at Gaviota include: potential Class II impacts of runoff, given the susceptibility to gullying of terrace materials and the distances to established surface drainage ways; reduced sediment loading impacts related to construction, because of the gentle slopes and limited grading required; a reduced potential for surface water quality impacts because of the distances to surface water bodies.

The offshore pipeline alternative would avoid all direct impacts to onshore surface waters.

MITIGATION MEASURES

Gaviota Facility

Mulching of slopes during construction and revegetation immediately after construction would reduce sediment losses from cut-and-fill slopes at the Gaviota site.

Adequate water quality would be maintained only if the proposed treatment facility is capable of separating floating and suspended oils from the runoff at the design flow rate of 7,700 gpm. Reevaluation of the treatment facility design would clarify this capability. Monitoring of facility operations and implementation of any necessary design modifications would ensure that water quality would not be degraded.

To further ensure that water quality impacts remain Class III, all runoff from potentially contaminated areas of the site could be routed through the treatment facility. This measure would be unnecessary if it could be shown that the untreated runoff meets the secondary and primary drinking water standards for all listed parameters.

Pipeline - Point Conception to Gaviota

Potential Class II streamflow impacts associated with construction could be mitigated to Class III by temporarily diverting flows around construction at stream crossings rather than constructing temporary impoundments.

In order to mitigate potential Class II impacts resulting from notching of streambanks and disruptions of flow in lagoons during construction, sensitive streams could be spanned either with new crossings or utilizing existing crossings, as specified in the Terrestrial Biology Section 5.6.5 and shown in Figure 5.3-1.

Potential Class II impacts from erosion and sediment loading to streams could be minimized if construction took place during the dry season, May to October.

In addition, sediment retention devices that allow continued streamflow (such as straw bales) could be installed directly downstream of the stream crossing during construction to control sediment loading resulting from disturbances of the channel.

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 applicant and subject 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 under way.

The pipeline could be relocated to a more southerly route between Damsite Canyon and Barranca Honda to avoid an area of steep terrace that poses potential sedimentation and erosion problems, and to mitigate Terrestrial Biology impacts (see Section 5.6.5 and Figure 5.3-1).

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.

To minimize Class II impacts of accidental oil spills, as described in Section 5.6-5 and shown in Figure 5.3-1, flow check valves could be installed in the pipeline on either side of stream crossings to decrease the amount of oil spilled in a pipeline rupture.

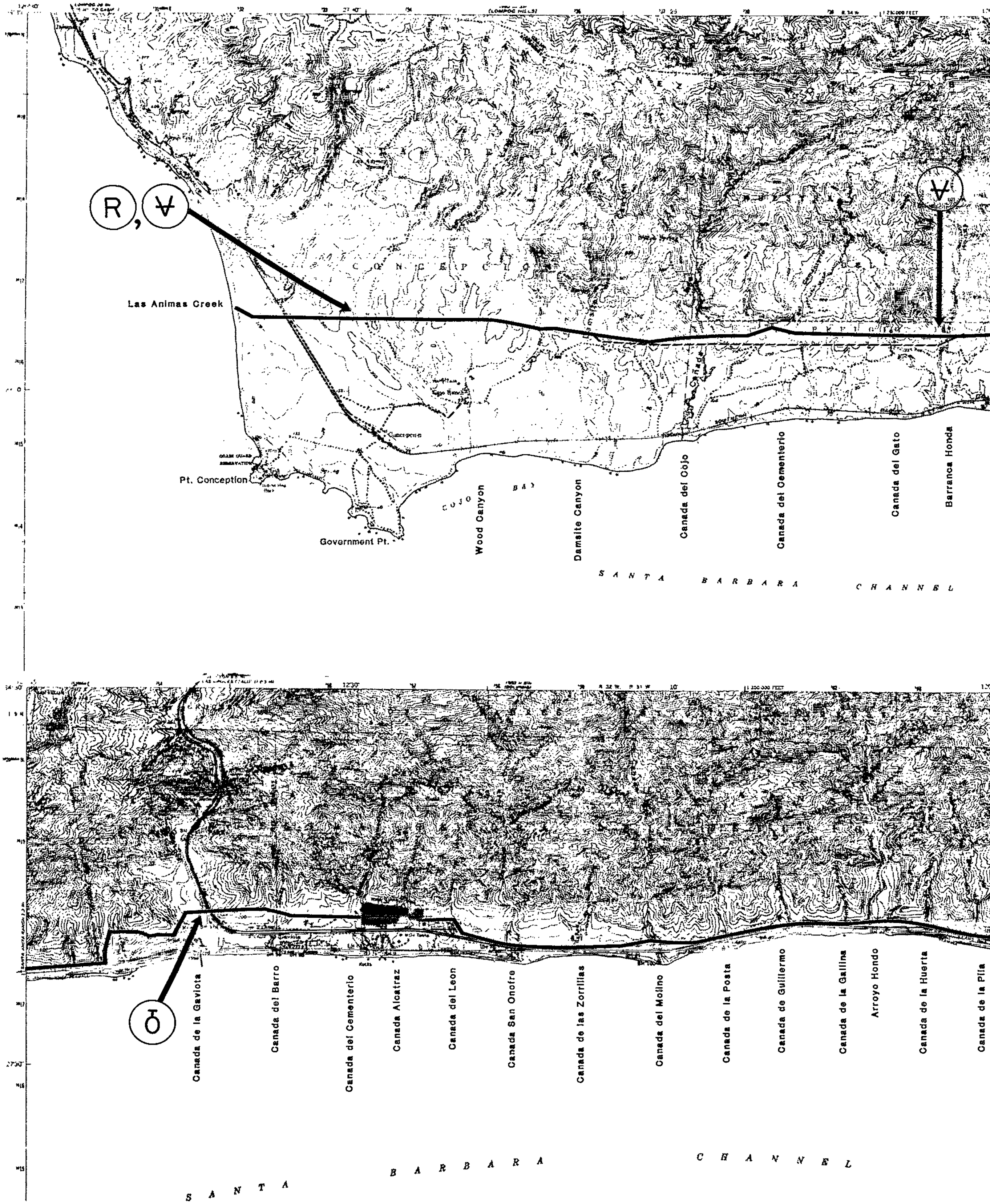


FIGURE 5.3-1 MITIGATION MEASURES FOR PROPOSED ONSHO

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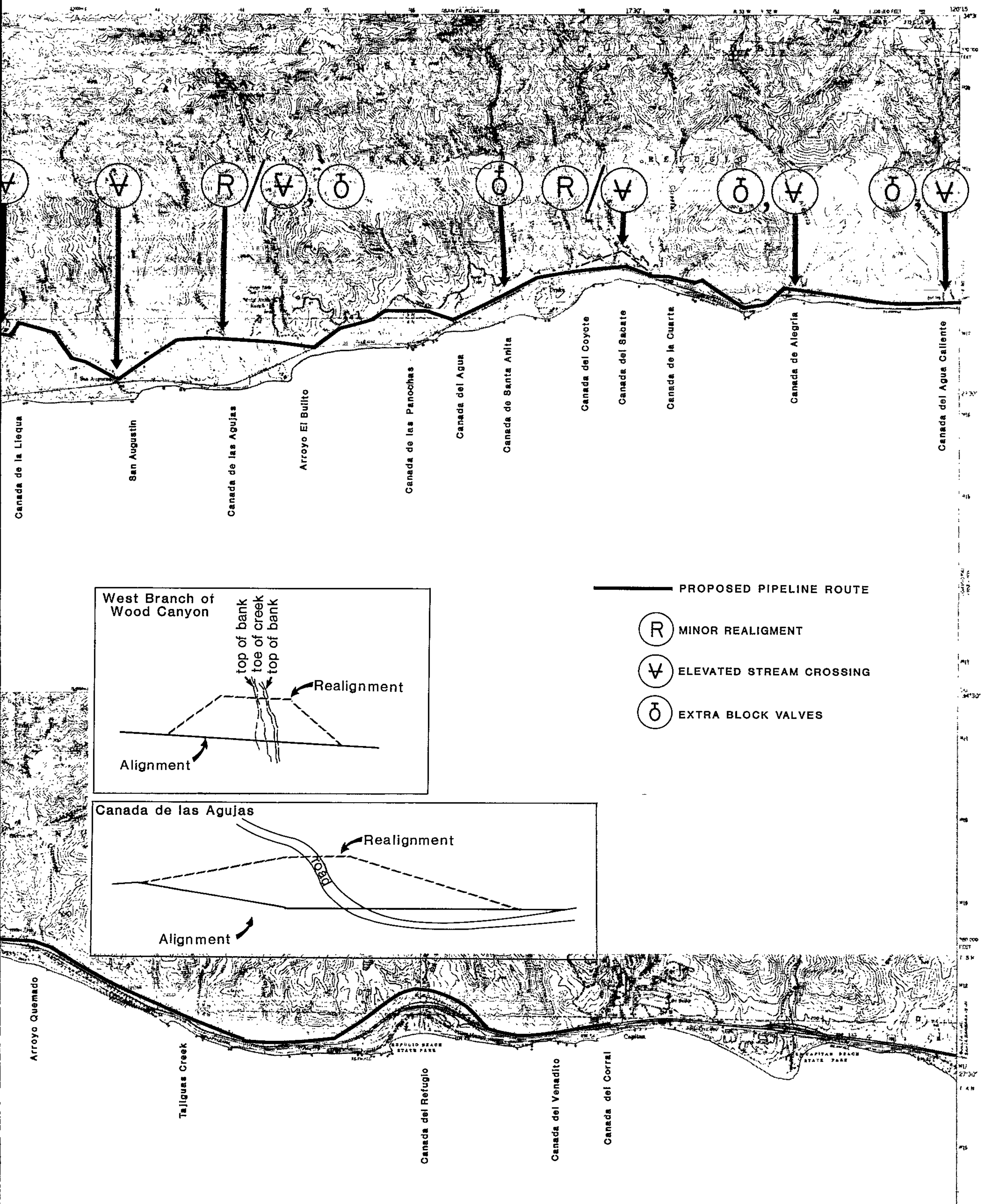

E PIPELINE BETWEEN POINT CONCEPTION AND GAVIOTA.

Arthur D. Little, Inc.

In addition, the oil spill contingency plan could be enhanced to include measures for the limitation of the downstream spread of oil, especially to prevent it from entering tidewater lagoons at Canada de Santa Anita, Canada del Alegria, Canada del Agua Caliente and Canada de la Gaviota.

Pipeline - Gaviota to Las Flores

The mitigation measures for the proposed pipeline route also apply to the extended pipeline option, and would need to be evaluated in greater detail if the likelihood of implementation increases.

Alternatives

Mitigation of sediment losses from cut-and-fill slopes during construction would probably not be necessary at Point Conception, given the flat topography and distances to receiving waters. The offshore pipeline alternative would not require mitigation of non-existent surface water impacts.

5.3.2 Groundwater

INTRODUCTION/METHODOLOGY

Potential impacts to groundwater include effects on quantity and distribution as a result of pumpage or diversions, and effects on quality as a result of seawater intrusion induced by pumpage as well as by either planned or accidental discharge of pollutants.

Impacts on groundwater were evaluated through a combination of literature review, site reconnaissance, and use of a groundwater flow model. Levels of significance are evaluated in the context of availability of water in sufficient quantity and of sufficient quality to supply existing and possible future users of groundwater in the area from Canada de la Gaviota to Canada San Onofre inclusive.

IMPACTS OF PROPOSED PROJECT

Hydrologic Impacts of Proposed Groundwater Withdrawal

Estimated daily fresh water requirements for the proposed facility range from 100,000 to 380,000 gallons (112-425 AFY), to be met by drilling one to four wells whose depths are estimated to be 1500 feet. The minimum requirement is about twice the estimated maximum, perennial groundwater yield for the project area of 60 AFY. If groundwater withdrawals exceed the long-term average recharge rate, an overdraft condition exists, water is removed from aquifer storage and groundwater levels will decline. Declining water levels could result in decreased availability of water for other local users owing to increased pumplifts, increased potential for significant salt-water intrusion and reduced baseflow to streams with possible impacts on surface vegetation and aquatic biota.

A two-dimensional mathematical model [Trescott, 1975; Larson, 1976] was used to assist in evaluating the hydrologic impacts of the proposed groundwater supply development and in particular to evaluate the amount of water level decline which could be expected in the vicinity of the Getty-Gaviota well (5N/32W-35F1), the Upper Brinkman well (5N/32W-35D2), and Canada San Onofre. The wells were chosen because they are existing supply wells on which the proposed Chevron well(s) may have an adverse impact. In particular, declining water levels would result in increased pumping costs and could render some wells useless if water levels drop below existing intake levels. Canada San Onofre was chosen because it is a perennial stream with significant riparian vegetation immediately north of the contact between the Rincon Shale and Vaqueros Formation.

The modeled area (about 2800 acres) extended from Canada de la Gaviota on the west to the approximate eastern edge of the surface water drainage basin of Canada San Onofre. The southern boundary was defined to be approximately at the shoreline and the northern boundary was defined to be slightly south of Gaviota Peak. (See Figure 5.3-2.) The principal area of interest (about 900 acres), however, is approximately represented by the surface drainage boundaries of Canada del Leon, Canada Alcatraz and Canada del Cementerio. A larger modeled area was used to minimize the effects of the predefined model boundary conditions. Hydrologic input parameters were estimated from information contained in previous water resource investigations [WESTEC, 1983; Miller and Rapp, 1968], as were other input parameters, such as existing pumping well locations and model evaluation criteria. The hydrostratigraphic units included in the model were the Vaqueros and Sespe Formations. The model edge nodes were represented as constant head nodes, which has the effect of underestimating the amount of drawdown that would result from groundwater withdrawals from the proposed Chevron well field.

Three pumping wells, or well fields, were included in the simulation analysis: the proposed Chevron well field, the Getty well and the Upper Brinkman well. Simulated constant withdrawal rates from the Getty well and Upper Brinkman well were 14,400 and 2,900 gallons per day, respectively. Four simulations with pumping rates of 84,000, 42,000, 21,000, and 4,200 gpd were made to evaluate the hydrologic impacts of pumping from the proposed Chevron well field. Results are summarized in Table 5.3-1 and indicate that groundwater withdrawals of 84,000 gallons would result in water level drawdowns at the Upper Brinkman and Getty wells of 66 and 126 feet, respectively, as well as drawdowns in excess of 65 feet at the shoreline. This amount of drawdown is probably unacceptable because it accounts for 84 percent of the allowable drawdown in the Getty well. The drawdown impacts of pumping at 42,000 gallons, even though less severe than at 84,000 gallons, still cause water level declines of 33, 63 and 32 feet at the Upper Brinkman well, the Getty well, and Canada San Onofre, respectively. It is likely that infiltration through the stream bed would occur at Canada San Onofre, resulting in decreased flow south of the Vaqueros/Rincon contact.

On the basis of these analyses it appears that water supply needs cannot be met from on-site sources without significant adverse impacts on water levels in nearby supply wells as well as on flows in Canada San Onofre. Impacts are rated as Class II, mitigable by desalination.

TABLE 5.3.-1

CALCULATED WATER LEVEL DRAWDOWN AT THE UPPER BRINKMAN AND GETTY WELLS AND CANADA SAN ONOFRE RESULTING FROM GROUNDWATER WITHDRAWALS AT THE PROPOSED CHEVRON WELL FIELD

	Calculated Water Level Drawdown, Feet		
Pumping Rate From Chevron Well Field	Upper Brinkman Well	Getty/Gaviota Well	Canada San Onofre
(gallons per day)			
84,000	66	126	65
42,000	33	63	32
21,000	17	31	16
4,200	3	6	3

Note: 1 bbl = 42 gallons.

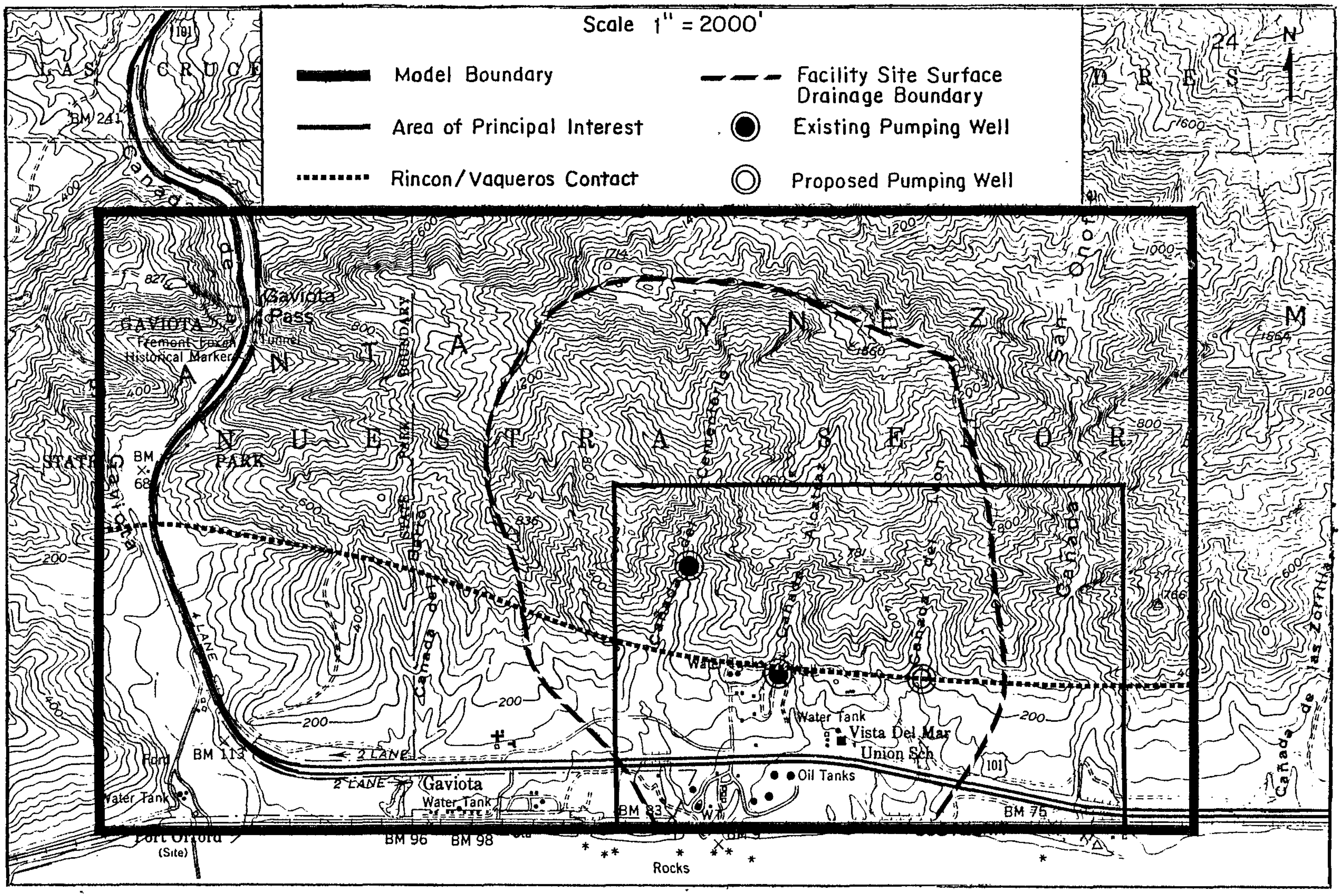

FIGURE 5.3-2 GROUNDWATER MODEL BOUNDARIES AND FEATURES OF INTEREST.

Sea Water Intrusion

At pumping rates in excess of total estimated groundwater recharge, there is an increasing likelihood of seawater intrusion into the Vaqueros Formation. Impacts of full project withdrawals of 84,000 gallons or greater are classified as significant but mitigable (Class II). At withdrawal rates less than the recharge, seawater intrusion would be negligible and drawdown impacts dominate. Intrusion impacts are rated as adverse but not significant (Class III) for these conditions.

Groundwater Quality

Groundwater quality could be affected as a result of accidental spills of process fluids. The most important characteristic of the site from the standpoint of groundwater quality is the presence of the Rincon shale, which has a very low hydraulic conductivity and which hydraulically separates all project facilities from the Vaqueros and underlying formations. Thus, the impacts of any surface-originating discharges on water quality in formations currently used for water supply would be, at most, adverse but not significant (Class III), since the shale would act as a barrier to flow.

Spills could affect alluvial materials. However, since no existing wells are in alluvial materials on the site and none is likely to be in the future, groundwater impacts are considered adverse but not significant (Class III) from a water supply perspective.

IMPACTS OF AREA DEVELOPMENT

The analysis of groundwater impacts has been conducted assuming water requirements associated with peak production from the Arguello Field.

IMPACTS OF ALTERNATIVES

The no project alternative would not have any impact on groundwater resources. Siting of the processing facility at Point Conception would have impacts of the same classes as those described at Gaviota, if water requirements were met solely through development of groundwater resources.

MITIGATION MEASURES

Impacts of proposed groundwater withdrawals include creation of an overdraft condition in the three site watersheds, excessive drawdown (with resultant impacts on surface water resources, aquatic biota and existing users), and the possibility of seawater intrusion. Mitigation of these impacts could be accomplished by finding alternative sources of supply or reducing project water requirements. During the course of preparation of this document, estimates of project water requirements have risen to the current range of 100,000-380,000 gpd (112-425 AFY). Site watersheds have the capability of providing no more than about 25-40 AFY (the difference between perennial yield and existing usage). Mitigations are considered with respect to their ability to meet the demand for water, and any additional impacts created by the mitigation.

Three possible mitigation measures are:

- Reduction in project water requirements and development of groundwater or surface water supplies in adjacent watersheds, i.e., groundwater in Canada de la Gaviota and Canada San Onofre, and springs in Canada San Onofre, and

- Desalination of seawater.

Of these two mitigation measures, only desalination has the potential for reducing environmental impacts to adverse but insignificant levels in all affected areas. Project water requirements would have to be reduced to 65% or greater of the current estimated minimum of 112 AFY to avoid an overdraft condition in site watersheds. Such reductions would not appear to be feasible. Therefore, this is a partial mitigating measure and additional measures would be required.

With regard to developing groundwater or surface water supplies in adjacent watersheds, WESTEC (1983) has suggested the possibilities of pumping in Gaviota Canyon near the stream course and close to the Vaqueros outcrop, pumping close to both of these features in Canada San Onofre, and diverting the flow of springs from the upper reaches of San Onofre. Perennial yield of these additional watersheds of about 770 AFY would be adequate to meet project water requirements and reduce overdraft and potential seawater intrusion impacts to Class III. However, such development would not reduce impacts associated with drawdown to insignificance, as it would result, in the case of maximum requirements, to Class I local impacts to surface water resources and Class I local and regional impacts to aquatic biota as a result of reductions in base flow of perennial and intermittent streams. In the case of minimum requirements, drawdowns would result in likely Class II locally or regionally significant impacts to aquatic biota, again, because of reduction in base flow. Additional mitigation would be necessary to reduce all impacts to insignificance.

Desalinating seawater could be used to meet all or part of project water requirements. Assuming that all requirements would be met through desalination, and that the associated brine would be codisposed with the produced water, there would be no demand-related impacts to onshore water resources and aquatic biota because there would be no use of fresh water resources. In addition, incremental impacts associated with desalination plant energy requirements, air emissions, effluents, land requirements, noise levels and labor requirements would be insignificant in the context of overall project impacts.

The potential environmental impacts associated with a desalination plant were evaluated assuming a production requirement of 400,000 gpd of water at the EPA secondary drinking water standard of 500 ppm total dissolved solids. This case therefore assumes maximum water requirements at a quality slightly better than that available from the better groundwater sources in the project area. An electrically-driven reverse-osmosis plant is considered a likely option for this situation, and was used in this preliminary evaluation.

For such a plant, operating at 30% recovery, brine to discharge would be 47,000 ppm TDS (compared to 33,300 ppm TDS of seawater) with a volume of discharge of 940,000 gpd. The brine stream discharged to the sea contains for the most part only the constituents taken from the sea by the feed stream, minus 30% of the water. In addition, there would be present a contribution from pretreatment chemicals (sulfuric acid, chlorine, etc.). As the total amount of chemicals used per day would be less than one ton, and would be diluted in the total brine stream, overall concentrations of pretreatment chemicals would be about 200 ppm in a total stream concentration of 47,000 ppm, and would probably not be detectable from background. Impacts on marine biology and water resources are considered adverse but not significant (Class III).

Air emissions would consist of some free chlorine evolved from the chlorination system, but no more than usual for any municipal chlorination arrangement. A modest amount of carbon dioxide would be released from the decarbonation post-treatment of the project water, but this should be innocuous as well. Air quality impacts are also considered Class III.

High noise levels would prevail in the high pressure pump room, necessitating hearing protectors for workers. However, most existing facilities are designed so that pump noise is barely discernible at the plant perimeters.

There would be no solid waste of any significance to be disposed of. Land requirements should be well less than one acre. Total supervisory and other labor would be no more than 300 hours/week.

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5.3 ONSHORE WATER RESOURCES

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5.4 MARINE WATER RESOURCES

5.4.1 Introduction/Methodology

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 wastewater discharges, comparisons of resulting pollutant concentrations with Federal and State standards, 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 H.

Criteria for classification of impacts as significantly adverse (Class I or II) were as follows:

1) Relatively large expected departure from baseline conditions; where possible, developing expectations based on analogous documented situations and previous studies.

   Examples: Both a major oil spill (a relatively short term event) and a significant buildup of pollutants in sediments (a long term event) could involve large departures from baseline conditions.

2) Persistence of adverse impacts long enough to measurably affect uses of the receiving water.

   Example: The accumulation of pollutants in the area sediments could lead to persistent pre-emptions of use by certain marine biota.

3) Degree to which water quality criteria and/or standards are expected to be approached or exceeded.

   Example: The proposed discharge from the Gaviota facility may result in concentrations of ammonia that exceed the limits (e.g., 0.6 mg/L 6-month median) set by the California Ocean Plan.

4) Local versus regional significance was judged by the relative volume of water or area of sea floor adversely affected and by the types of water uses adversely affected.

> Example: Some potential impacts will only be significant within 100 or 1000 meters of the discharge point; this is considered a local impact. A large oil spill or areawide contamination of sediments would have regional significance.

Areas of special emphasis for marine water resources include: (1) proposed discharges of produced water, drilling muds and drill cuttings (including potentially associated biocides) from the offshore platforms; (2) the proposed discharge of produced water and scrubber liquor from the Gaviota oil and gas processing facility; and (3) the (small) possibility of large oil 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; and any biocides or surfactants that may be used. For certain heavy metals and low-solubility organics that tend to associate with suspended solids, there is a further emphasis on long-term accumulation in the sediments.

5.4.2 Project Component Impacts Related to Physical Oceanography

Ocean currents and normal winds and waves are expected to have no significant impact on the project structures (platforms, subsea pipes). However, currents and wind drift are important in the transport and dispersion of materials discharged from platforms and outfalls, as well as from accidental spills. High waves and winds, when they occur, may require alternative designs, schedules, and operating procedures. The impact of a seismic sea wave (tsunami) on project structures will not be significant if they are designed to withstand the inundation or the impulse of heavy swash (water dashing against the structures).

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 wastewaters 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.

INITIAL DILUTION RATIOS FOR WASTE WATER DISCHARGES

Produced Water and Other Discharges Other Than Drill Fluids

The initial dispersion of the effluent discharges from the platforms and the Gaviota outfall was estimated using the OUTPLM dispersion model [Teeter and Baumgartner, 1979], slightly modified to allow comparison between positively and negatively buoyant plumes and superseded by professional judgment where incapable of simulating certain physical phenomena. The limited data available indicate that all proposed discharges will be positively buoyant, i.e., tend to rise towards the ocean surface after discharge. Inputs and assumptions used in model runs are provided in Appendix H. Key assumptions include the applicants' initial proposed use of subsurface pipes for platform discharges, and a 150-foot long subsurface diffuser system with 20-40 ports on the Gaviota processing plant outfall.* Because the exact dimensions and configurations of discharge structures are not known and there are uncertainties about wastewater flow rates, salinities and temperatures, the calculated dilution ratios should be considered rough estimates. The uncertainties in these estimates, due to uncertainties in the model inputs as well as model assumptions, could be as large as an order of magnitude but are probably closer to a factor of two. To help bound such estimates, the Appendix also provides calculated dilutions assuming negatively buoyant plumes which might be associated with more saline produced and waste waters.

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 Hermosa, Hidalgo, and Harvest 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 5.4-1 provides a summary of the model results for the centerlines of the discharge plumes. Calculated initial dilution ratios for the platform discharges during installation are all over 10,000. This dilution would be expected to protect marine water quality outside the mixing zone. Dilution ratios for platform discharges during production, however, are much lower: about 50 to 250 at the edge of the mixing zone. The initial dilution ratio for the Gaviota outfall is estimated to range from about 300 to 600 for the maximum and minimum discharge flows, respectively. Chevron indicates that this level is much higher than the planned 200:1 ratio. Of the dilution ratios estimated here (e.g., shown in Table 5.4-1), those below 1,000 are at the low end of the range 64 to 600,000 reported for the discharge of drilling muds at about 100 meters from the source. (See Table 5.4-12 of Appendix H.)

Drilling Fluids

Dilution ratio calculations have been reported for drilling fluid discharges from Platform Hermosa [California Coastal Commission, 1983]. A specially developed model was used by Chevron to estimate dilution ratios as a function of: (1) time after discharge; (2) distance from discharge point; and (3) season. The density of the drilling fluid was taken as 10.1 lbs/gal (1.21 g/cc) which results in a negatively buoyant discharge plume. The model results indicate dilution ratios (for soluble,

*In subsequent modifications of the outfall design, the applicants have indicated a 400-foot diffuser would be used. The diffuser would have 30 ports (each 1 1/2") discharging 45° from vertical.

TABLE 5.4-1

RESULTS OF "OUTPLM" MODEL ANALYSES FOR WASTEWATER DISCHARGES

Item	Installation	Operation[a]
I. Platform Hermosa		
Total Discharge rate, m^3/sec	7.4×10^{-5}	0.33
Distance down-current that plume surfaces, m	84	81
Initial dilution ratio	22,000	95
Plume diameter after initial dilution, m	8.8	9.0
II. Platform Hidalgo		
Total discharge rate, m^3/sec	7.4×10^{-5}	0.12
Distance down-current that plume surfaces, m	84	64
Initial dilution ratio	22,000	240
Plume diameter after initial dilution, m	8.8	9.0
III. Platform Harvest		
Total discharge rate, m^3/sec	5×10^{-4}	0.467
Distance down-current that plume surfaces, m	186	174
Dilution ratio at surface point	140,000	430
Initial dilution ratio at 100 m	800	60
Plume diameter after initial dilution, m	9.0	18.0
At:	Minimum Flow	Maximum Flow
IV. Gaviota Outfall		
Total discharge rate, m^3/sec	0.0298	0.0942
Ht. of plume rise at initial dilution, m	1.2	2.0
Initial dilution ratio	600	310
Distance down-current at initial dilution, m	less than 35[b]	less than 35[b]

[a]Excluding drill cuttings and drill mud discharges. See text and Appendix H for discussion. Note that operations discharge from Harvest includes a cooling water component.

[b]Reliable model estimates could not be generated. Roughly estimated to be within 100 ft.

Source: Appendix H.

conservative chemicals) will be above 1,000 beyond a distance of 100-300 feet from the point of discharge. Dilution ratios for the mud solids are up to 50 percent higher than those for the soluble components. No calculations were reported giving dilution ratios at the edge of the zone of initial mixing.

The model described above was also used to simulate the deposition of solid materials (in drilling fluid discharges) on the seafloor. The model simulation showed that only 17-20% of the solids settled out within a 16.6 hour period. During this time, the discharge plume may travel about 4-6 miles [California Coastal Commission, 1983.] The remaining 80 percent of the solids would be distributed outside of this local area and this leads to the possibility of regional impacts if sufficient accumulation on the seafloor is involved.

The physical fate of drilling fluid components from the proposed Platform Harvest discharge was simulated by Dames and Moore using the DRIFT model [Texaco, 1984]. These model runs evaluated the deposition of solids on the seafloor for various subsurface discharge depths: surface, 150 ft, 300 ft and 400 ft. The applicant indicates that the proposed 300-ft discharge depth is the least environmentally damaging since discharge at lesser depths results in more dispersion (and more deposition in the nearby hard bottom areas). Discharge at greater depths reduces the area affected but increases the deposition rate in that area. For discharge at the 300-ft depth, the DRIFT model predicts a solids deposition rate of 0.018-0.079 inches per day in portions of the hard bottom areas to the northwest of the proposed platform site.

TRAJECTORIES OF WASTEWATER DISCHARGES

All of the proposed discharges are subsurface: 200-300 feet deep for the major discharges from Platform Harvest, 150 feet for Platforms Hermosa and Hidalgo, and 90 feet for the Gaviota outfall. The discharge plumes would initially be directed by the currents at these depths; for those plumes that reach the surface, wind-influenced surface currents will be a factor. As described in Section 4.4.2 of this report, ocean current speeds and directions in this area are highly variable and the currents are not well defined.

The three platforms are in an area influenced by both the south-flowing California current and the north-flowing Davidson current. Thus, initial discharge plume trajectories may be expected to range between north, west, and south with brief intervals of pointing in other directions. The plume trajectory at the surface will usually be towards the southeast since prevailing winds are from the northwest, and thus some fraction of the discharges transported in the far field may enter the Santa Barbara Basin.

The discharge plume from the Gaviota outfall is expected to be carried westward parallel to the shore most of the time although tides and periodic changes in the deeper channel currents may cause the trajectory to move in other directions. This discharge is also expected to be slightly buoyant, but model calculations (see Table 5.4-1) indicate a plume rise of only 1-2 meters (3-6 feet) before stability is reached. Wind-driven surface currents will play a negligible role in the trajectory of this plume.

5.4.3 Impacts of Project Components on Chemical Oceanography

CONSTRUCTION PHASE

The installation of Platforms Hermosa, Hidalgo and Harvest is expected to result in locally insignificant (Class III) short-term impacts on the chemical quality of the receiving waters. Installation activities would include the discharge of treated sanitary sewage, desalination brines and equipment washdown, and the disruption and resuspension of bottom sediments under each platform all for periods of about 5-8 months. These activities would result in local and temporary increases in regional 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 platforms, and between Platform Hermosa and Point Conception, would also result in temporary impacts associated primarily with increased sediment suspension from vessel anchoring, pipelaying and, in the nearshore, excavation of the pipeline trench. It is estimated that the proposed construction would result in resuspension of some 300,000 cubic yards (0.26 X 10^6 metric tons) of solids; this may be compared with the estimate of 50 X 10^6 metric tons introduced into the area during the flood of 1969. (See Appendix H.) Following the 1969 flood, regional turbidity levels subsided to normal levels within six months. Local area impacts of the 1969 flood are not clearly identified in the available literature. Because lesser amounts of solids resuspension are associated with the pipe laying, a quicker recovery period is anticipated, probably less than a few weeks.

In conjunction with the above activities, there is the possibility that contaminated sediments may be resuspended with subsequent release of pollutants to the water column. While there do not appear to be any substantial amounts of anthropogenic (human originating) pollutants in the offshore construction locations, there are a number of natural oil seeps, especially near the Point Conception landfall. If the contaminated sediments around one or more seeps are resuspended, quantities of oil will be released to the marine environment and the effects in the lower water column may be similar to those of a small oil spill and of likely Class III significance.

The construction of the onshore processing facilities at Gaviota and the subsea pipeline (1677 m, or 5500 ft, long) are expected to result in only Class III water quality impacts, primarily due to elevated turbidity associated with pipe laying.

NORMAL OPERATIONS

Table 5.4-2 provides for a focus on pollutants and water quality parameters of potential significance associated with normal operations. These include: suspended solids (turbidity); "oil and grease" and potentially toxic organics; BOD and COD; heavy metals; other inorganics (e.g., some biocides, NH_3, H_2S, Cl_2); temperature; and the accumulation of pollutants in near-by sediments.

Two types of drilling muds are proposed for use at Platform Harvest: (1) spud mud (EPA Generic Mud #5); and (2) a lightly treated lignosulfonate mud (EPA Generic Mud #7). The basic components of these muds are shown in Table 5.4-3. No oil-based muds will be used. Only EPA-approved additives will be used in the muds. The use of chrome lignosulfonate will be avoided according to Texaco and Chevron. Additional details including discharge concentrations and estimated total mass loads are provided in Appendix H.

Table 5.4-2, indicates that certain discharges dominate in potential significance: the drill cuttings, muds and completion fluids during the drilling phase; and the produced water during the production phase. The discharge of produced water from the Gaviota facility into the ocean may be inconsistent -- unless special exemptions are provided -- with the U.S. Environmental Protection Agency's (EPA) pending revisions to effluent limitations promulgated under the Clean Water Act (40 CFR 425, Subpart C) and by the California Coastal Act (Section 30262[f]). One initially considered alternative to the proposed project involves reinjection of these produced waters back into deep rock formations; the use of reinjection is discussed below as a potential mitigation measure.

Discharges from the platforms, which are outside of California's 3-mile jurisdictional limit, are covered by the EPA's general NPDES permit No. CA0110516 described in the Federal Register of December 8, 1983 (Fed. Reg., 48 [237]: 55029, 1983). This permit expired June 30, 1984. The EPA expects to propose New Source Performance Standards (NSPS), best Conventional Treatment (BCT) and, possibly, Best Available Treatment (BAT) for "toxics" later in 1984. These new regulations may force changes in the presently proposed ocean discharges of the platforms and Gaviota facility insofar as ocean discharges are concerned. One previously proposed change was the requirement for offshore platforms (including those beyond the 3-mile limit) to reinject produced water.

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

Table 5.4-2

WATER QUALITY IMPACTS OF POTENTIAL SIGNIFICANCE DURING NORMAL OPERATIONS

	Approximate Discharge Rate	Pollutants of Water/Sediment Quality Parameters						
		Susp. Solids Turbidity	Oil & Grease, Toxic Organic	BOD/COD, O_2 Depl.	Heavy Metals	Other Inorg.	Temperature	Accumulation of Pollutants in Sediments
I. Platforms-Drilling, Phase	(per platform)[a]							
1. Drill Cuttings	16,000 ft^3/well	***	*	*	* (Ba)	--	--	**
2. Drill Muds, Fluids	900 bbl/well	***	*	--	* Ba, Cr)	*	--	**
3. Completion Fluids	600 bbl/well	**	*	--	--	--	--	--
- Others (as 6-9)	3,300 bbl/d	*	*	*	* (Zn)	*(Cl)	*	**
II. Platforms--Production Phase	(per platform)[a]							
4. Produced Water	100-18,000bbl/d	***	***	**	**(Fe, Zn)[b]	***	*	**
5. Cooling Water	160,000 bbl/d	--	--	--	--	--	**	--
6. Deck Drainage	2,000-3,000 gpd	*	*	*	--	--	--	--
7. Sanitary Sewage	2,000 gpd	*	--	*	--	* (Cl)	--	*
8. Desalination Brine	3,200 bbl/d	--	--	*	--	--	*	--
9. Corr. Protection Anodes	--	--	--	--	* (Zn)	--	--	--
Subtotal for II:	163,000-181,000 bbl/d							
III. Gaviota Outfall--Production Phase (total)								
10. Produced Water	15,500-50,000 bbl/d	***	***	**	**(Fe, Zn)[b]	***	*	**
11. Steam Generator Blowdown	200-550 bbl/d	*	--	*	--	--	*	--
12. Gas Plant Water	40-120 bbl/d	--	*	*	--	*	*	--
13. SO_2 Scrubber Water	450-550 bbl/d	*	--	**	--	--	*	--
14. Sanitary Sewage	1000 bbl/d (est.)	*	*	*	--	*(Cl)	--	*
Subtotal for III:	17,190-52,220 bbl/d							

a. 1 bbl = 42 gal.
b. Details in Table 2.4, including indications of potential variations.
c. Pollutants of potential significance marked with *; level of potential significance (including consideration of discharge rate) indicated by number of *.
c. See text for other metals of interest.

Table 5.4-3

PLATFORM HARVEST DRILLING MUD ADDITIVES

Spud Mud (EPA Generic Mud #5)	lb/bbl
Bentonite or Attapulgite	10-50
Barite	0-20
Soda Ash/Sodium Bicarbonate	0-2
Caustic	0-2
Lime	1/2-1
Lignite	0-3
Seawater	As needed

Lignosulfonate Mud (EPA Generic Mud #7)	lb/bbl
Bentonite	10-30
Barite	0-35
Lignosulfonate	2-5
Caustic	1-3
Water	As needed
Lignite[1]	0-3
Soda Ash/Sodium Bicarbonate[2]	0-2
Detergent, Defoamer, Lubricants[3]	As approved by EPA
Zinc Carbonate[4]	0-7

1. Lignite (brown coal) may be used to help reduce filtration (loss of mud liquid phase) and as a thinner. Will reduce requirements of lignosulfonate.

2. Soda Ash (Sodium Carbonate) and Sodium Bicarbonate used to treat out calcium contamination in mud after a cement job.

3. Detergent, defoamer, and lubricants are used in small amounts as needed under special circumstances.

4. Zinc Carbonate used infrequently to treat out H_2S in mud.

Additionally, sawdust, nut shells, mica, cellophane or similar fibrous substances may be used to control lost circulation.

Source: Texaco, 1984.

during the production phase are generally estimated to be less than 500 at the edge of these mixing zones. (See Table 5.4-1 and associated text.) Additional information on pertinent regulations is provided in Appendix H; portions of this information are included in Section 4.4 of this report.

Turbidity

Impacts associated with increased turbidity are expected to be local and insignificant (Class III). The subsurface discharge locations contribute to the achievement of adequate dilution at the edge of the mixing zones.

Oil and Grease, Toxic Organics

Produced waters may contain substantial amounts of organic chemicals, including benzene, toluene, xylene, phenol, naphthalene, and compounds of similar structure. These chemicals are generally biodegradable, are of moderate to low bioaccumulation potential (naphthalene may be considered moderate to high), and are not generally acutely toxic in low concentrations. Losses to the atmosphere may be important for volatile chemicals if, as projected, the plumes reach the sea surface. Natural oil seeps in the project area probably release much higher amounts of these chemicals; estimates of release from such seeps in the Santa Barbara Channel range from 5,000 to 50,000 metric tons/year (Appendix H). The proposed treatment of produced waters prior to discharge (from both the platforms and the Gaviota facility) is only intended to remove floating oil; fine emulsified oil drops and dissolved components will not be significantly reduced by such treatment. Except for the possibility of locally significant Class II effects resulting from accumulation in sediments, the overall impact potential is judged insignificant.

Oxygen Depletion

Dissolved oxygen in the waters near both the platforms off Point Conception and the Gaviota processing facility generally decreases with increasing depth; thus the discharge of oxygen-demanding wastewaters at the subsurface levels proposed may lead to significant local impacts. Several proposed discharges from the platforms and Gaviota facility would have high biological or chemical oxygen demands, including, in particular, the sulfite component of the SO_2 scrubber wastewaters at the Gaviota facility (up to 125 mg/L COD) and all produced-water discharges (100-3,000 mg/L COD, 300-2,000 mg/L BOD_5). The combined effect could have a Class II locally significant adverse effect on the oxygen content of the receiving water if initial dilution ratios are as projected and/or receiving waters already have oxygen contents near the 5 mg/L minimum that can be found periodically at the sites involved.

If only the rapid-acting COD of the sulfite in the Gaviota facility scrubber water is considered, and the minimum initial dilution ratio of 200:1 estimated by Chevron is used, a diluted oxygen demand of 0.6 mg/L is generated. California's Ocean Plan (1983) requires that dissolved oxygen concentrations never be depressed more than 10 percent from that which occurs naturally (5-19 mg/L). This standard would thus be violated whenever receiving waters contained less than 6 mg/L and the assumptions and conditions listed above were valid. The degree and extent of standards violation will be greater if other portions of the COD in the discharge also act rapidly, with the latter affecting the significance of the discharge of produced water from the platforms as well as from the Gaviota facility.

Heavy Metals

Of the heavy metals, only barium (Ba), chromium (Cr), iron (Fe), and zinc (Zn) in the several discharges appear to approach potentially significant impact levels. For most other metals, the levels discharged are less than naturally occurring concentrations after initial dilution and will not, therefore, present a problem of accumulation in sediments. Discharges of Ba, Cr, Fe, and Zn are unlikely to exceed water quality standards outside the mixing zone but could accumulate to higher than background levels in the sediments. The significance of such accumulation is not known but may be of Class II local significance for the Gaviota discharge which is in shallower waters. It is acknowledged that the speciation of the various metals (e.g., Cr) will affect their toxicity at any given time in the water column, as will their biochemical fate upon uptake by marine organisms. One cannot preclude toxic potential where sediment concentrations become elevated beyond the normal background levels.

Table 5.4.31 of Appendix H contains a breakdown of the expected sources of heavy metals, while Table 5.4.21 (Appendix H) shows estimated maximum concentrations at the edge of the mixing zone after a hypothetical initial dilution by a factor of 1000. The applicants have indicated they will avoid use of chrome lignosulfonate muds so that discharges of Cr can be minimized; the avoidance of such muds as well as other Cr-containing additives (e.g., biocides) is listed as a mitigative measure in this report.

Other Inorganics

Other inorganics of emphasis in produced water from the platforms and Gaviota discharge include ammonia, up to 800 mg/L*, hydrogen sulfide, up to 100 mg/L, and chlorine residual, about 1 mg/L in treated sanitary sewage. Ammonia from the Gaviota outfall discharge may not be adequately reduced below allowed levels of 0.6 mg/L for a six-month median, 2.4 mg/L daily maximum, and 6 mg/L instantaneous maximum for California waters after dilution by 300:1 and it is considered a locally significant Class II impact. The formation of toxic chloramines is possible but unlikely as it would be limited by the amount of chlorine available. However,

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* This is a conservative value; average concentration in produced water from Monterey Formation is apparently about 200 mg/L (as NH_4) according to Chevron comment #137 on DEIS/EIR.

even if ammonia salts predominate in the initial discharge, the solubidity of the expected compounds under the prevailing conditions would be expected to lead shortly to the presence of potentially toxic forms in the water column.

Temperature

Most of the effluents, especially during production, would have elevated temperatures, generally 95-180 °F (35-82 °C). (See Table 5.4-2 for list of discharges with elevated temperatures.) Produced water (35 °C) and once-through cooling water (22-28 °C) are both high-volume discharges. The temperature of the receiving waters varies with depth and season but will typically be 10-19 °C. Temperature increases at the edge of the mixing zone are unlikely to be more than 0.1 °C above ambient and thus the impact is considered insignificant.

Accumulation of Pollutants in Sediments

A major fraction of the pollutants discharged would be associated with fine particulates upon or shortly after discharge and may be carried long distances before settling to the seafloor. Large areas of the seafloor may thus be affected. This is a long-term process and potential impacts are difficult to assess. However, based upon a comparison of the documented effects of sediment loads from the major municipal outfalls in the Los Angeles area, the impacts may be of Class II local or regional significance.

The validity of the comparison of projected impacts in the project area with those in the Los Angeles area cannot be demonstrated to be beyond reasonable doubt. Although the types of pollutant sources differ, both the proposed and historical Los Angeles area discharges involve a mix of organic and inorganic pollutants and an environmental setting that will allow the pollutants to accumulate over the long term. (See Appendix H, especially Section 5.4.2.E, for further discussion.)

OIL SPILLS AND LEAKS

The probability and trajectories of oil spills from the proposed projects are discussed in Section 5.11, as well as in Appendix O. Smaller spills up to a few tens of barrels are likely to occur about once in ten years while very a large spill (on the order of 100,000 barrels) is projected to occur about once every thousand years. (See Appendix O and Section 5.11.) A rough integration of these probabilities and spill volumes indicates that about 10,000 barrels of oil can be expected to be spilled over a 30-year project lifetime. On a different basis (see Appendix H), the total volume of oil that might be spilled over the life of the project was estimated at 144,000 barrels (20,000 metric tons) which is on the same order of magnitude as the amounts released in the project's produced-water discharges (30,000 metric tons) and one to two orders of magnitude less than the amount estimated to come annually from natural seeps (5,000-50,000 metric tons/year). It should be noted that seeps are a steady, gradual source of oil whereas spills involve a sudden release; the locations of release are also different. Impacts would thus not be equivalent for equal volume releases.

Expected water quality impacts of spills include generation of turbidity, BOD and COD; release of toxic hydrocarbons to the water; reduced light penetration and oxygen reaeration rates; and, where the spill reaches near-shore areas, contamination of sediments.

The significance of a spill will depend on its size and fate, but any spill over 1000 barrels would likely cause Class I locally to regionally significant impacts. Such a spill would form a surface slick of about 6-km diameter covering an area of about 28 km^2 which would move with the prevailing currents at speeds typically about 1 km/hour. In heavy seas, oil could be mixed into the water column as deep as 50-60 meters. The slick might disappear in a few days because of wind and wave action, dissolution and volatilization losses. The dissolved components would be subject to dispersion, dilution and volatilization, as well as to degradation via aqueous photolysis and microbial processes. Concentrations of hydrocarbons in the water column would likely return to near normal conditions within a week; concentrations in contaminated sediments could take months to years to return to pre-spill levels.

ABANDONMENT

Proposed abandonment would be expected to cause insignificant, short-term increments in turbidity and associated pollutant concentrations. The seafloor sediments in the area of the platforms may be expected to eventually return to near-normal conditions. A more rapid recovery would be expected for the sediments near the Gaviota outfall since current speeds and sediment transport rates are slightly higher.

5.4.4 Impacts of Area Study Development

As described in Section 2.10, this scenario anticipates that an additional five platforms will be installed in the study area, that the oil from these platforms will go via subsea pipelines to Platform Hermosa or to the Hermosa - Point Conception subsea pipeline, and that the oil will be processed at the Gaviota facility. For purposes of impact assessment it is assumed that the amounts of discharges resulting from each new platform will be the same as the averages for the first three proposed platforms. This results in a total mass emission rate 2.7 times the total for the three proposed platforms.

Table 5.4-4 shows estimated pollutant loadings from: (1) the three proposed platforms; (2) 8-platform area development; (3) Southern California Municipal outfalls, and (4) natural oil seeps. Discharge rates with the area development scenario, except for solids and ammonia, would be about one-tenth or less the amounts from Southern California municipal outfalls; ammonia and solids are about 20% of the Southern California totals. Discharges of oil approach the lower limit estimated for natural oil seeps in the local area (5,000 metric tons/year).

At these total levels, water quality and sediment quality impacts of Class II significance could occur. It is assumed that water quality standards will be met at the edge of each individual mixing zone, but the possibility for chemical changes due to chronic accumulation in sediments on and adjacent to the Arguello Slope exists and could be better defined by measures discussed below in Section 5.5 here and Section 5.4.5 of Appendix H.

Table 5.4.4

ESTIMATED ANNUAL MASS EMISSION RATES FOR BUILDOUT SCENARIO

Source[A]	Discharge Vol. (bbls/year)	Components (metric tons/year)						
		Solids	BOD	COD	Oil & Grease	Phenols	Cyanide	Ammonia
3 Platforms/Pipelines	103,000,000	18,000	6,740	7,400	1,450	5.2	0.008	3,300
8 Platforms/Pipelines	275,000,000	48,000	18,000	19,700	3,870	14	0.021	8,800
So. Cal. Municipal Outfalls	9,500,000,000	226,000	264,000	--	37,000	1,500	98	41,000
Natural Oil Seeps	30,000-300,000	--	17,500-175,000	--	5,000-50,000	--	--	--

Source[A]	Components Continued (metric tons/year)									
	Ba	Cr	As	Cd	Cu	Pb	Hg	Ni	Ag	Zn
Each Platform/Pipeline	--	--	--	--	--	--	--	--	--	--
3 Platform/Pipelines	22	0.13	0.17	0.41	0.34	0.57	0.005	0.80	0.12	6.7
8 Platform/Pipelines	59	0.35	0.45	1.1	0.91	1.5	0.013	2.1	0.32	18
So. Cal. Municipal Outfalls	--	155	--	27.5	326	124	--	128	--	521
Natural Oil Seeps	--	--	--	--	--	--	--	--	--	--

a. Identified sources are: (1) the three platforms with pipelines in the proposed project; (2) the eight platforms with pipelines suggested in the buildout scenario; (3) the five major municipal outfall in Southern California; and (4) natural oil seeps.

Source: Appendix H.

5.4.5 Impacts of Alternatives

It should be noted that several of the project alternatives (processing site, LPG/NGL's transport) are onshore and have very little or no impact on marine water resources.

NO PROJECT

The no-project alternative would have the potentially significant beneficial impact of avoidance of the Class I impacts due to a large project-related oil spill.

OFFSHORE PIPELINE

An offshore pipeline from Platform Hermosa to Gaviota would increase marine water quality impacts because of the added sediment disruption during pipe laying, the added probability of disturbing the contaminated sediments around an oil seep during pipe laying, and the increased probability that a pipeline break would occur which would release oil to the south coast nearshore waters.

The added impacts are associated with the added subsurface distances traversed by the pipe; the offshore route would add approximately 15 miles (to the existing 10-12 miles) of subsea pipeline in the Santa Barbara Channel. Some natural oil seeps are in the area that the alternative route would traverse.

As indicated in Section 5.11 (and Appendix O), there are differences in oil spill probabilities and maximum oil spill volumes for onshore versus offshore pipelines; maximum oil spill volumes are estimated to be 6,100 barrels and 7,600 barrels (dry oil) for onshore and offshore pipes, respectively. The probability of a spill of 4,800 barrels or more is one in one thousand years for the onshore pipeline and about one in 2500 years for the alternative offshore pipeline (near landfall).

5.4.6 Mitigation Measures for Marine Water Resources

Mitigation measures fall into two categories: (1) specific measures connected with expected impacts of project components, and (2) monitoring programs for components with potential but thusfar unquantified impacts. For the former, the discussion below focuses on feasible measures for impacts that are significant and mitigable. For both, additional discussion is provided in Section 5.4.5 of Appendix H.

SPECIFIC MITIGATING MEASURES

Resuspension of Polluted Sediments During Pipelaying

The release of oil from disturbed sediments around natural oil seeps could have impacts equivalent to a small oil spill (oil slick, dissolution of toxic organics, depletion of dissolved oxygen, etc.). Although existing maps show the presence of natural oil seeps in nearshore areas, including the area off Point Conception, their apparent absence in deeper waters may be a faulty assumption. The potential impacts are considered Class II or III, potentially significant but mitigable. The releases can be mitigated in two ways: (1) the avoidance of such areas during trenching; and (2) the rapid deployment of oil spill containment and clean-up equipment after releases that result in surface slicks. The implementation of item 1 would require a careful survey (visual plus sediment sample analyses) of the pipeline route prior to any trenching. These mitigation measures become more important if the longer offshore pipeline route to Gaviota is selected as an alternative to the onshore route. It is expected that careful implementation of these mitigation measures would result in an insignificant (Class III) residual impact.

Discharge of Drilling Fluids Containing Biocides or Chromium

Some of the drilling muds which may be used in Area Study Development contain chrome lignosulfonate (see Table 5.4-3); the discharge of chromium (Cr) from such uses is considered a Class II impact, potentially significant but mitigable. The amounts of such Cr to be used are not known, and both of the present applicants have indicated they intend to avoid the use of chrome lignosulfonate. To mitigate the potential adverse impacts, applicants could provide a more complete and continuing commitment to avoid the use of chrome lignosulfonate, and to propose a decision/review process for any future change in this commitment. If such additives were used, and monitoring of on-site disposal appears to show unacceptable risk of contaminant build-up dispersed disposal in off-site soft-bottom areas of active sediment transport (i.e., shelf slopes) would be the preferred alternative.. Barging to shore and onshore disposal could be considered as subsequent choices. The latter action completely mitigates marine impacts but would generate new ones associated with the air quality effects of transportation and onshore disposal.

Other additives to the drilling muds may include biocides; the types of biocides which might be used have not been specified. Upon discharge, these toxic chemicals could produce a Class II impact in the immediate vicinity of the outfalls. Mitigation, as above, is considered to include restrictions of use, if possible; or if used, dispersed disposal in off-site areas or onshore disposal.

Oxygen Depletion Near Wastewater Discharge Points

Oxygen depletion would be associated with the COD of SO_2 scrubber discharge (Gaviota outfall), the COD and BOD of produced water discharges (Gaviota outfall and platform discharges), and with other discharges. (See Table 5.4-2.) The resulting water quality impacts are considered to be Class II, significant but mitigable.

Mitigation measures include: (1) aeration or scrubbing of the SO_2 scrubber water; (2) other treatment of the produced water discharge from Gaviota (e.g., by lagooning, activated sludge, or other biological treatment); and if necessary, (3) reinjection of produced waters and SO_2 scrubber water. The need for treatment of other produced water (for BOD and COD reduction) has not been clearly demonstrated; tests should be conducted to determine how rapidly the oxygen demand is manifested after discharge, and decisions on treatment or no treatment based on the results. Reinjection of produced water is discussed below under Accumulation of Pollutants in Sediments. The use of this measure (which may or may not be required at Gaviota under revisions to existing Federal regulations) would essentially eliminate any oxygen depletion problems (because the main discharges are eliminated) but does involve questions of necessity, feasibility and cross-media impacts (see below). Aeration of the SO_2 scrubber waters alone is quite feasible; however, implementation of just this measure may not be sufficient to ensure that state water quality standards for dissolved oxygen are met outside the mixing zone. Further treatment of both the SO_2 scrubber water and produced water at Gaviota would be expected to result in an insignificant (Class III) residual impact on dissolved oxygen.

Toxic Inorganics in Produced Water

Discharges of produced water may lead to water-quality-standards violations for ammonia, sulfide and perhaps other chemical species; toxic chloramines may be formed by reaction of ammonia with residual chlorine in the treated sanitary wastewater from the use of the proposed Getty wastewater treatment plant. The resulting water quality impacts are considered to be Class II, significant but mitigable. Mitigation measures are: (1) reinjection of produced waters; (2) treatment (e.g., via aeration/ stripping); and, possibly (3) redesign of the outfall diffusers to obtain higher initial dilution ratios. Reinjection, discussed as an alternative, would completely eliminate the impact, but does involve questions of feasibility, expense and cross-media impacts. The types of treatment processes that might be considered are difficult to identify because of the lack of data on the composition of produced water. A minimum dilution ratio of 330 would ensure that the California daily maximum standard of 2.4 mg/L for ammonia was not exceeded if, as assumed, the discharge has 800 mg/L and the receiving waters 0.0 mg/L; higher dilution ratios (about 1300:1) would be required to ensure compliance with the six-month average standard of 0.6 mg/L.

Accumulation of Pollutants in Sediments

Some pollutants (e.g., heavy metals, low-solubility organics) will be discharged under conditions where there is potential for significant (Class II) impacts, in the long-term, after accumulation in surface sediments associated with the platform and/or processing facility sites. Once the sediments are contaminated, there are no feasible mitigation measures. Early monitoring of project discharges and sediment accumulations is the first step in a mitigation sequence since it may allow early identification of problems and preemption of subsequent problems by subsequent action. Mitigation could then take the form of further pretreatment prior to discharge, or discharge elimination (e.g., via reinjection of produced and/or wastewater). The need for mitigation measures for this purpose has not yet been clearly demonstrated, and additional monitoring of actual discharges and impacts as discussed in Section 5.5.5 would provide the necessary quantification.

If one excludes consideration of discharges of once-through cooling water and desalination brines (which generally carry no "pollutants" except elevated temperature and salinity), discharges of produced water constitute up to 98 percent of the total volume of wastewater discharges expected over the project lifetime. (See Tables 5.4.31 and 5.4.38 in Appendix H.) Transferring this discharge from the marine environment to subsurface zones would eliminate a major portion of the project's Class II adverse marine water quality impacts but the necessity has not been demonstrated by present expectations. The reduction in impact would not be strictly proportional to the volume reduction of the discharge; it may, in fact, be nearer to 100 percent reduction in the discharge of some pollutants prone to accumulate in sediments (e.g., certain heavy metals and petroleum hydrocarbons).

Reinjection of the treated water through several injection wells at a depth sufficient to avoid contaminating local water supply would require installation of large high-pressure pumps and corresponding additional energy consumption and might require other backup facilities to provide for discharges if the injection system failed. Sufficient data to rigorously evaluate this measure are not available.

If injection is used, a permit to inject must be obtained from the California Division of Oil and Gas (CDOG) before injection can begin. Issuance of a permit or approval to inject waste fluids is based upon a determination that underground and surface sources of water suitable for irrigation and domestic uses are protected. The operator requesting approval for an underground injection project must provide to the CDOG detailed data and the results of engineering and geologic studies that are considered necessary for evaluation of the proposed project. Studies of the injection alternative were not undertaken by Chevron because they elected to discharge the produced water through an outfall line.

Core data from an exploratory well drilled in 1958 (Broadhurst #1) and from several water wells drilled in the Gaviota area provide cross sections of the structures down to about 4,000 feet. These data show steeply dipping formations and the existence of formations used as water supply aquifers in the Ellwood-Gaviota area to depths of 4,000 feet. But quantitative information on water quality of the deeper formations is lacking, and because of the general scarcity of water at Gaviota, it is assumed that there are no suitable zones for reinjection down to depths of at least 4,000 feet.

Based on reviewing currently available geologic information, evaluation is focused on identifying candidate formations for reinjection, their location and depth. Criteria include the ability to protect fresh-water aquifers; and the availability of suitable injection zones confined by strata with low vertical permeability to prevent upward migration of the injected water. The Matilija formation may satisfy these criteria.

In view of the significant depth required for onshore reinjection (over 4,000 feet) ultimate evaluation of this measure would also include a review of possible offshore locations where suitable injection zones may be available at shallower depths. Perhaps access to these zones might be achieved through abandoned gas or oil wells. Chevron has indicated that injection (via converted gas wells) into the Vaqueros formation in the offshore Gaviota gas field would not affect onshore fresh water aquifers because of a series of intervening folds. However, this producing formation is located at a subsea depth of over 4,800 feet.

It should be recognized that if the mitigating measure of reinjection needs to be pursued further on the basis of impact monitoring, subsequent to completion of the EIR/EIS, more detailed evaluation would be required. This further phase would involve drilling and engineering studies to confirm selection of the injection points and the ability to protect potential fresh-water sources.

Oil Spills

The release of oil from an unlikely major oil spill (e.g., 5,000 bbls) is considered to be a Class I impact, i.e., significant and not mitigable to insignificance. Smaller oil spills may be considered either Class II or III impacts. (See Section 5.11 and Appendix O for details on spill probabilities and some proposed mitigation measures.) Oil spill containment and clean-up equipment would need to be available within about 2-3 hours to those nearshore areas most likely to be impacted if a spill does occur: the Point Arguello/Point Conception area and the two western-most channel islands (San Miguel and Santa Rosa). Further discussion is provided in Section 5.5.5 (Mitigation Measures for Marine Biology Impacts).

Area Study Development

All the mitigative measures for offshore discharges described above apply at least equally to the Area Study Development. The probability that mitigation measures to protect against accumulation of pollutants in sediments will be required increases and would be quantified by monitoring. Similarly, the likelihood of oil spills from platform sites increases from about one in ten to one in three or four years. If monitoring of first-generation Arguello Field projects Hermosa, Harvest and Hidalgo is conducted, appropriate mitigation can be designed for second-generation Area Development projects. For example, if the discharge of drilling muds was found to require additional mitigation, then an area on the southwest edge of the Arguello Slope might be selected for off-site, dispersed discharge of the muds, and the required EPA dump site approval process could then be initiated.

MONITORING PROGRAMS

Insufficient information exists on certain project components to accurately quantify impact levels. To protect - in the long term - against presently unpredictable impacts, an integrated monitoring program would need to measure: (1) the amounts of specific contaminants in each major effluent (especially produced water); (2) the amounts of selected contaminants in the water and sediments; (3) the uptake and residues of selected contaminants in marine organisms and sediments; and (4) the resulting toxic impacts of the accumulated contaminants. Some results from such a program could be available within 1-2 years after initiation, although a thorough program might require several years. The results, as they did become available, could be used to select any additional mitigative measures needed. This would reduce impacts over a gradual time span. Additional details on the desired components of such a monitoring study are given in Section 5.5.5 (Mitigation Measures for Marine Biology Impacts) and in Section 5.4.5(A) of Appendix H.

REFERENCES TO CHAPTER V

5.4 MARINE WATER RESOURCES

California Coastal Commission, 1983. "Modeling of the Fate of Drilling Fluid Discharges from Platform Hermosa," undated Exhibit 13 to the Final Staff Report of the California Coastal Commission on consistency certification for the proposed Point Arguello Field Development and Production Plan.

Teeter, A.M. and D. J. Baumgartner, 1979. "Prediction of Initial Mixing for Municipal Ocean Discharges." CERL Publication 043, U.S. Environmental Protection Agency, Corvallis, OR.

Texaco, Inc. 1984. Responses to California Coastal Commission, Consistency Review, prepared for U.S. Department of the Interior, Minerals Management Service.

"Water Quality Control Plan - Ocean Waters of California," State of California, State Water Resources Control Board, Sacramento, CA; November 1983.

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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 applicants, including any measures they proposed to meet regulatory criteria 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 applicants. 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 Appendix I.

The criteria used in this section to assign significance to potential impacts and mitigation measures are as follows:

- An impact is considered regionally significant if it is judged likely to:

  Cause or substantially contribute to measurable change in the function or recovery of any habitat of recognized special importance to marine biota for a period of 5 years or longer, or

  Cause or substantially contribute to measurable change in the population of any species of recognized regulatory, commercial, recreational, scientific or educational importance for a period of 5 years or longer.

The habitats and species of recognized importance are identified in Section 4.5 of this report and in Appendix I. Examples include: marine mammal haulout and/or rookery areas, rocky intertidal areas, kelp beds, rocky subtidal areas near the coast, and seabird nesting sites.

- 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 in 10 percent or more of a contiguous unit of habitat for 5 years or longer. An example of a contiguous unit of habitat is a non-coastal, raised-profile, hard-bottom feature.

The above criteria were developed to be complementary to the classification described in Section 5.0 and the existing institutional and regulatory policies regarding marine biota. The consistency of the various impacts with these policies is discussed on a case-by-case basis below.

5.5.2 Impacts of Proposed Project Components

PROPOSED CONSTRUCTION ACTIVITIES

Platforms

Construction of the three proposed platforms would involve anchoring support vessels on the sea floor within (according to the applicants) about a 6,000 to 9,000-foot radius of the final location of each platform. Within this expected radius of anchor drag, impacts in the form of crushing organisms and/or of scarring of the rocks, substrate could occur on any of about a dozen raised-profile, hard-bottom features of varying sizes that have been identified around the proposed sites of Platforms Hermosa, Harvest, and Hidalgo, respectively (See Figure 4.52). Anchor scar impacts on these hard- bottom features are considered a likely Class I impact of individual local and additive regional significance because of the inability of the larger affected benthic organisms to repopulate in less than five to ten years. A locally significant impact of change in species composition on 10 percent or more of an individual raised profile may be expected around each of the platform sites. The large size and steep profile of the features around the Platform Harvest site makes loss of individual organisms more likely and potentially more severe there than around the other sites. Present information suggests that the combined anchoring effects of proposed platform and connecting pipeline construction could be of Class I significance at the regional scale because a majority of the larger raised-profile features on the Arguello slope are within the radius of impact. (See Figure 4.5-2.) The other impacts of platform construction on marine biota would include sublethal disruption of organism activity patterns due to increased turbidity and construction noise and are expected to be locally and regionally insignificant. (See Section 5.5 of Appendix I.)

Pipelines

Anchoring of the pipeline towing and support vessels during the installation of the inter-platform pipelines and the pipeline from Platform Hermosa to shore would impact up to 20 raised-profile hard bottom features (see Figure 4.5-2) in a manner similar to that described above, with individual Class I local and additive regional significance. Chevron has committed to attempt to anchor pipeline construction vessels so as to avoid hard-bottom features, but the extent of some of these features and the nature of vessel anchoring procedures at sea make complete avoidance unlikely.

Trenching of the pipelines through the nearshore and intertidal zones approximately 1.2 miles north of the rocky headlands and tidepools at Point Conception would be expected to have Class III impacts on all species except 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 occurs in late winter or spring or Class I if blasting is required. Chevron indicates that no blasting is anticipated because of the compact sand apparent at the landfall site. However, the variability and magnitude of local littoral processes are large enough to suggest that less sand may be present than needed for the design burial depth of the pipeline, and blasting would be required to achieve the required depth. Resulting marine mammal (resident harbor seal, transient gray whale or other species) mortality or the disruption of seabird (cormorant, guillemot or other) nesting at Point Conception from blasting would be considered a Class I or Class II impact of regional significance because it would be inconsistent with the protective intent of applicable policies of Section 3.9 of the Local Coastal Plan which designates the area as an Environmentally Sensitive Habitat (ESH), and the Marine Mammal Protection Act. Insufficient data are available to estimate the radius of potentially significant disruption due to blasting, particularly for disturbances to animals swimming under water. The MMS has indicated that endangered species consultation would be reinitiated if blasting is required (Personal Communication, M. Warhurst, MMS to C. Cooper, ADL, June, 1984).

Processing Facility

Construction of the onshore processing facility and installation of the outfall pipeline and diffuser in the nearshore and intertidal zones off the Gaviota site would have impacts similar to those of the comparable portion of the Hermosa to Point Conception lines, with the following exceptions:

- The towing and support vessels would be expected to uproot and thereby limit recruitment and recovery of kelp holdfasts and canopy in a corridor from 500 to 2000 feet wide crossing Bed 31 perpendicular to shore (see Figure 4.5-4), particularly if the plants are still attempting to become established based on initial attachment to such small features as worm tubes on the sand bottom. The radius of anchoring impacts would be expected to approximately equal the historical width of the kelp bed. This is considered a Class II regional impact because of the difficulty of unsubsidized recovery from the 1983 storms at this location and the recognized significance of the kelp bed habitat.

- Only transient marine mammals and seabirds are characteristic of the site (there are no rookeries or regularly occupied haulouts), reducing the likelihood of exposure to and thereby expected significance of any required blasting to Class III for seabirds and to either Class III or Class II for transient marine mammals.

- Measurable anchor scar impacts of the type described above for platforms could occur to biota of the few local hard-bottom features from installation of the outfall line, but recovery within five years is likely in the nearshore environment, and there are no raised profile features reported for the area.

- Construction-related sedimentation from the onshore processing facility could affect the nearshore area in the event of dry season storms (for which no retention basins are planned). Based on the sediment export estimates in Section 5.3.1, such a storm could export up to 200 tons of suspended sediment via Canada del Cementario and/or Alcatraz. Resulting suspended solid concentration at the nearshore edge of the kelp bed could be as high as 5 g/L, which is in the range reported to cause decreased feeding efficiency and clogging of gills, respectively in sensitive plankton and nekton [Sherk et al, 1974]. This would represent a short-term impact of Class II local significance.

Support Facilities

The proposed use of Port Hueneme, Carpinteria and Ellwood as supply and emergency crew bases, respectively, would require few if any additional marine construction activities, and would therefore be expected to have negligible or insignificant adverse (Class III) impacts on all species.

NORMAL OPERATIONS

Platforms

The information presented in Section 5.4 and Appendices H and I indicates that impacts of the various operating discharges from the proposed platforms on biota in the upper portions of the water column would be Class III locally, and insignificant regionally. Impacts on local hard-bottom benthic invertebrates and associated demersal fishes are expected to range from insignificant for dissolved constituents in wastewater to locally significant (Class II) impacts from the creation of fine-grained, homogeneous particle substrates, organism burial, and potential chemical toxicity of long-term accumulations of cuttings and disposed muds. The variables likely to determine whether the impacts are locally significant include the degree to which the local, as-yet poorly studied, and in some cases unclassified hard-bottom animals are adapted to and subjected to sedimentation, sublethal effects of metal and/or hydrocarbon uptake, and cumulative or periodic incremental oxygen depletion. These impacts are the type presently being emphasized by the EPA in their continuing assessment of the effects of development drilling [C. Menzie, personal communication to C. Cooper of ADL, 5/84]. 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 demersal fishes on a soft-bottom area.

Pipelines

Normal operating effects of the pipeline 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 due to the leaching and biotic exposure to zinc from sacrificial anodes, and local impacts of changed organism abundance of likely Class III significance because of changes in littoral sand transport near the pipeline landfall.

Processing Facility

The proposed wastewater discharge from the Gaviota processing facility is expected to have a locally significant (Class II) impact inconsistent with Section 30230 of the California Coastal Act because of long-term incremental dissolved oxygen depletion in an envelope of water extending about 100 feet downcurrent and potentially to the surface above the 150-400 foot long outfall diffuser. Oxygen reduction below 5 mg/L is projected to recur periodically, and would produce significant sublethal and/or lethal stresses on organisms unable to leave the area, and loss or significant reduction of use of the area by mobile organisms (e.g., finfish, lobsters, crabs).. Ammonia from the discharge would have a variety of impacts ranging from a locally insignificant adverse sublethal stress on characteristic marine plants, to toxicity in the form of gill damage of potential local Class II significance on larvae and/or juveniles of any of the commercially-valued finfish and/or shellfish species. As discussed in more detail in Section 5.4 and Appendices H and I, the other changes in water quality due to the discharge are expected to have negligible to insignificant short-term adverse effects. In particular, no constituents are expected at high enough concentrations in the kelp bed to adversely affect that resource. Projected temperature changes are about.1°C at the edge of the kelp bed. (See Part One of Appendix H.) Longer-term toxic effects on benthos and demersal fishes and shellfish could occur if hydrocarbon and/or trace metals from the discharge accumulate in sediments and/or interstitial waters around the outfall and are thereby available to benthic organisms. There are insufficient data to project whether or not such accumulations will occur, and monitoring of biological effects is a logical prerequisite to definitive analysis.

Support Activities

Supply and emergency crew activities based in Port Hueneme and Carpinteria, respectively, are expected to have insignificant incremental adverse effects because of their similarity in type and magnitude to present activities. Emergency crew vessel traffic to and from Ellwood would be expected to add to historical stress from this source on the kelp canopy, and would be of Class II regional significance assuming no a prior degree of restriction of vessel traffic to designated travel corridors. Aerial photographs of the Ellwood site show elimination of the kelp canopy in the corridors used for vessel traffic.

ABANDONMENT

Impacts of proposed abandonment procedures are expected to be limited to locally significant (Class II) but regionally insignificant reductions in marine organisms populations associated with the removed platforms, and beneficial impacts of potential local and/or regional significance because of the reductions in oil spill risks that prevailed during the operations period.

ACCIDENTS AND CATASTROPHIC EVENTS

Overview

Because of the prevalence of chronic oil seeps scattered throughout the Study Region, small project-related spills (i.e. less than 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 O 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 conditional landfall probability (up to about 5%) are of recognized special importance to marine biota: San Miguel and Santa Rosa Islands and/or the mainland coast between Point Arguello and Cojo Bay. Conditional landfall probabilities at other locations are generally unlikely to occur in the project 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 impacts of Class I local and/or regional significance documented in past spills, (i.e., mortality due to oiling) with the extent depending on spill size and location (See Appendix I, Section 5.5.2). Fur-bearing marine mammals, including the Federally threatened/State protected southern sea otter, Federal candidate/State-rare Guadalupe fur seal and 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 if they did because of a lack of avoidance behavior and because of the high likelihood of mortality following oiling of their pelts. (See Appendix I). 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 regional significance in the form of mortality due to 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 abalone off the Northern Channel Islands, would be expected to experience impacts of either Class III or Class I local significance due to smothering and celluular 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 and kelp bed communities would include mortality of early life stages, but are expected to be locally and regionally insignificant because of the oil resistance (kelp) and/or recovery potential (rapid reproductive turnover) of these groups. Section 5.5.2 of Appendix I contains a detailed discussion of the above and other aspects of the oil-spill vulnerability of the Region's marine biota.

Platforms

The analysis presented in Section 5.11 and Appendix O indicates that spills originating at or near the proposed platforms are overall 1-2 orders of magnitude more likely to occur than pipeline spills (one in ten years for smaller spills to one per thousand years for major blowouts); and include the only project-related spills greater than 10,000 barrels. The northern and western parts of San Miguel Island, the region's most important locations for marine mammal and seabird reproduction, are the most likely landfall points for spills originating near the proposed platforms, with conditional landfall probabilities of 4 percent to 7 percent. San Miguel is also prone to adverse weather and has a rocky shoreline, both factors that would make cleanup activities difficult at best.

Pipelines

Spills from the proposed offshore pipelines were projected to be generally smaller (up to 7600 barrels) and less likely (once or twice in 10,000 years) than platform spills. However, a spill from the proposed pipeline connecting Platform Hermosa to shore would have up to about a 30 percent likelihood of reaching shore along the mainland coast near Point Conception, with up to 5 percent annual average likelihood of landfall on San Miguel and/or Santa Rosa Islands. The landfall probabilities indicate about a 50 percent combined annual average likelihood of reaching the vulnerable Point Conception to Point Arguello resources discussed above, thereby creating marine biological impacts of Class I regional significance from a major spill originating from this pipeline.

The proposed onshore pipeline route crosses two tidally influenced lagoons at the mouths of Canada de Alegria and Canada del Agua Caliente, and is within 0.5 mile of the lagoon at the mouth of Canada de Santa Anita. Pipeline- related spills are projected to be somewhat more likely for this route than for the offshore line, and a spill at any of the above crossings would be expected to have regionally significant Class I impacts on estuarine and/or anadromous organisms by contaminating lagoon sediments. These impacts are discussed in more detail in Section 5.6. Impacts on the sandy intertidal biota adjacent to these lagoons could include smothering by oil, but would be expected to be of Class III local and regional significance because of their small geographic extent and assuming a lack of mechanical cleanup activities. These habitats are chronically oiled in many instances because of the activity of nearby seeps.

Processing Facility

Catastrophic failure of the two future wet-oil storage tanks at the Gaviota processing facility in a major earthquake (estimated probability of about one in 5,000 years), while unlikely, could overtop the presently proposed dike and represent a release of more than 1,000 (up to 40,000) barrels of oil less than half a mile from the coast. Even assuming maximum feasible containment and cleanup of such a spill, oiling mortality impacts of Class II regional significance on diving seabirds and smothering and cellular toxicity impacts of Class II local or regional significance on intertidal and nearshore subtidal benthos would be expected from such a spill. Regional significance would be expected if the conditions resulted in sufficient mortality to have measurable long-term impacts on the populations of commercially important demersal finfish, lobsters and/or crabs in the area, and would depend on the season of occurrence volume of oil reaching the ocean and the abundance status of the sensitive-year classes of the subject species.

Other types of accidents or catastrophic events at the processing facility would likely be confined to land, and would likely be insignificant to marine biota.

Support Activities

Collisions of project support vessels with marine mammals are considered unlikely, but would likely result in organism mortality 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 impacts to marine biota, but the incremental likelihood is small.

Review of 10 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% of the deaths of cetaceans and pinnipeds recovered in this region for study (Woodhouse, 1984). Deaths of individuals of fully protected species such as the southern sea otter, which may presently be prevented from expanding their populations by prevailing levels of mortality (from all sources combined) would be considered of Class I regional significance. 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 undistinguishable at the population level in any given year.

SUMMARY OF IMPACTS ON RARE AND ENDANGERED SPECIES

Pursuant to Section 7 of the Endangered Species Act, the MMS has initiated consultation with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Services (NMFS) for the proposed project and Area Study. The consultation with the NMFS has been completed; the USFWS consultation will be completed early August 1984.

The MMS has prepared a Biological Assessment for this action which is available upon request. A copy of the NMFS Bilogical Opinion which lists species under consideration, gives the rationale for the "no jeopardy" decision for species under their jurisdiction and specifies mitigation measures can be found as a supplement at the end of Appendix I. The Biological Opinion from the FWS will be circulated to interested agencies and individuals in late summer and will be in the Final EIR/EIS. Species considered by the FWS are listed in their letter to the MMS dated Jnaury 16, 1984 (Appendix I). The MMS will reinitiate consultation with these agencies if the project changes or if additional species are listed in the project area.

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, depending on spill size and location). 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 it practices avoidance.

- 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. (See Section 5.5.2.4 of Appendix I.) Impacts would likely be insignificant at the population level because of the small number of individuals affected, but Class I on a regulatory basis because of the status of the species.

- 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 population breeds to the south, outside of the Study Region.

- 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 present nearshore during blasting.

- Tidewater Goby (under consideration for Federal listing), present in lagoons crossed by proposed onshore pipeline route, subject to construction sedimentation and potential oil-spill impacts from onshore pipeline spill (Class I) or offshore spill in extreme weather (unlikely, Class I or II).

- Least Tern; 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. The tern is present at least through spring and summer; there is no documentation of spill-related mortality, leading to expectation of potential avoidance.

Because of their fully protected status, measurable adverse impacts on any of the above 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).

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-platforms pipeline components of the proposed projects. However, the two types of impacts discussed below would likely be additive to and have cumulative significance greater than the effects of the proposed project.

The combined construction and operations impacts of five additional Area Development platforms and connecting pipelines would be expected to affect many of the same plus additional offshore hard-bottom benthic features and associated demersal fishes of the Arguello Slope. 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 trace metal and/or hydrocarbon constituents in deposited muds and cuttings;

- Amount of cumulative oxygen demand exerted by deposited materials;

- Nature and extent of remaining unimpacted features at comparable depths on the Arguello Slope.

Means to define this impact better and mitigate it as necessary are detailed in Section 5.5.5.

The probability of oil spills would increase with the development of additional platforms and pipelines. The overall likelihood of all offshore platform and pipeline spills combined is projected to increase from about one in ten years for the offshore components of the proposed projects to about one in three or four years for the eight platforms and connecting pipelines in the Area Development scenario. Figure 5.11-2 shows the probability distribution of the sizes of these types of offshore spills. Trajectory analysis (see Appendix O) indicates no significant differences in landfall probabilities for spills originating at the other tracts in the Area Study versus those in which the proposed project would be located. Thus, spills 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.

5.5.4 Impacts of Alternatives

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.

OFFSHORE PIPELINES FROM PLATFORM HERMOSA TO GAVIOTA

Impacts on marine biota from the implementation of the offshore pipeline alternative would be expected to be similar to those described above for the proposed lines from Platform Hermosa to the vicinity of Point Conception, with the following exceptions:

1. A wider corridor and more construction activity would be required to install three lines instead of only the outfall through Kelp Bed 31 off Gaviota. The expected adverse impact would be of greater magnitude but still of Class II regional significance, and the expected benefit of additional hard-bottom substrate would be negligible to insignificant because of active sedimentation in the nearshore area. At least two additional large raised profile hard-bottom features would be subject to potential anchor drag impacts of the type described in Section 5.5.2, one off Point Conception and one off Gato/San Augustine (see Section 4.5).

2. Construction impacts on seabirds would likely be insignificant for the alternative because of the reported absence of nesting seabirds near Gaviota.

3. Construction impacts on water column organisms in the nearshore zone could be of at least local Class II rather than Class III significance if blasting is required, because of the expected presence and mortality of kelp and small fish and invertebrates associated with the kelp bed within about a hundred meters of the blasting sites.

4. The probability of oil spills from a pipeline along the alternative route is estimated to be about 1.5 to 2 times greater than for the proposed route, i.e. about once in 2,000 years for a major spill, and the probability of spill landfall between Gaviota and Point Conception would average about 20 percent and range above 40 percent on a seasonal basis. Areas and resources of special significance (seabirds, marine mammals, rocky intertidal areas) would thus be at greater risk at Point Conception, Cojo Bay and the lagoon mouths of at least four streams known to support either or both the tidewater goby and anadromous trout. Spills from the alternative and proposed routes are estimated to have comparable likelihoods of landfall on San Miguel or Santa Rosa Islands, but the alternative location also poses an estimated average conditional probability of landfall of about 1 percent on western Santa Cruz Island.

ALTERNATIVE ONSHORE PROCESSING FACILITY SITE

Marine biological impacts of an onshore processing facility at the Point Conception site would have expected impacts similar to those described above for the proposed Gaviota location, with the following exceptions:

1. Proximity to harbor seal haulouts would create the potential for regionally significant Class II or Class I impacts because of disruption of rookery activities by the noise and human presence during outfall construction activities. Class I impacts due to potential seal mortality would be expected only if blasting were required in the nearshore area. It appears that adverse impacts would be inconsistent with Policy 9-25 of the Local Coastal Plan.

2. Seabird nesting areas at Point Conception could likewise experience regionally significant (Class II) impacts as a result of construction-related disruption of nesting activites by human presence.

ALTERNATIVES FOR TRANSPORTING LPG AND NGLs

The elements of these alternatives have no identifiably important impact implications for marine biota.

ALTERNATIVE PORT LOCATIONS FOR ONSHORE SUPPORT

Development and use of both supply and crew base activity near Ellwood would be expected to have impacts of Class I or Class II regional significance by potential interference with harbor seal breeding and haulout activities, in conflict with LCP policy 9-25 (Class I), and by reducing kelp canopy by increased traffic from more and larger vessels traversing the nearshore kelp bed (Class II).

Development of both a crew and supply base at Gaviota would likely have a regionally significant Class II vessel traffic impact on the canopy in kelp bed 31, but would be expected to have insignificant adverse effects on marine mammal activities in the nearshore area.

A crew base at Carpinteria and supply base at Port Hueneme would have essentially the same impacts as Chevron's proposed action, with the additional benefit of eliminating Texaco's proposed emergency crew use of Ellwood and thereby reducing vessel traffic impacts on the canopy of through the kelp bed off Ellwood.

5.5.5 Mitigation Measures for Marine Biology Impacts

OVERVIEW

Tables 5.5-1 and 5.5-2 summarize the feasible mitigation measures for Class I and Class II marine biology impacts. See Appendix I for further details on measures applicable to all classes of adverse impacts.

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 losses of hard-bottom benthos due to construction vessel anchoring, 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. Chevron has agreed to minimize anchoring near such hard-bottom features along the offshore pipeline route. The Minerals Management Service will work with Chevron to develop an approved anchoring plan. [Personal communication, M. Warhurst, MMS, to Arthur D. Little, June, 1984]. Additional mitigation could be achieved by requiring and enforcing commitment of both applicants to avoid such features around all platform and connecting pipeline locations as well. 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. Additional hard-bottom features could also be established by placement of boulders on the sea floor in areas of the Arguello Slope upcurrent of the construction impact areas and areas of expected mud and cuttings deposition. To have

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TABLE 5.5-1
POTENTIAL SIGNIFICANT MARINE BIOLOGY IMPACTS AND MITIGATION MEASURES
CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

Proposed Project (Individual and Combined Components)		Loss of hard-bottom benthos due to construction-vessel anchoring	Local individually to regional combined, short to long term	Pre-construction demarcation, restricting vessel activities, consolidated moorings, establishment of additional hard-bottom features	Locally to regionally significant
Project-Related Accidents	1.	Mortality and disturbance of seabirds and/or marine mammals due to unlikely major oil spill and cleanup activities	Regional, short to long term	Achieve adequate response time at key locations, selective use of dispersants for oil, animal animal recovery assistance	Regionally significant
	2.	Damage to subtidal ecology due to unlikely major oil spill	Local or regional, short to long term	Avoid use of chemical agents	Locally to regionally significant if only these resources are threatened
	3.	Damage to estuarine lagoons and/or wetlands due to unlikely onshore pipeline spill	Regional, short to long term	Install additional block valves, barriers at culverts, emergency water flow maintenance procedures	Regionally significant to insignificant
	4.	Damage to marine mammals due to unlikely encounters with support vessel activities	Regional, short to long term	State of the art operator training, reporting requirements, restriction of vessel movements	Regionally significant to insignificant, potentially inconsistent with Federal Marine Mammal Protection Act; CCA Section 30230.
Area Study Development		Impact types 1 under Project, 1 and 2 under accidents above more likely due to additional platforms and pipelines	Local to regional, short to long term	As above for Proposed Project, and related accidents, plus limitation of concurrent production activities	As above for Proposed Project and related accidents
Project Alternatives	1.	Impact types 1 and 2 and damage type 3 above under accidents more likely due to offshore Hermosa to Gaviota pipeline	Local or regional, short to long term	As above for Project-related accidents, plus emergency procedures to prevent entry of spill from sea to lagoon	Significant to insignificant
	2.	Disturbance of seal rookery at Burmah Beach by use of supply base near Naples	Regional, long term	Restriction of vessel activities, commitment to use alternative sites	Regionally significant unless alt. site used, inconsistent with Marine Mammal Protection Act, CCA Sections 30230, 30240; LCP Policy 9-25

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TABLE 5.5-1 (continued)
POTENTIAL SIGNIFICANT MARINE BIOLOGY IMPACTS AND MITIGATION MEASURES
CLASS I: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CANNOT BE MITIGATED TO INSIGNIFICANCE

Cumulative Development Base 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
Base Scenario and Scenario I	Impact types 1 through 3 under project-related accidents become likely, #4 becomes more likely	Local to regional, short to long term	As above for Area Study Development	As above for proposed project related accidents
	Possible disruption of gray whale migration by cumulation 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

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 cross-disciplinary impact on commercial drag fishing from establishment of new reefs could be avoided by using relatively smooth reef building materials.

- To partially mitigate likely mortality and disturbance of seabirds and marine mammals due to major offshore oil spills (number 1 under Project-related Accidents), the applicable regional oil spill contingency plan could be amended as necessary to provide equipment and manpower on the scene at the documented rookery and haulout areas between Cojo Bay and Point Arguello in the less than three hours from initial notification that it could take oil to reach shore from a break in the Hermosa to Point Conception pipeline. Such equipment and labor could be used for capturing and rehabilitating oiled animals. Response at San Miguel Island 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 rehabitation 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 #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.

- To partially minimize potential onshore pipeline oil-spill impacts on downstream tidally-influenced lagoons, (# 3 under project-related accidents) block valves could be installed on both sides of the proposed crossings of Canada de Santa Anita, Canada de Alegria, Canada del Agua Caliente and Canada de Gaviota. Further protection could be achieved by providing a remotely-operated temporary barrier to prevent spilled oil from passing through the Southern Pacific Railway culvert below the proposed Santa Anita crossing, and a requirement for the applicant to purchase and conduct fresh water from the Drake's Beach recreational facility to the lagoon if monitoring shows reduction of water levels in the lagoon while upstream cleanup is in progress. Rapid response of the type described in the preceding item could be assured to prevent entry of offshore spilled oil into the lagoon near the mouth of Jalama Creek.

Additional information on measures listed in Table 5.5-2 to mitigate Class II marine biology impacts is as follows:

- To minimize adverse biological effects of possible blasting in nearshore areas, the feasibility of reducing design burial depth by additional reinforcement of the pipeline covering 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 October would minimize interference with seabird and mammal breeding and pupping activities near Point Conception.

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TABLE 5.5-2
POTENTIAL SIGNIFICANT MARINE BIOLOGY IMPACTS AND MITIGATION MEASURES
CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANT

Proposed Project (Individual and Combined Components)	1.	Disturbance of seabird and/or harbor seal rookeries, benthic, intertidal and fish communities at Point Conception due to nearshore pipeline construction	Local and regional, short term	Pre-construction seabird use survey, construct in late September-October, restrict blasting, apply substance of LCP Policy 9-34 to this type of development	Insignificant if blasting is avoided
	2.	Damage to kelp Bed 31 due to outfall construction and operation off Gaviota	Regional, short term	Document recovery status, restrict blasting, restrict vessel activities, reestablish kelp plants	Insignificant
	3.	Damage or disruption of nearshore kelp bed biota due to runoff discharge of suspended sediment from dry season storm during construction at Gaviota site	Local, short-term	Provide sediment retention for dry season as well as wet season construction	Insignificant
	4.	Damage to local hard-bottom biota due to discharge deposition near platforms	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; establish new hard bottom features	Potentially significant locally, short term; insignificant long term
	5.	Damage to nekton and benthos due to oxygen depletion and, potentially, ammonia from Gaviota outfall discharge	Local, long term	Forced oxidation of wastewater prior to discharge or implement reinjection alternative	Insignificant
	6.	Damage to kelp canopy off Ellwood due to Texaco crew boat traffic	Local and regional, long term	Restrict and monitor vessel movements and/or require use of alternate site without kelp canopy	Insignificant
	7.	Loss of habitat upon removal of platforms	Local, short to long term	Create or maintain similar habitats	Insignificant
Project-Related Accidents		Damage to seabirds and nearshore biota from unlikely catastrophic wet-oil reject spill at Gaviota	Local to Regional, short to long term	Increase retention capacity and ensure earthquake resistence of dikes	Insignificant

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TABLE 5.5-2 (continued)
POTENTIAL SIGNIFICANT MARINE BIOLOGY IMPACTS AND MITIGATION MEASURES
CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANT

Area Study Development		Cumulative damages to Arguello Slope hard-bottom biota due to operation 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 3 above and/or impose cap on number of concurrent development projects	Potentially locally significant short term, insignificant long term and regionally
Project Alternatives	1.	Greater damage to kelp Bed 31 due to alternative offshore Hermosa to Gaviota pipelines' installation	Regional, short term	As above for item 2 under Proposed Project, plus restriction of all Gaviota pipelines to common installation schedule and corridor	Insignificant if blasting is avoided
	2.	Greater disturbance of Point Conception biota due to outfall construction for altertive onshore processing facility (see item 1, Proposed Project)	Local and regional, short term	As above for item 1 under Proposed Project, plus common installation corridor	Insignificant if blasting is avoided
	3.	Potential damage to kelp Bed 31 and other biota by installation of offshore reinjection pipeline instead of outfall for Gaviota waste-water	Local and/or regional, short to long term	As above for item 2 under Proposed Project, plus selection of nearest feasible reinjection site away from kelp beds	Insignificant if blasting is avoided
	4.	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 6 under Proposed Project	Insignificant if Alternative sites are used
Cumulative Development Scenarios		Impact types 4 and 5 under Proposed Project, of greater magnitude due to occurrence at several sites	Local and regional, long term	As above for items 4 and 5 under Proposed Project, plus consolidation of facility sites	Insignificant
Scenario II - Accidents		Oil spil impacts 2-3 times more likely than for Proposed Project because of additional offshore production	Local to regional, short to long term	Minimize response time at key locations, selective use of dispersants and sinking agents, animal recovery assistance, limitation of concurrent production activities	Can be reduced to rare or extraordinary occurrence with limitation of production activities

TABLE 5.5-2 (continued)
POTENTIAL SIGNIFICANT MARINE BIOLOGY IMPACTS AND MITIGATION MEASURES
CLASS II: SIGNIFICANT ENVIRONMENTAL IMPACTS WHICH CAN BE MITIGATED TO INSIGNIFICANT

	2. Greater disturbance of Point Conception biota due to outfall construction for altertive onshore processing facility (see item 1, Proposed Project)	Local and regional, short term	As above for item 1 under Proposed Project, plus common installation corridor	Insignificant if blasting is avoided
	3. Potential damage to kelp Bed 31 and other biota by installation of offshore reinjection pipeline instead of outfall for Gaviota waste-water	Local and/or regional, short to long term	As above for item 2 under Proposed Project, plus selection of nearest feasible reinjection site away from kelp beds	Insignificant if blasting is avoided
	4. 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 6 under Proposed Project	Insignificant if Alternative sites are used
Cumulative Development Scenarios	Impact types 4 and 5 under Proposed Project, of greater magnitude due to occurrence at several sites	Local and regional, long term	As above for items 4 and 5 under Proposed Project, plus consolidation of facility sites	Insignificant
Scenario II - Accidents	Oil spil impacts 2-3 times more likely than for Proposed Project because of additional offshore production	Local to regional, short to long term	Minimize response time at key locations, selective use of dispersants and sinking agents, animal recovery assistance, limitation of concurrent production activities	Can be reduced to rare or extraordinary occurrence with limitation of production activities

- To mitigate damage to kelp bed 31 due to outfall construction and operation off Gaviota as described in item 2 under Proposed Project in Table 5.5-2, vessel traffic and anchoring areas could be minimized and kelp plants could be re-established in accordance with the procedures successfully applied to sandy substrates and documented by Neushul et. al. (See Appendix H to the Santa Barbara County Oil Transportation Plan, January, 1984).

- To ensure mitigation of the potential effects of mud and/or cuttings and other discharge deposition on offshore hard-bottom associated organisms (# 3 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 te planned work in the current MMS-sponsored long-term monitoring study of the Santa Maria Basin, but available information indicates that they are not all presently included in that program. Note that it is not intended that monitoring efforts identified duplicate ongoing or otherwise required monitoring programs:

  (1) Conduct pre-construction field study baseline of the extent to which the biota of raised-profile hard-bottom features around the Platform Harvest and Platform Hermosa sites and nearby (upcurrent) control sites are subject to sedimentation, and of the status of baseline contamination of sediment, interstitial water and resident organism tissues by selected chemicals expected in particulates deposited by project platform operations (e.g., those due to existing oil seeps). Data collection would need to include periodic (at least initial and second) occupation of transects by RCV or manned submersibles and synoptic (same day) collection of sediment, water and benthic 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. Section I.B. (pp. 192-200) of Appendix H [Marine Water Quality and Oceanography] Part Two, Chemical Oceanography] delineates 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.

  (2) Reoccupy RCV/submersible transects following platform and pipeline construction to determine extent of anchor scarring damage to hard-bottom features and extent of construction related sedimentation effects.

(3) Repeat protocols of (1) above twice during the first 2 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 Platforms Hermosa and/or Harvest as necessary by modifying any or all of the following: discharge mode (e.g., depth, co-mingling of mud and cooling water) mud components (e.g., substitution of mineral oil for diesel oil in pills, use of alternate or no biocides), disposal sites (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, onshore disposal of contaminated sediments may be feasible but would have cross-disciplinary impacts on air quality of circumstance-specific magnitude and significance.

- To mitigate potential oxygen depletion and ammonia impacts of the Gaviota outfall, forced oxidation of the wastewater could be implemented prior to its discharge. The above type of pre- and post-construction and operations period monitoring would also need to be conducted at the Gaviota outfall site (see #4 under Proposed Project in Table 5.5-2) because of the potential significance of the discharge and the considerable uncertainty associated with any attempts to model the short- or longer-term impacts, especially those of sediment contamination. If monitoring showed that the operating effects of the proposed wastewater discharge on marine biota were significant in spite of forced oxidation, they would be mitigated to insignificance by adoption of a reinjection mode of disposal. If an offshore reinjection site requiring additional pipeline construction were selected, effects due to pipeline construction and operations would be basically as described above for comparable proposed or alternative project pipelines, but of varying significance in accordance with the resources present along the selected route. Few raised-profile hard bottom features are expected within the prospective radius of such a pipeline from the Gaviota site (i.e. about 4 miles).

- The locational and design criteria discussed above for boulder reefs could also be applied to any evaluation of conversion to reefs or replacement of the platforms by reefs upon abandonment (#6 under proposed project in Table 5.5-2).

- Chevron's presently proposed plan shows future reject-oil storage in two 80,000-barrel tanks surrounded by a common dike with a retention capacity of 1.5 times the capacity of the largest tank. This retention capacity could be increased to at least equal the combined capacity of the tanks to prevent major spillage in the unlikely event of catastrophic tank failures in a major earthquake.

MEASURES TO MITIGATE IMPACTS OF AREA STUDY DEVELOPMENT

Additional information on measures to mitigate 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 hard-bottom benthos 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 Platforms Harvest and Hermosa described above.

- Restricting the number of Arguello Slope platforms and connecting pipelines constructed and operated in overlapping timeframes could serve to mitigate otherwise adverse cumulative impacts on benthos, and to reduce to or maintain oil spill probabilities at a predetermined level of rare or extraordinary incremental risk.

MEASURES APPLICABLE TO PROJECT ALTERNATIVES

See Tables 5.5-1 and 5.5-2 for description 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.

REFERENCES TO CHAPTER V

5.5 MARINE WATER BIOLOGY

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5.6 TERRESTRIAL AND FRESHWATER BIOLOGY

5.6.1 Introduction/Methodology

This section describes the impact potential of various onshore and offshore project components on terrestrial and freshwater biological systems. It is based on review of the available environmental reports of the project area [WESTEC, 1983; Dames and Moore, 1984; Woodward-Clyde Consultants and Arthur D. Little, Inc., 1984], color aerial photographs and stereo aerial imagery. Field checking and groundtruth analyses were performed by interdisciplinary and specialist teams on one or more days each month in January through June, 1984, providing site specific information for impact analysis and mitigation. Special emphasis has been placed on stream crossings and Environmentally Sensitive Habitats, ESH, [Santa Barbara County, 1982].

The Policies of the California Coastal Act of 1976 in general, and the Santa Barbara County Coastal Plan [1982] in particular, protect coastal streams, wetlands, riparian habitat, monarch butterfly trees, native grasslands, Black-shouldered (White-tailed) Kite habitats, vernal pools, and coast live oak trees under an Environmentally Sensitive Habitat Area overlay designation. Under these policies, wetlands are protected against development related reductions in productivity or degradation in water quality; sedimentation in streams is to be minimized, riparian and native grassland vegetation is protected, and disturbed areas must be revegetated with local native plants. Butterfly trees and live oak are protected against removal. In addition, overall habitat loss and potential for revegetation were considered for both ESH and non-ESH areas (details for this are in Appendix J, Table 5.2.1-2). Individual species are protected by the Federal Endangered Species Act of 1973, the California Endangered Species Act of 1970, the California Native Plant Protection Act of 1977, and C.E.Q.A., Section 15380. (See Section 4.6 of this report and Section 2.4.1 of Appendix J for detail.)

The criteria used to assign significance to potential impacts and mitgation measures are as follows:

- An impact is considered regionally significant if it is judged likely to: cause or substantially contribute to measurable change in the function or recovery of any habitat of recognized special importance to terrestrial biota for a period of 5 years or longer, or cause or substantially contribute to measurable change in the population of any species of recognized regulatory, commercial, recreational, scientific or educational importance for a period of 5 years or longer.

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The criteria used to assign significance to potential impacts and mitgation measures are as follows:

- An impact is considered regionally significant if it is judged likely to: cause or substantially contribute to measurable change in the function or recovery of any habitat of recognized special importance to terrestrial biota for a period of 5 years or longer, or cause or substantially contribute to measurable change in the population of any species of recognized regulatory, commercial, recreational, scientific or educational importance for a period of 5 years or longer.

- 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 in 10 percent or more of a contiguous unit of habitat for 5 years or longer. An example of a continuous unit of habitat is a stand of eucalyptus woodland.

- Impacts are further classified as Class I, Class II, Class III, and Class IV as described in Section 5.0.

The above criteria were developed to be complementary to the existing institutional and regulatory policies regarding terrestrial biota.

5.6.2 Impacts of the Project Components

CONSTRUCTION

Overview

Construction of onshore oil and gas pipelines from the Point Conception landfall to a proposed processing facility at Gaviota is assumed to require a cleared construction ROW width of no more than 100 feet. As presently proposed, pipeline construction would result in impacts of regional significance (Class II) to Environmentally Sensitive Habitat, especially wetland and riparian areas. Construction of the Gaviota processing facility would result in a locally significant impact (Class I, partially mitigable). Construction related activities, offshore and onshore, are likely to have insignificant adverse effects on terrestrial biota due to air quality changes. The use of Point Conception for staging construction activities is likely to result in significant adverse impacts (Class II) if clearing of the cypress trees occurs. Clearing of Butterfly and/or raptor roost trees for construction staging or Highway 101 access (the latter based on the most recently available proposals for the Gaviota site) would represent a regionally significant Class I impact.

Pipeline Corridor

As presently proposed, the pipelines will be buried for their entire 16.5 mile route, including 26 stream crossings (Figure 5.6-1) with a maximum 100-foot wide corridor of direct disturbance for construction purposes. While this represents a direct impact on 200 acres, a much larger amount of acreage would likely be impacted under present proposals due to downstream erosion effects. Construction is scheduled to commence during the second quarter of 1985 and take about four months. Chevron has proposed to: compact and restore disturbed terrain to its original contour; seed where required; cross streams during low flow periods; where necessary, reinforce disturbed stream banks or construct water diversion terraces; place willow cuttings and sedges in riparian (stream associated) areas where appropriate. Chevron has stated that erosion prone areas can be hydroseeded with fast-growing native annuals. These measures would not be sufficient for restoration given the habitats and

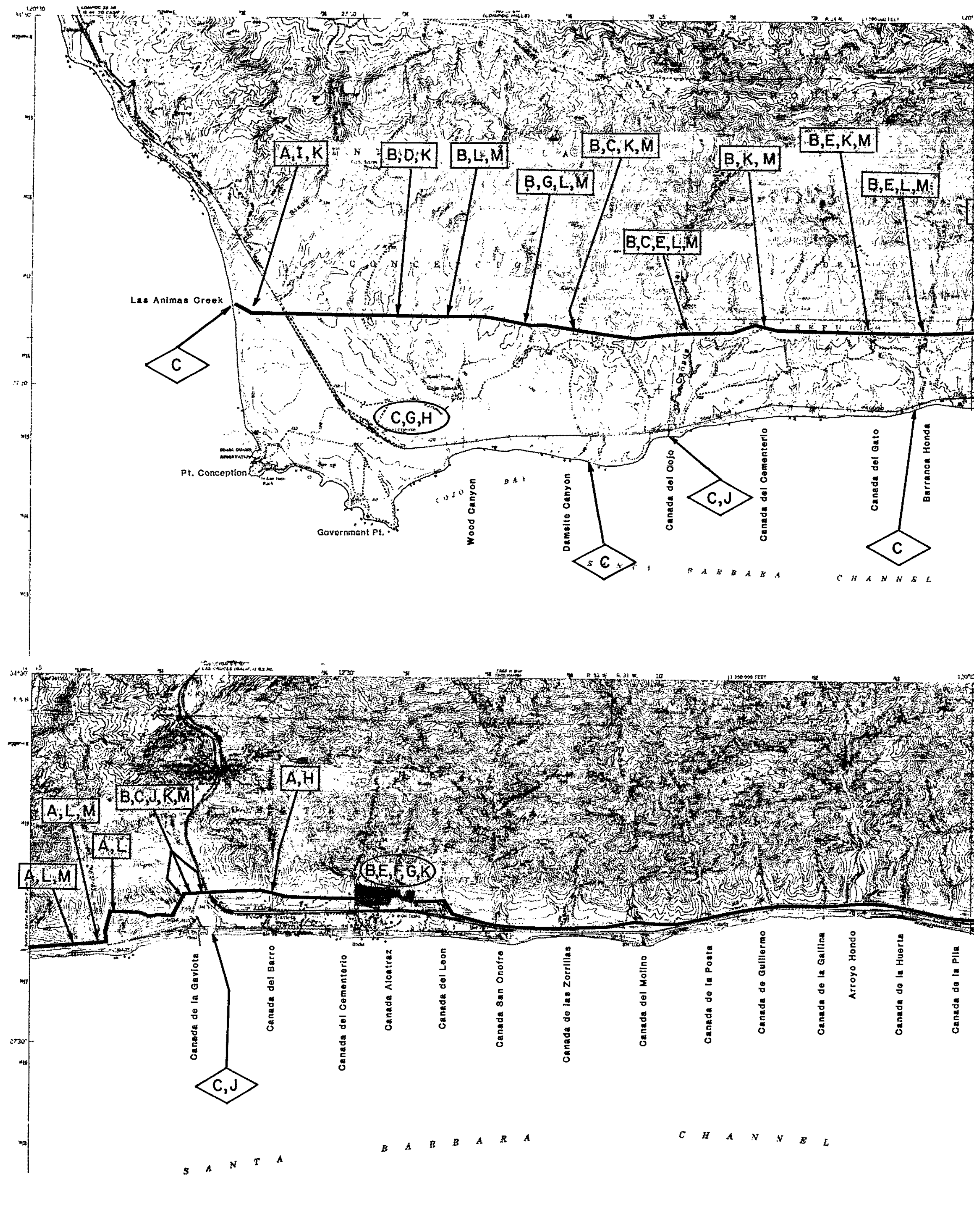
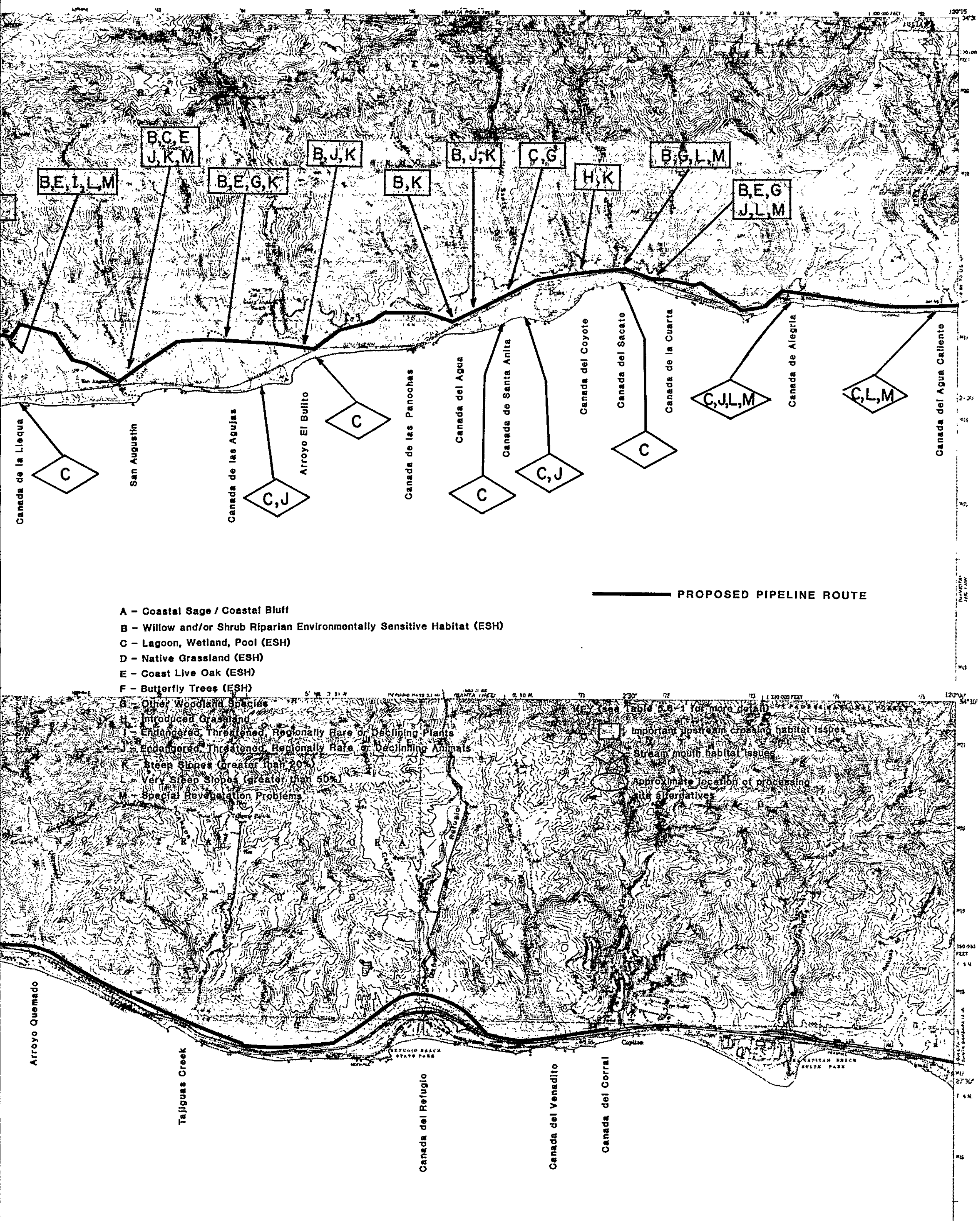


FIGURE 5.6-1 PROCESSING SITE AND PIPEL

IMAGE# 119,



NE STREAM CROSSING IMPACT ISSUES.

Arthur D. Little, Inc.

IMAGE# 120,

terrain crossed by the pipeline route. The following impacts are anticipated, given the above proposed measures. This assessment of consequences emphasizes the impacts of project components on the terrestrial and aquatic systems impacted. Those systems not noted are not believed to be impacted by components of the project.

Cismontane Introduced Grassland and Cropland - These represent nearly 80 percent of the pipeline route. Both can recover nearly completely within a year of disturbance (see Appendix J, Table 5.2.1-2). However, locally significnt impacts (Class II) could occur where topsoil is not conserved and replaced on cropland to allow for rapid total recovery and where slopes steeper than 20 percent are not stabilized through effective revegetation with species that give fast and long-term (several rainy seasons) slope stability.

Coastal Sage Scrub - This type makes up about 17 percent of the vegetation to be disturbed on the pipeline route. These vegetative communities can recover rapidly after disturbance. However, much of the coastal sage scrub in the area of the proposed pipeline occurs on slopes greater than 20 percent. In these cases, locally significant Class II impacts due to erosion would occur unless active stabilization/ revegetation programs are implemented.

Riparian Woodlands, Shrublands, Wetlands and Aquatic Systems - These ESHs make up the remaining 3 percent of the pipeline route. The pipeline route, as presently proposed, would cross 26 intermittent and perennial streams between Point Conception and Gaviota. As illustrated on Figure 5.6-1 and in Table 5.6-1, the proposed route would include pipeline burial across environmentally sensitive wetland, riparian and stream habitats. Impacts would result in long-term alterations in these habitat types depending on the extent of mitigation. Given the diminishing areas of these habitats and their recognized value in the local Coastal Plan, impacts on these habitats as a whole must be viewed as regionally significant (Class II). Specifically:

- A 100-foot wide corridor, as located, would remove or damage coast live oak (protected by Santa Barbara County policy), sycamore, cottonwood and/or willows at the majority of crossings. All but the last species require many decades to reach existing sizes, even if they are replanted and successfully reestablished. Such reestablishment has not been proposed by the applicant, and for reasons listed below, reestablishment would be difficult without considerable effort.

- In all cases, stream crossing burial locations have slopes steeper than 20 percent, most much more severe (Table 5.6-1). In many cases, vegetation removal would expose shale bedrock, which is very difficult to revegetate. Vegetation removal could also expose highly erosive deposits, which are very difficult to stabilize and hence revegetate.

- Construction through two wetlands/lagoons, at Canada de Alegria and Canada del Agua Caliente, would disrupt major portions of the total area of these two marshes. As noted in Section 4.6.2,

TABLE 5.6.1
SUMMARY OF PIPELINE CONSTRUCTION-RELATED IMPACTS AND MITIGATION
ON AQUATIC AND TERRESTRIAL RESOURCES, INCLUDING ESH'S

Stream Name (West to East) *	Resource Affected[1]	Constraints for Revegetation	Measures for Mitigation[2]
Los Animas	Coastal Sage/Coastal Bluff Habitat; Lagoon at mouth	Steep Slopes[3]	Revegetation Program; (see Section 5.6.5 for all revegetation details)
Wood Canyon (West Tributary)	Willow Riparian Habitat; Native Perennial Grassland	Steep Slopes	Move Alignment Northward to Avoid Grassland; Revegetate
Wood Canyon	Willow Riparian Habitat	Very Steep Slopes[4]; Special Revegetation Problem[5]	Span at Creek Bottom; Revegetation Program
Wood Canyon (East Tributary)	Planted English Walnut, Eucalyptus and Shrub Riparian Habitat	Very Steep Slopes, Special Revegetation Problem	Revegetation Program, Use Native Woody Species to Stabilize
Damsite	Wetland and Shrub Riparian Habitat; Deep Lagoon at Mouth	Steep Slopes; Special Revegetation Problems	Revegetation Program; Use Locally Obtained Plant Material
del Cojo	Valuable Large and Seeding Oaks; Willow Riparian Habitat; (Redlegged Frog) Diverse Native Wetland Lagoon at Mouth with Tidewater Goby	Very Steep Slopes; Special Revegetation Problems	Move Pipeline Southward to Avoid Oak; Span Creek to Avoid Wetland; Revegetation Program
del Cementario (Tributary to Cojo)	Willow Riparian Habitat (also in Neighboring Drainages)	Very Steep Slopes, Special Revegetation Problems	Continue above Southward Move, Avoiding Riparian Habitat; Revegetation Program
del Gato	Oak and Willow Riparian Habitat; Holly Leaved Cherry; Wetland at Mouth	Steep Slopes; Special Revegetation Problems	Continue Southward Move to South of Road (Span if Stay Upstream); Revegetation Program
Barranca Honda (joins Gato)	Oak and Riparian Species; Wetland at Mouth	Very Steep Slopes; Special Revegetation Problem	Stay South (from above) and Span or Put with Road; Revegetation Program
de la Llegua	Oaks and Willow Riparian Habitat; Coastal Sage scrub; Hoffman's Nightshade; Bobcat Use Area; Lagoon at Mouth	Steep to Very Steep Slopes, Special Revegetation Problem	Span Creek to Avoid Oak and Nightshade; Revegetation Program
San Augustin	Oak and Willow Riparian Habitat; Downstream Reservoir and Wetland; Redlegged Frogs; Western Pond Turtle	Steep Slopes, Existing Erosion	Span Adjacent to Texaco Line; Revegetation Program
de las Agujas	Oak, Cottonwood, Willow Riparian; Wetland Lagoon at Mouth with Tidewater Goby	Steep Slopes	Cross North of Road (or Span South of Road; Revegetation Program
El Bulito	Willow Riparian; Lagoon at Mouth; Redlegged Frog, California Newt	Steep Slopes Near	Stay in Road Corridor and Cleared Area Follow proposed Revegetation Program
de las Panoches	Small Area of Low Value Riparian vegetation; Small Lagoon at Mouth	Very Steep Slopes	Revegetation Program
del Agua	Willow Riparian Habitat; Lagoon; Mountain Lion Visited Regularly	Steep Slopes	Stay South of Willow Grove; Revegetation Program
de Santa Anita	Wetland and Valuable Nearby Lagoon; Tidewater Goby; Steelhead Trout; Redlegged Frog, Western Pond Turtle		Bury in or Parallel to Road in Plastic or Clay-lined Trench; Block Valves Each Side of Stream; Revegetation Program

TABLE 5.6.1 (continued)
SUMMARY OF PIPELINE CONSTRUCTION-RELATED IMPACTS AND MITIGATION
ON AQUATIC AND TERRESTRIAL RESOURCES, INCLUDING ESH'S

Location by Stream or Canyon	Resource Affected[1]	Constraints for Revegetation	Measures for Mitigation[2]
de Coyote	Introduced Grassland	Steep Slopes	Follow Proposed Plan
del Sacate	Willow Riparian; Hollyleaved Cherry Grove; Lagoon at Mouth	Very Steep Slopes; Special Revegetation Problems	Realign to North, or Span; Revegetation Program
del Cuarta	Oak, Sycamore and Willow Riparian; California Newt	Very Steep Slopes; Special Revegetation Problems	Move a Bit to North;Revegetation Program
del Alegria	Valuable Lagoon/Wetland (would require very deep burial); Tidewater Goby, Redlegged Frog	Very Steep Slopes; Special Revegetation Problems	Hang on RR Trestle; Block Valves Both Sides of Stream; Revegetation, Restoration and Restocking Program
del Agua Caliente	Valuable Lagoon/Wetland (would require very deep burial)	Very Steep Slopes; Special Revegetation Problems	Hang on RR Trestle; Block Valves Both Sides of Stream; Revegetation, Restoration and Restocking Program
Unnamed #1	Coastal Sage Scrub; Lemonadeberry sumac	Very Steep Slopes; Special Revegetation Problems	Revegetation Program with Sage Scrub
Unnamed #2	Coastal Sage Scrub; Agriculture	Very Steep Slopes; Special Revegetation Problems	Same as Above
Unnamed #3	Coastal Sage Scrub	Very Steep Slopes	Same as Above
de la Gaviota	Flood Plain Shrub Riparian Habitat; Wetlands; Redlegged Frogs; Lagoon at Mouth; Tidewater Goby; Steelhead Trout	Steep Slopes; Special Revegetation Problems	Work During Lowest Flow, Bury Very Deep and Use Hand Labor, Keep Flow to Down-stream at All Times. Block Valves at Both Sides; Restocking
del Barro	Catalina Mariposa Lily; Grassland and Coastal Sage Scrub Above ESH	Steep Slope	If Disturb Lily, Replace Clay and Replant Otherwise, as Proposed Plan
del Cementario	Woodland (Eucalyptus with Oak and Sycamore)	Steep Slopes	Erosion/Siltation Protection From Grading of Site (below)
Unnamed Tributary to del Cementario	Eucalyptus Woodland with a Few Oaks; Butterfly Trees; Raptor Nest		(Partial) Rapid Slope Stabilization and Revegetation Replanting of Lost Trees
Alcatraz	Woodland (mostly Eucalyptus) Butterfly Trees; Turkey Vulture Roost	Steep Slopes	Erosion/Siltation Protection From Grading of Site (above); avoidance in Highway 101 access

[1]Taken from field results. See Table 5.2.1-3 in Appendix 5.
[2]All measures for mitigation including revegetation program outlines, are discussed in Section 5.6.5 of this chapter.
[3]Steep = greater than 20 percent.
[4]Very steep = greater than 50 percent slope.
[5]Special revegetation problem = shale, or highly erodable marine deposits.

coastal wetlands represent a very diminished habitat type in the Study Region. Restoration is conceivable but it is not certain that existing soil/water and habitat relation- ships could be duplicated, and that the restored habitat would resemble or function as the existing ones do. Dewatering or extensive sedimentation in Alegria would cause loss or severe disruption of aquatic species including the tidewater goby (under consideration for Federal listing as endangered or threatened). Adverse impacts to the lagoons described above would have additive regional significance beyond that for all the crossings combined.

- The proposed construction activities would add to stream sediment loads, especially where water is flowing. Unless steep slopes are revegetated quickly, eroded sediments would blanket bottom fauna, scour, and accumulate in low spots such as lagoons. This would alter substrate characteristics and function. While the characteristic benthos populations recover reasonably quickly once streams stabilize, such impacts would be most significant at stream crossings that are close to downstream lagoons (de Las Agujas, El Bulito, Santa Anita) because turbidity and increased sediment can reduce water depth and alter reproductive success and food availability for such species as remant steelhead trout populations in Santa Anita or the tidewater goby in Santa Anita and Agujas. Wetland vegetation can be impacted by changes in water regime. Such lagoon areas are increasingly rare and of recognized environmental value and sensitivity. Adverse impacts to the lagoons described above would have additive regional significance beyond that for all the other crossings combined.

Wildlife -- Wildlife may be affected by pipeline construction through habitat disruption and noise. Noise impacts are expected to be adverse but short-term at any one location. Loss of foraging acreage due to pipeline construction is likely insignificant in the context of the whole area. These activities are believed to represent a short-term impact of Class III. Potential Class II impacts include loss of nesting for one season of declining riparian dependent birds, such as the yellow warbler. Fieldwork in June, 1984 determined present use of the riparian areas by the yellow and Wilson's warblers. Two willow flycatchers were observed in San Augustine Canyon in June, 1984. This species is particularly noteworthy as it has been considered extirpated as a breeder in Santa Barbara County due, at least in part, to habitat loss [Lehamn, 1982]. Further fieldwork indicated that the June observation was not of a breeding pair.

Onshore Processing Facility

Construction of the proposed onshore processing facility at Gaviota includes clearing and grading 30-35 acres. Final plans for managing the cut and fill on this site are still uncertain. Depending on storage locations and duration, fill represents a potentially large source of sediment that could be carried seasonally to one or more streams on the site, as well as downstream habitats and some designated Environmentally Sensitive Habitat Areas.

Most of the vegetation on the site that would be removed consists of introduced trees, grasses and weedy species. From the standpoint of native vegetation removal habitat loss in the non-treed areas, impacts would be adverse but are not likely to be significant. However, the southern part of the site, with its dense growth of trees, is used as roost by monarch butterflies and by raptors. Tree removal would reduce available habitat. Noise and activity may further diminish the supporting capacity of the remaining wooded area. The latter is a less certain impact as current use of the area indicates some tolerance for traffic and the noises of existing industrial development. The area proposed for filling includes the turkey vulture roost near the intersection of Canada Alcatraz and Highway 101 and an unnamed drainage between Canada Cementario and Canada Alcatraz that contains Butterfly roost trees and historical raptor nest trees. Butterfly trees would be removed from a second area as well. (Figure 5.6-2.) Monarch Butterflies use eucalyptus trees that are typically set down out of the wind, resulting in a protected microclimate. This makes this habitat more difficult to reproduce. However, the overall carrying capacity for wintering Monarchs at this site is unknown. Construction of the processing facility would result in an impact of at least local significance (Class I), and with butterfly tree removal would also be inconsistent with Local Coastal Plan (LCP) policy 9-22.

Chevron has stated as part of the Coastal Consistency Review (1983) that no butterfly trees would be removed and that eucalyptus trees would be replaced in equal numbers. However, in the December 3, 1982, memo from their consulting entomologist (Coastal Consistency Review, 1983), the proposed fill area noted above was not discussed. Her conclusion was that if the three low-lying eucalyptus areas she visited are left intact they could possibly handle most of the displaced butterflies. There are presently insufficient data on the effects of displacement on wintering monarch butterflies to verify this conclusion. It is not apparent how the applicant can replant more than 600 eucalyptus trees (see tree count in Figure 5.6-2) without displacing other locally significant habitat types. There is no assurance that replanting eucalyptus would re-create butterfly habitat.

Finally, decisions on additional required project components leave the fate of the remaining trees uncertain. If the adjacent Getty project wastewater treatment system is not built, it is assumed that additional eucalyptus woodland near the proposed administration building, including major Butterfly trees noted by Chevron's consulting entomologist, would have to be cleared for or would be affected by installation of a septic system. Plans for a water retention pond near this group of eucalyptus could reduce their numbers further. Impacts would likely be Class I, at least locally.

Construction Staging Areas

Any tree removal at the Point Conception staging area would represent a regionally significant long-term Class II impact. Construction staging activities very near the planted cypress windbreaks at the site during spring or fall, could disrupt migratory bird use of the area and would represent an impact of Class II, or more likely Class III, significance.

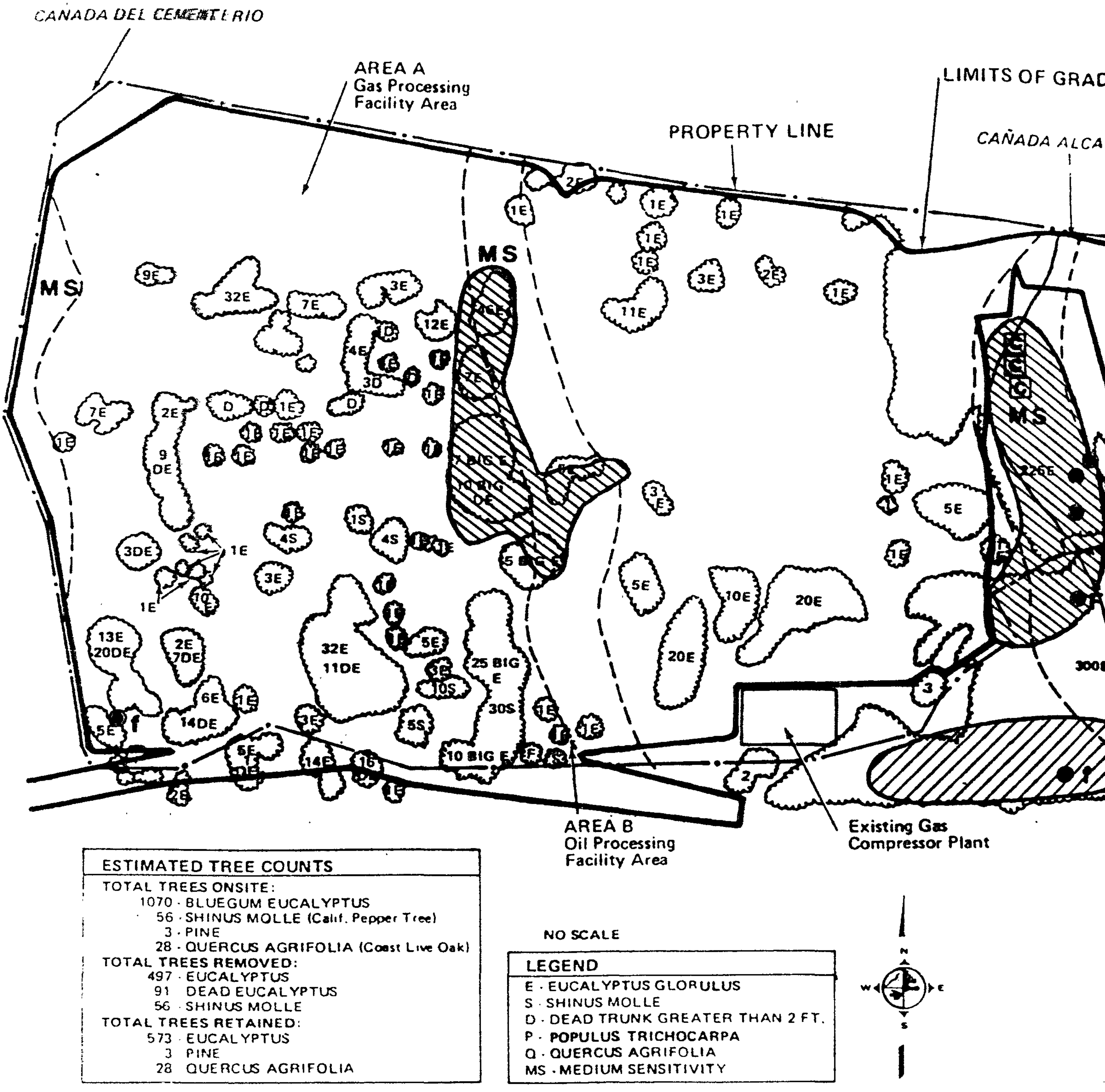
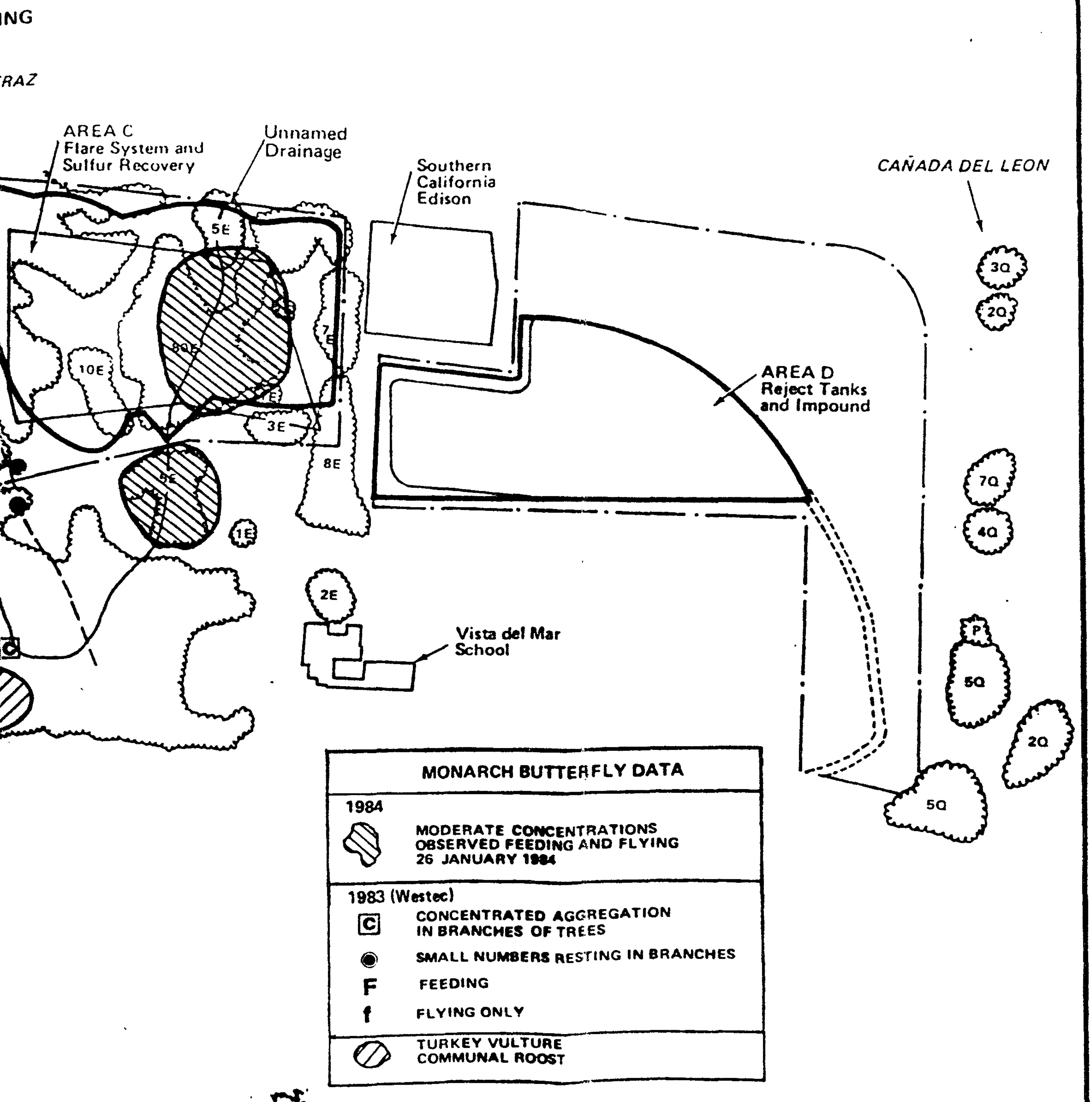


Figure 5.6-2 **Biologically sensitive areas and tree cou**

(Modified from West



nts for the Gaviota Processing Facility

: 1983 Exibit 42).

Dry-Oil Transportation Option from Gaviota to Las Flores

If neither the crude oil pipeline to Los Angeles nor the expanded Getty Marine Terminal are built (the Applicants' preferred options for moving crude oil out of Gaviota), the applicant considers use of the proposed marine terminal at Las Flores an option. This option would require the construction of a pipeline from Gaviota to the Las Flores onshore storage tanks. Such a pipeline would have to cross 24 perennial streams and most of the plant communty types characteristic of the South Coast. It would represent an increase in impact on stream habitat and biota because of streambank disruption and erosion sedimentation, and ESH loss. Riparian corridors contain more water between Gaviota and Las Flores Canyon than to the west and hence, support better developed and more complex riparian woodland. A number of canyons (Corral, El Capitan, Refugio, San Onofre are examples) contain habitat of exceptional regional value. Fish are present in a number of streams, with rainbow trout reported in Corral Creek [SAI, 1983], San Onofre Creek [Mulroy, 1984], and Dos Pueblos Creek [Sjovold, 1984]. Mosquito fish and Arroyo chub have been collected in Refugio Creek, which previously supported trout. Potential impacts in these sensitive areas would be regionally significant Class II, assuming plans for ESH avoidance and successful site restoration can be developed with site evaluations comparable to those completed for the proposed pipeline from Point Conception to Gaviota.

Onshore Effects of Offshore Construction Activities

The highest concentrations of air pollutants at onshore locations during construction, are related to offshore pipeline and outfall installation. Conservative worst case high one-hour levels of NO_2 [1333 ug/m^3 = 0.7 ppm] and SO_2 [443 ug/m3 = 0.12 ppm] would occur on land with direct onshore winds. Such winds occur two to three percent of the year. These worst case conditions might occur several times during construction (see Section 5.2 and Appendix F). Neither of the above levels exceeds reported acute toxicity thresholds for plants (see Appendix J). Together, they could cause foliar damage to sensitive species over a number of hours. However, because construction activities are of a relatively short duration and the frequency of such a worst case is at most several events, adverse impacts on sensitive species would likely be of Class III significance.

NORMAL OPERATIONS

Overview

During normal operations potential impacts would come from increases in air pollutant emissions and withdrawals of freshwater. The former is especially important considering Santa Barbara County's non-attainment status for ozone. (See Section 5.2.) Freshwater withdrawals have significant impact potential because of the sensitivity of biota associated with local surface (or subsurface) waters to any reduction in streamflow.

Pipeline Corridor

During normal operations, there should be no additional adverse effects from the existence of the pipeline. Maintenance inspection might disrupt local wildlife, but likely within the range of previously existing disturbance patterns. Chevron has given no indication of plans for active maintenance of the row through mowing or herbicide use.

Onshore Processing Facilities

The processing facility would produce emissions of types of air pollutants that can adversely affect terrestrial biota at high concentrations.

The combined effects on air quality of project-related offshore oil production, offshore and onshore project-related traffic, and processing of oil at the Gaviota site were considered. The analysis is considered conservative because of use of threshold values for sensitive species and "worst case" assumptions in the air quality modeling. (See Appendix J and Section 5.2.)

Increments in SO_2 and NO_2 onshore during normal operations will be greatest in the vicinity of the proposed processing facility at Gaviota. Even maximum increments of these two parameters under conservative worst case circumstances, do not reach reported impact thresholds for sensitive plant species. These high one-hour worst case values (SO_2, 0.08ppm, NO_2, 5ppm) would occur during northerly onshore wind conditions (two to three percent of the year). This causes the emission plume to intercept the south slope of the Santa Ynez Mountains behind the facility, exposing plants to higher concentrations that would otherwise occur. The maximum concentrations would be much lower for other wind directions and do not exceed any standards west, south, or east of the plant. It is anticipated that SO_2 and NO_2 levels will result in insignificant adverse effects under normal operations.

The proposed project will increase emissions of NO_2 and SO_2 under normal operations. Studies suggest that circumstances that add to the levels and frequency of high NO_2 and SO_2 emissions have the potential for increasing acid fog events and possible adverse effects on plants (Wisniewski, 1982; Waldman, 1982). However, the proposed project would produce increments of SO_2 and NO_2 that are less than 0.01% of baseline emissions for Santa Barbara County. It may be inferred that pH levels of fog may not change dramatically due to normal operations of the facility. (See Section 5.2 and Appendix J.)

In general, increments in ozone levels due to the proposed project represent slight increases above baseline conditions (Section 4.2 and 5.2). Baseline worst case conditions at all target locations for air quality analysis exceed the California .10 ppm standard, but are below the .12 ppm Federal standard, on at least several occasions per year. These levels are already within the range of sensitive plant damage thresholds (see Appendix J). While the proposed project would result in increments to the worst case levels, they are neither significantly higher nor significantly more frequent than levels under baseline conditions. Hence, impacts to vegetation would remain about the same as would exist under baseline conditions, resulting in insignificant increments in adverse effects (Class III).

The analysis reported in Section 5.3 indicates that groundwater yields from the site are insufficient to support the full needs of the proposed projects. Any plan for direct use or resulting in groundwater induced drawdown of onsite or offsite surface water, especially from one of a very small number of local surface streams such as San Onofre or Gaviota, would likely result in impacts on stream biota (including steelhead trout), riparian vegetation, and associated wildlife that would be considered regionally significant (Class II). These impacts would result from reductions in surface water volumes on a flow-limited aquatic regimes, particularly through elimination of shallow areas essential for trout reproduction. It would also result in potential reductions in the water required to maintain existing stream bank vegetation in these designated ESH areas. Impacts would be inconsistent with LCP policies 9-38 and 9-40.

Onshore Support Activities

Onshore support activities include crew bases and daily and weekly commuter increments to supply, man and offload onshore and offshore activities. The potential for impacts to terrestrial biota from these activities will arise from increases in air pollutants, especially ozone. These traffic-type increments have been included in the worst-case air analyses trajectories, hence, their impacts are included in the effects of air emissions from all operations-related onshore and offshore activities discussed above.

Abandonment

Existing proposals by the applicant indicate that pipelines will be left in place and platforms and components of the processing facility dismantled and disposed of elsewhere. The facility site would be restored and revegetated.

Restoring and revegetating the Gaviota site with removal of equipment, cement and asphalt pads would represent a long-term, locally significant, beneficial (Class IV) impact by allowing increased wildlife utilization.

A second positive effect from cessation of project related operational activities would be improved air quality, but it would be locally and regionally insignificant except with respect to upset conditions (see below).

ACCIDENTS, CATASTROPHIC EVENTS

Overview

The principal accidental, catastrophic events or upset conditions that could affect onshore biota include equipment or loading spills (small), pipeline rupture, offshore oil spills that reach shore, explosion or fire, and air quality control upsets. Impact potential is related to the magnitude of the accidental event, its relationship to sensitive habitats, and the probability of occurrence. (See also Sections 5.11 and 5.2.)

Onshore Events

The estimated likelihood of small controllable fires at the processing facility is about once a year, while there is an estimated likelihood of one uncontrollable processing site fire during the lifetime of the facility (see Appendix O). Fire is a naturally occurring part of most upland ecosystems in the project area, with many native species having adaptations that promote survival and rapid recovery. Fire in such habitats would not be viewed as having a long-term significant adverse ecological effect; although from a local policy standpoint, butterfly trees would be destroyed. Should gas or oil-fueled fires affect riparian or woodland habitats (crownfire), an unlikely event under other circumstances because of low fuel grassland understory, adverse effects would be locally to regionally significant (Class I to II). Fire supression activities in the vicinity of the facility could add additional offsite fuel to a proposed project related fire, increasing both its potential scope and damage. Increased human activity at project sites also contribute to the potential for fires, but the impact is not quantifiable.

Catastrophic oil spills from pipeline rupture during seismic activity or a landslide have a low probability of occurrence. Short-term impacts on fast growing terrestrial biota and on woody plant species would be significant (Class I) due to toxic effects and smothering that would cause loss of vegetation. Loss of some animal life is also possible, especially of slower reptiles and amphibians and burrowing animals. While unlikely (8 chances in 10,000 years), large spills of up to 6500 bbls into creeks, and especially into lagoons, would have regionally significant impacts (Class II or I). Such spills would be nearly impossible to stop or contain. Spills into lagoons would have long-term toxic and mechanical effects (smothering) on wetland and water dependent species because of poor flushing during most of the year. Clean-up efforts would remove oil, but also organisms and substrate reducing and/or eliminating populations of instream biota. They could also change pool depth and flushing characteristics and indirectly reduce the carrying capacity of the water body for certain populations and communities. Impact significance for the Gaviota to Las Flores pipeline option would be similar.

Spills from the processing facility of less than 60-900 bbls (4 chances in 1,000 years) would likely result in insignificant adverse effects, of the type described above, to biota of the types described above, both because of containment and such volumes in this location if not contained. Spills of diesel fuel, lubricating oils, or other materials used during construction are possible but not quantifiable. Greatest potential impacts would be in lagoons or perennial streams. Unlikely large spills (up to 60,000 bbls, 2 chances in 1,000 years) are estimated to exceed the capacity of containment. Even with clean-up, effects on terrestrial biota and effects on biota of the onsite creeks would likely be locally and regionally significant (Class II) and of the type described in the paragraph above.

An additional type of accident includes upsets where short-term increments of SO_2 and ozone to air emissions are expected to occur.

(Upsets would occur four times per year, but worst case conditions producing maximum impacts are less frequent.) [See Section 5.2.]

Ozone levels in Ojai (.15 ppm) and the Santa Ynez Valley (.12 ppm) due to processing facility upset conditions under a worst case scenario, would exceed the Federal Standard. Such levels are also above reported damage thresholds (about 0.10 ppm) for sensitive plant species and into the range for impacts on moderately sensitive species. The potential for increments in impact to terrestrial biota are more difficult to assess, as upset conditions would not be frequent and would add to relatively more frequent exceedances of standards in the area. The same applies to the Santa Ynez Valley, although existing high levels do not reach .12 ppm and the baseline frequency of exceedance is low. These would not likely represent a significant increase in impacts to terrestrial biota (Class III).

Sulfur plant failure and amine unit failures that happen in onshore wind conditions (2-3% of the time) could represent a one in ten year event (Section 5.2). Under such conditions the hill behind the Gaviota facility, at about 200 feet, would intercept the emissions plume prior to any substantial dilution of pollutants. Terrestrial biota which largely consist of Chaparial species would be exposed to one hour conservative SO_2 fumigation levels exceeding 2 ppm during amine plant failure. Sulfur plant failure could result in SO_2 levels up to 12 ppm for one hour over 100-1000 acres at the 200-foot elevation on the hill. Levels would exceed 2 ppm SO_2 up to 1100 feet. This would likely result in loss of foliage from plants over the affected area of the hill behind the facility. If defoliation also results in some plant death, erosion of the hillside could be a secondary result and reduction in habitat is possible. A number of rare plants have been reported for the Gaviota area but not specifically documented in the hills behind the facility (see Table 2.4-1, Appendix J and Responses to E.P.A. Comment No. 4 on Terrestrial Biology). SO_2 concentrations this high could also have adverse effects on wildlife, including nesting birds and possibly, peregrine reoccupation sites. These potential impacts are significant at a local to regional Class II level, and could occur several times during the life of the project. The above upset conditions do represent conditions that could contribute to the potential for increasing acid fog events, especially in the form of a localized "hot spot." Impacts on biota are possible, but difficult to project (see Section 5.2 and Appendix J).

<u>Offshore Events</u>

The probability that oil from an offshore oil spill from the platforms would reach terrestrial habitats along the mainland coast is low, especially because offshore distances could allow time for weathering and clean-up. The conditional probability of a platform landfall pipeline spill reaching shore is much higher, and Jalama Beach and Creek are among the most likely landfall sites (see 5.11) if such spills reach shore and threaten lagoons, as under storm conditions or if the pipeline breaks near shore potential impacts would reach regionally significant levels (Class I or II). If oil gets into lagoons such as Jalama or Cojo (the latter is less likely), Class I significant impacts of the type described for onshore events above, would result, including disruption of ESH for such species as the tidewater goby (Cojo and possibly Jalama) and/or anadramous steethead trout (Jalama).

SUMMARY OF IMPACTS LEVEL ON PROTECTED SPECIES AND AREAS OF SPECIAL IMPORTANCE TO TERRESTRIAL BIOTA

Construction of the onshore processing facility at the Gaviota site is not expected to have a significant effect on State or Federally proposed or listed rare, threatened or endangered terrestrial plant, wildlife or aquatic species. These include the reintroduced peregrine falcons on Gaviota Peak, which are judged to have sufficient buffering and foraging habitat even with the project (unless a pair chooses to nest in the area of potential infrequent high SO_2 under upset conditions with onshore winds -- a highly unlikely combination of events). The locally significant (Class I) loss of County protected Butterfly trees and raptor roosts may not cause a regionally measurable decline in these species, although absolute carrying capacity, even at the present time, is not known.

The construction of the pipelines as proposed would have a regionally significant (Class II) adverse impact on environmentally sensitive riparian habitat and wetlands, and coast live oak trees (Table 5.6-1). The potential exists for regionally significant adverse effects on tidewater goby (under consideration for Federally endangered or threatened species listing). Potential adverse impacts on regionally rare or declining red-legged frogs, and Hoffman's nightshade also exist due to construction and potential oil spills. (See Appendix J for more detail.)

5.6.3 Impacts of Area Study Development

The Area Development Buildout Scenario would not represent significant increments in habitat loss because no further onshore clearing is proposed. Other potential impacts on terrestrial biota (air and spill related) do not represent a significant increment over the proposed project.

5.6.4 Impacts of Alternatives

NO-PROJECT ALTERNATIVE

The No-Project Alternative would have no impacts on terrestrial biology.

ALTERNATIVES FOR TRANSPORTING LPG AND NGL

A pipeline for transporting LPG and LNG to Los Angeles would likely follow the same corridors as the suggested pipeline to Los Angeles refineries. As such, this additional pipeline would not represent a significant increase in impact potential over the oil line (not evaluated in this project).

Noise and increased fire hazard due to the use of trains for product transport would not represent a sufficient increment to existing conditions to represent a significant impact to wildlife.

OFFSHORE PIPELINE ROUTE FOR WET OIL AND SOUR GAS

The route from the platforms to the Gaviota processing facility would eliminate the onshore impacts to the ESH's listed in Table 5.6-1. An offshore pipeline is estimated to have about the same likelihood of rupture as a land based one, but proximity to the coast would greatly increase the potential for Class II to Class I oil spill coastal impacts between Point Conception and Gaviota. This stretch includes at least four tidally-influenced lagoons that support species of acknowledged regional rarity and significance. However, unlike a land pipeline rupture, quick, well-planned response to a spill could protect sensitive habitats such as lagoons and wetlands from regionally significant residual effects, except under extraordinary weather conditions. If oil should reach lagoons, impacts would likely be Class I regional significance.

ALTERNATIVE FOR LOCATING ONSHORE PROCESSING FACILITY

The Chevron-owned Point Conception site has been evaluated as an alternative site for a processing facility.

Air quality impacts of this alternative have been evaluated. Maximum worst case operations levels of SO_2 and NO_2 would be lower or the same as those at the proposed Gaviota site. The level nature of the Point Conception site, with hills further away, would suggest that groundlevel upset concentrations would also be less. Ozone worst case levels from this alternative could reach 0.16 ppm in Santa Barbara under upset conditions. This would be an infrequent event, and would require winds that sweep the facility and move toward Santa Barbara (see Section 5.2). Worst case levels, under normal opertions, would exceed the Federal Standard of 0.12 ppm. These impacts are significantly higher than those for the proposed Gaviota facility. The higher levels, although not frequent, could represent impacts to plant species of intermediate sensitivity as well as presently affected sensitive plant species. Thus, ozone impacts in Santa Barbara on biota due to the alternate Point Conception site are considered regionally significant (Class I).

Placing the processing facility at Point Conception is assumed to require a dry oil pipeline to Gaviota across all the same habitats crossed for the proposed project. Hence, impact potential on terrestrial biota would not change for construction, normal operations, and oil spill impact potential.

A processing facility at Point Conception could represent a Class I impact of local to regional significance because of the disruption of wildlife activity patterns by facility construction and operating noise/lighting. The local Coastal Plan sites the Point Conception areas as having outstanding examples of native plant communities. It is an area that is of regional, and probably statewide, importance to bird migration considered similar to Point Reyes, and is likely within the foraging territory of regionally rare large carnivores such as mountain lion. Historically, industrial areas have not been used by these forms of wildlife, which are sensitive to displacement by continued human presence, noise and traffic. It is considered important from a scientific and educational standpoint (Santa Barbara County, RCP), especially because it has been minimally disturbed. This latter fact makes the long-term impacts potential at this site likely more significant than the loss of ESH and Butterfly trees at the Gaviota site.

REINJECTION OF FORMATION/PROCESS WATER

Reinjection represents the discharge alternative to the proposed ocean outfall. It would not alter the terrestrial biota impacts of the proposed project unless a new pipeline were required to reinject at an onshore site. Depending on the proposed location of such a pipeline, impacts would be of Class II or III local or regional significance.

5.6.5 Mitigation Measures for Project Impacts on Terrestrial Biology

CONSTRUCTION RELATED MITIGATION

The necessity for crossing numerous environmentally sensitive habitats with pipelines and processing facility structures results in the regionally and locally significant impacts described above. Applicant proposed erosion control and revegetation measures (see 5.6.2 above) would not be sufficient to reduce the impact potential of proposed construction and operation activities to insignificant levels. The next four pages outline a general construction mitigation plan, followed by a listing of special mitigation activities for ESHs and rare and declining species (designated as subplans). If followed, the measures outlined below would likely reduce impacts 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:

a) Procedures for stockpiling and replacing topsoil, for placement of spoils of excavation, minimization of grading changes, restoration and maintenance of original topography as part of an ongoing program to follow as each section of pipeline is laid;

b) Procedures for containing sediment and allowing continued downstream flow at stream crossings, including scheduling construction activities during summer low-flow and having erosion control structures in place prior to start-up of construction;

c) 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 of native plant species and communities;

d) Procedures for restoration of riparian corridor stream banks and stream bed substrates and elevation;

e) A monitoring plan that would check the progress of site restoration and revegetation measures with contingency plans for remedial actions if initial activities toward site restoration are not successful;

f) 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

g) Advanced written weekly update of construction status and plans to supervising agencies.

The measures would reduce most impacts to terrestrial habitat along the pipeline corridor to insignificant. However, riparian habitats, lagoons, and other sensitive areas, as well as rare and declining species might still be significantly impacted. The following two mitigation subplans address mitigation of such potential residual impacts.

<u>Environmentally Sensitive Habitat Impacts Mitigation Subplan</u>

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:

- <u>Realignment</u> of pipeline to avoid particularly valued species and/or habitats, including a southward realignment from Damsite Canyon through Canada Barranca Honda and minor ones at several other crossings (see Table 5.6-1 and Figure 5.3-1); a similar approach should be used if a pipeline is built from Gaviota to Las Flores.

- <u>Spanning</u> 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, they should not be crossed by equipment or a 100-foot-wide, cleared corridor, and construction access should be achieved from previously disturbed areas, extra pipeline casing and insulation should be added to protect against vandalism and fire. A similar approach should be used for the optional Gaviota-Las Flores pipeline (following field work that would identify sensitive areas and mitigation similar to that now proposed for the Point Conception to Gaviota route). The visual impact of spanning would be different, but not necessarily more significant than erosion scars (see Section 5.8.1).

- <u>Scheduling</u> for construction in July through November, to avoid periods of high base flow and critical wildlife utilization (reproduction cycle of riparian dependent species).

- 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 as necessary to ensure establishment. Success of replacement should be monitored by a qualified independent biologist. This should also be applied to any plans for a Gaviota to Las Flores pipeline.

- To the extent possible, replacement of clumps of Butterfly and raptor tree types in an appropriate topographic setting at the processing facility site, or on other suitable property offsite. The success of this replacement program, and overall impacts on raptor roosting and monarch butterflies should be monitored by a qualified independent biologist for understanding the impact potential of future projects.

The combination of mitigation measures recommended for pipeline crossings at each stream or lagoon has been highlighted on Table 5.6-1. Impacts would likely be reduced to insignificant. However, realignment strategies could potentially alter impacts on cultural resources.

A number of potential additional impacts to Butterfly trees and riparian ESH on the Gaviota site are possible with:

- Construction of Highway 101 access, and

- A package wastewater treatment system or a septic system (if the Getty project is not built).

The overpass access to the site should be kept east of Cementario and west of the Unnamed Canyon to avoid Butterfly and vulture roost trees. This would likely reduce the impact to this habitat to insignificant. Onsite septage treatment could be located at the site of the administration building and the latter relocated to a non-Butterfly tree area. This too would likely reduce additional impacts to this habitat to insignificance.

Mitigation Subplan 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 mid-July and November to avoid interference with reproductive activities of regionally rare and declining or rare, threatened or endangered bird and amphibian and fish species and to have site-restoration and revegetation measures in place prior to the start of the rainy season;

- Streams that contain tidewater gobies (Gaviota, Alegria, Santa Anita, Agujas and Cojo) should be crossed during seasonal low-flows, usually August-September, to keep potential adverse impacts to lagoon habitat to an absolute minimum. Baseline waterflows should be maintained in these streams. This would also apply to at least Refugio, Hondo and Quemado with a pipeline to Las Flores from Gaviota.

- Remove tidewater gobies from the lagoon in Alegria and establish a population in live tanks prior to construction. Restock them in the lagoon after it is restored to preconstruction conditions. Restocking in Gaviota and other goby streams after construction may reduce impacts at those locations. This should be done through a close consultation with the California Department of Fish and Game, U.S. Fish and Wildlife Service, with oversight by qualified independent biologists. Restocking rainbow trout in Santa Anita and Gaviota after construction would reduce impact potential to populations in these streams. This should be done through close consultation with the California Department of Fish and Game, and with a qualified independent biologist;

- Remove a few individuals of Hoffman's nightshade (Solanum xanti var. hoffmanii) at the Canada del la Llegua crossing, place them in large tubs and replant them in the alignment after construction. and under oversight by a consulting biologist;

OPERATIONS-RELATED IMPACTS

Mitigation for adverse impacts due to groundwater and surface water withdrawal from the deLeon, San Onofre and Gaviota riparian ESH areas is a desalination plant. This would eliminate the otherwise likely unavoidable terrestrial adverse impact due to the present water plan. Cross-disciplinary impacts of desalination on air and marine water resources are expected to be insignificantly adverse (see Sections 5.2 and 5.4 in this document).

MITIGATION FOR ACCIDENTS AND CATASTROPHIC EVENTS

Several mitigative measures could reduce long-term significant impacts from a major processing facility fire, in addition to those found in Section 5.11. These include:

- Landscaping the processing facility with fire retardant locally compatible species (plan prepared by landscape experts with agency review and approval); and

- Preparation of a revegetation plan (to be approved by appropriate agencies) for post-fire restoration that would include replacement of habitat losses where they occur. A bond should be posted for such an eventuality.

- Preparation of a fire management plan consistent with system safety and reliability considerations.

The impacts from a major oil spill from pipelines would be nearly impossible to mitigate to a Class III level. In addition to probability reduction mitigations found in Section 5.11, the following measures would reduce long-term losses to terrestrial biota by reducing the size of the spill.

- Block valves installed on both sides of the pipeline at the Canada de Santa Anita, Canada del Alegria, Canada del Agua Caliente and Canada De la Gaviota crossings would minimize the size of spill should a break occur. If the pipeline at the Santa Anita crossing is buried in a plastic or clay-lined trench, and a remotely operated barrier system is installed downstream at the railroad culvert, total spill related impacts to the lagoon would also be reduced.

- Increase the containment area dike capacity at the processing facility, to fully contain any spills from all wet oil reject storage tanks.

- Preparation of a restoration and implementation plan for approval by appropriate agencies for terrestrial areas, for stream crossings and wetlands/lagoons in the event of onshore spill. A bond covering such restoration should be posted.

- Ensure that SCPCO Clean Seas Plan is updated to include stream mouth protection procedures for Jalama Creek and South Coast streams and lagoons in plans for offshore spill minimization and clean-up. (See Oil Spill and Emergency Contingency Plan for Point Arguello, Appendix O.) Response time on the order of 2-3 hours could be required to prevent a pipeline spill in the nearshore from reaching Jalama Creek under adverse weather conditions.

The impacts of a large spill reaching a sensitive lagoon would, however, remain Class I as defined in this document. Residual significant impacts in other areas would depend upon the size of the spill and its location.

The projected significant air-quality related impacts on terrestrial biota would occur during sulfur plant upsets with onshore winds, likely damaging and possibly eliminating vegetation on the south slope of the Santa Ynez Mountains behind the Gaviota processing plant. Mitigations could include an auxiliary sulfur train or auxiliary SO_2 scrubbing capacity. The feasibility of the former measure is uncertain, although the latter is feasible. (See Section 5.2.) A potential mitigation that would raise the plume higher, giving it a greater chance for dilution, only reduces SO_2 level to about half. It would also extend significant impacts further upslope and into historical peregrine falcon nest territory and could make the impacts of more widespread regional significance.

Air-quality impacts due to flare-ups would be localized. However, they could reduce uphill vegetation sufficiently to increase erosion potential. Mitigations beyond Air Quality control measures (Section 5.2) include:

- Establish a monitoring program to document impacts on vegetation in uphill areas; and

- Prepare a resistant species restoration and erosion control plan for implementation upon approval by appropriate resource agencies.

5.6.6 Area Study Development Mitigation

The terrestrial biology impacts associated with the Area Development Buildout scenario were not significantly different from the proposed project impacts, and the same mitigation measures apply.

5.6.7 Mitigation for Project Alternatives

The alternative offshore pipeline represents an increase in the probability of an oil spill reaching the South Coast and sensitive lagoons and wetlands. (See Section 5.11.) Mitigation for onshore impact potential would include a plan for rapid spill response that would prevent oil from entering lagoons and wetlands. Cutoff valves would reduce the size of the spill. A secondary mitigation would be the preparation of a restoration plan and its implementation. These would reduce impacts. Residual significance of impacts would depend upon the amount and weathering of oil reaching affected areas.

Construction of a processing facility at Point Conception would result in loss of the remoteness habitat value of this area for wildlife. Measures that would reduce impacts at this alternative processing facility site include:

- Maintenance of all existing cypress windbreaks for migrating birds;

- Planting of additional screening (with fast growing indigenous species) around the facility to reduce noise and light impacts; and

- Preparation of a site revegetation and restoration plan that would protects ESHs, including avoidance of the vernal pool at the site.

Pipeline construction for transporting oil products eastward to a Gaviota marine terminal (or further) would be mitigated by measures similar to those outlined in 5.6.5 above.

REFERENCES TO CHAPTER V

5.6 TERRESTRIAL AND FRESHWATER BIOLOGY

California Coastal Commission, "Final Staff Recommendation on Consistency Certification Chevron Point Arguello Field Development and Production Plan" May, 1983, and Chevron responses to comments: 7/13/83; 8/23/83; 9/7/83; 10/26/83; 11/4/83; 11/11/83; 11/21/83.

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5.7 CULTURAL RESOURCES

5.7.1 Introduction/Methodology

INTRODUCTION

In this section the potential impacts on cultural resources in the project area are identified and possible mitigation measures are introduced. The section begins by first establishing the methodologies to be used to assess cultural resource impacts and then follows with a detailed discussion of anticipated impacts on a project component by component basis. Finally, mitigation measures are proposed for each impact.

METHODOLOGY

Onshore

The significance or importance of any affected resource is the key element in assessing impacts. Significance and importance are assessed by using the uniqueness and significance criteria presented in Section 4.7. If the resource is not judged significant or important then impacts by definition cannot be classified as either Class I or II according to the following classification.

Class I: Are significant impacts that cannot be mitigated to insignificance.

For the purposes of this assessment it is assumed that all resources that may be ¨ffected are both significant and important. This worst-case procedure thus gives all known resources the full benefit of consideration in the environmental planning and review process.

Class II: Is a significant impact that can be mitigated to insignificance. Mitigation could be data recovery using standard archeological techniques to adequately recover scientifically important data from the site, thus mitigating direct project impacts.

Class III: Is defined as an adverse but insignificant impact. An example would be the removal of a small portion of a site that contained limited amounts of material.

Class IV: Pertains to beneficial impacts. The preservation of any site currently being damaged by natural or human factors would constitute a beneficial effect.

Sites that may be discovered during current investigations will also be considered significant and unique and eligible for mitigation. Some resources described herein as being impacted may not be affected; ground truthing may reveal sites that are just outside impact areas and some sites may be avoidable. Although new sites are currently being located, it seems likely that the true number of sites actually impacted will be lower than those so considered here. In the following paragraphs we clarify the impact analyses procedures.

Direct impacts are those resulting from land modification directly associated with the layout, construction, and operation of new or improved facilities. These effects eliminate sites and isolated artifacts or reduce their integrity.

Indirect impacts eliminate sites and reduce site integrity by increasing the operation of agents not strictly associated with the planning, construction, and operation of new or improved facilities. These effects result primarily from induced population growth and resultant increases in human activities. These effects may be as great as, or greater than direct effects. Common agents of indirect impacts include artifact collectors, off-road vehicle users, erosion, project induced land development and vandals.

Impact assessment begins with defining direct and indirect zones of disturbance. The zone of disturbance associated with the pipeline corridor is the corridor's maximum width of 100 feet because the entire surface of this corridor will be or is likely to be vulnerable to right-of-way clearing and grading, backfill/cleanup after ditching and pipelaying, traffic, and possible impacts associated with revegetation. Major impacts within this corridor will result from excavating the two pipeline trenches, which have an anticipated width of 4 to 7 feet each.

The exact route of the 100-foot corridor is still subject to modification but most, if not all, of the route will be located within a larger 200-foot corridor, the route of which is currently defined. Therefore, this 200-foot corridor is considered the maximum zone of disturbance for analytical purposes.

The zone of disturbance at the Gaviota facility is defined as the entire facility property because vegetation will have to be removed from much of the property.

Identification of particular resources that may be directly affected involved identifying all sites known or recorded to be in project zones of disturbance. Also, since materials were found in the corridor in each case for those sites recorded within 300 feet of the pipeline corridor, these sites are now considered to be in the corridor and potentially affected for the purposes of this document.

Offshore

Determining the impacts that the proposed projects will cause to offshore cultural resources depends on: 1) the presence of cultural resources within the zones of disturbance, 2) the size of the resources and 3) the relative significance of the resources. The severity of potential impacts also depends on the agents of disturbance and the extent of their disturbance. Each of these elements is briefly discussed below.

With regard to zones of disturbance at the platform sites, the impacts could come from the securing of the platform mooring system, from the lowering and installation of the platform on the seafloor and from the anchoring of the construction and support vessels. A zone of disturbance that may result from platform construction activities is considered to have a maximum radius of seven to eight times the water depth at the center of the platform site [BLM 1979].

The proposed offshore pipelines are planned to rest directly on the seafloor. If a construction of the lay barge is used to install the pipeline, then an area 3 to 8 times the water depth would be affected. This would constitute the specific zone of disturbance.

With disturbance zones established, the baseline data in such areas can be examined for potential cultural resources. Once the "anomalies" representing potential or actual cultural resources have been located and compiled, the significance of each resource must be determined to the extent possible.

To assess the significance of impacts to offshore cultural resources, the following impact categories have been developed. These have been organized into four classes. Class I is an unavoidable significant impact. This would be that relatively rare instance where a platform and/or pipeline would necessarily be constructed upon a cultural site (i.e., the platform or pipeline could not be moved to avoid the site) and the situation (e.g., water depth) precluded the excavation or other mitigation of the site. This would be the most severe type of impact due to the lack of any type of preserved information.

Class II is a significant impact which can be mitigated, such as a site located in water shallow enough to permit a salvage excavation of a useful sample of the site, or some other kind of mitigation. Other mitigations in this category could also include removal and relocation of the feature if it is a single artifact such as a stone mortar or a brass cannon.

Class III pertains to adverse but insignificant impacts. These are situations where a cultural site is located in a zone of disturbance but it is of such a nature that it does not warrant mitigation. Examples would be an insignificant recent sailboat wreck or a valueless sunken barge.

Lastly are the Class IV or beneficial impacts. These usually do not occur with cultural resources; most impacts to a cultural site are adverse rather then beneficial.

The project areas considered for this study could have both prehistoric and historic cultural resources. Submerged prehistoric sites may consist of isolated stone mortars, or other artifacts, ranging up to entire remains of inundated village sites [Hudson 1976; Stickel et al. 1978]. Such sites may have considerable significance, for even an isolated charmstone may represent ceremonial behavior [Hudson 1979] and an entire village site may represent substantial evidence of early human adaptations at those times when the now-inundated continental shelf was dry land and inhabitable.

Historic cultural resources for the various study areas essentially involve shipwrecks. The significance of a given shipwreck depends on many factors, including ship age, rarity, vessel type, distinctive vessel form, and value of cargo. A wreck can also be quite significant if it can serve as a "laboratory" of data for testing hypotheses concerning past human behavior (Gould 1983). To completely determine the significance of a shipwreck requires an assessment of whether or not it can be used for scientific studies.

The actual or potential cultural resources identified for this study were assessed with the above considerations of site significance taken into account. However, in the absence of direct visual confirmation that the anomaly is a cultural resource, those that could not be explained as any other were assumed to be potentially significant resources.

NATIVE AMERICAN CONCERNS

Significance, as related to Native American ancestry, was determined through consultation with the affected Native American groups as well as with various individuals. Every Native American consulted during the interview phase of the project expressed great concern for burial sites and archaeological sites, although none could identify heretofore unknown sites. The United Chumash Council ranked site sensitivity in the following manner: 1) highest -- burial sites; 2) next highest -- artifacts associated with burial sites; 3) next most sensitive -- prehistoric and historic village sites and other archaeological deposits; and 4) finally, hunting and gathering activities. It must be stressed that all sites are significant and may be impacted by any development. The extent of this impact on Native American values differs according to these four criteria. Furthermore, all four categories of significance may be found in a single site.

Based on library research and consultation with Native Americans, the following evaluation of the significance of specific sites to Native Americans was compiled:

- Class I -- Unavoidable Significant Impacts. The impact of the proposed project is considered to be in this class if it involves a site of great religious value to Native Americans, and if the impact is not mitigable. In the case of impacts to areas of extreme religious value, the only appropriate mitigation would be avoidance.

- Class II -- Significant Impacts. Impacts are in this class if they are as significant as Class I impacts but are mitigable. The preferred mitigation for archaeological sites is avoidance. Representatives of some Native American groups do not consider archaeological salvage programs to be appropriate mitigation; rather, these programs are perceived as further impacts. However, representatives of a variety of interests at the Santa Ynez Reservation agree that excavation is a possible, though not a preferred, mitigation. Therefore, if a site of great religious value can be avoided by project re-design, it will be considered as Class II. If a site of some significance cannot be avoided by project redesign, but can be mitigated archaeologically, it will also be considered Class II.

- Class III -- Adverse but Insignificant Impacts. Areas of existing but minor significances, which would only be temporarily impacted by the proposed project, are included in this category.

- Class IV -- Beneficial Impacts. These include protection of sites, provisions for allowing Native Americans to perform ceremonies in the project area following construction, and the preservation of Chumash culture through the use of interpretive displays.

5.7.2 Impacts of the Proposed Project

ONSHORE IMPACTS

Table 5.7-1 lists all known recorded sites and isolates that are within the project's potential zone of direct impact, defined here as the 200 ft. wide pipeline corridor and within the Gaviota facility. The sheer number of resources that could be maximally affected represent a significant impact. Because Chevron has demonstrated a willingness and ability to avoid where possible, some will be avoided.

Proposed Pipeline Corridors

Eighteen known sites two historic roads and 10 isolates will be affected by installation of the proposed pipeline. These include seven known or suspected villages (SBa-1494, 1491, 1658, 1807, 1879, 1808, 1747, 1493), two small quarries (SBa-1525, 1874), a variety of different sites generically classified as temporary camps (SBa-1876, 1479, 1871, 1878, 1873), sites with both historic and prehistoric materials (SBa-1875/H, 1877, 1887); and two historic roads (#8, #10), and isolates

#1-10 (note: site maps of isolates #11-16 are not yet available and they may also be in the corridor). Some isolates may be portions of bona fide sites whose surfaces are obscured by dense vegetation. See discussions of these sites in Section 4 and Technical Appendix K.

Major impacts are expected to villages SBa-1491 and 1807. The corridor crosses through main midden areas of both sites. Intensive testing at both sites suggests that major cemetery areas do not occur in the corridor. However, impacts could occur to isolated burials. Residential areas, work areas, and secondary refuse deposits are the most likely types of resources to be affected at SBa-1491 and 1807. Impacts to other village sites are much more limited because the corridor seems to cross areas peripheral to main midden areas. Still, peripheral areas could contain isolated features and burials as well as work areas and minor secondary refuse deposits. Little is known about such peripheral areas and their understanding is an important facet of research into prehistoric life and adaptations in the Santa Barbara Channel mainland. Impacts to villages are mitigable (Class II) from a scientific standpoint, but mitigation costs would be quite high and time-consuming.

Smaller sites may be severely disturbed as well, not only because of their size but also because they have little depth and are easily disturbed by surface activities such as grading and brushing, etc. Importantly, these types of sites have been poorly documented in the region and have been relatively undisturbed by pot-hunters, artifact collectors, and the unsystematic investigations of early archaeologists. Impacts are mitigable (Class II), from the standpoint of the archaeologist.

Impacts to true isolates are mitigable through collection, analysis, and perhaps curation.

The historic road is unlikely to be significantly affected because no cultural materials are likely located in the area of impact. Impacts are thus classified as Class III.

As indicated, most impacts are considered, from a scientific standpoint, mitigable (Class II) if avoidance is not possible. However, mitigation of such a large number of resources requires lengthy planning and unhurried execution if it is to be effective. Six to eight months of field work could be required.

Gaviota Facility

Two known sites, SBa-1507 and SBa-1555/H, will be affected by grading and construction. The sites are generally small and easier to successfully mitigate than the larger, more complex sites but could be significant in their own right. Undiscovered sites may lie beneath the current facility and ground cover and the area's potential may as yet be unrealized. Two major village sites, SBa-94 and SBa-95, lie beneath the

Getty facility south of U.S. 101 [ERT, 1984], and the Chevron facility may contain isolated features or small sites once associated with occupation of these larger sites. Since mitigation is believed possible, impacts would be Class II.

Ocean outfall lines are proposed to discharge emulsified water trapped in produced crude pipelines and wastewater from the plant. If they are buried in the stream channels of Canada del Cementerio and/or Canada Alcatraz, which run south, there should be few impacts (Class II). If, however, they run along land adjacent to the stream channels, then SBa-94 and SBa-95 could be disturbed.

Impacts of the Realignment Corridor

Hollister Ranch landowners have presented Chevron with suggested realignments of the proposed corridor. Because Chevron has indicated a willingness to consider these changes in the final corridor route, impacts from realignment are considered here. As previously noted in Chapter 4, all realignment segments have been subject to surface survey but no shovel test pit investigations were conducted. The discussions that follow focus on Chevron realignment ortho-photo maps dated 15 August 1984 and numbering 0253, 0254, 0255, 0256, 0257, and 0258.

The realignment segment located on Hollister Ranch Lots 33 and 55 passes 200 ft. below the recorded location of prehistoric site SBa-1885. As the STP and survey program has demonstrated, recorded site boundaries are often much smaller than actual boundaries. Therefore, it is highly probable that SBa-1885 would be impacted if this realignment corridor is selected for incorporation into project design. The proposed corridor is thus preferred at this location.

The realignment segment on lots 55, 57, 70 and 71 may avoid impacts to SBa-1877, a prehistoric site that lies within the proposed corridor. STPs, however, would be necessary to confirm this. On the negative side, this realignment segment passes closer to the recorded location of SBa-1494A, a major prehistoric village. Scattered artifacts noted during surface survey suggest that SBa-1494A does extend into the realignment segment.

The realignment segment on Lot 73 crosses the center of SBa-1873, a prehistoric site that has not yet had its boundaries defined with STPs. The site also extends into the proposed corridor which passes along the site's southern periphery. The proposed corridor may create less extensive imacts due to its peripheral location to the site's center.

The realignment segment on Lot 75 passes through prehistoric site SBa-1493. The proposed corridor also passes through the site. It is uncertain which route would generate the least impact. The realignment segment on Lot 106 is an exceptionally preferred route because it avoids impacts to SBa-1807, a very large village.

The realignment segment on Lot 122 crosses Alegria Canyon, as does the proposed corridor. SBa-1879 is located in the floodplain and probably would be affected to the same extent by either route. The realignment segment, however, impacts to a greater extent the two marine terraces which overlook the creek mouth. Since these terraces are prime locations for containing unrecorded sites, it seems that, overall, this realignment segment would create more impacts than would the proposed corridor.

In sum, realignment segments differ in terms of impacts; some are clearly preferable, others are not, and in some cases there is no clear choice between the proposed corridor and suggested realignment segments. Decisions regarding the incorporation of realignment segments should, therefore, be made on a segment-by-segment basis. The segment on Lot 106 avoids a major project impact and is strongly preferred.

Staging Areas

One staging area will be located at Gaviota and one will be located at Point Conception. The location at Gaviota has not been pinpointed but it is likely to be within facility boundaries. Staging could affect two known sites at Gaviota, SBa-1507 and 1555/H; these will also be affected by vegetation removal at the facility. The Point Conception staging area could affect CGP-3 (temporary number), remnant of the Point Conception railroad siding. Much of this site is well preserved and could yield valuable historical data on early day activities along the railway. The site could be easily avoided with proper site planning (Class II).

Optional Extension Pipeline

The optional pipeline from the Gaviota facility to Corral/Las Flores canyons passes close to shoreline, crossing exceptionally sensitive areas with respect to cultural resources. Fourteen sites are known to be in or near the corridor; intensive survey and subsurface testing would identify still more. Of the known sites, five (SBa-87, 89, 92, 108) are villages or middens, six (SBa-1151, 1152, 1156, 1157, 1204, 1506) are scatters of lithic and shell materials, one (#10) is an historic road, and another is of unknown type ("Unrecorded B"). Impacts to such site types were briefly described earlier in a generic sense. It is emphasized that selection of this pipeline option will require a separate EIR and more intensive data gathering and analysis.

Onshore Indirect Impacts of the Proposed Project

This section discusses potential indirect impacts from such agents as erosion, traffic, project-induced recreation, housing development, off-road-vehicles, and from vandals and artifact collectors. These agents except for erosion, results from project-induced population increases.

TABLE 5.7-1

KNOWN CULTURAL RESOURCES IN THE DIRECT IMPACT ZONE

Site Designation	Site Type	Impact Comments
18	Historic road	No materials expected to be affected
10	El Camino Real	No materials expected to be affected
SBa-1876	Special use site: asphaltum processing, lithic tool production	Much of site in corridor but heaviest concentrations of site lie outside corridor
SBa-1874	Special use site: small quarry	
SBa-1525	Special use site: small quarry/plant processing, hunting(?), lithic tool production	Limited - moderate materials in corridor
SBa-1479	Temporary camp/use area(?): lithic tool production, shellfish use	Very limited material in corridor
SBa-1875/H	Historic dump; possible overlap with SBa-1479	Limited materials in corridor
SBa-1877	Historic dump; prehistoric camp: lithic tool production	Much of site in corridor but limited materials
SBa-1494	Main village	Limited materials in corridor, main site area south of corridor; possibly affected by realignment
SBa-1871	Temporary camp/quarry(?): lithic tool production, shellfish use	Limited materials in corridor
SBa-1873	Temporary camp (?): plant processing, lithic tool production	Limited impact from proposed corridor moderate impact from suggested realignment
SBa-1493	Midden with lithic and shell scatter	Is in realignment corridor; extent of impact unknown
SBa-1491	Major village	Major impact to residential area, midden
SBa-1887	Prehistoric/historic of unknown types	Not STP tested; extent of impact unknown
SBa-1658	Major village	Limited materials in corridor

TABLE 5.7-1

KNOWN CULTURAL RESOURCES IN THE DIRECT IMPACT ZONE

Site Designation	Site Type	Impact Comments
SBa-1807	Major village	Major impact, earliest site known in Santa Barbara coastal mainland; avoided by suggested realignment
SBa-1879(X-5)	Seasonal fishing camp/ village (?)	Disturbed but intact portions may exist; impacts unknown
SBa-1878(X-3)	Temporary camp(?)"lithic tool production, plant processing, shellfish use	Limited - moderate amount of materials in corridor
SBa-1808	Village (?)	Moderate impacts, major site deposit south of corridor
SBa-1747	Village (?)	Limited impacts, major site deposit north of corridor
SBa-1507	Lithic scatter: lithic tool use and manufacture.	In facility, partially or wholly disturbed could be affected or avoided
SBa-1555/H	Historic structure, debris from historic Alcatraz; prehistoric camp (?): shellfish use, lithic tool production	Moderate impacts possible, depending upon access road route
Isolates #1-10		Usually minor but some "isolates" may belong to sites obscured by dense vegetation

(Note: Additional STP's could show SBa-1872/H, 1495, 1883 also occur in the direct impact zone. Depending upon the route of the ocean outfall line, SBa-94,95, and "Alcatraz East" could also be affected)

Erosion and project-induced housing developments have the greatest potential for causing impacts in areas where the pipeline would proceed directly upslope. Erosion could affect slopes greater than 20 percent. Importantly, cultural resources frequently occur on marine terraces and in flood plain deposits, which are areas particularly sensitive to erosion. Known sites which are especially susceptible to erosion include SBa-1658, 1878 and 1879. In addition, SBa-97, a major ethnohistoric village, may be affected as a result of construction of access roads.

Regional population increases can also indirectly affect cultural resources. For example, if the project creates traffic problems, new lands might be disturbed for road construction. A shortage of available housing might require new developments in archaeologically sensitive areas and architecturally or historically significant structures might be raised to make way for new developments. Increased recreational use of the environment can also affect cultural resources.

Housing demand for permanent dwellings peak in 1988 when 2,972 units are required in the tri-county region. Seventy-eight percent of this demand will occur in Ventura County in the peak year while the remainder will occur in Santa Barbara County. Most demand will occur in the housing markets of Oxnard, Thousand Oaks and Ventura. Ventura was densely populated by the Ventureno Chumash and the general area can be considered sensitive, and impacts to archaeological sites are likely. The cultural resource sensitivity of the other areas is unknown at present.

Traffic-related impacts may occur as a result of new construction on Highway 101 at the Gaviota facility. A planned frontage road and off-ramp on the north side of the highway may disturb or destroy SBa-1555-H, a historic site just east of the facility. The proposed ramps located south of the highway could affect major archaeological deposits SBa-94 and SBa-95. Both are suspected village sites and can be considered significant/unique.

Most other indirect agents of impact are unlikely to significantly affect cultural resources. Recreation is expected to be spread widely and primarily occur in developed recreational complexes.

Off-Road-Vehicle (ORV) use is not currently a problem in the area and it is unlikely that there will be ORV-related impacts. Private and Federal ownership of lands provide effective control over unauthorized access and ORV incursion. The region's many beaches, developed campsites, and other recreational facilities also provides many outdoor recreational opportunities for those who, in less controlled environments, might be tempted to illegally use ORVs in sensitive areas.

Onshore Impacts from Offshore Support Bases

These support bases apparently require no new construction to become operational. Therefore, there will be no impacts either to cultural resources or to any other resource of concern to Native Americans.

OFFSHORE IMPACTS OF THE PROJECT

As with all of the platform sites and pipeline routes involved in this study, a series of anomalies was identified for each that could be reasonably attributed to such features as seafloor reef or rock outcrops, coarse seafloor sediments, former exploratory well holes, and anchor drags and gouges. The discussions below, however, pertain only to those anomalies which are potentially cultural resources.

In evaluating impacts to potential cultural resources offshore, one must consider standard lease requirements included in all lease agreements by the Minerals Management Service (MMS). MMS stipulations on leases require operators to avoid anomalies of potential cultural significance unless they determine through investigation, that the anomalies are not significant. The stipulations also require operators to monitor installation and pipelaying procedures and to halt activities, until given guidance by MMS, if potential cultural resources are encountered. In addition, as a result of permit procedures,MMS will review anchor plans if a method of pipe installation is chosen that uses anchors. MMS will also schedule a meeting with the operator and the pipelaying contractor ship's captain to review avoidance procedures.

Platform Hermosa

Three anomalies identified by Horne [1982] as possible shipwrecks were located. These include his anomaly 8, which Horne [1982] stated " ... is almost certainly a shipwreck ..." and two possible shipwrecks known as anomalies 13 and 15. These three anomalies are located approximately 800, 2000 and 3200 feet respectively from any area of disturbance. Given MMS lease stipulations there is little likelihood that impacts will occur because the resources seem avoidable.

Platform Hidalgo

A number of anomalies noted for Platform Hildago can be attributed to anchor drags, exploratory holes and possible tar mounds or outcrops. Only one feature, known as anomaly 26, was identified previously as a "possible shipwreck" [MacFarlane 1983]. This anomaly ought to be considered further as a cultural resource. Given MMS lease stipulation, there is little likelihood that impacts will occur.

Platform Harvest

There were no anomalies seen which could be interpreted as a shipwreck or other type of cultural resource. Therefore, the construction of this platform will not impact cultural resources.

Hidalgo to Hermosa Pipeline Route

There will be no impacts due to a lack of cultural resources along this route.

Harvest to Hermosa Pipeline Route

There will be no impacts due to a lack of cultural resources along this route.

Hermosa to Landfall Pipeline Route

Based on the lack of evidence for such resources, there should be no impacts to cultural resources along this route.

NATIVE AMERICAN CONCERNS

Onshore Direct Impacts

Proposed Pipeline Route -- The proposed onshore pipeline extends from a landfall mouth of Point Conception to a processing facility at Gaviota. The 200 ft wide pipeline corridor follows relatively inland along the foothills route until it reaches San Augustin, at which point it follows the coastline more closely; however, it does not go to the south of the Southern Pacific railway tracks at any point.

Visual impacts to the Point Conception area are expected. Point Conception is regarded by many local Native Americans as the most sacred area in California. This area extends well beyond the actual point, and includes altar sites in the foothills overlooking the point. Native American religious specialists use these altar sites for ceremonies which include looking out over the point and toward San Miguel Island, which is on a direct line from the altar area. During construction, the proposed pipeline route would cross this vista and degrade the view. This visual impact is potentially mitigable after the construction phase, and is thus evaluated to be a Class II impact. The proposed microwave dish would be a permanent feature of the area and would be considered a Class I impact.

Archaeological investigations conducted as part of the environmental impact evaluation of the proposed project identified 16 prehistoric sites and two historic sites within the impact zone of the proposed onshore pipeline corridor. During this phase of the evaluation process, Chevron proposed a realignment of the pipeline corridor in the Hollister Ranch portion of the project. Although this realignment avoids one of the sites that would be impacted by the original pipeline route, it would impact another site. Descriptions of these sites and evaluation of impacts to Native American values associated with them are found below.

As stated above, members of the United Chumash Council have stated that any development in the Point Conception-Cojo area, including the entire LNG property, is unacceptable to them, regardless of the existence of archaeological sites in the proposed pipeline corridor. For the United Chumash Council, placing the proposed pipeline anywhere in the area constitutes a Class I impact.

SBa-1876 - This evidently was not a residential site and therefore is not likely to contain burials. However, it is a relatively intact site of lithics and asphaltum processing and is of value to Native Americans. Because archaeological salvage programs are acceptable to those groups who do not see any development in this area as Class I impacts, this site is considered Class II for those groups.

SBa-1874 - This is a very low-density lithics scatter which is relatively undisturbed. As such, it is subject to Class II impacts by the proposed project.

SBa-1525 - This is evidently a small campsite, and is therefore of greater signifance than a lithics scatter. Avoidance is more preferable for this type of site; however, archaeological mitigation would be acceptable to most Native American. This site is thus subject to Class II impacts.

SBa-1479 - This is a lithics scatter of very low density, and is subject to Class II impacts. Turtles were sighted in the creek near this site, and are of great concern to members of the Brotherhood of the Tomol.

SBa-1875/H - The prehistoric component of this site may be an extension of SBa-1479, discussed above. If further testing shows this to be the case, the site is subject to Class II impacts.

SBa-1877 - The derivation of the prehistoric component of this site is not clear. If it is part of the nearby site SBa-1494A, an historic site, its significance may be greater than if it is an independent deposit. The materials discovered in the proposed corridor were lithics, shell and bone, indicating that the site may not contain burials. If the area in the corridor is associated with the larger village site outside the corridor, however, it may contain burials. In addition, a representative of the Brotherhood of the Tomol indicated that the entire mouth of this canyon is extremely sensitive and should be avoided. Pending further archaeological testing, and unless the site can be avoided entirely through realignment of the corridor, this site is deemed to be subject to Class I impacts.

SBa-1494B - This site is that of a large village, probably the historic village of Texax. Preliminary archaeological testing yielded very little material in the corridor, and it appears that the corridor avoids most of the site. However, further testing will be necessary to establish this. Pending the results of such testing, impacts to this site are deemed to be Class III.

SBa-1871 - This is a low to medium density scatter of chipped stone and shell. The site has been disturbed by plowing, road construction, and erosion. The corridor goes through the eastern edge of the site, and very little cultural material was found during the archaeological testing. This site is subject to Class II impacts.

SBa-1491 - This is the site of a large village, probably that of the historic village of Kastayit. At least two descendents of residents of this village are now living. The proposed corridor goes through this extremely sensitive site. Any disturbance of any part of this site would cause extreme consternation to all members of the Native American community, since it is likely that the site contains burials, and it is a historic village with known descendants. Evidence suggests, however, that the corridor does not contain burials. This site is subject to Class I impacts.

SBa-1658 - This site contains dense midden, and therefore is likely to contain burials. The site has been disturbed, but the likelihood of burials makes it a highly significant site nonetheless. The archaeological testing program yielded little cultural material from the pipeline corridor in this site, and it is possible that there may not be burials in the corridor itself. However, pending further archaeological testing and further consultation with Native Americans, this site is considered to be subject to Class I impacts.

SBa-1807 - This site is the earliest known site on the Santa Barbara mainland, having a radiocarbon date of 7710 B.P. It is a very extensive site with midden, and therefore is likely to contain burials. Cultural materials was found in a majority of the shovel test pits during the archaeological testing program. This site is of extreme sensitivity to Native Americans, and is subject to Class I impacts by the proposed project.

SBa-1879 - Although this site has been disturbed rather extensively, it contains midden and therefore probably contains burials as well. In addition, the size of the drainage that the site is in indicates that it is more extensive than surface conditions indicate. The fact that the site may contain burials makes it subject to Class I impacts, unless further archaeological testing demonstrates that no burials are found in the corridor.

SBa-1878 - The archaeological testing program found no dense midden at this site, which has been disturbed by construction and agriculture. However, the site is in an area which is archaeological sensitive in that it is of the type generally settled by Native Americans during prehistoric times. The site is found on the western side of a canyon which has a site (SBa-1808) on its eastern side also, and it is very likely that the canyon bottom also has a site which is buried. In addition, this canyon is associated with the placename Alican'o, indicating significance to the Chumash. Further archaeological testing will be necessary to determine the exact nature of the impacts to this site. Based on current, rather limited knowledge, it is subject to Class II impacts.

SBa-1808 - Like SBa-1878, this site evidently contains no midden; however, further research in this entire canyon area is necessary to establish the nature of the archaeological deposit found there. Based on current knowledge, the site is subject to Class II impacts.

SBa-1747 - This site contains midden, and therefore probably has human burials. Evidence suggests, however, that few, if any, are located in the corridor. In addition, there have been reburials of cultural materials by Native Americans in the vicinity of this site, although no known reburials are in the corridor. This site is of special significance to the Brotherhood of the Tomol, who formerly lived nearby and who are trying to regain possession of the property. Finally, the site is associated with a placename, Leqpew. This site is subject to Class I impacts.

Proposed Realignment - The proposed realignment of the pipeline corridor avoids SBa-1807, which is subject to Class I impacts by the originally proposed pipeline. However, the proposed realignment would impact all of the other sites impacted by the original pipeline, as well as SBA-1873. In addition, SBa-1871 would be more severely impacted by the proposed realignment, which goes through the middle of the site. The original corridor goes along the edge of this site. Pending further investigation, SBa-1871 is deemed subject to Class II impacts by the proposed realignment.

SBa-1873 was not tested archaeologically because the realignment was proposed after the testing program had ended. The site was surveyed, however. Evidently it contains no midden and therefore is not likely to contain burials. However, it is a very large site, and further archaeological investigation is necessary to establish its exact nature. Based on current, inadequate knowledge, this site is deemed subject to Class II impacts.

Another type of site known to be in the impact zone is unique with regard to sites of Native American concern in the project area. This is the site of the residence of the Brotherhood of the Tomol. Although the Brotherhood lost permission to live on this site in 1982, the association still considers it home. The site contains at least one residence and ceremonial areas of great spiritual importance to the Brotherhood and to other Native Americans. It is likely that avoidance of the site is impossible, because of its close proximity to the Gaviota facility. However, it may be possible to avoid the structure and ceremonial areas.

The area formerly occupied by the Brotherhood is also associated with the archaeological site SBa-1747, and with the placename of Leqpew (see Table 2.4-1). In addition, there have been reburials of cultural resources within the Brotherhood site area. Because of these fcts, any disturbance of any of this area constitutes a potential impact to cultural resources, and members of the Brotherhood should be consulted before any such disturbance occurs. Mitigation measures acceptable to the Brotherhood may be arrived at through consultations with representatives of that organization. Based on these contingencies, this site is considered to be subject to significant but mitigable impacts (Class II).

Impacts at the Gaviota Facility - This site (SBa-1555) is extremely disturbed, and contains a light scatter of prehistoric bone, shell, and faunal remains. It is deemed to be subject to Class II impacts. However, Native Americans noted a vulture roosting area at this site, and expressed concern over disturbance of these birds. In addition, hawks and owls were sighted here, as were purple sage.

Optional Pipeline Extension from Gaviota to Las Flores - In this part of the proposed pipeline corridor route, two sites are known to be of gret importance to the Native American community. SBa-92 is the location of the hisotirc village of Si'suci', and almost certainly contains burials, as all historic villages had cemeteries. The only possible mitigation for this site is avoidance; it is deemed to be Class II exclusively on this condition. If avoidance is not possible, impacts would be Class I in nature.

A second site of great sensitivity is SBa-87, the site of the historic village of Qasil. In earlier excavations, burials have been discovered there, along with dense midden. It is also an area of historic use by contemporary Native Americans. One interviewee reported making yearly trips with her relatives through Refugio Canyon, where the site is located, and into the Santa Ynez Valley. This consultant stated that all of Refugio Canyon is highly sensitive. This site is classed as Class II with the provision that avoidance is the only acceptable mitigation.

Archaeological sites SBa-89, SBa-108, and SBa-1766, village/midden sites, are highly sensitive and, again, avoidance is the only acceptable mitigation.

The other known archaeological sites along this corridor consist of scatters of lithic and/or shell fragments (SBa-1151, SBa-1156, SBa-1157, SBa-1204, SBA-1506) and two mapped but unrecorded sites (one is mapped as "B"). The lithic/shell scatters are significant to Native Americans but are of lesser concern than villages, cemeteries, etc. Impacts to such sites can be described as Class II. Impacts to the unrecorded sites cannot be evaluated until further archaeological research is conducted to determine their nature.

Offshore Direct Impacts - Native Americans consulted did not express any site-specific concerns for offshore resources. However, several of those consulted voiced concern for marine resources in general, and for how these resources might be affected by the proposed project. The section on Marine Biology indicates that there may be temporary disruption of the migration patterns of gray whales due to the construction phase of the project. Otherwise, there will probably be no reduction in the total number of fish and other marine resources; however, these may be temporarily dislocated by construction. These impacts may be classified as adverse but insignificant (Class III).

More important than the issue of the effects of construction on marine resources is the question of possible oil spills and their impacts on the environment. As stated in the section dealing with System Safety and Reliability (Section 5.11), two major areas which have a likelihood of being affected should an oil spill occur are: Point Conception and San Miquel Island. As discussed in Section 4.7 a large area, not easily defined geographically, in the vicinity of the point is considered to be of great spiritual value. Based on figures from Technical Appendix O, the probability that an offshore oil spill resulting from the project will reach the shores of Point Conception is 0.007 for the life of the project. This probability is categorized as predicting a "likely" event based on Table 5.11-2 of the DEIS. An oil spill at Point Conception would be considered a desecration of a spiritual place of great significance to Native Americans, and any clean-up efforts would not reduce this impact to insignificance. For these reasons, the impacts of an oil spill at Point Conception are classified as unavoidable and adverse (Class I). The second area which could be affected by oil spills in San Miguel Island, which is inhabited by large numbers of seals and sea lions. Marine mammals were traditionally hunted by the Chumash and are held to be of sacred importance to many contemporary Chumash descendants, especially the Brotherhood of the Tomol. If appropriate measures are taken to protect these animals from the effects of any oil spills, the adverse impacts from these oil spills may be deemed to be mitigable by Native Americans (Class II).

<u>Indirect Impacts: Onshore and Offshore</u>

Indirect impacts to Native American concerns may include an increase of looting of archaeological sites due to greater access by the public; an increase in the construction of recreational facilities and concomitant disturbances to archaeological sites and other sacred places; and disturbance to such sites and places by increased housing construction. Indirect impacts may also include beneficial effects. These may be the granting of access to ceremonial and subsistance use areas to Native Americans; the development of interpretative displays about Chumash culture for educational purposes and the preservation of ethnohistoric information such as placenames and their associated geograpical location as part of local history.

The Local Coastal Plan, in Section 3.7, stipulates that certain measures must be taken to increase public access to coastal areas as part of any approved development projects. This stipulation is made in concurrence with Policies 7-3 and 7-18 of the California Coastal Plan. In accord with this stipulation, any development in the Point Conception area would mandate the opening of that area to public access. This access would include the building of trails in the area as well as other recreational facilities. The opening of the point to public use would create indirect impacts to this area considered sacred by Native Americans. These impacts may include looting of some major archaeological sites in the vicinity, desecration of the sacred area by littering and vandalism, and general increase in use of the region by individuals who do not appreciate the sacred value of the point area.

The greatest indirect impacts will occur as a result of the predicted population increase. The construction involved in satisfying these population and related housing demands, given the large number of archaeological sites and othe places sacred to Native Americans in the area, is certain to have a severe impact on the culture values of this group. Because of the magnitude of projected construction, indirect impacts from the proposed project are deemed to be Class I-adverse and unavoidable.

5.7.3 Area Study

ONSHORE IMPACTS

Given that the area to be developed does not modify the onshore pipeline or processing facilities, no additional cultural resource impacts are expected.

OFFSHORE IMPACTS

The greater Santa Maria Basin Area Study includes possible development of five additional hypothetical platforms. This area, in general, is sensitive with regard to the possible presence of cultural resources [cf. Stickel et al. 1978; Horne and Barnette 1982; MacFarlane 1982; Minerals Management Service 1984]. At the present time, the exact number of location of cultural resources that could be affected by any of the five hypothetical platforms is not known. However, as a result of the cultural resources lease stipulation requirements that the Minerals Management Services places on platform operators (see Section 5.7.2 for discussion of the requirements) no impact to cultural resources in the vicinity of the hypothetical platforms is expected.

NATIVE AMERICAN CONCERNS

Given the area to be developed does not modify the onshore pipeline or processing facilities, no additional cultural resource impacts are expected.

ALTERNATIVE PROCESSING FACILITY SITES

The Point Conception alternative processing site contains the remnants of the Point Conception railroad siting. This site, CG P-3, was recorded in 1982 by WESTEC archaeologists who noted glass, "Depression era" stoneware and porcelain, tin cans, shellfish, and other remains. Much of the site is intact except for the standing structures. It could be affected by construction of the facility but more detailed siting plans would be required to accurately assess impacts.

As noted previously, Point Conception is a place of the highest significance to many Native Americans. The occupation by Native

Americans of the proposed site for Western LNG's facility, much farther from the point than Chevron's proposed facility, demonstrates the great concern that the Point not be developed beyond its current state. The proposed alternative facility at the Point would create Class II impacts to Native American values.

ONSHORE IMPACT FROM OFFSHORE SUPPORT BASES

Alternative bases for the offshore support bases have been proposed at the Getty Gaviota site, at Ellwood and at Carpinteria. Only the Getty site has been well examined with respect to the presence-absence of cultural resources. WESTEC [1983] prepared an environmental report assessing potential impacts of constructing the Getty Gaviota Consolidated Facility and reported that two major sites, SBa-94 and SBa-95, could be affected by construction south of Highway 101, the assumed location of the alternative support base. Class II impacts are expected.

Ellwood basing does have the potential for impacts because local canyon mouths and adjacent areas are densely covered with archaeological sites [e.g., Serena, 1980] but further siting information is required to assess potential impacts, however. Similarly, the planned location of the Carpinteria alternative is required for further consideration.

Only one of the proposed three support bases, Getty Gaviota site, has been adequately examined for cultural resources. Impacts to the Getty Gaviota site could be expected at SBa94, 95 and on "Alcatraz East". Although these remnants of major villages are disturbed, Native Americans would prefer other alternatives if impacts of villages could be avoided.

ALTERNATIVES FOR TRANSPORTING LPG AND NGL

Pipeline transportation will run parallel with one of the crude oil pipelines proposed to Los Angeles or Bakersfield. Pipeline corridors tend to follow through drainages and canyon bottoms; routes with the least gradient. These areas are prime locations for cultural resources, particularly prehistoric archaeological sites. Although the LPG/NGL pipeline alternative would "piggyback" one of the two crude oil pipelines, it is unlikely that all ground disturbance can be limited to previously disturbed areas. It is more likely to assume that LPG/NGL pipeline alternative, particularly the coastal route to Los Angeles, will incur extensive impacts because of its length and location in generally sensitive areas.

Although if a lack of project specific data precludes specific impact comments, it is clear that the LPG/NGL coastal pipeline route would incur extensive impact to Native American sites. The Bakersfield route would avoid coastal impacts which would be preferable even though non-coastal sites would be affected.

Transportation by rail would require a new siting at the Getty-Gaviota site to the south of U.S. 101. Major village sites, SBa-94 and SBa-95, would probably be severely impacted. These overall impacts would be far less, however, than those associated with pipeline transportation. This impact assessment assumes the siding is the only element of new disturbance. Native Americans would prefer rail since less sites overall would likely be impacted.

Reinjection of Treated Water

Reinjection of waste and emulsified water would eliminate potential impacts associated with the proposed ocean outfall. Offshore reinjection would eliminate all onshore impacts; offshore impacts would be unlikely because of the relatively low density of cultural resources offshore, at least when compared to onshore. Onshore reinjection impacts are difficult to assess because the location and number of wells have not been determined.

OFFSHORE PIPELINE

One of the project alternatives is to construct the pipeline, now slated to be built on-shore along the Santa Barbara Coast, offshore and paralleling the coast for the same distance. This stretch of the Santa Barbara Channel is quite sensitive with regard to both prehistoric and historic Native American artifacts and sites and historic sites. The underwater prehistoric sites have been partially documented in Hudson [1976], Stickel et al [1978], the State Lands Commission [1982], and the Minerals Management Service [1984]. The area towards shore is especially sensitive because of the relative increase in artifacts which have been recovered in those areas. Shipwrecks, which are more sensitive at sea, have been noted for the area by Stickel et al [1978], by Macfarlane [1982], and by the Minerals Management Service [1984]. Analysis of geohazards data for the offshore route by a recognized archeologist, Steven Horne, for potential cultural resources indicates that one possible shipwreck is located in 275 feet of water within the corridor. No relic landforms or artifacts were observed. [Dames and Moore, 1983b.]

Native Americans interviewed unanimously supported this alternative over the proposed project. Although this alternative may involve some disturbance of the natural environment, the known and potential impacts to human burials and archaeological deposits implicit in the proposed project would be greatly reduced by an offshore pipeline.

Selection of this alternative would eliminate impacts to a large number of onshore cultural resources.

5.7.4 Mitigation Measures for Cultural Resources

PROPOSED PROJECT

Onshore Pipeline

Mitigation, as usually defined, is the alleviation of adverse impact by avoidance, protection, or collection of a reliable sample of data that make each affected resource significant, unique, or otherwise important.

Mitigation as used here also includes additional surveys, shovel test pit (STP) investigations, and test excavation programs necessary to 1) complete the project area's cultural resource inventory, 2) evaluate the significance/importance of each affected resource, and 3) prepare and implement the actual mitigation plan. Specific mitigation-related activities are described below.

Additional Survey and STP Investigation

The current onshore baseline is for the most part based upon STP investigations of a sample of the areas to be directly affected. It is necessary to combine surface survey and STP testing in other areas of the project area in order to help identify other resources in the direct impact zone. These activities need to be conducted at all archaeologically sensitive terraces listed in Table 4.7-7 and at the former locations of historic structures in the project area. Where STPs are ineffective, backhoe investigations could be conducted in appropriate canyon bottoms to locate sites. All moderate to highly sensitive canyon bottoms listed in Table 4.7-2 need to be investigated to determine presence of sites. All sites of unknown sensitivity should also be examined with STPs or, if STPs are ineffective, backhoes.

Surface reconnaissance should occur first in order to locate as many sites and isolates as possible. Excavation of STPs will be most effective if survey data can identify specific artifact locations. Because the current STP program proved so successful, future STP investigations should be similar in technical design, with one exception. In the current program, corridor areas within 300 ft. of a known site were considered sensitive. Almost all of the areas tested in the 200 ft. corridor contained materials through the full 200 ft. This suggests that using a 400-500 ft. criterion to identify STP areas would result in the identification of additional sites within the corridor.

STPs are necessary to define the boundaries of all currently known sites in the project area. Many of these have already been tested with STPs and found to be much larger than expected. Because of their great size, additional STPs are needed to define boundaries. Other sites were identified late in the field project during surface reconnaissance and have not yet been tested with STPs. Defining the extent of all these sites is necessary to either avoid sites by redesign or to plan for subsequent phases of field investigation. Table 5.7-2 lists currently known sites requiring boundary definition. Some sites that yielded very limited materials in excavated STPs are not recommended for further STP boundary definition (e.g., SBa-1479).

Isolate locations may also need STP investigation if their ground surfaces were obscured by vegetation. Data on all such areas is not yet available but will be presented in OPA's survey and STP report.

All materials recovered during survey and STP investigations must be screened, analyzed, and reported in a manner compatible with current research designs in the local area. For example, all lithic debitage thus requires accurate description of specific raw material; flakes should be classified in terms of reduction sequence; procedures should be developed to differentiate cultural from non-cultural materials; bone and shell should be speciated as precisely as possible; all materials recovered should be weighed and counted; rounding and weathering of artifacts should be noted when present; burned artifacts should be noted; bone should be examined for recent introduction and gnawing, butchering, and evidence of tool manufacture; all tools should be morphologically described; C^{14} dates should be generated for all tested sites that have datable materials; and all data should be interpreted in a regional context.

Once sites in the project area are located and their boundaries defined, the applicant can choose to avoid, to preserve, or to proceed in a stepwise fashion toward data recovery.

Chevron pipeline engineers have indicated that major redesigns in the pipeline corridor are not feasible in most cases due to landowner right-of-way agreement. They do have flexibility within the corridor and on their property near landfall where SBa-1876 is located although this will not likely allow them to avoid most sites. Impacts might be lessened if the pipeline route were redesigned to go up to a N-S erosional feature that cuts through the site. This feature would require substantial stabilization, however, to prevent erosional impacts to the site. Chevron may also have some flexibility in the placement of access roads to landfall. The existing access road through SBa-1844 should be entirely avoided. Even limited traffic will result in unnecessary impacts to this rare resource. Chevron should be required to identify all proposed access road locations as soon as possible so that appropriate field activities can locate sites that may be affected. Sites SBa94, 95 and "Alcatraz East" could be avoided by the ocean outfall line if the pipeline follows the drainage corridors. ERT (1984) Figure 3-2 can be used to define the specific avoidance rate.

Besides conservation through project redesign, a site may be protected by incorporated the site into parks, greenspace, or other open space, or by covering it with a layer of protective soil before building. The latter is appropriate if the archaeological deposit will not suffer serious compaction, the covering soils are chemically inactive, the covering soils are void of archaeological materials, modern objects are placed in the covering soil to date the soil to the last quarter of the century, the site being covered is one in which the natural processes of deterioration and loss have been arrested, and the site has been adequately recorded.

To protect sites along the pipeline from impacts, a minimum of 7 ft. of fill and a maximum of 16 ft. of fill would be required at any particular site. The magnitude of such a fill operation is likely to render this type of avoidance infeasible. Given the near certainty that complete avoidance of all resources through project redesign is not possible, it is useful to briefly discuss test excavation and data recovery mitigations.

TABLE 5.7-2

KNOWN SITES REQUIRING FURTHER BOUNDARY DEFINITION

Site Description	Comment
SBa-1872/H	In corridor; no previous STPs
SBa-1495	Within 300 ft. centerline; no previous STPs; test in corridor to see if materials present
SBa-1873	In proposed and realigned corridor; no previous STPs; define site in corridor
SBa-1883	Same as SBa-1495
SBa-1887	In proposed corridor; no previous STPs; define site in corridor
SBa-1493	In realigned corridor; no previous STPs; define in corridor
SBa-1876	In corridor; define easterly boundary
SBa-1874	In corridor; define eastern boundary
SBa-1525	In corridor; define E-W boundaries
SBa-1877	In corridor; define eastern boundary
SBa-1494A	In realigned corridor; no previous STPs; test in corridor to define site
SBa-1871	In corridor; define northwest boundary
SBa-1491	In corridor; define western boundary
SBa-1658	In corridor; define eastern boundary
SBa-1807	Avoided by possible realignment; if not avoided, define E-W boundaries
SBa-1879	In corridor; define E-W boundaries
SBa-1878	In corridor; define western boundary
SBa-1808	In corridor; define eastern boundary
SBa-1507	In Gaviota facility; no previous STPs; define site boundaries
SBa-1555/H	In Gaviota facility; define northwest, northeast boundaries.

Test Excavations - Mitigations are required when significant/important sites are affected. Basic scientific data required for an evaluation of significance and importance are obtainable only through test excavations designed to determine: 1) the vertical and horizontal extent of the deposit, 2) the structure of the deposit in terms of cultural stratigraphy, features, burials, etc.; 3) the range and density of artifacts and ecofacts (ecological data) in the deposit; 4) the nature and extent of disturbance; 5) disturbance-related limitations of the data; 6) types of information present in the site when compared with similar sites in the region; 7) research questions that may be addressed; and so forth.

All sites that will be affected by the project will require testing in order to prepare a site-specific mitigation (excavation) plan as specified in CEQA, as amended, and other guidelines (e.g., Santa Barbara County's Archaeological Project Requirements, 1980). The testing program and subsequent evaluations of significance and importance would be adequate if satisfactorily answered the questions contained in checklists published by the California State Historical Preservation Office (SHPO). The SHPO will use these checklists to evaluate test excavations and resource evaluations prepared in connection with undertakings subject to the provisions of CEQA, and the National Historic Preservation Act. These checklists affirm the necessary link between adequate site testing and the preparation of appropriate mitigation measures (avoidance through in situ preservation is the preferred mitigation, of course). These checklists are presented as Appendix 2 at the end of Part I of Technical Appendix K.

Following evaluations of significance and importance, the applicant could decide to avoid or preserve the site in situ or fund data recovery mitigations. Preservation and avoidance precedures were described earlier.

Data Recovery Mitigations - Unavoidable impacts to scientifically significant/important resources must be mitigated through a data recovery program (culturally or ethnically significant resource mitigations differ). Such a program is designed to record or otherwise obtain a reliable sample of the data that make each resource significant/ important. Signficance/importance is identified in terms of a research design which identifies specific problem-oriented research questions for which the resource can yield scientific information (ethnic or cultural significance is identified differently). A site is judged scientifically significant/important if it contains data of relevance to the questions posed by the research design. A site-specific research design for data recovery mitigations would describe, for each affected site,

- theoretical bases of research
- regional and site-specific research areas and questions to be addressed through implementation of the mitigation plan (see Section 1.2.4)
- specific types of data required by each question posed
- amount of each type of data required (i.e., specification of reliable sample size)

- methods and techniques for obtaining the data
- laboratory and analytical procedures necessary to link raw data with the research questions
- the logic to be used in interpreting the data.

The mitigation plan must also describe a program for monitoring construction activities and managing emergency discoveries of previously unknown cultural resources. This emergency discovery plan should explicitly cover direct project impacts that were not identified in the EIR/S process because of post EIR/S refinements in project design. Procedures for the mitigation plan should be designed to mitigate impacts to the different classes of expected resources, including prehistoric and historic Native American archaeological sites, historic archaeological sites of Spanish, Euro-American, and other origins, and standing historical structures.

The mitigation program would not be directly managed by the applicant. Standard County procedures are similar to those used in preparing EIR/EISs; that is, Chevron would make funding available for the County's use in 1) selecting an archaeological contractor on the basis of peer review assessments of research adequacy and responsible costing, and 2) funding the mitigations themselves, including the preparation of a professionally adequate final report.

Mitigations of Gaviota Facility Impacts - Mitigation comments are, in general, the same as described above. In addition, it seems possible that sites SBa-1507 and 1555/H could be avoided by incorporating them into open or green space at the facility.

Mitigation of the Optional Extension Pipeline Impacts - Mitigation comments are, in general, the same as described in the sections above.

Mitigation of Indirect Impacts - Erosion impacts could be mitigated by erosion control measures suggested in Technical Appendix G, including compacting and stabilizing trench backfill, prevention of runoff collection in or near the trench, promotion of revegetation, and periodic usual monitoring of the pipeline to identify erosional problems early in their development (e.g., monitoring immediately after each rainstorm would identify problems early). The development and implementation of the erosion control plan should be coordinated with project archaeologists to ensure that specific actions are taken to avoid inadvertent impacts to cultural resources. All areas subject to land disturbance as a result of the erosion control activities should be surveyed and/or subject to all additional forms of archaeological investigation necessary to locate and "salvage" resources that may be affected.

Revegetation activities may also have inadvertent effects on archaeological sites. Planting trees and shrubs could result in the excavation of cultural materials, as could the deployment of any subsurface irrigation lines. Revegetation planning would need to be coordinated with project archaeologists to avoid known sites. If avoidance is not possible, then archaeological excavation should be conducted prior to revegation activities to collect significant/important data from affected site areas.

Stream diversion or impoundment will be necessary at all streams flowing during construction. Excavation of diversion trenches and excavation of fill for impoundment dams could impact sites located in excavated areas (e.g., SBa-1879). Most canyon bottoms in the corridor have not yet been subject to archaeological investigation, but many are likely to contain sites. All areas subject to diversion or impoundment should be subject to archaeological surveys and any additional investigations designed to remove all significant/important data from areas affected.

Vandalism to standing historic structures along the pipeline and unauthorized artifact collection from archaeological sites could result from additional human presence in the project area during and after construction. To avoid impacts from construction workers, an educational program should be developed to make workers aware of the impacts that could result from collecting historical or archaeological materials. Workers should not be allowed in the project area during off hours (e.g., weekends, nights). If vandalism or artifact collecting from sites being excavated is evident, then additional security measures (e.g., night-time guards) should be instigated.

Offshore Facilities

No mitigation measures are needed for the offshore facilities given that no cultural resources will be impacted by the offshore facilities.

NATIVE AMERICAN CONCERNS

Onshore Facilities

In terms of a general mitigation philosophy, avoidance, of course, is preferred by all Native Americans interviewed, and Native Americans agree that avoidance is the only acceptable mitigation for sites that are likely to contain burials. For some Native Americans, archaeological data recovery (excavation) programs are acceptable mitigations for impacts to sites like lithic scatters that do not have or are not likely to contain burials. Other Native Americans view archaeological excavation as a form of impact rather than as a mitigation measure. Such impacts are strongly disliked but have proven to be mitigable (Class II) in the past through Native American consultation and monitoring of excavations and avoidance of all burials encountered. If avoidance is clearly not possible, re-burial of all interred remains (including grave goods) may be acceptable to some Native Americans.

Mitigation of Native American concerns could also include the hiring of Native American monitors during all phases of construction which include sub-surface disturbance. Native American monitors could also be present during archaeological recovery programs which include excavation. If the monitors were drawn from all sectors of the Native American community, then if human remains are discovered either during archaeological recovery programs or during construction, the appropriate measures as defined by Sec. 3 Section 7050.5 of the California Health and Safety Code, as stipulated by California Senate Bill No. 297, August 30, 1982 should be implemented. These measures include suspending further excavation or disturbance of the site until the county coroner has determined the nature of the remains, the cause of death, and other matters stipulated by law. If the coroner determines the remains to be those of a Native American, he or she must contact, by telephone within 24 hours, the Native American Heritage Commission. The Commission has identified the United Chumash Council as the group responsible for re-interment of Native American remains in Santa Barbara County. However, if a Native American burial is discovered in any phase of the proposed project, every effort should be made to avoid the burial. Re-burial is to be considered only as a last resort.

The disposition of burials, although a somewhat complicated procedure, is less marred by disagreement within the Native American community than is the fate of artifacts recovered from archaeological salvage programs. The United Chumash Council guidelines request that artifacts be ultimately re-buried after scientific study by archaeologists. Representatives of the Santa Ynez Reservation as well as the Southern Owl Clan disagree with this position, and would prefer to see the artifacts stored in museums which are accessible to Native Americans for educational purposes. All of these groups agree that ultimate ownership and control of the artifacts should rest with Native Americans, whenever the artifacts might be curated. Should there be archaeological recovery programs associated with the proposed project, extensive consultation with representatives of all perspectives within the Native American community should be conducted. Only in this way can a mitigation program which truly mitigates potential impacts be implemented.

Proposed Onshore Pipeline

Four archaeological sites found in the Point Conception-Cojo area (SBa-1876, 1874, 1525, and 1479) are subject to impacts from the proposed pipeline; these impacts will cause Class II impacts to the values of Native Americans who are not members of the United Chumash Council. Mitigation of these impacts to these Native Americans would include extensive consultation with their representatives in conjunction with an archaeological salvage program.

In addition to the four sites in the Point Conception-Cojo area, four others (SBa-1875/H, 1871, 1878, and 1808) are subject to Class II impacts. Of these, the Class II determination was made based on very scanty knowledge about SBa-1808 and 1878, further investigation at these sites is necessary. For the other two sites, archaeological mitigation may be acceptable to Native Americans if it is conducted in conjunction with extensive consultation with representatives of all sectors of the Native American community. Native American monitors would also need to be hired during any archaeological mitigation procedures to ensure their concerns were fully addressed.

A total of six sites (SBa-1877, 1491, 1658, 1807, 1879, and 1747) are subject to Class I impacts by the proposed project, as to Native American concerns. Of these, the Class I determination was made pending further archaeological research at SBa-1877, 1658, and 1879. Depending on the results of such research, the impacts to these sites may or may not be categorized as Class II. Should impacts to a site be re-classified, mitigation of the impacts may be the same as for the other Class II sites. The remaining Class I sites will not be re-classified because they are of extreme value to all members of the Native American community. Impacts to the cultural values of this community as a result of disturbance of these sites cannot be mitigated.

There is one site which is subject to Class III impacts; mitigation for these impacts is not identified. Finally, SBa-1880 was not classified because at the present level of knowledge it is considered not to be in the corridor. Further research is necessary to establish the extent of this site.

Proposed Pipeline Realignment

The proposed realignment would impact all sites in the original corridor except SBa-1807. Mitigation identified for sites subject to Class II impacts in that corridor remain the same for impacts from the proposed realignment. The realignment would also impact SBa-1873. The impacts to this site are Class II, and mitigation recommendations for other Class II impacts are the same for this site.

Onshore Facility

SBa-1555 is subject to Class II impacts, and archaeological salvage at this site, in conjunction with consultation with Native Americans, may be acceptable as mitigation of these impacts.

Area Plants and Animals

Impacts to plants and animals of significance to Native Americans should be considered in conjunction with consultation with Native Americans. In general to mitigate impacts to Native Americans, habitats of the species subject to impacts would need to be avoided by the proposed construction. It is not only stands of plants, but elements of the environment which contribute to their survival, such as water, which are of concern. Should impacts to plants be unavoidable, if Native Americans were allowed to collect the plants rather than have them destroyed by construction this would provide partial mitigation. Nesting and roosting areas of animals would likewise need to be avoided by construction and related activities to reduce impacts.

Several specific comments regarding animals were made by Native American consultants. Turtles were noted at SBa-1479. Specific mitigations identified by Native Americans were that, if the turtles are to be disturbed by construction, they should be moved to another perennial stream with a habitat similar to the one at SBa-1479. A white coyote was seen at SBa-1873 and a vulture roosting area was noticed at the Gaviota facility. Construction should avoid this area. Efforts made to protect the coyote and nesting areas and to avoid construction there would reduce impacts to Native Americans.

Brotherhood of the Tomol Site

A modern ethnographic site, the former residence of the Brotherhood of the Tomol, is extremely sensitive to members of the Brotherhood as well as to other Native Americans. As noted in the impact sections, it is probable that avoidance of this site is unlikely, given its proximity to the proposed pipeline corridor. Mitigation procedures identified for this site are: extensive consultation with members of the Brotherhood, and avoidance of the remaining structure and ceremonial areas.

Gaviota to Las Flores Optional Pipeline

This optional segment, like the proposed pipeline, is routed through highly sensitive areas. Fourteen known sites could be affected, including four village/cemetery complexes, a midden site, five scatters of shell and/or lithic materials, a "camp"(?), and several sites of an unknown nature. Avoidance of village/cemetery sites is the only acceptable mitigation. Although each village site is highly significant, it is worth noting that one, SBa-87, is accorded the greatest significance because it is the historic Chumash village Qasil.

The scatters are of less importance than villages but avoidance is still preferred. However, suitable archaeological mitigations acceptable to many Native Americans could be developed through consultation.

There are a number of significant Native American archaeological sites in the mouth of Corral Canyon that could be affected by this pipeline. Further detail on the pipeline route is necessary to 1) identify which, if any, of these sites could be affected and 2) determine appropriate mitigations.

Avoidance of village/cemetery sites is the only acceptable mitigation. Although ech village site is highly significant, it is worth noting that one, SBa-87, is accorded the greatest significance because it is the historic Chumash village qasil. The scatters are of less importance than the village but avoidance is still preferred. However, suitable archaeological mitigation acceptable to many Native Americans could be developed through consultation.

A number of significant Native American archaeological sites in the mouth of Corral Canyon could be affected by this pipeline. Further detail on the pipeline route is necessary to: a) identify which, if any, of these sites could be affected, and b) determine appropriate mitigation.

Offshore

Impacts to marine resources as a consequence of construction are deemed to be adverse but insignificant to Native Americans. These impacts do not require mitigation. However, the potential impacts of oil spills are significant. The primary mitigation would be to the greatest on the results of such research, the impacts to these sites may or may not be categorized as Class II. Should impacts to a site be re-classified, mitigation of the impacts may be the same as for the other Class II sites. The remaining Class I sites will not be re-classified because they are of extreme value to all members of the Native American community. Impacts to the cultural values of this community as a result of disturbance of these sites cannot be mitigated.

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A number of significant Native American archaeological sites in the mouth of Corral Canyon could be affected by this pipeline. Further detail on the pipeline route is necessary to: a) identify which, if any, of these sites could be affected, and b) determine appropriate mitigation.

Offshore

Impacts to marine resources as a consequence of construction are deemed to be adverse but insignificant to Native Americans. These impacts do not require mitigation. However, the potential impacts of oil spills are significant. The primary mitigation would be to the greatest possible care to prevent oil spills and, should they occur, to keep oil from reaching the beaches around Point Conception and San Miguel Island.

Indirect Impacts

Indirect impacts to the Point Conception area as a result of increased public access to this area are Class I in nature. These impacts cannot be mitigated. The greatest number of indirect impacts will result from construction of housing to accommodate the projected increase in population resulting from the proposed project. These impacts are adverse and unavoidable, and have no satisfactory mitigation as far as Native Americans are concerned. However, these effects may be ameliorated slightly by a complete study of the indirect impact areas in Ventura, and a careful consideration of the impacts to sites of concern to Native Americans during the process of planning and constructing developments indirectly related to the proposed project. Inclusion of inputs from all perspectives of the Native American populations in both Santa Barbara and Ventura would also help to allay their concerns. These procedures, however, should not be construed as mitigations, as the deterioration of cultural resources involved in the indirect impacts cannot be adequately mitigated by any procedure.

The lack of indirect impacts which would benefit Native Americans may be mitigated in several ways. These mitigations may include the provision of access to Native Americans to ceremonial areas and historic use areas currently inaccessible to them; the development of interpretive displays for educational purposes; and the preservation of ethnohistoric and ethnographic knowledge of the area through educational programs. Any such mitigation procedures would need to be developed through extensive consultation with representatives of all sectors of the Native American community to assure effectiveness. As has been pointed out repeatedly in this report, measures which are acceptable to some sectors of this population are vehemently opposed by others. This fact must be taken into consideration in any mitigation planning.

ALTERNATIVE PROJECT MITIGATIONS

Alternative Processing Facility at Point Conception

General mitigation measures for this alternative site are similar to those described previously for the proposed project location.

Offshore Support Base Mitigations

In the absence of data to the contrary, it has been assumed that little or no new construction will be associated with these bases. As a result, there will be no impacts and mitigation measures are not required.

Offshore Pipeline Mitigations

One possible shipwreck is identified to be within the corridor. No relict landforms or artifacts were observed. Mitigation measures would be the same as those discribed above.

In the absence of geophysical remote-sensing data for this pipeline route, site-specific mitigations cannot be given. In general, the MMS .

Native American Concerns

Mitigation measures described in the earlier section addressing Native American concerns generally apply to mitigations of alternate project impacts.

AREA STUDY

No mitigation measures are anticipated, given the policies of the Minerals Management Service with respect to cultural resources avoidance requirements in lease stipulation.

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Pt. Arguello, Chapter 5

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5.8 AESTHETIC ENVIRONMENT

In assessing the potential aesthetic impact of the proposed project, its alternatives and the area development buildout, it is necessary to determine the degree to which the project may alter the aesthetic quality of the environment. As defined in Section 4.8, the aesthetic environment surrounding the project area has been separated into two major components: visual impacts and noise and vibration levels.

5.8.1 Visual Impacts

DEFINITIONS AND CRITERIA

The potential visual impact of a project is the degree to which visual quality may be altered. One attribute of visual quality which may be affected is visual condition and another is visual resource variety which is considered generally to be stable in the face of all but catastrophic landscape changes of great magnitude. Definitions and criteria for rating visual resource quality, visual resource variety, and visual condition were presented in Section 4.8.2.

Direct visual impacts are those caused by the appearance of project-related features and associated activities during construction and operation. Indirect visual impacts are of two kinds: project construction may trigger later occurrences affecting visual quality, such as landslides, eroded slopes, or, by precedent, future projects; and, indirect effects may result from increased exposure of the landscape resulting from increased public access. Sensitivity may thereby be increased which may increase the significance of potential visual impacts.

For this study, substantial visual impacts are considered to be adverse visual effects that, directly or indirectly, would lower the visual quality of the affected area one full class rating (e.g., from Visual Quality Class II to Class III). This criterion reflects the overall importance of the visual resources within the study region.

Substantial visual impacts may occur at three levels of intensity. A Level 1 impact is one where the future visual quality is expected to change by one class rating. A Level 2 impact occurs where quality is expected to change by two class ratings. A Level 3 impact is a change of three or more class ratings.

Visual impacts are considered negligible if 1) they do not change the visual quality class rating for an area, or 2) if they do change the visual quality class rating, they do so because of construction activities, whose visual effects cease when those activities are done.

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 more than five years for effective mitigation.

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." Therefore, substantial visual impacts (i.e., Level 1, 2, or 3 impacts, as defined above) would all be considered significant.

Visual impacts are broadly classified as follows:

Class I Unavoidable significant impacts. These would be significant (i.e., substantial) impacts which could not be effectively mitigated. That is, no measure could be taken which would reverse adverse effects upon visual quality to negligible, and hence, insignificant levels.

Class II Avoidable significant impacts. These impacts would be considered significant (substantial), but with appropriate measures, the adverse effects on visual quality could be reversed to insignificant (negligible) levels.

Class III Adverse but insignificant impacts. These impacts would be adverse changes in visual quality occurring at neglible levels of intensity. Mitigations would be recommended but not required.

Class IV Beneficial impacts. These impacts would be changes improving the visual quality for an area, relative to baseline levels.

Significant impacts are further defined in terms of their relative degree of significance. The degree of significance is a function of several factors: the intensity of substantial visual impacts (Levels 1, 2, or 3); the degree to which effects are likely to be highly controversial; and whether the action is related to other actions with individually insignificant but cumulatively significant impacts. The intensity of substantial visual impacts has been defined as the degree to which quality class ratings change. The potential for controversy is related to the attitudes held by the public; the number of viewers exposed to the project impacts; the relative quality of the potentially affected area; and its scarcity or uniqueness.

Criteria for assessing the degree of significance (high, moderate, low) are displayed in Table 5.8-1 in the form of a matrix. The three factors used are visual impact intensity (Levels 3, 2, 1 in descending order of severity); sensitivity, which is a composite rating of the number of viewers and public concern over adverse changes in scenic resources; and visual quality. Scarcity of highly valued areas is reflected in the distribution of significance ratings: for example, Quality Class 1 views are so scarce and important that any substantial impact is rated as being highly significant (given an "H" rating).

Table 5.8-1 should be used as follows: given the level of impact intensity and the rated sensitivity for the position from which the project features are viewed, the reader should read down the matrix to the Quality Class rating applicable to the affected area. Example: a Level 3 impact, as judged from a Sensitivity Level 2 position, on a view currently Visual Quality Class II, would indicate a highly significant impact (H).

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 example, a Variety Class A landscape with a Class 3 visual condition would be rated as a Quality Class II scene. Changing the visual condition of that landscape to Class IV would affect the visual resource by altering its overall quality to Class III.

The visual impacts of a project relate not only to characteristics of the project itself, but also to circumstances under which the project is viewed. On one hand, the apparent magnitude, distribution, and visibility of project components, and related activities have partly to do with siting and design. Of interest is the degree to which the project contrasts with the surrounding landscape because of its structures, supporting activities, changes in landforms and vegetation. On the other hand, whether the project would be conspicuous and perceived as incongruous also has to do with from where it would be seen, duration and time of views, and the experience and expectations the public has concerning an area.

KEY OBSERVER POSITIONS

For consistent comparisons with baseline and estimated future visual quality, the impact assessment has been made relative to the travel routes and use areas established in Section 4.8. Visual impacts of project features have been judged from "key" observer positions along these routes.

Table 5.8-1

MATRIX RELATING SENSITIVITY, IMPACT INTENSITY, AND VISUAL QUALITY CLASS RATINGS TO THE DEGREE OF IMPACT SIGNIFICANCE

		Visual Impacts Significance Rating Criteria								
Sensitivity Level[a]		1			2			3		
Impact Intensity Level[b]		3	2	1	3	2	1	3	2	1
Visual Quality Class Affected[c]	I	H[d]	H	H	H	H	H	H	H	H
	II	H	H	H	H	H	M[d]	H	M	M
	III	H	M	M	M	M	L	M	L	L[d]
	IV	–	L	L	–	L	L		L	L
	V	–	–	L	–	–	L	–	–	L
	VI	–	–	–	–	–	–	–	–	–

Note: By definition, Impact Intensity Level 3 cannot occur for an area currently rated as Visual Quality IV or V, and Level 2 cannot occur for Class V areas. Class VI areas are considered to be so seriously disturbed that no further impact can occur.

a Level 1 = highly sensitive;
Level 2 = moderately sensitive;
Level 3 = low sensitivity.

b 3 = a decline in visual quality by three or more class ratings.
2 = a decline by two or more class ratings.
1 = a decline by one class rating.

c This denotes the baseline visual quality class for the affected area. The classes are defined in Table 4.8-3, Section 4.8.6.

d "H" = highly significant; "M" = moderately significant; "L" = low significance.

Intensity of Visual Impacts

To rate the project's effects on visual conditions, consideration was given to the degree of project exposure; other features within view; and finally the magnitude, scale, distribution, siting, configuration, color, materials of construction, and other aspects of project design. The focus of these considerations was the degree to which project elements would appear incongruous or conspicuous, and dominate the field of view.

Significance

From baseline analyses, the sensitivity of the key observer positions and the quality of the potentially affected views were noted and compared with the intensity of impacts. The significance of the impacts was then assessed in accordance with the criteria presented in Table 5.8-1. 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. The range of variability was assessed based upon available information and best professional judgment, as were the potential effects.

PROPOSED PROJECT

Offshore: Platforms and Subsea Pipelines

The installation of platforms Hermosa, Hidalgo, and Harvest and their appearance, once in place, as well as the installation of subsea pipelines, would have the potential for adverse visual effects.

Installation activities for the platforms and offshore pipelines, and the platforms once in place, would all be within 10 to 13 miles southwest of Jalama Beach County Park. Platform Hidalgo would also be visible from Ocean Beach County Park. Distance and topography preclude views of the platforms from any other developed public use area. The platforms and associated installation activities would be seen by Amtrak passengers between Point Conception and Point Arguello, and by the few residents using the Bixby Ranch Road. Several residences at the top of the low foothills of Hollister Ranch would also be within view of the offshore activity and structures. The stretch of rail line and two county beaches noted are considered highly sensitive travel routes and public use areas, while Bixby Ranch Road is considered to be of low sensitivity. Figure 5.8-1 displays the location of the proposed offshore platforms relative to key observer points.

Given the sensitivity of the potentially affected travel routes and public use areas, and the potential for a substantial visual impact, a graphic simulation was prepared showing the platforms as they would be viewed from a recreational vehicle campsite at Jalama Beach. Figure 5.8-2 is the "before" view and Figure 5.8-3 is the "after" view. The view from this position is representative of those generally available from that beach, as well as views from the rail line and the Bixby Ranch Road.

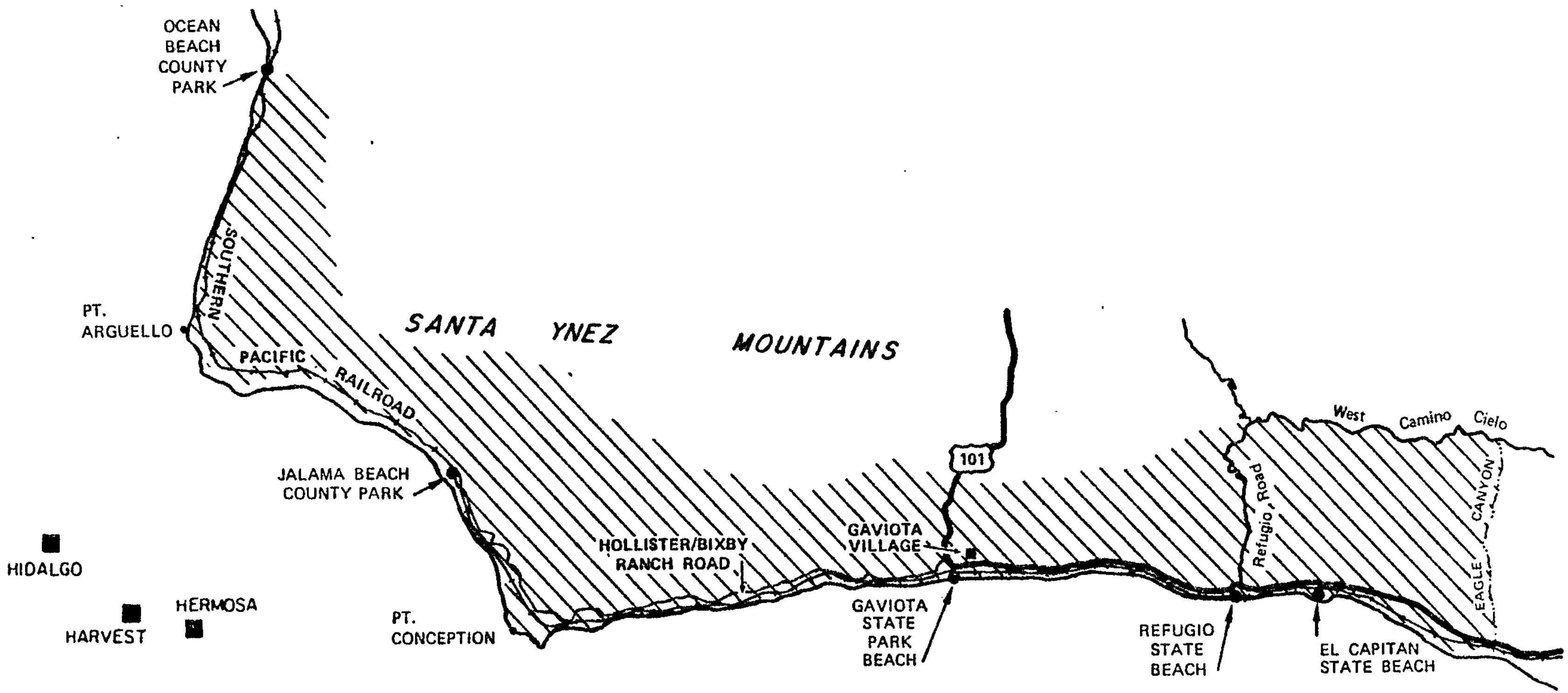


Figure 5.8-1 The Study Region Relevant to Visual Impact Analyses.

Figure 5.8-2 Representative view from Jalama Beach County Park, looking west.

Jalama Beach County Park -- Currently, views from Jalama Beach are Visual Quality Class II. No platforms are now in view (Figure 5.8-2), and the Visual Condition of the area is Class I. The simulation in Figure 5.8-3 shows all three platforms after installation under optimum viewing conditions. Visibility, however, is diminished much of the time from June through October, when the beach is most heavily used. Then, visibility extends beyond 10 miles for less than half the time.

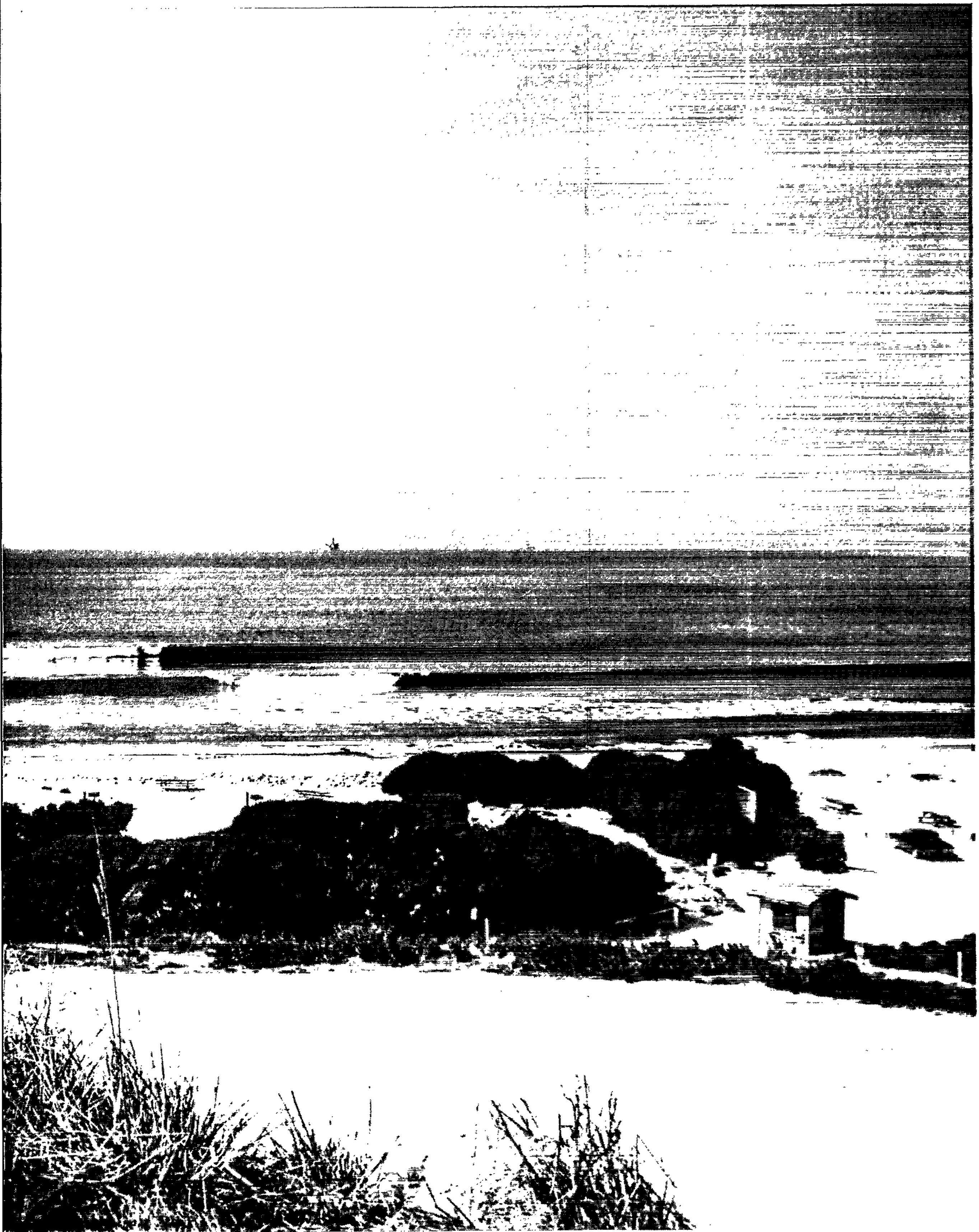
Since the proposed activities would occur at distances exceeding 10 miles, they would not be visible for much of the critical season for viewing. Secondly, since vessels are characteristic of offshore activity, until the platform and deck structures are in place, the activities of tugs and barges, though concentrated at the platform sites, might initially go unnoticed. In conclusion, the visual impact of installation activities by themselves would be negligible and short term at Jalama Beach County Park: visual conditions would change from Class I to Class II for less than half the time (on clear days) from June to November and would not, under such optimum visibility, impair overall visual quality sufficiently to alter the current quality rating of Class II.

The impacts of the three platforms, once installed, must be considered together. Although Hidaldo is scheduled to be in place later than the other two, the difference in impacts caused by two versus three somewhat closely spaced platforms cannot be discerned.

The primary aspect of platform operation having visual importance is the appearance of the platforms themselves, although the vessel and helicopter traffic for supply and crew transport would be noticeable, as would occasional flaring. Under optimum visibility, the three platforms and support activity would be evident and attract attention. The platforms' prominence would be enhanced on clear days by their white color which would be highly reflective, increasing the platforms' dominance over a significant portion of available ocean views. Because they would be stationary and unlike vessels in configuration, they would probably be seen as incongruous features on the horizon. However, because of the greater-than-180-degree views available from the beach, the platforms and their support activities would tend to be seen as co-dominant overall, with attention being drawn equally toward the headlands of Point Arguello or southeast along the coast. The impact on clear days would result in the overall visual quality being Class IV.

Some consideration must be given to the reduced visibility offshore during the summer months. Further, when visibility extends to and beyond the three platforms, if haze and fog prevail in the background, the white color of the platforms may cause them to blend in during part of the time they are "visible." Visual conditions at such times would be Class II, and the overall quality would remain unchanged. The impact under these circumstances would, therefore, be negligible and insignificant.

Figure 5.8-3 Simulation showing Platforms Hermosa, Harvest and Hidalgo, from left to right, as seen from Jalama Beach.



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However, it is on clear days that the scenic aspects of the coast are most apparent and viewing conditions most critical. The visual impact of the platforms on such days is substantial, occurs in a highly scenic area and is viewed from a highly sensitive public use area. Though much of the time the visual impact of the proposed offshore platforms during operations would be reduced by restricted visibility, the potential impacts at Jalama Beach County Park would, at other times, be intense, be highly controversial, and therefore, be considered locally highly significant. The effects, moreover, would be long term, lasting from 30 to 35 years until abandonment, at which time the platforms would be removed.

Ocean Beach County Park - This public beach is located about 19.7 miles northeast of the site for Platform Hildago, the only platform that might be in view from the beach.

By itself, during construction and afterward, Platform Hidalgo would have little impact. The primary direction of views from Ocean Beach is due west. The platform and its construction and support activities would be seen at the extreme left-hand edge of the field of view and probably would be overlooked most of the time (Figure 5.8-1). The visual conditions at Ocean Beach County Park following construction would, then, decline from the current Class I rating to no lower than Class II and the effect would therefore be insufficient to appreciably reduce the overall quality of views from this beach. The impact would be negligible and insignificant.

Southern Pacific Rail Line - The impacts of the proposed platforms from the railroad tracks would be somewhat less than for views from Jalama Beach. Visitors to Jalama Beach would generally be oriented toward the platforms, while rail passengers are oriented mainly toward either Point Arguello or Point Conception. It is estimated that visual conditions would change from Visual Condition Class I to Class III for views from the rail line between Point Conception and Point Arguello during and following platform installation. Given that the affected views are largely Quality Class II from Jalama Beach to Point Arguello, the impact would be substantial but of Level 1 intensity for that stretch. The rail line, like most other main travel routes and public use areas, is considered to be highly sensitive. That factor, plus the quality of views and level of impacts, indicates that the adverse effect would be highly significant. From Point Conception to Jalama Beach the views are somewhat less scenic than those from Jalama Beach to Point Arguello being Quality Class III. A change in condition here from Class I to Class III would change overall Visual Quality from Class III to Class IV. An impact of that intensity on a highly sensitive view indicates a moderately significant impact. The impact on views from the rail line would be long term, lasting until abandonment of the platforms in 30 to 35 years.

Bixby Ranch Road - From the Point Conception area to where it meets with Jalama Road (near Jalama Beach County Park), the road through Bixby Ranch is partially within view of the offshore platforms. For those traveling toward the northwest, the scene would include the proposed platforms for brief stretches as the road alignment permits. The breadth of such views would generally be less than that for views along the rail line because the driver is assumed to be preoccupied with directing the vehicle. Therefore, the platforms might often be overlooked by those traveling toward Jalama Beach and would not be in view of those traveling in the other direction since the platforms would be behind the driver. At worst, visual conditions along Bixby Ranch Road following construction of the platforms would change to Class II for the largely Variety Class C views. The visual impact would be insufficient to affect the current overall quality of views and therefore are considered negligible and insignificant.

Onshore Pipelines

Proposed Route - Visual impacts associated with the pipeline would primarily be the result of only installation. No dominate aspects of normal pipeline operation would be visible, and, upon abandonment, the pipelines would be sealed and left underground; soil and vegetation would not be disturbed. While microwave relay equipment and associated above ground pipeline equipment will be installed near the landfall, its small relative size suggests that they would not alter the visual quality of the area, and could be screened with appropriate vegetation.

The presence during the construction stage of the project of the workforce, heavy equipment, and staging areas, though attracting attention to the point of dominating certain views, would only present short-term visual impacts. More important are the grading, clearing, trenching and backfilling activities.

In most cases, the potential for adverse visual impacts from pipeline construction would be greatest at stream crossings where adjacent slopes and banks are steep and wooded. In such areas direct visual impacts would be due primarily to the destruction of riparian vegetation and disturbance of soil within the right-of-way by the movement of heavy equipment during grading, clearing and trenching. Indirect visual effects in the drainage areas would be expected where subsequent erosion and gullying could occur. Particularly vulnerable are the steep canyon slopes and stream banks. Table 5.8-2 indicates the expected visual impacts on sensitive stream crossings from pipeline installation. By sensitive is meant those drainages within view of the Bixby/Hollister Ranch Road and the railroad and characterized by steep and/or wooded slopes and banks.

Of greatest concern are those visible crossings where oak woodland would be disturbed; these include Canada de la Llegua, Barranca Honda, Canada de la Cuarta, Canada del Gato, and Canada del Cojo.

The visual impacts at stream crossings in most cases following construction, as noted, would be significant and long term but only along short stretches of the Hollister/Bixby Ranch roads and the rail line. By contrast, disturbances on the terrace and across slopes and hilltops would, in many cases, also be significant but short term, and be exposed to more sustained viewing. If the mitigation measures identified for

Table 5.8-2

VISUAL IMPACTS OF
PROPOSED PIPELINE RIGHT-OF-WAY AT SENSITIVE
STREAM CROSSINGS

	Visual Quality				Level of Significance[2]			
	Hollister/Bixby Ranch Road		Railroad					
Stream Crossing	Baseline	Proposed	Baseline	Proposed	N	Low	Mod	High
Wood Canyon, East Fork	II	II	II	II	*			
Damsite Canyon	II	III	not seen				*	
Canada del Gato	II	V		not seen				*
Barranca Honda	II	V	III	IV			*	
Canada de la Llegua	II	V	III	III	*(RR)		*(HR)	
Canada de Santa Anita	I	III	I	III				*
Canada del Sacate	II	III	II	V				*
Canda de la Cuarta	II	V	II	V				*
Canada de Alegria	II	V	II	V				*
Canada del Agua Caliente	II	V	II	V				*

1 "Sensitive" stream crossings in this context means where adjacent slopes and banks are steep and/or oak woodland or riparian vegetation would be disturbed, and where these drainages are not topographically screened from view.

2) "RR" = impact as viewed from railroad; "HR" = impact as viewed from Hollister/Bixby Ranch Road. Otherwise, the level of significance is the same as viewed from either route.

pipeline stream crossings are implemented (Sections 5.3 and 5.6), pipeline spanning of selected stream crossings would increase visual degredation in areas presently undisturbed. However, visual degredation would occur in these areas regardless, due to their views of the exposed pipe or views of the burial scar that may not successfully revegetate.

Optional Routes - Because the optional route for wet-oil and gas pipelines generally would occur within the right-of-way for the Southern Pacific Railroad, visual impacts would probably be negligible. Land adjacent to the rail line has been previously disturbed and also is below the line of sight for most rail passengers.

The precise route for the optional dry-oil pipeline between Gaviota and Las Flores has not been finalized. For this analysis, the route is assumed to lie north of U.S. Highway 101 and within the highway right-of-way for nearly the entire length of the pipeline. Current Visual Quality for westbound highway views varies from Class I to Class V. The intensity of the impact would therefore vary from Level 1 to Level 3 and would be of low to high significance. Because the visual disturbed area following construction would be primarily grassland, recovery would be rapid and complete within less than 5 years. The impacts, while significant, would therefore be short term.

Onshore: Processing Facilities

The aspects of the installation of the proposed facility most impacting the scenic qualities of the area would be the removal of vegetation and disturbance of existing topography during site preparation; the visibility of construction activities; the appearance of the facilities once built; and, to a lesser extent, the introduction of screening vegetation that, while concealing project structures, also may block views of attractive landscape features.

Construction activities, and the appearance of project features after construction would affect views from U.S. Highway 101, the Southern Pacific Railroad, Hollister/Bixby Ranch Road, Gaviota Village and the Vista del Mar School.

U.S. Highway 101-West Viewpoint - It is assumed that many motorists using the highway in the vicinity of the proposed facilities are tourists or recreationists having high expectations regarding scenic quality along the coast. Figure 5.8-4 shows the current view of the Gaviota site from the median strip across from Gaviota Village.

Proposed ground cover and shrubs would reduce this contrast substantially within several years. However, proposed plantings along the west site boundary would not screen facilities for perhaps 20 to 30 years, Figure 5.8-5. Based on Figure 5.8-5, the facilities for an extended period would be the dominant feature in the landscape, commanding full attention while imparting an obviously industrial appearance to the area. A complete discussion of the reasoning associated with this impact is presented in Section 3.3.4, pages 101 through 122 in Technical Appendix L. With the introduction road side planting, Figure 5.8-6, nearly all of the facilities would be screened from view. Given the variety of the landscape in the surrounding area that would be hidden

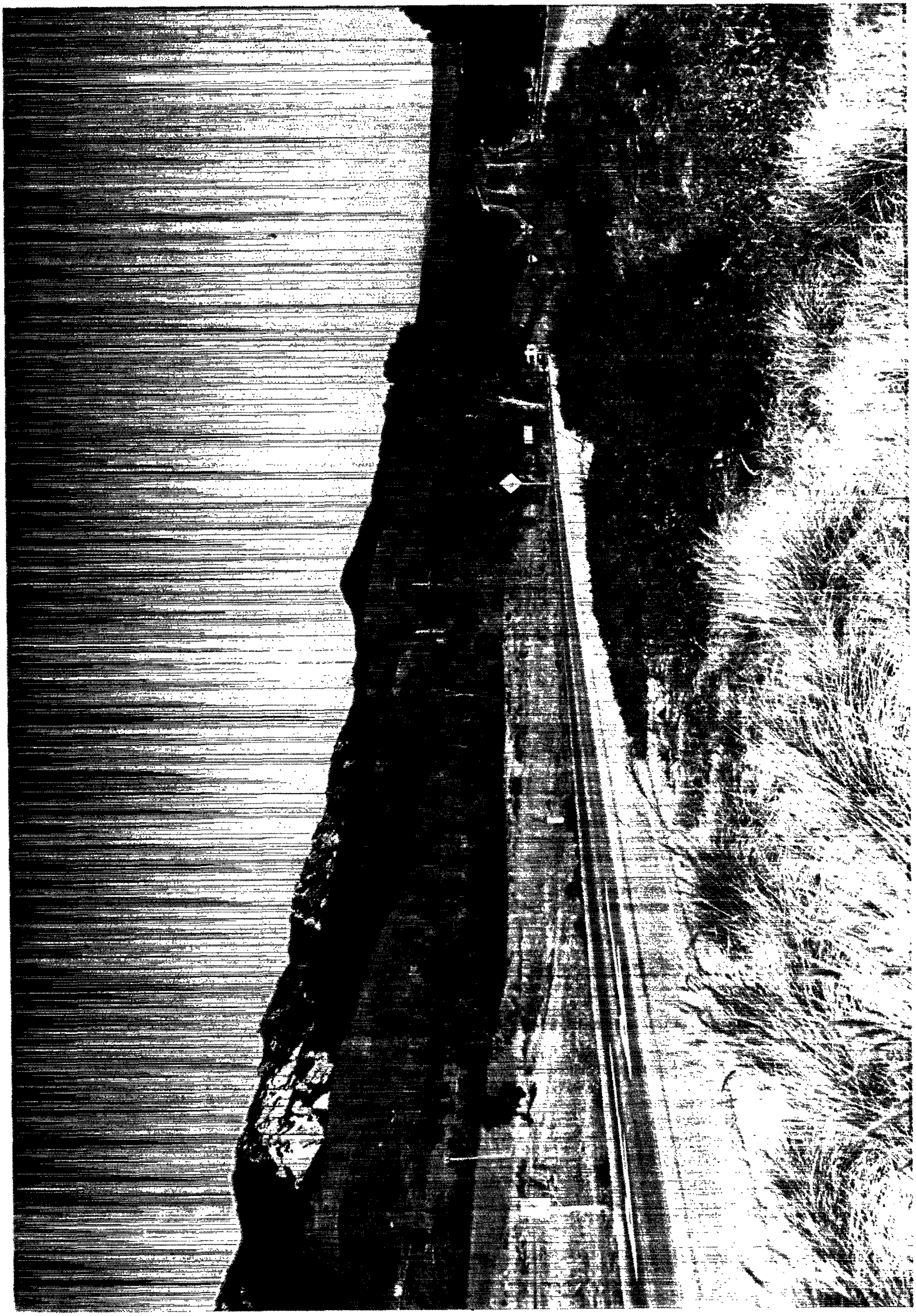

Figure 5.8-4 Current view of Gaviota site for onshore processing facilities, seen from median strip across from Gaviota Village, looking northeast.

as a result of the roadside planting, the visual impact of the facility would be significant and long term.

U.S. Highway 101 - East Viewpoint - Views of the facilities from the highway would also occur from the east. Figure 5.8-7 shows the existing scene, with the SCE substation to the right and the landmark jet plane, belonging to Vista del Mar School, to the left. Figure 5.8-8 is a simulation showing the visible facilities before mitigative plantings mature. The reject tanks south of the SCE substation and the two emergency flare towers would be the primary project features visible from the east. The proposed screen plantings on the berm surrounding the reject tanks would appreciably reduce the tanks' visibility. Together, the existing plantings, those proposed, topography and the speed of travel would limit the effect of the facilities. Figure 5.8-9 shows the effect of the screen plantings after maturity, which would also screen the SCE substation from view. In time, the proposed facilities as well as the SCE substation would become unnoticeable. Therefore, while the reject tanks would pose a highly significant and long-term impact, eventually there would be a net improvement in visual quality in the vicinity of the facility as viewed eastwardly from U.S. Highway 101.

Southern Pacific Railroad - Views of the processing facilities would occur from the rail line as it approaches the trestle over Gaviota State Beach from the west. Topography and existing vegetation would block such views as the train passes beyond that point going east. When in view, only the tallest of facilities would be seen, and at that distance would appear subordinate. The visual impact of the facilities from the railroad tracks would be adverse but negligible, though long term.

Gaviota Village - Views to the east from the restaurant and parking lot would be affected significantly by the facility. Figure 5.8-10 shows the current condition. Figure 5.8-11 shows the site as modified to accept the proposed facilities. Until the proposed screen planting matures in 20 to 30 years, the magnitude and proximity of the facilities would easily dominate the view and substantially impact the quality of the scene. Visual Quality would change from Class II to Class IV and therefore, the visual impact from the area surrounding Gaviota Village would be highly significant and long term.

Hollister/Bixby Ranch Road - Views of the facilities would be available for a short stretch as the traveler approaches Gaviota State Beach from the west. The impact would be substantially the same as that experienced from the railroad: adverse, long term, but negligible.

Vista del Mar School - Views from the school to the southwest are currently affected by Getty's storage tanks across the highway. The current Visual Quality is Class VI for these views. Views to the west are blocked by a grove of eucalyptus, while southeast to northeast views are attractive and open (Quality Class I). To the north, the SCE substation competes with conspicuous rock outcrops for attention. Overall Visual Quality to the north is currently Class III. With the addition of two 40-foot tall, 110-foot diameter reject tanks within 100 feet of the playing field, the effect would be to dominate the views from

Figure 5.8-5 Simulation showing Gaviota site immediately after construction of processing facilities, and as it would appear for 20-30 years if no roadside screen plantings occur. Same viewing position and orientation as in Fig. 5.8-4.

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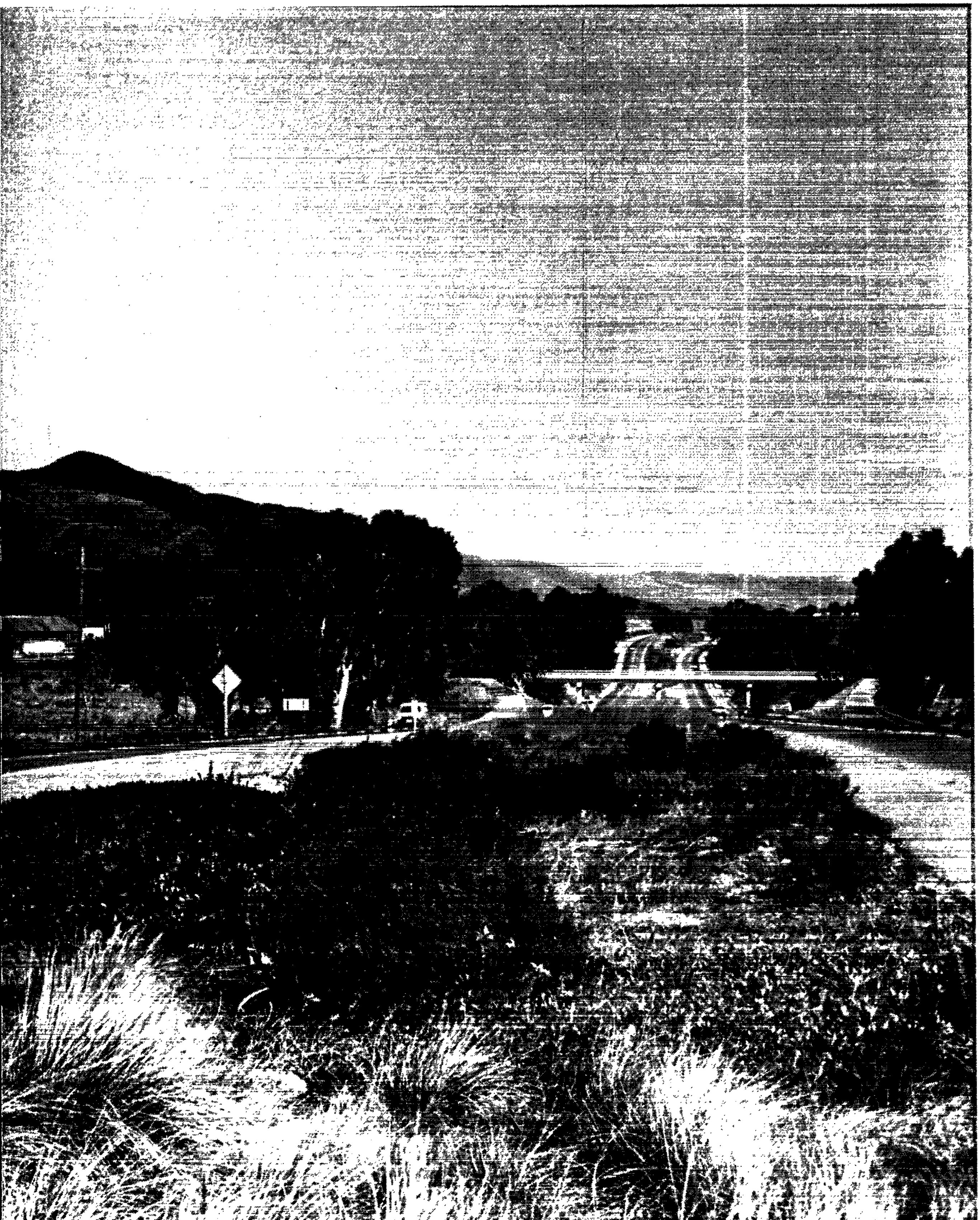

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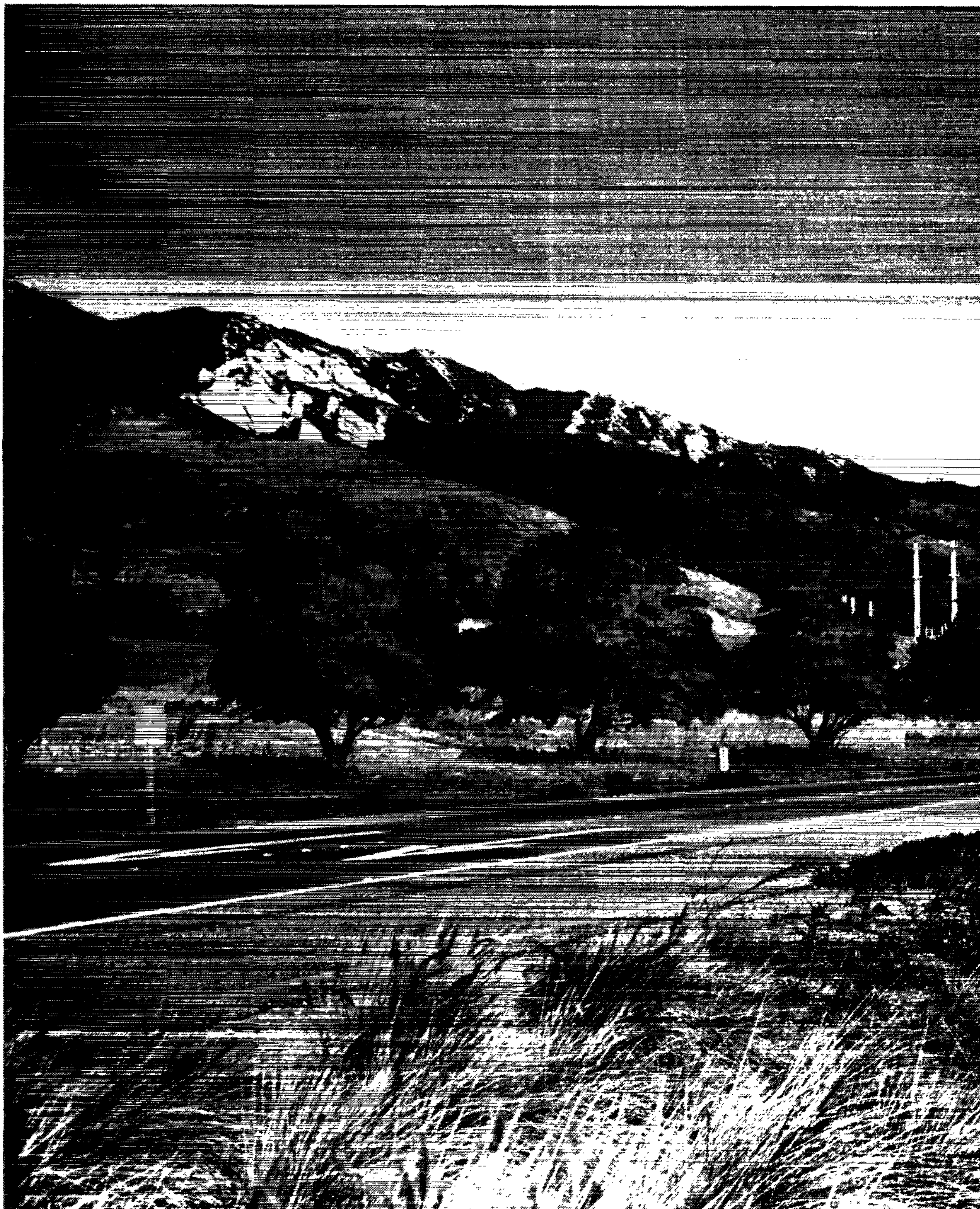
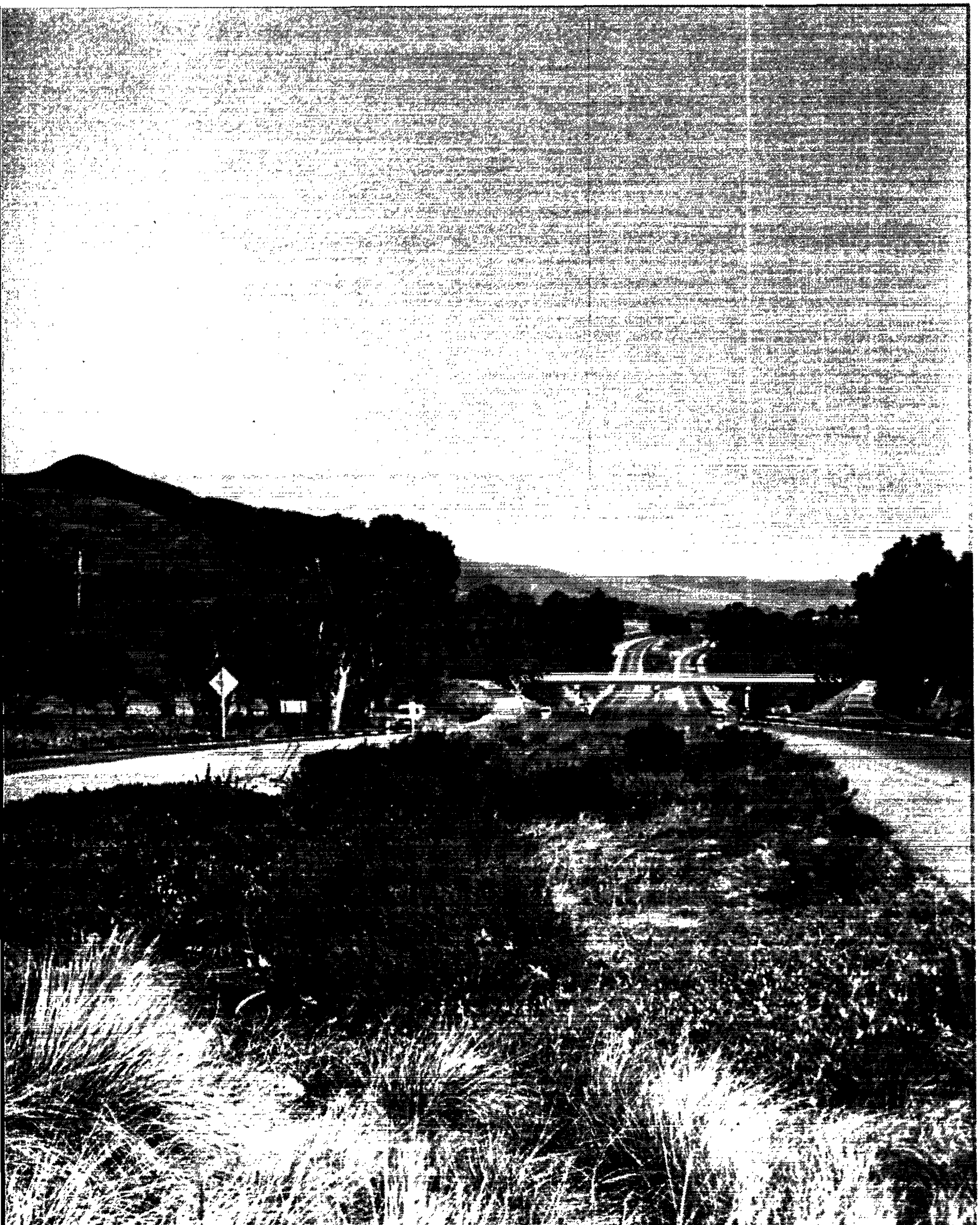


Figure 5.8-6 Simulation showing Gaviota site with processing facilities screened by roadside plantings. Same viewing position and orientation as in Fig. 5.8-4.



IMAGE# 199,

Figure 5.8-7 Current view of Gaviota site for onshore processing facilities, seen from Hwy 101, east viewpoint

the school immediately after construction with uncharacteristic features with overall visual quality being changed to IV, highly sensitive receptor.

If screening plantings along the southern berm become dense enough and tall enough, the visual impact on Vista del Mar School could be mitigated to negligible levels. Depending upon the plant materials selected, full screening could occur in 10 to 15 years. The impact would be long term, mitigable, and therefore Class II.

Offshore Support Bases

Supply from Port Hueneme - The movement of supply boats in the channel would have no adverse impacts on ocean views during drilling and production operations on platforms Hermosa, Hidalgo and Harvest.

Crew Transport by Helicopter - The support base for crew transport would be the Santa Barbara Airport. If the helicopters pass along the coast several miles from shore, they will not visually disrupt ocean views.

Consistency With Existing Plans and Policies

The proposed onshore processing facilities would be inconsistent with the Santa Barbara County Coastal Zoning Ordinance [Santa Barbara County, 1982b] in several respects:

- Section 35-154-4a, band c requires that, for a Preliminary or Final Development Plan to be approved, the Planning Commission must find, among other requirements, that "the proposed facility is compatible with the present and permitted recreational and residential development and the scenic resources of the surrounding area" (underline added).

  In this report, views from U.S. Highway 101, from Gaviota Village, and from Vista del Mar School, all would be significantly impacted by the project as proposed. Proposed mitigations would not, in all cases, serve to reduce the impacts to negligible levels, the proposed facility remaining incompatible with its surroundings as viewed from some critical positions.

- Section 35-154-5 sets forth development standards, part "d" of which requires the installation to be visually compatible with the potential surroundings by use of any or all of the following ...: buffer strips, depressions, natural or artificial; screen planting and landscaping ...; camouflage and/or blending colors." As noted above, screening by onsite plantings would be ineffectual for two-thirds of the life of the project, as judged from viewing positions west of the site and along the highway or at Gaviota Village, and berming and depressed pads have not been proposed. Also, screening by roadside plantings within Caltran's right-of-way may not occur, as noted.

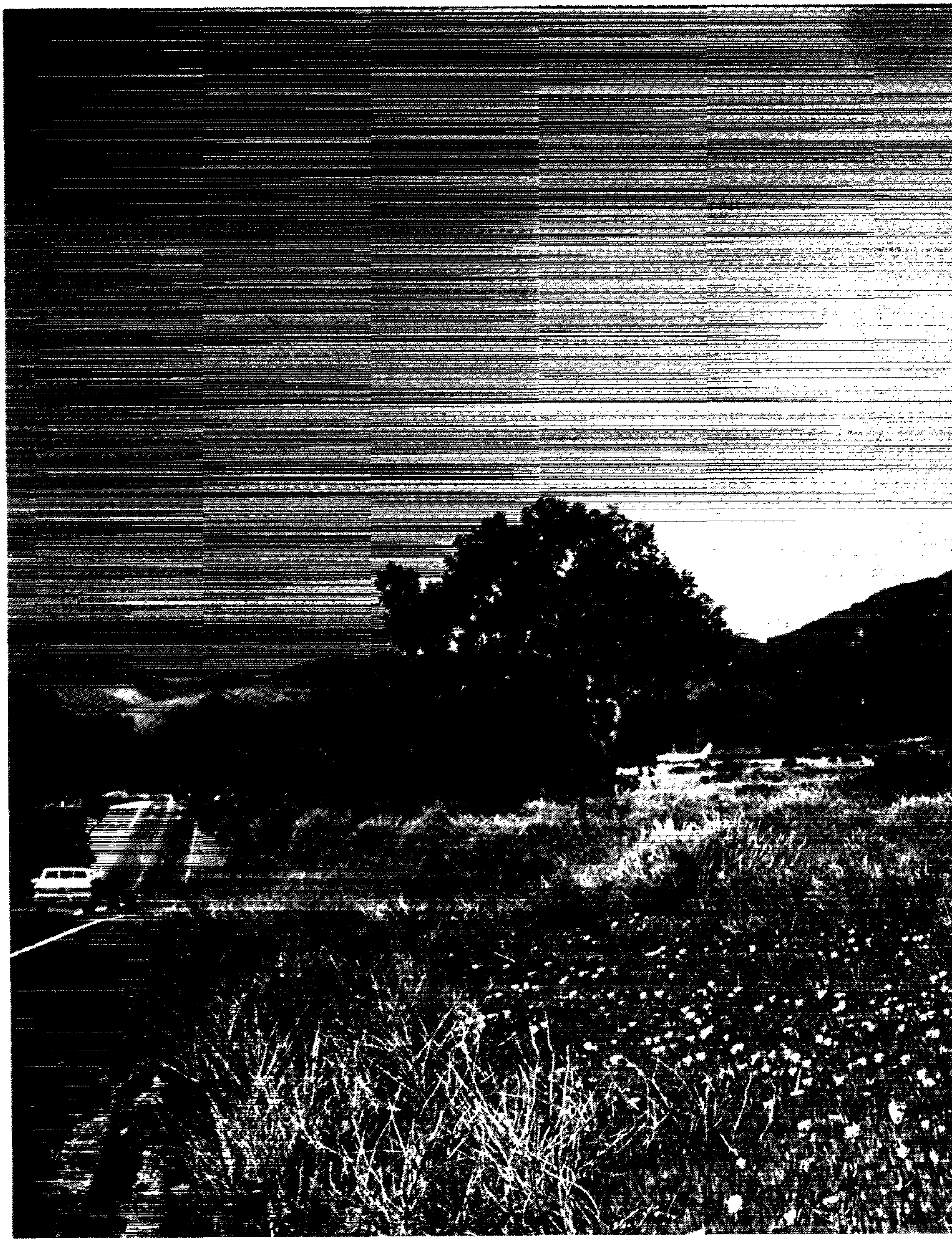


Figure 5.8-8 Simulation of Gaviota site showing reject tanks on Gervais Fee property as they would appear for several years before screen plantings mature (same viewing position and orientation as in Fig. 5.8-7).

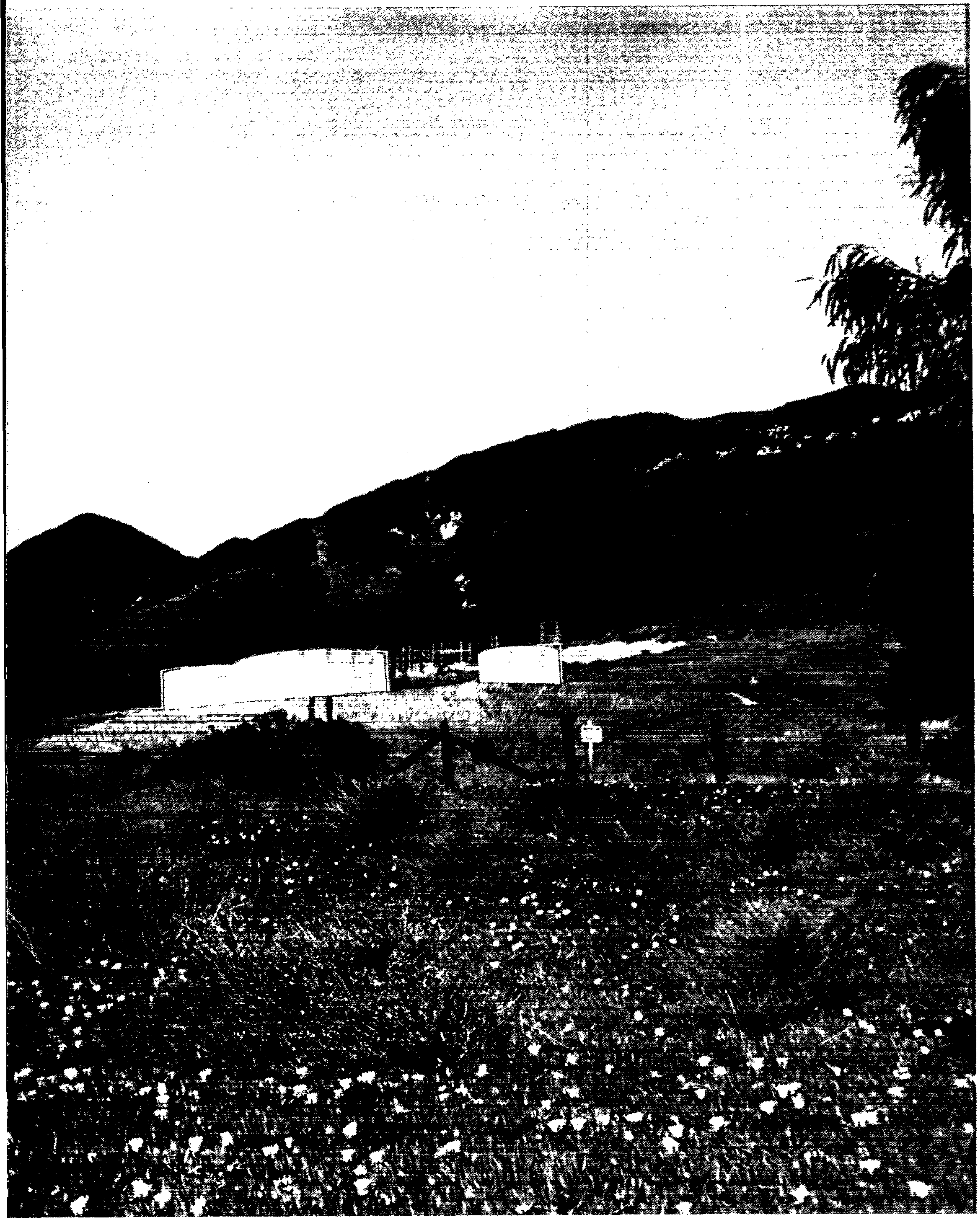


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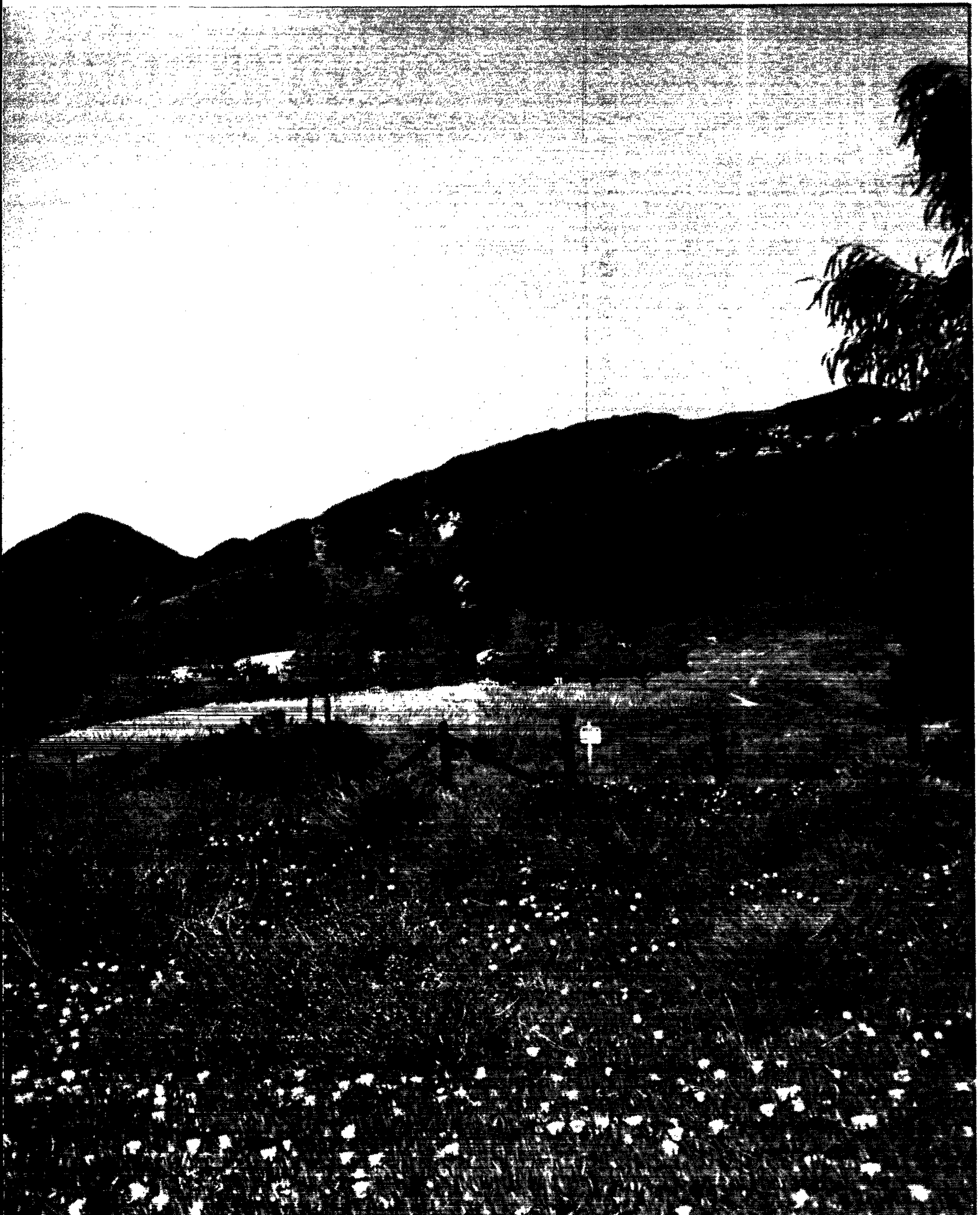
Figure 5.8-9 Simulation of the effect of plantings screening reject tanks on Gervais Fee proper
5-10 years after construction (same viewing position and orientation as in Fig. 5.8



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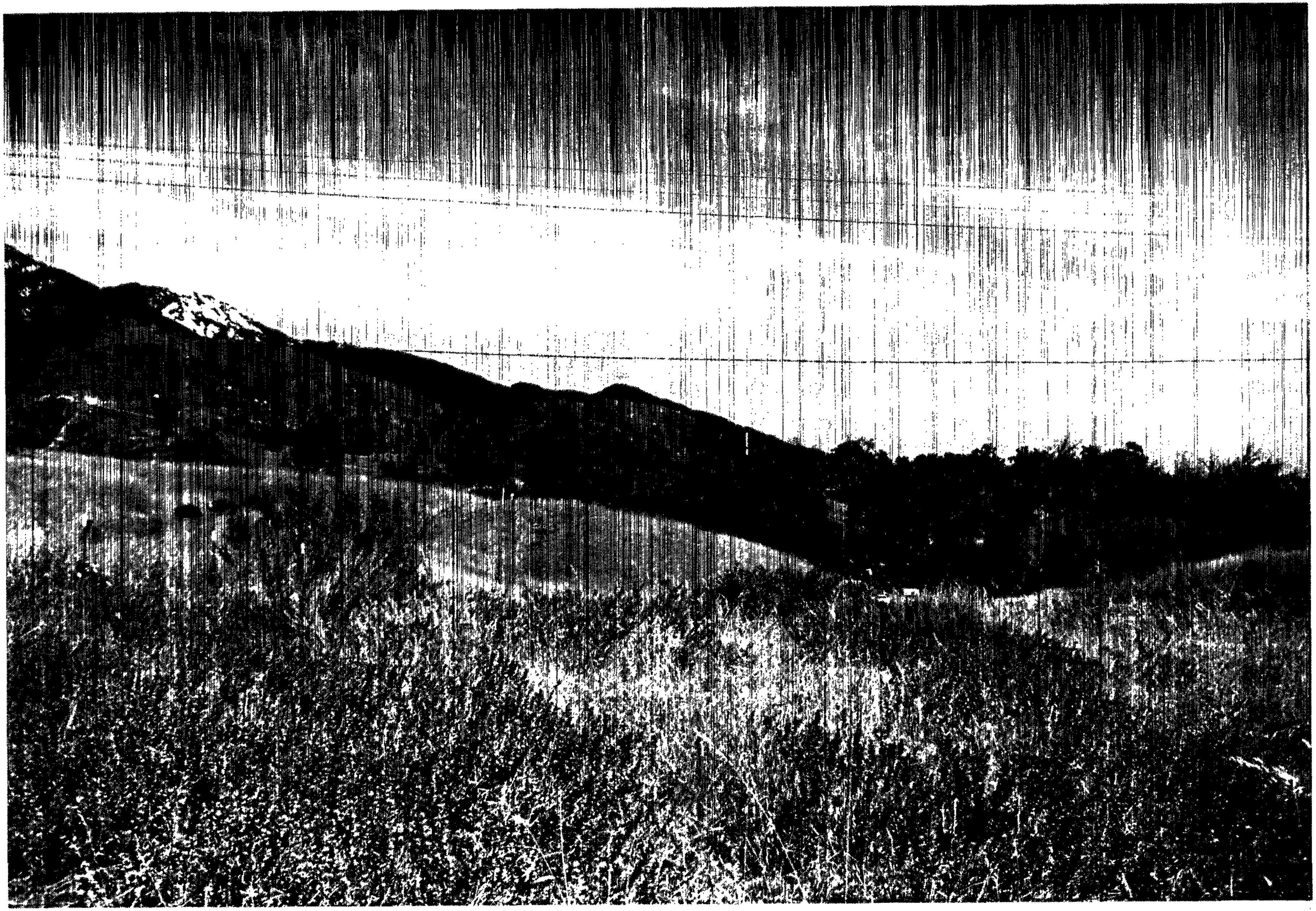

Figure 5.8-10 Current view of Gaviota site for onshore processing facilties, seen from Gaviota Village parking lot.

- Section 35-87.7 of the County Coastal Zoning Ordinance imposes a height limit of 45 feet on all buildings or structures within the MC-D zone (coastal dependent industry). As noted, a number of proposed facilities will exceed that limit.

AREA STUDY

The additional five platforms proposed for the area would be installed 6.5 to 16.4 miles from Jalama Beach County Park. To illustrate the potential visual impacts, the proposed and Area Study platforms are shown in Figure 5.8-12 as viewed from Jalama Beach and Ocean Beach. Figure 5.8-13 simulates the area study platforms as seen from Jalama Beach. The "before" view from Jalama Beach appears in Figures 5.8-2. Topography precludes views of the platforms from any other developed public use area. Between Point Conception and Point Arguello, Amtrak passengers would see all eight platforms, as would a few residents using Bixby Ranch Road and several residence on Hollister Ranch.

Jalama Beach County Park - The sites for two of the hypothetical platforms would be substantially closer to the viewer than Platforms Hermosa, Hidalgo and Harvest. Under optimum viewing, the eight platforms (Figure 5.8-12) and support activity would be evident and attract attention.

Because of the extent of the affected horizon, the eight platforms together would dominate ocean views from Jalama Beach, creating a change in the overall Visual Quality from Class I to Class V. Though fog and haze would obscure the platforms once installed from Jalama Beach for a large part of the time, the visual impact would be highly significant for the most relevant (critical) conditions for viewing (summer, clear days). The impact would be long term, lasting 30 to 35 years until abandonment.

Ocean Beach County Park - Area platforms #4 and #5, and to a limited degree, Platform Hildalgo, would be in view from this beach (Figure 5.8-13). Unless one is close to the water's edge, Hidalgo would not be visible because it is nearly in line with the coast. The other two platforms would be more readily seen, but would be well to the southwest of the primary viewing direction and 14 to 16.5 miles away. Given the grand scale of the scene and the distance at which the platforms would be seen, the platforms would probably be overlooked. Visual Conditions following installation would change from Class 1 to Class 2, which indicates that there would be a negligibly adverse effect on visual quality as viewed from Ocean Beach Park.

Southern Pacific Rail Line - The earlier remarks focused on the proposed project concerning views from the rail line pertain to the Area Study impacts as well. However, the additional platforms would, together with Hermosa, Hidalgo, and Harvest, compete with the sweep of the coastline for attention and cause Class IV Visual Conditions. Overall, the visual impact from the rail line would be highly significant and long term.

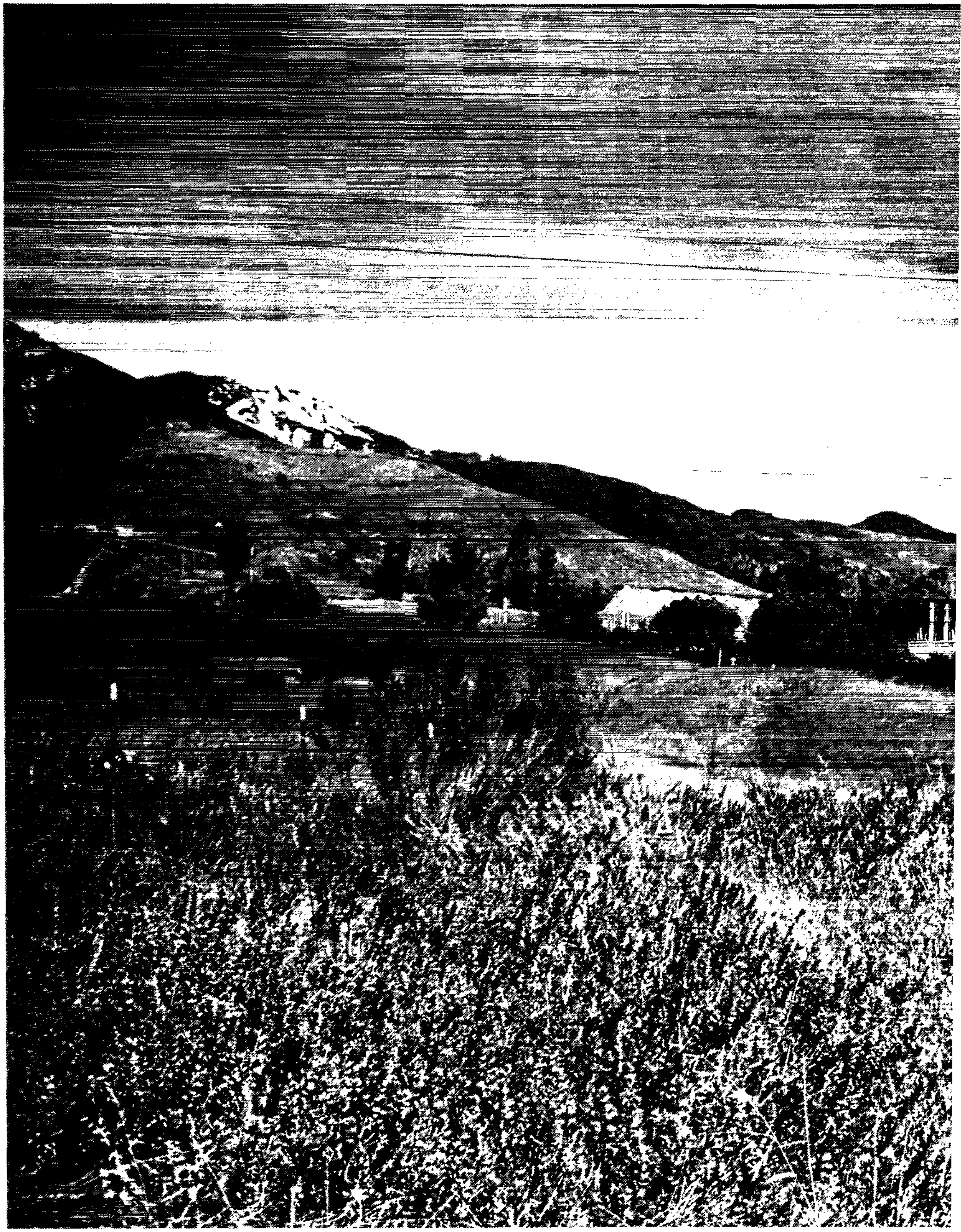

Figure 5.8-11 Appearance of processing facilities at Gaviota immediately after construction and 20 to 30 years (same viewing position as in Fig. 5.8-10).

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IMAGE# 209,

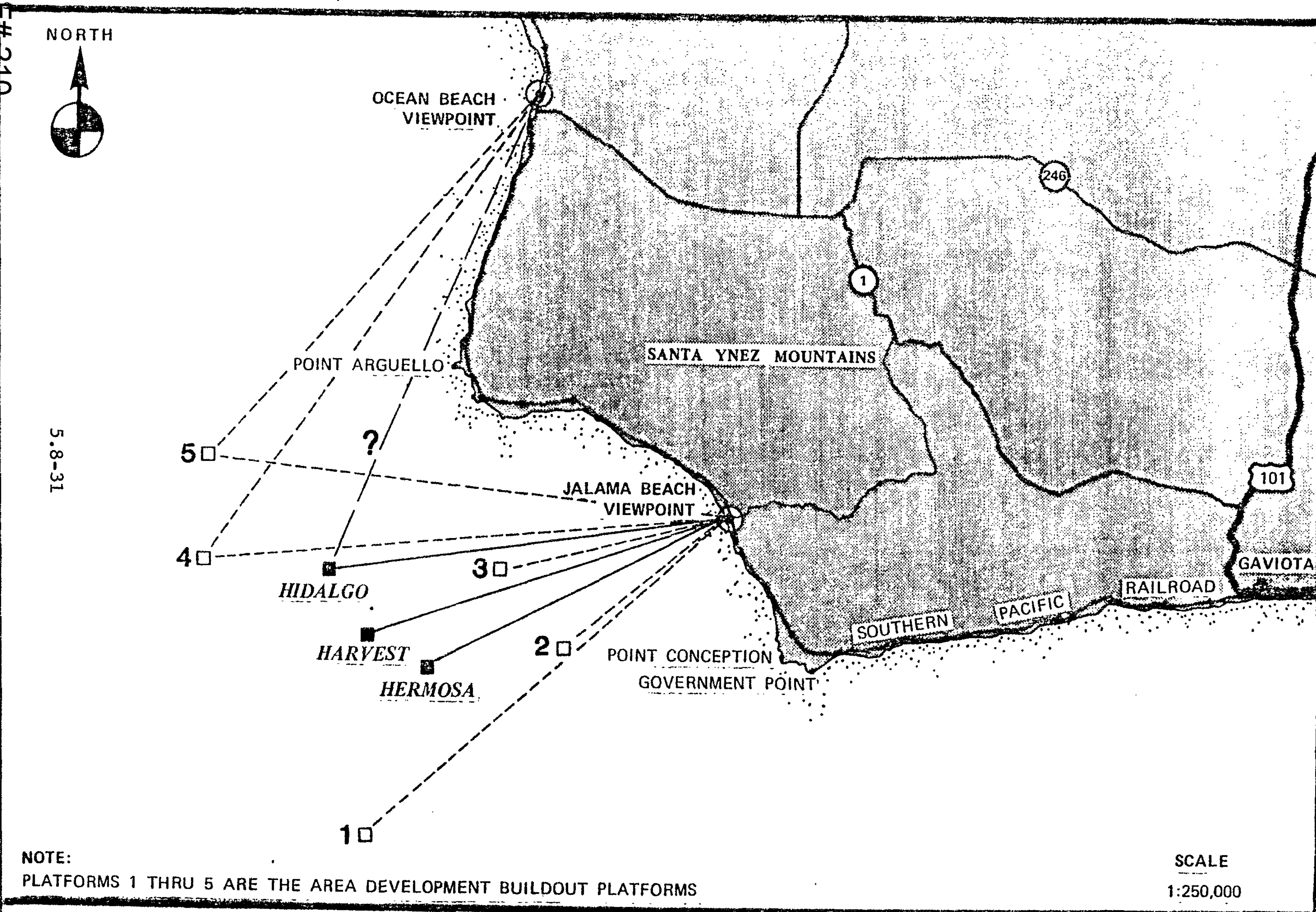


Figure 5.8-12 Approximate locations of hypothetical platforms considered in the Cumulative Area Buildout Scenario, seen in relation to Platforms Hermosa, Harvest and Hidalgo.

Bixby Ranch Road - Although the three proposed platforms might be overlooked by those traveling toward Jalama Beach, with five additional platforms the effect would be noticeable. But because of the irregular, winding route and the fact that the driver's attention would be directed largely to the road ahead, the eight platforms would probably be a subordinate part of the visual experience (Visual Condition, Class III). Visual Quality, as seen from the Bixby Ranch Road, would change from Class III to IV and therefore be an impact of minimal significance. The impact would be long term.

PROJECT ALTERNATIVES

Offshore Pipelines

The alternative to installing onshore pipelines is to install wet-oil and gas pipelines, as well as the dry-oil pipeline, offshore. Except for the activity of installation, there would be no visual consequences to such an alternative. Installation activities would cause short-term adverse effects that would cease immediately after installation and therefore be considered negligible impacts.

The use of an offshore pipeline would eliminate visual impacts associated with onshore pipelines (microwave dish, valve boxes, scars along canyon walls, overall route scar (until vegetaged), loss of visually scenic oak trees, etc.)

Processing Facilities

An alternative to the proposed location of the processing facility is on the Chevron-owned property at Point Conception. From both the Hollister/Bixby Ranch Road and the rail line, the facilities would have unavoidable visual impacts. Current Visual Quality is mostly Class II. With construction of the facility at this location, future visual quality would decline to Class V. The impact would therefore be highly significant. The duration would be long term.

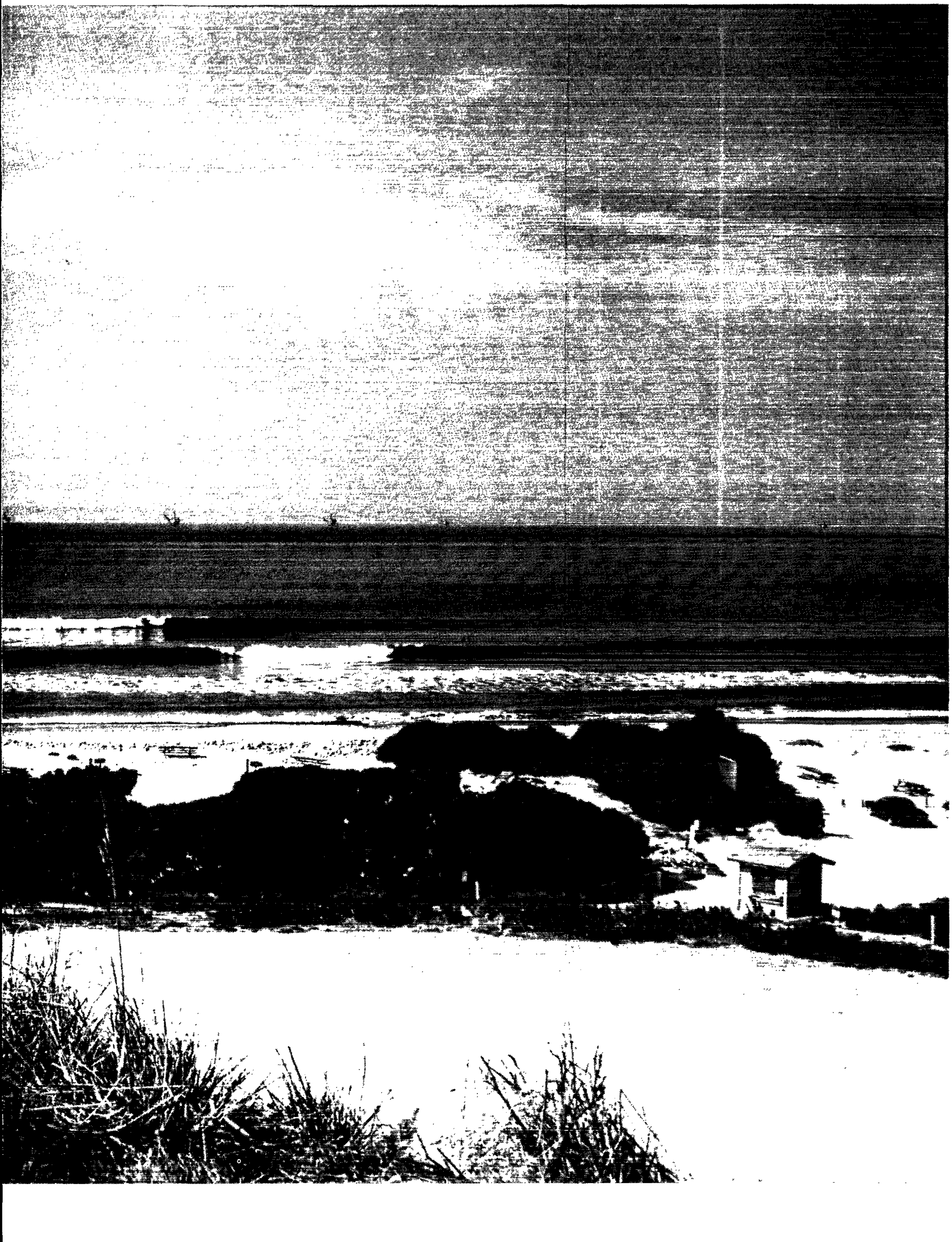
MITIGATING MEASURES FOR VISUAL IMPACTS

The purpose of visual mitigations is to make obtrusive project features less evident by reducing their visibility or the degree to which they contrast with their surroundings. Where structures are concerned, visibility may be reduced by planting screening vegetation, construction berms or depressions, or, where possible, relocating the structure. Where the project cannot be screened or relocated, contrast may be reduced by painting the structures with colors that blend with the surroundings.

Proposed Project

Offshore Platforms - The impact of platforms Hermosa, Hidalgo and Harvest would be highly significant and long term as viewed from Jalama Beach County Park and the Southern Pacific Railroad, and negligible as seen from Bixby Ranch Road and Ocean Beach County Park.

Figure 5.8-13 Simulation of effect of three proposed platforms and five hypothetical Area Study platforms, as seen from Jalama Beach County Park.



IMAGE# 213,

Relocating the platforms would not improve the visual effect inasmuch as they would remain in view regardless of their position within their tract, and given other constraints, does not represent a feasible mitigation measure. The only feasible mitigation would be to paint the platforms a color other than the proposed white. The preferred color would be light grey-blue.

However, if the sealanes are to be extended north of Point Conception and the platforms become navigation aids, it is possible that they would have to be painted an appropriate color. The Coast Guard is currently reviewing a proposal to extend the sealanes from Point Conception northward, with platforms Hermosa, Hidalgo and Harvest being considered as aids to navigation. The Coast Guard would prefer that they be painted orange or white. The MMS, which has approval authority, would not approve orange, but would accept white or white-gray (Warhurst, 1984).

With respect to subsea pipelines, the activities associated with installation would be the only visual effect; these activities would occur only for several months. No mitigation would be necessary.

Onshore Pipelines - All visual impacts associated with onshore pipelines would be the result of installation, primarily from disturbance of vegetation, soil and bedrock along the right-of-way during clearing, grading, trenching and backfilling. Visual impacts would be significant and long-term.

Mitigations to hasten revegetation and minimize erosion and mass wastage of onshore pipeline construction are presented in the Terrestrial Biology and Onshore Water Resources sections (Sections 5.6 and 5.3). For several stream crossings spanning the drainages with the pipelines would be preferable to burying the pipelines in an area of active erosion. The pipelines could be painted in earth tones blending with the surroundings.

Where trenching across steep slopes must occur, compacting backfill and hydroseeding the exposed soil with shrub and grass species indigenous to the disturbed site is would be appropriate. In cases where mature oaks and sycamores would be destroyed, large diameter specimens should be planted to shorten the time needed to mitigate the loss. Guying the planted trees may be appropriate, as may irrigation during the first several years to assure their survival.

Processing Facilities - On-site screening vegetation proposed would offer no effective mitigation for 20 to 30 years, relative to the Gaviota Village and highway views unless planting of native trees and shrubs is implemented. Planting trees at the top of the fill slope running along the west boundary would achieve effective screening sooner than planting the trees at the toe of the slope.

The visual impacts of the processing facilities would be reduced noticeably by the on-site plantings described above. Screening of the facilities as seen from Gaviota Village and the highway positions would not occur for more than a decade, perhaps as long as 15 years. Although substantially reduced, the residual impacts would be highly significant, long term, and therefore be designated as a Class I impact.

If negotiations with Caltrans are successful and plantings within the right-of-way occur as proposed, species that do not exceed 10 to 15 feet in height at maturity should be selected. This height limit is appropriate in order to retain views of the mountains that would be blocked by some of the species proposed in the conceptual landscape plan submitted by the applicant. The residual impacts in this case would be adverse but insignificant (Class II).

Views of the Chevron facilities at a point directly opposite to them would be effectively screened by plantings as proposed in the application. Without further mitigations, the adverse effects would become negligible and be considered Class III impacts. However, to reduce the time needed to achieve screening, it may be appropriate that the reject tanks be set into a depression four to five feet lower than the currently proposed pad (elevation 175' rather than 180'). Not only could berming and screening more rapidly improve highway views, but also those from Vista del Mar School.

Under favorable circumstances the proposed project may, in time, become consistent with Santa Barbara County Zoning Ordinance Section 35-154-4 and 35-154-5, at least relative to most views of the facilities.

The parts of the facility remaining in view after maturation of the plantings, should be painted a color that blends, in value and hue, with the surroundings.

<u>Offshore Support Bases</u>

No mitigations would be required.

<u>Area Study Development</u>

No mitigation measures are possible to minimize the visual impact of the proposed offshore platforms and are therefore Class I and long term.

<u>Project Alternative Mitigations</u>

<u>Offshore Pipelines</u> - The alternative to onshore pipelines is offshore pipelines, which would have no long term visual impacts. During construction, offshore pipelaying activities would be visual for short periods of time from various locations along the coast. No mitigations are possible for this short term visual impact and is therefore Class I.

<u>Offshore Support Bases</u> - Measures proposed in Section 6.8 would serve to screen the visibility of crew and supply boat traffic as seen from the highway. No mitigation is possible for impacts on views from Gaviota State Beach, Hollister Ranch Road, and the Southern Pacific Railroad.

<u>Processing Facilities</u> - The alternative site at Point Conception would be within view of highly sensitive travel routes and public use areas. This site would be more difficult to screen than the proposed site due to its close proximity to travel routes and little existing screening. It would be appropriate to site the facilities on depressed pads and berming at the perimeter. The residual effects would not be mitigated to the level of insignificance, and would be designated as long term Class I impacts.

5.8.2 Noise Impacts

INTRODUCTION/METHODOLOGY

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 noise levels vary with passing events. To take account of these fluctuations it is the usual practice to consider the statistical distribution of noise levels with time. The current methodology describes the statistical characteristics of the community noise level fluctuations in terms of the percent of exceedence.

In addition to these statistical measures, noise can also be characterized by average levels, such as the energy equivalent continuous noise levels, LEQ, which can be averaged over a 24-hour period or, for specific applications such as schools, averaged over a portion of the day; and by the day/night equivalent noise level, LDN. In California, the measure of community noise is the CNEL, or Community Noise Equivalent Level. This measure is similar to LDN but applies an additional evening penalty of 5 dB to the period from 7 PM to 10 PM. Except for unusual cases, LDN and CNEL are identical.

NOISE CRITERIA

With regard to national noise level criteria, note that the Noise Control Act of 1972 established by statutory mandate a national policy ...."to promote an environment for all Americans free from noise that jeopardizes their public health and welfare."

It is EPA's judgment that levels of environmental noise must be maintained at or below those specified in the statue to protect the public from adverse effects on health and welfare. With respect to a residential setting, this judgment brings into consideration the following factors:

1. Conservation of hearing requires a quiet residential environment to permit the human hearing mechanism to recuperate if it is exposed to higher levels of noise in an occupational or other setting.

2. Normal speech communication outdoors requires that background levels not exceed an energy average of 50-58 dB(A).

3. Normal sound attenuation of a residential structure, with windows partly open for ventilation, will reduce exterior noise to an indoor level which should in most cases protect against sleep interference.

The Department of Housing and Urban Development Noise Standards as set forth in HUD Circular 1390.2, define four noise exposure categories which are applied to any site of proposed housing construction: Acceptable, Discretionary-Normally Acceptable; Discretionary-Normally Unacceptable, and Unacceptable.

It is difficult to relate the HUD criteria to existing data describing the noise environment of Santa Barbara County. Except for airport noise, where LDN standards are specified, "Acceptable" and "Unacceptable" locations for HUD-assisted housing cannot readily be identified by reference to either ambient noise survey data or noise contour data generated for the Noise Element of Santa Barbara County. Such determinations will require on-site measurement.

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: 1) speech communication needs; 2) subjective judgments of noise acceptability and relative noisiness; 3) need for freedom from noise intrusions; and 4) sleep sensitivity criteria.

Different considerations are involved in determining noise sensitivities for different land uses and activities. For example, noise level limits for satisfactory speech communication in a home are different from those for satisfactory telephone usage in an office. The guidelines attempt to account for those considerations as well as anticipated noise-sensitive activities that occur both outdoors and indoors. Also recognized is the amount of outdoor-to-indoor noise reduction provided by typical structures.

In developing these land-use acceptability recommendations, the Office of Noise Control made an effort to maintain consistency with the U.S. Environmental Protection Agency's "Levels Identified as Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety". In both the EPA findings and Office of Noise Control recommendations, an interior Day-Night Average Sound Level of 45 dBA, attributable to exterior noise sources, is considered to be the maximum level consistent with normal residential activity. Considering the typical range of 12- to 18-dBA noise reduction provided by residential dwellings (with windows partly open), the 60-dBA value identified as "normally acceptable" for residential land use would provide an interior environment of about 45 dBA.

Note that the Santa Barbara County Noise Element does not address the issue of boat noise or helicopter noise that occurs beyond that area treated at the Santa Barbara Airport.

IMPACT OF PROJECT COMPONENTS

Pipeline construction noise levels are considarably above the ambient noise level in uninhabited areas. Because there are no sensitive receptors, however, the impact is insignificant and short lived. At or near the Vista del Mar School, the pipeline construction noise level is 7 to 9 dBA above the measured level that is due to traffic sources. This is a significant impact, but of a short duration. Pipeline construction also induces an associated increase in local vehicular traffic. This increase in truck and auto traffic causes an estimated 0.5h dBA increase in noise level, which is insignificant. Since the pipeline construction is not a stationary activity, noise exposure at any location is limited to about two weeks.

Process plant construction noise is estimated to be 17 to 20 dBA above the measured levels at or near the Vista del Mar School. This sound level increase would create a significant impact if the school were in session. Construction, of course, takes place throughout the proposed site area and it is the construction activities nearest to the school that contribute most to the construction noise levels at the school.

Normal operation of the proposed processing facility is estimated to cause a long term 1- to 2-dBA increase in the noise level at the Vista del Mar School. To achieve this insignificant increase in noise level, plant equipment will have to be designed with noise-reducing features such as mufflers, intake and exhaust silencers, structural noise barriers and enclosures, as appropriate. Additional vehicular traffic generated by the facility operating personnel will cause a slight increase in traffic noise which would not be significant. Ground vibration caused by the plant machinery will be insignificant since there is no large reciprocating equipment. Overall vibration levels are intentionally kept low because equipment is mounted by design on vibration isolators to insure a long operating life.

Noise from helicopters and crew and supply boat activity will increase because of construction and operation of the proposed project. Although these noise sources are unavoidable and long term, their impact can be kept to a minimum. Helicopter flights, after leaving the airport along allowable flight paths, could be routed away from sensitive receptors along the shore. In the case of support and crew boats, the arrival and departure speeds at piers and ports could be restricted or limited in order to reduce the effects of engine noise. The travel lanes can be arranged to minimize the vessel noise effects.

AREA STUDY

Sound levels in the immediate area of platform construction and during operation would be high enough to exceed the OSHA maximum permissible noise exposure criteria. Hearing protection and monitoring would be provided as necessary to comply with OSHA requirements.

Because of the attenuation of the sound energy over this distance (from the offshore platforms and shore could be between 6.5 and 16.4 miles), platform construction sound levels could not be heard onshore. Vehicular traffic, helicopters, and crew and supply boats supporting the construction effort and the operation would produce perceptible short-term increases in ambient residual sound levels at some onshore receptor areas when these vehicles are arriving and departing. However, because of the intermittent nature and short duration of these episodes, the daytime LD, nighttime LN, and CNEL ambient sound levels at onshore receptor areas would not increase measurably and would be insignificant.

IMPACT OF ALTERNATIVES

It is proposed that the Chevron land near Point Conception be considered as an alternative to Gaviota, assuming the same basic design. If the facilities are the same at that location, the level of noise impact is assumed to be the same. However, the impact of the noise would not be significant because of the lack of populated areas in the local vicinity.

MITIGATION MEASURES FOR NOISE IMPACTS

Proposed Project

Table 5.8.3 summarizes suggested mitigation measures by description of impact.

Offshore Platforms

The installation of offshore platforms will have no direct impacts other than that related to offshore transportation, which is discussed below.

Onshore and Offshore Pipelines

Pipeline construction near noise sensitive sites, such as the Vista del Mar School, could be restricted to those hours of the day or days of the year when the site is not in use.

Processing Facilities

Process plant construction noise could be reduced by the use of temporary barriers around the noisier sites when school is in session. Constructing the facilities at night would reduce noise impacts on the school. Design features will be incorporated into the proposed processing facility that will minimize noise levels at the adjacent school site. These will include structural barriers and enclosures around noise-generating equipment, intake and exhaust silencers, and mufflers.

Offshore Support Bases

The total elimination of helicopter overflight noise impacts is an unlikely prospect. In addition to adherence to the Santa Barbara Airport noise regulations, helicopters could be routed directly away from shore to specified distances to reduce substantially the flight time spent near all noise sensitive land receptors.

Support and crew boats could be required to travel in designated lanes as far from shore as practical. The entering and departing segments of travel could be speed limited to reduce the engine exhaust noise levels.

AREA STUDY DEVELOPMENT

No mitigations would be required beyond that discussed above

PROJECT ALTERNATIVE MITIGATIONS

The mitigation measures outlined in Table 5.8.3 are also appropriate for the project alternatives.

TABLE 5.8-3

SUMMARY OF NOISE IMPACTS AND MITIGATION MEASURES

Description of Impact	Scope	Mitigation Measures	Residual Impact
Class II Significant Impacts Which Can Be Mitigated			
Pipeline construction noise; 7 to 9 dB above existing.	Local at Vista del Mar school; short-term	Construction only when school is not in session	Insignificant
Process plant construction noise 17 to 20 dB above existing.	Local at Vista del Mar school; short-term	Schedule nearest activities when school is not in session; erect temporary barriers around noisiest activities.	Insignificant
Class III Other Environmental Impacts Which Are Adverse But Not Significant			
Pipeline construction, 10% increase in road traffic, 0.5 dB increase in noise level	Local residences; short-term	None; temporary nature of construction	Insignificant
Process plant operation; 1 to 2 dB increase in CNEL.	Local at Vista del Mar School long-term.	Built-in noise reduction of plant equipment.	Insignificant
Process plant operation, unmeasureable increase in traffic noise.	Regional along Highway 101; long-term.	None	Insignificant
Process plant operation, ground vibration.	Local around project site: long-term	Standard industrial vibration isolation for equipment protection.	Insignificant
Helicopter noise during construction, during operation.	Regional; short-term long-term	Reroute flight path away from shore; enforcement of airport noise abatement regulations.	Insignificant
Support and crew boat noise during construction, during operation.	Local pier or port, and shore; short-term; long-term	Restrict travel to lanes away from shore; limit speed upon entering or departing.	Insignificant

REFERENCES TO CHAPTER V

5.8 AESTHETIC ENVIRONMENT

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5.8 AESTHETIC ENVIRONMENT (cont)

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5.9 SOCIOECONOMICS

5.9.1 Introduction

This section describes in broad socioeconomic terms the environmental consequences associated with the introduction of the proposed project into the area. The discussion below focuses on nine elements of socioeconomic activity to measure the impact of the project on the surrounding environment.

- Regional Growth
- Housing
- Services/Utilities
- Tourism
- Public Finance
- Public Hazards
- Energy
- Onshore Support Activity
- Vista del Mar School

For each of these elements a brief description of the particular methodology is provided. Following that discussion, the impact of the individual elements is presented.

5.9.2 Regional Growth

INTRODUCTION/METHODOLOGY

The regional growth impacts of the proposed project, area development buildout scenario and the proposed alternatives were quantitatively estimated using an integrated system of regional economic models. This system consists of an input-output model of the tri-county economy, a regional macroeconomic accounting framework for integrating baseline projections and impact estimates, and a spatial allocation model for estimating the intra-regional distribution of impacts.

Assumptions concerning the availability of local labor are important to this analysis since, as labor availability is depleted, in-migration of workers is necessary to fill direct and indirect project-related jobs. The labor force projected to be available to fill jobs associated with the project may in fact be hired for other proposed offshore oil and gas developments and other major energy projects.

The project's impacts on population and related socioeconomic factors depend heavily on the labor demands created by project expenditures, as well as on the extent of local labor supply. The expenditure data used in this analysis were supplied by the applicants. The results presented in this report are sensitive to both the level and the composition of these expenditures. Modifications to project expenditure patterns would affect the number of jobs indirectly created by the project as well as the distribution of these jobs within the tri-county region and among the various sectors of the local economy.

The starting point for evaluating the impacts of the proposed project on regional labor force, population, and income is a comparison of future socioeconomic conditions without the project to the predictions of project effects on employment. Workers who are unemployed without the project but potentially employable as a result of the project constitute a locally available labor force. Hiring these otherwise unemployed workers leads to greater income, sales, and local tax revenue, but does not trigger population growth. It is additions to the population of the area which cause most planning problems regarding availability of water, land, housing, and key government services.

Population impacts result from the influx of workers seeking to fill project-related jobs. These may be either direct jobs (employees of the operators or their construction or drilling contractors) or indirect jobs (workers in the tri-county region whose jobs are related to purchases of goods and services by the operators). Since some of the project-related jobs may be filled by local residents who otherwise would be unemployed, only the excess demand for labor above this local supply triggers labor force in-migration.

Many factors affect this balance between project-related employment growth and local labor availability:

- The size of the regional labor market, with a larger labor force able to provide more resident workers to the project.

- Unemployment without the project. The higher the rate of unemployment, the more workers are available to fill project-related jobs.

- The occupational skills of the employed and unemployed local labor force. The project may require specialized work skills that may or may not be available in the local labor force or among the local unemployed.

- Interaction between the local labor market and surrounding areas. With good transportation, workers can commute from outside the tri-counties to jobs within the region. Over longer periods -- and the projects represent a long-term direct and indirect employment source -- these commuters are likely to move to the desirable tri-county residential area as long as employment opportunities are good.

Many workers who relocated to the tri-counties to take project-related jobs would bring families, and all would demand housing, require water and sanitary services, and generate traffic. Many of the dependents of these workers would themselves be in the labor force, and would be available for employment. Moreover, because some labor turnover always occurs in any expanding economy, more workers are likely to relocate than can be fully employed at any given time. Consequently, an allowance must be made for worker in-migration in excess of job creation.

Interactions among these critical factors are captured using a disaggregated, quantity-adjustment labor market model [Niehaus, 1982]. The model provides a framework for integrating the baseline projections of economic activity with the direct and indirect employment impacts of the project. Forecasts of the available resident labor forece, suitably disaggregated into 11 employment types, are compared to project-related job demands on a year-by-year basis. Estimates of excess labor demand are translated into labor force impacts, allowing for labor force participation among dependents, as well as less-than-full employment of the relocating labor force. Indirect jobs are first filled by the available resident labor force, then by dependents of in-migrants, and then by additional relocating workers as needed. Finally, these impact estimates are superimposed on the baseline forecasts to produce estimates of critical regional economic indicators -- employment, unemployment, labor force, population, earnings, and personal income -- with the project in place. For a complete description of the methodology used, see Technical Appendix M, Section 1.3.

IMPACTS OF PROJECT COMPONENTS

Employment

Direct Employment - Most of the direct project-related employment will be involved with construction activities which are expected to begin in mid-1985, and be mostly completed by mid-1988. Drilling is the second major component of direct employment, in timing and in magnitude, though not in duration. Finally, employment related to production is also considered.

Major direct employment impacts for the project will occur between 1985 and 1988 with 220 to 250 workers being hired from the tri-county area. The long-term level of 150 workers will be reached in 1993. The direct employment impact resulting from construction, drilling and production is long-term and minor relative to total employment in the tri-county area.

Indirect Employment - Total indirect employment impacts will peak at 4,530 jobs in 1985. The indirect-induced impacts will then decline and remain stable at about 2,070 jobs after 2000. The trade, services, and construction industries will be the most affected. The total indirect-induced jobs being created over the study period (1985 -- 2000) in these sectors will be 14,545, 11,418, and 3,565, respectively. Together they account for more than 76 percent of the impacts on the tri-county economy.

Total Regional Employment Impacts - Total regional employment impacts are simply the sum of direct impacts and indirect-induced impacts in the tri-county region. Since indirect-induced impacts much outweigh direct impacts, total regional impacts can be expected to follow the same pattern as indirect-induced impacts. Total regional direct and indirect employment impacts are summarized in Table 5.9-1 for 1985 and 2000. The impact of the proposed project produces short run employment impacts that are important and beneficial by themselves. In the longer term the impacts are also immportant and beneficial.

Unemployment

The peak-year (1985) unemployment rate would be about 0.2 percentage points lower than baseline conditions and the long-term (2000) unemployment rate about 0.1 percentage point lower. The unemployment impact resulting from the proposed project is long-term and beneficial and important. Table 5.9-1 details these results.

Population

Peak year (1985) population impacts are projected at 4,090 persons for the tri-county region, an increase of only about 0.8 percent over the baseline which is considered negligible and unimportant by themselves. Long-term impacts are also negligible -- only about 4,620 persons (Table 5.9-1). Most of the peak year and long term population in-migration is expected to demand residence in Ventura County. Peak year (1985) and long term (2000) residence by local area are shown in Technical Appendix M, Socioeconomics.

Income

Peak year (1985) personal income gains (in 1983 dollars) would be about $163 million (about 1.2 percent of the baseline figure). Long-term income impacts would be about $80 million, or 0.4 percent of baseline income. The per capita income gain over baseline conditions would be about 0.3 percent ($40 per capita) in the peak year, and about zero in the long run. Table 5.9-1 highlights these results. Both of these short- and long-term impacts are beneficial and important.

IMPACTS OF AREA DEVELOPMENT BUILDOUT SCENARIO

Employment

Direct Employment - The direct employment impacts of the area buildout scenario in the tri-county area will increase from 490 workers in 1991 to a peak of about 490 workers in 1991 and then decline to the long-term level of 340 workers in 1998. Although the impact is minor relative to total employment in the tri-county region, it is important because it will trigger significant indirect and induced impacts over the life of the project. See Table 5.9-1 for a summary of the impacts.

Indirect Employment - The impacts in the first two years, 1985 and 1986, are identical to those for the Chevron/Texaco project because the additional five platforms in the Arguello area are assumed to be installed after 1986. The peak impact will take place in 1995, with 5,397 jobs being created. Then the impacts will decline to the long-term level of 4,993 jobs in 2000.

Again, the trade, services, and construction industries are the most affected sectors. The indirect-induced impacts on these three sectors in the entire study period will be 26,656, 20,284, and 6,895 jobs, respectively. In the peak year (1995), approximately 1,878, 1,568, and 677 jobs will be generated, respectively, in these sectors.

TABLE 5.9-1

TRI-COUNTY REGION PEAK YEAR AND LONG TERM ECONOMIC AND DEMOGRAPHIC IMPACTS

Socioeconomic Indicator	Proposed Project		Area Development Buildout Scenario	
	Peak Year	Long Term	Peak Year	Long Term
Year	1985	2000	1995	2000
Project-related Employment				
Direct Jobs	220	150	380	340
Indirect/Induced Jobs	4,530	2,070	5,400	4,990
Total Jobs	4,750	2,220	5,780	5,330
Total Employed Labor Force				
Without Project(s)	493,890	631,940	597,780	631,940
With Project(s)	498,640	634,160	603,650	637,270
Percent Change	1.0	0.4	1.0	0.8
Total Population				
Without Project(s)	1,096,080	1,350,470	1,276,100	1,350,470
With Project(s)	1,105,880	1,355,090	1,288,070	1,361,590
Change	9,090	4,620	11,970	11,120
Percent Change	0.8	0.3	0.9	0.8
Unemployment Rate (Percent)				
Without Project(s)	7.6	6.8	6.6	6.8
With Project(s)	7.4	6.7	6.4	6.7
Change	-0.2	-0.1	-0.2	-0.1
Personal Income (millions 1983$)				
Without Project(s)	13,827	21,167	18,638	21,267
With Project(s)	13,990	21,347	18,838	21,458
Change	163	80	200	191
Percent Change	1.2	0.4	1.1	0.9
Per Capita Income (1983$)				
Without Project(s)	12,610	15,750	14,610	15,750
With Project(s)	12,650	15,750	14,630	15,760
Change	40	0	20	10
Percent Change	0.3	0	0.1	0.1

Note: Peak year is chosen as the year with highest project-related population impacts, and varies with labor availability and project job creation.

Source: Projections by Applied Economic Systems, June 1984.

As with the proposed project, the employment impacts resulting from the area buildout development scenario, both in the short run and in the long run, are beneficial and important in themselves.

Unemployment

The regional unemployment rate is expected to be about 0.2 percentage point lower than the baseline during the entire study period. This unemployment impact resulting from the area buildout scenario by itself both in the short- and in the long-term is beneficial and important.

Population

Peak-year (1995) population impacts of the Area Buildout Scenario on the tri-county region would reach 11,970 persons. Long-term impacts would be about 11,120 persons. These effects represent 0.9 and 0.8 percent of baseline regional population in the peak and long-term years, respectively.

Substantial peak-year project-related growth is forecast for the resource-constrained areas of Santa Barbara County. This raises significant planning issues, and must be judged an important but partially mitigable impact in both the long-term and short-term. See Technical Appendix M, Socioeconomics for a display of residence by local area.

Income

Peak-year (1995) personal income gains would be about 1.1 percent ($200 million) of the baseline conditions. Long-term personal income impacts would be about 0.9 percent ($191 million) over the baseline. The per capita income impacts would be about 0.1 percent ($20 per capita) in the peak year, and about 0.1 percent ($10 per capita) in the long run. These income impacts are beneficial and important over the entire study period.

IMPACTS OF ALTERNATIVES

Since the only differences between the various alternatives considered are related to location, the regional growth impacts will remain the same as for the proposed projects. For a detailed listing of the economic indices that describe the alternative scenarios see Technical Appendix M.

MITIGATION MEASURES

Regional growth impacts associated with the proposed project, the area buildout development and project alternatives are due primarily to population in-migration resulting from direct and indirect project-related employment. The principal cause of indirect growth, is the large planned expenditures by the applicants for materials and services. Because of uncertainties in estimating these impacts prior to project implementation, a mitigation measure would be to have the applicants monitor and report to regional local governments project expenditures and hiring in the region and a projection of these indicators over the next two years. This would provide a basis for government assessment of growth impacts due to the project.

When offshore development occurs, onshore economic growth is virtually certain to accompany it. The timing of multiple offshore projects can be controlled by granting permits and accepting development plans on a phased basis.

For that part of the employment impact that is related to direct project employment strategies to expand the use of local otherwise-unemployed labor could be effective in moderating project-related population growth.

For example:

- Job training and apprenticeship programs could be sponsored by the applicants to help retrain local workers to acquire needed skills;

- Require certain construction jobs to be given to local contractors, thereby increasing the use of local labor; and

- California Employment Development Department's (EDD) Job Service program could help match unemployed workers with unfilled positions.

However, the principal employment impacts of the proposed projects, the area development buildout and the project alternative are indirect and induced jobs, spread broadly over the regional economy. Expansion of EDD's Job Service assistance would be useful in dampening worker influx, but targeted training and contracting would do little of value.

Another approach to managing offshore-related growth impacts is to control the outcome of the growth process. This would be almost entirely a local government responsibility, and would simply be an extension of current planning, zoning, and permitting efforts already extant in the tri-counties.

5.9.3 Housing

INTRODUCTION/METHODOLOGY

To determine the housing impact resulting from the proposed project, housing demands of in-migrants are broken down by permanent and temporary needs. It is assumed all in-migrant construction worker housing is to be temporary; all in-migrant production worker and indirect worker housing permanent; and in-migrant drilling worker housing half permanent and half temporary. Furthermore, each worker who is accompanied by a family is assumed to require one housing unit. Unaccompanied workers are assumed to share housing units to some extent, so that, in all, there is a demand for half as many housing units as there are unaccompanied workers.

To further assess the housing impact of the proposed project, one must also be aware that Santa Barbara County places fixed requirements on housing projects so that certain amounts of affordable housing are provided. Specifically, maximum sales prices are associated with "low affordable" housing and such units are to be sold only to families whose incomes do not exceed 80 percent of the county-wide median family income.

U.S. Census data (1980) reveals that approximately 38 percent of all families in Santa Barbara County would qualify for low affordable housing and 21 percent for moderate affordable housing; 20 percent are in the middle income group, and the remaining 21 percent are above that range. These percentages are used to estimate the proportions of total housing demanded by indirect project-related workers that fall into each of those categories. All of the direct project-related workers would be paid in excess of 150 percent of the county-wide median family income, and would not qualify under affordable housing criteria. For a complete discussion of the methodology employed in this section see Technical Appendix M, Section 2.

IMPACTS OF PROJECT COMPONENTS

Total housing demands associated with the project peak in 1985 and are estimated to be 3,235. Of this amount, 3,087 units are considered permanent and are required in the tri-county region. (See Table 5.9-2.) Housing demand remains at a high level between 1985 and 1989. In 1985, 78 percent of the demand is anticipated to be in Ventura County, with most of the remainder in Santa Barbara County. The housing demands resulting from the proposed project will create important short- and long-term impacts on the housing markets in Santa Barbara and Ventura Counties, but not in San Luis Obispo County. For a more detailed display of housing demands by local area see Technical Appendix M, Socioeconomics.

Of the peak year regional housing demand of 3,235 units, most are concentrated in the low, moderate affordability and middle income categories. (See Table 5.9-2.) In addition to the required permanent housing, temporary housing unit requirements, (to meet the needs of much of the direct employment category workers), are anticipated to be 148 in 1985.

Demand for permanent housing for the proposed project, the area development buildout and the alternatives would be primarily due to population in-migration resulting from indirect project-related employment. As many of the indirect housing requirements are in the "affordable" housing range, an appropriate mitigation measure would be for the applicant to provide oversized desalination facilities that could be used to supply water for domestic uses. This extra capacity would provide downward pressure on housing demands. Moreover, the applicant could tract the need for additional housing and contribute funds to an affordable housing finance program. Such a mitigation program would be most effective, if, in the area development buildout and cumulative cases, all applicants contributed to this effort. The feasibility and effectiveness of this is unproven.

TABLE 5.9-2

REGIONAL HOUSING DEMAND IMPACTS
ASSOCIATED WITH THE PROPOSED PROJECT
(number of units above baseline)

		Permanent					
Year	Temporary	Low Affordable	Moderate Affordable	Middle Income	Upper Income	Total	Total
1985*	148	1170	651	627	639	3087	3235
1990	30	625	348	335	470	1778	1808
1995	0	569	317	305	441	1632	1632
2000	0	573	319	307	443	1642	1642

*Peak housing demand year

Source: Applied Economic Systems, June 1984

By the year 1992 (achievement of steady-state conditions) all housing demand is created by the higher-paid direct production workers. This demand will not create an important impact on the local housing market.

IMPACTS OF AREA DEVELOPMENT BUILDOUT SCENARIO

Total housing demands associated with the peak project peak in 1988 are estimated to be 3,859. Of this amount, 4,816 units are considered permanent and are required in the tri-county region (See Table 5.9-3.) Housing demand continues at a high level throughout the projection period (1985 to 2000). In 1988, 77 percent of the permanent housing requirements are anticipated to be in Ventura County, with much of the remainder in Santa Barbara County. The housing demands resulting from the proposed project will create important short- and long-term impacts on the housing markets in Santa Barbara and Ventura Counties and begin to place a strain on the housing markets in San Luis Obispo County. For a detail display of housing demands by local area see Technical Appendix M, Socioeconomics.

Of the regional housing demand of 3,859 units in 1988, most are concentrated in the low and moderate affordable and middle income categories. (See Table 5.9-3.) In addition to the required permanent housing, temporary housing unit requirements needed to meet much of the direct employment category workers are anticipated to number 136 in 1988 (the peak year).

TABLE 5.9-3

REGIONAL HOUSING DEMAND IMPACTS
ASSOCIATED WITH THE AREA DEVELOPMENT BUILDOUT SCENARIO
(number of units above baseline)

		Permanent					
Year	Temporary	Low Affordable	Moderate Affordable	Middle Income	Upper Income	Total	Total
1985	145	1,170	651	627	639	3,087	3,232
1988*	140	1,351	752	724	892	3,719	3,859
1990	136	1,161	646	622	866	3,295	3,431
1995	41	1,489	829	797	1,100	4,215	4,256
2000	0	1,389	773	744	1,047	3,953	3,953

*Peak housing demand year

Source: Applied Economic System, June 1984

By the year 1998 (achievement of steady-state conditions) all housing demand is created by the higher-paid direct production workers. This demand will not create an important impact on the local housing market.

IMPACTS OF ALTERNATIVES

Impacts arising from project alternatives will differ only negligible from those enumerated for the proposed project. One exception is the case where the supply base would be located in Santa Barbara County, resulting in some shift of impacts from Ventura County to Santa Barbara County.

MITIGATION MEASURES FOR HOUSING IMPACTS

Temporary housing would be required for those persons--primarily direct project construction and drilling workers--whose local tenure would be too brief to make permanent housing worthwhile. The applicants could provide temporary housing to the extent required through development of recreational vehicle spaces, establishment of work camps and/or the use of offshore housing (converted workbarges with helicopter support). The location of thes temporary housing facilities could be at the Chevron project site or in the area near Lompoc. In addition, the applicants could provide temporary housing by leasing blocks of rental/hotel rooms with kitchenetts. These rentals could be remote from major tourist and recreational areas so as not to compete with the needs of the tourist. The area around Lompoc would be one possible area where rental hotel space would be available.

5.9.4 Services/Utilities

INTRODUCTION/METHODOLOGY

Associated with many of the key direct impacts discussed under regional growth and housing are a number of other service and utility impacts.

A simplified approach using net in-migration was employed to estimate demands on services and utilities. Per capita factors were used to derive demand from the in-migrant population. These factors were developed for the more critical infrastructure components in a study concerning major population impacts to northern Santa Barbara County (U.S. Air Force, 1981). The one exception is the per capita water use rate which is taken from the Area Planning council's Forecast 82 [Santa Barbara County-Cities Area Planning Council, 1983].

Importance of impacts is judged by comparing project-related demands to presently available and projected future capacities to provide each service. Increases in water demand of 2 percent or more in areas where total water supplies are fixed are assumed to be important. Increases in service demands likely to result in higher uncompensated agency operation costs, or delays in providing services, likewise are judged to be important.

IMPACTS OF PROJECT COMPONENTS

Direct Impacts

Direct project related requirements for utilities and services are very minor. Most of these will be provided by the applicants directly. The most important exception would be for the disposal of solid and liquid wastes. Landfill sites likely to be used such as Foxen Canyon, Tajiguas, Casmalia Santa Clara and Toland are more than likely going to be full before the end of the decade.

Indirect Impacts

Utility and service demands were calculated using impact population figures obtained from a spatial allocation model. Table 5.9-4 shows projected demand for important utilities and services in the peak year and long term.

Electricity

No problems are foreseen in meeting indirect demands for electrical power.

Natural Gas

No problems are foreseen in meeting indirect demands for natural gas.

TABLE 5.9-4

UTILITY AND SERVICE DEMANDS FOR
SANTA BARBARA, VENTURA, SAN LUIS OBISPO
COUNTIES ASSOCIATED WITH THE PROPOSED PROJECT

	Santa Barbara County		Ventura County		San Luis Obispo County	
	Peak	2000	Peak	2000	Peak	2000
Category						
Water Demand (1) (acre-ft/year)	329	150	1,444	744	136	75
Waste water (2) (1000 gal/day)	182	83	797	411	75	42
Police (3) (personnel)	3	1	14	7	1	1
Fire Protection (4) (personnel)	3	1	11	6	1	1
Education (enrollments (5))	282	129	1,237	638	117	64
Health Services (hospital beds (6))	6	3	27	14	3	1

NOTES:

(1) .21 acre-feet/year per capita (urban use)
(2) 116 gallons/day per capita
(3) 2 personnel per 1000 population
(4) 1.65 personnel per 1000 population
(5) 18 school age children per 100 population
(6) 4 beds per 1000 population

Peak year is 1985.

Source: Applied Economic System, June 1984

Water Supply

Water supply in Santa Barbara County is limited, and given voter rejection of access to state-supplied water, appears likely to remain so. Projected water availability to support population growth in the County is summarized in Table 5.9-5.

Water is a particularly scarce resource in the Goleta Valley, relative to population demand. A moratorium on new water line hookups is in effect in the Goleta Water District.

The water needs of the Gaviota Oil and Gas Processing Facility are proposed to be met by drilling one to four wells to depths of approximately 1500 feet (see Section 5.3.2, Groundwater). The estimated minimum daily fresh water requirements (112 AFY) for the proposed facility would be about twice the estimated maximum perennial groundwater yield for the project area.

If housing development is allowed to proceed at a pace sufficient to meet project-related demand, water requirements would be substantial. Peak-year (1990) requirements would total about 415 acre-feet per year [AFY]. Nearly half of this demand would occur in Goleta. Since supplies available for residential development in the Goleta area are currently estimated at less than 570 AFY, project-related demand would be about 36 percent of the available supply. The impact of the proposed project on increased water demand consequently are judged to be long-term and both important and unavoidable.

Sanitary Waste

Sanitary waste demands will peak at measurable levels and then become negligible with the proposed projects. The cumulative demands for sanitary waste treatment are relatively high and would be sustained through the year 2000. Facility expansion would be needed to meet the increased demands.

Solid Waste

As a result of the proposed project, waste disposal will be required at a Class I landfill site (a landfill designed to handle various types of hazardous waste). The only Class I landfill in the area is the Casmalia landfill. At the time of peak throughput of the facility, waste disposal at the Casmalia landfill would occur at a rate approximating 5 percent of the current annual waste disposal at the site. Impact of the increased disposal of hazardous wastes at Casmalia is judged to be significant but mitigable.

Education

A measurable increase in projected enrollments and teaching demands occurs during the peak years for the project-related scenarios. This increase becomes negligible by the year 2000.

Health Care

Available capacities in local hospitals are presently large enough to handle the minor increases projected in all three scenarios.

The combined demands for waste water treatment, solid waste disposal, fire protection, police protection, and health care services are likely to increase as a result of the projects. Occasional peak-year

TABLE 5.9-5

WATER AVAILABILITY IN SANTA BARBARA COUNTY

Area	Available Municipal and Industrial Water, Acre-feet per Year
South Coast	1,881
City of Carpinteria	156
Carpinteria, unincorporated	0
Summerland	0
Montecito	0
City of Santa Barbara*	1,158
Goleta	568
North County (groundwater only)	-
Santa Ynez River Basin**	Unlimited
Santa Ynez Upland Basin	Overdraft
Lompoc Basins	Overdraft
Santa Maria Basin	Overdraft
Orcutt Storage Unit	Overdraft
San Antonia Basin	Overdraft
Cuyama Basin	Overdraft

* An additional 1,000 AFY would be available after 1990.
**First claim to Cachuma water in event of overdraft.

Source: Santa Barbara County-Cities Area Planning Council, 1983.

Fire Protection

A specific project-related demand for fire protecton is cited by Chevron [1983] for the onshore facilties. Although fire protection at the onshore facility would be provided by Chevron, local fire stations in Goleta and Santa Barbara would be briefed on the facility in case of a major disaster. County fire department facilities may need to be expanded or relocated to serve the project's direct needs and other growth related needs of the projects. Any significant increase in development in the area of the proposed project will require the establishment of a County Fire Station and the means to fund such a facility.

Police Protection

No specific project-related demands are made for police protection. The facilities would be policed privately by Chevron. The staff level requirements would be the same as those for fire protection personnel.

constraints in providing these services at desired levels may occur. The long-term impacts resulting from the project are judged to be adverse but not important.

IMPACTS OF AREA DEVELOPMENT BUILDOUT SCENARIO

Direct Impacts

The addition of five more platforms in the Santa Maria Basin would cause greatly increased impacts on sanitary waste disposal. The area buildout scenario, over its life, would have little effect on requirements for community provided utilities and services and is, therefore, judged to be unimportant.

Indirect Impacts

As shown in Table 5.9-6, the expansion of offshore platforms as proposed in the area development buildout scenario would result in greater requirements for services and utilities than that required for the proposed project because of the associated indirect population in-migration impacts.

IMPACTS OF ALTERNATIVES

Changing the location of the processing facility installing an offshore pipeline, and the use of onshore support bases would shift the distribution of the in-migrant population slightly, possibly resulting in a greater share of services and utilities impacts in Santa Barbara County. However, the differences are not expected to be important.

MITIGATION MEASURES

Demands for water would be substantial in all cases and scenarios , and would possibly exceed supplies in some areas. Water conservation could alleviate the problem to some extent, but accommodation of project-related growth would require development of alternative water sources. The applicant could help to mitigate this impact by contributing to the effort to locate and obtain additional water supplies. Furthermore, the applicants could provide for an oversized desalination facility that could be used to meet the additional indirect project-related water requirements.

Growth-related demands for public services in Ventura County, where growth impacts are projected to be largest in absolute terms, would be at least partially mitigated by means of existing fiscal mechanisms. County jurisdictions could continue to impose school capital construction fees on new housing units. State average-daily-attendance (ADA) payments would accrue to county, school district, municipal, and service district budgets.

Increased demands on all utilities and services (schools, police, fire, waste water treatment) could be monitored by the applicants, who could contribute funding to affected agencies to help offset additional costs. If all applicants participate in such a program, the level of these impacts would be rendered insignificant.

TABLE 5.9-6

UTILITY AND SERVICE DEMANDS FOR SANTA BARBARA, VENTURA, SAN LUIS OBISPO COUNTIES ASSOCIATED WITH THE AREA DEVELOPMENT BUILDOUT SCENARIO

	Santa Barbara County		Ventura County		San Luis Obispo County	
Category	Peak	2000	Peak	2000	Peak	2000
Water Demand (1) (acre-ft/year)	381	348	1,939	1,805	197	181
Waste water (2) (1000 gal/day)	211	192	1,071	998	109	100
Police (3) (personnel)	4	3	18	17	2	2
Fire Protection (4) (personnel)	3	3	15	14	2	1
Education (enrollments (5))	327	298	1,662	1,548	169	155
Health Services (hospital beds (6))	7	7	37	34	4	3

NOTES:

(1) .21 acre-feet/year per capita (urban use)
(2) 116 gallons/day per capita
(3) 2 personnel per 1000 population
(4) 1.65 personnel per 1000 population
(5) 18 school age children per 100 population
(6) 4 beds per 1000 population

Peak year in Ventura County is 1995.
Peak year in Santa Barbara and San Luis Obispo Counties is 1994.

Source: Applied Economic System, June 1984

5.9.5 Tourism

INTRODUCTION/METHODOLOGY

In this section, estimates of the economic impact on tourism are presented. The reader is encouraged to also review the sections on Air Quality (Section 5.2), Aesthetics (Section 5.8). Marine and Terrestrial Biology (Sections 5.5 and 5.6) and System Safety and Reliability (Section 5.11) to obtain additional information relevant to tourism impacts.

Tourism expenditures play an important role in the local economies. Representative estimates of the value of tourism losses were derived from projected tourism expenditures on the South Coast.

IMPACT OF PROJECT COMPONENTS

Many visitors to the South Coast would not be affected visually by the proposed project facilities, particularly if they limited their visits to the Santa Barbara-Goleta urbanized area, because the Chevron facilities would not be directly visible from the areas of greatest population concentration and visitor use.

The installation of the proposed offshore platforms and associated offshore pipeline facilities brings with them the possibility of offshore oil spills that could impact local tourism. Based on the analysis presented in the System Safety and Reliability section (Section 5.11) there is the possibility of offshore oil spills impacting recreational beaches. However, presently there are no usable data, other than a study performed by Meade and Sorensen in 1970, to measure the impact on tourism resulting from a project such as that proposed herein. Professional judgement would suggest, however, that impacts would be adverse but partially mitigable. As a worst case, it is expected that the impacts would be long-term and a Class II impact level.

IMPACTS OF AREA DEVELOPMENT BUILDOUT SCENARIO

Potential impacts on tourism under the area buildout scenario, while indirect, would be larger than those for the project alone because of greater public perception of industrial development.

IMPACTS OF ALTERNATIVES

Alternative pipeline routes or processing facility locations would not significantly alter the effects discussed above.

Alternative supply base locations, to either the Ellwood or Gaviota areas, would result in a significant change in the character of the environment in these areas, from primarily rural to more industrial. Increased traffic, noise, and degradation of visual amenities would probably affect tourism levels to a greater extent than the other alternatives.

MITIGATION MEASURES

Provision of temporary housing for direct workers in areas remote from most tourism would reduce potential impacts on tourist overnight facilities, e.g., hotels and models.

5.9.6 Public Finance

INTRODUCTION/METHODOLOGY

This section addresses the impacts of the proposed project, alternatives to it and the area buildout on county government finances in the tri-county region.

Fiscal impacts are estimated using models of county government finance from which the baseline fiscal projections were derived. These models are documented in Section 6.2 of Technical Appendix M, Socioeconomics. The information needed to simulate the models under with-project conditions include estimated impacts on:

- Population,
- Personal income,
- Assessed valuation of project facilities, and
- Number of workers residing in area hotels and motels during the period of their employment.

Impacts are judged to be adverse if the effect of the project is to raise required expenditures more than revenues. Impacts are beneficial if revenues would rise more than expenditures due to the projects. Impacts are assumed to be important if they represent 10 percent or more or the baseline surplus of deficit, or $100,000 per year, whichever is larger.

Whether or not adverse impacts would be mitigable depends on the county in which they occur. Initial adverse impacts of the project in Santa Barbara County could potentially be mitigated by requiring advance or pre-payment of property taxes or contributions for selected services as conditions for granting required permits. Adverse impacts in Ventura and San Luis Obispo counties could be addressed by monetary contributions by the applicants to the county budget, but, since these counties do not have permit authority, no proven mechanism currently exists for requiring such a contribution. Adverse impacts in Ventura and San Luis Obispo counties, if they should occur, consequently are treated as unavoidable. While the feasibility of these mitigation measures has not been determined, it is reasonable to explore measures such as these to minimize the fiscal impact of the project.

IMPACT OF PROJECT COMPONENT

The large increase in population in the tri-counties area in the beginning years of the project are expected to erode the positive net fiscal surpluses forecast for each county government as compared to baseline conditions. (See Table 5.9-7.) Without accompanying increases in assessed valuation of new oil or gas facility properties until 1987, Santa Barbara County will incur slight negative impacts on the annual surplus in both 1985 and 1986. Beginning in 1987, large net revenue contributions are anticipated as increased sales tax revenues and property taxes keep ahead of increased per capita expenditures over a larger population base.

Table 5.9-7

NET FISCAL IMPACT WITH PROPOSED PROJECT, BY COUNTY. ALL VALUES IN CONSTANT 1983 DOLLARS

	SANTA BARBARA	VENTURA	SAN LUIS OBISPO
Year	Net Impact	Net Impact	Net Impact
1985	$ -100,000	$-606,000	$-73,000
1990	1,524,000	40,000	34,000
1995	1,507,000	2,000	2,000
2000	1,508,000	8,000	3,000
Present Value at 6%	11,675	-570	-40

Source: Projections by Applied Economic Systems, June 1984

Because no new oil and gas properties will be constructed within the county jurisdiction of Ventura, property tax increases cannot be relied on to provide incremental revenues equal to expenditure increases on new in-migrating population. Large population growth in Ventura County relative to Santa Barbara and San Luis Obispo is responsible for the large present value net fiscal deficit and is judged to be important. The present value of the net fiscal impact in San Luis Obispo County is negative but very small and relatively unimportant.

IMPACTS OF AREA DEVELOPMENT BUILDOUT SCENARIO

Under the area buildout scenario, impacts to Santa Barbara will be favorable in all years of operation and unfavorable during construction. Although negative net fiscal impacts are estimated for 1985, the size of these impacts is small. A positive net fiscal position due to the entire buildout scenario is projected for the 1989-2000 time period. Consequently the fiscal impact of the area development scenario is expected to be unimportant.

With very large increases in employment resulting from the area development buildout scenario, expenditures in Ventura County rise significantly relative to revenue increases from sales taxes, miscellaneous taxes and property taxes.

In San Luis Obispo County, the present value of net fiscal impact are anticipated. The additional expenditures required to maintain per capita service standards indicative of the 1968-1983 period are expected to exceed the increase in sales, property, and miscellaneous taxes and other revenues over the entire planning horizon. This is judged to be adverse and unmitigable.

Table 5.9-8 displays the net fiscal impacts associated with the area buildout scenario, by county.

IMPACTS OF ALTERNATIVES

An alternative pipeline route or processing facility location would not significantly alter the effects discussed above.

MITIGATION MEASURES

For each of the scenarios analyzed the applicants could implement a program to monitor and report to local governments project expenditures and associated hiring in the region, to provide a basis for government assessment of fiscal burdens related to the project. The applicants could be further required to fund induced expansion of public services, including those needed for emergency response in case of accidents. The applicants could be required to post a performance bond to cover the costs of emergency response and clean-up. A Regional Fiscal Impact

Table 5.9-8

NET FISCAL SURPLUS WITH AREA
DEVELOPMENT BUILDOUT, BY COUNTY
ALL VALUES IN CONSTANT 1983 DOLLARS

	SANTA BARBARA	VENTURA	SAN LUIS OBISPO
Year	Net Impact	Net Impact	Net Impact
1985	$ -100,000	$-606,000	$-73,000
1990	1,694,000	140,000	20,000
1995	1,810,000	2,000	12,000
2000	1,792,000	20,000	7,000
Present Value at 6%	13,275	-1,080	-77,000

Source: Projections by Applied Economic Systems, May 1984.

Council could be formed to manage the fiscal monitoring program. The applicant could provide in-lieu payments if fiscal impacts are found to be negative. In addition, a fiscal contingency plan for minimizing the impact of employment and revenue loss in the event of a facility shutdown should be prepared by the applicant.

The applicants could be required to take title to all purchased construction, drilling, and production materials within the jurisdiction of Santa Barbara, Ventura, and/or San Luis Obispo counties, as well as selected municipalities within these counties. If title were assumed immediately upon entry into the counties, the local governments would receive their allocated share of state sales and use revenues sooner.

5.9.7 Public Hazards

IMPACTS

Large project such as the one that is the subject of this document, may lead to a variety of accidents or pubic hazards. These hazards can be grouped around the following principal components of the project:

- Processing facility
- Offshore platforms
- Onshore and offshore pipelines
- Transport of products from processing facility

To assess the public hazards related to the proposed projects a formal system safety and reliability analysis has been performed. The analysis examined the future consequences for public safety and the potential for oil and gas spills on the environment as a possible result of the proposed development. The analysis is based on an identification of all important accidental events; events that are unwanted, unplanned and acute. See Section 5.11, System Safety and Reliability, for a complete discussion of the potential hazards and safety impacts of the proposed project, project alternatives and the area development buildout scenario.

The public risks and hazards associated with the proposed project, as discussed in Section 5.11, can be summarized as follows:

- Shoreline Environmental Risks. Oil spills of up to a few hundred barrels from a variety of causes but larger spills caused by well blowouts.

- Public Risks from the Onshore Gas Pipeline. The major source of public risk from the pipeline could arise from failures at the Gaviota end of the pipeline, e.g., releasing flammable material that then ignites, resulting in a fire and, in some cases, an explosion.

- Public Risks from the Oil-and Gas-processing Facility. The public risks at the facility are entirely dominated by releases from the gas pipeline pig receiver. The hazard is principally due to releases that might ignite in the facility and then explode, causing injuries and fatalities at the Getty facility and at the Vista del Mar Union School. Apart from the gas pipeline pig receiver, the location of the Vista del Mar Union School makes it particularly vulnerable to events involving the LPG and NGL storage tanks, and the truck loading operations.

- Public Risks from Transportation of Gas By-products. The transportation risks are distributed among the communities bordering the routes to Bakersfield and to Los Angeles. For the low-fatality incidents, the rates per vehicle-mile are identical for the two 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 is the Bakerfield route because of its highly-populated areas where many people might be impacted by a spill which did not immediately ignite.

MITIGATION MEASURES

See the discussion in Section 5.11 dealing with mitigation measures.

5.9.8 Energy

INTRODUCTION/METHODOLOGY

An appropriate criterion to use to measure the impact on energy of the proposed project is the ratio of energy produced by the project to that consumed in its operation. The higher that ratio, the more available energy would be introduced into the economy for productive use. To derive this ratio, all the energy forms produced and consumed as a result of the project were converted to a single basic unit of measure (i.e., British thermal units or Btus) and then expressed in terms of trillions of Btus. The energy produced/consumed ratio was then computed for the project over its expected lifetime. Chapter II, Project Description, details the energy requirements and production of the project.

IMPACTS OF PROJECT COMPONENTS

Energy will be consumed by the following components of the proposed project: offshore and onshore stationary fuel burning equipment; electricity production; support vessels (crew and supply boats) and helicopters; and onshore transport of processed materials. The resulting ratio of energy produced to that consumed over the life of the project is estimated to measure nearly 10. to 1. and is judged to be beneficial in both the short and long run.

IMPACTS OF AREA DEVELOPMENT BUILDOUT SCENARIO

The ratio of energy produced to that consumed over the life of the area development buildout scenario is estimated to be 150. to 1 and is judged to be beneficial in both the short and long run.

IMPACTS OF ALTERNATIVES

Moving the onshore processing facilities to an alternative site would not materially change the ratio of energy produced to that consumed from that estimated for the proposed project. Neither would the proposal to employ a complete offshore pipeline route to the processing facility.

MITIGATION MEASURES

Several energy - conserving measures already are included in the proposed project and are assumed to be applicable as well to both the area study development and the project alternatives. These include the use of cogeneration, consolidated offshore supply trips, and busing of workers. No additional specific mitigation measures are appropriate.

5.9.9 Onshore Support Activities

INTRODUCTION/METHODOLOGY

Development of the Point Arguello field will have a direct impact on many industries. To satisfy the final demand changes resulting from Point Arguello development, the local support industries will have to increase their output in a timely fashion and at levels above what would be expected under normal baseline growth conditions.

In terms of impacts, the industries which would experience the largest absolute effects are the wholesale trade sector, and crude petroleum and natural gas exploration (both maintenance/repair and new construction). Each industry, however, is affected differently in terms of the timing of necessary expansion over the different development phases of the project, as well as being affected by the timing of other projects proposed for the area.

IMPACTS OF PROJECT COMPONENTS

Peak year gross output requirements of the support industries in the region total $385.1 million in 1988.* The majority of these needs are expected to come from the new construction, wholesale trade, retail trade, and maintenance and repair construction industry sectors. No major capacity constraints would exist under this alternative. For a detailed display of gross output by major industry, see Table 7.3-2 in Technical Appendix M, Socioeconomics.

The effects of increased output are beneficial to the businesses serving the offshore industry in the short- and long-term and are classified as a Class IV impact. Increased supply boat activity at Port Hueneme would exacerbate already crowded conditions at this location, possibly resulting in higher expenses in the marine transport industry if turnarond times for loading and unloading activities are increased.

IMPACTS OF AREA DEVELOPMENT BUILDOUT SCENARIO

The addition of another five platforms in the Point Arguello area would result in substantially higher support industry output requirements, $588.2 million in the year of peak activity (1991). Capacity constraints are evident under this scenario. The proposed expansion of Port Hueneme facilities is expected to be complete at this time providing some relief to the overcrowded conditions expected during the buildup of activities associated with offshore operations under this scenario. See Table 7.3-2 of Technical Appendix M, Socioeconomics, for a breakout by major industry.

In addition, increased pressure for support industry expansion in areas surrounding crew transport points (Santa Barbara Airport, Carpinteria and Ellwood piers) would be expected. Although not significantly affecting the regional outlook, this situation would increase the pressure for industrial land uses at these points and alter the intra-regional distribution of employment discussed earlier.

IMPACTS OF ALTERNATIVES

Regionwide effects of locating the proposed project at Point Conception and an offshore pipeline route would be negligible. In most instances, the effects will be the transfer of economic activity from one sector of the local economy to another, although slight variations in output and costs could be expected. For example, an alternative pipeline route from the platforms to the onshore processing facilities which would follow an offshore route rather than the proposed route would require more support from the marine transport sector with corresponding reductions in truck transportation activities.

An alternative processing facility location would have no material effect although locations requiring new facilities versus replacement of existing facilities would marginally increase temporary output in the construction sector.

Alternative crew and supply base locations would increase pressure for support industry expansion to areas surrounding these alternative locations. Although not significantly affecting the reginal outlook, this alternative would alter the intra-regional distribution of employment discussed earlier.

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*The output levels discussed are the estimates of the local direct and indirect output requirements of the various affected industries associated with the project. The industry estimates reflect the requirements of the industry as a whole, regionwide, and not that portion directly providing goods or services for the project themselves.

MITIGATION MEASURES

No direct environmental impacts of onshore support activities that require mitigation have been identified. Industrial expansion could lead indirectly to important impacts, however, and appropriate planning might offset those impacts. In particular, in the event of a supply base locating in Santa Barbara County, increased pressure for industrial expansion in the County should be anticipated.

The Gaviota area is proposed as a potential alternative supply base location. As such, appropriate sites for both commercial and industrial expansion should be identified, and planning for water and other needs should be undertaken. In addition to the Gaviota area, use of the Ellwood Pier, an undeveloped site at the mouth of the Santa Maria River, and the Port of San Luis have been discussed as potential supply base locations. In each case, planning for water and other needs should be undertaken.

5.9.10 Vista del Mar School

INTRODUCTION/METHODOLOGY

Impacts to Vista del Mar School learning environment are judged to be significant if they: 1) interrupt scheduled educational activities, 2) inhibit learning through disturbance of student attention to educational activities, or 3) are detrimental to the safety of students or staff at the school.

This section summarizes results of other analyses in this document, and assesses the likelihood that project impacts will affect the learning environment at Vista del Mar School.

IMPACT OF PROJECT COMPONENTS

The project impacts that would be the most significant to the Vista del Mar School would be related to noise, air quality, traffic, ground and surface water, visual aesthetics, and safety:

Noise -- Construction of the proposed pipeline, oil and gas processing facilities and the cogeneration power plant will result in significant noise impacts to the Vista del Mar School in the short term. Operation of the proposed facilities would result in noise levels below 60 dBA (less than existing levels) at the school property boundary. Thus, plant operation would not create a significant noise impact (See Section 5.8.2 for details.)

Air Quality -- Dust produced during construction would temporarily affect air quality at the school. The dust could adversely affect the health of students and staff if concentrations at the school were to exceed the State 24-hour particulate standard of 100 micrograms per cubic meter at some time during the construction period. In addition, odors would be potentially noticeable at the school during construction activities such as paving and painting. These odors would be unpleasant but short-lived.

Long-term air-quality impacts at the school due to the project would result primarily from emissions at the onshore processing facility. The most important impact would be the increase in 1-hour NO_2 concentrations. The maximum NO_2 levels could potentially exceed the California standard, which would constitute a significantly impact, and have health implications. (See Atmosphere, Section 5.2.)

During oil and gas processing, fugitive emissions of hydrogen sulfide and organic sulfur compounds could be released. Since the odor threshold for many of these compounds is very low, odors could disturb the learning environment of the school and is therefore judged significant but mitigable. (See Section 5.2 for details.)

<u>Traffic</u> -- Site construction traffic would use the Chevron at grade intersection and possibly the Vista del Mar intersection for access to the area between the school field and the SCE substation. Consequently, such traffic could create traffic conflicts with school related traffic. These conflicts would decrease once the overpass is constructed and operational.

<u>Visual Aesthetics</u> -- Construction activities and the appearance of processing facility features after construction would affect views from the Vista del Mar School. The long-term overall visual quality would be significantly affected.

The proposed screen plantings on the berm surrounding the reject tanks would appreciably reduce the visibility of the tanks. If the plantings become sufficiently dense and tall, the impact could be mitigated to negligible levels. However, depending upon the plant materials selected, full screening would not occur for 10 to 15 years. The impact would be significant in the short term, but mitigable in the long term, and would therefore be a Class II impact. (See Section 5.8.1 for details.)

<u>Safety</u> -- The risks to students and staff at the school are dominated by releases from the gas pipeline pig receiver. The hazard is principally due to releases that might ignite in the facility and then explode, causing injuries and fatalities at the school. The location of the school makes it particularly vulnerable to events involving the LPG and NGL storage tanks, and the truck loading of flammable materials. The major source of risk from the onshore gas pipeline arises from failures at the Gaviota end of the pipline, releasing flammable material that could then ignites, resulting in a fire, and in some cases, an explosion.

The predicted frequency of a major event (i.e., accident) at the Gaviota processing facility that would result in five fatalities is approximately one in eight years. (See System Safety and Reliability, Section 5.11-4.) A severe event resulting in 12 fatalities has the probability of occurring once in the 25-year life of the project. (See Section 5.11 for details.)

IMPACTS OF AREA DEVELOPMENT BUILDOUT SCENARIO

With the introduction of five more platforms in the Santa Maria Basin the impacts on the Vista del Mar School will be no different from those associated with the proposed project.

IMPACTS OF ALTERNATIVES

Onshore Pipelines

The installation of the oil and gas pipelines offshore rather than onshore would reduce the adverse short-term noise and visual impacts of construction. The duration of the impacts would be significantly shorter under the offshore alternative, possibly limited to one or two days as pipeline construction concludes at Gaviota.

Processing Facilities

The alternative site proposed at Point Conception would be preferable to the proposed Gaviota location.

MITIGATION MEASURES

Three distinct options are available for mitigating the project's impacts on the learning environment at Vista del Mar School. In order of preference, as stated by the school administrator [Kelly, 1984], they are: 1) locating the project's onshore facilities at locations other than the proposed site; 2) a "scaling back" of the onshore facilities and/or the institution of adequate controls to insure safe coexistence between the school and the facilities at the proposed site; and 3) relocating the school to another site (the "last option" according to Kelly). These are discussed in turn.

Alternative Project Location

This is the preferred option from the school's standpoint as it maintains most environmental conditions at the school site at current levels.

Safe Coexistence

Measures to mitigate the construction and operation impacts of the project on visual quality, noise, air quality, and safety are discussed in their respective sections. These mitigations would be insufficient to reduce the impact on the learning environment to an insignificant level or to allow for the safe coexistence of the school and the project.

School Relocation

Chevron has agreed to relocate the school to one of three new sites far enough away to insure safety from project activities, if school relocation is deemed necessary [Kelly, 1984]. The search for such sites is believed to focus on properties east of the current location, as properties to the west are generally less available.

Besides the inconvenience, disorientation, and sentimental trauma associated with moving the school from a site which it has occupied for nearly sixty years, there are three key issues concerning the implementation of this measure:

1) the timing of such a move with respect to school and project construction as well as the schedule of school sessions;
2) the quality of the new site and of the new school itself; and
3) the location of the new site with respect to the project and to the residences of students and staff.

Timing -- New school construction would have to be completed before classes begin at the new site, and project construction would have to be delayed until that time also, to fully mitigate constuction impacts on the learning environment. It would also be most desirable if the move took place during a school vacation, as that would be a lesser interruption to the staff's activities and would amount to less disruption of student learning.

Quality -- The school's current site affords beautiful ocean and mountain views, and the setting is generally peaceful. The buildings themselves are old but stylish, and the facilities as a whole represent an elementary alma mater of which many community residents are very proud.

A new school at a new site must be of at least equal quality (in terms of structural integrity as well as aesthetic appeal) to the current one, to be considered an appropriate mitigation.

Location -- The school is presently located in the center of a long school district. About half (38) of the students and two staff members presently commute from the west, and the rest (36) of the students and six staff members commute from the east. This nearly equivalent distribution of commuters on either side of the school provides a great deal of leeway in terms of the travel time impact of a new location. That is, whereas 5 minute move to the east would increase travel time for about half of them, it would decrease travel time for the rest. It does not seem likely, therefore, that enrollment levels should appreciably decrease solely on the basis of travel time in the event of a new school location.

Students living at the extremes of the district, however, are impacted the greatest by a move in either direction. In other words, whereas an equally efficient distribution of travel times can be maintained by moving the school elsewhere in the linear corridor of Highways 101 and 1, the equitable dsitribution afforded by the school's current location could not be maintained.

There is a serious tradeoff as a result, between the need to locate the school a great enough distance from potential hazards of the project and the need to retain the shortest possible commute for the students who must travel the greatest distances.

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5.10 OTHER USES

Five other elements of environmental importance are addressed in this section:

- Commercial Fishing and Kelp Harvest
- Transportation
- Military Activities
- Recreation
- Coastal Land Use and Ownership

5.10.1 Commercial Fishing and Kelp Harvest

INTRODUCTION/METHODOLOGY

Impacts on commercial fishing and kelp harvest 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.

- South Coast kelp beds, including kelp bed 31 off Gaviota, are assumed to be in a state of active recovery from 1983 storm damage by 1985, and subject to commercial harvest thereafter.

- Projects were analyzed as proposed by the applicants, 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 applicants.

A physical change is considered a regionally significant environmental impact if it is judged likely to:

- Change the catch of 10 percent or more of the fishermen in the Study Region by 10 percent or more during a period of high productivity for the target fishery in at least one fishing season; or

- Change the ability to harvest 10 percent or more of the area available within the Study Region for any individual type of fishery during a period of high productivity for the target fishery in at least one fishing season; or

- Cause or substantially contribute to a 10 percent or greater change in annual income for fisheries-dependent businesses for at least one year.

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.

IMPACTS OF PROJECT COMPONENTS

Construction Impacts

Construction of the proposed platforms and associated offshore pipelines would, in combination, pre-empt between 10 and 15 percent of the 27 square mile Study Region rockfish tow area generally acknowledged to be of greatest importance to the fishery at intervals over about a two-year period (See section 2.8, Proposed Project Schedule and Appendix N, Part One, Section 2.2.) This would be considered an impact of Class I regional significance. Early and continuing consultation with potentially affected fishermen has focused on the individual project components and has thus far not revealed major objections to the components (personal communication, M. Warhurst, MMS to C. Cooper, ADL, June, 1984). Other construction related impacts on fisheries are expected to be of regional insignificance, with the following exceptions:

- Combined construction-related pre-emption of halibut tow and set-gear fisheries would be expected to pre-empt somewhere between 5 and 10 percent of the area fished most heavily for this species but for periods of only a few weeks. This includes about 3 percent of the 7.5 mile tow area in Blocks 643 and 658 and about 20 percent of the combined set gear areas in Blocks 656, 657 and 658 (see Section 2.2 of Appendix N, Part One). Impacts would be of Class II significance if pre-emption was clustered during an open season when the resource was being heavily fished in the pre-empted area.

- If construction of the outfall occurred during the fall-winter open season for lobster, impacts on the set gear fishery for lobster, crab and finfish off Gaviota would likely be of Class II significance because of the area pre-emption noted immediately above. Construction is not presently scheduled for that period, although Chevron was still modifying the schedule as the DEIR/EIS was being finalized in June, 1984.

Construction impacts on kelp harvest are expected to be of regional insignificance, although, as discussed in Section 5.5.2, such impacts may be of Class II regional significance from the standpoint of marine biology due to holdfast damage by construction vessel anchoring and pipelaying.

Impacts of Normal Operations

Impacts of oxygen depletion, long-term accumulation of contaminants in sediments and, possibly, ammonia from the Gaviota outfall discharge could reduce local shellfish and/or finfish species populations of commercial importance and thereby have an impact of Class II significance on the set gear fishery which concentrates in this nearshore area of the South Coast.

Other operations of the proposed project components are generally expected to have regionally insignificant adverse impacts on the various commercial fisheries. Combined long-term fishing area pre-emptions by the platforms are estimated to be less than three percent of the available tow area. Impacts of Texaco's emergency crew boat traffic on the kelp bed off Ellwood would be additive to documented vessel-traffic-related reductions of kelp canopy in that area, and would be of Class II or more likely or Class III significance depending on the extent of restriction of the traffic to prescribed narrow travel corridors. Crew and supply boat traffic is proposed to be restricted to offshore areas that would minimize conflict with fishing vessels. 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.

Support vessel service requirements of the proposed project would compete with those of the fishing industry 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).

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 mariculture sites.

Impacts of Accidents and Catastrophic Events

Regionally significant Class I impacts can be expected to accompany any project-related offshore spills of 1,000 barrels or more, which have an overall probability of occurrence of about five percent over the project life. (See Appendix O.) The catastrophic failure of the future wet-oil reject tanks at the Gaviota processing facility in a major earthquake would cause Class II impacts with a probability of about one in 500 years. These classes of spill-related impacts are expected because of the likelihood of one or more of the following effects:

- Physical pre-emption of enough of the productive tow or set gear fishing areas for rockfish and/or halibut for long enough to reduce the catch of at least 10 percent of the fishermen by at least 10 percent.

- For tank failure at the Gaviota site, pre-emption of set gear fisheries for and/or resource populations of lobsters and/or crabs - sufficient to result in 10 percent or greater regional catch reduction in a season.

- In conjunction with either of the above, a reduction of 10 percent or more in annual income of fishermen or any of the smaller local purchasers of the catch, who have no readily available alternative sources of supply.

Spills of less than 1,000 barrels would be expected to have regionally insignificant adverse impacts.

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 be considered of Class II regional significance.

IMPACTS OF AREA STUDY DEVELOPMENT

The hypothetical additional platform locations involved in the Area Study are not of recognized regular importance to any of the region's fisheries. The construction and operations of five additional platforms inter-platform pipelines, and additional support vessel traffic in these general areas would be expected to have regionally insignificant (Class III and IV) impacts of the types described above for the proposed project components. The overall likelihood of oil spills is estimated to increase from about one in ten years to one in three or four years with the Area Study Development, with similar conditional spill trajectories. Therefore, the spill impacts of regional significance discussed above would become more likely.

IMPACTS OF ALTERNATIVES

The impacts of alternative project components on commercial fisheries would be expected to be of generally comparable extent and significance to those described above for analogous proposed project components, with the following exceptions:

- The no-project alternative would have no incremental impact on the fishery or kelp harvest.

- Construction of the alternative offshore pipeline would cross about 15 miles as opposed to about 3 miles of the Region's more important set gear fishing area with impacts of Class II regional significance.

- Spills from the alternative offshore pipeline route from Platform Hermosa to Gaviota would have equal probability of occurrence, but would be far more likely to have Class I impacts on the set gear fisheries off the coast between Point Conception and Gaviota than would spills from the proposed pipelines.

- The use of Ellwood or Gaviota for a supply base would introduce increased traffic by larger vessels into the kelp canopies offshore, with the potential for impacts of Class II regional significance on kelp harvest.

MITIGATION MEASURES

Tables in the Executive Summary systematically list mitigation measures for each of the Class I and II impacts on commercial fishing and kelp harvest.

Measures for the Proposed Projects

Several measures that are not currently incorporated in the projects could be implemented to reduce the expected impacts.

- To mitigate the preemption of halibut tow and set gear and lobster set gear fishing, construct the shore-to-3 mile (4.8 km) offshore segment of the Hermosa-to-shore pipeline in late summer/early fall and the produced-water outfall between late Spring and early Summer. This would separate the combined impacts on the halibut tow and set gear fisheries, and, off Gaviota, would correspond to the closed season for lobster.

- To mitigate the impact of emergency crew vessel traffic on fishing vessel activity, use the newly-agreed upon corridors shown in Appendix N Part One. The action would only partially mitigate Texaco crew boat impacts on the Ellwood kelp bed. More complete mitigation of those impacts could be achieved by specification on navigation charts and enforcement of a narrower corridor (on the order of 150' in width) through the bed, by use of Carpinteria as an alternative crew base site, as proposed by Chevron.

- To mitigate the impacts of the Gaviota outfall discharge, require forced oxidation of the wastewater prior to discharge and, if monitoring shows unacceptable contaminant accumulation in sediments, implement the reinjection alternative. If the outfall is used, the monitoring program for the produced water discharge described in Section 5.5.5 could be used to assure that kelp and other nearshore fishery resources are not adversely affected by changes in temperature, dissolved oxygen, or salinity (See details in Section 5.5.5.) If measurably adverse effects are detected, modify discharge composition or location as necessary to reduce effects to insignificant levels.

- To avoid the fishery impacts of catastrophic failure of the wet-oil reject tanks at Gaviota, increase the retention capacity of the surrounding dike to exceed the combined capacity of the tanks, and ensure the earthquake resistance of the dikes.

- To mitigate construction impacts on kelp bed 31 (off Gaviota) and on set gear fishing, minimize width of pipeline laying disturbance corridors through nearshore waters, particularly for vessel traffic corridors and by enforcing the use of narrow corridors. Monitoring recovery and, as necessary, replacing any kelp lost through damage to holdfasts or substrate during outfall construction activities at Gaviota to ensure establishment of an equivalent or greater number of kelp plants (see Section 5.5.5) would mitigate kelp bed impacts to insignificance.

- To partially mitigate the pre-emption of rockfish tow areas and along with the other measures mentioned above, mitigate to insignificance the impacts on dragging for other species, avoid overlapping construction schedules for the three proposed platforms and connecting pipelines, 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 proposed project components is uncertain.

- Prompt, adequate compensation for fishing-related revenue lost due to a major oil spill would mitigate the economic aspects of physical pre-emption of local fisheries.

- To minimize impacts to drag fishing, conduct post-construction side-scan sonar surveys and test trawl runs to locate debris or bottom alterations that could snag drag nets. Obstructions must be removed if feasible, in accordance with OCS Order #2.

Measures to Mitigate Area Development

Measures to reduce potential impacts of constructing and operating the additional platforms and connecting pipelines assumed for Area Development would be similar to those above or otherwise included in the proposed projects. Measures not listed above include the following:

- To minimize impacts to drag fishing, conduct post-construction surveys to locate debris or bottom alterations that could snag drag nets. MMS has indicated they will review mitigation on a site-specific basis for additional pipeline installations and will require such a survey in areas with potential fishing conflicts. [Personal Comm., M. Warhurst, MMS to ADL, May, 1984.] Obstructions should be removed if feasible, in accordance with OCS Order #2.

- In addition, other operators could be required, as proposed by the present applicants and OCS Order #2, to use a smooth pipeline construction and shroud any projections that could snag nets.

- To minimize vessel traffic interference with fishing activities, use existing crew vessel corridors from onshore bases out to the 30-fathom (55 m) depth contour where available; establish such corridors if none is available. Use the VTSS for supply vessel traffic from Port Hueneme to Point Conception.

Measures Applicable to Alternatives

Since the alternatives that could affect commercial fishing involve different outfall and pipeline locations, those measures listed for the proposed projects that apply to the outfall and pipeline construction would also apply for the alternatives. Support vessel corridor widths, however, would need to be no wider than 150 feet (61 m) at Ellwood and/or Gaviota. One additional measure would be to place the produced water outfall and the nearshore segment of the alternate pipeline to shore within a common corridor to minimize disturbance to kelp and set gear fishing. Avoidance of supply basing at Gaviota or near Ellwood would likely limit effects of support vessel traffic on kelp harvesting to Class III, insignificant levels.

5.10.2 Transportation

In the paragraphs below the impact of the proposed project, the area development buildout and project alternatives are described, as well as mitigation measures.

ONSHORE TRANSPORTATION

Introduction

This section addresses the potential impacts on vehicular traffic associated with the proposed project. Attention is focused primarily on roadway and intersection conditions in Santa Barbara County with some consideration of traffic-related conditions near Port Hueneme in Ventura County.

The analysis is based on a number of assumptions:

Impact Generators - The major impact has been assumed to come from worker commuter traffic and from truck traffic associated with material deliveries (principally for construction), and with shipment of recovered natural gas liquid (NGL), liquefied petroleum gas (LPG), and sulfur from the onshore processing facilities at Gaviota.

Trips and Trip Ends - A trip is defined as "a single or one-direction vehicle movement with either the origin or destination (exiting or entering) inside the study site." Trip ends are "the total of all trips entering plus all trips leaving a designated land use or building type over a given period of time" [ITE, 1979].

Worker Categories - For the purposes of this analysis the project workers are divided into four broad categories:

- All offshore workers other than supply boat personnel
- Port Hueneme supply boat personnel
- Onshore pipeline construction workers
- Onshore oil and gas facility construction and operation workers

Impact Locations - The determination of locations at which project-induced impacts on traffic will occur was guided by the sites used for: 1) onshore construction and staging, 2) supply boat loading, 3) offshore crew transport, 4) onshore oil and gas processing, 5) crude oil loading for refinery destinations and 6) worker residences. Roadways, parking facilities, and intersections in and around these sites as well as major roadways between them will experience traffic impacts. The specific locations at which project activities occur are:

- Onshore Construction: Chevron's Gaviota site and Point Conception to Gaviota to Las Flores pipeline route
- Supply Boat Harbor and Dock Facility: Port Hueneme
- Offshore Crew Transport Loading Site: Santa Barbara Airport, (Ellwood and Carpinteria piers as backup)
- Oil and Gas Processing: Chevron's Gaviota site
- Crude Oil Loading: Getty's Gaviota site or Las Flores Canyon
- Work Residences: Santa Barbara, Ventura, and San Luis Opispo counties

Methodology

Potential impacts have been analyzed in terms of the change 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 the maximum traffic they can accommodate, or in terms of the availability of gaps in interfering traffic and the times required to negotiate them.*

The concept of LOS provides a qualitative measure of such traffic characteristics as: speed and travel time, traffic interruptions, freedom to maneuver, driver comfort and convenience, safety, and vehicle operating costs.

Five levels of service have been established, designated A through E, to measure the relative level of traffic service in terms of driver satisfaction. This measure of driver satisfaction represents a range, the extreme of which is defined by an upper volume limit and a lower speed limit. As defined, a level of service valued at A implies a "best" condition, while a value of E refers to a "worst" condition.

The policy statement in the Regional Transportation Plans (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 LOS. D

*The analysis of vehicular parking is based on a comparison of the space provided for project vehicle parking and that space normally considered acceptable for these vehicles.

For a detailed discussion of the methodology used to measure impacts see Technical Appendix N, Part 4.

To assess the change in traffic conditions resulting from the introduction of the project, the following matrix was used:

		LEVEL OF SERVICE WITH PROJECT				
		A	B	C	D	E
Baseline Level of Service	A	U	U	Ad	S	S
	B	U	U	Ad	S	S
	C	BE	U	U	S	S
	D	BE	BE	BE	Ad	S
	E	BE	BE	BE	BE	Ad

Where:

S - denotes an unavoidable and significant impact
Ad - denotes an adverse but not significant impact
U - denotes an insignificant impact
BE - denotes a beneficial impact

Using this matrix, the following impact classes have been established:

- Unavoidable and significant impacts (S) are considered Class I if they cannot be mitigated and Class II otherwise; Adverse (Ad) and insignificant (U) are Class III; and Beneficial impacts are Class IV.

Impact of Project Components on Ground Transportation

This section presents the results of the analysis of traffic impacts of the proposed project by major local area.

Hollister Ranch and Bixby Ranch - The traffic and circulation impacts created in the ranch areas are associated exclusively with pipeline construction. This onshore activity will include that portion of the offshore pipeline construction taking place in the nearshore zone.

- Ranch Roads. The full extent to which the construction activity will use the ranch roads cannot be accurately described because the construction process is not established. The vehicles that will need to reach the full extent of the pipeline route include: worker vehicles, pipe delivery trucks, trenching machines, sideboom bulldozers, and compactors.

- Because of the uneven topography and distances, it is unlikely that delivery trucks and worker vehicles can reach all the work locations by following a haul road alongside the pipeline itself. Consequently, these vehicles are expected to travel on Hollister Ranch and Bixby Ranch roads.

- The ranch roads are not suitable for heavy truck and other equipment use, nor are they designed for two-way traffic. Thus, project traffic is likely to damage these roads considerably and inconvenience normal users. Residents of Hollister Ranch, for example, may need to stop at numerous locations to allow large project vehicles to pass. The problems would be confined to a relatively short period of several months and the road would be returned to its initial condition or a better one at the completion of the work. For these reasons, the projects impacts on the ranch roads are judged to be significant but short term and subject to mitigation (Class II).

Jalama Road/Route 1 Intersection - Workers and delivery trucks will reach the Point Conception area during pipeline construction via Jalama Road off Route 101. This traffic activity is considered to be an insignificant impact because the delays are of average duration and confined to primarily project workers (Class III).

Gaviota Beach State Park/U.S. 101 Intersection - The Hollister Ranch Road ties into the access road to Gaviota Beach State Park a short distance from U.S. 101. Consequently, if construction workers are busy in the eastern portion of Hollister Ranch, they would be likely to use this intersection. Assuming 60 percent of the workers must turn left onto U.S. 101 and a peak-hour flow in each direction on U.S. 101, then this intersection would operate at LOS E during the afternoon peak hour. This traffic impact is considered an significant impact in the area of Gaviota Beach State Park. However, the impact is relatively short lived and falls primarily on project workers and is therefore considered Class III.

Onshore Facility Intersection at U.S. 101 - The Chevron Gaviota facility will be a major activity center during both construction activities in 1985 (Phase I) and 1986 (Phase II) and years beyond when routine operations are under way. Traffic in and out of the facility would use the existing at-grade intersection on U.S. 101 until a planned overpass is built. It is unlikely that the overpass could be built prior to 1987. These are the years when during construction of the processing facility in 1985 and 1986 project-induced traffic levels will be the highest at the facility. By 1987 the facility will be fully operational and the number of workers at the site will be significantly reduced.

Through traffic on U.S. 101 is assumed to have the right-of-way at all times. Delays may be experienced by workers and truck drivers turning into or out of the facility from and to U.S. 101. Individuals turning either right or left onto U.S. 101 would experience unacceptable delays during peak hours (LOS E). The situation would not be appreciably improved for right-turners if an acceleration lane were added though this action would probably improve safety. The left-turning capacity onto U.S. 101 is so small that the intersection's LOS is likely to remain unacceptable (LOS E) until the freeway overpass is built.

Traffic delays would also be experienced by workers driving to the Gaviota facility. The impact in this case would fall on those driving south on U.S. 101 and turning left into the facility. This situation is not as critical as for left-turners leaving the facility.

Traffic conditions in the area of the onshore facility on U.S. 101 resulting from construction worker and supply vehicles are considered significant and not mitigable (Class I) during the period of facility construction. Building of the freeway overpass would eventually eliminate the impact for even those individuals. Consequently, the impact is classfied as important but subject to mitigation (Class II).

To this point only facility construction workers have been considered and the worst case has been found to correspond to workers leaving the facility. Several factors could act to make the situation worse. The inclusion of truck traffic with personnel shift-change traffic would be one aggravating factor. Another would be the use of the Gaviota facilities as a parking area for pipeline construction personnel. These individuals would intensify the traffic impacts and/or extend their duration on a typical work day. A third aggravating factor would be additional traffic in and out of the Getty facility on the opposite side of U.S. 101. Getty traffic would add to the conflicting traffic streams addressed in this analysis.

State Highway 246 and U.S. 101 Intersection -- The 246/101 intersection provide access to U.S. 101 from the communities of Solvang, Santa Rita, Santa Ynez, Lompos, as well as areas surrounding these communities. These communities are expected to be the home of some of the project construction and operations personnel. The change in traffic levels at this intersection resulting from the project is unlikely to reduce the level of service below C. Therefore, at most, the traffic impact resulting during construction and operation would be adverse but insignificant (Class III) but would be long term.

U.S. 101 Corridor - Project workers and delivery trucks traveling to work sites in the Gaviota area, to the Santa Barbara Airport, and (under special conditions), to the Carpinteria and Ellwood piers will travel along the U.S. 101 corridor through the Carpinteria/Santa Barbara/Goleta area.

Two improvements to U.S. 101 are likely to occur over the next five years: the Crosstown Freeway*, and widening of the Freeway from four to six lanes through portions of Santa Barbara and Goleta**. These improvements will not be completed prior to 1988. Because of this timing they will have no impact on the peak project traffic flows, which occur in 1985.

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*Work is expected to commence in 1986 or 1987 and would require approximately three years to complete (Santa Barbara County - Cities Planning Council, 1982)

**Work is expected to begin in 1986 - 1987 and take about one year to complete (Santa Barbara County - Cities Planning Council, 1982).

The incremental traffic related to the proposed project will impact this section of U.S. 101. This impact is judged to be adverse but not significant considering that these parts of U.S. 101 that are likely to experience this additional traffic are now operating at LOS D and E and will remain so in 1985. In 1987 and future years, the project's peak-hour traffic contribution to the U.S. 101 corridor will be substantially reduced. This is considered adverse because of the expected long-term congestion on U.S. 101 but not significant (Class III).

Ellwood Pier Area in Goleta - The Ellwood Pier would be used on an emergency basis by Texaco personnel if helicopter services are inadequate or unavailable because of weather, equipment difficulties, or emergencies. The frequency of emergency use is estimated at 15 to 20 percent of the time crew changes are required. As many as 40 to 50 individuals may need to be conveyed to the Ellwood Pier from the Santa Barbara Airport if helicopter operations are interrupted. Texaco has indicated that its personnel would travel by bus between these two locations. If this is the case, one or two buses would be adequate for the transfer function. It would be necessary for the bus to use the at-grade intersection on U.S. 101 to enter and leave the roadway leading to the pier.

The small impact on U.S. 101 traffic by one or two buses in the Ellwood Pier area in Goleta is considered insignificant (Class III). Buses probably would have no impact on streets and intersections near the airport. Texaco intends to bus workers from an inland parking area to Ellwood Pier.

Chevron Pier Area in Carpinteria - No plans exist to use the Chevron Pier as part of routine project operations. It would be used, like Ellwood Pier, on an emergency basis if the helicopter transport of offshore crews during project construction or operation were interrupted. Use of the Chevron Pier in Carpinteria would be limited to Chevron personnel and the duration of use is assumed to be short (i.e., several days in succession or less) and therefore of no significance (Class III).

Port Hueneme Area - The majority of all Port Hueneme traffic trips are assumed to occur at nonpeak hours. The daily total for these nonpeak trips ranges up to 64. Streets and intersections are normally operating at LOS A or B during this period and the additional traffic would not cause the LOS to change. Ample parking spaces appear to be available for the personal vehicles of crew members adjacent to the dock and plans are under way to expand the area available for supply boat operations at the harbor.

The peak-hour trips are so few in number (maximum of six) that no significance is attached to them. They would at most constitute an adverse impact at intersections operating at LOS D or E for short periods of time. Project related truck deliveries in the are of Port Hueneme can avoid the peak hours entirely and project-related 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 (Class III).

Pipeline Crossing of U.S. 101 - It will be necessary for pipeline crossing of U.S. 101 in the vicinity of the U.S. 101/Gaviota Beach State Park intersection in Gaviota. The proposed wet oil and sour gas pipelines will cross U.S. 101 in the vicinity of U.S. 101/Gaviota Beach and the proposed outfall line will cross U.S. 101 immediately south of the Chevron site.

The technique to be used for construction of these pipeline crossings has not been described. Consequently, it is not possible to estimate the extent of any traffic delays that may occur in that area. However, it is not expected that the pipeline crossing would cause any significant delay in traffic. Because the duration of this particular pipeline construction period would be short and the fact that drivers are unlikely to be delayed, the impact caused by the pipeline crossing work is expected to be adverse but not significant in the worst case (Class III).

Santa Barbara Airport

The Santa Barbara Airport Master Plan (PRC Speas, 1980) projects airport parking needs (long- and short-term) to grow from 524 in 1983 to 1,228 in 1998. These numbers are estimated based on the growth in parking needs observed during the 1970's decade. Specific consideration is not given to parking requirements generated by OCS activities in the Master Plan. It is assumed that project parking would add to the figures found in the master plan.

Parking is presently in very short supply at the airport. This situation could be seriously aggrevated by the addition of large numbers of offshore workers parking at the airport. Significant long-term impacts are likely unless other provisions are made (Class II).

Impact of Project Components on Air Transportation

The assessment of the impacts of the proposed projects on air transportation is presented in Section 5.11.

Impacts of Area Study Development

Traffic impacts associated with Area Development Buildout would occur in the vicinity of the Santa Barbara Airport and Port Hueneme. The latter location would support all of the supply boats traveling to the five platforms. No change in traffic activity is projected for the Gaviota area. The pipelines and processing facilities of the proposed project are designed and constructed of sufficient size to handle the field's total output.

Traffic flow in the vicinity of the Santa Barbara Airport is satisfactory during non-peak hours. Project-induced traffic during these periods would have adverse but not significant impacts (Class III).

Traffic flow on U.S. 101 is satisfactory during non-peak hours. Many of the offshore workers will use it to reach the airport. Flow on the freeway is expected to deteriorate even if planned widening and downtown intersection removal projects are completed in the second half of this decade. This deterioration is even expected to extend into what are normally not the peak hours because of tourist traffic.

Traffic impacts in the vicinity of Port Hueneme and Oxnard result from supply boat activity. Delivery trucks and boat personnel vehicles will travel on city streets in that area. This activity is assumed to occur at non-peak hours and is not judged to be significant although adverse impacts may occur in both the short- and long-term periods (Class III).

Impacts are also possible in the Ellwood and Carpinteria areas when it becomes necessary to transfer offshore crews by boat rather than helicopter. The traffic impact in the area of Ellwood and Carpinteria from offshore construction workers is considered insignificant and therefore Class III. Buses would be relied upon to move crews to the Carpinteria pier. Impacts are likely to be adverse in the area of Carpinteria but not significant (Class III).

Impacts of Alternatives

Oil And Gas Facility At Point Conception - The proposed project alternative is close to Point Conception, and reached via Jalama Road and Bixby Ranch Road off of Route 1 south of Lompoc. The number of peak-hour trips during simultaneous building of the pipeline and the facility would essentially double. The Jalama Road/Route 1 intersection was estimated previously to experience an unacceptable level of service. This situation would become worse with the location of the processing facility at Point Conception. The impact resulting from this project alternative is judged significant (Class II) during the construction phase. The small number of workers required during operations would still imply the impacts are adverse in the long term but not significant (Class III).

Subsea Pipeline From Platform Hermosa To Gaviota - Several beneficial aspects related to traffic flows would accrue as a result of this alternative compared to the proposed project, including:

- The adverse impacts on the Hollister and Bixby Ranch roads associated with the proposed project would be eliminated.

- Pipeline construction workers otherwise traveling on U.S. 101 and using at-grade intersections in the Gaviota area at peak hours would be eliminated. A smaller number of workers would instead travel during nonpeak hours to and from the Santa Barbara Airport.

Adverse impacts at other locations would be slightly aggravated by this alternative:

- An increased parking burden would be imposed on the Santa Barbara Airport.

- Truck and supply boat activity associated with pipeline construction would last longer and extend traffic impacts in the area of Port Hueneme.

Crew and Supply Base at Ellwood, Carpinteria or Gaviota - Consolidation of crew and supply boats at a new facility at Getty's Gaviota site might make it practical to transport offshore crews by boat instead of helicopter. If the Carpinteria and Ellwood locations were selected, it is assumed that offshore crews would continue to travel by helicopter from the Santa Barbara Airport.

Implementation of a crew and supply boat base at Gaviota prior to interchange construction would aggravate project-induced traffic conditions. The new interchange would preclude these impacts. Because of concerns related to trucks merging and other safety issues, the project impacts are judged adverse but not important (Class III). In the absence of a frontage road, the assignment of project traffic to Goleta area intersections would be highly speculative. Truck traffic would be confined to U.S. 101.

Project traffic in Carpinteria would travel on Dump Avenue, Carpinteria Avenue, Bailard Avenue, and Casitas Pass Road most often. Casitas Pass Road and Bailard Avenue both provide northbound and southbound on and off ramps to U.S. 101. The projected intersection congestion in Carpinteria is less than in the Goleta area. Furthermore, truck deliveries from the Los Angeles area would not need to pass through Santa Barbara or use at-grade intersections on U.S. 101. Traffic impacts in the area of Dump Avenue are considered adverse but not significant (Class III) over the long term.

Mitigation Measures

Proposed Project - The impacts associated with the proposed project 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.

Bus Offshore Workers. Buses would eliminate occasional adverse impacts on Carpinteria streets, intersections, and parking areas during period when helicopter transport is not used. It is estimated that 5-20 percent of all crew transfers to and from platforms would be by boat rather than helicopter.

Tunnel Under U.S. 101. The onshore oil and gas pipelines would cross U.S. 101 in the Gaviota area on their way from the Point Conception landfall to the processing facilities. Traffic flows would be briefly disrupted while this was being accomplished if conventional trenching practices are followed. No disruptions would occur if holes for the two pipes were augered beneath the roadway from a lateral position.

Increase Airport Parking - Additional areas within the airport grounds could be paved and set aside for long-term parking. The cost of new parking areas created by asphaltic paving over an aggregated basis on flat ground can be estimated. Each space would necessitate about 300 square feet of paved area (aisles included) at about $5 to $10 per square yard. Each space then costs about $100 in large numbers. If spaces are dedicated to OCS worker use, then the oil industry could fund improvement directly or through helicopter companies. The airport is located in a wetland, the remaining portions of which are protected from further filling the California Coastal Zone Management Act and City of Santa Barbara LCP policies.

Add Lanes to U.S. 101 - Vehicles moving on and off the northbound lanes of U.S. 101 at the Chevron Gaviota facility lack special provisions to do so. Deceleration and acceleration lanes could be added to this at-grade intersection. Widening the driveway entrance to the facility would also increase its effectiveness.

Accelerate Gaviota Overpass Construction - Chevron has committed to the construction of an overpass with on and offramps at its Gaviota facility. It is appropriate to immediately undertake actions to accomplish the planning and scheduling necessary prior to construction. This would greatly facilitate the movement of cars and trucks into and out of the facility, if the overpass were available as soon as possible.

Stagger Timing of Construction Work Shifts - The greatest number of trips generated by the project occur during the construction phase. Impacts during this period could be reduced if workmen were not on the U.S. 101 corridor during peak hours. This would be accomplished if the daily work shifts began at 7:30 a.m. or earlier and ended prior to 4:00 p.m. or after 5:30 p.m. Ten hour shifts from 7:30 to 6:00 p.m. or from 7:00 a.m. to 5:30 p.m. could accomplish the desired objective.

Bus Workers to Point Conception Work Sites - The Bixby and Hollister Ranch roads may experience hundreds of trips daily if pipeline constructon workers drive to the Point Conception landfall site or other points along the pipeline route. Adverse interactions with local residents on the same roads could be avoided if workmen were bused to their work sites. Parking areas could be located along Route 1 with buses making use of Jalama Beach Road. Route 1 is preferred as a site for parking rather than U.S. 101. Worker use of at-grade intersections somewhere along U.S. 101 is likely if parking areas are positioned along it. Workers using U.S. 101 can reach Route 1 by way of on and offramps and an overpass at Las Cruces.

Upgrade Bixby and Hollister Ranch Roads - Heavy and large construction and material delivery equipment will probably travel on the ranch roads during pipeline construction. Damage to the existing roadbed, culverts, and stream crossings is likely to result from this use. Improvements could be made prior to use rather than merely repairing damage once constructon is complete. This approach would eliminate delays and inconvenience imposed on ranch residents by road damage created otherwise during construction.

Schedule 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.

Area Study Development

No additional mitigation measures over and above those described for the proposed project are considered for the Area Study.

Project Alternative Mitigations

No additional mitigation measures over and above those described for the proposed projects are required for project alternatives.

OFFSHORE TRANSPORTATION

Introduction/Methodology

The Santa Barbara Channel is a major marine route for inbound and outbound vessel traffic servicing the ports of Los Angeles, Long Beach, and Port Hueneme. The current and projected marine traffic levels are considered to be light by comparison to other waterways and coastal routes servicing major port areas in the United States and in other parts of the world. This marine traffic is of interest in this analysis because of the possibilities of collisions with the platform structures and the potential consequences of such collisions.

For the proposed project, situations involving marine vessels in collision with platform structures are of primary interest. As with the other types of vessel casualties, no marine vessels have collided with (or rammed) offshore platform structures in the Santa Barbara Channel. Consequently, a probabilistic approach was used to estimate the likelihood of vessel-platform collisions. See Technical Appendix O for a detailed discussion of the methodology used.

Potential impacts from interim tank transport are not specifically addressed in this document; however, a thorough discussion of the related impacts of such tankering will be addressed in the Getty-Gaviota Consolidated Coast Facility EIR/EIS.

Impact of Project Components

Application of methods described in Technical Appendix O for ship traffic through the field of platforms and the Vessel Traffic Separation Scheme (VTSS) zones leads to an estimated probability of a transiting vessel colliding with one of the three platforms equal to once in every 100,000 year which is consdered rare Assuming an average of 33 ship transits per day, the likelihood of a ship-platform collision is estimated to be equal to once in every 250 years for each platform and is thus considered unlikely (See Table 5.11.-2 for Impact Probability/Frequency Classification in Technical Appendix O).

While the project is under construction, no support boats would be visiting the platforms. Furthermore, supply boats servicing the platforms will not berth alongside the platforms, but will tie up to off-platform anchor buoys and be off-loaded by crane booms. For these reasons, ship collisions with the platforms should be less likely than historical statistics suggest.

The likelihood that a very large ship impacting at high speed with sufficient energy to damage the platform structure itself is considered to be very low, of the order of 1 percent of the ship-platform collisions. In such a case, the likelihood that such an event would produce a catastrophic failure, with loss of the oil inventory on the platform together with any oil that might be released from oil pipelines connected to the platform, and the spillage of oil in the well system above the subsurface shutdown valves, is extremely small. Overall, therefore, the probability of such a catastrophic ship-platform failure is expected to be extremely unlikely (See Technical Appendix O for more details) and over the long term, the impact of the offshore platforms on ship traffic is considered insignificant (Class III).

Impacts of Area Development Buildout Scenario

The probability of ship collision because of the additional five platforms is similiar to that described for the proposed project.

Impacts of Alternatives

None of the proposed alternatives will impact marine transportation.

Mitigation Measures

Potential mitigation measures associated with the proposed project, area study development, and project alternatives are discussed in Section 5.11.

5.10.3 Military Impacts

Impacts

Military missiles and space vehicles (including future space shuttle missions) launched from the Western Space and Missile Center (WSMC) operated by the Vandenberg Air Force Base are expected to fly over portions of the Point Arguello Field. During such overflights, there is the potential, which is considered remote, that fragments or debris from aborted space vehicles or boosters may impact the offshore platforms. The likelihood of such an event is considered rare and improbable. Such events have been considered in the System Safety and Reliability aspects of the project, and are discussed in Section 4 and 5 and Addendum C of Technical Appendix O.

To further reduce potential hazards to the platform personnel over and above the structural design features that have been incorporated into the platform design, the Minerals Management Service (MMS) of the U.S. Department of the Interior has also incoporated certain stipulations into the leases for OCS areas. These stipulations, discussed in Addendum C of Technical Appendix O, control vessel traffic in designated areas, include "hold harmless" conditions and requirements, and reserve the right of the United States to suspend offshore operations temporarily for national security reasons. Prior to a vehicle launch, provisions for control of air and marine traffic, for stabilization of platform operations, and for personnel shelter and evacuation measures are coordinated by the WSMC, U.S. Coast Guard, MMS, and the platform operators. A Platform Contingency Plan delineating evacuation plans shelter operations for essential personnel, action timelines, and damage control procedures has been prepared for Platform Hermosa and approved by the MMS. A similar plan is being finalized for Platform Harvest and is in preparation for Platform Hidalgo.

The only possible effect that the proposed project could have on military operations in the area would be the inability of an offshore facility to comply with the lease stipulations in the event of the existence of a platform emergency condition during a proposed launch countdown. The likelihood of such a situation over the long term is considered to be extraordinary and therefore classified insignificant (Class III).

Existing procedures and policies are adquate to protect military activities in the project area.

MITIGATION MEASURES

No mitigation measures are proposed.

5.10.4 Recreation

INTRODUCTION/METHODOLOGY

A project as large and complex as that proposed has the potential of affecting the recreational resources in the surrounding area for numerous reasons: 1) increased visitor use of recreational facilities; 2) changes in the mix of desired forms of recreation because of in-migrant characteristics; 3) increased funding for state and local agencies because of increased taxes or license revenues; 4) construction of platforms, connecting pipelines and cables; 5) increased vessel traffic in the Channel from crew and supply boats; 6) discharges of drill muds and cuttings; 7) periodic small oil releases; 8) presence of platforms; 9) discharge of produced water, treated sewage, test water, and desalinization brine; 10) alteration of the sea floor (e.g., anchor scars, pipelines, and cuttings piles); and 11) major oil spills resulting from well blowouts, pipeline ruptures, or tanker accidents.

The potential impacts of the above on the recreational activities (swimming, diving, sunbathing, surfing, boating, beachcombing, fishing, camping, biking and hiking) along the coastal area of the Santa Barbara Channel region have been separated into direct effects (resulting directly from the physical introduction of project elements into the environment) and indirect effects (resulting from the project in a secondary way, i.e. increased recreational demands from pipeline, processing facility, and platform activities).

To determine the level of significance of individual impacts resulting from the proposed project the following steps were followed:

- First, proposed project activities which possess the potential for affecting recreational resouces were identified;

- Then, the potential consequences both with regard to the proposed project and the suggested alternative were identified;

- Next, criteria were developed to measure and evaluate the impact;

- Finally, based on the criteria selected, the level of significance of the individual impacts were estimated qualitatively and mapped into the significance classifications defined at the beginning of the Chapter.

Determination of the standards and criteria for impact evaluation was based on immediately available technical information regarding baseline conditions coupled with professional judgment concerning:

- The magnitude of the project effects relative to the quality, quantity, and availability of the recreational resources;

- The importance of the resource to other regional resources;

- The resiliency of the resource and its ability to recover from potential project effects; and

- The receptivity of the resource and associated project-related impacts to mitigation measures.

IMPACTS OF PROJECT COMPONENTS

Direct Impacts

Gaviota State Park - As proposed, the onshore pipeline route potentially will cross the northwest corner of Gaviota State Park. As such, there is the potential for a direct impact to the Park during the construction stage of the project due to use of Park access roads and use/disturbance of a pipeline corridor. This impact is considered to be significant and short term but mitigatable (Class II). Longer term during project operation, pipeline operations would have no effects on the Park.

Recreational Fishing - For recreational fishing, impact categories are defined by effects on game fish populations, accessibility to fishing grounds, and on individual fishermen.

Construction of the platforms and connecting pipelines and cables is expected to have no significant impacts on recreational or aesthetic enjoyment of fishing. Actual construction activities would take place offshore in areas that receive very little recreational fishing pressure from private boats or partyboats. Increased vessel traffic from Port Hueneme (supply boats) and "emergency" crew boats during the construction phase from Carpinteria could cause some inconvenience to private boat fishermen. Competition for harbor space and increased congestion at Port Hueneme are also possible. Shoreline fishing would not be affected. Overall the impact on recreational fishing and diving resulting from the installation of the offshore platforms is expected to be insignificant (Class III).

Drilling activities should have no long term direct significant impacts on recreational fishing (Class III). Indirect effects could result from toxic substances discharged in drill muds and cuttings, but are expected to be insignificant. The types of effects and sensitivity of various species are detailed in Section 5.5.

The effects of crew and supply boat traffic following completion of construction would continue, but at a reduced level as fewer trips will be necessary. Normal production from the offshore facilities would have no significant adverse effects on recreational fishing (Class III). After several years, the platforms may potentially benefit partyboat fishing by providing habitat for fish. The actual benefit, however, is difficult to measure, particulerly since the platforms would be a considerable distance offshore and far from areas where most recreational fishing occurs. The impact is therefore considered Class III.

A moderate oil spill (1,000 barrels) could affect recreational fishing: 1) by port closure, 2) by causing fishermen to avoid oil slick areas (i.e., a loss of fishing area) and 3) through acute toxic or sublethal effects on planktonic egg and larval stages or nearsurface adults of recreational species or their food supply. The latter types of effects are discussed in more detail in Section 5.5.

Port closure or persistence of oil slicks in areas heavily used by fishermen could have considerable economic impact on the partyboat industry as well as private boat fishing. Shoreline fishing would be affected where oil reached the shore and by the odor from offshore oil slicks. Thus, a moderate oil spill of 1,000 barrels could have a significant (Class I) effect on recreational fishing, but would be short lived. Publicity about the oil spill could cause additional negative economic effects by reducing future appeal of the area for fishing.

Coastal Beaches - The installation of the proposed offshore platforms and associated offshore pipeline facilities brings with them the possibility of offshore oil spills that could impact the shoreline recreational facilities in the area. Based on the analysis presented in the System Safety and Reliability section (Section 5.11), there is the possibility of offshore oil spills impacting recreational beaches. However, not all coastal beaches will be impacted equally. As indicated in Table 5.10-1, most of the actively used beaches are very unlikely to be impacted in any given year, or even over the expected lifetime of the proposed project. The most likely location for spill landfall is San Miguel Island/Castle Rock, with an estimated overall probability of 7.2 per thousand years. Assuming a 25-year project life, the likelihood of contamination during the project is about one chance in six. This estimate is for a spill of 100 barrels or more; a larger spill of 1,000 barrels or more is only about one-tenth as likely. The length of coastline heavily damaged by such spills is 0.1 miles and 0.8 miles, respectively. It should further be noted that these are worst-case estimates as they give no allowance for successful spill containment and/or cleanup.

Visual Resources - A critical element of the attractiveness and enjoyment of any recreational area is the scenic value and pleasure gained from the general ambience of the area. The evaluation of project-related impacts upon scenic visual resources in recreational resources involves the

Table 5.10-1

ESTIMATED OFFSHORE OIL SPILL IMPACT FREQUENCIES FOR ENVIRONMENTALLY SENSITIVE AREAS

Sensitive Area	Spills Oringinating Near: Platform Hermosa	Spills Oringinating Near: Landfall of the Pipeline
Sea Otter Range	*	*
Point Buchon/Morro Bay	*	*
Santa Ynez River Mouth	*	*
Government Point/Cojo Bay	0.0008/yr	0.00072/yr
Jalama Beach Park	0.0003/yr	0.00024/yr
South Coast Beaches		
Gaviota	*	*
Refugio	*	*
El Capitan	*	*
Naples	*	*
Goleta	*	*
San Miguel Island/Castle Rock	0.007/yr	0.00022/yr

*Estimated conditional probability of impact is less than 0.001, given a spill. Therefore, the frequency of reaching these areas is less than 0.0001 per year for spills originating near Platform Hermosa and less than 0.0000024 per year for spills originating near where the pipeline reaches shore.

Source: Arthur D. Little, Inc., taken from System Safety and Reliability Section: Table 5.11.-3.

potential exposure of the various project elements from representative viewing points. Such selected points are those where project components would be visible to the viewing public. The degree of visual intrusion is influenced by the distance from viewing points to the project elements, the duration of the activity type of structure, the existing quality of the existing field of view, and the individual perceptions of the viewer. A detailed analysis is found in The Technical Appendix L, Part 2: Visual Resources. The following is a brief highlight of the impact on the visual resources of the South Coast recreation lands resulting from the proposed project.

Such effects include an alteration of the existing land/seascape by the addition of new offshore oil platforms and a small increase in vessel traffic. It is anticipated these visual impacts would be long term and Class I at Jalama Beach, located approximately 10 miles from the proposed Point Arguello platforms. The platforms would be located west of Point Conception and south of Point Arguello. They would not be visible from U.S. Highway 101, South Coast public beaches east of Point Conception, or from public access areas north of Vandenberg Air Force Base.

Visual effects on recreation resources of the onshore pipeline routes from the landfall sites north of Point Conception to the Gaviota processing facility are anticipated to be significant but mitigable (Class III) principally due to the impact on visual conditions at stream and canyon crossings. Potentially visible elements of construction activities are anticipated to have a short term, significant impact where the pipeline corridor crosses Gaviota State Park and U.S. Highway 101 enroute to the proposed Gaviota processing facility. Such elements include equipment and material marshalled, stockpiled, and deployed in the vicinity of Gaviota Canyon, construction workers' vehicles parked in this area, stockpiled ditch excavation material, and workers/equipment associated with the construction of the processing facility. Further, because the pipeline would be placed on rather precipitious topography, the hillside trenching scars and any resulting erosion would also have significant (Class II) visual impacts, which would potentially be long term. The onshore processing facility at Getty Gaviota would not be visible to visitors at Gaviota State Park.

. Indirect Impacts on Recreational Facilities

The following discussion is, of necessity, generic with regard to potential impacts due to the difficulty of developing the necessary quantitative measures of the number of unauthorized campers on public and private lands and/or increased visitor demands on South Coast recreational facilities resulting from the project.

The reader is encouraged to also review the tourism portion of Section 5.9 for additional aggregate estimates of the impact on State and County Parks of the proposed project.

For indirect impacts on public recreation facilities, impact categories are defined by the effects of project related increased user demand and/or attendance. The standard used to assign levels of impact are based on the anticipated project related increase in visitor use exceeding the carrying capacity and necessitating major increases in facilities or restrictions on use. A Class I impact is defined as a projected 10 percent or greater increase in user demand/attendance that is not mitigable, or, a similar measurable reduction in quantity, quality, and availability for use by the users. The same criteria apply to Class II impacts. However, consultation with resource management agencies, resulting in the development and implementation of extensive mitigation measures would be able to reduce impacts to Class III (less than 10 percent increase in user demand/attendance in South Coast recreation areas). Class IV impacts would increase revenues from, for example, user fishing licenses and excise taxes.

The potential exists for impact on camping facilities at parks such as Gaviota, Refugio and El Capitan since in-migrant workers, particularly those associated with the construction of the Gaviota processing facility, may choose to use these as temporary residences. (See page 31 of Technical Appendix N, Part 3 for restrictions on length of stay at State Parks.) The relatively low availability of permanent housing in the areas adjacent to the project is another factor influencing the use of park camping facilities as temporary homes for project-related workers. It is possible that an in-migrant (and family) will be "forced" to seek temporary quarters at places such as the state park camping facilities, while they search for permanent residences.

Unlike the basically uncrowded day-use facilities, the campgrounds at these parks are already used to capacity during the summer months. Any additional demand for these facilities resulting from project related personnel has the potential for significant impact (Class II) in the long term. The extent to which these camping facilities are mitigatable depends on the housing mitigations enacted. In summary, the potential exists for some campgrounds to be strained by project-related in-migrants.

Other project related activities will bring a general decline in the publicly enjoyed recreational values and experience along the shoreline from Carpenteria to Gaviota Beach Park and at Jalama Beach (public access to and use of the shoreline from Gaviota Beach west to Jalama is prohibited by Hollister and Bixby Ranches). This is the stretch of shoreline where the greatest number of uses presently compete. As the industrial use increases, its intrusion into and impact upon the recreational ambience is unavoidable (Class I) in the long term. The noise impacts of helicopter flights over Goleta Beach Park and along the shoreline to platforms, sea boat noise and traffic activity, increased industry activity at piers adjacent to recreational beaches such as Haskells and Carpenteria State Beach, increased truck activity along primarily coastal access routes, new industrial visual elements on the ocean horizon and landside nearshore all adversely impact the existing recreational resource.

IMPACTS OF AREA STUDY DEVELOPMENT

The area buildout would have basic impact levels similar, but of a larger magnitude to the proposed project on South Coast recreational resources.

IMPACTS OF ALTERNATIVES

Alternative Pipeline Route

The proposed offshore pipeline from Hermosa to Gaviota would alleviate the impacts associated with view sheds as well as potential impacts to recreational resources in the vicinity of the Point Conception landfalls. However, pipe laying nearshore and in the vicinity of Gaviota State Park could temporarily impact the area's recreational pursuits that include diving, shoreline fishing, visual aesthetics, etc. These effects of platform construction and drilling would be the same as for the proposed action.

Point Conception Site

The construction of a processing facility in the vicinity of Point Conception would have a temporary and unimportant negative impact on nearshore recreational fishing and diving. The level of impact, which would be long term, would be the same as that of the proposed action (Class III). The effect of this alternative on nearby South Coast recreational facilities will depend on the specific staging area for construction and workforce requirements. The lack of specific in-migrant figures and preferences in addition to construction and operation schedules preclude visitor use projections with regard to increased user demand on vicinity recreation areas.

Alternatives for Crew and Supply

The use of Ellwood as a crew and supply base would require construction of a new base at Ellwood. Similarly use of the supply base at Carpinteria presumes the construction of a new facility. Such construction would have the potential for increased user pressure on nearby recreational beaches (e.g., Goleta and Haskells) and particularly those with overnight camping facilities (e.g., El Capitan).

MITIGATION MEASURES

Proposed Project

Mitigation for the pipeline easement across Gaviota State Beach Park would include revegetation and maintenance by Chevron to standards agreed to by the State. More specifically,

- All pipeline construction or State Park Property should be required to take place during the off season (September through March).

- During those periods of time that the State Parks are closed due to pipeline project construction, the Department of Parks and Recreation should be compensated for loss revenue.

The mitigation measures suggested in the visual area, Section 5.9.1, are also necessary to minimize the impact of the project on recreational resources. Furthermore, the specific mitigation measures presented in Section 5.11.6 dealing with system safety and reliability are also relevant.

Mitigation which will reduce the project's impact on the quality of the recreational experience along the shoreline are those which have the effect of offsetting those impacts by enhancing the amount, quality and aesthetic values of shoreline recreation. For example, opening the presently closed beach from Goleta to Jalama Beach to a limited public use would provide more shoreline to absorb the impacts and provide a relatively quiet and intrusion-free beach experience to offset what will become less so east of Gaviota. As a counterpart to this project-related "impact driven" mitigation, the County's Local Coastal Program contains policies which require the provision of access as a condition of project approval (See Land Use and Policy Consistency, Section 5.10.5). These policies were adopted by the County and the California Coastal Commission to be consistent with the requirement of the California Coastal Act to maximize public access along the State's shoreline.

Any combination of, or all of, the mitigations below would mitigate project-related (and cumulative scenario) impacts, and would appear to address Local Coastal Program policy requirements:

- Require project approved public easements providing beach access where it does not currently exist (e.g., Western LNG, Bixby Ranch, Hollister Ranch). The access corridor would be along the beach, pipeline route, road or railroad tracks where necessary to provide a continuous access.

- Require in-lieu fees sufficient to purchase and implement the coastal access program approved by the Coastal Commission for implementation by the coastal conservancy by legislative action for Hollister Ranch or on a route consistent with paths of common carriers (e.g., railroad, pipeline).

- Require land dedications for purposes of access and recreation at Point Conception and/or at Gaviota.

- Require recreation improvements in project area (e.g., campsites, hostels, coastal trails, bikeways).

- Improvements in other non-project areas (offsite).

- In conjunction with access, development of an Interpretive Center at Point Conception.

  -- Chumash Interpretive Center
  -- Oil Interpretive Center

Area Study Development

The suggested mitigation measures discussed in Secton 5.9.1 and under the proposed project portion of this section are appropriate for consideration for the area study development.

Project Alternatives

No additional mitigation measures other than those presented in the previous portions of this section are necessary.

5.10.5 Land Use/Existing Plan and Policies

INTRODUCTION

This section describes direct onsite impacts and indirect impacts on South Coast land uses by the proposed project and each of the project alternatives.

The project is divided into two essential components: 1) the proposed oil and gas processing facilities, and 2) the proposed pipeline from the OCS platforms to the processing facilities. See Chapter III for a complete description of the project. Only the onshore portion of the pipelines is discussed here.

IMPACTS OF PROJECT COMPONENTS OF PROPOSED PROJECT

Gaviota Facilities

Construction of the proposed oil and gas processing facilities at the Getty-Gaviota site would commit an existing 32 acres of open space to industrial use. Because of the existence of the gas processing facilities already on the site, and the adjoining power substation, the project could be considered to be a Class III impact (adverse but not significant) for land use. However, this heavy industrial use associated with the proposed project is not necessarily compatible with the nearby Vista del Mar School (400 to 700 feet). Therefore, land use impacts must be considered to be Class II (significant but mitigable) over the term during which the school is located at its present site. The project's relationship to the Vista del Mar School is discussed further in Section 5.9.

Point Conception to Gaviota Pipeline

This proposed 26.2-mile oil pipeline would run through mostly uninhabited area, with little effect on agriculture which is mostly grazing and about 10 percent cultivation. Construction of the pipeline could have many temporary adverse effects. Therefore, in the short term, there would be a Class I impact (significant and not mitigable) and long term a Class II impact (significant but mitigable).

Gaviota to Las Flores Canyon Pipeline

This optional 11.2-mile, dry-oil pipeline would adjoin the existing Pacific Lighting pipeline in relatively undeveloped areas. It would have the same potential hazard from accidential damage and safety drills.

However, like the existing pipeline, which it would adjoin, except in steep topography, there should be no noticeable effect after a few years. Therefore, the Gaviota to Las Flores Canyon pipeline would have a Class II impact (significant but mitigable) in the long run.

CONSISTENCY WITH LAND-USE PLANS AND POLICIES

Introduction

For a detailed discussion of project consistency with land-use plan and policies see Section 5.3.2 of Technical Appendix M. We summarize below critical elements.

Local Coastal Plan Policies

Following are the abbreviated LCP land-use related policy titles and a statement of the proposed project's consistency or inconsistency with them. Where the proposed project is anticipated to be inconsistent, proposed mitigation measures are outlined. In most cases, findings of consistency or inconsistency can be made only after reviewing the entire environmental analysis, including those related to water, erosion, air quality, and other impacts.

Policy 2-2: Integrity of Groundwater Basins and Sub-basins - The project is not consistent with this policy which protects the long term integrity of groundwater basins and sub-basins located wholly within the Coastal Zone. Mitigation would include reduced facility requirements and the installation of desalination equipment.

Policy 2-6: Adequacy of Public Services - Requires County to make a finding that adequate public services are available to serve the proposed projects and requires applicant to assume full responsibility for cost of extending services required as a result of the project. The direct project impact is expected to be consistent with Policy 2.6. However, indirect project impacts associated with increased population and economic activity in the area may not be consistent. Mitigation would include controlled housing development along the south coast, applicant could monitor levels of local services required to assure timeliness of available facilities.

Policy 2-11: Environmentally Sensitive Habitat - This policy requires avoidance of adverse impacts on habitat resources. The project pipeline corridor would cross many areas that are county-designated Environmentally Sensitive Habitat Areas. The project may not be consistent with this policy. Mitigation efforts would include replanting of sensitive flora (butterfly trees) in appropriate areas, monitor butterfly population, offsite replacement of habitat if relocation is possible, install barriers at culverts, perform site-specific grade modification minimization, erosion control, site restoration and monitoring.

Policy 3-2: Shoreline Alteration - This policy would require designing shoreline construction to preclude adverse impacts on the shoreline sand supply and interference with lateral beach access. The policy applies to the landfall pipeline near Point Conception and the proposed outfall pipeline at Getty-Gaviota. Because the pipelines that cross the beach would be placed a minimum of 3 feet below the surf zone the project would appear to be consistent with this policy.

Policy 3-7: Bluff Face Development - This policy precludes bluff face development with certain exceptions, including coastal dependent industry pipelines. Because the pipelines would be buried through the bluff, they could be considered consistent with this policy.

Policy 3-8: Geologic Hazards - This policy requires that building and grading permits be reviewed for threats from, and impacts upon, geologic hazards. Assuming that appropriate and timely geological studies are made, and the project is appropriately designed, the project appears to be consistent with this policy.

Policy 3-12: Contribution to Flood Hazard - Because the proposed pipelines of Options A and B would lie within 50 feet of the creek (dry) in Corral Canyon (for at least a portion of their lengths) this policy would require that the pipeline development plans be reviewed by the County Flood Control Agency to assure that the project does not contribute to flood hazards or lend to expenditure of public funds for flood works. Additional mitigation would be collection of runoff and divert to site runoff discharge point. Assuming these procedures and criteria are followed, the development of the pipeline would appear to be consistent with this policy.

Policies 3-13 and 3-14: Minimization of Cut and Fill Operations - These policies "apply to all construction and development ... which proposes to involve the movement of earth in excess of 50 cubic yards," and require minimum alteration of the natural terrain and preservation and native vegetation to the maximum extent feasible. To the extent feasible, the applicant proposes that grading will balance cut and fill to avoid soil importation or exportation (WESTEC Service, 1983:5.1.3.1). However, it is not clear whether the applicant's proposed grading plan represents the minimum alteration, therefore, th project may not be consistent with this policy.

Policies 3-16, 3-17 and 3-18: Grading Procedures - These policies would require sediment basins in conjunction with initial grading operations, revegetation of areas disturbed by grading, and control of surface water to prevent erosion. With implementation of the measures identified by applicant, the project appears to be consistent with the three subject coastal policies.

Policy 4-2: Landscaping Plans - This policy requires that landscaping plans be submitted to the county for approval for all industrial development within the Coastal Zone. Assuming implementation of appropriate landscaping plans, the project would appear to be consistent with this policy.

Policy 4-3: Structures in Rural Areas - This policy requires that for structures in rural areas, "the height scale and design ... shall be compatible with the natural environment, except where technical requirements dictate otherwise." The proposed oil and gas processing facilities include distillation/fractionation towers and safety flares that would fit this exception, and would therefore appear to be consistent with Policy 4-3.

Policy 4-8: Scenic Highway (pending) - Project may prejudice the County's petition to the State for designation of U.S. 101 as a scenic highway. Mitigation would include plantings to provide screening of the proposed project components.

Policy 6-6: Consolidation of Oil and Gas Facility Sites - This policy requires that, if new facilities are required, existing facilities shall be expanded unless opening of new sites would be less detrimental to the environment. Chevron's processing facilities have been sized with excess capacity. The project appears to be consistent with this policy of the LCP.

Policy 6-7: Petroleum Ordinance and "Statement of Policy Relative to the Location of Onshore Facilities - Project consistency with this LCP policy is discussed under County Oil and Gas Facility Location Policy.

Policy 6-8: Crude Oil Transportation Pipeline - This policy would require pipeline transshipment of crude oil to refineries in lieu of tanker shipment if such pipeline is determined (by the County) to be "technically and economically feasible." Applicants commit to use a crude oil pipeline to Los Angeles when constructed makes project appear to be consistent with this policy.

Policy 6-9: Emergency Response Plans - This policy of the LCP requires the preparation of an emergency response plan to deal with potential hydrocarbon leaks and fires. The project would appear to be consistent with this LCP Policy.

Policy 6-10: Petroleum Ordinance and Locational Policy - This policy incorporates all relative portions of the County Zoning Ordinance (Article 3, Division 8), the County Petroleum Ordinance (No. 2795), and the County Oil and Gas Facility Location Policy into the local coastal plan. These matters are discussed in the County Zoning Ordinance, and the County Oil and Gas Facility Location Policy sections. The project appears consistent with County Petroleum Ordinance 25-40 which requires fingerprinting of oil crossing the high tide line.

Policy 6-14: Survey of Coastal Resources that my be Impacted by Construction and Operation of an Onshore Pipeline - Based on the existing survey work performed by the applicant and that being performed as a result of this environmental report, this project would appear to be consistent with this policy.

Policy 6-15: Herbicides and Sidecasting Shall Not Be Used for Pipeline Construction - At the present time, it is not clear what the applicant proposed to do with excess soil that may be generated from construction of the proposed project, and therefore this project may not be consistent with this policy.

Policy 6-16: The Pipeline Shall be Sited/Constructed to Inhibit Erosion - This project does not appear to be consistent with this policy. Mitigation measures would include spanning of and access from tops of banks to streams where burial would alter habitat and realignment appears either difficult or offers no mitigation. Where streams are spanned, they should not be crossed by equipment and construction access should be achieved from previously distributed areas.

Policy 6-17: Avoid Important Coastal Resources - This policy requires the avoidance of important coastal resources including recreation, habitat and archaeological areas. The project appears to be inconsistent with this policy. Mitigation would include rerouting of proposed pipeline, revegetation of impacted habitat and institution of appropriate archaeological mitigation plans.

Policy 6-18: Isolate Pipeline Segments by Automatic Shutoff Valves - The project appears to be inconsistent with this policy. Mitigation would iclude the installation of automatic shutoff valves to isolate pipeline segments passing through important coastal resource areas.

Policy 6-19: Minimize the Impact of Oil Spills - This policy requires routing the proposed pipeline, given recreational, habitat and archaeological areas in a manner that minimizes the impact of oil spills. The applicant plans to have the ability to directly isolate, via automatic valves, each two-mile segment along the onshore pipeline. In addition, the applicant has prepared for an oil spill and emergency contingency plan for the Gaviota facility and onshore pipeline. The project appears to be consistent with this policy.

Policies 6-20 and 6-21: Electric Transmission Lines - These policies require that the routing of transmission lines in scenic areas be such that there would be minimum impacts on viewsheds, and that where vegetation must be removed, it be revegetated. Undergrounding of electrical utilities is also required in important scenic areas where it is technically and economically feasible. The project would appear to be consistent with these policies.

Policy 6-22: Use of Existing Piers - This policy gives precedence to be continued use of existing piers, their upgrading and expansion on adjacent sites over construction of new facilities. The policy applies to both Carpinteria and Ellwood Piers because of continued use of Ellwood Pier for crewboats. Continued use of both piers appears to be consistent with this policy.

Policies 7-2 and 7-3: Access to Shoreline and Coastal Dependent Recreation - These policies require that vertical access to beach areas be provided, unless a more suitable public access is available. Public access to the beach area below Getty-Gaviota is aleady in place from Gaviota State Beach. However, the project does not provide for lateral vertical access and is therefore considered inconsistent. Mitigation would include allowing public easements for beach access where it does not currently exist, and land dedication for purposes of access at Point Conception and/or Gaviota.

Policy 7-25: Coastal Access Trails - This policy requires that easements for coastal access trails be included as a condition of approval of a project on which a trail crossing is proposed. The policy applies to because the outfall pipeline would cross a bicycle trail south of Highway 101. The project appears to be consistent with this policy because an easement for a bike trail in that area already exists.

Policy 9-1: This policy has two requirements. The first is that prior to the issuance of a development permit the project be found to be in conformity with the habitat protection policies of the LCP. Such a finding is to be made by the appropriate decision making bodies utilizing the information presented in this EIR/S. The second requirement, that all development plans grading plans, etc., show the precise locations of habitats potentially affected had not been compiled with at the time of filing the project application with the County.

Policy 9-14: Wetlands - This policy requires that new developments adjacent to our in close proximity to wetlands shall be compatible with the continuance of the habitat area. The project does not appear consistent with this policy. Mitigation would include field program to identify most sensitive areas; installation of block values and barriers at culverts and develop restoration program.

Policies 22 and 23: Butterfly Trees - This policy requires that Butterfly trees shall not be removed except where they pose a serious threat to life or property. Adjacent development shall be set back a minimum of 50 feet. The proposed project appears to be inconsistent with these policies. Mitigation would include replanting of Butterfly trees in appropriate lower-lying areas, monitor Butterfly population and raptor use at site for better understanding of impacts applicable to future projects.

Policy 25: Marine Mammal Rookeries and Hauling Grounds - This policy requires that marine mammal rookeries shall not be altered or disturbed industrial activities during the times of the year where such areas are in use for reproductive activities. The proposed project appears to be inconsistent with this policy. Mitigation would include pre-construction demarcation restricting vessel activities, consolidated mooring, and establishment of additional hard bottom features.

Policies 35 and 36: Native Plant Communities - These policies require that when site grading and development occurs, areas with significant amounts of native vegetation including oak trees be preserved. The proposed project appears to be inconsistent with these policies. Mitigations would include avoidance where possible. If no avoidance is possible, attempt to re-establish by a special restoration plan.

Policies 9-38, 9-40, 9-41 - As proposed, the project appears to be inconsistent with the above policies. The mitigations identified within the terrestrial biology impacts section of this EIR/S (Section 5.6) will provide the project with policy conformance.

Policies 10-1, 10-2, 10-3, 10-4 and 10-5: Archaeological and Historical Resources - These policies relate to: avoidance of development on significant cultural sites, mitigation measures, prohibition of artifact collection or destruction, and consultation with Native Americans where developments may impact significant archaeological or cultural sites. Significant impacts to cultural resource sites may occur, even though the applicant has declared that it will avoid all archaeological and historical resources. The project may not, however, be consistent with Policies 10-1 through 10-4. The project appears to be consistent with 10-5. With respect to Policies 10-1 through 10-4, additional field data collection and consultation with Native Americans is undertaken as part of this EIR/EIS. The project appears to be inconsistent with these policies.

Policy 11-1: Air Quality - This policy requires consistency with the provisions of Air Quality Attainment Plan in the Coastal Zone. The proposed project will be developed with a Permit to construct and an Authority to Operate issued by the APCD. Significant air quality impacts to the coastal zone do not appear evident and therefore the project appears consistent with this policy.

FINAL COASTAL COMMISSION STAFF RECOMMENDATION ON CONSISTENCY CERTIFICATION

In October of 1983, the California Coastal Commission staff presented, a final staff recommendation on the Chevron Point Arguello Development and Production Plan (DPP) consistency certification (California Coastal Commission, 26 October, 1983). The staff recommended that they object to Chevron's consistency certification for the DPP without prejudice. The staff agreed that many elements of the project appeared to be consistent with the California Coastal Management Plan. However, additional mitigation measures and information were needed. In making this recommendation the staff pointed out that most of the information needed would not be available to Chevron until after completion of the EIR/EIS. Therefore, the staff's recommendation for objection to the consistency certification was the result of Chevron having asked for such certification before all necessary data was available. The Commission acted on the certification as recommended in November 1983 (California Coastal Commission, 10 April 1984).

The staff cited seven major issues for which additional information was required:

Cumulative Impacts

No cumulative impacts were included in the DPP as required by Sections 30202(b) and 30250 of the Coastal Act. This information will be available in this EIR/EIS.

Crude Oil Transportation

The DPP includes no proposal to transship processed crude oil by pipeline nor does it demonstrate that tanker shipment would be less environmentally damaging than pipeline shipment. Chevron has agreed to transship by pipeline at least some processed crude if such a pipeline is constructed.

Marine Resources

Additional mitigations to impacts on marine species are feasible but not cited in the DPP. Included would be the narrowest possible subsea construction corridor. Also missing was information on impacts on water quality by discharge of produced hydrostatic test water and treater wastewater. These issues and possible mitigation measures are presented in this document.

Drilling Muds and Cuttings

The DPP requires additional information on mitigation measures for these potential pollutants. Chevron has proposed adopting additional feasible mitigations that would result from a special study of mitigations. This issue is discussed in this document.

Commercial Fishing

There would be at least temporary limitation of fishing activities when the supsea pipeline is constructed between Platform Hermosa and Point Conception. The staff felt that additional mitigation measures to impacts on fisheries were needed. They felt that transshipment by pipeline would relieve impacts on marine resources. Also, if the pipeline is found infeasible, a better location for the oil terminal could be found than the one proposed to be used at Gaviota because of impartant nearshore fisheries in that area.

Air Quality

Proposed mitigations are for new sources only. Insufficient information presently exists regarding whether necessary offsets would be available. Chevron has agreed to conduct an air quality modeling analysis.

Public Welfare

As proposed, the project would pose unacceptable risks to such areas as marine and coastal resources, national security, production of seafood, and clean air and water unless further mitigations are proposed. Potential project benefits could be outweighed by potential loss of other public benefits if the project is allowed to proceed before all necessary information is available to make a reasoned decision to allow the proposed development.

COUNTY COMPREHENSIVE PLAN POLICIES

While the local coastal plan takes precedent in setting land use policy for all project development within 3,000 ft. of the shoreline, the County Comprehensive Plan policies apply to all development inland from that point. Because all direct project impacts would fall within the coastal zone, comprehensive plan policies would not apply to those impacts.

GOLETA VALLEY POPULATION GROWTH

Policy 1: Expansion of Industry Relationship to Projected Growth - This policy requires that expansion of industry, "should be in line with projected population expansion." Baseline population projections and baseline population increases as well as projects impacts in the Goleta Planning Area during the first six year period are discussed below.

If no policies are actively pursued to limit population growth in the Goleta area, project-related population impacts would be significant. The population impacts resulting from the proposed projects in the Goleta Valley Planning Area in 1985 would be about 565 persone, or about 0.8 percent of the baseline population. While the estimated population impacts are roughly equal to the projected baseline population increases in 1986 and 1989, the former appear to much outweigh the latter in 1987 and 1988. These results indicate that there would be no room for other growth projected for the Goleta area. This does not appear to be consistent with stated planning goals. However, by 1995 and the year 2000 the project-induced population in the Goleta Valley Planning Area would have diminished to only about 15 persons and 14 persons, respectively.

COUNTY OIL AND GAS FACILITY LOCATION POLICY

The 1967 County Oil and Gas Facility Location Policy is intended to assure that the location of onshore oil facilities will protect what is stated to be the highest and best use of coastal land: residential, recreational, and scenic resources. The existing gas processing plant at Getty Gaviota was constructed in 1962, and was not subject to this policy.

Section A of the location policy states when and where the policy would apply. Sction B requires that oil or gas facilities be compatible with recreational, scenic, and residential resources, and Section C sets forth the definitions of four types of oil and gas handling facilities. Section D of the locational policy would permit no new oil and gas facilities within three miles of an existing facility; Section E favors expansion of existing facilities; and Section F requires consideration of appearance and impact on deveopment of surrounding areas. Section G of the policy sets forth specific standards related to noise, odor, and air pollution, visual appearance, lighting, traffic, grading, flood and erosion control, land and water pollution, public safety, and land use (zoning) control.

All of the A through G components of the location policy are now dealt with in the Coastal Zoning Ordinance, the Petroleum Ordinance, and Division 8 of Article 3 of the County Zoning Ordinance. Most of these issues would apply to the Chevron project. All of these issues have been addressed in this section, above, and need not be repeated here.

STATE LANDS COMMISSION POLICIES

On December 1, 1975, the California State Lands Commission adopted the report: Inventory of Unsurveyed State School Lands and Tide and Submerged Lands Possessing Significant Environmental Values. The purpose of the document was to inform the legislature of the general identification and classification of state school lands and tidelands, and to adopt policies necessary to assure permanent protection of such lands.

In the report, the Santa Barbara South Coast (seaward from the MHTL) from Gaviota to Coal Oil Point (excepting therfrom Naples Reef), offshore from the proposed site for the Getty Gaviota facilities, is designated as area 42-062-100. The area from Gaviota West to Point Conception offshore from most of the proposed pipeline route is designated as area 42-002-000. The state's evaluation of these tidelands and submerged lands place them in Use Class B, meaning limited use:

> "Areas in which one or more closely related dominant, significant environmental values is present. Limited use compatible with and non-consumptive of such values may be permitted." (Calif. State Lands Commission, December, 1975.

In adopting the report recommendation, the State Lands Commission found that identified portions of the South Coast have significant environmental values in the following elements:

Geological	Fishery (or Wildlife)
Biological	Wildlife Support
Endangered Species	Recreational

The Commission also adopted regulations intended to assure protection of these values. Included in these regulations is the following:

"4. The Commission will not allow sale, lease, or other use of significantly environmental land without:

- Finding that adequate provisions have been made for the permanent protection of the significantly environmental characteristics; or

- Finding that granting of the application will have no significant effect upon environmental characteristics" (Calif. State Lands Commission, December, 1975).

COUNTY LAND-USE ORDINANCES

This section discusses the four land-use permit applications required by the project and the applicability and consistency of the project with County land-use control ordinances.

Land Use Permits and Approvals Required by the Project

Four land use permits and approvals must be approved by the County before the proposed project could move forward. All applications have been filed. They are discussed below:

- Coastal Development Permit - Section 35-169 of the Coastal Zoning Ordinance requires that all major developments in the Coastal Zone obtain approval of a coastal development permit by the Planning Commission. Chevron requires a Coastal Development Plan for the oil and gas processing facilities and for the proposed onshore wet and dry crude oil, and gas pipelines.

- Local Coastal Program Amendment - Approval of an amendment to the Local Coastal Program is required for the portion of the Gervais property on which Chevron proposes to construct future rerun tanks.

- Rezone Application - This application would be applied for on the same 13 acres of Gervais property for which the Local Coastal Program Amendment is sought.

- Conditional Use Permit - This permit is required because the proposed Point Conception to Gaviota and Gaviota to Las Flores pipelines would cross many creeks designated as Environmentally Sensitive Habitat (ESH) areas.

Land Use Control Ordinances

Essentially four ordinances control land use and energy development in Santa Barbara County and they are:

- Article 3, Division 8 (Energy Facilities) of Zoning Ordinance - Article 3, Division 8, does not apply to the Chevron project because the project lies entirely within the Coastal Zone where the Coastal Zoning Ordinance supersedes it.

- County Petroleum Ordinance - The County Petroleum Ordinance is a permitting procedure ordinance. This appears inconsistent with Section 2540 of the County Petroleum Ordinance which requires fingerprinting of oil crossing the high tide line.

- Environmentally Sensitive Habitat (ESH) Overlay District - Section 35-97 of the Coastal Zoning Ordinance establishes regulations for areas designated in one of the ESH overlay districts. Section 35-97 applies to development standards for stream habitats. Pipelines are permitted within stream corridors when no other location/route is feasible.

- County Coastal Zoning Ordinance (CZO) - This ordinance, adopted in April of 1982, was prepared pursuant to Section 30500 of the California Coastal Act of 1976 for the area within the coastal zone (minimum of 3000 feet inland from the mean high tide line). The ordinance is designed to implement the Local Coastal Program plans and policy. All elements of the Chevron project would fall under the Coastal Zone Ordinance.

The following sections of the ordinance would apply to various project elements:

Section 35-59	Section 35-87.6
Section 35-61	Section 35-87.7
Section 35-65	Section 35-87.9
Section 35-66	Section 35-154
Section 35-67	Section 35-157
Section 35-69.3-8	Section 35-169.6
Section 35-87.3	Section 35-172.8
Section 35-87.3 subsection	Section 35-174.7

IMPACTS OF AREA STUDY DEVELOPMENT

The area buildout scenario assumes that all Santa Maria Basin production would be processed at the proposed Chevron processing facilities at Getty-Gaviota. Therefore, there would be no land use impacts other than those in the discussed under the proposed project.

The land-use impacts associated with the addition of five offshore platforms is not considered to increase the impact to the area beyond that already occurring because of the proposed project.

IMPACTS OF ALTERNATIVES

Alternative Processing Facilities Site (Point Conception)

As with the Getty-Gaviota site, construction of oil- and gas-processing facilites at the Point Conception site would also be a long-term commitment of existing open space to industrial use. In this case, however, no industrial uses exist on the site, although some oil storage tanks exist at Government Point, about 4,000 feet south. A processing facility at this location would be incompatible with the proposed Bixby Ranch clustered housing project in the same general area. Further, the present grazing of the project site and to some extent, the surrounding area, would cease. For these reasons of land use incompatibility, the processing facilities at the alternative (Point Conception) site are considered to be a significant and not mitigable impact of long term duration.

Offshore Pipeline Alternative

With this alternative, the wet-oil pipeline would run from Platform Hermosa, around Point Conception and easterly to Gaviota where it would come ashore on the Getty property south of Highway 101. Except for a brief construction period interruption of lateral beach access, it would have virtually no impact on land use. The impact level would be III adverse but not significant and of short term duration (Class III).

MITIGATION MEASURES

Land use related impacts associated with the proposed project can be partially mitigated by the following measures:

- Continuation of the Goleta water moratorium would reduce development housing availability in the Goleta area. Thus, even though several hundred persons may desire to live in the Goleta Valley during years of peak project impacts, fewer would be able to do so. This would allow currently stated plans regarding growth within available resources to be met. The moratorium policy would, however, continue the upward pressure on housing costs.

- Provision of temporary housing outside the South Coast area for month-to-month worker fluctuations would ease the greatest potential conflicts with tourism, recreational parks use, and other land uses.

- Revision of the proposed project to include multi-company co-used or co-located facilities would move the project in the direction fo the County's stated goals for avoiding proliferation and redundancy of facilities. Such mitigation would require the cooperation of other oil and gas producers.

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5.10 OTHER USES

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5.11 SYSTEM SAFETY AND RELIABILITY

A safety assessment has been conducted to quantify the risks of public injury or fatality, and of oil contamination to environmentally sensitive areas, arising from the proposed project. In this context, 'risk' is defined as 'the potential for realization of undesirable consequences arising from an event or activity'; as such, it has both a probabilistic component (the probability of the event occurring) and a deterministic component (the consequences of the event). Events which might only affect project employees or facilities were not a part of this assessment, unless they had the potential to escalate into more serious situations.

The principal steps in the assessment were:

1) to identify events which might lead to off-site impacts and then estimate their frequencies of occurrence,
2) to calculate possible release quantities of hazardous materials,
3) to calculate the harmful consequences of those releases, and
4) to combine the event frequencies and consequences to produce estimates of total risk.

Having calculated the risks for the proposed project, four additional steps were:

5) to suggest mitigation measures that might be adopted to reduce the risks,
6) to consider the spill contingency plans and platform evacuation/shelter contingency plans,
7) to consider the risk implications of alternative proposals for certain aspects of the project, and
8) to consider the risk implications of area development beyond the three platforms currently proposed.

The methodology and findings of each of these eight steps are briefly discussed in the following sections; more expansive details will be found in Technical Appendix O.

5.11.1 Assessment of System Failures and Accidental Events

Two complementary techniques were used to identify events that might lead to offsite impacts and to estimate the frequencies of occurrence of those events. For well blowouts, pipeline failures, and product transportation, the approach was to analyze historical accident data to predict events that might occur in the Point Arguello Field development project. This historical approach is valid where there is sufficient statistical information from activities similar to those proposed in this project to permit reliable estimates.

However, the process equipment proposed for the platforms and for the oil- and gas-processing facility is too complex for such a historical approach to be appropriate. Instead engineering analyses of the project-related systems were conducted as follows:

- Hazard identification. A critical examination was made of the preliminary piping and instrument diagrams, layouts, and process drawings to identify potentially hazardous deviations from normal conditions. Typical deviations would be caused by equipment failures -- such as a valve opening wide -- or by human error -- such as omitting to isolate an item of equipment before opening it up. Consideration was then given to safety equipment, such as shutdown systems, that might control the deviation automatically, as well as to information available to facility personnel that might warn them to take appropriate action. In addition, consideration was given to external events such as earthquakes, aircraft impact, military and space traffic hazards, and vessel collisions that might lead to rare hazards with large consequences.

- Fault-tree analysis. The various system failures and accidental events were displayed in the form of fault trees -- logical representations of the chains of events leading to particular undesired top events, such as oil spills or releases of flammable or toxic gas. A total of 30 fault trees were developed.

- Frequency estimation. Failure rate data were applied to the fault trees in order to estimate the frequencies of the top events. These failure rates were based either on information reported in the literature, or on estimates that combined information supplied by applicant sources with information from other sources. In some cases it proved necessary to use engineering judgment to modify the reported data to reflect more accurately the conditions anticipated in the applicants' proposed facilities.

OFFSHORE PLATFORMS

Oil spills from platforms will clearly be of concern. However, because all of the platforms will be located greater than 6.5 miles offshore, neither fires, explosions, nor toxic releases occurring there will have the potential to affect the public on shore directly.

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 probably the largest oil spill to date on the U.S. OCS. Since that date, improvements in regulatory requirements, training programs, equipment, and operating practices have greatly reduced the probability of a recurrence of that particular event. Even so, blowouts might occur during development of the Point Arguello Field. A review of historical data on gas and oil blowouts, both during the drilling phase and the production phase, was used to estimate the probability of an oil spill resulting from a blowout at any one of the three proposed platforms, during the first 10 years of the project when drilling will be occurring and/or wells producing under pressure. The predicted frequency of oil spills from blowouts is approximately 17 per thousand years (once in 60 years) for the three platforms, corresponding to a likely event as defined by the impact probability levels given in Table 5.11-2. This is a conservative estimate, based largely on U.S. offshore historical data, which does not give any allowance for significant improvements in recent years in the prevention of blowouts. Furthermore, the analyses later in this section demonstrate that many of the predicted spills would not impact the shoreline, because of their small magnitude and/or the spill trajectory resulting from prevailing winds and currents.

Engineering analyses of spillages from the process systems on the three platforms highlighted failures of major oil-containing vessels due to seismic events, marine impacts, or spontaneous failure, totalling 0.4 per thousand years (per three platforms) which is classified as an unlikely event; significant oil spillages through the platform produced-water systems, totalling 60 per thousand years (likely event); and significant oil spills due to maloperation or mechanical failure of oil pipeline pig launchers and receivers on the platforms, totalling 1.7 per million years (rare event).

External impacts on the three platforms that might cause partial or total destruction of the platform were identified as ship-platform collisions (6 per million years), aborted space missions (6 per million years), and seismic events (15 per million years): all of these are classified as rare events. The effects from air traffic, whether associated with the platforms or overflying the area, were considered negligible.

OFFSHORE AND ONSHORE PIPELINES

Failure modes for both offshore and onshore pipelines include external corrosion, external impact, mechanical defects, natural hazards, internal corrosion, and operating errors. Historical data indicate that the first three failure modes are the most significant.

A number of surveys have attempted to differentiate pipeline failures by offshore/onshore, product carried, diameter, etc., but only the latter proved significant (with the failure rate decreasing as the diameter increases). For this project, a failure rate of 1.6 per thousand mile-years was selected for the smaller pipelines (8-inch to 12-inch diameter) and 0.48 per thousand mile-years for lines in the 16-inch to 24-inch range.

In addition, the onshore lines will cross the south branch of the Santa Ynez fault. The analysis indicates that an appropriate failure rate for earthquake-induced damage at this location is about 0.1 per thousand pipeline-years.

The resulting pipeline failure rates are estimated to be:

Pipeline	Commodity	Length (miles)	Diameter (inches)	Overall Failure Rate
Harvest to Hermosa	Oil	3.2	12	5.1 per 1000 yrs
	Gas	3.2	8	5.1 per 1000 yrs
Hidalgo to Hermosa	Oil	5.4	16	2.6 per 1000 yrs
	Gas	5.4	10	8.6 per 1000 yrs
Hermosa to Gaviota	Oil	26.0*	24	13. per 1000 yrs
	Gas	26.0*	20	13. per 1000 yrs

*10 miles offshore and 16 miles onshore

Riser failures were treated separately, and the estimated failure rate is 7 per thousand riser-years.

In general, the probability of rupture or major leak has been taken as 10 percent of the total failure rate, except for earthquake-induced failure where this probability was assumed to be 50 percent.

Based on these estimates, a pipeline oil spill would occur about once in 50 years, and a pipeline gas spill about once in 38 years. Thus, spills of both oil and gas are likely to occur over the life of the project.

OIL- AND GAS-PROCESSING FACILITY

Because of the relatively close proximity of the public to the Gaviota facility, it was necessary to consider events leading to fires, explosions and toxic effects, as well as to oil spills. The analyses were conducted for the fully expanded facility, namely, for treating 250,000 B/D of wet oil and 120 MMSCF/D of sour gas.

Seventeen types of events were identified by the engineering analysis, typical ones being:

- 1 minute or 5 minute releases from oil pig receiver or launcher (0.46 per thousand years and 0.46 per million years, respectively);
- rupture of oil-containing pressure vessel (0.24 per thousand years);
- rupture of oil storage tank (0.12 per thousand years);
- sour gas release from gas pipeline pig receiver (15 per thousand years for 1 minute, 1.5 per million years for 5 minutes);
- condensate surge vessel ruptures (0.24 per thousand years);
- sour gas enters sales gas (0.18 per million years);
- toxic gas discharges from sulfur plant (4.4 per thousand years);

- molecular sieve dryer spills propane (0.5 per thousand years);
- LPG storage tank BLEVE (boiling liquid expanding vapor explosion) (56 per million years).

Apart from seismic events, which were considered separately for each key pressure vessel or storage tank, there were no significant external impacts.

TRANSPORTATION OF GAS BY-PRODUCTS

The accident events and the resulting releases of hazardous material associated with truck transportation of the propane, butane and NGL by-products from the processing facility at Gaviota to market destinations in Bakersfield and in the Los Angeles area were assessed using historical accident data. On that basis, the casualty rate was estimated to be 1.5 accidents per million vehicle-miles, of which 10 percent were assumed to spill the entire cargo and 15 percent to spill one-tenth of the cargo.

The resulting spill frequencies for full operation of the facility are:

	Spill Rates	
Material Transported	10% spill	100% spill
NGL	0.19/yr	0.13/yr
Propane	0.23/yr	0.15/yr
Butane	0.19/yr	0.13/yr

With the facility at peak production, it is estimated that the transportation of the gas by-products will result, on average, in four vehicle accidents per year, one of which will result in a significant spill.

5.11.2 Range of Possible Release Quantities

Two approaches were applied to quantify spill amounts and to ensure their validity for the particular facilities of concern:

- Historical data were used where the physics of the discharge phenomenon was poorly understood, or where an engineering analysis would have required data that were not readily available and could not be estimated without an extreme degree of uncertainty. Historical data were also used to confirm that the results of engineering analyses or estimates were credible from a historical perspective.

- Engineering analyses were used to consider key features and characteristics of the proposed systems in order to provide more accurate assessments of spill volumes or discharge rates.

OFFSHORE PLATFORMS

Consideration was first given to oil spills arising from blowouts. Based on historical data, the following spill size distributions were developed:

Spill Volume, bbl	Probability per Blowout
Up to 100	0.153
100 to 1,000	0.270
1,000 to 10,000	0.275
10,000 to 100,000	0.196
100,000 upwards	0.106

The engineering analysis focused on the specific equipment items. For example:

- Oil-water production separators on the platforms will contain free water, wet oil (80 percent oil and 20 percent water), and natural gas in the vapor space; it was assumed that rupture of the vessel would release a quantity of oil equivalent, on a dry basis, to one-third of the vessel volume.

- Spilling volumes from pig launchers or receivers were estimated by assuming release capacities equal to pipeline design capacities, adjusted for the 80 percent oil content in wet oil, with durations of 1, 5 or 10 minutes, as estimated in the fault-tree analysis.

- 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; thus, loss of Platform Hermosa, with both interplatform pipelines and the industry pipeline as potential spill sources, would result in a relatively large spill.

Typical estimates for major oil spills from platforms were:

- oil-containing vessels - 100 to 190 bbl oil (dry equivalent)
- oil pig launchers or receivers - 44 to 700 bbl oil
- produced water systems - 120 to 770 bbl oil
- complete platform loss - Hermosa 8,800 bbl oil
  Hidalgo 3,000 bbl oil
  Harvest 1,700 bbl oil

OFFSHORE PIPELINES

An engineering analysis was performed and checked against historical data. In the event of an oil pipeline rupturing, there will be early-time losses dominated by the continued pumping of oil until the break has been detected and all the pipeline pumps shut down; because of the length of pipelines from the platforms to Gaviota, which will delay the onset of flow discrepancy alarms, and the need for Gaviota then to request the platforms to shut down pumping, it is estimated that the reaction time will be around 10 minutes. This gives a spill of 1,400 bbl of dry oil for the main pipeline. Other early-time losses, due to compressibility and to the initial momentum of the oil, may be conservatively assumed to spill an equal amount, leading to a total of 2800 bbl of dry oil for the early-time losses.

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, undulations of the pipelines across the sea bed will lead to "intrusion traps" where lighter-than-water oil becomes trapped above water and prevents further oil release. It has been estimated that the worst case location for a subsea break would lead to an intrusion loss of 4,800 bbl of dry oil.

Thus, the maximum loss from a subsea pipeline break was assumed to be 7,600 bbl of dry oil. If, instead of a rupture, there were to be a major leak, approximated by 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. However, unless an early repair were possible, the pipeline might slowly lose up to 4,800 bbl of dry oil between intrusion traps; thus, the total spill would be similar to that from a rupture. In the event of a minor leak, historical data suggest that the spillage would be approximately 80 bbl of dry oil.

Two cases were considered for the offshore gas pipeline, first, a rupture of the 20-inch line and, second, a 2-inch diameter hole. In each case, it was assumed that the Point Conception isolation valve could be closed after 5 minutes. The results were insensitive to water depth, and predicted flowrates were:

	Gas Pipeline Release Flowrates	
Type of Failure	Maximum flowrate (lb/s)	Average flowrate over 10 mins. (lb/s)
Complete severence	7,300	1,700
2-inch diameter hole	37	35

ONSHORE PIPELINES

Since the Gaviota control center will be capable of directly activating isolation valves along the onshore pipeline route, it was estimated that oil or gas pipeline flows could be stopped within 5 minutes of a significant discharge.

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 a 2-mile valve interval, this is estimated to total 6100 bbl of dry oil. For a 5-mile interval, the total could be 13,200 bbl of dry oil. For a 2-inch diameter hole, the spill would be 4,900 bbl and for small leaks 80 bbl of dry oil.

Release rates from the onshore gas pipeline would be almost identical to those from the offshore gas pipeline.

Oil- and Gas-processing Facility

Engineering analyses for the processing facility used the approach previously described for the platforms, typical estimates being:

- oil pig receiver or launcher - 140 to 690 bbl oil (dry equivalent)
- oil-containing pressure vessel - 1,400 bbl oil
- oil storage tank - 7,500 to 60,000 bbl oil
- gas pipeline pig receiver - 78 tons sour gas in 1 minute from full release at 1294 kgls, or 3 tons in 1 minute from limited release at 52 kgls
- condensate surge vessel - 1,100 bbl condensate
- sour gas into sales gas - 3,500 ppm H_2S maximum
- toxic gas from sulfur plant - 1.3 to 2.7 lb/min H_2S
- molecular sieve dryer - 1400 gallons liquid propane
- LPG storage tank BLEVE - 90,000 gallons liquid propane

5.11.3 Major Hazards and Consequences

Having assessed the probability and magnitude of releases of hazardous materials, hazard models were used to estimate the extent of damage due to oil pollution, thermal radiation, explosions and toxic exposures. These models represent the state-of-the-art in hazard assessment capability. Even so, to make the mathematical treatment of these models workable, several idealizations and assumptions were employed, and these must not be overlooked in interpreting the results. Accordingly, the prediction of trends is accurate, although the exact numerical values may be less certain.

DAMAGE CRITERIA

Before using the models, it was necessary to define damage criteria for the various hazards:

- Oil spills will spread rapidly on water, simultaneously evaporating, forming oil droplets that are dispersed in the water column, and drifting under wind and surface current forces. Although the oil spill model calculated the percentages of any particular spill that would evaporate or be absorbed in the water column, the consequences have been addressed in earlier sections against air- and water-quality considerations. The length of a coastal stretch that is polluted by an oil slick washing ashore cannot readily be predicted on a theoretical basis. Based on assessments of major accidental oil spills, the criteria selected were that the landfall of 140 tons (approximately 890 bbl) of oil per mile will result in heavy pollution with 29 tons (180 bbl) of oil per mile causing moderate pollution.

- 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 were 1600 Btu/hr-ft for injury to 50 percent of the exposed public (corresponding to unbearable pain after 13 seconds and second-degree burns after 40 seconds) and 3200 Btu/hr-ft 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 by the skin after its temperature reaches 130°F -- an additional exposure of 7.0 Btu/ft was considered to result in injury and 14 Btu/ft in fatality.

- 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 were 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 (resulting from severe damage to buildings).

- 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, one-half the LFL was selected as the flammable dispersion criterion. Thirty percent of the people within the ignited vapor cloud were assumed to be fatalities and 70 percent were assumed to be injured. The dispersion of toxic vapors was measured against the 'immediately dangerous to life and health' (IDLH) criteria which are considered appropriate for short-term (30 minute) acute exposures. The resulting vapor dispersion hazard zone criteria used were:

Material	Flammable Concentration (Volume %)	Toxic Concentration (ppm)
Methane (natural gas)	2.50	-
Propane	1.05	20,000
Butane	0.95	10,000
Hydrogen sulfide	2.15	300
Sulfur dioxide	-	100

OIL SPILL HAZARDS

Many of the oil spill scenarios would occur over a short period of time -- typically a few minutes to 1 or 2 hours. In conducting the analysis, it was assumed that the entire volume of oil was spilled over a short period and could be treated as an instantaneous spill.

The size of oil slick that would be produced from a given spill will depend on:

- the proportion of the spill that evaporates (largely determined by the composition of the oil);
- the proportion of the spill dispersed into the water column by wave action (largely determined by the sea state);
- the breakup of a single slick into several slicklets (again largely determined by sea state).

Wave height and wind speed data from the Santa Barbara area were used to establish three representative sea states -- typical, rough and stormy. These were used to analyze the wave and wind effects on the various predicted spills. Examples of the results are:

Oil Spill Hazards

Scenario	Spill Volume (bbl)	Sea State	Maximum* % Evaporated	Maximum* % in Water Column	Maximum Contaminated Area Due to Slick Breaking (square miles)
Pig receiver at Hermosa (1-min spill)	44	typical	26	6	0.7
(10-min spill)	440	typical	27	13	6.6
Small blowout	100	typical	26	9	1.5
Severe blowout	100,000	typical	29	19	870
		rough	28	45	540
		stormy	27	60	200

*Maximum percentages over time period greater than 24 hours

An oil spill trajectory analysis was then performed to assess the probability that oil spills originating offshore would impact the coastline. This used a 'Monte Carlo' technique to relate the motion of oil slicks to prevailing wind and current conditions. Three representative spill locations were modelled:

1) at Platform Hermosa,
2) 2 miles offshore from the pipeline landfall, and
3) a location representative of future area buildout platform locations.

Some 5,000 trajectories were simulated for each location and repeated for the four seasons of the year, which were then combined to yield an annual average estimate of shoreline conditional impact probabilities. Because of its proximity to the shore, spill location 2 gave the highest probabilities, as shown in Figure 5.11-1. The environmentally sensitive areas include the shoreline from north of Point Sal to the Santa Barbara area, the westerly channel islands and the sea otter range offshore. With the exception of Jalama Beach, immediately north of Point Conception, with an impact probability of 30 percent per spill from location 2, and San Miguel Island, where the estimated impact probabilities per spill approach 10 percent, most other areas of

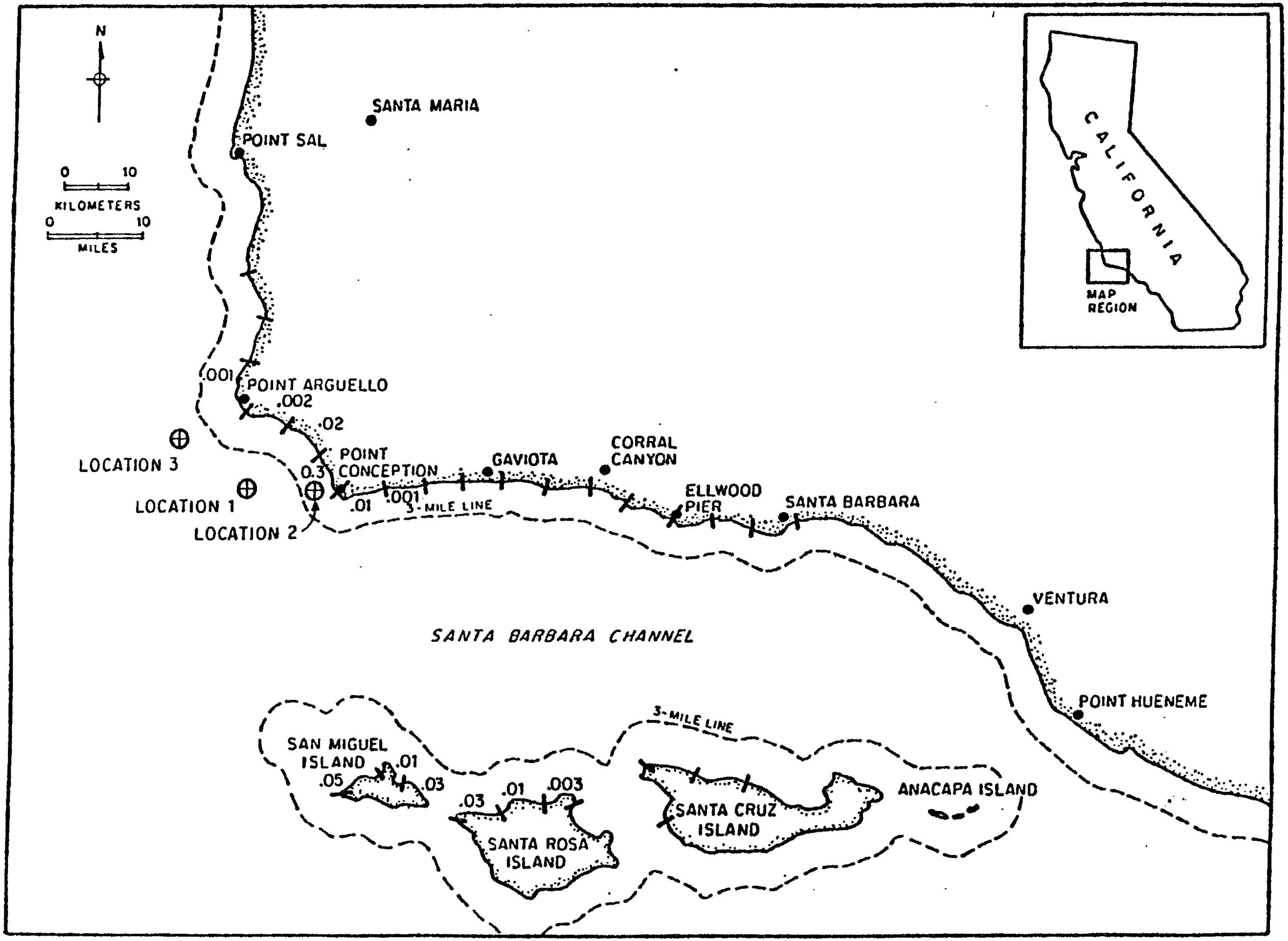


FIGURE 5.11-1

ESTIMATED ANNUAL CONDITIONAL PROBABILITIES OF LANDFALL FOR SPILL LOCATION 2 environmental concern have low impact probabilities of less than 0.1 percent per spill.

Coastline damage was then computed for various spill sizes by combining the results of the oil slick model with the trajectory analysis, as in the following examples presented below. A detailed discussion of these procedures are given in Section 6 of Technical Appendix O.

Scenario	Slick Diameter at the Time of Landfall (miles)	Length of Coastline Affected by Spill (miles)	
		Heavy Damage	Moderate Damage
100-bbl blowout at Hermosa	1.2	0.1	0.4
1,000-bbl blowout at Hermosa	3.8	0.8	4.1
100,000-bbl blowout at Hermosa	20	52	250
7,600-bbl pipeline spill 2 miles offshore	2.1	3.1	*

*Damage very localized because shore impact will occur before oil slick breaks up.

FIRE, EXPLOSION AND VAPOR DISPERSION HAZARDS

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:

- burning pool on land or water
- jet fire
- 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
- flammable vapor cloud dispersion without ignition, and, therefore, no hazard

For each release scenario, all of the relevant consequences were calculated using computerized hazard models; the potential hazard distances calculated for some of the more severe events are given in Table 5.11-1. These events are themselves unlikely to occur and, even then, there is a low probability of realizing the maximum hazard distances that require, for example, unfavorable weather conditions and ignition of a flammable cloud just as it reaches its maximum extent. Furthermore, certain of the events are mutually exclusive -- for example,

TABLE 5.11-1

POTENTIAL HAZARD DISTANCES FOR SEVERE EVENTS IN UNFAVORABLE CONDITIONS

Scenario	Material Released	Hazard	Hazard Distance (ft)** Fatality	Serious Injury
Gas pipeline break at Point Conception	1,700 lb/s sour gas	Radiation*	650	850
		Vapor fire#	19,000	-
		Toxic vapor+	13,000	-
NGL storage tank spill into sump	3,750 bbl	Radiation*	110	140
Propane storage tank rupture	90,000 gal	Fireball$^{\phi}$	720	1,100
		Explosion$^{\phi}$	990	3,800
		Vapor fire#	4,100	-
Gas pipeline pig receiver opened	78 tons total	Explosion$^{\phi}$	720	2,700
	1.3 tons/s sour gas	Vapor fire#	14,000	-
	37 lb/s H_2S	Toxic vapor+	2,000	-
NGL truck rupture	9,000 gal	Radiation*	260	340
Propane truck rupture	9,000 gal	Fireball$^{\phi}$	380	620
		Explosion$^{\phi}$	460	1,800
		Vapor fire#	1,700	-

*Distance from flame surface

#Distance to concentration of vapor in air equal to one-half of the lower flammable limit (LFL) under unfavorable dispersion conditions

+Distance to concentration equal to immediately dangerous to life and health (IDLH) levels prescribed by OSHA/NIOSH under unfavorable dispersion conditions

$^{\phi}$Distance from ignition point

**The probability that any one of these hazard distances would be realized is very low. For example, even if a large quantity of vapor were released, the resulting cloud would likely ignite long before it grew to its maximum theoretical size.

immediate ignition of a gas release would prevent subsequent flammable or toxic vapor dispersion -- and this was subsequently taken into account when computing the overall levels of risk.

5.11.4 Assessment of Risks

Once the probabilistic and deterministic components of risk had been developed (in Sections 5.11.1 and 5.11.3 respectively), the next step was to combine those components to give an overall measure of risk. In accordance with the format suggested by the CEQA guidelines, the System Safety and Reliability issues have been classified by the criticality and impact probability levels indicated in Table 5.11-2.

SHORELINE ENVIRONMENTAL RISKS

To analyze oil spill risks, all the relevant events in the fault trees were assigned to specific locations. All spills occurring at the Hermosa, Hidalgo or Harvest platforms, the interplatform pipelines, and the first half of the industry offshore pipeline were assumed to occur at the location of Platform Hermosa; spills from the remaining half of the industry offshore pipeline were assumed to occur at the location 2 miles offshore from the landfall.

The risk profile in Figure 5.11-2 provides a graphical representation of the probability with which various levels of oil spill are predicted to occur from all three platforms and all the project offshore oil pipelines.

Because of the effects of wind and currents, only a fraction of these oil spills would impact the shore and even fewer would contaminate environmentally sensitive locations. As indicated in Table 5.11-3, most of the sensitive areas are unlikely to be impacted over the expected lifetime of the proposed project. The most likely location for spill landfall is San Miguel Island/Castle Rock, with an estimated probability of 4.4 per thousand years. Assuming a 25-year project life, the probability of contamination during the project becomes 0.11, or 1 chance in 9. These estimates are for a spill of 100 barrels or more; a larger spill of 1,000 barrels or more is only about one-sixth as likely. The length of coastline heavily damaged by such spills was noted earlier as 0.1 miles and 0.8 miles, respectively.

It should be noted that these are impact estimates which do not include the potential for mitigation through the successful use of oil spill containment, cleanup, or chemical dispersion dispersants.

Onshore Oil Contamination

Oil spills on shore could arise from pipeline leaks and ruptures or from incidents at the Gaviota facility. The analysis indicates the following spill size distribution:

TABLE 5.11-2

CRITICALITY AND PROBABILITY CLASSIFICATIONS

(a) Criticality Classification

Accident Criticality	Description of Public Health Hazards and Oil Spill Consequences
Negligible	No significant risk to the public, with minor injuries at most. Oil spills limited to 10 bbl or less, with negligible potential for environmental damage.
Minor	Small level of public risk, with a few injuries, most of which are minor. Oil spills of between 10 and 1000 bbl, with potential for minor damage to environment.
Major	Major level of public risk with up to 10 severe injuries and fatalities. Oil spills of between 1000 and 10,000 bbl, with potential for major environmental damage.
Severe	Severe public risk with up to 100 severe injuries and fatalities. Oil spills of between 10,000 and 500,000 bbl with potential for severe environmental damage.
Disastrous	Disastrous public risk involving more than 100 severe injuries and fatalities. Oil spill quantities greater than 500,000 bbl with potential for irreversible, unmitigable environmental damage.

(b) Impact Probability/Frequency Classification

Type	Frequency per Year	Description
Extraordinary	Less than 10^{-6}	An event which has never occurred, but could occur.
Rare	Between 10^{-4} and 10^{-6}	An event which has occurred on a worldwide basis, but only a few times.
Unlikely	Between 10^{-2} and 10^{-4}	Events which are not predicted to occur during the project lifetime.
Likely	Between 10^{-2} and 1	Probably will occur during the project lifetime.
Frequent	Greater than One	Occurs more than once a year on the average.

FIGURE 5.11-2

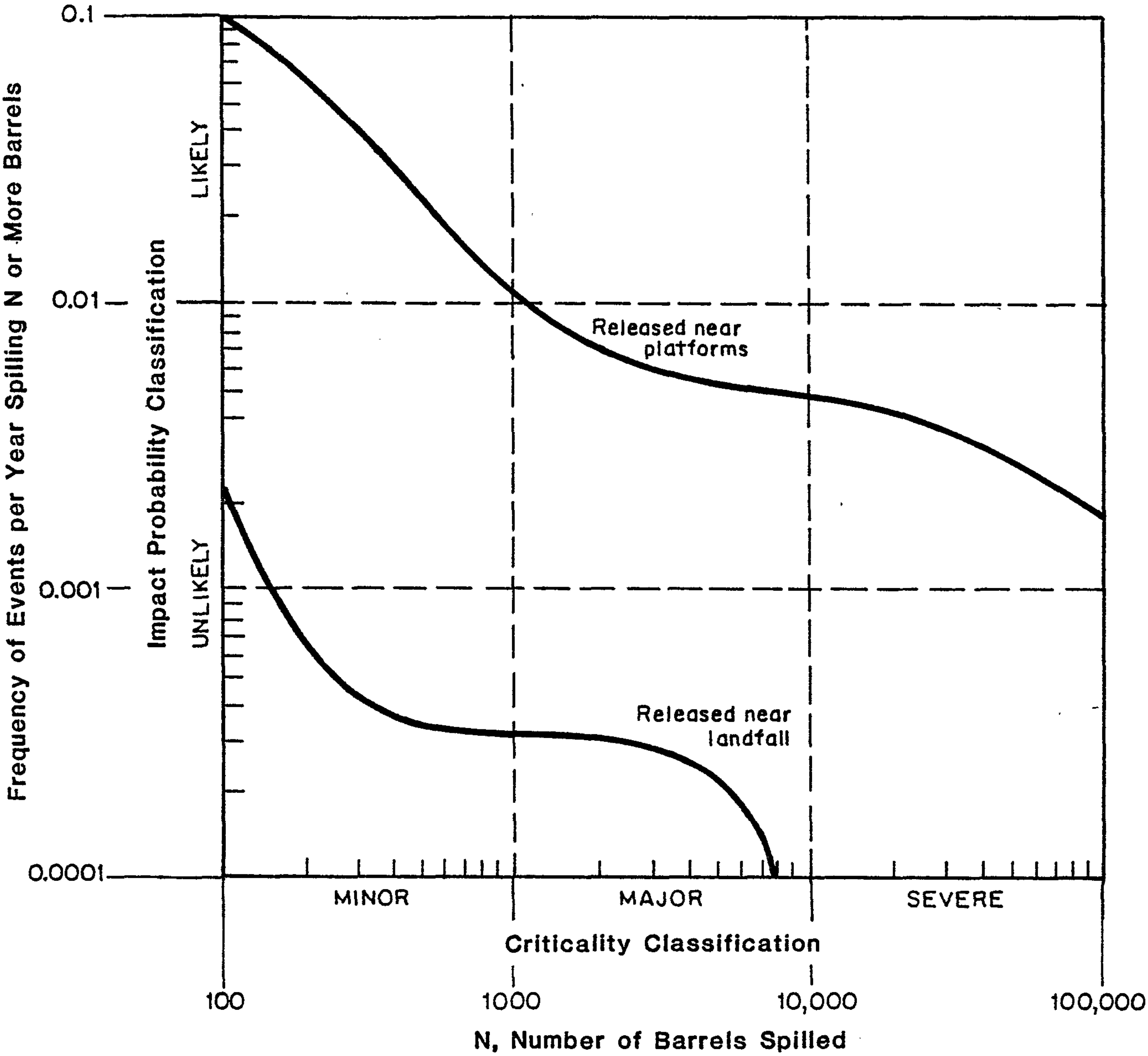


FIGURE 5.11-2 DISTRIBUTION OF OIL SPILLS - OFFSHORE

TABLE 5.11-3

ESTIMATED OFFSHORE OIL SPILL IMPACT FREQUENCIES FOR ENVIRONMENTALLY SENSITIVE AREAS

	Spills Originating Near	
Sensitive Area	Platform Hermosa	Landfall of the Pipeline
Sea Otter Range	*	*
Point Buchon/Morro Bay	*	*
Santa Ynez River Mouth	*	*
Jalama Beach Park	0.0008/yr	0.00072/yr
Government Point/Coho Bay	0.0003/yr	0.000024/yr
South Coast Beaches		
Gaviota	*	*
Refugio	*	*
El Capitan	*	*
Naples	*	*
Goleta	*	*
San Miguel Island/Castle Rock	0.007/yr	0.00022/yr

*Estimated conditional probability of impact is less than 0.001, given a spill. Therefore, the frequency of reaching these areas is less than 0.0001 per year for spills originating near Platform Hermosa and less than 0.0000024 per year for spills originating near where the pipeline reaches shore.

Spill Location	Spill Size (bbl)	Frequency
Gaviota	100 or more	1. per 1000 yrs
	1,000 or more	0.36 per 1000 yrs
	10,000 or more	0.12 per 1000 yrs
Onshore pipeline	100 or more	8. per 1000 yrs
	1,000 or more	1. per 1000 yrs
	10,000 or more	--

However, it is anticipated that the majority of onshore spills would either be contained or cleaned up such that contamination of ground or surface water would be negligible.

PUBLIC RISKS

While oil spills will pose a threat to the environment, they would be very unlikely to cause injury or death to any member of the public. Similarly, accidents at the platforms causing fires, explosions or toxic gas releases would be too distant to affect the public onshore. Therefore, the assessment of public risks focused on the onshore gas pipeline, the Gaviota facility, and the transportation of by-products:

- Onshore Gas Pipeline. Along the proposed route are several small populated regions that might be exposed to flammable or toxic concentrations of gas should a release occur nearby. Three representative release locations were used to estimate risks, the first being the initial mile of pipeline from the landfall; releases there might impact Jalama Beach. The second release location was midway through the Hollister Ranch and was typical of the next 13 miles of the line through a sparsely-populated area. The final location -- at the intersection of the pipeline and Route 101 -- could impact the highway, the roadside restaurant and gas station, or Gaviota Beach.

- Oil- and Gas-processing Facility. The main public groups at risk will comprise the 80 to 100 daytime occupants of the Vista del Mar Union School, together with an assumed total of 60 employees in the Getty facility.

- Transportation of Gas By-products. It has been assumed that approximately 20 percent of the products may be transported 170 miles to Bakersfield and the other 80 percent 140 miles to the Los Angeles area. Based on population densities along the various sections of the transportation routes, estimates were developed for overall frequencies of impacting the public for each route and for each gas by-product.

The risks were estimated by considering each accident event which posed a potential hazard to the public; determining the frequency of occurrence of these events; the types of possible hazards, the distances associated with these hazards (as given in Table 5.11-1, shown for unfavorable conditions), and the conditional probabilities of the various types of hazards; and aggregating the predicted outcomes in terms of potential fatalities and injuries at each public location. This analysis included consideration of such factors as: the population density at particular locations of interest and along the by-product transportation highway routes; the different products and their credible spill sizes; the likelihood of immediate ignition; the wind and atmospheric stability conditions affecting the dispersion of an unignited vapor cloud; ignition sources in the facility, on the highway, and in public locations and other populated areas; the likelihood of a vapor cloud igniting as it disperses; whether such ignition would be explosive; the percentage of the exposed population which would be protected, or if not, the likelihood of injuries or fatalities, and so on.

Detailed risk profiles for the various activities are contained in Section 4 of Technical Appendix O and are summarized in Figure 5.11-3.

5.11.5 Discussion of Risks

Based on the project design information, the events which contributed most significantly to the risk profiles are now discussed.

- Shoreline Environmental Risks. Oil spills of up to a few hundred barrels arose from a variety of causes but the larger spills were almost entirely caused by well blowouts.

- Public Risks from the Onshore Gas Pipeline. Failures occurring near the landfall contributed little to the risk. Failures near the Hollister Ranch contributed only to low fatality accidents, and were principally due to toxic effects because there are few ignition sources in this sparsely-populated area. The major source of public risk from this pipeline arose from failures at the Gaviota end of the pipeline, releasing flammable material that then ignited, resulting in a fire and, in some cases, an explosion.

- Public Risks from the Oil- and Gas-processing Facility. The public risks at the facility are dominated by releases from the gas pipeline pig receiver, the LPG and NGL storage tanks, and the truck loading operations. The location of the Vista del Mar Union School makes it particularly vulnerable to events in the storage and loading areas.

- Public Risks from Transportation of Gas By-products. The transportation risks are distributed among the communities bordering the routes to Bakersfield and to Los Angeles. For the low-fatality incidents, the rates per vehicle-mile are identical for the two routes

FIGURE 5.11-3

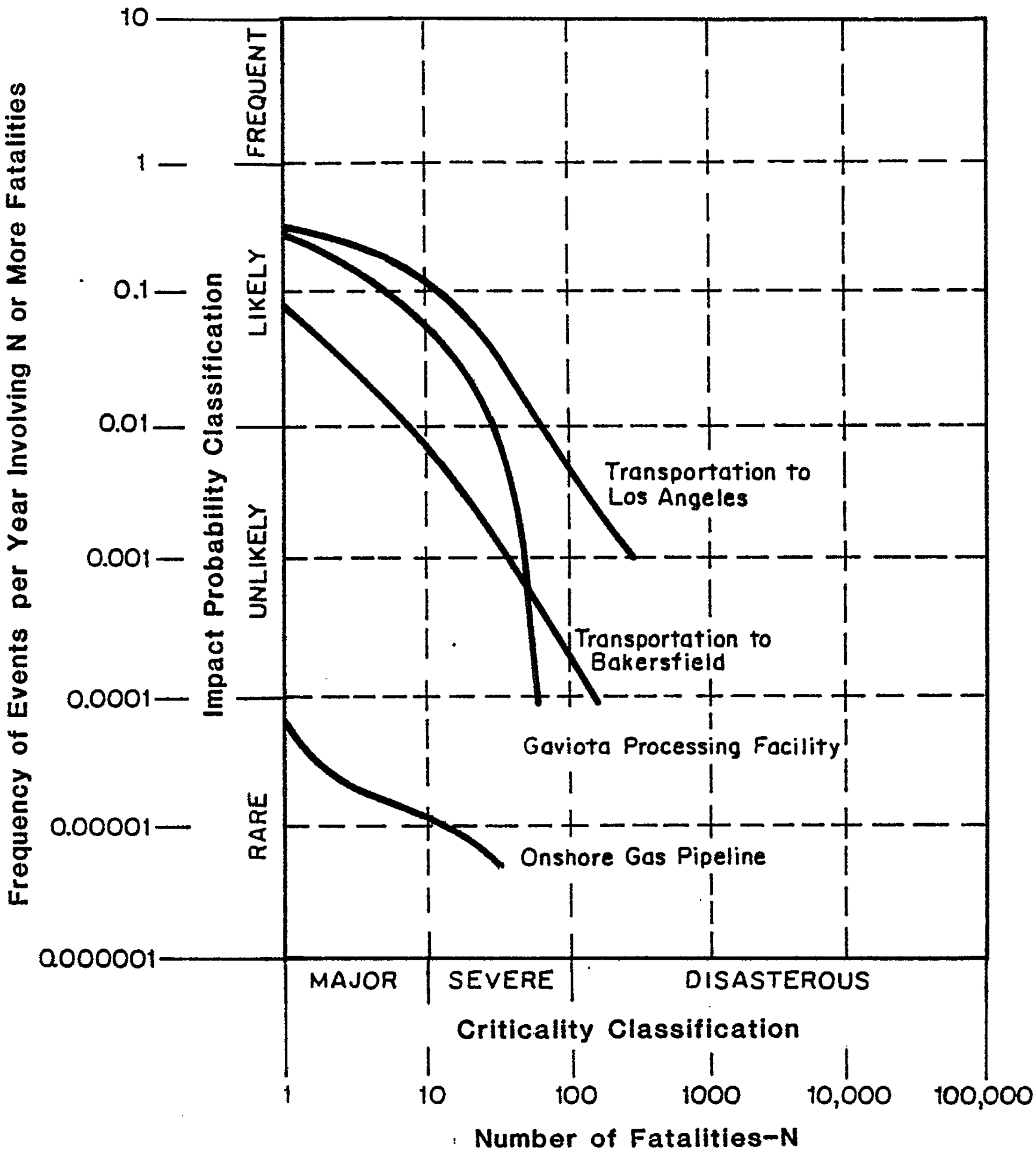


FIGURE 5.11-3 PUBLIC RISK PROFILES FROM PROJECT ACTIVITIES

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 is the Bakersfield route, because of its highly-populated areas where many people might be impacted by a spill which did not immediately ignite.

5.11.6 Mitigation Measures

This assessment of Systems Safety and Reliability for the project components indicates that the engineering systems have been designed for continuity of operation and with safety in mind. Nonetheless, system failures can occur. The likelihood and consequences of such potential failure events have been estimated, both in this assessment and by the applicants. Based on these assessments and on evaluations and analyses of safety-related systems in use in the energy industries, a series of mitigation measures has been developed for consideration by the applicants and permit decisionmakers. These measures generally reflect current industry practices and techniques shown to be feasible and effective in increasing the level of system safety, although in many cases, their effectiveness cannot be quantified. These measures are discussed fully in Section 8 of Technical Appendix O, and are summarized here.

OFFSHORE PLATFORMS

Additional control, detection, and measurement systems in specific areas would enhance the safety and reliability of the platforms. These include oil-in-water analyzers in the produced water systems, which would reduce the frequencies of oil spills due to possible failure of the control instrumentation at the oil/water interface level and subsea earthquake detection and measurement systems at the platform sites, which would improve the understanding of seismic design and safety needs for platform improvement. It is suggested that a Hazard and Operability Study might be conducted once the final detailed design of the platform processing systems is completed; such studies are becoming standard practice for many oil companies, and provide an effective method for a safety-related review of the proposed design.

OFFSHORE AND ONSHORE PIPELINES

Isolation valves on the subsea industry pipeline would limit the amount of inventory lost in case of a pipeline break or leak; however the additional valves may themselves be a source of leaks. The pipeline integrity-monitoring system being designed for the offshore systems will likely not be capable of detecting relatively small oil leaks from interplatform pipelines; an additional monitoring system on each interplatform pipeline would provide a means for the rapid detection of such leaks.

OIL- AND GAS-PROCESSING FACILITIES

The safety of the onshore storage and processing facilities could be enhanced through the use of several measures considered to be both feasible and practical. Mounding of the LPG storage tanks (i.e., covering the tanks with earth material) would prevent their overheating in case of a fire in their proximity, and would protect against a potential tank BLEVE. This type of construction, in use at several storage facilities, would require careful attention to corrosive protection of the tanks consistent with current industry practice. If mounding is not feasible, the installation of a fixed-position water deluge system would assist in preventing cascading accident events; the current design utilizes fire water monitor nozzles around the storage tank area. Relocation of the LPG and NGL tanks to a site remote from the Vista del Mar Union School would reduce the potential hazards to the school from accidents involving these stored liquids.

Reduction and/or elimination of sources of ignition in the proximity of flammable vapors is required by applicable fire codes and regulations; therefore no further mitigating measures of this type are necessary.

Risks to Vista del Mar Union School occupants from pig receiving operations can be greatly reduced by conducting the pigging operations during the time the school facility is not in use.

Additional instrument and control systems which could be considered for the facility include remotely-operated block valves on the condensate surge tanks to control spillage in the event of a release and fire in proximity to the manual valves; an emergency depressurization valve on the propane surge tank to protect this tank in the event of a sustained fire close to the manual valves. Burying one set of the redundant emergency shutdown wiring systems would enhance the safety of the facilities by eliminating the possibility of both ESD systems becoming inoperable from a single failure event.

In the LPG and NGL truck loading area, the development of procedures for the periodic testing of the loading hoses to ensure that these pressurized hoses are maintained in suitable operating condition, and incorporation into the final plant layout and design of security measures for this area of the plant to control access to the plant and storage areas could reduce the likelihood of spill accidents during loading operations.

As in the case of the offshore platforms, the applicant could arrange for a Hazard and Operability study once the final detailed design of the processing facility is completed. Periodic safety audits of the major safety-related systems of the facility could also be considered once the facility is in operation.

TRANSPORTATION OF GAS BY-PRODUCTS

Potential mitigation measures for the truck transportation of the gas by-products include scheduling of truck trips to avoid peak population exposure times; specialized driver training; development of a coordinated emergency-response and evacuation plan for impacted populations; monitoring of critical safety systems on the truck and trailer; and investigation of alternate transportation routes to bypass or reduce the exposure to urban areas.

OTHER RELATED OPERATIONS

Mitigation measures which are beyond the control of the applicants, or relate to all aspects of the proposed operations, include the extension of the vessel traffic separation system to control vessel traffic west of the Point Arguello Field area; the incorporation of vessel exclusion zones around the platforms; anchor buoy systems for platform support vessels to reduce vessel-platform impacts; the development and use of simulators in training programs for safety-related operations on the platform and at the processing facility; development of a risk management plan; integrated emergency response plans with local agency jurisdictions; and a program of periodic security reviews to ensure the integrity of the security systems.

RISK MANAGEMENT PLAN

An important element in the effective management of overall risks associated with the proposed project is the development and implementation of a comprehensive risk management plan by both the Applicant and various regulators. Risk management plans could be developed containing as a minimum the elements discussed in Section 8.4 of Technical Appendix O. As described in that section, the management risk plan would recognize the need for a formal approach to the ongoing management of safety and would be the "template" that permits day-to-day risk management as well as providing a structure to enhance and improve the levels of safety associated with the facilities throughout the life of the project.

5.11.7 Contingency Plans

OIL SPILL PLANS

Oil Spill and Emergency Contingency Plans have been prepared by Texaco for Platform Harvest and by Chevron for Platform Hermosa and for the Gaviota facility and onshore pipeline. The plans for Platform Hidalgo are still in preparation. The purpose of these plans is to describe the organization, equipment and resources, and the notification and operational procedures used by the response team to prevent, report, and contain oil spills, natural gas releases and fire hazards. Under MMS guidelines, these plans are reviewed and updated annually, starting one month before platform installation.

The facilities and resources for coping with an oil spill are framed within a three-level response philosophy developed by the Federal and State agencies. As described in detail in Addendum H of Technical Appendix O, the first level is a fast response utilizing on-site applicant's equipment on the platform or at the shore facilities; this equipment -- consisting of hoses, boats, skimmers, sorbents, etc. -- would be capable of handling spills of up to 10 bbl (420 gallons). The second level of response would include the facilities and equipment of the oil spill cooperative Clean Seas, Inc. and other cooperative organizations and outside contractors; these resources can handle oil spills of up to several thousand bbl, are on a 24-hour alert, have equipment prepositioned at coastal points to protect the environmentally sensitive areas along the coastline, and are designed to provide an arrival time on-scene in less than four hours.

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 is the U.S. Coast Guard Pacific Strike Team which includes trained personnel and extensive oil containment and removal equipment from Federal agencies and private industry outside the local spill area. This response level would be called upon after 24 hours had elapsed and the need for more extensive resources had been established. The resources available at this level would include dispersants, appropriately chosen for the types of crude oil in production, in those cases where mechanical containment, removal, or diversion methods were not deemed adequate. In such cases, however, the decision to use dispersants would require the approval and authorization from the Regional Response Team, consisting of representatives of the U.S. Coast Guard, MMS, and the U.S. Fish and Wildlife Service.

Overall, the oil spill mechanical containment and recovery resources are considered to be applicable for conditions up to 6- to 8- foot seas, or even higher, as discussed in Addendum H of Technical Appendix O. On this basis, sea and weather conditions in the Point Arguello Field area should permit oil spill control and recovery about 50 to 75 percent of the time.

The fate of recovered oil is not specifically addressed in the oil spill contingency plans. Any recovered oil would necessarily require proper treatment and/or disposal if it cannot be processed.

H_2S RELEASE PLANS

An Emergency Response Plan for the Gaviota facility, developed by Chevron, contains a detailed description of the hydrogen sulfide (H_2S) hazards, contact points, and response procedures in cases of release of H_2S from the processing facility and onshore pipeline. The facility will incorporate a range of emergency and safety equipment to prevent and control H_2S contamination. All plant personnel will be trained in H_2S detection, prevention, and response procedures.

PLATFORM CONTINGENCY PLANS FOR MISSILE-RELATED HAZARDS

Military missiles and space vehicles launched from Vandenberg AFB are expected to fly over portions of the Point Arguello Field. During such overflights, there is a potential that fragments from aborted missions may impact the offshore platforms. Although the likelihood of such an event is 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 and to temporarily suspend or stabilize offshore operations, and to provide evacuation measures and personnel shelters, as required.

Accordingly, Platform Contingency Plans, prepared by the applicants and subject to MMS approval, delineate evacuation plans, shelter operations for essential personnel, action timelines, and damage control procedures. Such a plan has been prepared and approved for Platform Hermosa. A similar plan is being finalized for Platform Harvest and is in preparation for Platform Hidalgo.

5.11.8 Safety-related Risks of Alternatives

The safety considerations described so far apply to the basic project comprising three platforms; oil and gas pipelines running between the platforms, from Platform Hermosa to Point Conception, and then to Gaviota; processing facilities at Gaviota; and truck transportation of gas by-products. Certain alternatives have been suggested and their safety implications are now considered.

ALTERNATIVE OFFSHORE PIPELINE ROUTE

This alternative would route the subsea oil and gas pipelines from Platform Hermosa to a landfall at Gaviota, thereby eliminating most of the onshore portions of the consolidated industry pipelines. The safety analyses indicate that the overall rate of pipeline failures would not be affected by this alternate routing. Consideration of oil spill potential and consequences would favor an onshore route for the wet-oil pipeline, since oil spills on land have less impact than spills at sea, tend to be localized, and can be responded to more effectively. Conversely, public-safety considerations would favor an offshore route for the sour-gas pipeline to reduce the public exposure to potential releases of gas. Assuming that the oil and gas pipelines would either both be located along the offshore route or both along the onshore route, there appears to be no clear safety-related advantage to either route.

RELOCATION OF THE PROCESSING FACILITY

Alternative sites to Gaviota for the processing facility include a site at Point Conception and eight others, located off Route 101 between Gaviota and Goleta, listed in the Oil Transportation Plan recently prepared for Santa Barbara County.

The alternate site at Point Conception would have the advantages of remoteness from populated areas (particularly from the Vista del Mar Union School and the Getty facility) and the elimination of the onshore sour-gas and wet-oil pipelines. Its disadvantages include its potential exposure to missile hazards; the possible requirement for a new onshore sales-gas pipeline; a longer route for transportation of gas by-products; and several disadvantages related to support and community services, commuting distances, etc. due to the remoteness of the site. Overall, the Point Conception site would have certain operational disadvantages and some public safety advantages because of its remoteness from populated areas.

The other eight alternatives sites would also have some operational disadvantages, although to a lesser degree than those for Point Conception. The principal advantage of each of these sites in terms of public safety is their remoteness from the Vista del Mar Union School and from the Getty facility.

ALTERNATIVE GAS BY-PRODUCT TRANSPORTATION MODES

Alternative transportation modes for the gas by-products include the use of pipelines or of railroad tank cars. An LPG pipeline could be installed in parallel with the proposed crude oil pipeline to Los Angeles or Bakersfield or to another terminal area, from which distribution to consumers would be carried out, probably by smaller tank trucks. Railroad transportation of the LPG would require installation of a siding on the Getty site on the south side of Highway 101 for direct connection with the Southern Pacific Railroad System. For either alternative, the NGL products could be injected into the crude oil transported by pipeline.

Compared with trucking, either pipeline or rail transport would have a lower expected frequency of spills for a given cargo volume transported over similar distances. For tank truck transportation of LPG, it is estimated that an average of 1.4 spills releasing some amount of cargo will occur each year. The equivalent yearly rate for rail transportation is about 0.3 spills per year, and for pipeline transportation is about 0.22 spills per year.

However, other factors must be considered. If a spill accident were to occur, the potential spill volumes would be larger for either pipelines or railroad tank cars than for tank trucks. Furthermore, in the case of rail transportation, multiple tank cars in a train could be involved, possibly resulting in BLEVEs. While tank trucks can deliver their cargoes directly to consumers, terminal operations for either rail or pipeline will generally require trucks to distribute the products, thus involving additional cargo transfer operations and increased transport distances. The injection of NGL into the crude oil pipelines will also increase the flammability hazards of the crude in the event that it should be spilled.

Overall, while the alternative transportation modes may result in fewer accidents than tank trucks, these accidents are potentially of greater severity. The comparative risks to the public from the alternative modes of by-product transportation can only be assessed through a detailed analysis of the transportation routes, terminals, and consumer locations; such information is not presently available.

5.11.9 Safety Implications of Area Development

The further development of the southern Santa Maria area is assumed to include five additional platforms, and their associated gas and oil subsea pipelines connecting to the consolidated industry pipelines to shore. The assumed locations of these additional platforms and the configuration of the subsea pipelines are shown in Figure 10-1 of Appendix O. No further development or expansion will be needed for the industry pipelines themselves or for any portion of the onshore pipelines, processing facility or product transportation facilities; each of these components has been sized to accommodate the full production from the total of eight platforms in the area development, and the safety assessment was based on the fully expanded facility.

The safety implications of the area development, therefore, will include the risk of oil spills from the additional platforms and from the additional subsea pipelines, together with the risks associated with increases in air and marine traffic to service those added components. Based on the assumption that each of the five additional platforms would be essentially similar to the three project platforms, the overall annual rate of oil spills greater than 100 bbl for the area buildout will be 0.17 spills/year, compared to 0.06 spills/year for the project.

The potential impact of spills from the additional platforms and pipelines will be essentially the same as from the project components, other than small changes in the trajectory characteristics as they are affected by the specific site of the spill in the area. A trajectory analysis was carried out assuming a spill located at the northernmost platform assumed for the area buildout (Block OCS-P 0446). The potentially significant landfall areas from such a spill site included areas similar to those estimated for spills from Platform Hermosa and from the industry pipeline, with the addition of a possible landfall near the mouth of the Santa Ynez River. The overall probability of such shoreline impact was estimated to be less than that from Hermosa, and substantially less than that from the postulated pipeline spill.

in the area development, and the safety assessment was based on the fully expanded facility.

The safety implications of the area development, therefore, will include the risk of oil spills from the additional platforms and from the additional subsea pipelines, together with the risks associated with increases in air and marine traffic to service those added components. Based on the assumption that each of the five additional platforms would be essentially similar to the three project platforms, the overall annual rate of oil spills greater than 100 bbl for the area buildout will be 0.28 spills/year, compared to 0.10 spills/year for the project.

The potential impact of spills from the additional platforms and pipelines will be essentially the same as from the project components, other than small changes in the trajectory characteristics as they are affected by the specific site of the spill in the area. A trajectory analysis was carried out assuming a spill located at the northernmost platform assumed for the area buildout (Block OCS-P 0446). The potentially significant landfall areas from such a spill site included areas similar to those estimated for spills from Platform Hermosa and from the industry pipeline, with the addition of a possible landfall near the mouth of the Santa Ynez River. The overall probability of such shoreline impact was estimated to be less than that from Hermosa, and substantially less than that from the postulated pipeline spill.

VI. CUMULATIVE IMPACTS AND MITIGATION MEASURES

6.0 INTRODUCTION AND DESCRIPTION OF SCENARIOS

Potentially significant concurrent developments are described below to serve as a basis for cumulative impact assessment. Inclusion of any project or alternative does not imply its acceptance by any agency.

Mutually exclusive projects are evaluated in a framework of alternative scenarios. Figure 6.0-1 presents a map showing the locations for all the projects included in the cumulative impacts scenarios. Figure 6.0-2 presents the expected schedule for the development of the oil-related projects. The description of oil-related development includes the year-by-year build-up of oil and gas production. Maximum impacts would be expected up to and including 1991, when total production offshore Santa Barbara is expected to peak at about 500 MB/D of oil and 400 MMCF/D of gas.

The significance criteria used throughout Chapter V are used throughout this chapter as well without modification.

6.0.1 Offshore Oil Development

Current production from fields located in East Santa Barbara Channel is assumed to continue. In addition to implementation of the immediate projects for development of the Point Arguello field by Chevron and Texaco, the following further development projects are assumed:

Santa Ynez Unit - Several fields in the Santa Barbara Chennel (Hondo, Pescado, and Sacate) are proposed for development under a joint program. The first platform, Hondo A, has been operating since 1981. Three or four future platforms are projected under the development plan submitted by Exxon as operator for the unit. Schedule for installation of the next three platforms is indicated to be one each year, starting in 1988.

Coal Oil Point - Arco, as operator, has proposed a two-platform development of the Coal Oil Point Field. These platforms would be located in State tidelands near existing platform Holly, offshore Ellwood. A development plan has been submitted; installation of the platforms is indicated for 1986/1987.

Sockeye - This field is located at the east end of the Santa Barbara Channel. It is expected that Chevron will submit a development plan later this year calling for a single platform to be installed during 1987.

Central Santa Maria Basin - Several significant discoveries have been made on Leases P 0440 and P 0441, opposite Point Arguello. At this time, only one development plan has been submitted -- by Union for an initial platform on Lease P 0441. It is anticipated that further development of these two leases will involve two more platforms installed before 1990.

Southern Santa Maria Basin - As depicted by the Area Study scenario, further development of this field is assumed to require five more platforms -- installed over a period from 1987 to 1992.

Exploration - This continuing activity is assumed to require an average of six to eight rigs operating in Federal and State offshore areas between the Central Santa Maria Basin and the east end of the Santa Barbara Channel until the late 1980s. Coal Oil Point is assumed the only development project in State tidelands -- although this portion of the OCS may be explored during the next five years. Exploration of any resulting discoveries in the mid-90s would partly offset the decline in production from the fields placed in production earlier.

Tables 6.0-1 and 6.0-2 show the assumed levels of oil and gas production from all areas offshore Santa Barbara.

A snapshot of the level of offshore activity in 1991 would have the current 16 platforms still in operation, with 18 new platforms assumed to have the following status:

- 6 in production mode, with development drilling completed
- 10 still in development drilling phase
- 1 platform being installed during 1991
- 1 further platform for the Santa Ynez Unit left to install after 1991.

It is also assumed that exploration effort in 1991 has decreased to two drilling rigs. The total level of drilling activity for exploration and development is estimated at 125 wells for the year.

6.0.2 Onshore Oil Development

Treating plants and oil transportation projects are described in three scenarios to reflect uncertainties and Santa Barbara County policies to consolidate such facilities to the extent practical. These are:

- Base Scenario: focuses on consolidated marine terminal at Gaviota proposed by Getty and related onshore treating plants.

- Alternative I: focuses on consolidated marine terminal at Las Flores and its interdependent onshore treating plants.

- Alternative II: based on pipeline transportation for all crude production and related treating plants.

In all three scenarios, production from the fields located in East Santa Barbara Channel is transported to refineries in Ventura and Los Angeles Counties by existing pipelines. Also, production from the fields in the Central Santa Maria Basin, particularly OCS Leases P 0440 and

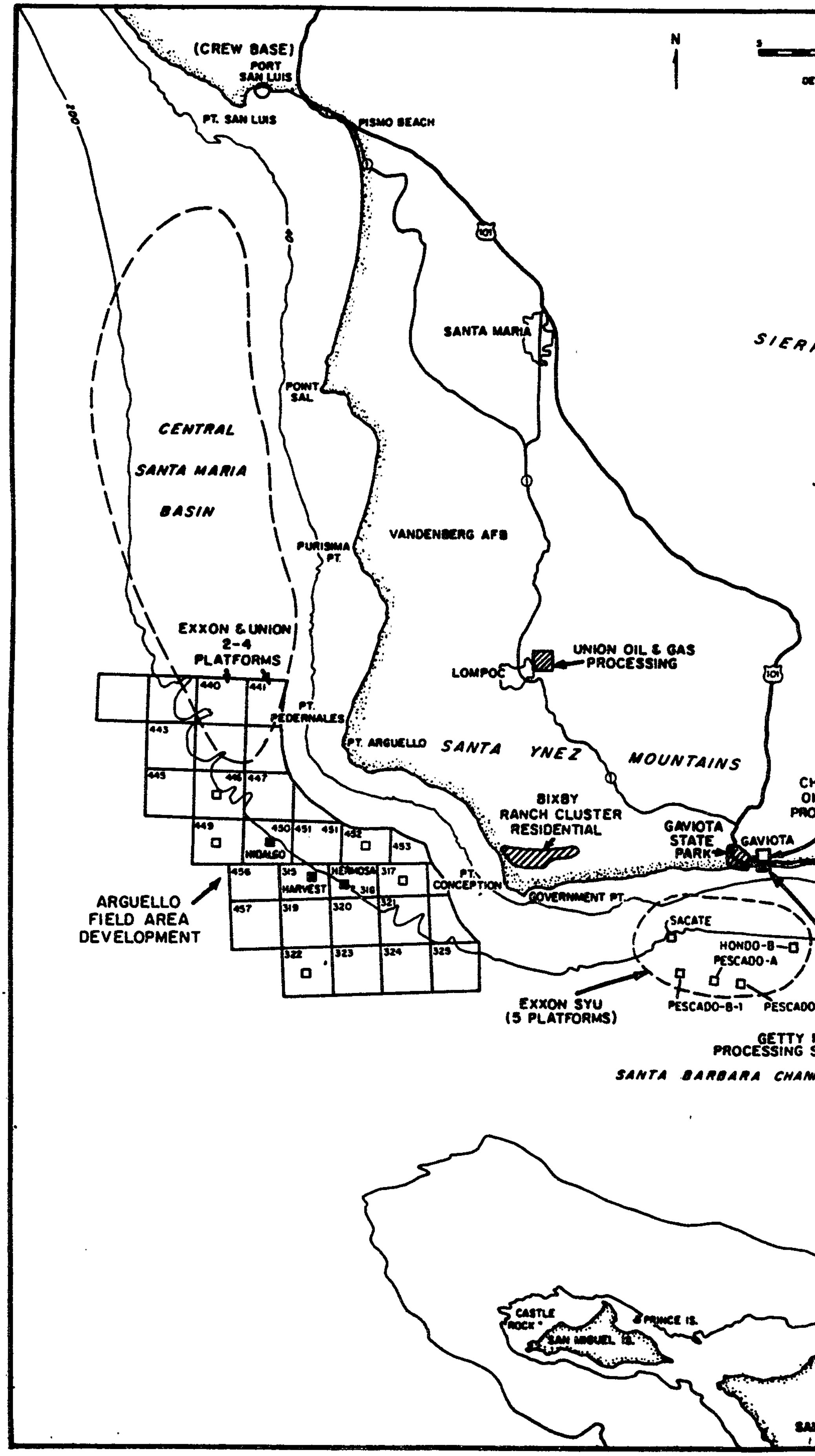
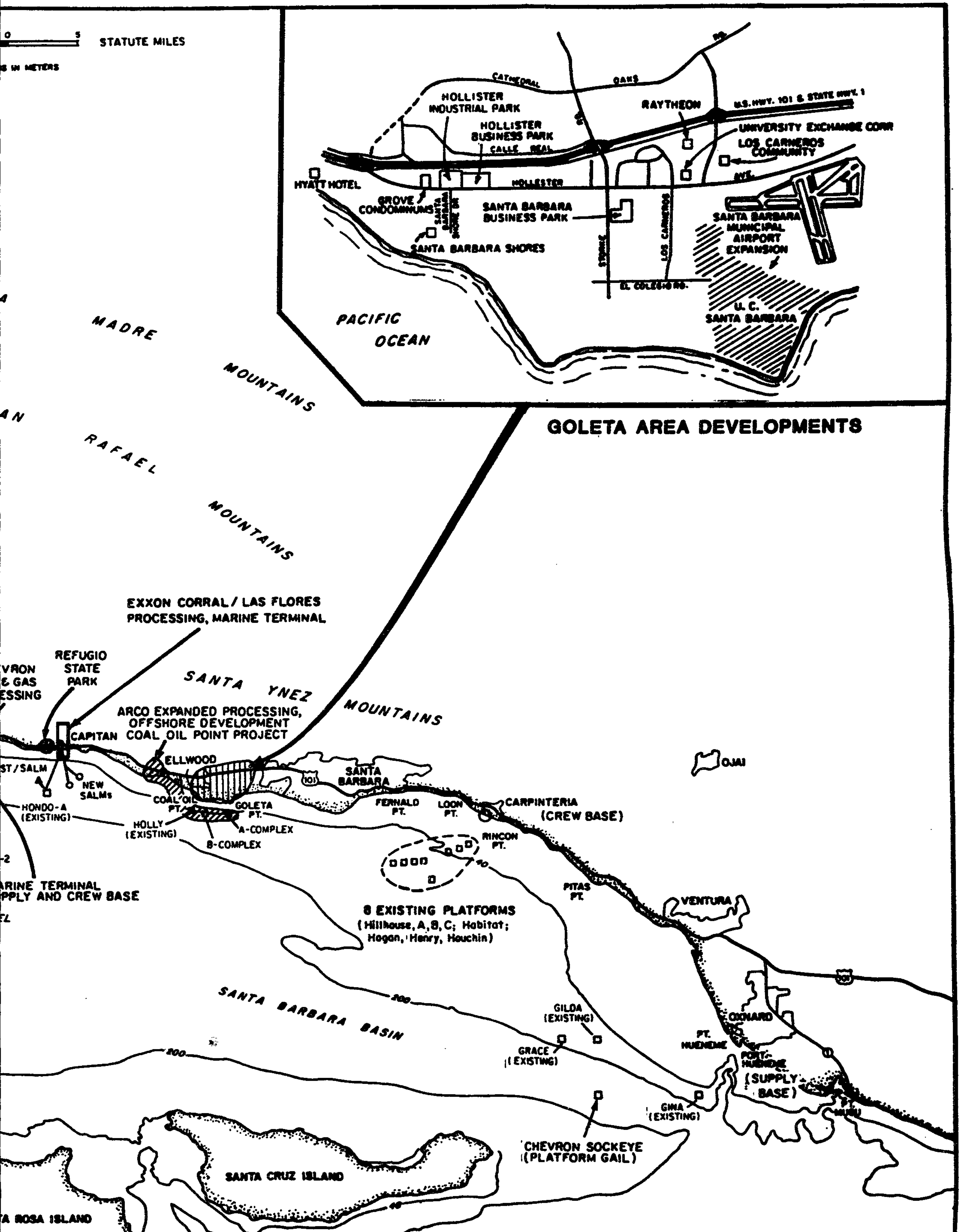


FIGURE 6.0-1 LOCAT

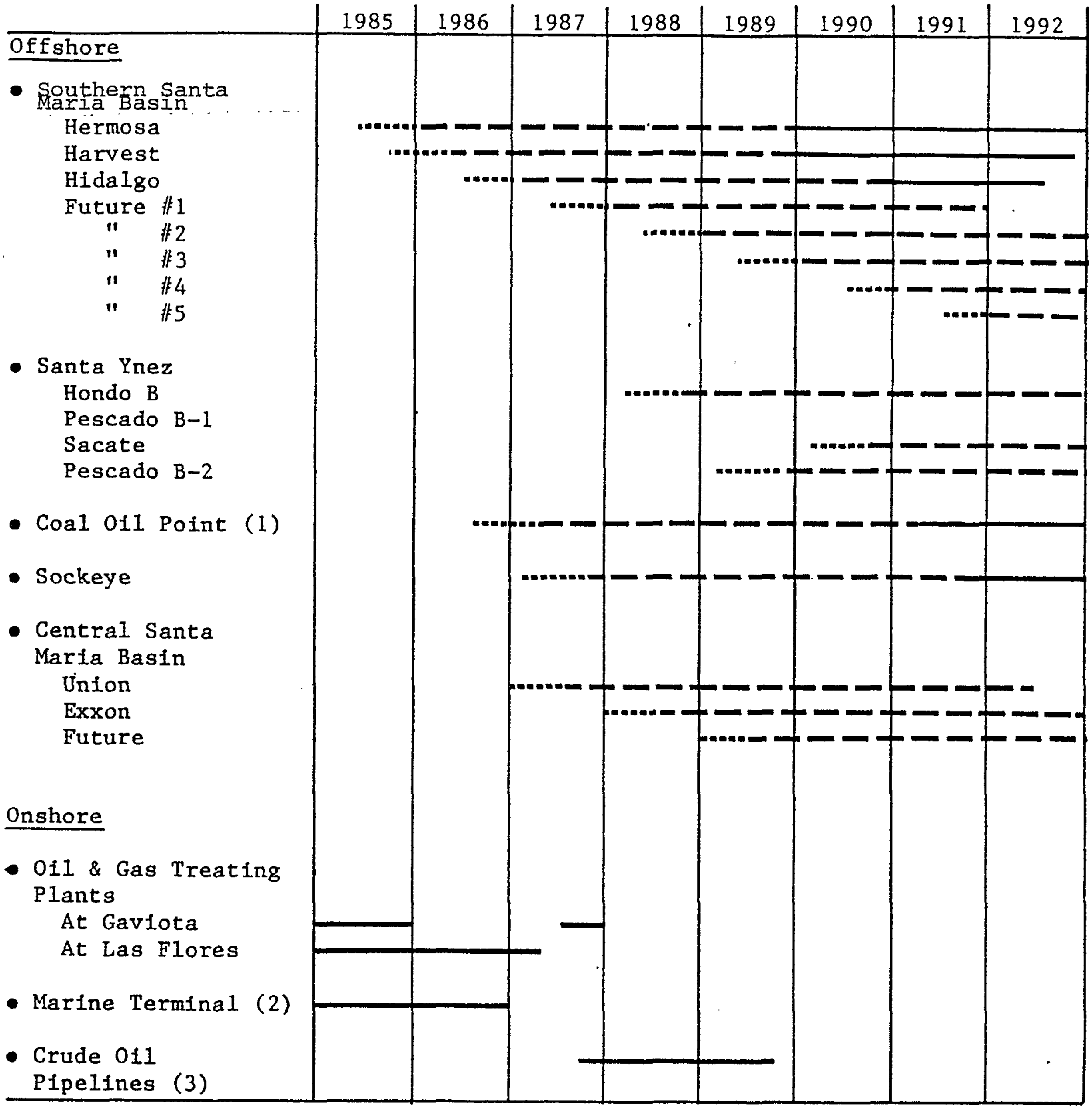
IMAGE# 3,



ONS OF CUMULATIVE SCENARIO DEVELOPMENT

IMAGE# 4,

FIGURE 6.0-2 SCHEDULE OF DEVELOPMENTS FOR CUMULATIVE IMPACTS



Notes:
(1) Two Platforms
(2) Getty or Las Flores
(3) To Los Angeles and Texas

Legend for Platforms:
.... installation
— — — development drilling
——— production only

TABLE 6.0-1

OUTLOOK FOR OIL PRODUCTION - OFFSHORE SANTA BARBARA
(MB/D)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Base Scenario										
Arguello (1)	25	50	95	115	135	170	150	134	117	103
Santa Ynez Unit (2)	40	50	65	80	80	80	80	80	80	80
Coal Oil Point (3)	8	18	37	57	77	76	69	63	56	50
Union (P-0441) (4)	--	5	10	15	15	13	11	10	9	8
Central Santa Maria Basin (4)	--	--	5	15	25	30	30	25	21	19
	73	123	212	282	332	369	340	312	283	260
East Santa Barbara Channel										
Sockeye (4)	--	4	8	11	14	16	15	13	12	11
Santa Clara (5)	31	31	30	30	29	28	27	26	25	25
Carpinteria (5)	5	4	4	4	3	3	3	2	2	2
Dos Cuadros (5)	17	17	17	16	16	15	15	15	15	14
Hueneme (5)	6	6	6	5	5	4	4	4	3	3
	59	62	65	66	67	66	64	60	57	55
Total	132	185	277	348	399	435	404	372	340	315
Alternatives I and II										
Santa Ynez Unit (6)	40	60	85	120	140	140	130	125	120	115
Additional Production	--	10	20	40	60	60	50	45	40	35
Total	132	195	297	388	459	495	454	417	380	350

Footnotes on Sources:

(1) Taken from basis for area study.
(2) Production limited by capacity of OS & T.
(3) Peak production from Arco DPP; ADL estimate for build-up and decline; includes production from existing platform Holly.
(4) From MMS letter of March 27 to ADL.
(5) From Santa Barbara OTP.
(6) Peak production from Exxon DPP; ADL estimate for build-up and decline.

TABLE 6.0-2

OUTLOOK FOR GAS PRODUCTION - OFFSHORE SANTA BARBARA
(MMCF/D)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Base Scenario										
Arguello(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 (P-0441)(4)	---	2	4	4	4	6	9	12	13	13
Central Santa Maria Basin(5)	---	---	6	12	19	19	22	22	22	23
	60	100	180	275	300	305	295	275	255	240
East Santa Barbara Channel(6)	50	50	50	50	50	55	55	50	50	50
Total	110	150	230	325	350	360	350	325	305	290
Alternatives I and II										
Santa Ynez Unit(7)	30	50	75	110	135	135	125	120	110	105
Additional Production	---	5	10	20	45	45	35	30	20	15
Total	110	155	240	345	395	405	385	355	325	305

Footnotes 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; ADL estimate for build-up and decline
(4) From MMS letter of March 27 to ADL.
(5) ADL estimate.
(6) ADL estimate.
(7) Peak production from Exxon DPP; ADL estimate for build-up and decline.

P 0441, is assumed to be treated separately and transported by expanded existing pipelines. An overall summary of the scenarios is presented on Table 6.0-3. The allocation of total offshore production defined by these three scenarios is shown on Table 6.0-4.

BASE SCENARIO

- Consolidated Getty marine terminal provides tanker transportation for total production from Arguello and Coal Oil Point. All existing marine terminals are shut down.

- Production from the Santa Ynez Unit is treated in the OS&T system and transported by tanker.

- There are no new pipelines for transporting treated crude oil -- except a dry oil line from Ellwood to Gaviota for Coal Oil Point production.

- Onshore oil treating plants are located at Gaviota (200 MB/D for Arguello) and Ellwood (80 MB/D for Coal Oil Point).

- Major onshore gas treating plants are located at Gaviota (120 MMCF/D), Las Flores (Popco expansion to 90 MMCF/D), and Eagle Canyon (60 MMCF/D for Coal Oil Point).

- To examine potential effects of consolidation of processing facilities, a hypothetical variation of the Base Scenario is also evaluated, although not proposed by any applicants. This would involve consolidating processing at Gaviota of the oil and gas from existing small facilities between Point Conception and Ellwood, and of the Coal Oil Point production. New onshore pipelines would carry untreated oil and gas from Elwood to Gaviota. Total dry oil production capacity at Gaviota would be about 280-300 MB/D. Because of Arco's description of the composition of Coal Oil Point gas, it is assumed that a separate co-located plant would exist at Gaviota for its treatment.

ALTERNATIVE I (Marine Terminal at Las Flores Instead of Gaviota)

- Consolidated Las Flores marine terminal provides tanker transportation for total production from Arguello, Coal Oil Point, and the Santa Ynez Unit.

- OS&T system for the Santa Ynez Unit is replaced by an onshore treating plant located at Las Flores. 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 expanded to 135 MMCF/D.

TABLE 6.0-3

SUMMARY OF SCENARIOS FOR CUMULATIVE IMPACTS

	Base Scenario	Alternative I	Alternative II
Oil Treating Plants			
Arguello	--- 200 MB/D at Gaviota as proposed by Chevron ---		
Santa Ynez Unit	80 MB/D at OS&T	----140 MB/D at Las Flores------	
Coal Oil Point	Expand Ellwood to 80 MB/D(1)	--------Co-locate 80 MB/D--------	
Central Santa Maria Basin (2)	-------------Treat in separate facility-----------		
East Santa Barbara Channel	--------------Treat in existing plants------------		
Gas Treating Plants			
Arguello	--120 MMCF/D at Gaviota at proposed by Chevron----		
Santa Ynez Plant	Expand Popco to 90 MMCF/D	---Expand Popco to 135 MMCF/D---	
Coal Oil Plant	60 MMCF/D at Eagle Canyon(1)	---Co-locate 60 MMCF/D at Las--- Flores	
Central Santa Maria Basin (2)	--------------Treat in separate facility----------		
East Santa Barbara Channel	--------------Treat in existing plants------------		
Tank Farm Location	Gaviota	------------Las Flores----------	
Marine Terminal Location	Gaviota	Las Flores	Gaviota until 1987, none after 1987
Maximum Throughput,MD/D	246	386	
Crude Oil Pipelines	Dry Oil, Ellwood to Gaviota (1)	Dry Oil, Gaviota to Las Flores; wet oil, Ellwood to Las Flores	Dry Oil to Los Angeles and to Texas via Bakersfield

(1) Within Base Scenario, impact analysis will include evaluation of possible consolidations at Gaviota to replace facilities between Point Conception and Ellwood and proposed gas plant in Eagle Canyon. Capacity would be about 280-300 MB/D for dry oil and 180 MMCF/D of gas in two co-located facilities, with pipelines from Ellwood to Gaviota.
(2) Includes production from OCS Leases-P 0440 and -P 0441.

TABLE 6.0-4

ALLOCATION OF PRODUCTION TO TRANSPORTATION MODES
(MB/D)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Base Scenario and Alternative II										
• Tanker via OS & T(1)	40	50	65	80	80	80	80	80	80	80
• Existing pipelines(2)	59	62	65	66	67	66	64	60	56	54
• Pipeline via Union's facilities(3)	---	5	15	30	40	43	41	35	30	26
• Tanker from Getty terminal(5)	33	68	132	172	212	246	219	197	174	155
	132	185	277	348	399	435	404	372	340	315
Alternative I										
• Tanker from OS & T (1)	40	---	---	---	---	---	---	---	---	---
• Existing pipelines(2)	59	62	65	66	67	66	64	60	56	54
• Pipeline via Union's facilities (3)	---	5	15	30	40	43	41	35	30	26
• Tanker from Getty terminal(6)	33	---	---	---	---	---	---	---	---	---
• Tanker from LFT (7)	---	128	217	292	352	386	349	322	294	270
	132	195	297	388	459	495	454	417	380	350
Alternative II										
• Tanker via OS & T (1)	40	---	---	---	---	---	---	---	---	---
• Existing pipelines (2)	59	62	65	66	67	66	64	60	56	54
• Pipeline via Union's facilities (3)	---	5	15	30	40	43	41	35	30	26
• Chevron/Four Corners Pipeline (4)	---	---	25	100	150	200	200	200	200	200
• Bakersfield/Texas Pipeline	---	---	42	167	202	186	149	122	94	70
• Tanker from Getty terminal (6)	33	128	150	25	---	---	---	---	---	---
	132	195	297	388	459	495	454	417	380	350

(1) This is Exxon's present system for Santa Ynez expanded to 80 MB/D.
(2) Existing pipelines are assumed for all production from East Santa Barbara Channel fields.
(3) Assumes facilities to be proposed by Union will provide pipeline transportation for all production from Central Santa Maria Basin.
(4) Assumes volume transported to L.A. is limited by retrofit capacity of refineries in L.A. area.
(5) Getty terminal receives remaining volumes to be transported by tanker.
(6) Getty terminal is used for interim operation.
(7) LFT receives remaining volume to be transported by tanker.

6.0.3 Support Facilities for Offshore Activities

Under the Base Scenario which provides a consolidated marine terminal at Gaviota, it is assumed there would also be a supply and crew base there. Ellwood is also considered as a potential supply and crew base, and it is assumed that a crew base would also exist at Port San Luis. Some combinations of the above would generate air and marine types of support activity for about twice the number of platforms presently operating offshore, and at locations further offshore.

6.0.4 Non-Oil Related Development

In addition to the projects described above, the larger proposed non-oil related development projects have been considered in the evaluation of cumulative impacts. Figure 6.0-1 shows the proposed locations of these projects, most of which are scheduled for construction in the mid to late 1980s:

Cross-Town Freeway Projects - Two projects are considered. The first would replace the existing traffic signals on U.S. 101 through Santa Barbara with overpasses or underpasses. The second would widen the highway to six lanes between the Castillo Street and Fairview Avenue exits.

Airport Expansion - The present Master Plan calls for expansion of the Santa Barbara Airport southwesterly into the area presently occupied by part of the Goleta Slough wetland.

Goleta Residential/Commercial Developments

Santa Barbara Shores plans exist for a large hotel and about 300 residential units in the area just east of the Sandpiper Golf Course in western Goleta.

Raytheon Corporation has proposed an industrial/office project that would employ about 3,100 people at a site just west of Los Carneros Road.

Los Carneros Community would be located just east of Los Carneros Road and is proposed to include some 235 residential units and 345,000 square feet of light industrial, R&D use.

University Exchange is a third proposed project in the same neighborhood as the two above, and would include some 961,000 square feet of light industrial, R&D use.

Santa Barbara and Hollister Business Parks are two projects that have been approved but not constructed, and are proposed office/retail developments of about 200-300,000 square feet each off Storke Road and Hollister Avenue.

Hyatt Hotel - This project would consist of a 574-room hotel on the coast just east of Ellwood Pier.

Bixby Ranch Cluster Residential Development - The Master Plan for cluster development of the Bixby properties calls for some 300 residential units of clusters situated just southeast of Jalama Beach and thence eastward in the foothills to the north of the proposed Chevron pipeline route. Implementation of this project is not considered as likely as is that of others described above, but it is considered here because of the physical proximity to the proposed Chevron facilities.

Expansion of Gaviota and Refugio Beach State Parks - Plans exist for expansion of the developed areas of these properties, but details are unavailable as of this writing.

Activities at Vandenberg Air Force Base - Future activities at Vandenberg are covered as part of the "projected baseline" conditions in the sections of Chapter 5 above on impacts on military uses.

6.1 GEOLOGY

6.1.1 Impacts of Cumulative Scenarios and Their Significance

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. However, increased development would increase the likelihood of impacts, because of anomalous geologic conditions or extreme events.

Other offshore geologic impacts which could be cumulative are ground subsidence induced seismicity and seafloor alterations. Based on current understanding of the geologic settings in which subsidence has been a problem, subsidence due to hydrocarbon withdrawal is not expected to be a problem in the southern Santa Maria Basin.

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.

Hydrocarbon development activities will alter the seafloor, primarily as a result of pipeline laying and drilling operations. Effects of future development of the surrounding region would be local and isolated in the geologic environment. The cumulative significance of construction and production activity is further discussed in Section 6.5, Marine Biology.

Further onshore development could lead to induced or accelerated erosion and slope stability problems. These impacts would be local and isolated. In addition, careful engineering investigation and design, consistent with current practice, can reduce potential impacts to insignificant levels (Class III).

6.1.2 Mitigation Measures Applicable to Cumulative Geology Impacts

As the cumulative geology 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.

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 cumultive 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 the sources identified in the base cumulative scenario, as described in Section 6.0. These emissions were used in the inert pollutant analysis and in the TRACE photochemical modeling runs. Details of the emission inventories of the cumulative sources is given in Appendix F.

Emissions due to non-oil related projects are not expected to be significant because they generally consist of localized residential development or light industrial R & D facilities. However, temporary localized emissions can exist during construction of these facilities. In the Socioeconomics Section (6.9) it is estimated that future population growth under the cumulative scenario would be less than 3 percent in Santa Barbara County where projected oil development would occur. Greater population growth is expected in Ventura and not near the cumulative project sources. Thus, additional emissions from increased automobile traffic and from other population-dependent sources would not be significant in the Santa Barbara region.

6.2.1 Effects of Base Cumulative Scenario

For the inert pollutants short-term concentrations were predicted by using the PTMOCS model. The estimated levels, which are summarized in Table 6.2-1, indicate that for NO_2, SO_2 and TSP the maximum incremental concentrations are much greater than those due to the proposed projects alone. The maximum NO_2 level, which is predicted to be over three times the California one-hour standard, would occur immediately northwest of the Gaviota facility at elevated terrain. The principal contributors to the maximum receptor level include a tanker loading at the Getty East Salm (53 percent of the increment) and emissions from the auxiliary heater at the Gaviota onshore facility (20 percent) along with contributions from the cogeneration units. The maximum one-hour SO_2 concentration, which may exceed the California standard by 5 percent, would occur immediately north of the Gaviota facility with the main contributors being tanker loading emissions at the Getty East Salm (60 percent) and the sulfur recovery unit at the Gaviota onshore facility (37 percent). The TSP maximum, which is predicted to be up to 1.3 times the 24-hour standard, would occur at the same location as the NO_2 maximum, with the Gaviota onshore facility contributing 62 percent of the increment and the tanker loading contributing 37 percent. Details of the short-term modeling results are given in Appendix F. In general the high short-term impacts occur as a result of the combined emissions of the Gaviota on-shore facility and tanker loadings at the Getty terminal.

The annual average concentrations under the base cumulative scenario are summarized in Table 6.2-2. They show that the maximum increments result in no exceedances of the annual standards. The maximum annual NO_2 concentration would occur near the Gaviota onshore facility as in the case of the maximum one-hour NO_2 levels. The principal contributors are the onshore processing facility and tanker loadings at the Getty East and West Salms. Additional peak concentrations would occur near other on-land oil and gas processing facilities although the levels would be much lower than at Gaviota. They include the ARCO Eagle Canyon facility and the POPCO plant.

For photochemical pollutants the maximum ozone concentrations predicted by the TRACE model are shown in Table 6.2-3.

Trajectories 1 and 5 show significantly higher levels of ozone. For trajectory 1 the increase is .02 ppm or 20 percent over the future baseline and for Trajectory 5 the increase is .016 ppm or 15 percent. These predicted increases over the future baseline and the future project levels occur in Santa Ynez for Trajectory 1 and in Ojai for trajectory 5. In both cases, the Federal Standard is predicted to be exceeded.

The potential for the formation of acid fog under the cumulative scenario would be greater than 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.

6.2.2 Alternative Cumulative Scenario I

For this cumulative scenario, as described in Section 6.0, the expected peak production throughput in 1991 would be approximately 13 percent greater than the base cumulative scenario. There would be a smaller number of processing facilities because the Ellwood facility would not exist. The offshore OS&T processing facility would be replaced with a larger capacity onshore facility at Las Flores. The net emission burden for the region would be slightly greater but would not change significantly. However, the maximum levels of the inert pollutants would increase over the base cumulative scenario because of the higher throughput. The level of increases would depend on the relationship of the elevated terrain at Las Flores to the emission sources. The distribution of the maximum concentrations would change, because onshore and offshore emissions would occur near Las Flores instead of Gaviota. Maximum ozone levels for the Las Flores option as compared with the base cumulative scenario would depend on the orientation of emission sources in the air parcel trajectories that are unique to the site. These trajectories may be similar to Trajectory 3, which was used in the base scenario modeling analysis. In the base cumulative scenario, Trajectory 3 did not predict high ozone levels. It might be expected that Scenario I would have similar impacts to the base scenario, although these assumptions are difficult to make because of the nonlinear relationship in photochemical models. The NO_x and HC emission would be greater because of the higher throughput rate and may result in higher ozone impacts.

6.2.3 Alternative Cumulative Scenario II

Under this scenario, there would be a considerable reduction of pollutant emissions because of the lack of marine terminal operations. The levels of inert pollutant concentrations near the Gaviota and Las Flores terminal locations would thus be reduced when compared with the base scenario and with Scenario I.

In the base cumulative scenario it was estimated that tanker loadings at the Getty terminal would result in major contributions to the maximum short-term concentration 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 change significantly 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 reduced ozone levels because of the reduced emissions of reactive hydrocarbons and NO_x in the region.

6.2.4 Mitigation Measures Applicable to Cumulative Impacts

Mitigation measures for the base cumulative scenario that would reduce the emissions of NO_x and SO_2 are:

- 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 was discussed as Scenario II in the previous section.

- Purchasing electric power from the grid for the onshore facilities. The elimination of cogeneration units would lead to significantly lower ambient NO_2 concentrations immediately bordering these facilities. For most of the processing facilities, high levels of NO_2 would occur at nearby elevated terrain in canyons along the coast. Reducing NO_x emissions would significantly mitigate these impacts.

TABLE 6.2-1

MAXIMUM WORST-CASE SHORT-TERM CONCENTRATIONS DUE TO CUMULATIVE PROJECT SOURCES (ug/m^3)

Pollutant	Avg. Period	Maximum Increment	Allowed PSD Increment	Total Concentration	Standard
NO_2	1-hr	1267	100-470	1474	470
CO	1-hr	2466	10,000	3611	40,000
	8-hr	1356	2,500	2501	10,000
SO_2	1-hr	1322	-------	1374	1,310
	3-hr	965	512	1007	1,300
	24-hr	529	91	539	365
TSP	24-hr	294	37	354	260

TABLE 6.2-2

PREDICTED MAXIMUM ANNUAL AVERAGE CONCENTRATIONS DUE TO CUMULATIVE PROJECT SOURCES (ug/m^3)

Pollutant	Maximum Increment	Allowed PSD Increment	Total Concentration	Standard
NO_2	17.1	15-100	36.1	100
SO_2	3.2	20	3.2	80
TSP	1.3	19	34.3	75

Table 6.2-3

PREDICTED MAXIMUM ONE-HOUR OZONE CONCENTRATIONS UNDER THE CUMULATIVE SCENARIO (ppm)

Trajectory No.	Future Baseline	Project Only	Cumulative
1C	.101	.112	.122
2C	.107	.108	.110
3C	.103	.103	.086
4C	.111	.118	.115
5C	.109	.123	.125

California Standard 0.10 ppm
Federal Standard 0.12 ppm

- Use steam operated tankers instead of diesel for shipping crude. The operation of steam tankers would significantly reduce NO_x emissions in the region, thus leading to lower NO_2 levels and reduced contribution of ozone precursors. However, the SO_2 emission levels for the region would increase with steam tankers.

- Use methanol as a fuel for diesel tankers to reduce NO_x emissions.

- Use NO_x controls on process heater stacks by applying thermal de-NO_x or selective catalytic reduction (SCR).

6.3 ONSHORE WATER RESOURCES

6.3.1 Surface Water

Instances of cumulative impacts to an individual surface-water body are generally limited to a few specific locations because of the characteristics of the resource. In only a few locations does more than one project affect a single surface-water body. There could be a regional incremental effect from projects in several individual watersheds.

The only projects that lead to direct cumulative impacts in conjunction with the proposed Chevron project are the Getty Gaviota marine terminal and the Bixby cluster development. These projects would have increased effects upon streamflows and water quality in the vicinity of the Gaviota site for Getty and on the Bixby portions of the pipeline alignment for the cluster development.

Cumulative water requirements for Getty and Chevron development at Gaviota have raised the possibility of damming and diversion of surface water in Canada San Onofre. Such activities would have Class I local impacts on the surface-water resource.

Cumulative impacts to surface water would result from the additional grading required for new development. The sediment yields, even with properly mulched slopes, would be increased over the amount predicted for the proposed project. At Gaviota, 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. For all three cumulative scenarios, regional surface-water impacts would increase because of construction of pipelines connecting Ellwood to Gaviota. Coupled with proposed pipelines from Point Conception to Gaviota, every drainage from Point Conception to Ellwood would be affected by increased sediment loadings as well as potential spill impacts. Spill likelihood and impacts would vary slightly depending on number of pipelines and content (e.g., dry oil vs wet oil).

Impacts associated with construction and grading activities for cumulative facilities (e.g., tank farms) would be local and short-term, and similar at the different locations being considered. Distinctions among alternative processing facility sites with respect to pipeline construction impacts are lost at the cumulative level as equivalent lengths of pipeline would be required to connect production and processing facilities with transshipment points for all three cumulative scenarios. The Base Case and Alternative I would have no surface impacts related to transportation from a consolidated facility, as both assume tanker transportation. Alternative II would have the potential for additional surface water impacts, due to disturbances associated with additional pipelines in Corral/Las Flores Canyons. Future offshore development would have negligible direct impacts on surface water resources.

In order to supply future non-oil related water demands (estimated to be about 1000 acre-feet/year for South Coast urban areas), 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.

MEASURES TO MITIGATE CUMULATIVE IMPACTS TO SURFACE WATER RESOURCES

The additive/potentially cumulative impacts to surace-water are related to effects on streamflow of potential cumulative withdrawals for the Chevron and Getty projects. (See Section 5.3.2.) Such withdrawals would be expected to have Class II regionally significant impacts on streamflow in at least Canada de San Onofre and Canada de Gaviota, which are flow-limited trout waters. These impacts would be mitigated by use of desalination as the water supply for the Chevron and Getty projects.

Other measures 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.

6.3.2 Groundwater

Projects considered in the cumulative analysis of groundwater impacts are the proposed Chevron/Texaco projects, the proposed Getty project and the proposed Gaviota State Park expansion.

Water requirements associated with the Base Case cumulative scenario range from 380 to 690 acre-feet/year. As noted in Section 5.4.2, project requirements alone far exceed available groundwater supply from the three site watersheds. Withdrawals would create a severe overdraft condition, excessive drawdowns and the conditions for seawater intrusion. Impacts would be significant but mitigable by desalination (Class II).

In addition, the demand for domestic water supplies in the urban areas of the County brought about by the population growth induced by this and other projects could cause significant demands on the regional water-supply resources. Urban areas on the South Coast are capacity-constrained with respect to the water supply, for the most part because of overdrafted groundwater basins. Development of groundwater resources in the Gaviota area to meet project water requirements would preclude other less intensive uses, through pre-emption of the resource. Alternative sources of supply, e.g., desalination, would be technically feasible but economically less viable for small users.

CUMULATIVE IMPACTS TO GROUNDWATER

Mitigation of cumulative impacts would depend on timing of construction and water requirements of the projects.

The discussion of mitigation measures and secondary impacts presented in Section 5.3.2 is generally applicable here with additional water requirements associated with additional projects, more water would need to be produced by desalination to maintain impacts at Class III levels.

Cumulative groundwater impacts for the case of minimum project withdrawals would be mitigable to Class III levels with use of additional sources in Gaviota Canyon, though Class I surface water and aquatic biology impacts in Gaviota Creek would be created..

6.4 MARINE WATER RESOURCES

6.4.1 Impacts of Cumulative Scenarios and Their Significance

Considering the Base Scenario only, one may expect the discharge of about six or seven times the waste water expected in the proposed Chevron/Texaco project discharges, excluding spills. The amount of oil spilled would increase, but probably not by an equivalent factor since common facilities, such as the pipeline from Platform Hermosa to shore, would be used in some cases.

The components of the cumulative scenario would be spread out over a 100- to 140-mile (160-220 km) coastal stretch. (See Figure 6.0-1.) Not all of the approximately 20 platforms will be operating simultaneously, or - if operating - producing the same quantities of oil and pollutants. Thus, marine water-quality impacts will not be directly proportional to the number of facilities, but this number may be used to anticipate the overall boundaries of the impact magnitude.

All of the marine water resource impacts considered potentially significant in Section 5.4 also apply to the cumulative scenario. These include: (1) the discharge of drilling fluids containing biocides or chromium; (2) oxygen depletion near waste water discharge points; (3) the discharge of potentially toxic inorganics in produced water (e.g., ammonia, hydrogen sulfide); (4) the accumulation of pollutants in sediments; and (5) oil release-related impacts.

Except for items 4 and 5 above, the identified impacts are all near-field, i.e., restricted to the areas generally within 100-1000 m of the point of discharge. The near-field impacts do not take on any added significance in the cumulative scenarios except to the extent that they contribute to the long-term accumulation of pollutants in sediments.

There may be some small lowering of the dissolved oxygen (DO) concentration, over a defined regional area, in the deeper waters of the Arguello Slope, as a result of platform discharges. If it is assumed that the discharged, oxygen-demanding waste waters remain at (or below) the discharge depths of 100-300 feet, and that the oxygen demand is as high as 3,000 mg/L (maximum), then the Area Development type of scenario involving eight platforms in a 90-square-mile (230 km^2) area could lead to a lowering of 1 mg/L DO over a 4-cm depth each day. The probability of this scenario, which approaches a worst-case situation, appears to be low if, as projected, the discharge plumes are positively buoyant.

Certain pollutants (e.g., heavy metals and organics of low solubility) tend to associate with particulates. These particulates are frequently very small and easily transported over long distances (several tens of kilometers) before settling to the seafloor. Over the 30- to

40-year period associated with the operations in the cumulative scenario, it is possible that large areas of the ocean sediments in the area would receive a significant flux of such polluted particulates. At present, insufficient data are available on the long-term changes this might cause in the composition of the sediments and the overlying water. A review of some studies for areas in the Santa Barbara Channel, the Georges Bank, the Gulf of Mexico and the Southern California Bight areas affected by municipal discharges is given in Appendix H. Accumulations of some metals and hydrocarbons have been noted, but the significance of such accumulations is not clear and serves as one basis for monitoring activities discussed in theis EIR/EIS.

The likelihood of potential impacts associated with oil spills increases in the cumulative scenarios. One might expect, for example, the overall probability of spills in the region, including those due to marine traffic casualties, to increase by a factor of about two to four compared to existing conditions. There would be a high probability of a 1,000-barrel spill and perhaps a 20 percent probability of a 100,000-barrel spill associated with the addition of the new projects in their lifetime. These higher spill probabilities increase the potential for significantly adverse (Class I local and regional) water-quality impacts correspondingly. Oil spills can also contribute to the above-mentioned issue of contamination of sediments, especially when the spill reaches nearshore waters.

Appendix H, Section 5.4.3 [B], contains additional analyses of expected discharges of solids, oil, metals and other pollutants for a cumulative analysis. The flux of discharged solids, for example, is estimated to reach 10^5 metric tons/year over the duration of drilling and production, a figure that is 7 percent of the background detrital sediment flux into Santa Barbara Basin. Associated with these solids, however, are pollutants which may accumulate over time leaving extensive areas of the seafloor with significant changes in chemical properties. The areas so affected may be on the order of square kilometers to several tens of square kilometers. The extent to which these changes, and those seen in the marine life inhabiting the areas, will be similar to those seen in other areas, such as the Southern California Bight off Los Angeles, is not known. Such a comparison involves many assumptions and thus the area estimates should be considered not a prediction, but an indication of the extent of the impacts that may be involved.

6.4.2 Mitigation of Cumulative Impacts

All of the mitigative measures discussed in Section 5.4.6 for impacts associated with platform discharges, oil and gas processing plant discharges, and oil spills take on a greater import in the cumulative scenario, primarily because of the possibility of long-term accumulation of pollutants in sediments, and the added probability of oxygen depletion in areas where facilities may be clustered on slopes adjacent to deep, oxygen-poor waters. (See Section 6.4.1.)

The additive impacts on deep basin-water quality mentioned above are of unknown extent because of insufficient data on discharge fate and the range of variation in the receiving environment, and thus of uncertain significance. This uncertainty provides impetus for the monitoring program discussed as a mitigative measure in Section 5.5.5. The program would integrate studies of first-generation facilities on the Arguello Slope yielding information on the specific effects of contaminants in each effluent, especially produced water, the amounts of these chemicals in area waters and sediments, the partitioning of chemicals in marine organisms and sediments, and the resulting toxic impacts. At least second-generation facilities could then be conditioned as necessary if adverse impacts are evident. Details of the recommended program are provided in Section 5.4.5(A) of Appendix H.

The mitigation of oil spills in the cumulative scenario may require a higher level of area-wide and agency-wide planning and preparation than is currently envisioned. The region must ensure that Federal agencies (e.g., EPA and U.S. Coast Guard spill response crews), state and local agencies, the offshore operators and their spill clean-up contractors are prepared to respond in a rapid, coordinated way to all potentially significant spills. See Sections 5.5.5 and 6.5.2 (Mitigation Measures for Marine Biology Impacts), and 6.11 (System Safety and Reliability) for additional discussion of oil-spill mitigation measures.

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.

CUMULATIVE ACTIVITIES AT GAVIOTA

In the base scenario with the proposed Chevron and full-scale Getty projects operating at the Gaviota site, cumulative impacts of construction, and vessel traffic related to marine terminal and supply/crew base operations would have the potential to create canopy loss impacts on Kelp Bed 31 of Class I or Class II regional significance, depending on the extent of mitigation employed. Waste water discharge volume from the proposed Chevron outfall would increase by a factor of about 2 with the proposed addition of Getty project discharges. If a presently hypothetical consolidation of oil and gas processing for Coal Oil Point and other western Channel production were to occur on the Gervais Fee property at the Gaviota the discharge volumes would be closer to three times as large as those from the proposed project above. However, the likely impact of these increased amounts of discharge would still be of Class II local significance. (See below.)

CUMULATIVE EFFECTS OF NEARSHORE DISCHARGES FROM SEVERAL PROCESSING FACILITIES

In a case where large-scale onshore processing occurred simultaneously at Gaviota, Coal Oil Point, and Las Flores facilities, three nearshore zones could be impacted by discharges similar to those proposed for the Gaviota facility, each with Class II local significance. Taken together, this type of effect on three South Coast nearshore areas can be considered of Class II regional significance because of the potential for oxygen depletion and/or ammonia-related stress on fish and shellfish populations of importance to South Coast commercial fisheries. See Section 4.5.2 of this report and Section 4.5.6 of Appendix I for more detailed information on species present in these waters.

CUMULATIVE EFFECTS ON PLATFORM CONSTRUCTION AND OPERATIONS

As noted in Section 5.5 with respect to the Area Study development, construction and operation of a total of 15-20 platforms and associated pipelines on the Arguello and Santa Barbara Basin Slopes could have additive, regionally significant impacts on hard-bottom benthic communities 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 expected to limit impacts to regional insignificance.

CUMULATIVE EFFECTS OF OIL SPILLS

The cumulative development scenarios indicate the potential for 2-4 times greater probability of offshore oil spillage in the Study Region than prevails today. In particular, Alternative I, in which the accelerated development of the Santa Ynez Unit would occur in conjunction with continued reliance on tanker transport leads to a cumulative probability of about 20% of at least one spill of 100,000 barrels of oil in the scenario timeframe. (See Appendix O.) 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 Santa Ynez Unit Development [Dames & Moore, 1982] suggests that additive cumulative risks would occur for that development and the proposed Point Arguello Field development for resources along the coast between Point Conception and Point Arguello and in Cojo Bay. SYU would pose essentially non-additive (to Arguello Field) risks to the biota of the South Coast between Cojo Bay and Ellwood unless the alternative offshore Platform Hermosa to Gaviota pipeline were part of the Point Arguello Field development. However, additive cumulative risks to the biota of the Point Conception to Ellwood coastal area would be expected from the SYU, Getty Gaviota and Coal Oil Point projects in circumstances like the Cumulative Base Scenario, in which the Getty marine terminal and the OS&T co-exist. The resources at greatest cumulative risk are likely to be seabirds and rocky intertidal habitats.

A major spill anywhere in the Region would be expected to have Class I regionally significant impacts on seabirds, with high impact potential for different reasons throughout most of the year. One or more rocky intertidal habitats of recognized regional significance between Ellwood and Point Arguello or on the coast of the Northern Channel Islands would be at likely risk greater than or equal to one-percent of Class I impacts in the event of a major spill. Although the biota 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 changes enduring more than five years would be expected to follow a major landfall of fresh or partially weathered oil.

Depending on spill conditions, particularly spill origin and the extent of significant 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 Local Coastal Plan is Naples Reef, which would be at relatively low risk from spills originating from the Point Arguello 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. While the overall probabilities suggest that it is unlikely that a major spill would reach one or more of these areas, 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 muds and cuttings deposition around each group of production platforms. In addition, the following measures are also considered feasible.

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 pre-empt 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 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 Santa Ynez Unit and Point Arguello Field would illustrate this approach. This approach would complement the third principal means of reducing cumulative spill probability, which consists of determining the acceptable cumulative probabilities (particularly for major spills) and permitting only phased development to restrict the numbers and types of concurrent projects to stay below the upper limits of probability of rare or extraordinary risks.

ACTIVITIES AT GAVIOTA

The measures listed in Tables 5.5-1 and 5.5-2 and discussed in Section 5.5.5 would partially mitigate cumulative effects of full-scale marine terminal, processing, supply and crew activities at Gaviota. Minimization or elimination of pier construction and use of alternative sites for supply and crew vessel traffic would be a particularly effective means to limit effects on kelp Bed 31 to a Class III level.

PROCESSING-FACILITY DISCHARGES

Consolidation of onshore processing at a minimum number of sites and 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 insufficient, reinjection of produced water could be feasible on a case by case basis.

6.6 TERRESTRIAL AND FRESHWATER BIOLOGY

6.6.1 Effects of Cumulative Scenarios and Their Significance

OIL RELATED DEVELOPMENT - BASE SCENARIO

Construction Related Impacts

The consolidated Getty marine terminal at Gaviota, Getty processing facilities at Gaviota, Arco processing facilities in Eagle Canyon, and a dry-oil pipeline from Ellwood to the Gaviota marine terminal would be constructed in the cumulative base scenario. Construction of components of these onshore oil related facilities would likely result in additional adverse impacts to portions of recognized environmentally sensitive habitats [ESHs]. Projects would adversely affect one or more of the following: riparian habitat, native grassland, sycamore-oak woodlands and anadromous trout streams and some rare and declining species. Such impacts would be significant at the regional level (Class II). They represent potential cumulative losses of portions of regionally the same type of ESHs that are associated with the proposed project. Habitat loss impacts on individual wildlife species, except freshwater fish, are likely to be at least locally significant (Class II) and are not necessarily additive where repopulation is possible.

Oil project-related projected induced population growth would result in likely increase in housing and shopping area related construction habitat loss, depending upon its location and type; could be locally to regionally significant (Class I or II).

Expansion of existing oil treatment at Ellwood (Arco) and of only gas treatment in Las Flores Canyon (Popco) would not add directly to the regionally significant impacts of the proposed project or other projects in this cumulative scenario.

The scenario variation consolidating oil and gas processing at Gaviota from all existing small facilities between Point Conception and Ellwood, including Coal Oil Point production, would not alter impact significance along pipeline routes but could increase impacts at the Gaviota site by consumption of additional areas of nature grassland on the Gervais Fee property. The consolidation would shift proposed gas processing from Eagle Canyon to the Gaviota site, eliminating the potential for significant impacts at the former location but adding to significant impact at the latter.

Accidents and Catastrophic Events

An oil spill impacting a perennial stream with downstream lagoons or wetlands would be regionally significant at the Class I level. More pipeline crossings of streams would exist in the cumulative scenario. The potential for an onshore pipeline-related oil spill would roughly double from that of the proposed project with the addition of numerous stream crossings with the Ellwood to Gaviota pipeline, but would still remain relatively unlikely (1-5 in 10,000 year range). Spills in intermittent streams are more likely to be locally than regionally significant (Class I). The scenario variation that consolidates processing at Gaviota reduces the number of locations having the potential for facility-related fires and onshore processing component spills, it thus reduces the number of terrestrial resources at risk, and facilitates contingency planning for impacts that would have Class I to Class II regional significance.

Air Emission Impacts

The results of air quality modeling for the cumulative scenario (see Section 6.2) show that one-hour worst case peak concentrations for SO_2 (0.5 ppm) in the Gaivota area are within the range that can damage sensitive plant species with a one-hour exposure. This would be a significant impact (Class II). Worst case one-hour NO_2 levels (0.75 ppm) would be much higher than for the proposed project, but not at a level that would have significant adverse impacts on plants with infrequent events. However, worst case 24-hour averages of SO_2 (0.2 ppm) and NO_2 (0.15 ppm) are at a level where synergistic adverse effects do occur on vegetation (see Appendix J).

These modeling results imply that cumulative development with a Gaviota marine terminal would have a long-term adverse impact on vegetation (Class II).

These results also imply that such increases in NO_2 and SO_2 (ultimately SO_4, which is already high) could increase the incidence of and severity of acid fog events. There was no quantitative modeling of acid fog events within the scope of this project, and baseline measurements are not available. However, the potential for acid fog damage to sensitive plants, at a minimum, appears to be a possibility. (See Section 5.2 and 5.6 above.)

Increments in cumulative scenario worst case ozone along the trajectories chosen for modeling are small. The largest change would be in the Santa Ynez Valley where worst case ozone levels could exceed 0.12 ppm. These levels could increase adverse effects on agricultural crops (especially grapes and citrus) and other sensitive species.

OIL-RELATED DEVELOPMENT, ALTERNATIVE I SCENARIO

The replacement of the OS & T System by a processing facility in Corral/Las Flores Canyons would adversely affect by major tree removal a riparian habitat and oak woodland that is regionally unique in its high quality, and the resulting loss would be of Class I regional significance.

This alternative would not result in any real reduction in pipeline construction between Ellwood and Point Conception. Hence, the overall impact potential to ESHs due to pipeline construction and operations remains essentially the same as for the base scenario.

The addition of the Las Flores onshore facility would place terrestrial biota at an additional location at risk from a major facility-related fire or oil spill with impacts ranging from Class III to Class I significance, depending on the nature of the event.

While air quality modeling was not done for this scenario, it is expected that the increased throughput due to processing in Las Flores Canyon instead of the OS & T, would increase concentrations of SO_2, NO_2 and O_3 during the production peak. As with the Base scenario, impacts would be regionally significant at the Class II or Class I level.

OIL-RELATED DEVELOPMENT, ALTERNATIVE II SCENARIO

The cumulative habitat loss and accident-related impacts for Alternative II would be generally the same as for Alternative I. The Bakersfield and Los Angeles product pipelines would likely result in at least locally significant (Class II) impacts that could be cumulative with those already noted, but their analysis is outside the scope of this effort.

Air quality modeling was not done for this scenario. The use of these pipelines instead of tankers would be expected to reduce SO_2 and NO_2 emissions. It is possible that this might reduce adverse SO_2 and NO_2 synergistic effects on vegetation below significance thresholds. (See Section 6.2.)

NON-OIL RELATED DEVELOPMENT

Only three of the proposed non-oil developments represent significant cumulative impact potential. While many of the remainder could each have locally significant impact potential, their contribution to cumulative effects would be of Class III regional significance.

The expansion of the Santa Barbara Airport has been described to include expansion into Goleta Slough wetlands, which would have significant impact potential on the slough and adjacent habitat. As the Goleta Slough habitat is an ESH unique in the region, these impacts are considered potentially regionally significant at the Class I level. This development would also add directly to the cumulative adverse impact of various projects on Santa Barbara County's declining wetland habitats.

The Bixby Ranch cluster residential development as portrayed in the Master Plan for development of Cojo/Jalama Ranches would adversely impact the streams and riparian drainages also impacted by the proposed project pipeline (Class II). This project would further increase the overall decline in county riparian and stream habitat. Its uncertain timing would likely preclude directly additive impacts on the same streams as the proposed pipeline. While the development is not considered likely in this open space area, it would be expected to approach or exceed thresholds of human disturbance for such wide-ranging fully protected species as the mountain lion, and would therefore have potentially Class I or Class II regional significance. The impact potential would be additive if the project alternative Point Conception processing site were developed.

Gaviota and Refugio State Beach expansion plans are unspecified at this time. If these result in additional impacts to the respective streams and lagoons through construction and/or human access, they would further contribute to potentially significant (Class II) adverse impacts on these ESHs, at least one of which supports the tidewater goby and both of which have supported steelhead runs.

6.6.2 Mitigations for Cumulative Scenarios

OIL-RELATED DEVELOPMENT

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 oil related cumulative development. These are listed below:

- Establish a long-term regional monitoring program of selected biological resources/areas (including data on the regional status of declining species) to determine "normal" conditions and provide a basis for assessing possible changes related to oil and gas development from construction, operation, and accidents; monitoring of disturbance effects on Monarch butterfly trees and the turkey vulture roost at the Gaviota site should be part of this program.

- 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/o upgrading at impact 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.);

- 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. (Spanish moss is an example, but it may be too sensitive for existing conditions.) Require preparation of plans for further mitigation if degradation occurs. Restricting the rate of development (i.e., simultaneous processing) may be the only reliable mitigation for air quality impacts; and

- Establish fees for oil development projects that would support research, area monitoring, and acquisition, habitat improvement or restoration related to cumulative impacts.

NON-OIL RELATED DEVELOPMENT

Mitigation of the impacts of airport development on Goleta Slough wetlands would likely require avoidance of this habitat. Other mitigation that might reduce impacts include wetland restoration and offsite habitat improvement. (The feasibility of the latter is uncertain.)

Mitigation of impacts from Bixby Ranch development to stream habitat would include development and implementation of a plan for preserving or reestablishing disturbed riparian woodland and downstream habitat resources. Elements of such a plan would be similar in many respects to the measures recommended to mitigate the proposed pipeline crossings of riparian ESH in Section 5.6.5.

The mitigation of the impacts of non-oil development projects would require action by various agencies not necessarily represented by the Joint Review Panel responsible for the proposed project.

6.7 CULTURAL RESOURCES

6.7.1 Effects of Cumulative Scenarios and Their Significance

ONSHORE CUMULATIVE EFFECTS

Many of the foreseeable projects included in the cumulative scenarios could dramatically impact archaeological sites located near beaches and canyon mouths. These areas are the most sensitive archaeologically, because they have the highest density of sites. Such sites contain important scientific information concerning prehistoric population size, technology, economy, site structure, trade, cultural adaptations, paleo-environments, and the like. These village sites are especially of concern to local Native Americans. Significant and not fully mitigable (Class I) impacts to archaeological resources and Native American concerns are expected. Cumulatively, the effects of such impacts will be exacerbated by the current trend of agricultural expansion in the ridgetop/foothill areas west of Goleta.

Population growth induced by oil and gas developments can also affect cultural resources. Increased recreational use in the area as a result of the expanded commercial and industrial activity can affect archaeological and historical sites but actual impacts are expected to be minimal (Class III) because the current day-use recreational facilities are abundant, relatively uncrowded, and they can accommodate the projected increases in use. Camping facilities may be unable to meet the needs of temporarily employed, in-migrant construction workers.

The greatest population-related threat to cultural resources is associated with the increased demand for housing and water. Changes in the low-density and open-space policies, as opposed to changes in water usage controls, would result in greater impacts to cultural resources but these could be avoided or otherwise considered during the planning and environmental review processes and are thus considered Class II impacts.

Class I impacts would probably result from the reduction or elimination of the Goleta water restrictions. If these restrictions were changed, zoned lands west of Goleta would be prime locations for new housing developments which would probably concentrate on ridges between major drainages and up in the foothills.

The construction of new infrastructural components may be necessary. Cultural resources that could be directly affected by these impacts are considered Class II in nature because they would be considered in the environmental planning and review process.

OFFSHORE CUMULATIVE EFFECTS

Offshore effects can only be described generically and briefly because, relative to the onshore project areas, little useful data on the nature, location, and information potential of offshore cultural resources are available. Based on current experience, it does not seem likely that many resources will be affected offshore because they seem to be relatively scarce and easily avoided. Also, MMS stipulations on leases require operators to avoid anomalies of potential cultural significances unless they determine through investigation, that the anomalies are not significant. The stipulations also require operators to monitor installation and pipelaying procedures and to halt activities, until given guidance by MMS, if potential cultural resources are encountered.

CUMULATIVE IMPACTS TO NATIVE AMERICANS

Cumulative impacts will result in further degradation of the environment and loss of cultural resources, both of which are of great value to Native Americans. Archaeological investigations will necessarily be required at a relatively large number of sites during planning activities associated with cumulative developments and a smaller but substantial number of them are likely to be impacted. The magnitude of these impacts results in Class I impact classification. However, employment opportunities as a result of cumulative projects may well result in substantial beneficial economic impacts to some Native American groups and individuals. Such benefits, however, will be temporary in nature and of little consequence to most Native Americans.

A site of the utmost significance to Native Americans in the vicinity of the proposed Gaviota facility, although not within the impact zone as now designed is the historic village of 'Onomyo (SBa-97). It almost certainly has burials; in addition, numerous living descendants of residents of this village have been identified. These facts mean that any disturbance of the site would constitute Class I impacts. The proximity of the site to an area where there are proposed oil developments creates a necessity to point out its extreme sensitivity to Native American concerns.

The cumulative impacts of development projects now under consideration in the study area (primarily onshore) will be Class I in nature whether or not the proposed project is approved. However, the damage inflicted on the archaeological and other cultural resources in this coastal area by the proposed project represents a greater threat to these resources than any other single project currently under consideration.

6.7.2 Mitigation Measures Applicable to Cumulative Impacts

- Evaluating the effects of the cumulative projects on onshore cultural resources will require test excavations at a large number of sites of concern to the scientific community and the public, especially local Native Americans. Mitigating those effects would require full-scale excavation of some, if not many, sites. To avoid significant information losses from rapid, multi-project developments as expected in Santa Barbara and Ventura Counties, all data recovery programs would need to be coordinated and to include initial, applicant-funded survey and testing programs, as well as post-EIS excavation programs designed to mitigate impacts.

One way to prevent loss of scientific information would be to develop a single Cultural Resource Compliance Program, coordinated among all cultural research programs (including applicant funded initial studies) in consultation with concerned Native Americans by the appropriate county agency in the affected county, i.e., Santa Barbara or Ventura Counties. This program is envisioned to: a) be regional in scope, b) define the types and content of cultural resource studies and coordination activities required to comply with relevant legislation, c) establish standard sequences for conducting these programs and activities, and d) create standard operating procedures for those teams conducting the programs and activities specified by the Compliance Program. Unless such a program is created, the many different research activities associated with the myriad of projects making up the cumulative scenario will not contribute to an appreciably greater understanding of a rapidly diminishing resource base. Implementation of this program, while unable to mitigate to insignifiance the impacts of such a large portion of the resource base, would result in a meaningful reduction in data loss and a corresponding gain in useful data.

No additional mitigation measures are necessary wth respect to offshore cultural resources. The procedures employed as part of the offshore lease sales provide the appropriate safeguards to protect offshore cultural resources.

As stated in the preceeding section, cumulative impacts to Native Americans are of the Class I type, therefore no acceptable mitigation of these impacts is possible. However, one procedure exists which may help to ameliorate these impacts for some Native Americans. This procedure involves the removal of the unused Union oil-related structures at Point Conception and the restoration of natural vegetation in their place. While this will, by no means, allay the many concerns expressed by Native Americans about the cumulative effects of oil development in the area, it would represent in a small way a recognition of the importance of the point to a sizeable portion of the local Native American community.

6.8 AESTHETIC RESOURCES

6.8.1 Visual Resources

EFFECTS OF CUMULATIVE SCENARIOS AND THE SIGNIFICANCE

Cumulative visual impacts refer to the additive effects due to two or more activities or features occurring within a single view or a set of integrally-related views. Under this interpretation, offshore exploration and development activities in the vicinity of Point Conception and Point Arguello are pertinent, as is other offshore and onshore oil development in the vicinity of Santa Barbara. (See Figure 6.0-1.) Non-oil-related development expected to occur near proposed onshore pipeline routes and processing facilities are also relevant. (See Technical Appendix L for a detailed discussion of how cumulative impacts were defined for visual resources.)

Offshore Development

The cumulative scenario will result in the development and introduction of up to 18 platforms offshore Santa Barbara County. These platforms and associated exploration activities would be within view of Ocean Beach County Park and Jalama Beach County Park. Depending on the exact location of the offshore activity, exploration would also be within view of Bixby Ranch Road, Southern Pacific Railroad and a few residences at the higher elevations of Hollister Ranch.

From Ocean Beach, platforms would be visible, however, their appearance would have a negligible impact on the views from the beach. The additional two to four production platforms plus exploration activities in the area could compete with positive elements of the scene though their location, being southwest of the beach, would keep the 5-7 plaforms from wholly dominating the sweep of the coastline. The cumulative impact would therefore be highly significant and considered Class I.

With respect to views from Jalama Beach, the railroad, and Bixby Ranch Road, exploration activities would produce negligible incremental effects. Exploration activity, if visually evident, would cause adverse visual impacts, but these would be insufficient to lower overall visual conditions and overall quality further. The impact is, therefore, considered Class III.

Onshore Facilities

The onshore oil and gas processing facilities defined in the base scenario would affect the views from U.S. Highway 101, Hollister Ranch

Road, Vista del Mar School and Gaviota Village. Views from Gaviota Beach State Park are not considered in this assessment of cumulative impacts. Although the Getty marine terminal pier, SALMs and traffic would be within view from the beach, the Chevron facilities would be screened by the coastal bluff.

The cumulative impact of the proposed consolidated facilities would be to adversely affect the visual quality of the area and the impacts would, therefore, be highly significant and long term (Class I).

A variation on the base scenario calls for phasing out other small oil processing facilities west of Ellwood and consolidating them at Gaviota. The extent to which impacts would differ from the base scenario would depend on the degree to which different uses of the Gervais Fee property would be visible. In any case involving the full-scale Getty project and/or consolidation of facilities for Coal Oil Point production on the Gervais Fee property, the visual condition of the area would be significantly changed and would so dominate the field of view, because of the size and/or distribution, that the character would appear out of place with the rest of the region and would therefore be considered Class I. Visual quality from Gaviota to Ellwood after consolidation would not benefit appreciably from the consolidation because few travel routes and public use areas are currently within view of existing processing facilities. From the highway these facilities are generally difficult to see and can be assumed to be minimally noticed by the general public. Rail views would be improved somewhat by removal of processing facilities between Ellwood and Gaviota since the line passes by or through several of these facilities.

Cumulative Scenarios I and II

Both of these alternative scenarios would call for interim operation of Getty's Gaviota marine terminal until 1987. Scenario I focuses on the Las Flores Terminal, while Scenario II focuses on pipeline transportation of oil production. In either case, onshore processing would occur at both Gaviota and Las Flores.

Of importance to cumulative visual impacts is that the Gaviota marine terminal would no longer be required after the installation of either the Las Flores Terminal or the pipeline system. If, the terminal were no longer needed, the marine terminal pier and SALMs would be removed. Visual impacts for views from the west would improve to the level that would have occurred solely because of Chevron's processing facilities. It is assumed that Getty's storage tanks north of the highway would remain in place under Scenarios I and II. Views from the east, while improved by removal of the pier, SALMs and berthed tankers, would still be significantly impacted by the tank farm and the limited views of Chevron's facilities.

MITIGATION MEASURES

Offshore Development

The impact of the proposed offshore activity described under the cumulative scenario cannot be mitigated to an insignificant level. The number of platforms, the related support activity, plus exploration in the vicinity would, for most of the time, be visually dominant. No mitigation measures are possible to reduce the impact of the offshore development. The adverse effects would be significant, long-term and of Class I impact/category.

Onshore Facilities

The views of the proposed onshore facilities cannot be screened completely. Where such views can be screened, the quality of the scene would be reduced by obscuring views to the ocean and the surrounding mountains. Such screening (ocean viewing) would also not conform with View Corridor Overlay designation as defined by area County Policy 4-10. One would also have to assume that Caltrans would install and maintain plantings in the right-of-way north and south of the highway. Nonetheless, because some reduction in visual impacts would occur, roadside and buff top planting is recommended. Because positive, as well as negative, aspects of the scene will be obscured, the net effect will remain adverse and substantial and would be rated as a Class I impact.

With respect to the variation of the Base Scenario (Scenarios A and B) the scope of the facilities would also be too extensive to be mitigated to insignificance. Under Cumulative Scenarios I and II, the Getty marine terminal would be phased out in 1987. Assuming that the pier and SALMs would be removed, the visual effect on ocean views would be beneficial. Screen plantings for the tank farm would still be desirable but would not mitigate the visual impacts to the point of insignificance, as noted.

Similarly, the level of supply boat activity in and around the supply bases will also increase, thus causing more impacts. The impact is not considered significant (Class III).

6.8.2 Noise

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

The introduction of each of the onshore facility components included within the cumulative scenarios will not significantly change the overall regional level of impact. On a localized basis, the level of noise impact related to the individual projects will be no greater than that discussed in Section 5.8.2. Cumulative noise effects from increased tank truck trips should be minimum. (See Section F of Appendix L.) With the expanded level of offshore activity in any of the cumulative scenarios, overall noise levels at the Santa Barbara Airport will be increased because the increased number of helicopter flights.

MITIGATION MEASURES

Process plant construction noise may be reduced by the use of temporary barriers around the noisier sites. Constructing the facilities at night would also reduce day time noise impacts where appropriate. Design features should be incorporated into the proposed processing facilities that will minimize noise levels. These should include structural barriers and enclosures around noise generating equipment, intake and exhaust silencers, and mufflers.

Pipeline construction near noise sensitive locations should be restricted to those hours of the day when local presence is minimized. In general, construction activities would not occur in the evening or nighttime hours when near any noise sensitive receptors. During all phases of the proposed development and construction, OSHA noise exposure standards should be observed to protect the health of on-site personnel.

The total elimination of helicopter overflight noise impacts is an unlikely prospect. In addition to adherence to the Santa Barbara Airport noise regulations, helicopters could be routed directly away from shore to specified distances to reduce substantially the flight time spent near noise sensitive land receptors.

Support boats could be required to travel in designated lanes as far from shore as practical. The entering and departing segments of travel could be speed limited to reduce the engine exhaust noise levels.

6.9 SOCIOECONOMICS

The effects of cumulative regional offshore and onshore oil development on the tri-counties would be substantially larger than that related solely to the applicant projects, and would have important implications on the socioeconomic conditions in the tri-counties area.

6.9.1 Regional Growth

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

Table 6.9.1 summarizes key economic indicators of regional growth resulting from the various cumulative scenarios.

Regional Employment Impacts

Total employment impact for the Base scenario is projected to peak at 21,592 jobs in 1988 and to decline thereafter until 1998, when it increases slightly and then decline to the long-term level of 22,630 jobs in the year 2000.

For Scenario I, projected employment peaks at 25,570 jobs in 1987 and then declines over time and reaches a level of 20,030 jobs in 2000. Compared with the Base scenario, the impacts for Scenario I are relatively stronger before and in 1988, and slightly weaker thereafter.

It can be observed that the annual impact patterns for Scenario II remain roughly the same as that for Scenario I, except that the peak impact appears one year later in 1988. The magnitude of the impacts also remains roughly the same, except in 1985 and 1988.

These regional employment impacts by themselves are beneficial and important since they create long-term earning opportunities for residents in the tri-counties (Class IV).

Unemployment Impacts

The effects of cumulative regional onshore and offshore developments on the tri-counties would be substantially larger than for the proposed project. Peak-year (1988) cumulative employment impacts are estimated to be 21,592 jobs. As a result, unemployment would be expected to decline by 0.5 percentage point compared to baseline conditions. This unemployment impact would produce long-term beneficial and important impacts (Class IV).

The peak-year (1987) and long-term unemployment impacts under cumulative Scenario I would both be 0.5 percentage point lower than the

Table 6.9.1

Tri-county Regional Peak Year and
Long-Term Economic and Demographic Impacts
Cumulative Scenario

Socioeconomic Indicator	Base Scenario Peak Year	Base Scenario Long Term	Scenario I Peak Year	Scenario I Long Term	Scenario II Peak Year	Scenario II Long Term
Year	1988	2000	1987	2000	1988	2000
Project-related employment						
Direct jobs	2,340	4,390	2,460	4,220	2,630	4,230
Indirect/induced jobs	19,250	18,240	23,110	15,810	23,110	15,890
Total jobs	21,592	22,630	25,570	20,030	25,570	20,120
Total employed labor force						
Without project(s)	537,280	631,940	524,530	631,940	524,530	631,940
With project(s)	558,870	654,570	550,100	654,220	550,100	652,061
Percent change	4.0	3.6	4.9	3.2	4.9	3.2
Total population						
Without project(s)	1,167,080	1,350,470	1,143,060	1,350,470	1,143,060	1,350,470
With project(s)	1,212,430	44,690	1,198,390	1,388,820	55,330	1,389,056
Change	45,350	1,315,160	55,330	38,350	1,198,390	38,586
Percent change	3.9	3.3	4.8	2.8	4.8	2.9
Unemploymenbt rate (percent)						
Without project(s)	6.9	6.8	6.8	6.8	6.8	6.8
With project(s)	6.4	6.3	6.3	6.3	6.4	6.3
Change	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Personal income (million 83$)						
Without project(s)	15,406	21,267	14,885	21,267	15,406	21,267
With project(s)	16,843	22,070	15,673	21,977	14,885	21,980
Change	637	803	818	710	878	713
Percent Change	4.1	3.8	5.9	3.3	5.9	3.4
Per capita income (83$)						
Without project(s)	13,200	15,750	13,020	15,750	13,020	15,750
With project(s)	13,310	15,820	13,150	15,820	13,150	15,820
Change	110	20	130	70	130	70
Percent Change	0.8	0.3	1.0	0.4	1.0	0.4

Note: Peak year is chosen as the year with highest project-related population impacts, and varies with labor availability and project job creation.

Source: Projections by Applied Economic Systems, June 1984.

baseline, the same as that under the Base cumulative scenario. The magnitude of the peak-year (1988) and long-term unemployment impacts under Scenario II would be the same as under the previous two scenarios. As with the Base Scenario, the unemployment impacts for Scenarios I and II would produce long-term beneficial and important impacts (Class IV).

Population Impacts

Like the regional unemployment impacts, the regional population impacts under the cumulative scenarios would be substantially larger than those under the proposed projects, because the magnitude of employment requirements associated with the cumulative projects.

Peak-year (1988) regional population impacts in the base scenario are projected to exceed 45,550 persons. These impacts are far greater than those under the proposed projects. Long-term population impacts would be about 45,000 persons. These impacts are much greater than those under the proposed project.

Peak-year (1987) regional population impacts under Scenario I would be stronger than that under the Base cumulative scenario. It is projected to be about 55,300 persons. Long-term population impact under this scenario, however, would be slightly weaker than that under the Base cumulative scenario. It would be about 38,400 persons, or about 2.8 percent over the baseline.

Peak-year (1988) population impact under Scenario II would also be stronger than that under the Base scenario. It is projected to be about 55,330 persons. Long-term impact under this alternative would be about the same as that under Scenario I.

All areas within the tri-county region will not be impacted to the same extent. Direct project-related impacts will likely be greatest in the South Coast area of Santa Barbara County. Indirect impacts, on the other hand, will mostly occur in the largest urban centers located in Ventura County. See Technical Appendix M, for estimated population levels by county for each of the scenarios analyzed.

The long-term population impacts under these various scenarios in and of themselves are negligible. The associated impacts related to housing and local services are not negligible. See the appropriate portion of this section for discussion of the impact on these other activities.

Income Impacts

Under the Base cumulative scenario, regional personal income gains would be \$637 million in 1983 dollars in the peak year (1988) and \$803 million in the long term. These impacts represent about 4.1 percent and 3.8 percent increase over baseline conditions in the peak year and in the long term, respectively. These impacts are long-term and beneficial and important (Class IV). Since the relative personal income impacts are greater than the population impacts, per capita income would increase to some extent. These impacts are also long-term and beneficial and important (Class IV).

Under Scenario I, regional personal income gains would be $878 million in the peak year (1987) and $710 million in the long term. The peak-year impact under this alternative is somewhat greater than under the Base scenario, while the long-term impact is slightly smaller.

Regional personal income gains under Scenario II would be $878 million in the peak year (1988) and $713 million in the long term. These impacts represent, respectively, about 5.9 percent and 3.4 percent over the baseline conditions. Similarly, the peak-year impact under this alternative is relatively greater than under the Base scenario, while the long-term impact is slightly smaller.

MITIGATION MEASURES

Even with these large cumulative impacts, it would still be possible to maintain current South Coast planning goals for restrained population and housing growth, but only if current growth management policies - particularly with respect to water conservation planning, Santa Barbara City low-density zoning, and overall adherence to current plans regarding preservation of open space - remain in place through the year 2000. Growth of this magnitude would place significant pressures on housing prices and land values on the South Coast as residential demand continues strong in the face of limited supply.

Because of uncertainties in estimating the impacts described above, a program could be undertaken by the individual applicants or project proponents to monitor and report to regional local governments project expenditures and hiring in the area. This would provide a basis for government assessment of growth impacts due to the project.

6.9.2 Housing

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

Total cumulative peak-year 1988 housing demands would reach approximately 16,122 units for the base scenario, 18,689 for Scenario I, and 19,666 for Scenario II. Demands are significantly greater under all three cumulative scenarios than the demands associated with the proposed projects alone. This is a significant and unavoidable (Class I) long-term impact, susceptible to only partial mitigation (Class II).

MITIGATION MEASURES

Temporary housing required for those persons (direct project construction and drilling workers) whose local tenure would be too brief to make permanent housing worthwhile could be provided by the individual applicants. Joint planning of the need for temporary housing by each of the individual applicants could be coordinated by the County. Where feasible a single temporary housing facility could be developed and financed and shared by all applicants.

As much of the permanent housing requirements are in the "affordable range", an appropriate mitigation measure would be for each of the applicants to contribute funds to an affordable housing finance program. Note, however, that the feasibility and effectiveness of this mitigation is unproven.

6.9.3 Services/Utilities

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

The cumulative demands made on all utilities and services are significant (Class II). In general, impacts are approximately ten times the level of the proposed project alone in the peak year. Ventura County receives the greatest portion of impacts of the three counties.

In the case of water, if residential development is permitted to accommodate housing demand, Santa Barbara County will be affected by large water requirements, far exceeding available supplies (Class I). The Ventura and San Luis Obispo County schools would be faced with substantially greater enrollments than with the proposed project alone, and districts would incur increases in operating costs as well as capital construction costs for new classrooms (Class II). Waste water treatment and solid waste disposal are relatively high and would be sustained through the year 2000. Facility expansion would be required to meet the increased needs (Class II). A sustained measurable increase in police and fire protection staff levels will also be required. See Table 3.4-1 of Technical Appendix M for details on the size of the amount of the impacts.

MITIGATION MEASURES

Demands for water would be substantial. Water conservation could alleviate the problem to some extent, but accommodation of the projected growth would require development of alternative water sources. The individual applicants could help to mitigate this impact by contributing to the effort to locate and obtain additional water supplies, such as through seawater desalinization.

Growth-related demands for public services would be at least partially mitigated by means of existing fiscal mechanisms. County jurisdictions should continue to impose school capital construction fees on new housing units.

Increased demands on utilities and services (police, fire, waste water treatment, etc.) could be monitored by a joint county agency and the applicants, who could also contribute funding to affected agencies to help offset the additional costs. If all applicants participate in such a program, the level of these impacts would be rendered insignificant.

6.9.4 Tourism

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

As the visual environment of the tri-county area, as well as other aesthetic resources, (e.g., air quality) is further eroded by increased activity, it is probable that reductions in tourism would result. Public perceptions of the area would change in response to increased offshore and onshore facility development. For the base scenario involving a consolidated facility complex including a supply/crew base at Gaviota, the increasing industrial character of the area, increased truck traffic involved in the transport of supplies, increased supply boat traffic near shore, and the proliferation of platforms offshore could result in reduced tourist visits and associated expenditures to the the Tri-County Region. Because of the local importance of tourism, these impacts are potentially significant, though uncertain in magnitude - Class II or Class III.

As Scenario I involves the decommissioning of the OS&T, no supply base in the area, and consolidated onshore facilities mostly out of visual sight in the Los Flores Canyon area, public perceptions of the loss of amenities could be reduced and tourism effects would be reduced from those levels discussed above.

Scenario II would greatly reduce tanker traffic, involve the decommissioning of the OS&T, and could result in marginally less impact than those discussed under the base scenario. Note that among any of the options proposed, the potential effects initially may depend more upon the public's perception of the area's desirability rather than on any specific configuration of various projects' components. Additional data and analysis would be required to develop definitive estimates.

MITIGATION MEASURES

In addition to many of the other mitigation measures discussed elsewhere in this chapter, more specific mitigation measures focused toward tourism would include:

- Provision for temporary housing, funded by the individual applicants, to locate direct workers in non-tourist areas so as to minimize the impact on campgrounds and other tourist sites.

- Applicant-funded provisions for new or enhanced recreational facilities and publicity campaigns to attract more visitors to the South Coast which would wholly or partially offset any tourism loss.

6.9.5 Public Finance

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

Given cumulative offshore and onshore development impacts of population, personal income, assassed valuation, and temporary hotel/motel housing requirements associated with the Base Scenario, total

Santa Barbara County incremental expenditures are projected to exceed incremental revenues for only 1985-1986. Incremental surpluses are forecast to prevail thereafter. Overall, this is considered a long-term beneficial and important impact to Santa Barbara County (Class IV).

Very large deficits are projected for Ventura County under the base scenario over the period 1985-1986 through 1987-1988. Inmigrating population impact projections between 1985 and 1990 under this scenario will increase baseline population levels. Maintaining current per capita service standards will create very large deficits for the county in the initial development years. For the base case, the county is estimated to incur deficits of about $100,000 to $200,000 frequently over the remainder of the time period. These impacts are considered long-term significant impacts that can be partially mitigated (Class II).

With relatively large population increases in San Luis Obispo County, incremental expenditures will rise faster than incremental revenues from sales taxes, bed taxes, miscellaneous taxes and other sources in 1985. These net impacts are slight and may be considered relatively unimportant in the long-term (Class III).

Net fiscal impacts for each county government are presented for the period 1985 through 2000 in Technical Appendix M.

Effects are much more pronounced under Scenario I because of greater expenditure levels associated with larger population inmigration levels. Santa Barbara County is projected to experience deteriorating financial positions in the peak project years, 1985-1988, and positive financial positions thereafter. This effect is considered adverse in the long term but unimportant (Class III).

For Scenario I, population impacts in Ventura County of as much as 20,000 above the cumulative base scenario yield even greater deficits for the county treasury during the peak project years. In-migrating population impact projections in peak year 1987 alone will increase baseline 1987 estimated population by 11 percent. Maintaining current per capita service standards will create significantly larger deficits for the county in the initial project development years. These deficits are projected to persist, although to a lesser extent throughout the period of analysis (Class II).

For San Luis Obispo County, very small incremental negative net deficits are projected to prevail under Scenario I (Class III).

In terms of population and income impacts to the tri-counties area, Scenario II is very similar to Scenario I. The addition of the marine terminal at Gaviota for the first two years of operation, and the two new pipelines after 1988, requires some new workers and augments the property tax base of Santa Barbara County to some extent. However, relative to Scenario I, the incremental population, income, and assessed valuation are negligible. Net fiscal impacts to each of the counties are consequently quite similar to the Scenario I impact projections.

Technical Appendix M display the net fiscal impacts for each county between 1985 and 2000 for Scenario I and II, respectively.

MITIGATION MEASURES

The mitigation measures presented in Chapter V are appropriate for the cumulative impacts. The suggested mitigation measure of forming a Regional Fiscal Impact Council would be most appropriate to mitigate the cumulative projects. Given the large number of projects included in the cumulative analysis it would be necessary to manage and oversee the individual applicant mitigation requirements to insure consistency and equity.

6.9.6 Public Hazards

Large projects of the type included in the cumulative scenario may lead to a vareity of accidents or public hazards. These hazards can be grouped around the following principal components:

- Processing facilities
- Offshore platforms
- Onshore and offshore pipelines
- Transport of products from processing facilities

A formal system safety and reliability analysis was performed to assess public hazards . The analysis examined the future consequences for public safety and the potential for oil and gas spills in the environment as a possible result of the envisioned development. The analysis is based on an identification of all important accidental events; events that are unwanted, unplanned and acute. See Section 6.11, System Safety and Reliability, for a complete discussion of the potential hazards and safety impacts associated with the various cumulative scenarios. Also included in Section 6.11 is a discussion of mitigation measures associated with each identified hazard.

6.9.7 Energy

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

Cumulative impacts on the energy resource resulting from the implementation of additional oil and gas production projects are expected to be of the same type as for the proposed projects. Each would have a long-term beneficial contribution of making increased supplies of oil and natural gas available in the marketplace, thereby enhancing national security and improving the international balance of payments (Class IV).

MITIGATION MEASURES

Several energy-conserving measures are already included in projects included in the cumulative scenarios. These include consolidated offshore supply trips, ridesharing, and cogeneration. No further mitigation measures are suggested.

6.9.8 Onshore Support Activity

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

For the Base scenario, peak effects would be felt in 1988 when local area final demands would amount to about five times the levels associated with the proposed project. Specific industries which would require major expansion in existing output are the fabricated metals manufacturing and transportation industries. Output levels necessary to support the level of offshore development under this scenario would be on the order of two to three times 1979 levels.

Under the Base Scenario, reduced pressure on Port Hueneme facilities would result with concurrent pressure for further industrialization along the South Coast of Santa Barbara where the supply/crew base is proposed under this scenario. The ability of this area to support the facility and resource requirements of a supply/crew base in the Gaviota area, however, is questionable. While this alternative scenario would result in somewhat lower economic impacts on a region-wide basis, the presence of the supply crew base along the South Coast would result in differing intra-regional distribution of economic impacts and relatively higher effects being felt in the Santa Barbara area.

Peak year effects of Scenario II are felt in 1987. While similar effects as discussed above would be felt in most industries under these scenarios, the continued utilization of Port Hueneme as the supply base would exacerbate already overcrowded conditions there. Expansion of dock, wharfing and storage areas which are proposed at the port, however, would tend to relieve this situation.

MITIGATION MEASURES

Industrial expansion associated with onshore support activity could lead to significant impacts, however, appropriate planning can offset those impacts. In particular, in the event of a supply base locating on the South Coast of Santa Barbara County, industrial expansion in the county should be anticipated. Appropriate sites should be identified, and planning for water and other needs should be undertaken.

6.9.9 Vista del Mar School

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

The impacts on Vista del Mar School would be greatest under the Base Scenario since the Gaviota processing facility would be expanded to allow consolidation of onshore oil processing at the Gaviota site and Getty's proposed marine terminal and supply base are installed.

Under Scenarios I and II the processing facility would still be planned for Gaviota and therefore the impacts would be essentially the same as the base scenario.

For the Base Scenario and for Scenarios I and II the impacts are considered long-term and significant but mitigatable (Class II).

MITIGATION MEASURES

The only feasible mitigation applicable for the above mentioned cumulative impacts is relocation of the school. See Section 5.9.10 for a detailed discussion of this mitigation recommendation.

6.10 OTHER USES

Five other elements of environmental concern are addressed in this section:

- Commercial Fishing and Kelp Harvest
- Transportation
- Military Activities
- Recreation
- Coastal Land Use and Ownership

6.10.1 Commercial Fishing and Kelp Harvest

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

Overview

Cumulative effects that are likely to be greater than for the individual projects could occur for drag, set gear, 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.

Effects on Set Gear Fishing

Set gear fishing would be affected by all of the oil development projects being considered in this analysis. The set gear disruptions related to vessel traffic associated with a full-scale Gaviota marine terminal, supply and crew base 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. Impacts on the set gear fishery and kelp harvest at Gaviota could range from Class I 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

Drag fishing would be affected by the Exxon SYU development, central Santa Maria Basin development, Platform Gail, the Point Arguello State lease, and possibly exploratory activities (depending on specific location), in addition to the proposed project and Area Study development. For example, concurrent construction of the proposed project platforms and platforms Sacate and Pescado A/B2 for the Exxon SYU development could exclude dragging from about 11 percent of the rockfish grounds available in the Study Region (See Table 3.1-1 in Appendix N, Part One.) Exclusion from halibut dragging grounds could 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 are expected to be insignificant because the areas excluded by operational structures would be small. The only departure would be if long-lasting, problematic bottom alterations (e.g., anchor scars or pipeline snags) are left in productive tow areas

Effects on Purse Seining

Concurrent construction of platforms for several of the projects, along with exploratory activities (drilling plus seismic testing), could have significant impacts (Class I) on purse seining in the short term only if these activities were to make fish unavailable for harvest through exclusion from 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 would remove present uncertainty about the frequency of occurrence of this type of impact.

Effects on Kelp Harvest

Construction of the expanded Getty marine terminal at Gaviota is assumed to occur after construction of the proposed project. If this schedule is followed, disturbance of kelp bed 31 and harvest exclusion effects would be repeated, but on a larger scale. Construction impacts of a full-scale Getty terminal and crew and supply base at Gaviota 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 would further reduce the kelp surface canopy unless 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 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 in the Santa Barbara Channel, to the point where a major spill could be expected in the scenario timeframe. Such a large spill would have Class I impacts on at least some, if not all, types of commercial fishing. Based on the information cited in Section 6.5, South Coast set gear fisheries in the nearshore area between Point Conception and Ellwood would be particularly vulnerable to additive cumulative risk of preemption by spilled oil. The frequency of smaller spills would also be increased with impacts ranging from Class III to Class I, depending upon location, volume, and time of year.

MITIGATION MEASURES

The measures discussed in Section 5.10.1 to mitigate impacts of the proposed projects, alternatives and area development or commercial fishing and kelp harvest are also applicable to mitigate cumulative impacts, particularly in the nearshore waters off Gaviota. An additional measure with particular applicability to cumulative effects on drag and set gear fishing is the phasing of multiple project construction activities to avoid overlapping pre-emption of important fishing grounds. For example, steps could be taken to avoid simultaneous construction of offshore components of the Santa Ynez Unit and Point Arguello Field development projects.

6.10.2 Transportation

The onshore and offshore activities associated with the cumulative scenarios will impact to a greater or lesser extent the surrounding transportation arteries.

ONSHORE TRANSPORTATION

Effects of Cumulative Scenarios and Their Significance

The discussion of cumulative projects is based on six individual impact areas:

- Goleta area streets and intersections
- U.S. Highway 101 corridor in South Coast
- Carpinteria street and intersections
- Streets and intersections near Port Hueneme
- Gaviota area/U.S. Highway 101 intersections
- Hollister Ranch/Bixby Ranch/Jalama roads

Goleta Area - Cumulative traffic impacts in the Goleta area are expected to be long-term and significant. Improvement in existing roadway and intersection improvements will be necessary to minimize the impact of any of the cumulative scenarios. This suggests that a Class II impact classification is warranted.

U.S. Highway 101 Corridor in South Coast - The U.S. Highway 101 corridor would experience important impacts from cumulative projects. In addition to the traffic impacts from the projects listed in the cumulative scenario, increased truck traffic will utilize this corridor for hazardous waste transport to Casmalia fuels and oxygen to Vandenberg Airforce Base and solid waste disposal at various land fill sites. While subject to mitigation, it is unlikely that funding will be available for more than the widening and crosstown freeway projects. Further improvements such as widening the freeway through Carpinteria would cost tens of millions of dollars. The cumulative impact is categorized as Class I and long-term because it is not subject to total mitigation. For a discussion of the safety aspects of project related truck transport on Highway 101 see Section 6.11.

<u>Carpinteria Streets and Intersections</u> - The Chevron Pier in Carpinteria may experience additional crew boat activity because of the offshore-related cumulative projects.

It was pointed out in Section 5.10 that traffic flow conditions are expected to deteriorate in the southern portion of Carpinteria. The cause of this was identified as residential development along Carpinteria Avenue close to the Dump Road access to the pier. Residential traffic will utilize the same arterials and freeway interchanges as offshore oil workers traveling to and from the Chevron Pier. Based on available information concerning the cumulative projects, it is expected that these impacts would be long-term significant impacts that are mitigable (Class II).

<u>Streets and Intersections near Port Hueneme</u> - All of the offshore-related cumulative scenarios are likely to impact traffic levels in the Port Hueneme area. This situation will occur until such time as an alternative supply base is operational. It is difficult to estimate the actual traffic levels because of the preliminary nature of the cumulative project descriptions. It is expected, though, that the cumulative project traffic would be distributed throughout the day and not exhibit peaking during normal peak flow periods. Several streets near Port Hueneme are expected to be operating near capacity by the year 1990 (Oxnard, City of, 1980). Both worker vehicles and trucks will be using these roads and a portion of the cumulative project traffic will move during peak hours. The impact is likely to be long-term and significant (Class III) but neglible.

<u>Gaviota Area U.S. 101 Intersections</u> - The intersection flows on U.S. 101 in the Gaviota area (at Refugio, El Capitan, Getty Gaviota, Gaviota Beach State Park, etc.) should be good despite cumulative projects if the new overpass is built at the Getty/Chevron site (Class III). Prior to the construction of the overpass, as noted in Section 5.10, important traffic problems are expected since the three at-grade intersection will still be used.

<u>Hollister Ranch/Bixby Ranch/Jalama Roads</u> - The Bixby Ranch Road is scheduled to be used for access to onshore and offshore pipeline construction areas. As such, use of it would occur during a portion of 1985. Project use beyond that period would only occur if the Point Conception area is selected for the oil and gas processing site.

Only the clustered residential development proposed for the Bixby Ranch would additionally affect roads and intersections in the Point Arguello area. Traffic for this project would use Bixby Ranch and Jalama Roads. Bixby Ranch Road is presently unsuitable for project use or residential development use. Expected improvements in the ranch area are not currently well known (Urban Assist et al., 1978) though a rural character is reportedly to be maintained. No traffic would utilize Hollister Ranch Road. Traffic levels would increase, however, on Jalama Road and at the Jalama Road/Route 1 intersection. Levels are likely to be higher than those estimated for the proposed project construction phase. Those were classified as insignificant (disregarding road damage, which is unlikely if the roads are rebuilt prior to residential development). The impact for these cumulative scenarios over the long run are also judged insignificant (Class III).

Mitigation Measures Applicable to Cumulative Impacts

The mitigation measures discussed in Section 5.10.2 are appropriate for the cumulative scenario alternatives. Most of the mitigation measures highlighted below and discussed in more detail in Section 5.10.2 could be implemented by the individual project proponent and if done would impose no financial burden on the public agencies.

- Bus offshore workers
- Tunnel onshore oil and gas pipelines under U.S. 101
- Increase airport parking
- Add lanes to U.S. 101
- Accelerate Gaviota overpass construction
- Stagger timing of construction workshifts
- Bus workers to Point Conception work sites
- Upgrade Bixby and Hollister Ranch Road
- Schedule offshore crew changes at midday

OFFSHORE TRANSPORTATION

Effects of Cumulative Scenarios and Their Significance

The base scenario will include tanker operations for the total production from Arguello and Coal Oil Point at the expanded Getty terminal, and from the OS&T system at the Santa Ynez Unit. The peak crude oil production throughput at the Getty terminal will be 246,000 B/D in the 1991 time period. Assuming a range of tankers in the 30,000 to 260,000 ton capacities leads to an estimate of 160 tanker port calls per year at this terminal. The production of 80,000 B/D from the Santa Ynez Unit would add 75 port calls per year at the OS&T with tankers in the 40,000-60,000 ton range.

Overall, the annual number of tanker port calls would be 235, or 470 transits of the Santa Barbara Channel area, or approximately 1.3 transits daily. This would represent an increase in the expected channel traffic of 7 to 10 percent over the vessel traffic operations estimated in Addendum A of Technical Appendix O. This is judged significant but mitigable over the long run.

Under Scenario I, all of the production of the Santa Ynez Unit (which would increase from 80,000 to 140,000 B/D because of the greater capacity provided by onshore treatment), and the production treated at Gaviota and Coal Oil Point would be consolidated at the Las Flores marine terminal. The maximum throughput in 1991 would be 386,000 B/D which would require an estimated 225 tanker port calls per year. The increase in annual tanker transits would be 450, or approximately 1.2 transits daily. The effect on the channel traffic would be essentially equal to that estimated for the base scenario.

Under Scenario II, all of the crude oil production under consideration would be transported by new pipeline systems. For this case, there would be no impact on the marine activity in the Santa Barbara Channel area and the offshore transportation impact in the long run would be minimum.

MITIGATION MEASURES

Scenario II represents a significant reduction in the impact on marine traffic due to the cumulative development. For the base scenario and for Scenario I, mitigation of the increases in marine traffic could be achieved by the use of larger tankers, which would reduce the required number of port calls.

6.10.3 Military

EFFECTS OF CUMULATIVE SCENARIO AND THEIR SIGNIFICANCE

Each of the cumulative scenarios will expand the number of offshore platforms and support vessels in parts of the Western Test Range Danger Zones. Military missiles and space vehicles (including future space shuttle missions) launched from the Western Space and Missile Center (WSMC) operated by the Vanderberg Air Force Base are expected to fly over portions of these facilities and activities. During such overflights, there is some potential that fragments or debris from aborted space vehicles or boosters could impact the offshore platforms. Although the likelihood of such an event is rare, it could severely damage platform structures and result in an oil spill with potentially major consequences. Such events have been considered in the System Safety and Reliability Section (Section 6.11).

To reduce potential hazards to the platform personnel, the MMS of the U.S. Department of the Interior incorporates certain stipulations into the leases for OCS areas. These stipulations, discussed in Addendum C of Technical Appendix O, control vessel traffic in designated areas, include "hold harmless" conditions and requirements, and reserve the right of the United States to suspend offshore operations temporarily for national security reasons. Prior to a vehicle launch, provisions for control of air and marine traffic, for stabilization of platform operations, and for personnel shelter and evacuation measures and coordinated by the WSMC, U.S. Coast Guard, MMS, and the platform operators. A Platform Contingency Plan delineating evacuation plans, shelter operations for essential personnel, action timelines, and damage control procedures is also required by each offshore operator and must be approved by the MMS.

The only possible effect that the proposed cumulative scenarios could have on military operations in the area would be the inability of an offshore facility to comply with the lease stipulations in the event of the existence of a platform emergency condition during a proposed launch countdown. The probability of such a situation is considered to be extraordinary (Class III).

MITIGATION MEASURES APPLICABLE TO CUMULATIVE IMPACTS

No mitigation measures are recommended.

6.10.4 Recreation

EFFECTS OF CUMULATIVE SCENARIOS AND THEIR SIGNIFICANCE

Associated with the commerical and industrial development underlying the cumulative scenario will be increased recreational activities throughout the tri-county region. For example, attendance at the State Parks in the tri-county area and Santa Barbara County parks are forecasted to increase by approximately 1 percent in the peak year (1993) and by no more than 0.7 percent in the year 2000. Given the already heavy use of recreational facilities in the tri-county area, the effects of the cumulative scenario will make the facilities saturated and therefore impacts sould be considered long-term and significant but mitigable (Class II). Moveover, the expanded number of oil related projects may also reduce public access to various areas along the coastline in the vicinity of the individual projects. The expanded oil-related activities associated with the cumulative scenario would also potentially increase the probability of an offshore oilspill that would impact shoreside beaches and parks.

In addition, construction activities associated with the combined projects included in the cumulative scenario would cause a short-term loss in the area available for private and party-boat fishing and for shoreline fishing. These impacts are expected to be generally insignificant (Class III). The possibility of a large oil spill in the cumulative scenario creates the potential impact of Class I by pre-emphasis of offshore recreational fishing. See Sections 6.5.1 and 6.11.1 for further discussion.

MITIGATION MEASURES APPLICABLE TO CUMULATIVE IMPACTS

Onshore recreational activities will be impacted by the cumulative scenarios. Mitigation, which will reduce the impact of the cumulative projects on the quality of the recreational experience along the shoreline, are those which have the effect of offsetting those impacts by enhancing the amount, quality, and aesthetic values of shoreline recreation. To move in this direction, Santa Barbara County's Local Coastal Progam contains policies which require the provision of access as a condition of project approval. These policies were adopted by the County and the Califoria Coastal Commission to maximize public access along the coastline. Any combination of, or all of the mitigations listed below would mitigate cumulative project related impacts and would appear to address Local Coastal Program policy requirements.

- Require as part of individual project approval public easements providing beach access where it does not currently exist (e.g., Western LNG, Bixby Ranch, Hollister Ranch).

- Require in-lieu fees sufficient to purchase and implement the coastal access program approved by the Coastal Commission for implementation by the Coast Conservancy for Hollister Ranch or on a route consistent with paths of common carriers.

- Require recreational improvements in the affected project areas (e.g., campsites, hostels, coastal trails, bikeways).

- Improvements in other non-project areas (offsite).

Furthermore, the mitigation measures outlined for tourism (Section 5.9.5) and system safety and reliability (Section 5.11) would also be considered when reviewing recreational mitigation. As discussed in Section 6.10.4, it is not expected that the component facilities of the cumulative scenario will significantly impact recreational fishing; thus no mitigation measures are proposed.

6.10.5 Land Use

EFFECTS OF CUMULATIVE SCENARIO AND THEIR SIGNIFICANCES

Direct Impacts

The Base scenario would have minimal effect on the character of the Santa Barbara South Coast, because of the existence of oil production related facilities already existing at or near the Getty Gaviota site. This is considered to be a Class III impact (adverse but insignificant). With phasing out of small oil processing west of Ellwood ("Base Scenario B") this impact would be lessened.

The effects of Scenario I would be somewhat greater than the base scenario because both the Las Flores and Gaviota areas would be developed for oil and gas processing. Such development, expecially at Las Flores Canyon, begins to affect agricultural uses in the South Coast, and the direct land use impact level is expected in the long-term to be significant but mitigable (Class II). Mitigation would include screening of the various projects--existing and future--from public view.

With the addition of the proposed pipelines, Scenario II, this scenario would have a Class I (unavoidable significant impacts) impact on the land use character of the South Coast, but only in the short term (construction periods). In the long term, because of faster depletion of the Santa Ynez Unit, relatively short-term use of the Getty terminal, and the "hidden" character of the pipelines after they are in place and revegetated, the impact on the character of South Coast land use should be no greater than Class III.

Indirect Impacts

Table 5.4-1 of Technical Appendix M sets forth the peak year residential acreage requirements for each of the Cumulative Impact scenarios, for each community (planning area) in the tri-county region. In each case, the impacts on residential acreage are considered to be at a Class I level.

It is estimated that 799 acres of residential land would be required to accomodate the Base Scenario, 895 acres for Scenario I and 881 acres for Scenario II on the Santa Barbara South Coast (Carpinteria, Montecito, Santa Barbara, and Goleta). These data compare to the approximately 4,200 acres of residential land available on the South Coast in 1980 (based on 14,800 potential residential units, Area Planning Council, 1983: Table I). This means that from 19.0 to 21.3 percent of the available South Coast residential land would be used by the cumulative projects by 1988.

Table 5.4-1 in Technical Appendix M also shows that the residential land acrage demand for the three cumulative scenarios in Santa Barbara County area is 1,391, 1,472, and 1,452, respectively. These data compare to the approximately 10,900 acres of residential land available in the County in 1980 (based on 43,673 potential residential units, Area Planning Council 1983: Table I). This means that from 12.6 to 13.5 percent of the available County residential land would be used by the cumulative projects by 1988.

MITIGATION MEASURES APPLICABLE TO CUMULATIVE IMPACTS

Mitigations for these cumulative impacts include strict adherence to specified land use designations to minimize land conversion; and continuation of growth controlling policies; and formulation of multi-company co-used or co-located housing facilities for the temporary work force.

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.

6.11.1 Cumulative Safety-Related Impacts

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 area vis-a-vis the current situation. Risks associated with Alternatives I and II are somewhat different than those associated with the base scenario in this regard. Increased production from the Santa Ynez Unit is part of Alternatives I and II, and this would mean a small increase in the probability of blow-out related spills in the early years of production. These alternatives eliminate the need for the OS & T system, thus reducing marine oil spill risks to some degree, but Alternative I continues to rely on tanker transport of crude oil.

The 17-18 new offshore platforms are expected to be associated with an estimated 780 or so oil and/or gas wells. Based on the statistics presented in Addendum E of Technical Appendix O, and assuming a 5-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 six blowouts during their collective lifetime, of which one will result in oil spillage. This represents about twice the number of blowout-related spills estimated for the existing platforms in the cumulative study region.

Application of the drilling blowout statistics of Addendum E to drilling rigs, with the assumption that each rig will drill 10 wells per year, provides a conservative estimate of about four blowouts over a 25-year period starting in 1986. Of these, 0.7 on average should result in oil spillage. Addendum E and Section 5 of Technical Appendix O present a cumulative probability distribution for the spill volumes associated with these events. As indicated there, spills of the order of 10,000 bbl 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 Baseline scenario and Alternative I (the two involving tankers), there is the risk of a major spill due to tanker operations during loading or transit in the Santa Barbara Channel area. However, such events are classified as rare according to the Impact Probability/ Frequency Classification of Accident Events (see Table 1-1 of Technical Appendix O), although the impact of such events would be severe.

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 4 of Technical Appendix O, and assuming that all 17-18 new platforms are essentially similar to those proposed for the Point Arguello Field, gives an estimate of 10 significant 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 10,000 barrels, and would be a relatively 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 bbl or more would occur in about 5 percent of oil spill accidents involving 100 or more bbl.

All but the coal Oil Point 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 the Vandenberg Air Force Base. As estimated in Addendum C to Technical Appendix O, individual platforms in the Point Arguello Field will have a 2×10^{-6} per year probability of being impacted by military and space vehicle fragments. This same rate may reasonably be applied to platforms in the Central Santa Maria Basin and in the Santa Ynez Unit. As a reasonable estimate, therefore, the overall rate of impact by military and space vehicle fragments to any of the 15-16 new platforms in this region is estimated to be on the order of 3×10^{-5} per year, thus being classified as a rare event. Since platforms would be secured and wells shut-in during launches, impacts should mostly be minor.

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 region. Assuming that onshore pipelines will be used for the transportation of dry oil from Coal Oil Point to Gaviota, the differences in the pipeline safety impacts between the base scenario and alternatives are likely to be minimal.

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 lines between proposed processing facilities and coastal marine terminals. Alternatives I and II increase the risk of a spill from an onshore oil pipeline by requiring additional segments from the Santa Ynez Unit to treatment facilities. However, by eliminating Exxon's proposed OS&T, they reduce the overall probability of a major oil spill at sea. Alternative II requires the greatest increase in onshore oil pipeline mileage, but substantially eliminates the increased possibility of major spills from oil tankers or coastal marine terminals.

Sour-gas discharges from pipelines situated near populated areas may have severe consequences under certain conditions. Both the base scenario and the alternatives would increase such risks by requiring additional transportation of sour gas to new or consolidated 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 Las Flores, Gaviota, and possibly Ellwood and Eagle Canyon, with additional oil treatment onboard Exxon's OS&T vessel. Alternatives I and II would also have a facility operating at Corral/Las Flores Canyon. As a first approximation, overall cumulative facility risks for all scenarios are estimated to be 2 to 3 times the risks described for the Gaviota facility in Technical Appendix O.

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).

The base scenario entails shipment of crude oil from a consolidated marine terminal at Gaviota and from the Exxon OS&T system. Alternative I reduces the number of marine terminals by consolidating all cargo loading activities at Las Flores. Alternative II eliminates the risks from marine terminals and tankers by transporting the processed crude oil by onshore pipelines.

The safety hazards associated with new gas processing and LPG/NGL storage and transportation facilities are comparable for the base scenario and the alternatives. Given the risks identified in this study for the Gaviota facility, it is evident that the necessary tens of thousands of yearly LPG, NGL, and sulfur shipments by truck from the various gas processing facilities may pose a significant safety risk to the public. As a first approximation, the cumulative risks of such shipments are estimated to be two to three times the risks associated with the shipments from Gaviota associated with the Point Arguello project.

These risks of gas processing by-products will be in addition to the transportation risks associated with liquid oxygen shipments to Vandenberg Air Force Base and with various types of hazardous waste shipments to Casmalia, both of which utilize the South Coast Route 101 corridor. Transportation of hazardous waste materials and of liquid oxygen fuels along this route is likely to increase over the next few years.

6.11.2 Mitigating Measures

There may be benefits in investigating further alternatives designed to reduce the risks associated with the transportation of gases, as well as the risks of oil spills. In line with the discussion in Section 9 of Technical Appendix O regarding alternatives to the proposed Point Arguello development project, various measures may be considered for the cumulative projects, such as:

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 may result in a greater total length of onshore oil pipeline, the consequences of oil spillage on land would generally be less than those associated with spills in water. At specific locations along the onshore route, however, such as the crossings of lagoon areas, the environmental consequences of oil spills could be significant.

Minimize number and length of onshore gas pipelines, particularly those conveying sour gas - 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 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 two oil- and/or gas-processing facilities are apt to be more than those associated with a single facility of equivalent capacity. It follows that there may be advantages to the consolidation of such facilities, particularly at sites distant from densely populated areas.

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.

Optimize project elements with respect to overall safety - It is not necessarily possible to develop a single scenario which minimizes the risks associated with each and every project element. A formal analysis of risks, however, may identify an optimum scenario that minimizes the overall risks of area development. This may ultimately require some tradeoffs between environmental risks and public safety.

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 feedstocks.

The second commitment of resources involves the consumption of fossil fuels to provide energy for project construction and operation. Construction activities during 1986 to 1990 will require approximately 1.8 "quads" (1.8 quadrillion Btu), provided in the form of diesel fuel, jet fuel, gasoline, and natural gas. Some of these fuels will be obtained outside the project area but consumed at the platform and onshore gas treating facility sites.

However, most of the natural gas requirement will be met with gas produced by the project itself.

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.

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 decomissioned, 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 Arguello Slope as part of this project 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 site, 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 project would represent a short-term gain by providing for some of the nation's energy requirements. The project is consistent with the objectives of national 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. The following effects on long-term productivity would result:

1. The oil and gas resources used and extracted by the project will not be available for use at a future time.

2. Certain onshore or offshore cultural resource sites may be altered or removed as part of the project mitigation plan.

3. Benthic communities around the production platforms and their related pipelines will remain altered for an unknown period of time after facilities are removed.

4. Construction of the onshore pipeline will result in losses of and disruption to environmentally sensitive habitats that could take a long time to reestablish. (Mitigations would minimize recovery time.)

5. Groundwater and/or surface water withdrawals from San Onofre and Gaviota Creeks will not be available for other uses for the life of the project. Such withdrawals could alter aquatic and terrestrial habitat for the life of the project and some unknown period of time after cessation of processing activities.

Other impacts from the proposed project are expected to be short-term and are not expected to significantly affect long-term productivity. However, the proposed project could affect long-term usage of the local resources through (1) damage to 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 EIR/EIS report. 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 PROJECT

The effects of the proposed project and its alternatives on regional growth are analyzed in detail under Socioeconomics (Section 5.9). These effects primarily consist of direct and indirect impacts on individuals and businesses providing goods and services (including labor) used as inputs to the project.

Other growth-inducing impacts of the project potentially could relate to its effects on activities, using the output of the project as inputs to produce other goods and services. In this case, Chevron and Texaco propose to transport the oil to their existing refineries outside the project area, and from there to distribution points around the United States. Growth inducement from this activity would be so broadly dispersed as to be negligible in any location or sector. Produced gas would be sold within the region, but would just displace gas already available from other sources. Growth inducement from gas production therefore would be negligible.

Growth inducement also can occur if the project establishes precedents with regard to policies for regulations that may be applied to other projects at a later time. For example, granting land use plan amendments and zoning changes for the project may lead to additional development in the area that could be inconsistent with the original plan. This is unlikely in this case, however, because stated local policies require consolidation or colocation of energy facilities in order to avoid undesired proliferation. This alternative is addressed throughout this report.

XI. DISTRIBUTION OF THE EIR/EIS

Over 300 copies of the draft EIR/EIS have been automatically distributed to various agencies and groups, including those listed below, for their review and comment. Interested organizations and individuals who did not receive a copy during the first mailing will be sent one upon request (see cover sheet). In addition, copies of the EIR/EIS have been distributed to the public libraries listed below.

Federal Agencies

U.S. Department of Commerce
- National Oceanographic and Atmospheric Administration (NOAA)
- National Marine Fisheries Service
- Office of Coastal Zone Management

U.S. Department of Defense
- Army Corps of Engineers
- Department of the Navy
- Vandenberg Air Force Base

U.S. Department of Energy
- Federal Energy Regulatory Commission

U.S. Department of the Interior
- Fish and Wildlife Service
- National Park Service
- Minerals Management Service

U.S. Department of Transportation
- Coast Guard

U.S. Environmental Protection Agency
Federal Aviation Administration
Marine Mammal Commission

State Agencies

Air Resources Board
Caltrans
Clearinghouse
Coastal Commission
Department of Boating and Waterways
Department of Conservation
Department of Fish and Game
Division of Mines and Geology

State Agencies
continued

Division of Oil and Gas
Emergency Services
Governor's Office of Environmental Affairs
Health Services
Lands Commission
Native American Heritage Commission
Office of Historic Preservation
Parks and Recreation
Public Utilities Commission
Resources Agency
Waste Management Board
Water Quality Control Board
Water Resources

Libraries

County of Los Angeles Public Library
County of Ventura Library
Goleta Branch Library
Lompoc Public Library
San Luis Obispo City/County Public Library
Santa Barbara Public Library
State Library - Government Public Section
Santa Maria Public Library
University of California Library, Santa Barbara Campus

Other Organizations

Chevron, USA, Inc.
Commercial Fishermen
Environmental and Other Public Interest Groups
Local Agencies and Municipalities
Native American Organizations
Private Citizens
Texaco, USA

APPENDIX A

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.
API Index	American Petroleum Institute index, a measure of the specific gravity of hydrocarbons.
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.
Cathodic Protection	Coatings or devices used to prevent corrosion.

Cetaceans	Aquatic mammals such as whales, dolphins, porpoises.
Chalcedony	A type of quartz.
Chert	A flint-like rock consisting mostly of quartz.
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.
Debitage	Debris.
Demersal	Associated with bottom of a body of water.
Depauperate	Below normal development.
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.
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.
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/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 or required to raise the temperature of a pound of water 1°F.
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.
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.

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.
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 exiting from a production process.
Tectonic	Related to deformations of the earth's crust.
Thermocline	A layer in which temperature drops a 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.
Upset	Equipment malfunction.
Vernal Pool	Recently formed pool, usually temporary.

APPENDIX B

ORGANIZATIONS AND PERSONS CONTACTED

This appendix lists organizations and persons contacted during the study. The listing is organized by technial discipline, with the names of individuals shown alphabetically.

AIR QUALITY

Cary McGregor
U.S. Minerals Management Service
Los Angeles

Robert Sears
Santa Barbara County Air Pollution Control District
Santa Barbara

Clifford Scholle
Santa Barbara County Air Pollution Control District
Santa Barbara

Andrew Ranzieri
California Air Resources Board
Sacramento

COMMERCIAL FISHING AND KELP HARVEST

A. Ebeling
University of California at Santa Barbara

C. Fusaro
Fisheries Liaison Office
Santa Barbara

R. Hazard
Fisherman
Santa Barbara

R. McPeak
Kelco Co., Inc.

J.B. Richards
Area Marine Advisor, University of California Cooperative Extension

Lt. Cdr. Varanko
U.S. Coast Guard

Mike Wagner
Seafood Specialties
Santa Barbara

MARINE BIOLOGY (continued)

Steve Lannoy
Vandenberg AFB/Fish and Wildlife Division
Vandenberg

Alec MacCall
National Marine Fisheries Service
La Jolla

Ken Mais
California Department of Fish and Game
Long Beach

Ron McPeak
Kelco
San Diego

Fred Piltz
Minerals Management Service
Los Angeles

Marty Pletcher
California Department of Fish and Game
Long Beach

Cam Swift
Los Angeles County Museum of Natural History
Los Angeles

PROJECT DESCRIPTION

Chuck Alpert
Texaco

Richard Aseltine
Chevron

Dave Blomquist
Standard Oil of California

Gerry Brower
Chevron Pipeline Co.

Susan Callister
Chevron

Sam Chase
Chevron

Steve Cox
Texaco

PROJECT DESCRIPTION (continued)

Andrew Cufton
Minerals Management Service

David Dixon
Chevron

Tom Dunaway
Minerals Management Service

Orrin Gilbert
Minerals Management Service

Douglas Grauel
Standard Oil of California

Dominic Gregorio
Chevron

Debbie Gordan
Chevron

Richard Habrat
Minerals Management Service

Dean Hargis
Dames & Moore

David Herrington
Chevron

Keith Holtus
Chevron

Dave Jones
Standard Oil of California

Lyn Liddell
Texaco

Nancy Minick
Dames & Moore

Vern Norviel
Chevron

Arlin Peters
Chevron Research Co.

Kevin Prochaska
Chevron

Cyrus Rhee
Fluor Engineering

CULTURAL RESOURCES

Nicholas del Cioppo
State Historic Preservation Office
Sacramento

Dwight Dutschke
State Historic Preservation Office
Sacramento

Hans Kreutzberg
State Historic Preservation Office
Sacramento

Larry Wilcoxon
California Central Coast Archeological Inventory
University of California at Santa Barbara

Dave Stone
Staff Archeologist
Santa Barbara County, Department of Resource Management

GEOLOGY

Joseph Ziony
U.S. Geological Survey

GROUNDWATER

David Doerner
Santa Barbara County Resource Management Department

Michael Hoover
Hoover and Associates
Santa Barbara

Peter Gise
Gaviota Village

Mark Zuser
ERT
Santa Barbara

MARINE BIOLOGY

Bud Antonelis
National Marine Fisheries Service
Seattle

PROJECT DESCRIPTION (continued)

Ted Rutkowsky
Texaco

Glenn Shackell
Minerals Management Service

Doug Uchikura
Chevron

RECREATION

R. Acquistapace
Park Superintendent
Santa Barbara County Department of Recreation

F. Benko
Sport Fishing Operator
Sea Landing
Santa Barbara

P. Dougherty
Resident Park Ranger
California Department of Parks and Recreation
Gaviota

W. Howard
California Department of Parks and Recreation

Klaasje Nairne
Santa Barbara County Department of Parks and Recreation

L. Paynter
California Department of Parks and Recreation

SOCIOECONOMICS

J. Briton
School Maintenance
Vista del Mar Union School

D. Brown
State Lands Commission
Sacramento

L. Clark
Strategic Planning Department
VETCO Offshore, Inc.

SURFACE WATER (continued)

David Doerner
Division of Environmental Review
Santa Barbara County Resource Management Department

SYSTEM SAFETY AND RELIABILITY

Lt. Philip Dyer
U.S. Coast Guard
Santa Barbara

Michael Livers
Santa Barbara Airport

Patrick Murphy
Santa Barbara Airport

Daniel Muslin
Army Corp of Engineers
Los Angeles

William Roberts
Caltrans
San Luis Obispo

Lt. Commander Robert S. Varanko
U.S. Coast Guard
Long Beach

TERRESTRIAL BIOLOGY

S. Cooper
University of California at Santa Barbara

M. Fletcher
Botanist
Santa Barbara

J. Gustafson
Endangered Mammal and Species Coordinator
California Department of Fish and Game

J.J. Holbrook
Mammalogist
University of California at Santa Barbara

Al Remmenga
Ranch Manager
Hollister Ranch Owner's Association

K. Sasaki
California Department of Fish and Game

SOCIOECONOMICS (continued)

M. Draze
Senior Planner
San Luis Obispo County Planning Department

D. Garth
Chamber of Commerce
San Luis Obispo

R. Harmuth
Director of Operations
Port of Hueneme

Doug Hemp
Fire Marshall
Santa Barbara County Fire Department

K. Ingalls
Office of the Clerk
Santa Barbara County Board of Supervisors

B. Jones
Santa Barbara County Assessor's Office

S. Kelley
Administrator/Teacher
Vista del Mar Union School

C. Pauley
Santa Barbara County Resource Management Department

Darwin Sainz
California Coastal Operations Group
Santa Barbara

R. Smith
Ventura Chamber of Commerce

J. Steineger and B. James
Santa Barbara, Auditor's Office

N. Visel
Santa Barbara County Assessor's Office

D. Vrtis
Office of the Auditor-Controller
Santa Barbara County

SURFACE WATER

John Ahlroth
Santa Barbara County Flood Control and Water District

TERRESTRIAL BIOLOGY (continued)

S. Sweet
Herpetologist
University of California at Santa Barbara

C. Swift
Los Angeles County Museum

TRAFFIC

B. Burnworth
County of Santa Barbara Public Works Department

G. Duffy
City of Port Hueneme Public Works Department

J. Genovese
City of Oxnard Public Works Department

S. Goetz
Santa Barbara County-Cities Planning Council

W. Heath
Caltrans
San Luis Obispo

J. Johndoff
City of Oxnard Public Works Department

J. Kemp
Santa Barbara County-Cities Planning Council

L. Melancon
Lead Pilot
Petroleum Helicopters, Inc.
Santa Barbara

K. Ransdell
Assistant Director
Santa Barbara Airport

R. Ruch
Chief of Security
Santa Barbara Airport

VISUAL

C. Black
Public Information Representative
Amtrak Corporation
Washington, D.C.

VISUAL (continued)

D. Holcomb
Forest Landscape Architect
Los Padres National Forest

Larry Lavagnino
Government Affairs Manager
Pacific Offshore Pipeline Corporation
Santa Barbara

Al Remmenga
Ranch Manager
Hollister Ranch Owner's Association

S. Kelley
Administrator
Vista del Mar Union School

APPENDIX C
LIST OF PERMITS/APPROVALS

1. SANTA BARBARA COUNTY

Air Pollution Control District

- Authority to construct - Permit to operate	Both for onshore facilities that are emission sources.

Department of Public Works

- Grading permit for approval of Gaviota site final grading plans.

Resource Management Department

- Development plan, for overall environmental analysis and conformance with policies;
- Local Coastal Plan Amendment, to allow for a change in zoning in project area five acres of the Gervais fee prosperity;
- Rezone application, to change five acres of the Gervais fee property from agricultural zoning designation to coastal-dependent industry zoning;
- Conditional Use Permit, for pipeline crossings in Environmental, Sensitive Habitat areas;
- Coastal Development Permit for approval to construct and operate within coastal planning policies.

2. STATE OF CALIFORNIA

Coastal Commission

- Coastal Development Permit for:

a. Segment of offshore pipelines between the 3-mile line and the mean high tide line, and;

b. Segment of wastewater outfall at Gaviota seaward of mean high tide line.

-Consistency review of Development and Production Pland (pursuant to Coastal Zone Management Act.)

State Lands Commission

-Right-of-way/lease for:

a. Segment of tghe offshore oil and gas pipelines between 3-mile line and the mean high tide line, and;

b. Segment of wastewater outfall at Gaviota seaward of mean high tide line.

Department of Fish and Game

- Permit for stream alterations

Department of Parks and Recreation

- Right of way for pipeline corridor across Highway 101 at Gaviota;

- Design approval for proposed Highway 101 overpass and associated ramps and frontage roads;

- Encroachment permit, for work on State right-of-way

Division of Occupational Safety and Health

- Permits for trenches over 5 feet deep, during pipeline construction

Division of Oil and Gas

- Permit to inject, if produced water re-injection is implemented

Regional Water Quality Control Board (Central Region)

- NPDES permit for discharge of produced water from the wastewater outfall line at Gaviota.

3. FEDERAL

Minerals Management Service

a. Approval of the Development and Production Plans. (Separate DPP's have been filed for Platforms Hermosa, Hildalgo and Harvest.)

b. Issuance of right of use and easement for segment of offshore pipelines from Platform Harvest to Platform Hermosa.

c. Approval of offshore pipelines, as appropriate, under OCS Order No. 9.

d. Approval of Application for Permit to Drill each well on the platforms.

e. 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.

f. Approval of Oil Spill Contingency Plan submitted per requirements of OCS Order No. 7.

g. Approval of Critical Operations and Curtailment Plan submitted per requirements of OCS Order No. 2.

h. Approval of Platform Shelter-Worthiness and Evacuation Plans for hazardous missile launches from VAFB. This is being required by MMS implementation of relevant lease stipulation.

Environmental Protection Agency

a. National pollutant Discharge Elimination System (NPDES) permit for discharge of drilling and production effluents (e.g. muds and cuttings) at platforms. This is required by the Clean Water Act.

b. Prevention of Significant Deterioration (PSD) permit for facilities inland from 3-mile line. (This will be eliminated upon EPA approval of APCD's 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.

Federal Energy Regulatory Commission

- Certificate of Public Convenience and Necessity for gas pipeline from Platform Hermosa to Gaviota Processing facilities.

U.S. Army Corps of Engineers

- Permit to perform work in or affecting navigable waters of the United States (per Section 10 of Rivers and Harbors Act of March 3, 1899). This permit is required for installation of offshore platforms and pipelines.

U.S. Coast Guard

a. Approval of aids to navigation.

b. Obtain Certificate of Financial Responsibility to accommodate requirements of the Oil Spill Contingency Fund.

APPENDIX D

LIST OF PREPARERS

This Appendix sets forth the list of preparers who contributed to this EIR/EIS document. The list is organized by individual technical areas. In addition to Arthur D. Little, Inc. staff, principal subcontractor staff and consultants are also indicated.

PROJECT ADMINISTRATION

JOINT REVIEW PANEL

Randall Smith
Energy Division
Santa Barbara County Resource Management Department

Amy Glad
California Office of Environmental Affairs

Daniel Gorfain
California State Lands Commission

John Hunter
California Office of Environmental Affairs

Phil Mees
California Coastal Commission

Rich Taylor
Energy Division
Santa Barbara County Resource Management Department

Mary Elaine Warhurst
U.S. Minerals Management Service

ARTHUR D. LITTLE, INC.

Project Management

- Dr. Philip O'Brien, Geologist, Project Director
- Roger Steiner, Public Administration, Deputy Project Director

Administrative Support

- Joyce Garnes, Project Secretary
- Patty Walker, Secretary
- Kim Fleishell, Secretary

PROJECT ADMINISTRATION (continued)

- Kathryn Gomes, Secretary
- Barbara Gibbons, Graphics.

Critical Path Management

- David Hellstrom, Civil Engineer

Review Committee

- Dr. Alfred Wechsler, Chemical Engineer
- Dr. Ashok Kalelkar, Mechanical Engineer
- Dr. John Ehrenfeld, Chemical Engineer
- Bruce Putnam, Geologist

AIR QUALITY/METEOROLOGY

Dr. Robert Vranka, Physical Chemist, Arthur D. Little Coordinator

Arthur D. Little

- Gary Magil, Chemist, Air Quality Analysis

Applied Modeling

- Khan Tran, Mechanical Engineer, Computer Modeling

Pacific Weather Analysis

- R. Rea Strange, Meteorologist

Tecolote Research

- Richard Nordsieck, Mechanical Engineering, Emissions Calculations and Modeling Analysis
- Arve Sjovold, Physicist
- Joseph Canas, Environmental Scientist, Emissions Calculations

Tracer Technologies

- Thomas Rappolt, Meteorologist

PHYSICAL RESOURCES

David Leland - Environmental Engineering, Arthur D. Little Coordinator

Geology

Arthur D. Little

- Marise Mikulis, Geologist

Earth Technology Corporation

- Bruce Schell, Geologist
- C.B. Crouse, Civil Engineer

Surface Water

HDR Systems

- Bruce Ross, Geologist/Hydrologist

Groundwater

Arthur D. Little

- Dr. John Guswa, Hydrogeologist

MARINE/BIOTIC RESOURCES

- Charles Cooper - Biologist, Arthur D. Little Coordinator

Marine Water Quality/Oceanography

Arthur D. Little

- Dr. Warren Lyman, Physical Chemist, Principal Author

Consultant

- Dr. William Anikouchine, Physical Oceanography

Aquatic Terrestrial Research

- Dr. David Brown, Biochemist, ATR Team Leader, Principal Author
- W. Craig Meyer, Geologist, Physical and Chemical Oceanography

MARINE/BIOTIC RESOURCES (continued)

- Anne Brown, Integration and Research
- G. Patrick Hershelman, Biologist, Trace Metals
- Richard Gossett, Organic Chemist, Organic Compounds

Coastal Consultants

- Dr. Tareah Hendricks, Physicist, Reviewer, Physical Oceanography

Marine Biology

MBC Applied Environmental Sciences

- Dr. R. Craig Wingert, Fisheries Biologist, MBC Team Leader and Fisheries Evaluation
- Donald Cadien, Zoologist, Benthic Evaluations
- Dr. Robert Cimberg, Environmental Planner, Intertidal Evaluations
- Dr. Robert Kanter, Intertidal Evaluations
- Michael Sowby, Biologist, Plankton and Kelp Community Evaluations
- Robert Ware, Biologist, Mammal, Seabird and Special Area and Species Evaluations

Santa Barbara Museum of Natural History

- Dr. Charles Woodhouse, Zoologist, Reviewer, Marine Mammals
- Dr. Dennis Power, Zoologist, Reviewer, Seabirds
- Dr. Frederick Hochberg, Biologist, Reviewer, All Marine Communities

California Institute of Technology

- Dr. Wheeler North, Biological Oceanography, Reviewer, Kelp Communities

Consultant

- Dr. Charles Menzie, Environmental Scientist, Reviewer, Marine Biology and Water Quality

MARINE/BIOTIC RESOURCES (continued)

University of California at Santa Barbara

- Dr. Milton Love, Biologist, Reviewer, Fisheries

Terrestrial Biology

Arthur D. Little

- Sara Bysshe, Biologist, Principal Author

HDR Systems

- Dr. Thomas Mulroy, Biologist, HDR Terrestrial Biology Team Leader, Principal Author/Investigator
- Dr. Rosemary Thompson, Marine Biologist, Aquatic Resources
- Mary Hochberg, Botanist, Botanical Resources

HDR Systems (continued)

- Steven Junak, Botanist, Botanical Resources
- Paul Lehman, Avifauna

Santa Barbara Museum of Natural History

- Paul Collins, Vertebrate Biologist, Wildlife Resources

University at California at Santa Barbara

- Wayne Ferren, Plant Ecologist, Botanical Resources

Commercial Fishing

HDR Systems

- Dr. Rosemary Thompson, Marine Biologist, Principal Author/Investigator
- Dr. Jack Stuster, Anthropologist, Reviewer

SYSTEM SAFETY AND RELIABILITY

Peter Athens, Mechanical Engineer, Arthur D. Little Coordinator

Arthur D. Little

- Lisa Bendixen, Applied Mathematics, Risk Analysis

- Dr. Paul Croce, Mechanical Engineer, Fire and Safety
- Stan Dale, Chemical Engineer, System Safety and Reliability
- Kumkum Dilwali, Engineer, Oil Spill Analysis
- John Hagopian, Chemical Engineer, Risk Analysis
- Gerald Laroque, Mathematician, Oil Spill Analysis
- Marian Long, Mechical Engineer, Transportation
- Dr. Krishna Mudan, Mechanical Engineering, Risk Analysis
- John Peirson, Chemical Engineer, System Safety Description
- Dr. Daniel Schiff, Physicist, Oil Spill Contingency Plans
- Dr. Gordon Sellers, Physicist, System Safety and Reliability

PROJECT DESCRIPTION

Arthur D. Little

- Stanley Dale, Chemical Engineer
- John Peirson, Chemical Engineer

PROJECT ALTERNATIVES

Arthur D. Little

- Joseph Shandling, Chemical Engineer, Energy Economist

HUMAN RESOURCES

James O'Keefe, Economist/Mathematician, Arthur D. Little Coordinator

Socioeconomics

Applied Economic Systems

- Dr. Robert Niehaus, Economist
- Dr. To-Far Wang, Economist

Cultural Resources

HDR Systems

- Craig Woodman, Archaeologist

- Mary O'Connor, Ethnologist

Noise

Arthur D. Little

- Robert Lucas, Mechanical Engineer, Principal Author

Visual

HDR Systems

- Lawrence Headley, Landscape Architecture

Traffic

HDR Systems

- Jim Castle, Engineer
- Tom Fahy

HUMAN RESOURCES (continued)

Recreation

HDR Systems

- Ken Reed, Forest Ecologist
- Nora Barnes Berwick