ENVIRONMENTAL REPORT (EXPLORATION)
FOR
PROPOSED EXPLORATORY WELLS P-0316-1, 2, AND 3
POINT CONCEPTION REGION
OFFSHORE SOUTHERN CALIFORNIA
FEDERAL OCS LEASE BLOCK 0316

TO SUPERVISOR,
THE UNITED STATES GEOLOGICAL SURVEY
CONSERVATION DIVISION
PACIFIC REGION

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TABLE OF CONTENTS

PAGE NO.

List of Tables and Figures

CONSISTENCY CERTIFICATION
FOR OCS-P 0316

The proposed activities comply with the State of California's Coastal Management Program and will be conducted in a manner consistent with such program.

The only policy of the CCMP which might relate to the proposed activity is contained in Section 30232. No other policy of the CCMP is applicable to the proposed permitted activity and therefore this statement in Support of Consistency Certification addresses only Section 30232 which provides as follows:

Section 30232, Protection Against Spillage

Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.

Chevron's Exploratory Plan protects against the spillage of crude oil, gas petroleum products and hazardous substances and provides effective containment and cleanup facilities and procedures for any accidental spills which might occur in compliance with Pacific Region OCS Order No. 7 of the U.S. Geological Survey. The provisions covering this matter are set forth in detail in Chevron's Oil Spill and Emergency Contingency Plan as previously submitted for OCS P-0215-2.

The impact of drilling exploratory wells in Outer Continental Shelf, as analyzed in the accompanying Environmental Report, is negligible in magnitude and temporary in nature. Such temporary operations will not significantly affect any land or water use in the coastal zone of the State of California, and are therefore consistent with the Coastal Zone Management Act as implemented in 15 CFR 930.

ENVIRONMENTAL REPORT (EXPLORATION)

1.0 INTRODUCTION

Chevron U.S.A. Inc. proposes to drill several exploratory wells in the Point Conception region of the Pacific Ocean, about 55 miles west of the City of Santa Barbara and about 10 miles offshore, west of Point Conception (Figure 1). The proposed wells will be located in Federal OCS lease P-0316. Figure 2 shows three proposed well locations: location #1 is the location for the initial exploratory well on the lease; location #3 is a delineation well depending on results of the initial well; location #2 is a test of a separate geologic structure, which also depends upon results of the first well.

This project will be of temporary duration. At locations #1 and #2 (proposed depths 9,000 ft.), the active drilling phase will probably last about 45 to 60 days, after which evaluation and abandonment procedures will probably last another 15 to 25 days. It will take about 6 days to move in and then out of each location. This results in a total of about 65 to 80 days for each of these wells. At location #3 (proposed depth 10,500 ft.), the active drilling phase will last about 55 to 70 days and the total operation, about 70 to 100 days.

The submission of this Exploration Environmental Report, which will be accompanied, or followed by, an Exploration Plan for these wells, is intended to fulfill the requirements of Section 250.34-3 of CFR Title 30, Part 250 as published in the Federal Register, Vol. 44, No. 180 - Friday, September 14, 1979. The sequence of topics conforms with Section 250.34-3(a)(1)(i) and (ii), (2), and (3), inclusive, of the above cited regulations.

Information available in recent applicable environmental studies and environmental impact statements has been referenced extensively in this report. Data has been summarized from other reports by state agencies and independent authors. Information applying specifically to this project has been furnished by the professional staff of Chevron U.S.A. Inc.

Copies of all referenced material are available either at most university or college libraries, the U. S. Geological Survey Library at Menlo Park, California, or in the library of the Standard Oil Company of California, San Francisco. In the event any reviewing agency has difficulty in obtaining a copy of a particular reference, one of the parties listed under item 5.0 of this report should be contacted.

The general environment in the area of the project, including information on the oceanography, submarine geology, sensitive and hazardous areas, potential project impacts, alternatives and mitigations, and many other aspects, is amply discussed in a number of the references listed in the bibliography. Considering the extensive nature of these prior studies, and in order to avoid redundancy, data which is directly applicable to this project is often simply referenced in this report.

The impacts of the proposed projects on the environment, as analyzed in the following presentation, are concluded to be negligible in magnitude and temporary in nature. If the proposed exploratory project results in the confirmation of a commercially developable accumulation of oil or gas, or both, then a plan for the development of the resource will be required. In this event, another Environmental Report for the development phase also will be required per 30 CFR 250.34-3(b).

2.0 DESCRIPTION OF PROPOSED ACTION

Chevron is proposing to drill up to three exploratory wells on OCS parcel P-0316 (Figure 2). The floating drilling vessel Glomar Grand Isle (see Appendix A, for description of drilling vessel) will be used. The wells will be drilled to depths ranging from 9,000' to 10,500', unless hydrocarbons are discovered in paying quantities at a lesser depth or the operator determines that further drilling would be unwarranted or impractical.

2.1 Proposed Drilling Program

The purpose of the proposed drilling program is to evaluate the hydrocarbon potential of the Pliocene, Miocene and Cretaceous age sediments below OCS parcel P-0316. This program presently consists of 3 exploratory wells, one of which is proposed for drilling in early 1980. Location of each proposed well is shown on Figures 2 and 3 and described in detail on the applications to the USGS for a permit to drill (*Explor. Plan*). The proposed operations for each well site are summarized as follows:

	Well #1	Well #2	Well #3
Water depth	623'	344'	644'
Total depth (Vert)	9,000'	9,000'	10,500'
Proposed Deviation	Ø	Ø	Ø
Est'd Drilling time	75 days	75 days	85 days

These wells are to be drilled by the Glomar "Grand Isle," which is a 400-foot long shipshaped drilling vessel. The vessel will be moored at the drillsites with eight 30,000 lb. anchors.

2.2 Oil or Waste Material Spill Prevention, Reporting and Clean-up

This section contains a description of procedures, personnel, and equipment for preventing, reporting and cleaning up spills of oil or waste materials, including information on response time, capacity and location of equipment.

2.21 Prevention

Prevention of oil spills during the proposed exploratory drilling operation will be maximized by following the prescribed requirements in OCS Order No. 2 for the Pacific Region. Specifically, the order establishes requirements for casing; blowout prevention equipment (BOPE); installation and testing; and training of personnel; which insure that uncontrolled flow from the well will be prevented. To enhance this requirement, Chevron will utilize equipment that reflects the best state-of-the-art as described in the Exploration Plan for this lease. All other activities related to the exploratory drilling work at all times will be conducted in an orderly fashion, to best prevent an oil spill incident from occurring.

To prevent pollution to the ocean waters from harmful quantities of waste materials, Chevron will be operating under the NPDES Permit (CA0110125) issued by the EPA to Global Marine for the drill ship Glomar Grand Isle.

2.22 Control and Clean-Up

In the event that a spill does occur, including sheens on the water, procedures for reporting and response are described in Chevron's Oil Spill and Emergency Contingency Plan for Santa Barbara Channel OCS Leases which has been previously submitted to the U.S.G.S. as part of the plan of Development for the Santa Clara Unit. This plan is also applicable to tract P-0316.

All Chevron and contract personnel directly involved in the proposed exploratory drilling will be trained in boom deployment and clean-up operations. Therefore, response to spills will be immediate. Supervision of the clean-up will be handled by the Contract Foreman or Company drilling representative, using trained personnel from the drilling vessel crew and the on-site containment equipment and absorbent material listed in the oil spill containment and equipment list (Table 1). Generally, small spills occurring on the deck can be cleaned up with available absorbent goods before they reach the open water. If an open water spill occurs, that is of five (5) barrels or less of hydrocarbons, the crew will deploy absorbent booms and pads to clean up the spill. The clean-up steps involved in spills exceeding five (5) barrels of hydrocarbons are as follows:

1. Alert the local spill cooperative immediately. For the Santa Barbara Channel area this will be Clean Seas, Inc. Next, the appropriate cooperative and/or contractor will be called to bring their clean-up equipment if it becomes

apparent that the "on board" equipment cannot handle the spill. Mr. Waage, General Manager of Clean Seas, estimated that this equipment can reach the proposed well site within 7-10 hours.

2. Assess wind and current direction to determine the possible path of the spilled hydrocarbons.

3. Deploy the containment boom stored on the vessel and surround the spill.

4. Use skimmer stored on board the vessel to recover oil retained by the boom.

5. Utilize the spill cooperative (Clean Seas) equipment as needed to effect rapid and complete clean-up of the spill.

6. Use absorbent goods to remove final traces of hydrocarbons.

Chevron will activate the Major Oil Spill Contingency Plan whenever a major hydrocarbon spill occurs (i.e., a major spill is considered to be over 1000 barrels or a continuous discharge for several days that will exceed 1000 barrels). In this event, Chevron will utilize all feasible equipment and manpower resources to effect a rapid clean-up.

2.3 Onshore Support and Storage Facilities

Onshore services will originate from the Carpinteria, Ventura, Port Hueneme and Santa Barbara areas. Because the support services and storage facilities required for this project are already in existence at these locations, no increase in their size or complexity will occur. Also, because the project uses a temporary, self-propelled vessel, acquisition of lands, rights-of-way, and easements is not anticipated.

2.4 Personnel Requirements of Offshore, Onshore and Transportation Activities

At this time it is anticipated that a drilling vessel, the Glomar Grand Isle, will drill the proposed exploratory wells. A crew boat will be employed to transport working personnel and contracted services to and from the drilling vessel. Materials and supplies will be transported by a supply boat. A helicopter service will be contracted for medical emergencies and other situations as they arise. Local vendors furnishing various materials and offering services will also be employed in support of this exploratory activity.

TABLE 1

CHEVRON U.S.A. INC.

Oil Spill Equipment and Materials Inventory

1	Model 1011-OS Floating oil skimmer with 1-1/2 HP 115/230-volt Class 1 Group D explosion-proof GE motor
1	Homelite Generator #176A 35-1 3,500 watts w/spark arrester
1,500	Feet, #3-12.24 Floating Barrier* as manufactured by Oil Spill Services w/12" fence and 23" skirt and 3/8" chain
6	Bales, Conwed Sorbent Booms (240 feet)
2	Bales, Conwed Sorbent Continuous Sweeps
2	Boxes, Conwed Sorbent Regular Sweeps
4	Hudson Ozark Sprayers
10	Drums, Corexit Dispersant (Concentrated)
3	Drums, Shell, "Herder"

*[Note: A boat to deploy the Floating Barrier (i.e., containment boom) will be continuously available, and within 15 minutes of the drill site.]

Population growth in the affected coastal areas will be temporary and minimal. Most employees directly associated with the drilling vessel are transient. Their homes and families are located outside the affected coastal area. The work schedule of these employees (usually 7 days on and 7 days off) is such that their employer transports them between job and home. The categories of people who are likely to reside in the affected coastal area include current Chevron employees and employees of local suppliers of materials or services. The need to hire additional employees to support this operation is not anticipated.

About 140 persons are expected to be employed during the proposed exploratory operations: drilling vessel (110 total but 70 on board at any one time); supply boat with a crew of 6; crew boat with a crew of 2; Chevron personnel (6 total, 2 on board at any one time); and 18 miscellaneous service company personnel (each on short periods of service).

2.5 Routes and Frequency of Travel Between Offshore and Onshore Facilities

A contracted crew boat will transport personnel to the well site from the pier at Carpinteria. The current plans call for about 20 trips per month using this service.

Supplies taken to the drilling vessel will originate from facilities at Port Hueneme. The supply boat will probably follow the regular shipping lanes for most of the distance. On the return trip, the supply boat will carry any wastes from the drilling vessel which require onshore disposal. About 25 trips per month from Port Hueneme are anticipated.

Helicopter service to the drilling vessel is expected to originate from the Goleta airport. Helicopter service will operate as required (emergencies and special situations) with an estimated 15 trips per month.

2.6 Solid and Liquid Wastes and Pollutants

The various discharges to the environment from the drilling vessel will be divided into 2 categories: solid and liquid wastes, and gaseous pollutants. The solid and liquid wastes will be treated and discharged according to the NPDES permit (Appendix B). Besides the exhaust and combustion products from power generation engines, the only other gaseous emissions will be from the flaring of encountered natural gas.

2.61 Solid and Liquid Wastes

Solid and liquid wastes will be treated and discharged to the environment in accordance with the issued NPDES permit. The alternative to offshore discharge is barging the wastes ashore and trucking them to appropriate disposal facilities.

The environmental impact of onshore disposal of solid and liquid wastes will be mainly related to air pollution. A task force of the Western Oil and Gas Association recently estimated the air emissions involved in disposing of 6000 barrels of cleaned muds and cuttings from one 10,000 ft. well. Barges making 50-mile round-trips would generate a total of 340 lbs. of hydrocarbons, 1620 lbs. of NO_x, and 7200 lbs. of CO. Trucks taking the wastes 70 miles round-trip would emit a total of 12.0 lbs. of particulates, 25.9 lbs. of SO_2, 266 lbs. of CO, 42.6 lbs. of hydrocarbons and 193 lbs. of NO_x. The air quality in Santa Barbara County has been declared as non-attainment for oxidants.

Wastes from the drilling vessel will consist of the following:

(i) Excess water-based drilling mud
(ii) Drilled hole cuttings
(iii) Excess wet cement
(iv) Sanitary wastes
(v) Kitchen, shower and washing machine wastes
(vi) Biodegradable and trash, garbage wastes
(vii) Deck drainage and washdown water
(viii) Engine room drainage
(ix) Engine cooling water (non-contact)
(x) Water generated from subsurface formation tests
(xi) Brine from potable water maker

It is estimated that approximately 50,000 to 80,000 gallons of excess drilling mud will be disposed of during the drilling of each proposed well. A typical drilling mud will be used in the proposed exploratory wells. This will contain fresh water, montmorillonite clays, barium sulfate, and additives such as caustic, organic polymers, and lignite derivatives. These additives are not highly toxic in the concentrations used. When discharged to the ocean, the mud disperses readily and the additives are diluted to undetectable levels a short distance away (Refs. 1, 2, 3, 4 & 5). If the drilling mud has become contaminated with oil from a subsurface formation, it will not be discharged into the ocean but will be transported ashore and disposed of in an approved dump site.

It is estimated that 9,000 to 11,000 cubic feet of cuttings will be generated during the drilling of each of the proposed wells. They will contain only those constituents contained in the drilling mud. Any cuttings which might inadvertently contain entrained oil will be transported ashore to be disposed of in an approved dump site.

It is anticipated that approximately 800 cubic feet of excess mud-contaminated cement will be disposed of to the ocean, in accordance with the NPDES Permit, during the drilling of each proposed well. Cement, like drilling fluids, contains no highly toxic substances. It disperses readily in ocean water and becomes undetectable within a very short distance from the point of discharge. For a current reference to aspects of the preceding paragraphs refer to the Ecomar, Inc. and Shell Oil Co. study at Tanner Banks (Ref. 1).

Sanitary wastes will be processed in an aeration-type sewage plant approved by the U. S. Coast Guard for marine service. The effluent will be treated with chlorine in accordance with conditions set out in the NPDES Permit. The estimated discharge is 5000 gallons per day.

The kitchen, shower, and washing machine wastes are basically non-toxic, containing only food, soap, and biodegradable detergents and cleaning agents. These wastes are estimated to amount to 40 gals. per day per man, resulting in a total of 2800 gals. per day for a 70-man crew.

Trash and garbage (paper containers, wiping materials, etc.) will be placed in suitable portable containers which will be transported ashore for disposal in an approved dump site. An estimated 110 lbs. per day of this waste will be generated by a crew of 70 men.

The drilling vessel is designed to contain all deck drainage and wash-down water which will be processed in a suitable oil-water separator prior to ocean disposal. The quality of this effluent is controlled by conditions set out in the NPDES Permit. It is estimated that about 1,000 gallons per day will be generated in this manner. Both sea water and fresh water will be present in this discharge.

It is estimated that engine room drainage will range between 30 and 50 gallons per day. Normally this water will contain minimal quantities of lubricating oils. Excess oil contamination will be disposed of onshore.

Engine cooling water (non-contact) discharge will have served to cool engine water jackets and as such will not contact any pollutants. Temperature increases will be minimal (2° - 4°F) at the design circulating rate of 2,000 gallons per minute (2,880,000 gpd).

The maximum amount of waste water generated from subsurface formation tests is estimated at 15,000 gallons for each of the proposed wells. Any oily water derived from these tests will be transported ashore for suitable disposal in an

approved dump site or processed in the deck drain oil-water separator prior to disposal of the waste water in the ocean according to applicable discharge regulations.

As a result of distilling sea water as a source of potable and domestic water, approximately 14,000 gpd of concentrated brine is produced as a by-product. This brine is non-toxic and will result in no pollution upon ocean discharge.

2.62 Gaseous Pollutants

Gaseous emissions associated with this project are primarily exhaust and combustion products. The emissions will occur during the period of time it takes to drill and abandon the proposed wells (estimated at 65 to 80 days each). The specific emission sources include:

1. Generators used to supply power for the drilling operations.

2. Supply and crewboat engines and helicopters.

3. Drill ship movement to and from the proposed site.

4. Natural gas flaring.

In the course of evaluating each proposed well we anticipate flaring about 1500 MCF of gas during drillstem tests. The emissions from this type of operation are generally considered to be low and because of the temporary nature of the project, are not considered significant.

Table 2 is a summary of the estimated quantities of gaseous emissions resulting from each proposed exploratory drilling operation using EPA AP-42. Units are in pounds/hour unless otherwise indicated (Ref. 6).

TABLE 2

SUMMARY OF ESTIMATED GASEOUS EMISSIONS (Avg. per well)
(lbs/hr)

	CO	NO	SO	Unburned Hydrocarbons	Average Operating Time (Total Time, Hours)
Prelim, site prep.	14.3	6.6	4.4	6.3	54
Drill ship movement	7.0	32.4	2.2	3.1	18
Drilling Operations*	25.3	117.6	7.9	11.1	2160
Support vessels					
supply boats	46.7	215.0	14.3	20.5	770
crew boats	4.8	22.0	1.5	2.1	255
Helicopter	14.0	1.4	0.4	1.3	35
Natural Gas					
Flaring	480.0	neg.	neg.	33.0	-

*Represents average. Actual hourly rates will vary greatly depending upon the activity taking place.

2.7 Estimated Requirements for Major Supplies, Services and Resources

This section discusses the approximate amount of any significant demand for major supplies, equipment, goods, services, water, aggregate, energy or other resources within the affected Coastal area.

This drilling operation will not place any demands on the resources within the affected area other than those which the area has been experiencing with past and present exploration work. The following demands for supplies and equipment required for the actual drilling work, average per well, are estimated to be:

- 450,000 pounds oilfield casing.
- 4,500 cubic feet cement (neat).
- 25,000 cubic feet mud (barite, bentonite and miscellaneous mud additives).
- 50 oilwell rock bits.
- Food to prepare three meals per day for 100 persons.
- Soap and laundry detergent (130 lbs. detergent, 30-40 gals. bleach).
- Linen supplies for 100 persons.
- Miscellaneous items to maintain vessel.
- 10 tons sand (for sandblasting), 500 gallons paint.
- 6,500 barrels of diesel fuel.

In addition to the above, the following services will be required during the proposed drilling operation: well logging, perforating, well testing, drilling fluids engineering, mud logging and oilwell cementing. The planned drilling vessel has the capability to distill water for drilling and crew requirements.

3.0 ENVIRONMENTAL SETTING

The following summary of environmental conditions in the area of proposed exploratory wells P-0316-1, 2, and 3 has been prepared to accompany the Exploration Plan as it is submitted with requests for a permit to drill these wells.

This Environmental Report (Exploration) includes, as required, available information that is accurate and applicable to the geographic area. The following information is from "the most recent Environmental Impact Statement(s) for the area" as well as other generally available and current publications.

3.1 Site-Specific Geology

The proposed drilling sites in Parcel P-0316 are located at the western end of the Santa Barbara Channel (Figure 1) about 10 miles west of Point Conception. The regional geology of the Channel area has been described in considerable detail by Vedder and others (Ref. 7), the U. S. Geological Survey (Ref. 8) and Sylvester and Darrow (Ref. 9). These reports provide a comprehensive geologic summary of the stratigraphy and structure of the region. Figure 4 shows the relationship of Parcel P-0316 to the significant structural features within the area. Most of the major structural features in this area are nearly parallel to the Channel's east-west trend. The proposed drilling sites are located on one of these east-west features that appears to be an extension of the Santa Ynez Mountains. The tectonic history of the northern Channel Islands and the adjacent Santa Barbara Channel has been discussed in reports by Greene (Ref. 10), Vedder and others (Ref. 7) and in Reference 8.

3.11 Bathymetry

Depths and ocean floor conditions have been reported by NOAA (Ref. 11) and have been mapped and analyzed by Intersea Research (Ref. 12) utilizing waterborne surveys. Intersea's detailed mapping (Figure 3) is in general agreement with the more regional bathymetry shown on the NOAA charts.

Water depths at the proposed drill sites are:

Location #1 - 623 feet
Location #2 - 344 feet
Location #3 - 644 feet

The regional slope of the sea floor on parcel P-0316 is to the southwest. In the shallower northeast corner of the block the bottom slope averages 49 ft. (15 m) per mile, or less than one percent, to about the 410 ft. (125 m) depth. From the 410 ft. depth into deeper waters the bottom slope increases to 196 ft. (60 m) to 246 ft. (75 m) per mile (four to five percent). In the Southern California borderland the break in slope occurs generally at about the 400 foot depth.

A few irregular bottom features were reported by Intersea (Ref. 12). None of the proposed drill sites are associated with these irregularities. The possible significance of these features is discussed under Section 3.13, Shallow Geologic Hazards.

3.12 Bottom Sediments

During the summer of 1977, drop core sites were selected and cored by Fairfield Industries. The lithology of the recovered core material was either a dark green soft clay silt or a highly plastic greyish-green clay with occasional shale fragments. The core sampler used was a blue water marine dart core weighing 900 lbs. The core barrels were capable of sampling two-foot lengths in soft sediments and one-foot lengths in hard outcrop areas. Diameter of the sampler was two inches outside. In water depths between 300 feet and 1000 feet on this parcel, sample lengths ranged from 7-1/2 inches to 20 inches in length. Notes accompanying the sample recovery indicate that sampler penetrated at least 4-1/2 feet below the mud line in many instances.

The exact thickness of overburden materials (i.e., soft, unconsolidated sediments and clay ooze) is presently unknown. Intersea has mapped a near-surface zone from their high resolution geophysical surveys that ranges from 100 feet to 260 feet in thickness (Ref. 12). From previous experience, it is believed that this section will consist of stiff clays and clay silts that become firmer with depth and does not represent loose unconsolidated watery materials.

3.13 Shallow Geologic Hazards

(1) Landslide Potential:

Intersea (Ref. 12) has mapped a large landslide area in the southwest half of the parcel where slopes are over 4% (Figure 3). This large landslide ranges from water depths of around 500 feet to slightly over 800 feet. All water depths over 800 feet on this parcel appear to be located beyond the toe of the landslide. None of Chevron's proposed drill sites appear to be in the landslide area. Since all of the locations are up slope from the slide it appears that any movement within the slide area will not affect the temporary wellheads.

(2) Scouring and Erosion:

There is no evidence, from the survey records obtained to date, of any ocean floor scouring and erosion. On the contrary, the lithology and evenly-bedded nature of

the uppermost layers of sediments indicate that the proposed drilling sites are in an area of slow and uniform accumulation of sediments, and that sea floor currents are very mild.

(3) Hydrocarbon Seepages and Shallow Gas

There are no oil seeps reported within the area of Parcel P-0316, the nearest being about 1000 feet to the north (Ref. 13). Intersea (Ref. 12) reports that the high-resolution geophysical surveys suggest the presence of dispersed gas in the near-surface sediments in the northern part of the parcel. Similar gasified sediments penetrated during drilling operations elsewhere in the Channel have not proven to be hazardous. No evidence of shallow gas pockets was observed in the survey area.

(4) Shallow Faulting:

Intersea (Ref. 12) reported shallow faulting that appears to be limited to the underlying sedimentary section and does not appear to come through to the ocean floor. None of the proposed drill sites appear to be involved with this faulting.

3.14 Deep Geologic Hazards

The usual deep drilling hazards encountered while penetrating hydrocarbon-bearing formations are expected during the drilling of the proposed wells. As part of the blowout and oil spill prevention plan, Chevron's drilling programs will contain a casing program that will be in accordance with OCS Order No. 2 - Drilling Procedures.

In the offshore and onshore Point Conception area 21 exploratory wells, 18 exploratory core holes and 3 development wells have been drilled. Most of these wells are located to the south of and within 5 miles of the Point Conception Oilfield. The proposed exploratory wells, to be drilled on Parcel P-0316, will be located about midway between the Point Conception drilling and the deep stratigraphic test well OCS-CAL 78-164 No. 1 (Figure 2). The deepest penetration was made in the Exxon-Chevron P-0197 No. 3. This well went to 12,006 feet without encountering any problems. The 78-164 No. 1, located approximately 5.5 miles west of the P-0316 parcel, also encountered no serious problems while being drilled to a total depth of 10,571 feet. Hydrocarbons were encountered in many of these wells. However, no abnormal pressures, lost circulation problems or other mechanical problems were reported during the drilling of any of these wells. Some of the more significant wells drilled in the Point Conception area are summarized in the following tabulation:

Well Name	Max. Mud Wt. lbs/cu.ft Gradient (psi)	Total Depth	Distance from P-0316 #1
Exxon P-0197 #3	77 (.535)	12006'	54,000 ft
Exxon P-0197 #2	77 (.535)	10341'	64,000 ft
Exxon P-0197 #1	78 (.546)	11975'	62,000 ft
Union State 2879 #8-6	77 (.535)	7828'	62,000 ft
Exxon 2879 H-1	81 (.566)	9173'	59,000 ft
OCS-CAL 78-164 #1	77 (.535)	10571'	37,000 ft

3.15 Seismicity

Earthquake activity in the Santa Barbara Channel has been adequately covered by the Bureau of Land Management in their 1978 report (Ref. 13), the U. S. Geological Survey's 1969 and 1976 reports (Refs. 7 & 8) and the earthquake reports of 1973 and 1976 by the Seismological Laboratory at the California Institute of Technology (Refs. 14 & 15).

There are no known active faults within Parcel P-0316. The nearest potentially-active fault is the Santa Ynez River fault, a postulated west-trending left-oblique fault (Ref. 9) whose near-surface trace is about 12 miles north of the proposed drill sites (Figure 4). This is also the dominant potentially active fault within the range of Chevron's operation (Table 1) which would establish the design criteria for future development. All other active faults are too far removed to create levels of ground shaking at the proposed drill sites which could exceed those from a possible magnitude 7.5 Richter scale earthquake at a 9 Km depth on the Santa Ynez River fault. It is estimated from Schnabel and Seed (Ref. 16) that such an earthquake could cause vertical ground accelerations of about 0.38 g at the drill sites. Since this degree of vertical acceleration is expected to occur during the high frequency part to the ground shaking spectrum it should have little or no effect on the drilling equipment.

Earthquake Related Damage

1. Ground Rupture

A study of the published literature and an analysis of the high-resolution surveys indicates that there are no fault traces beneath any of the proposed sites. Therefore, ground rupturing is not anticipated during any nearby earthquakes.

TABLE 3

DIRECTLY DETERMINED ROCK ACCELERATIONS

Fault	Magnitude	Distance to the Site in Miles (Km.)	Site Rock Acceleration
Santa Cruz	7.0	15 (24)	0.27
Santa Ynez, North Branch	7.5	16 (26)	0.33
Santa Ynez River	7.5	12 (19)	0.38
Santa Rosa Bay	7.0	27 (44)	0.11
Red Mountain	6.5	51 (82)	0.03
Pitas Point	6.5	50 (80)	0.03
Hosgri	7.0	36 (58)	0.11
More Ranch	7.0	40 (63)	0.10
San Andreas	8.25	69 (112)	0.10
Arguello Canyon	6.0	24 (39)	0.10
Random Event* (directly beneath the site)	6.0	6 (10)	0.31

*Hypocentral distance (kilometers)

2. Ground Failure

(a) Liquefaction

The subsurface soils at the proposed sites can safely support the proposed drilling equipment. The Intersea Research Corp. Surveys (Ref. 12) indicate that the near-surface sediments appear to be comprised mostly of clays which do not liquify when cyclically loaded.

(b) Slumping

The ocean bottom in the immediate area of the No. 2 drill site has a very gentle bottom slope, and there are no indications of slumping at or near this proposed location. The No. 1 and No. 3 drill sites are on a slope of over four percent and near the headward edges of landslide areas. The sites themselves do not appear to be subject to slumping during severe ground shaking, but the slope to the southwest does.

3. Tsunami

Based on published records and the location of the sites in open water, tsunami damage should not be a factor to be considered significant at the proposed drill sites. Tsunami waves do not impact vessels or structures in open water because of their low amplitude and great breadth.

3.16 Subsidence

Since there will not be any significant fluid withdrawals during the drilling and possible testing in the proposed wells, subsidence from fluid withdrawals will not occur.

3.17 Hydrology

The presence of fresh-water aquifers in the area of OCS Parcel P-0316 is unknown at this time. This parcel is located over 6 miles offshore from the Santa Barbara county coastline and none of the shallow sediments offshore reach the coastline so that they can collect fresh run-off waters.

3.18 Hazardous Areas Map

There are no significant geologic hazards in the area of the proposed drill sites, so a map has not been prepared for this Environmental Report. See Reference 12.

3.2 Weather Patterns

Due to its location on the southeast edges of the Pacific High the Southern California Coastal area has a Mediterranean subtropical climate characterized by warm dry summers and mild wet winters. Summers in the offshore area of Parcel P-0316 are moderated by the cooler maritime influence of the California Current. In winter, as the High weakens and migrates southwestward, the southward advance of low-pressure areas brings rainstorms alternating with periods of calm. Mean maximum temperatures at Point Arguello range from the low 60's in winter to 68°-71° in summer, with mean minimums from 49° in winter to the mid 50's in summer. Extremes of 30°F and 104°F have been recorded (Ref. 8). Average annual rainfall at Parcel P-0316 is estimated at 12 in. (Ref. 17) compared to 17.6 in. at Santa Barbara. The rainfall occurs mostly in the winter, November through April. Thunderstorms are less frequent than in any other part of the United States, averaging less than 5 days per year (Ref. 8). Funnel clouds and tropical cyclones ("hurricanes") are almost unknown; only one severe tropical storm has reached the southern California coast in the past 50 years or longer (Ref. 17).

Prevailing winds are from the northwest throughout the year (Ref. 8), strongest in spring and summer, and average 15 knots at Point Conception (Ref. 18); here, they exceed 34 knots one to four percent of the time (Ref. 8) Winter winds are more variable, though "Santa Ana" conditions are seldom observed this far west. Infrequent strong storm winds may blow from the east or southeast, veering through south to west and northwesterly as the storm passes; near Point Conception these winds have recorded velocities of 75 to 80 knots. During the spring, northwest winds have recorded maximum velocities of 60 to 65 knots (Ref. 13).

The occurrence of fog is greatest and most extensive in the summer. From May through November, visibility is reduced to 2 miles or less an average of eight percent of the time. From December through April, the same reduction occurs only five percent of the time (Ref. 8). Against the coastline, fog is more persistent; Point Arguello is a notably foggy area where visibilities during the summer and fall months may drop below 1/2-mile on about 10 to 20 days per month (Ref. 13).

3.3 Air Quality

The onshore areas of Santa Barbara and Ventura counties are within the South Central Coast Air Basin. Ambient air quality data for the Santa Barbara Channel region can be obtained from the California Air Resources Board (CARB), the Santa Barbara Air Pollution Control District (SBAPCD), and the Ventura Air Pollution Control District (VAPCD). A number of reports are available giving specific data (Refs. 6, 8, 13, 19). Data are available for total oxidants, carbon monoxide, nitrogen oxides, hydrocarbons, and suspended particulates. 1976 is the latest year for which reasonably complete information is available.

Several studies have noted that there is a lack of air quality data in the offshore area. The nearest stations to the proposed OCS projects are located in the city of Ventura and in downtown Santa Barbara. These are operated by the respective Air Pollution Control Districts. Unfortunately, these station locations are located too far from the proposed drill sites to be used directly for air quality determinations. However, there are no emission sources of any consequence in the northwestern portion of the channel that can impact air quality at the drill sites. Thus, air quality at the drill sites and surrounding region are considered good, and Federal Standards are undoubtedly not exceeded.

Engineering-Science, Inc. (ES) (Ref. 20) was retained by the American Petroleum Institute (API) to determine the effect of outer continental shelf (OCS) activities on the air quality of adjacent states. The purpose of the study was to ascertain whether OCS drilling and producing operations impact the states and if so, to what degree.

Since EPA exempts onshore sources from regulation in non-attainment areas if they have uncontrolled emissions of up to 100 T/Y, ES assumed that it is reasonable to also exempt OCS activities that have the same or less air quality impact at ground level on the shoreline. Therefore, ES also developed curves describing OCS emission rates as a function of the distance from the shoreline that is necessary to give the same onshore maximum impact as a 100 T/Y onshore source.

API provided emission and equipment data for extremely large Gulf Coast and Pacific Coast OCS operations. Impact analyses were conducted for oxides of nitrogen (NO_x) since NO_x is the predominant pollutant emitted from drilling and producing activities. ES developed NO_x concentration isopleths for 500-ton-per-year activities offshore California and Louisiana. Five-hundred ton-per-year sources represent an extreme case since there are only two OCS activities, Beta and Hondo (Southern California), which approach emissions of that magnitude.

The mix of internal combustion engines and turbines was varied from 97% IC engines to 3% turbines to 80% turbines and 20% IC engines. These parameters followed the API (1979) report submitted to USGS (Ref. 21). These combinations were selected to simulate as nearly as possible actual offshore operations.

Meteorological data were obtained from the nearest onshore weather stations for which STAR data were available. In addition, offshore meteorological data were taken from the Hondo platform and used in preparing analyses for the Santa Barbara Channel.

ES used two EPA dispersion models for the analyses: the Climatological Dispersion Model (CDM) for annual concentrations

(Ref. 22) and Point-Multipoint (PTMTP), a short-term multiple source model for 1-hour concentrations (Ref. 23). Both computer codes had been run with a test deck to ensure that proper and valid results would be generated for these analyses.

An analysis was performed for a platform located 5 miles offshore (Figure 5) emitting 500 tons/year of NO_x. The 1-hour maximum surface concentration again would be 26.7 ug/m^3 at 300 meters from the platform. The surface level concentration 10 km from the platform toward shore was 7.8.

The analysis on an annual basis using Santa Barbara Airport meteorological data (Figure 6) calculated a maximum surface level impact of 0.8 ug/m^3 of NO_x occurring 1 km from the platform and decreasing rapidly with distance from the platform (Figure 7). The surface level concentration of NO_2 at the shoreline would be 0.1 ug/m^3 or 1/1000 of the NAAQS, which in the opinion of (ES) is an insignificant level of NO_2.

Another annual analysis (Figure 8) was prepared on the basis of Hondo platform meteorological data. There is a striking difference between the two calculations based on Santa Barbara Airport and Hondo platform meteorological data. The maximum surface level concentration of NO_x is 0.5 ug/m^3, about 40% lower than determined with the Santa Barbara Airport data. Also, the plume is spread over a much greater area and the 0.2 ug/m^3 contour is much farther from the shoreline.

Accordingly, use of actual offshore meteorological data for the Hondo platform for determining the annual concentrations indicates that onshore air quality effects are even lower than suggested by Santa Barbara data. Comparison of the two analyses (Figures 7 and 8) indicates that the onshore data provides a very conservative estimate of the effects of a Santa Barbara Channel site on the Santa Barbara shoreline. In either event, the impact appears not to be significant.

3.4 Physical Oceanography

3.41 Currents and Waves

Point Conception marks a major regional boundary between colder northern waters and warmer southern waters, controlled by several different water masses and current systems. From the north, the California Current flows southeastward at a mean speed of 0.3 knots, driven by the westerly winds of the North Pacific subtropical anticyclone. This current divides as it passes the northern Channel Islands and Cortes Bank, with the eastern branch turning counter-clockwise to form the Southern California Countercurrent. Well-developed in winter and weak in spring, this current has velocities estimated at

0.25 to 0.35 knots (Ref. 13). A subsurface countercurrent measured at 200 m carries water northward past Point Arguello throughout the year, at maximum velocities of 0.15 knots (Ref. 13). It is widest (90 mi.) and strongest in January and weakest in April and May.

As the Southern California countercurrent enters the Santa Barbara Channel it is shaped by mainland and island coasts, and by the California Current, into one or more gyres, which vary seasonally on a regular basis. From July to November a counter-clockwise gyre flows in the western Channel, south of Point Conception, with a near-shore branch flowing northwestward towards Point Arguello. From November to mid-February the Davidson Current surfaces, flowing to the north-northwest across the western Channel and as far as Point Arguello. From mid-February to August, longshore winds cause upwelling, the most conspicuous center of which is at Point Conception. With the upwelling comes the return of one or two counter-clockwise gyres in the western Channel, with northwesterly flow west of Point Conception (Ref. 13).

Thus during all three conditions of oceanic circulation, surface water movement across the proposed drillsites is to the northwest. Beyond Point Arguello this local current meets the California Current and the water mass either rejoins the local gyre or is carried to the west of San Miguel Island.

Bottom currents, related primarily to tides and sea-floor topography, have not been measured in the project area. In the deep portion of the Santa Barbara Channel, maximum measured bottom currents were less than 0.6 knots, and maximum mid-water currents were 0.2 to 0.3 knots (Ref. 13).

In Southern California waves are predominantly from the northwest and west because of prevailing winds from this quadrant (Ref. 8). These are commonly 3 to 6 feet high in the area between Point Arguello and San Nicholas Island (Ref. 18), Maximum predicted 100-year-storm waves in the area of the proposed drill sites are estimated at 32 feet in height, with an eighty percent probability that such waves will not exceed 29 feet (Ref. 8). Moderate swells commonly develop from the prevailing winds and from North Pacific winds and storms; at Point Conception, swells from 220° to 250° reach the shore with little modification (Ref. 24). Swells from Hawaiian Lows seldom exceed 8.2 feet in height, and are most common in the spring. Swells from tropical hurricanes may reach the area once every four or five years, on the average (Ref. 13). Tsunamis, which do not develop significant height or force until they impinge upon the shelf at water depths of 50 feet or less, would not be a hazard; at the proposed drilling sites, depths are 340 to 650 feet.

3.42 Water Qualities

The physical and chemical characteristics of the waters in the Santa Barbara Channel vary with the currents, discharges from various onshore sources, and the interactions between these and other processes. A great deal of information is available from the Final EIS for the Development of Oil and Gas in the Santa Barbara Channel OCS, FES/76-13 (Ref. 8, pp. II-214 through II-226) and the EIS Proposed 1979 OCS sale No. 48 (Ref. 13, pp. 90 through 119).

Surface water temperatures in the Point Conception area fluctuate annually between about 12°C and 16°C. During the spring and summer, the combined effects of currents and upwelling produce a rather abrupt change in surface coastal water temperatures in the Point Conception area. A cold, saline tongue extends past Point Conception, varying in location and extent in accordance with the degree of development of the countercurrent and upwelling (Ref. 25). Maximum thermocline depths from 1967 to 1960 at Point Conception were shallow relative to the rest of the Bight, ranging from 10 to 40 feet in July, 25 to 50 feet in April, with the thermocline eliminated in January due to upwelling (Ref. 24). These deeper waters vary in temperature from 9°C to 14°C at 60 meters depth.

The salinity of the area waters varies between about 33.3 o/oo (parts per thousand) and 34.0 o/oo. These fluctuations are caused by precipitation and evaporation at the surface, by freshwater land runoff, advection, and by upwellings.

The hydrogen ion concentration (pH) of the area from Point Conception to the Mexican Border ranges from 7.5 to a maximum of 8.6 with a mean of 8.1.

Dissolved oxygen is a product of photosynthesis by marine flora, free exchange with the overlying atmosphere, and turbulent mixing by winds, tides, and currents. The surface is nearly always saturated, sometimes as high as 140 percent of saturation. Dissolved oxygen decreases with depth and at 60 meters is about 4 mg/l, which is about 50 percent of saturation.

Various inorganic nutrients such as nitrogen, phosphorous, and silica are supplied by upwellings (especially during the spring and summer months), advection and land discharges (rivers and industrial and domestic effluents). These nutrients are depleted by uptake by phytoplankton. Nitrate concentrations vary from 0.01 mg/l to 0.16 mg/l at the surface, 0.20 mg/l to 0.40 mg/l at 90-m depth. Phosphate varies between about 0.01 mg/l and 0.08 mg/l at the surface and 0.09 mg/l to 0.20 mg/l at 300 meters depth; silicate, 0.10 mg/l to 1.40 mg/l at the surface and 0.85 mg/l to 2.38 mg/l at 300 meters.

Trace metals such as copper, cobalt, zinc, iron, manganese, boron, molybdenum, and selenium are physiologically essential to biological productivity. However, these same elements can be toxic in concentrated and/or transformed conditions. It is difficult to ascertain general concentrations for trace metals in sea water due to the limits of detection of analytical equipment and uncertainty as to the physical/chemical state of the constituent. Factors such as variations with depth, nearness to shore, upwellings, storm runoff, or extensive depletions by plankton populations all create variation ranges.

3.5 On-Site Flora and Fauna

The Point Conception region is the center of the transition zone between the subtropical (Californian) and the temperate (Oregonian) faunal provinces. Species diversity is higher in this area (approx. 150 mi. long) than on either side due to the presence of biota from both provinces, as well as endemic species. There is a very sharp faunal transition on either side of the headland, probably due to the hydrographic differences described earlier, especially temperature.

The environmental impact report for lease sale 48, Vol. 2 (Ref. 13) lists the area from Point Conception to 10 km offshore as an Area of Special Biological Importance, stating that it serves as a funnel for migrating birds, especially shearwaters and Brant; enormous numbers of birds pass through the area; and it serves as a staging area for migrating gray whales. Parcel P-0316 is at least 3 km west of this area, as defined.

Marine Mammals

A study was conducted by the University of California Santa Cruz, for the U. S. Bureau of Land Management, of marine mammals in the Southern California Bight, which Dames & Moore (Ref. 26) cited in an environmental study for the proposed LNG terminal near Point Conception. The only cetacean sightings reported off Point Conception were of three California grey whales. The Point Conception region is within the range of the endangered blue, finback and humpback whales, but none of these species was observed near Point Conception or in the Santa Barbara Channel. Historical sightings of Pacific whitesided dolphin, Dall's porpoise, and common dolphin have been reported within the Santa Barbara Channel.

The U. C. Santa Cruz study estimated the population in the Southern California Bight of the California sea lion at 23,000 to 34,500, and that of the harbor seals in California at 2,000. Both species, along with the northern elephant seal, northern fur seal and Steller sea lion, maintain breeding populations on the Channel Islands, especially San Miguel and San Nicolas. Two harbor seals were sighted off Point Conception. No sea lions were observed

within 10 miles of Point Conception, from April-September. Animals were observed in the area between October and December at a concentration of 1-5 animals per square km. Two endangered marine mammals - the humpback and fin whales - have geographic areas which include the Point Conception area, but no sightings have been reported within 50 miles.

Marine Birds

The U. C. Santa Cruz group also conducted an aerial reconnaissance of the Point Conception area, where sampling areas corresponded to Department of Fish and Game fish blocks. Table 4 shows species sighted in fish block 658. Jaegers, gulls, and terns were most common from April to June 1975, while procellariform species (shearwaters and petrels) were dominant from July to September. Abundance was low from October to December, and slightly higher in January to March, 1976, when both these groups were equally represented. This block shows a more typically oceanic species composition than fish blocks located on the coast. Total densities as well as species numbers in the area varied considerably over the year, reflecting seasonal changes in habitat. Dames & Moore (Ref. 26), citing the Hollister ranch study, listed the following open ocean birds inhabiting the Point Conception area: Heerman's, Bonaparte's, and Western gulls, Brandt's and double-crested cormorants, brown pelican and Western grebe.

Nesting sites for several species of seabirds are located on the northern four channel islands, as well as Santa Barbara Island.

Fish block data show no sightings in the survey period of the brown pelican or of any least terns, which are classified as rare and endangered species. The nesting areas of the former are on Anacapa Island and nearby Scorpion Rock. The nearest least tern colonies are at the Santa Ynez River mouth.

Fishes

Commercial Fisheries:

Fish block data from the California Department of Fish and Game can be used to estimate the relative volume of the area's fishery. The Point Conception area provides a significant portion of the state's fish catch. The most important commercial catch in the area (several blocks combined) is the northern anchovy, with an average annual catch per square mile of 3,710 pounds, or in dollar terms $1,836/square mile (Dames & Moore, Ref. 26). The next most important species is Pacific bonito, with roughly two-thirds the yield and half the economic value of anchovy. Other commercially important species include abalone, bass, rockfish, and other tunas.

Fish block data for block 658 from 1971-75 (Table 4) show that the northern anchovy yielded the highest catch (based on one year's catch), followed by Pacific bonito. Smaller by an order of magnitude were the yields of the next ranking species, rockfish (lumped), red rockfish, and albacore. Comparison of these data to those for adjacent, nearshore fish blocks 643 and 658 shows similar yields for bonito; data were insufficient to compare anchovy yields (probably due to patchy spatial and/or temporal distribution). Demersal fishes, however, showed an apparently lower yield offshore, probably as a function of depth distribution. Generally, then, this area can be considered to be one of slightly lower productivity relative to contiguous inshore areas.

Slope Fishes:

Several families have members with ranges at the depths of the lease sites in question; e.g., chimaeras, ratfishes, snailfishes, eelpouts, skates, and flatfishes (Ref. 27). The macrourids are the dominant fishes on the slopes, with nine species being seen off California (Ref. 13).

Kelp Beds

Macrocystis pyrifera, or giant kelp, occurs in thick beds along the shores of the Santa Barbara Channel and in smaller beds around the Point Conception-Point Arguello headland. These beds provide food and habitat for fish and invertebrates and are an indispensable part of an ecosystem which supports many commercially important fish species, as well as abalone. Furthermore, harvest of the kelp is an important economic resource.

These kelp beds are located inshore of the lease blocks under consideration but may constitute a source for some of the fauna found on the lease sites, as well as serving as a habitat for larvae and juveniles which may occupy the lease sites in adult stages.

Benthic Macrofauna

The bottom in the area of lease site P-0316 is a mud bottom of olive green silt. The Point Conception description area of Fauchald & Jones (Ref. 28) showed at 150 m depth densities around 4750 organisms per m^2, a species richness of 80 species per sample and a standing crop of 100 g per m^2. Below 200 m all these parameters decreased dramatically. Breakdown into taxonomic groups showed that the dominant group was polychaetes, followed by mollusks, crustaceans, echinoderms and minor phyla.

The faunal composition shallower than 200 m was denser and richer than that at deeper depths. For example, the ophiuroid Amphiodia urtica was prominent at less than 200 m but was absent below that depth, as were echinoderms. Fauchold & Jones (Ref. 28) felt that possible explanations included:

TABLE 4

AVERAGED FISH BLOCK DATA, 1971-5, IN POUNDS
(CALIFORNIA DEPARTMENT OF FISH AND GAME)

Fish	643	657	658
anchovy	11,321,950		120,160
bonito	123.171	155,957	111,473
rockfish	10,299	29,045	2,268
red rockfish			2,089
albacore			1,428
red abalone	15,823	111,295	
sea urchin	51,044	6,339	
bocaccio		9,387	
Total	11,531,007	339,887	240,520

Source: California Dept. of Fish and Game
Fish Block data.

(1) High density may have been due to higher productivity from upwelling at Pt. Conception.

(2) High species richness may have been due to the position at the boundary of two biographic provinces.

(3) Poorly oxygenated water below 200 m limited density and richness at depth.

Table 5 shows faunal assemblages and abundances at the most comparable station from this study, as well as from a later study for another similar site.

Phytoplankton

Species carried by the California Current are mainly northern species originating in Subarctic waters. Southern (equatorial) species are carried in by the northward flowing undercurrent (below 200 m) and the seasonal Davidson countercurrent. The northward Davidson Current extends out 36 miles from the coast from November to February and is most strongly developed north of Pt. Conception. In the fall, oceanic species are introduced from the Pacific Central Water Mass. Large concentrations of diatoms may be found in upwelling periods.

Production was measured offshore north of Pt. Conception (February-December 1969) at 648 mg C/m^2/day. Chlorophyll a concentrations for the four quarters of 1969 measured 30-50, 50-70, 50-70, and 15-20 mg/m^2 (Ref. 29).

Dames & Moore (Ref. 26) found the following phytoplankters to be dominant in their samples: Chaetoceros spp., Nitzschia delicatissima and N. closterium/longissima, Skeletonema costatum, Leptocylindricces danicus, Navicula distans and Phizosolenia fragillisima/delicatula. Their data showed considerable seasonal variability. Typical dinoflagellates that might occur at other times of the year include Gymnodinium splendens, Gonyaulax Polyedra, G. catenella, Ceratium furca, as well as others of this genus, Peridinium sp., and Prorocentrum micans.

Ryznik (Ref. 30) listed the following species for the Santa Barbara area: Ceratium furca, C. fuscus, Peridinium spp., Bacteriastrum delicatulum, Chaetoceros compressus, C. decipiens, C. didymus, Coscinodiscus spp., Licmophora abbreviata and Skeletonema costatum.

Zooplankton

The most abundant species in the Point Conception area, as for phytoplankton species, are of subarctic and transitional origin, with the presence of Equatorial and Eastern Central Pacific species depending on the particular conditions of circulation at any given time. There are also endemic nearshore species.

TABLE 5

FAUNAL COMPOSITION OF ST. 4814 (89.2 M)
OFF PT. CONCEPTION, JANUARY 16, 1957

Taxon	No.
POLYCHAETA:	
Anaitides madeirensis	5
Ancistrosyllis tentaculata	1
Aricidea uschakowi	1
Axiothella rubrocincta	2
Ceratocephala americana	3
Chone gracilis	1
Cossura candida	10
Eumida sp.	1
Glycera capitata	9
Isocirrus longiceps	1
Laonice cirrata	5
Lumbrineris bicirrata	8
Lumbrineris spp.	34
Maldane sarsi	2
Nephtys ferruginea	2
Ninoe gemmea	2
Nothria iridescens	2
Panthalis pacifica	1
Pectinaria californiensis	2
Pista disjuncta	5
Prionospio malmgreni	12
Prionospio pinnata	14
Rhodine bitorquata	1
sabellid	1
Sabellides sp.	100
Sternaspis fossor	2
Stenelais tertiaglabra	1
Terebellides stroemi	30
Tharyx tesselata	4
Travisia pupa	1
CRUSTACEA:	
Ampelisca brevisimulata	19
Ampelisca pacifica	8
Ampelisca hancocki	6
Argissa hamatipes	1
Dulichia monacantha	1
Parametopellaninis	1
Photis californica	51
Photis lacia	9
Protomedeia articulata	7
Westwoodilla caecula	2
Lysianassa holmesi	2
Lysianassa oculata	5
Ampelisca pugetica	10
Paraphoxus abronius	1
Sympleustes subglaber	5
Dexamonica reduncans	1
Cirripedia	
stalked cirriped	2
Cumacea	
Eudorella A	7
Eudorellopsis A	4
Diastylidae unknown	3
Leucon A	1
Procampylaspis A	2
Decapoda	
crab unknown	1
shrimp unknown	4
Isopoda	
Gnathia productatridens	2
Idarcturus allelomorphus	1
Munna sp.	1
Tanaidacea	
Leptochelia sp.	7
ECHINODERMATA:	
Holothurioidea	
Leptosynapta albicans	1
Ophiuroidea	
Amphiacantha amphacantha	1

Taxon	No.	Taxon	No.
Byblis veleronis	16	Amphiodia urtica	76
Heterophoxus oculatus	23	Amphipholis squamata	3
Metaphoxus frequens	4	Amphioplus strongyloplax	1
Phoxocephalus homilis	2		
Paraphoxus similis	2		
Paraphoxus bicuspidatus	1		

Source: Jones, 1957

FAUNAL COMPOSITION AT ST. 837 (185m)
IN THE POINT CONCEPTION DESCRIPTIVE AREA

Taxon	No.
POLYCHAETES	
Maldanidae, unid.	3
Paraprionospio pinnata	2
Prionospio spp.	1
Tharyx spp.	20
Pectinaria californiensis	7
Spiophanes spp.	4
Capitellidae, unid.	30
Lumbrineris spp.	4
Ampharetidae, unid.	20
Maldane sarsi	1
MOLLUSKS	
Axinopsida serricata	2
Nemocardium centifilosum	1
Tellina carpenteri	4
CRUSTACEANS	
Heterophoxus, near oculatus	4
Eudorellopsis longirostris	1
Euphilomedes producta	1
Paraphoxus bicuspidatus	2
Rutiderma spp.	6
Ampelisca, near pacifica	2
ECHINODERMS	
Amphiodia urtica	15
Brisaster latifrons	1

Source: Fauchald and Jones, 1978 (Ref. 28)

Long-term averages of zooplankton standing stock (Ref. 13) showed that the peak of zooplankton abundance in the upper 140 m of the water column occurs in the spring and summer, and lowest values occur in the winter. Smith's (Ref. 31) data (medians from 1951-1960) showed plankton volumes in ml/1000 m^3 of 16-64 in January 1959, 64-256 in February, March, April, May, and July, and 256-1024 in June.

Table 6 lists major zooplankton in the Southern California Bight.

Fish larvae and eggs are an important part of the plankton. At various times of the year, saury eggs, anchovy eggs and larvae, as well as rockfish larvae, were found off Point Conception. (Ref. 13 and 32).

3.6 Environmentally Sensitive Areas

Included in this discussion of environmentally sensitive areas is an inventory of such areas in the general region of the Santa Barbara Channel as enumerated below. These are also shown in map form (Figure 9). Because the proposed projects do not lie within or near any such area no detailed discussion is contained herein, but references for some are indicated. Other reports (Ref. 33, Chapters 6 and 16) have suggested other values to be included within the "sensitive" categories and the discussion of alternatives and mitigations following would also pertain to these.

In the general region of the Santa Barbara Channel, the following officially protected areas presently exist:

1. State Oil and Gas Sanctuary (No. 1, Fig. 9), (Ref. 33, p. 339).

2. San Miguel, Santa Rosa, Santa Cruz and Anacapa Islands (Nos. 2 and 3, Fig. 9), and Mugu Lagoon to Latigo Point (No. 4, Fig. 9). These are designated as Areas of Special Biological Significance by the State Water Resources Control Board (See: Ref. 8, Vol. 2, p. 600, Ref. 33, p. 338; and Ref. 34).

3. Channel Islands National Monument (No. 5, Fig. 9), of which only Anacapa Island lies in the general region of this project (Ref. 33, p. 336).

4. Federal Ecological Reserve and Buffer Zone (No. 6, Figure 9). This area lies about 41 miles east of the proposed project (Ref. 8, p. ii-11).

All of the above officially protected areas are 20 to 90 miles to the south and east of the proposed drilling sites. To the north, the nearest officially protected area is the Pismo Beach Ecological Reserve, 40 miles distant in a direction counter to the year-round winds and currents north of Point Arguello.

TABLE 6

MAJOR ZOOPLANKTON TAXA IN THE SOUTHERN CALIFORNIA BIGHT

Taxon	Common Species
COELENTERATES (Cnidaria)	Poorly known for the area.
CTENOPHORES	Pleurobrachia bachei, Beroe sp.
CHAETOGNATHS	Sagitta euneritica, S. bierii, S. minima, S. enflata
POLYCHAETES	Vanadis formosa Torrea candida Tomopteris elegans Travisiopsis lobifera
MOLLUSKS	
Pteropods	Limacina helicina
Heteropods	Atlanta peroni, Atlanta sp. Carinaria japonica
Cephalopods	Abraliopsis felis Gonatus onyx
CRUSTACEANS	
Copepods	Libinocera trispinosa Acartia tonsa A. clausi Calanus helgolandicus Rhincalanus nasutus Oithona similis
Amphipods	Vibilia armata
Cladocera	Penila avirostris Evadne nordmanni, Podon polyphemoides, Evadne spinifera, E. Tergestina
Euphausids	Euphausia pacifica Nematoscelis difficilis Nyctiphanes simplex Stylocheiron longicorne Thysanoessa gregaria T. spinifera
Decapods	Sergestes similis

THALIACEA

Doliolum denticulatum
Dilioletta dgegenbauri
Cyclosalpa bekeii
Pegea confoederata
Salpa fusiformis
Thalia democratica

Source: U. S. Dept. Int., 1979 (Ref. 13)

The proposed project should have little or no effect on biological conditions in the immediate drill site areas. Biological conditions further removed from the proposed drill sites could only be affected by a major oil spill (i.e., over 1000 barrels). Section 2.2 should be referred to for the oil spill preventive measures to be employed by Chevron during the drilling. Available evidence indicates that total exposure of the flora and fauna which occupies the project area, to the discharge of drilling fluids and drill cuttings will result in no adverse effects to measurable numbers of these organisms (Refs. 35 and 1).

The section of coastline nearest to the proposed activity includes Jalama Beach County Park, 8 miles to the east-northeast. A major oil spill might impact this recreational site. The area from Point Conception to a distance 10 km. offshore has been listed (Ref. 13) as an area of special biological importance, and a major spill during certain seasons could have a significant impact on migrating seabirds or grey whales. Other environmentally sensitive areas include San Miguel Island, 30 miles south-southeast of the proposed drill sites, and to the east of it, the northern shore of Santa Rosa Island. This area is within a potential spill trajectory from Parcel P-0316, due to prevailing winds and currents. Especially on western San Miguel Island, various species of seabirds and pinnipeds (none of them listed as endangered species) have major reproductive colonies. The Guadalupe fur seal (Archocephalus townsendi) has been observed to haul out occasionally near Point Bennett, on westernmost San Miguel Island.

There are no known rare or endangered species of flora or fauna residing in the proposed project area. A detailed discussion of marine mammals and birds, fish, and plant resources may be found in the Draft Environmental Impact Statement on the Proposed Channel Islands Marine Sanctuary, U.S. Department of Commerce (Office of Coastal Zone Management), 1979.

The California brown pelican (Pelecanus occidentalis), listed as an endangered species, is present year-round throughout the Channel region, though most common in the northern and central Channel Islands, and from September through December. Though considered a resident of San Miguel, Santa Rosa, Santa Cruz and Anacapa Islands, its rookeries are restricted to western Anacapa Island and nearby Scorpion Rock, where breeding populations of 424 and 80 birds were reported in 1975-76 (Ref. 13). These rookeries are more than 70 miles east-southeast of the proposed drilling sites.

Concern has often been expressed as to the effects of drilling operations on marine mammals, particularly migrating whales. Regarding the California Gray Whale (Eschrichtius robustus) and the Pacific Right Whale (Eubalena glacialis), contact was made with Drs. William C. Cummings and Raymond Gilmore, scientists at the Natural History Museum in San Diego. Dr. Cummings was formally Senior Scientist at the Naval Ocean Systems Center in San Diego, and has spent the last 15 years doing bioacoustic and marine

biological research related to whales. Dr. Gilmore is considered one of the top authorities in the nation on the California gray whale.

Both Drs. Cummings and Gilmore indicated that the internal navigational systems of whales are highly sophisticated and that it would be very unlikely for such whales to come into contact with any objects in the ocean. They stated that whales are very adept at avoiding even "whale-watching" boats that attempt to follow migrating whales as closely as possible. Also, the Gray Whale is very accustomed to both natural and man-made objects and noises, and frequently travels in the shipping lanes where noise levels are at their highest. As to the Pacific Right Whale, the last sighting of such a whale was off the coast of California near San Diego in 1955, and one sighting every 20 years would be about normal for this species.

While Drs. Cummings and Gilmore indicated that there was no definitive study which provides information on the effect, if any, on migratory patterns of the types of noises which will be created by Chevron's proposed activities, they both stated their opinion that the proposed exploratory drilling does not pose any threat to the whales or their migratory patterns.

Commercial and sport fishing will not be materially affected by the presence of a drilling vessel in the project area. The operations contemplated by Chevron are of small dimensions, are of short duration (about 65 to 100 days per well), and do not involve any construction, large amount of noise or the use of any freighters or other large vessels, other than the drilling vessel itself. Since the project area is located beyond the western end of the Santa Barbara Channel, over 6 miles from the nearest shoreline, it receives little or no sport fishing or recreational use.

3.7 Onsite Uses of the Area

Coastwise shipping lanes through the Santa Barbara Channel terminate to the southwest of Parcel P-0316, and shipping will ordinarily pass five or more miles to the west of the proposed activities. The area is a significant locus of commercial fishing (see also Section 3.5), though this is limited to the pelagic and littoral species; the lease block and environs are not within any established commercial trawl grounds (Ref. 13). Sport fishing and pleasure-boating in this block, as in the whole area, is negligible, primarily due to inaccessibility from ports.

There appear to be no other known mineral deposits of either commercial or non-commercial value on or adjacent to lease P-0316.

The area of the proposed activity is subject to various military uses. Chief of these are the Pacific Missile Range and the danger zones controlled by Vandenberg Air Force Base. Potential conflicts in usage are dealt with in Stipulations 1 and 2 of the lease, which provide for coordination, notification, and the temporary suspension of operations and evacuation of lessee personnel during hazardous military activities, and the lessee's assumption of all risk from such activities (Ref. 13).

3.8 Archaeological and Cultural Resources

The proposed exploratory drilling described in this report is located in water depths which range from 344 ft. to 640 ft. Because the water depth over a portion of Parcel P-0316 is less than 400 feet and possible drilling may occur in these shallower waters, an archaeological survey was performed. The results of this survey are included as Appendix C. It is the conclusion of Mr. J. Hunter, who prepared the report, that his careful analysis of the remote sensing data revealed no identifiable archaeological resources.

3.9 Existing and Planned Monitoring Systems

Many agencies currently regulate or have authority over specific activities and particular natural resources in the area. No single authority has the responsibility for monitoring the entire system. Because the proposed exploratory well activities will generally have minimal impact on the area, only the operators, who will be drilling the wells, and the USGS Pacific Region Conservation Division, will be maintaining close surveillance during the exploration drilling. Extensive cooperation during the drilling operation will be maintained with the U.S. Coast Guard, the National Marine Fisheries Service, Bureau of Land Management, the California Dept. of Fish and Game, and onshore California county agencies who supervise the disposal of drilling wastes.

During the drilling, shipboard personnel will monitor for oil spills, possible blowouts, disposal of shipboard wastes, hydrocarbon showings, and shipping activity in the area. Procedures for utilizing the blowout prevention system have been submitted to the California State Lands Commission and USGS Conservation Division. All Chevron and contract drilling supervisors and drillers will be given formal well control training. A site-specific oil spill contingency plan has been prepared and submitted to the USGS Conservation Division. During drilling operations, an on-board mud logging unit equipped with gas detectors and other instrumentation will be operating. The "Grand Isle" is also equipped with a pit-level totalizer on the active mud tanks and a rate-of-return recorder.

4.0 ASSESSMENT OF DIRECT EFFECTS ON THE ENVIRONMENT

This section discusses the impacts on the offshore and onshore environments expected to occur as a result of implementation of the proposed exploratory plan.

These impacts are expressed in terms of magnitude and duration of the proposed operation with special emphasis upon the identification and evaluation of unavoidable and/or irreversible impacts on the environment.

4.1 Offshore Impacts

The only negative impacts on the offshore environment which are expected to occur as a result of drilling the proposed exploratory wells are minor, transitory, local effects on air and water quality in the Channel offshore region. The discharge of wastes to the ocean from these operations will have no discernible impact on the environment, since this will be done in accordance with the NPDES Permit (Appendix C). Unpredictable negative impacts which are not expected to occur, but might occur, include the effects of accidental leakage or spillage of diesel fuel, or of crude oil during the drilling process. The magnitude of such impact is unpredictable, but the duration would be of only a few days since spill containment and clean-up would commence almost immediately.

4.1(a) Air Quality

As indicated in Section 3.3 of this report, air emissions from this operation will consist mainly of exhaust and combustion products from the diesel power generation engines located on the drilling vessel. These emissions will occur for only about 65 to 100 days (duration of operations) per well. Their magnitude is discussed in Section 3.3. Well tests will last only a few hours and all gas will be flared. Due to favorable circulation and air quality in the area, negative air impacts caused by the project would be dispersed a short distance from the source. Modeling done for Chevron's Platform Grace on P-0217 show no significant impacts on air quality from a peak production of 13,000 barrels per day of crude (Ref. 6). Therefore, it is concluded that the small amount of emissions associated with the drilling of the proposed exploratory well would not cause air quality standards to be exceeded.

Another potential air emission source is a large oil spill (1000 bbls. or more). Technology and regulations make the likelihood of a spill remote. In addition, special programs previously discussed (Sections 2.1 and 2.2) would be placed in effect to control and eliminate a spill as quickly as possible. Thus, a large spill is quite unlikely, but if it occurs, the effect on air quality will be of short duration, with most of the volatile fractions having evaporated within 24 hours.

4.1(b) Marine Environment

The drilling fluid used in the proposed wells will be a water-base fluid containing no oil. Bioassay tests conducted on this type of drilling fluid used at other exploratory operations in the Santa Barbara Channel show that the fluid is non-toxic, having a TLm-96 range of 8500 mg/l to over 560,000 mg/l (Refs. 4, 5, 35, 36). The earth removed from the hole in the form of drill cuttings will also be non-toxic because it is similar to sediments continuously deposited by local rivers into the marine environment. The volume of this material is discussed in Section 2.6. Its disposal would occur over the drilling phase of the operations, approximately 45 to 70 days. Studies on the dispersion of drilling mud and drill cuttings released from drilling vessels and platforms show that the materials disperse rapidly with background levels occurring within 300 feet of discharge (Refs. 3, 4, 5, 35, 37). At the proposed locations, water depth is 340 to 650 feet and the materials will be highly dispersed before settling on the ocean floor. Studies by the California State Department of Fish and Game (Ref. 38) and others (Refs. 1-5, 35-37, & 39) show that deposition of drill cuttings on the ocean floor and dispersion of small amounts of drilling mud in the ocean environment have had "no adverse effect on the marine environment."

As specified in the NPDES Permit (Appendix C) for the drilling vessel, the volume of oil discharged as deck drainage will not exceed 52 mg/l (approximately 47 ppm, or about .047 gals/day). When compared to the volumes of oil discharged annually by rivers (1.6 metric tons), natural seeps (0.6 mta), and tankers (2.2 mta), this discharge (15.7 kg. over a 80-day drilling period, per well) will have a negligible effect on the marine environment (Ref. 40).

The NPDES Permit granted to this drilling vessel specifies that domestic and sanitary wastes not cause visible oil or floating solids, and that the discharge maintains 1/0 mg/l residual chlorine as cited in 40 CFR 435.2 and 435.5. The Environmental Protection Agency has concluded that this type of control for these wastes will ensure that there is no significant adverse effect on the marine environment.

Spillage of diesel fuel might occur as a result of an accident involving a supply boat or during transfer of the fuel to the supply boat or to the drilling vessel. The U.S. Coast Guard enforces regulations covering transfer of fuel and the Coast Guard procedures will be rigorously implemented by the fuel supply and drilling vessels. If an accidental spill of diesel fuel occurs while loading the supply boat or transferring the fuel to the drilling vessel, the volume involved will probably be small enough (a few hundred gallons) that it can be contained and cleaned up by equipment maintained at the onshore loading site and on board the drilling vessel. A larger transfer spill or a spill that might result from a fuel supply vessel accident will be handled by the oil spill co-op in the area in the same manner as described below for a crude oil spill from the drilling vessel (Section 2.22).

A spill of crude oil could occur from the drilling of one of these wells only if it encountered a formation containing sufficient oil at a high enough pressure to flow from the well, and if there were a "concurrent" unavoidable failure in the blowout prevention control equipment, or improper procedures were used in drilling the well. Drilling crews and vessel operators are trained in proper drilling procedures and in the deployment and use of oil spill prevention and control equipment maintained at the drilling vessel. Note that there has never been a spill of crude oil anywhere in U.S. waters as the result of exploratory drilling. In the event of any oil spill (diesel fuel or crude oil), the Chevron U.S.A. Spill Contingency Plan will be implemented immediately and used to contain and clean up the spill. Note that only approved clean-up methodologies will be employed. The potential for damage to the shoreline would be minimized because of the prompt containment and clean-up of the crude oil or diesel fuel, and the small volume of diesel fuel which might be spilled.

The nearest landfall for an oil spill is approximately 6 miles north of the northernmost proposed well and is the southern shore of Point Arguello. The entire coastline adjacent to the well is traversed by the Southern Pacific Railroad, and emergency access is provided by the railroad's service road. As noted in Section 3.41, currents would tend to carry a spill to the northwest at all times of the year, though these would be counteracted by the prevailing northwesterly winds. An oil spill at any of the proposed drill sites, if not contained, could impact the adjacent coastline. However, as was shown in the Santa Barbara spill, the impact of any such spill even on the shoreline of Santa Barbara County is not expected to be lasting, but will have some short-duration adverse effects (Refs. 8, 41).

4.2 Onshore Impacts

4.2(a) Air Quality

Aerovironment, Inc., conducted a study of the air quality impacts resulting from development following proposed OCS Lease Sale #48 (Ref. 19). Using a worse-case tanker scenario, emissions from extensive development were found to be minor. Studies done for Platform Grace on P-0217 also show negligible onshore impacts.

4.2(b) Water Quality

There will be no impacts on onshore water supplies. Water is provided by onboard desalination.

4.3 Socioeconomic Impacts

As discussed in Section 2.4, no significant increase in the population or support facilities will be required. Therefore, the socioeconomic impact is negligible.

4.3(a) Aesthetic Impacts

Even on clear days the drilling vessel will be barely visible from the mainland shore (6 miles away at the closest point) because all but the upper part of the derrick will be near the horizon. The derrick lights may be visible at night from the mainland, and the vessel will be seen by passing boatsmen. The impact of this visual sighting will be negative, neutral or positive, depending on the subjective reaction of the viewer. In any case, the temporary duration of its presence (65-100 days) will result in a negligible transient environmental impact.

4.4 Mitigating Measures

Mitigating measures have been discussed in previous sections as appropriate.

Mitigating and preventive measures are described in: 1) Introduction, (temporary duration of project); 2) Section 3.1, (no shallow faulting); 3) Section 3.14, (successful prior drilling); 4) Section 3.15, (no active faults); 5) Section 3.2, (severe storms rare); 6) Section 3.6, (project not near biologically sensitive areas); 7) Section 3.8, (no evidence of cultural remains); 8) Section 3.0, (no submarine hazards); 9) Section 2.21, (drilling in accordance with USGS orders and regulations); 10) Section 3.1, (careful site selection and hazard studies); 11) Section 2.21, (best state-of-art BOPE - operations conform to NPDES Permit); 12) Section 2.2, (clean-up and containment equipment immediately available); 13) Section 2.3, (no new or expanded onshore facilities required); 14) Section 2.4, (negligible impact of operating personnel); 15) Section 2.6, (sanitary wastes processed in sewage plant); 16) Section 2.61, (trash hauled ashore for disposal); 17) Section 2.61, (deck drainage processed through oil-water separator); 18) Section 2.2, (oily waste water transported to shore); 19) Section 2.61, (oily water from testing hauled ashore to approved disposal site); 20) Section 2.61 (water-base drilling fluid used); 21) Section 4.1(b), (NPDES Permit limits oil and waste discharges); 22) Section 4.1(b), (prompt containment and clean-up limits potential spill impacts); 23) Section 4.3, (no significant increase in population, no new facilities required).

The main mitigating measure will be utilization of safe and proper operating procedures in all phases of the exploratory drilling program.

4.5 Unavoidable and Irreversible Impacts

Only transitory impacts on offshore air and water quality are expected to occur as a result of drilling these exploratory wells and have been previously discussed. Irreversible impacts would be limited to the deposition of cuttings on the ocean bottom. However, this impact has neither "a beneficial nor detrimental effect on the environment" (Ref. 38). Recent studies show many possible positive effects from creation of an artificial reef area.

A potential impact could result from a large oil spill. However, any damage sustained by the shoreline, 6 or more miles distant, would likely be minor and of short duration (Ref. 41).

5.0 COMPANY CONTACTS FOR INQUIRIES

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San Francisco, CA 94105
Phone (415) 894-4442

Mr. D. S. Moore
Chevron U.S.A. Inc. - Western Region Production
575 Market Street, Room 1856
San Francisco, CA 94105
Phone (415) 894-2099

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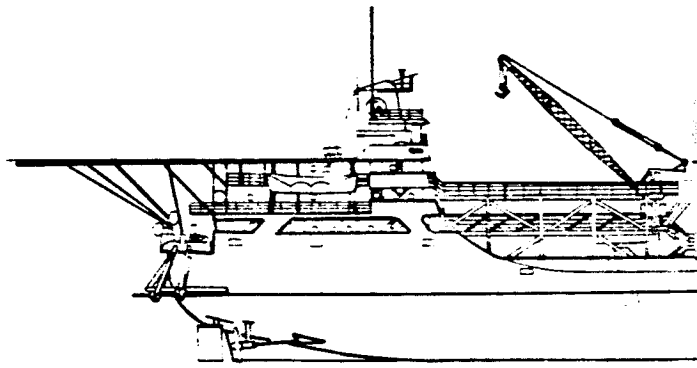
APPENDIX A

Description of Drilling Vessel

Length, Beam, Draft:
Length: 400.0' — Beam: 65.2' — Draft: 11'10" (Light ship)
Displacement:
5,727 L.T. (Light ship)
Centerwell:
20' x 22'
Propulsion:
Diesel electric, twin screw, each driven by 3 GE 752 RI electric motors.
Ground Tackle:
10 — 30,000 lb. anchors, 8 with 2500' of 2¾" stud link chain, 2 with 1500' of 2¾" stud link chain used with 2¾" wire rope.
Anchor Winches:
4 double wildcat with 1000' 2½" galvanized wire, diesel driven.
Electric Power:
3 — 500 KW AC General Electric generators, 2 independently driven by one Caterpillar D-398 Series B diesel engine, 3rd couples to No. 6 DC generator.
1 — 250 KW AC emergency generator driven by Caterpillar D-343 diesel engine.
Cranes:
1 — Link Belt TC-108, 40 ton, diesel
1 — Link Belt TC-48, 15 ton, diesel
Auxiliary Pumps:
2 Fuel pumps
2 Drillwater pumps
2 Fresh water circulating pumps
2 Salt water cooling pumps
2 Fire Pumps
2 Bilge pumps
1 Sanitary pump
Compressed Air System:
2 — 358 CFM 125 PSI air compressors with after coolers.
Water Distillation Unit:
2 — MECO Model PEE 300 K, 171 barrels per day each.
Radio:
RCA telegraph high seas system.
Radar:
Decca RM 916
Fathometer:
Raytheon DE-103

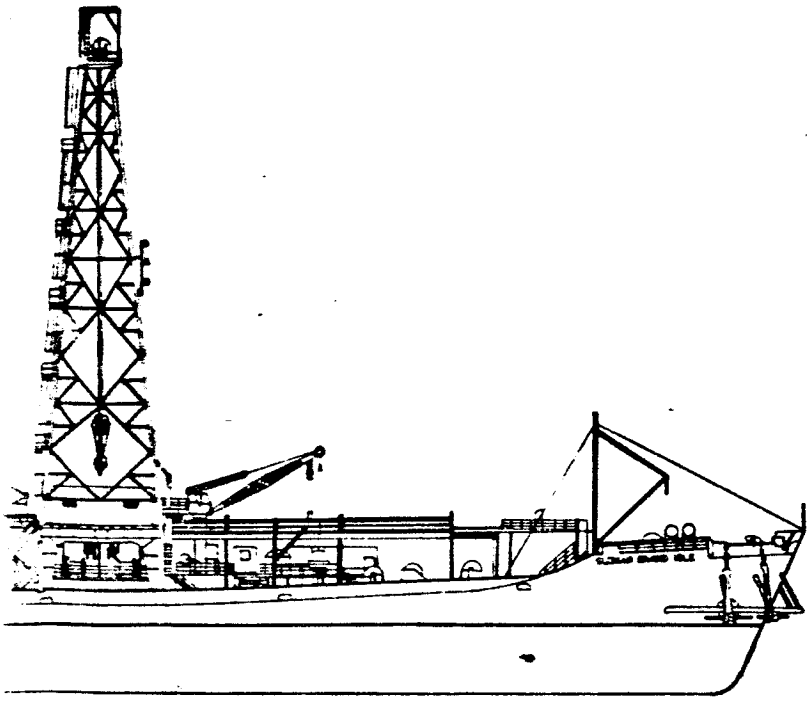
RDF Unit:
Raytheon Model 355
Intercom System:
Sound powered telephone.
Welding Machine:
2 — Lincoln 300 amp. electric driven.
Fire Smothering System:
D15A "Fire Boss" dry chemical fire extinguishing system for centerwell area.
Active Mud:
330 barrels
Reserve Mud:
2,484 barrels
Drilling Water:
15,325 barrels
Bulk Mud:
8,640 cu. ft.
Bulk Cement:
4,540 cu. ft.
Sack Material Storage:
12,000 sacks



Fuel:
8,144 barrels
Potable Water:
512 barrels
Derrick:
142' x 61' x 38' special design galvanized with 1,000,000 lb. hook load capacity, API rating.
Drawworks:
National type, 1625 DE, with 60" RC Parkersburg Hydromatic brake, driven by 2 General Electric 752 RI DC electric motors, 500' 1½" drilling line, Sand reel with 15,000' 9/16" wire rope.
Rig Power:
6 — 800 HP (continuous) 1100 HP (intermittant) General Electric GT 606 D generators with Caterpillar D-398, Series B diesels.
Rotary Table:
National type, C-365, 36½" opening, independently driven by GE 752 RI DC motors, 525 HP.

Mud Pumps:
2 — National N 1300 duplex power slush pumps, 7¾" x 16" each driven by diesel GE 752 RI electric motors independently driven.
Mud Mixing Pump:
2 — Mission 6 x 8R centrifugals, 75 HP motors.
Cementing Unit:
2 — Halliburton HT 400
Traveling Block:
National 660 G for 1½" wire line, with special guide rail rollers.
Swivel:
National type P 650, 500 ton bail.
Air Tuggers:
Ingersoll K6UL (moon pool)
Rotary Hose:
Goodall (10,000 PSI) 3"
Crown Block:
National 760G.
Master Bushing:
Varco, hinged
Drill Pipe:
5" drill pipe Grade E, 19.5 lb./ft. Range 2
5" drill pipe Grade G, 19.5 lb./ft. Range 2
Drill Collars:
6½" x 30'
8" x 30'
Logging Unit:
Schlumberger
Submarine Equipment:
Guideline system
BOP Control System:
Koomey 240 gallon accumulator with direct and remote controls and dual sub-sea pods.
BOP Stack:
Hydril GK 16¾", 5,000 PSI
Cameron 16¾", 5,000 2 ea DBBC
Vetco H4 wellhead connector
Riser Tensioning:
4 ea Rucker Riser Tensioners
12 x 50,000 lb. 30' stroke horizontal mounted
Guideline Tensioners:
4 ea air counterweights (GMI design)
TV Wires:
2 ea air counterweights (GMI design)

AR GRAND ISLE



APPENDIX B

Drilling Vessel NPDES Permit

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

NOTICE OF PROPOSED ACTION

by the

U.S. Environmental Protection Agency
Region IX
215 Fremont Street
San Francisco, CA 94105

(415) 556-3450

On Modification of National Pollutant Discharge Elimination System Permits to Discharge Pollutants to Waters of the United States

Public Notice

C-79-17-W(M)

On the dates given below, the Regional Administrator, Region IX, Environmental Protection Agency, issued National Pollutant Discharge Elimination System (NPDES) permits to the following operators of off-shore exploratory drilling vessels which he now proposes to modify:

Discharger	Name of Vessel	Date of Issuance	NPDES No.
Global Marine, Inc. Global Marine House 811 West Seventh St. Los Angeles, CA 90017	Glomar Atlantic	June 26, 1978	CA0110401
	Glomar Pacific	September 30, 1977	CA0110389
	Glomar II	January 20, 1977	CA0110142
	Glomar Grand Isle	December 8, 1976	CA0110125
	Glomar Grand Banks	December 8, 1976	CA0110109
	Glomar Conception	December 8, 1976	CA0110117
	Glomar Coral Sea	December 8, 1976	CA0110087
	Glomar Java Sea	December 8, 1976	CA0110133
Diamond/General Drilling, Ltd. PO Box 22738 Houston, TX 77027	Diamond M General	January 20, 1977	CA0110330

Note: **This notice was published in the "Los Angeles Times" on October 18, 1979. The period for comment will expire November 18, 1979. Absent unforeseen opposition, the NPDES permits will be modified as proposed in the notice, effective December 18, 1979.**

Dolphin International 2525 One Allen Center Houston, TX 77002	Borgsten Dolphin	January 20, 1977	CA0110338
Keydril Company One Allen Center Houston, TX 77002	Aleutian Key	January 20, 1977	CA0110282
Zapata Offshore Co. Zapata Tower PO Box 4240 Houston, TX 77001	Zapata Trader	June 30, 1977	CA0110346
Exxon Corporation PO Box 2180 Houston, TX 77001	Alaskan Star	March 3, 1978	CA0110206
ODECO (U.K.), Inc. PO Box 61780 New Orleans, LA 70161	Ocean Prospector	November 24, 1978	CA0110176

Permitted discharges from the above vessels include domestic and sanitary waste, washed drill cuttings, non-oil-base drilling muds, excess cement slurries, deck drainage, engine room and compartment drainages, cooling water, ballast water, distillation blowdown, shale shaker cleaning water, helioport drainage, and blow-out preventer control fluid. These operations have an SIC code of 1382. All discharges enter the Pacific Ocean which is classified for the following beneficial uses: aesthetic enjoyment; propagation and sustenance of marine life; scientific research and training; sport and commercial fishing; pleasure boating; commercial and naval shipping; and industrial water supply.

The Regional Administrator, Region IX, proposes to modify the permits (in compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, et seq.; the "Act") and 40 CFR 122.31) to include as authorized discharge sites the 54 lease parcels which were recently awarded as a result of OCS Lease Sale No. 48. These additional parcels are (by OCS lease parcel number):

in waters south and west of Pt. Conception,

P-0315	P-0316	P-0317	P-0318	P-0319	P-0320
P-0321	P-0322	P-0323	P-0324	P-0325	P-0327
P-0328	P-0330	P-0331	P-0332	P-0333	P-0338;

in the Santa Barbara Channel from Pt. Conception to Goleta

Point,

P-0326	P-0329	P-0334	P-0335	P-0336	P-0339
P-0340	P-0341	P-0342	P-0343	P-0344	P-0345
P-0348	P-0349	P-0350	P-0351	P-0352	P-0353
P-0354	P-0355	P-0356	P-0357	P-0358	P-0359
P-0360;					

in the Santa Barbara Channel from Santa Barbara to Ventura,

P-0337 P-0346 P-0347 P-0361;

in waters south of Santa Rosa and Santa Cruz Islands,

P-0362 P-0363 P-0364;

in the San Pedro Channel between San Pedro and Laguna,

P-0366; and

in waters west of San Clemente Island in the Tanner Bank area,

P-0367 P-0368 P-0369.

The discharge limitations and monitoring requirements in these permits have not been changed. The only modification is the addition of the new authorized discharge sites.

Persons wishing to comment upon or object to the proposed modification, or request a public hearing pursuant to 40 CFR 125.34, should submit their comments or requests in writing within thirty days from the date of this notice, either in person or by mail to:

U.S. Environmental Protection Agency
Region IX, Enforcement Division, E-4-1
(at the address shown above)

All comments or objections received within thirty days from the date of this notice will be considered in the formulation of the final determinations regarding the permit modification. If written comments indicate a significant degree of public interest in a proposed modification, the Regional Administrator shall hold a public hearing in accordance with 40 CFR 125.34.

If no public hearing is held, final determinations will be made shortly after the close of the comment period. The modification will become effective thirty days following the date when the final determinations are signed.

A request for an adjudicatory hearing may be submitted to the Regional Hearing Clerk within ten days following the signing of the final determinations, in accordance with 40 CFR 125.36. If granted, applicable provisions of the modification will be stayed pending the hearing.

A copy of the proposed modification, fact sheets, if required, and further information may be obtained by writing or calling to the Regional Office of EPA at the above address.

Please bring the foregoing notice to the attention of all persons whom you know would be interested in this matter.

GLOBAL MARINE INC.
GLOBAL MARINE HOUSE
611 WEST SEVENTH STREET
LOS ANGELES, CALIFORNIA 90017
U.S.A.

TELEPHONE: 213-680-8550
CABLE: GLOMARCO
LOS ANGELES
HOUSTON
LONDON

September 22, 1976

Mr. Robert A. Alexander
Standard Oil Company of California
225 Bush Street
San Francisco, California 94104

Dear Bob: Re Permit to Discharge Region 9

GMI has filed with the Environmental Protection ~~Association~~ Agency (Region 9) in San Francisco for a permit to discharge. This will be a five-year permit, when issued, to discharge in all federal leases off shore that have been leased from Point Conception to San Diego.

The ships for which the permit to discharge have been filed are as follows:

CUSS I
GLOMAR 2
GLOMAR GRAND ISLE
GLOMAR CONCEPTION
GLOMAR GRAND BANKS
GLOMAR JAVA SEA
GLOMAR CORAL SEA

If you need any specific information concerning these permits and an up-to-date status at any time, I suggest you contact Norm Dion directly at our office, extension 260.

Very truly yours,

Jimmy Dean

JD/jr

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

MODIFICATIONS OF ISSUED NPDES PERMITS FOR GLOBAL MARINE DRILLING VESSELS: CORAL SEA (CA0110087), GRAND BANKS (CA0110109), CONCEPTION (CA0110117), GRAND ISLE (CA0110125), JAVA SEA (CA0110133), GLOMAR II (CA0110142), AND CUSS I (CA0110052)

In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et. seq.; the "Act"), and 40 CFR 125.22(a), the Regional Administrator has made the following modifications:

1. Condition I.A.2.a. in each of the permits (sanitary wastes) is changed to delete the discharge limitations on suspended solids and BOD (5 day).

2. The following condition is added to each of the permits:

During the period beginning the effective date of this permit and lasting through May 31, 1982, the permittee is authorized to discharge from outfall serial number (specified below) blow-out preventer control fluid. Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Monitoring Requirements*	
	Measurement Frequency	Sample Type
Total Volume (gallons)**	Monthly	Estimate

* The monitoring requirements shall commence on the effective date of this permit.
** The total volume of blow-out preventer control fluid discharged into the ocean waters each month of the year shall be monitored.

The above condition appears as Condition I.A.7. in permits:

CA0110087	(Discharge 018)
CA0110109	(Discharge 018)
CA0110117	(Discharge 018)
CA0110125	(Discharge 018)
CA0110133	(Discharge 018)
CA0110142	(Discharge 013)

and appears as Condition I.A.6. in permit CA0110052 (Discharge 006).

The permit modifications shall become effective thirty (30) days from the date of signature.

Signed this 29th day of July, 1977.

For the Regional Administrator

Director, Enforcement Division

Permit No. CA0110087

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"), Global Marine Incorporated is authorized to discharge:

shower, washing machine, garbage disposal, sink and galley wastewaters (discharge 001) from frame 160;

sanitary wastes (discharge 002) from frame 139;

drill cuttings, drilling muds, and excess cement slurries (discharge 003) from frame 95;

work area deck drainage (discharge 004) from frame 95;

engine room drainage (discharge 005) from frame 158;

engine cooling water (discharge 006) from frame 144;

auxiliary system cooling water (discharges 007, 008, and 009) from frames 148, 127, and 154, respectively; and

accumulated drainage (discharges 010, 011, 012, 013, 014, 015, 016, and 017) from frame 21, the port and starboard sides of frame 44, the port and starboard sides of frame 54, the port and starboard sides of frame 74, and the starboard side of frame 109, respectively,

from the drilling vessel, ~~Global Coral Sea~~ to authorized discharge sites within the waters of the Pacific Ocean beyond the territorial seas off the coast of the State of California in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on December 3, 1976.

This permit and the authorization to discharge shall expire at midnight, September 30, 1981.

Signed this 8th day of November, 1976.

For the Regional Administrator

Director, Enforcement Division

The authorized discharge sites include (by OCS lease parcel number):

in the Santa Barbara Channel from Pt. Conception to Goleta Point,

P-0180	P-0181	P-0182	P-0183	P-0184	P-0185
P-0186	P-0187	P-0188	P-0189	P-0190	P-0191
P-0192	P-0193	P-0194	P-0195	P-0196	P-0197;

in the Santa Barbara Channel north of San Miguel and Santa Rosa Islands,

P-0167	P-0168	P-0169	P-0170	P-0171	P-0173
P-0174	P-0175	P-0176	P-0177	P-0178	P-0179;

in the Santa Barbara Channel from Santa Barbara to Ventura,

P-0166	P-0198	P-0199	P-0200	P-0201	P-0202
P-0203	P-0204	P-0205	P-0206	P-0207	P-0208
P-0209	P-0210	P-0211	P-0212	P-0213	P-0215
P-0216	P-0217	P-0218	P-0219	P-0220	P-0221
P-0222	P-0223	P-0224	P-0226	P-0227	P-0228
P-0229	P-0230	P-0231	P-0232	P-0233	P-0234
P-0235	P-0237	P-0238	P-0240	P-0241;	

in waters south of Santa Rosa and Santa Cruz Islands,

P-0243	P-0244	P-0245	P-0246	P-0247	P-0248
P-0249	P-0250	P-0251	P-0252	P-0253;	

in the San Pedro Channel between San Pedro and Laguna,

P-0293	P-0295	P-0296	P-0298	P-0300	P-0301
P-0302	P-0303	P-0304	P-0306	P-0309	P-0310
P-0311;					

in waters west of Santa Barbara Island,

P-0289 P-0290 P-0291; and

in waters west of San Clemente Island in the Tanner Bank Area,

P-0257	P-0258	P-0259	P-0260	P-0262	P-0263
P-0264	P-0265	P-0266	P-0267	P-0268	P-0269
P-0270	P-0271	(P-0272)	P-0273	P-0274	P-0275
P-0276	P-0277	P-0278	P-0280	P-0281	P-0282
P-0284	P-0285	P-0286	P-0287	P-0288.	

SIC # 1382

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning the effective date of this permit and lasting through September 30, 19[illegible] the permittee is authorized to discharge from outfall(s) serial number(s) 001 (domestic wastes).

Such discharges shall be limited and monitored by the permittee as specified below:

a.

Effluent Characteristic	Discharge Limitations kg/day (lbs/day)		Other Units (Specify)		Monitoring Requirements*	
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency**	Sample Type
Flow-m^3/Day (MGD)	-	-	-	-	Once/month	Estimate

b. There shall be no visible oil or floating solids in the receiving waters as a result of the discharge of these wastes.

c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: discharge 001, subsequent to all treatment processes and prior to entry into the waters of the Pacific Ocean.

* The monitoring requirements shall commence on the effective date of this permit.

** The measurement frequency is once per month with a minimum frequency of once per site.

SHOWER, WASHING MACHINES, GARBAGE DISPOSAL, SINK + GALLEY WASTE WATER

130 Bbls. PERDAY

PART I
Page 3 of 20
Permit No.
CA0110087

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Based on a daily maximum flow of .005 million gallons per day or .0002 cubic meters per second)

2. During the period beginning the effective date of this permit and lasting through September 30, 1981, the permittee is authorized to discharge from outfall(s) serial number(s) 002 (sanitary wastes). SEWAGE

Such discharges shall be limited and monitored by the permittee as specified below:

a.

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Daily Avg	Discharge Limitations kg/day (lbs/day) Daily Max	Discharge Limitations Other Units (Specify) Daily Avg	Discharge Limitations Other Units (Specify) Daily Max	Monitoring Requirements* Measurement Frequency**	Monitoring Requirements* Sample Type
Flow-m^3/Day (MGD)	-	-	-	-	Once/month	Discrete
Suspended Solids	-	2.8(6.3)	-	150 mg/l	Once/month	Discrete
Biochemical Oxygen Demand (5-day)	-	0.9(2.1)	-	50 mg/l	Once/month	Discrete
Residual Chlorine	-	-	1.0 mg/l***	-	Once/month	Discrete

IN ISHIN

b. There shall be no visible floating solids in the receiving waters as a result of these discharges.

c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: discharge 002, subsequent to all treatment processes and prior to entry into the waters of the Pacific Ocean.

* The monitoring requirements shall commence on the effective date of this permit.

** The measurement frequency is once per month with a minimum frequency of once per site.

*** After a minimum retention time of fifteen minutes, the effluent shall have a minimum chlorine residual of 1.0 mg/l and be maintained as close to this concentration as possible.

1,000,000 5,000GPD

5/1000 900GAL

A. E[illegible]UENT LIMITATIONS AND MONITORING REQUIR[illegible]NTS

3. During the period beginning the effective date of this permit and lasting through September 30, 1981, the permittee is authorized to discharge from outfall(s) serial number(s) 003 (drilling muds, drill cuttings and cement slurries). Such discharges shall be limited and monitored by the permitee as specified below:

a.

Effluent Characteristic	Discharge Limitations kg/day (lbs/day)		Discharge Limitations Other Units (Specify)		Monitoring Requirements*	
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency	Sample Type
Total Volume (cubic meters)**	-	-	-	-	Once/site	Estimate

b. There shall be no discharge of free oil as a result of the discharge of drill cuttings and/or drilling muds.

c. There shall be no visible floating solids in the receiving waters as a result of these discharges.

d. The discharge of oil base drilling muds is prohibited.

e. The discharge of drill cuttings, drilling muds and/or excess cement slurries is prohibited in Areas of Special Biological Significance as designated by Bureau of Land Management (BLM) lease contracts. Any subsequent modification of BLM contracts may be basis for a modification of this requirement. Areas of Special Biological Significance presently identified in BLM contracts include, but are not limited to, areas in OCS parcels (P-0272) P-0273, P-0274, P-0277 and P-0278.

* The monitoring requirements shall commence on the effective date of this permit.

** The total volume of drill cuttings and drilling muds discharged at each site shall each be monitored by an estimate sample type.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Based on a maximum flow of .072 million gallons per day or .003 cubic meters per second)

4. During the period beginning the effective date of this permit and lasting through September 30, 19 the permittee is authorized to discharge from outfall(s) serial number(s) 004 (work area deck drainage).

Such discharges shall be limited and monitored by the permittee as specified below: OIL WATER SEPARATOR SKIMMER

a. Effluent Characteristic

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Daily Avg	Discharge Limitations kg/day (lbs/day) Daily Max	Discharge Limitations Other Units (Specify) Daily Avg	Discharge Limitations Other Units (Specify) Daily Max	Monitoring Requirements* Measurement Frequency**	Monitoring Requirements* Sample Type
Flow-m^3/Day (MGD)	-	-	-	-	Once/month	Composite
Oil and Grease	-	14.2(31.2)	-	52 mg/l	Once/month	Composite

4 OR 24 HR

b. There shall be no visible floating solids in the receiving waters as a result of these discharges.

c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: discharge 004, subsequent to all treatment processes and prior to entry into the waters of the Pacific Ocean.

* The monitoring requirements shall commence on the effective date of this permit.

** The measurement frequency is once per month with a minimum frequency of once per site.

1000 GAL DAY

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Based on a maximum flow of .014 million gallons per day or .0006 cubic meters per second)

5. During the period beginning the effective date of this permit and lasting through September 30, 1981, the permittee is authorized to discharge from outfall(s) serial number(s) 005 (engine room drainage).

Such discharges shall be limited and monitored by the permittee as specified below:

a.

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Daily Avg	Daily Max	Other Units (Specify) Daily Avg	Daily Max	Monitoring Requirements* Measurement Frequency	Sample Type	
Flow-m^3/Day (MGD)	-	-	-	-	Quarterly/yr.	Composite	4 CA 24 HR
Oil and Grease	-	2.8(6.2)	-	52 mg/l	Quarterly/yr.	Composite	

b. There shall be no visible floating solids in the receiving waters as a result of these discharges.

c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: discharge 005, subsequent to all treatment processes, and prior to entry into the waters of the Pacific Ocean.

* The monitoring requirements shall commence on the effective date of this permit.

30 GAL PER DAY

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

6. During the period beginning the effective date of this permit and lasting through September 30, 1981, the permittee is authorized to discharge from outfall(s) serial number(s) 006, 007, 008, and 009 (engine and auxiliary system cooling water).
Such discharges shall be limited and monitored by the permittee as specified below:

a.

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Daily Avg	Discharge Limitations kg/day (lbs/day) Daily Max	Other Units (Specify) Daily Avg	Other Units (Specify) Daily Max	Monitoring Requirements* Measurement Frequency**	Monitoring Requirements* Sample Type
Flow-m^3/Day (MGD)	-	-	-	-	Once/month	Discrete
Temperature	-	-	-	-	Once/month	Discrete
Oil and Grease***	-	250(550)	-	15 mg/l	Once/month	Discrete

After a review of effluent monitoring representing at least one (1) year of discharge from the permittee's facility, the Regional Administrator may, upon due notice, revise the permit to establish final temperature limitations. Such a revision of this permit may also include an Implementation Schedule for an abatement program or other appropriate conditions to achieve the final temperature limitations.

b. The use of chemical additives is prohibited.

c. There shall be no visible floating solids in the receiving waters as a result of these discharges.

d. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: discharges 006, 007, 008, and 009, prior to mixture with the waters of the Pacific Ocean and at a point in the receiving waters where there is no thermal influence from the discharge (receiving waters need only be monitored with respect to temperature).

(2000 GPM)

* The monitoring requirements shall commence on the effective date of this permit.

** The monitoring frequency is once per month with a minimum frequency of once per site.

*** The oil and grease limitations described in kg/day (lbs/day) apply to the total discharge from discharges 006, 007, 008, and 009.

A. EFFL T LIMITATIONS AND MONITORING REQUIREMENTS

7. During the period beginning the effective date of this permit and lasting through September 30, 1981, the permittee is authorized to discharge from outfall(s) serial number(s) 010, 011, 012, 013, 014, 015, 016, and 017 (accumulated drainage). Such discharges shall be limited and monitored by the permittee as specified below:

a.

Effluent Characteristic	Discharge Limitations kg/day (lbs/day)		Other Units (Specify)		Monitoring Requirements *	
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency	Sample Type
Flow-m^3/Day (MGD)	-	-	-	-		
Oil and Grease	-	-	-	-	Quarterly/yr.	Discrete
Total Volumes (gallons)**	-	-	-	-	Quarterly/yr.	Discrete
					Quarterly/yr.	Estimate

After a review of effluent monitoring representing at least one (1) year of discharge from the permittee's facility, the Regional Administrator may, upon due notice, revise the permit to establish final oil and grease limitations. Such a revision of this permit may also include an Implementation Schedule for an abatement program or other appropriate conditions to achieve the final limitations.

b. There shall be no visible floating solids in the receiving waters as a result of these discharges.

c. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: discharges 010, 011, 012, 013, 014, 015, 016, and 017, subsequent to all treatment processes and prior to entry into the waters of the Pacific Ocean.

* The monitoring requiremonts shall commence on the effective date of this permit.

** Total volume discharged from discharges 010 through 017 during that particular quarter of the year.

013 - 014 } 40 Bbls

015 - 016 } 50 Bbls

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

Not applicable

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

3. A "schedule of compliance" means a program composed of two integral parts: (a) plan--description of new or modified facilities to treat and dispose of the effluent; and (b) schedule--a timetable setting forth the date by which all wastewaters will be in compliance with the effluent limitations of this permit. The schedule shall include (if appropriate) dates by which the permittee will accomplish:

   a. Completion of a preliminary engineering plan report;

   b. Completion of construction plans and specifications;

   c. Initiation of construction;

   d. Completion of construction;

   e. Demonstration of compliance with effluent limitations.

MONITORING AND REPORTING

1. *Representative Sampling*

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. *Reporting*

Monitoring results obtained during the previous 3 months shall be summarized for each month and submitted on forms to be supplied by the Regional Administrator, to the extent that the information reported may be entered on the forms. The results of all monitoring required by this permit shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this permit. Unless otherwise specified, discharge flows shall be reported in terms of the average flow over each 30-day period and the maximum daily flow over that 30-day period. Monitoring reports shall be postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on February 28, 1977 . Duplicate signed copies of these, and all other reports required herein, shall be submitted to the Regional Administrator and the State at the following addresses:

Regional Administrator
Environmental Protection Agency
Region IX, ATTN: E-5/MR
100 California Street
San Francisco CA 94111

State of California
Water Resources Control Board
Attn: Mr. Bill B. Dendy
P.O. Box 100
Sacramento, Ca. 95801

3. *Definitions*

See Part III.

4. *Test Procedures*

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(g) of the Act, under which such procedures may be required.

5. *Recording of Results*

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. *Additional Monitoring by Permittee*

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form. Such increased frequency shall also be indicated.

7. *Records Retention*

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the State water pollution control agency.

MANAGEMENT REQUIREMENTS

1. *Change in Discharge*

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, or treatment modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. *Noncompliance Notification*

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

3. *Facilities Operation*

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. *Adverse Impact*

The permittee shall take all reasonable steps to minimize any adverse impact to receiving waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. *Bypassing*

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Regional Administrator and the State in writing of each such diversion or bypass, in accordance with the procedure specified in Part II.A.2. above.

6. *Removed Substances*

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. Safeguards to Electric Power Failure

See Part III.

RESPONSIBILITIES

1. *Right of Entry*

The permittee shall allow the head of the State water pollution control agency, the Regional Administrator, and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. *Transfer of Ownership or Control*

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the State water pollution control agency.

3. *Availability of Reports*

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public

inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

4. *Permit Modification*

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. *Toxic Pollutants*

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. *Civil and Criminal Liability*

Except as provided in permit conditions on "Bypassing" (Part II, A-5) and "Power Failures" (Part II, A-7), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. *Oil and Hazardous Substance Liability*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. *State Laws*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

erty Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

.0. *Severability*

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART III

ER REQUIREMENTS

Part I.A.8. Additional Monitoring Requirements: Bioassay of Spent Drilling Muds

Within one (1) year of the effective date of this permit or within the first year of operation in federal waters off the State of California, the permittee shall conduct and report the results of a 96-hour static bioassay determining the LC_{50} (concentration at which fifty percent of the test organisms survived for 96 hours) of spent drilling muds. A sample of spent drilling muds, immediately prior to their intended discharge, shall be collected for analysis from each permitted vessel. The bioassay shall be conducted with a test organism approved, in writing, prior to use, by the Regional Administrator. The following shall be submitted to the Regional Administrator:

(a) the date the sample was collected;

(b) the total volume of spent muds discharged on the date of the sample;

(c) the water depth into which the muds were discharged;

(d) the results of the 96-hour bioassay, including the survival percentages of all dilutions tested and the graph from which the LC_{50} was extrapolated; and

(e) a list of all components, including the weights, used to compose the drilling muds which were discharged. If commercial names are listed, their chemical constituents shall also be provided.

rt I.C.3. Definitions

a. "Territorial seas" means that part of the ocean measured three miles seaward from the line of lower low water and the line closing bays, rivers, and historic waters and which is shown on a series of charts prepared by the National Security Council, Law of the Sea Taskforce on the United States Baseline and published by the National Ocean Survey.

b. A "discrete sample" means any individual sample collected in less than fifteen (15) minutes.

c. The "daily maximum" discharge means the total discharge by weight during any calendar day.

d. The "daily maximum" concentration means the measurement made on any single discrete sample or composite sample.

e. "Sanitary wastes" include human body wastes discharged from toilets and urinals.

f. The term "deck drainage" includes all water resulting from platform washings, deck washings, and runoff from curbs, gutters, and drains including drip pans and work areas.

g. A "composite sample" means four (4) samples taken over a twenty-four (24) hour period, analyzed separately and the four samples averaged. The daily maximum limitations for oil and grease are based on the above definition of composite samples.

Part I.C.8. Monitoring Modification

Monitoring, analytical, and reporting requirements may be modified by the Regional Administrator upon due notice.

Part II.A.7. Safeguards to Electric Power Failure

a. The permittee shall, within ninety (90) days of the effective date of this permit, submit to the Regional Administrator a description of the existing safeguards provided to assure that, should there be reduction, loss, or failure of electric power, the permittee shall comply with the terms and conditions of this permit. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures or other means. A description of the safeguards provided shall include an analysis of the frequency, duration, and impact of power failures, experienced over the past five years, on effluent quality and on the capability of the permittee to comply with the terms and conditions of the permit. The adequacy of the safeguards is subject to the approval of the Regional Administrator.

b. Should the treatment works not include safeguards against reduction, loss, or failure of electric power, or, should the Regional Administrator not approve the existing safeguards, the permittee shall, within ninety (90) days of the effective date of this permit, or within ninety (90) days of having been advised by the Regional Administrator that the existing safeguards are inadequate, provide to the Regional Administrator a schedule of compliance for providing, not later than July 1, 1977, safeguards such that in the event of reduction, loss or failure of electric power, the permittee shall comply with the terms and conditions of this permit. The schedule of compliance shall, upon approval of the Regional Administrator, become a condition of this permit.

Part II.B. Responsibilities

11. Other Affected Authority

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable law or regulation under authority preserved by Section 511 of the Act.

12. Discharge Site Modifications

A minimum of 120 days prior to the initiation of any discharges at a site not authorized by this permit, the permittee shall provide to the Regional Administrator a written request for the modification of the discharge sites authorized in this permit. This written request shall include:

(a) the new site(s), listed by the parcel number(s) assigned in the leasing contracts,

(b) the lambert coordinates of the center of each parcel, and

(c) any additional information necessary to the Regional Administrator for his determinations regarding the modification request.

Until the modifications have been approved by the Regional Administrator and are in effect, any discharge at an unauthorized site is prohibited.

Part III.A. Notification of Relocation

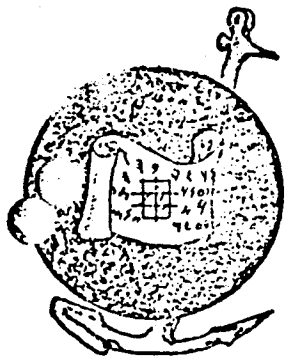
No less than fourteen (14) days prior to any relocation and initiation of discharge activities at an authorized discharge site by the drilling vessel, Glomar Coral Sea, the permittee shall provide to the Regional Administrator and the appropriate state agency, written notification of such actions. The notification shall include the parcel number and exact coordinates of the new site and the initial date and expected duration of drilling activities at the site.

Part III.B. Reapplication

If the permittee desires to continue to discharge, the reapplication shall be submitted no later than 180 days prior to the expiration date of this permit.

APPENDIX C

Archaeologist's Report



JACK HUNTER
Marine and Terrestrial Archaeology

October 19, 1979

Mr. F.J. Schambeck
Oil and Gas Supervisor
Pacific Region
United States Dept. of the Interior
Geological Survey
Conservation Division
1340 W. 6th St., Room 160
Los Angeles, California 90017

Re: Channel Islands Area, California
Tract No. 48-004, OCS Lease No. P-0316

Dear Mr. Schambeck:

Enclosed please find the Archaeological Report on Block 4, Channel Islands area, California.

Should any questions arise regarding the survey or the accompanying report, please feel free to contact me at your convenience.

Sincerely,

Jack Hunter
Marine Archaeologist

JH:dkg

Enclosure

612 W. 40th Street San Pedro,
CA 90731 (213) 547-2044

ARCHAEOLOGICAL ANALYSIS OF REMOTE SENSING DATA
FROM CHANNEL ISLANDS AREA LEASE BLOCK 55N 84W,
TRACT NO. 48-004, OCS LEASE NO. P-0316

This lease block is located approximately eight miles west of Pt. Conception, California (figure 1). The survey was performed by Intersea Research Corporation for Chevron Oil Company aboard the M/V CALCASIEU during the period September 7 through 11, 1979.

Survey Specifications

Approximately 215 miles of survey data were obtained within the lease block and a one-half mile wide border area around it. This extension is necessary to elucidate potential hazards or cultural resources impact by anchors set into adjoining blocks when operating near the boundaries of lease block 4. Fifty northwest-southeast strike lines were run at 150-meter intervals and 28 northeast-southwest dip lines traversed at 300 meter line spacing. Water depth over the survey area measured from 97 meters (320') at the northeast corner to approximately 297 meters (983') at the southwest corner.

Navigational Positioning

Navigational positioning throughout the survey area was achieved using a Mini-Ranger III positioning system operated by Offshore Navigation, Inc. Position fixes (shot points) were taken at 1000-foot intervals along all track lines.

Survey Instrumentation

Five instrument systems were operated simultaneously over each survey line with gating and synchronizing techniques employed where necessary to eliminate interference between systems. Vessel speed was 5 to 6 knots. Sea state was one to five on the Beaufort scale, with two to three predominating through the majority of data collection. Electrical event marks were simultaneously recorded on all systems.

Depth Recorder

A Raytheon DE 731 recording echo sounder utilizing a 41 kHz transducer with a beam width of 17 degrees and operating on the 0-110 or 100-210 fathom recording scale was used throughout the survey.

Shallow Sub-Bottom Profiler

An EG&G Uniboom Sub-Tow system was used to obtain detection of the upper 100 feet of geologic strata. The Uniboom source and hydrophone receiver were towed 35 feet behind the survey vessel at a depth of 25 feet under the water surface. Power output was 500 joules with a firing rate of 500 ms. and a sweep rate of 250 ms.

Seismic Sparker System

Detection of sub-bottom geologic units to 1000 feet of depth was obtained using a 13.5 kJ sparker system and a 12-channel digital recording system. Over bottom firing rate was calculated to 41 feet.

Magnetometer

A GeoMetrics Model 801/3 full-field proton precession marine magnetometer was operated on all survey lines. The sensitivity setting was one gamma with a 3 second rep. rate. Cable length astern of vessel for setback computation was 360 feet, with an additional 97 feet measured to the navigational antenna. Chart speed 2 inches/minute.

Side Scan Sonar

A Klein Side Scan Sonar System with variable cable length according to water depth was used over the survey area. Range scale setting was 150 meters per channel with 15 meters between ranging lines.

Instrument Platform

The M/V CALCASIEU is a converted steel-hull petroleum supply vessel. Her length is 120 feet; beam 30 feet, and draft 8 feet. Power is provided by twin marine diesels with twin propellors. The vessel was operated 24 hours a day by a crew of 13 to 15 during the length of the survey. The survey crew (apart from vessel operators) consisted of Charles Williams, Party Chief/Geophysicist; Jose Gomez, Digital Technician; William Charbonneau, Electronics Technician; Ron Devermann, Garnet West, Neal Naseland, Operator/Technicians; Marion Lassiter, Dennis Jones, Navigators.

Lease History

Lease Block OCS No. P-0316 has no record of prior drilling activity on file with either the USGS or the California Division of Oil and Gas. Drilling activity has occurred on P-0197 some five miles to the southeast and inshore to the east on California State Lands Tract PRC-2879.

Magnetometry Analysis

Magnetic background values within the survey area fluctuated between 49,340 and 49,512 gammas. The magnetometry data is consistently good with respect to noise levels (plus or minus one gamma) but is occasionally subject to disturbances caused by alterations in side scan sonar cable length. This condition is most noteable as observed on Line 135A where two magnetic anomalies of 24 and 7 gammas, respectively, occur in association with side scan cable adjustments. (Note that a sonar target occurs within the vicinity of the 7 gamma anomaly, but it is believed to be of geologic origin.) Line 255A, near shot point 55, also shows this effect with a 6 gamma anomaly and a corresponding sonar deployment.

This sonar cable disturbance effect is also seen on Line 149A where an unusual number of cable length adjustments correspond with magnetic data fluctuations for the same transect. Note that few sonar cable adjustments cause a corresponding magnetic anomaly. This implies special conditions are necessary for this disturbance to occur. It is felt that the primary variables are the rate of cable deployment, length of cable and direction and speed of the survey vessel.

A small number of instrument-generated data spikes (seen for a single polarization of the sensor) occur in the magnetic record but do not effect interpretation. Therefore, except for the less than optimum sensor depth as a result of survey vessel speed, an industry-wide problem, the data are acceptable with regard to detection of large magnetic sources of potential archaeological interest.

Side Scan Survey

The sonar records generated throughout the survey are of acceptable quality and show a number of unidentifiable targets which appear to be of cultural origin. Although these targets may be recent debris, they are

plotted on Plate V and should be avoided. Line 251A shows a linear feature in the port channel which appears to be a chain or cable over a hundred feet long with a loop on its north end. Water depth here is about 110 meters.

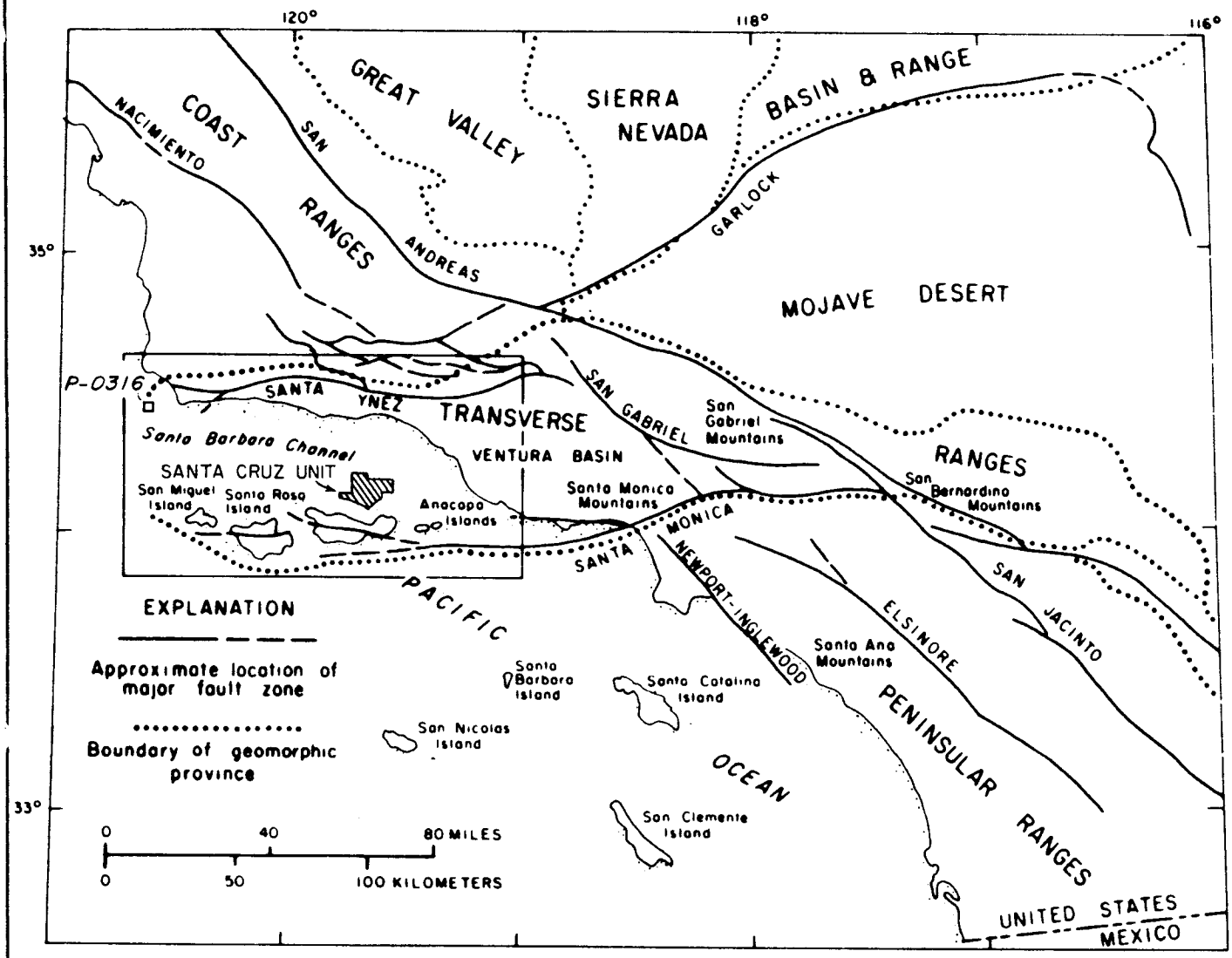
Previous Sea Level Stands

It is generally accepted that sea level 15,000-17,000 years ago was probably as great as 130 meters (430 feet) below present sea level (Emery, 1969; Bloom, 1971). Since human occupation of the western hemisphere is known to at least this date, and exploitation of the littoral environment is known to have occurred wherever possible, it is reasonable to assume that in these offshore submerged landscapes occur sites worthy of archaeological investigation (P. Bickel, Changing Sea Levels Along the California Coast: Anthropological Implications. The Journal of California Anthropology, Vol. 5, No. 1, 1978).

Surficial sediment depth in Block 4 ranges from 0 (outcropping) to 90 feet. Since it is not possible to distinguish marine from terrestrially deposited sediments without core analysis, it would be interesting to allow an archaeologist to examine near surface cores from geotechnical studies done within the area to determine the potential for now submerged human occupation sites, even though none were recognized within the block.

Summary

An intensive analysis of remote sensing data for Tract No. 48-004, OCS Lease No. P-0316 has revealed no identifiable archaeological resources. However, the unidentified sonar targets noted on Plate V should be avoided until properly identified.

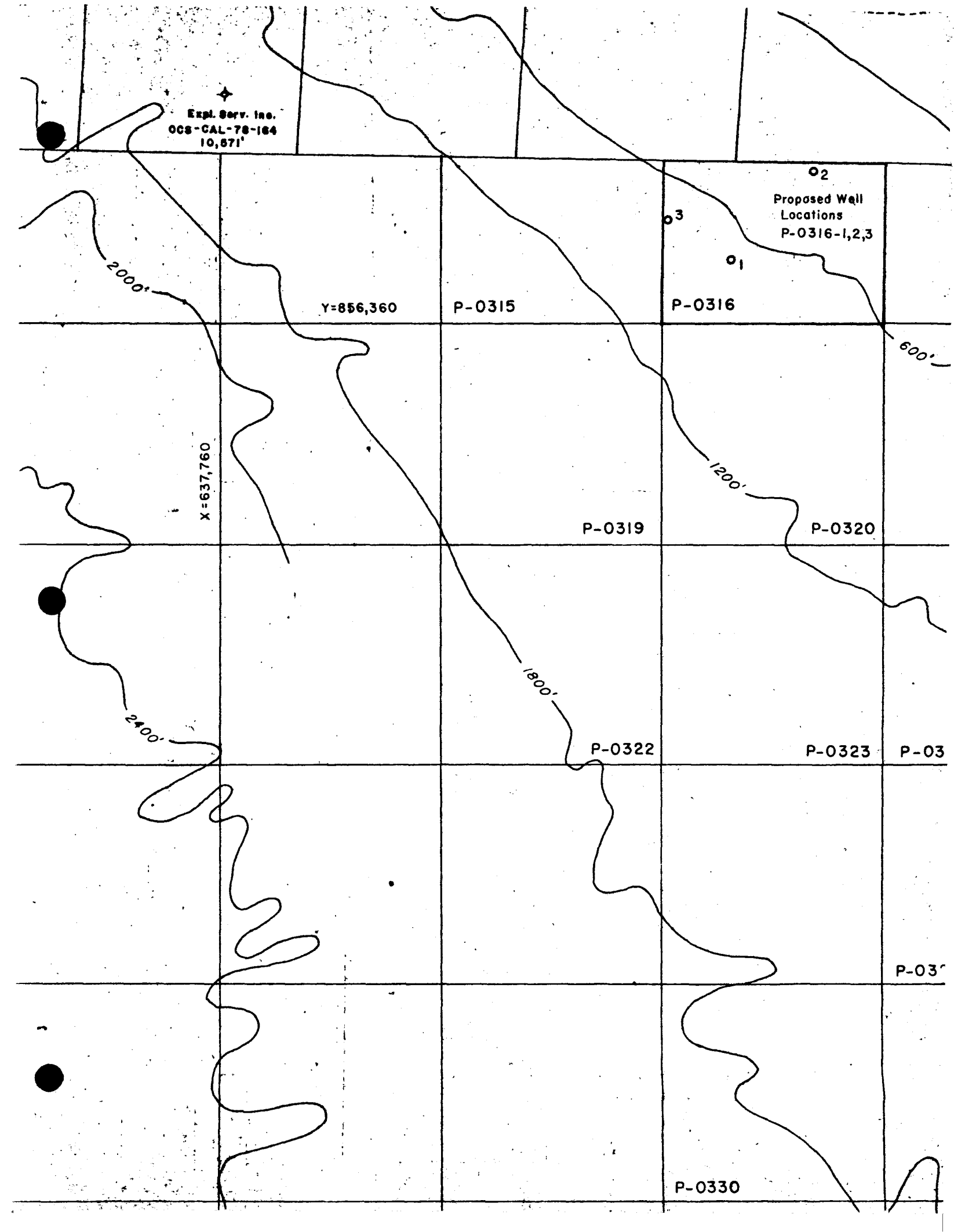


Index map showing relation of Santa Barbara Channel region to major faults and physiographic provinces of southern California

Source:- U.S. Geological Survey 1974

FIGURE 1

Chevron U.S.A. Inc. Western Region, Production Department	ENGINEERING DRAFTING CHECKED APPROVED	SCALE NOTED DATE


Expl. Serv. Inc.
OCS-CAL-78-164
10,671'
Proposed Well
Locations
P-0316-1,2,3
2000'
Y=856,360
P-0315
P-0316
600'
X=637,760
1200'
P-0319
P-0320
1800'
2400'
P-0322
P-0323
P-03
P-03
P-0330

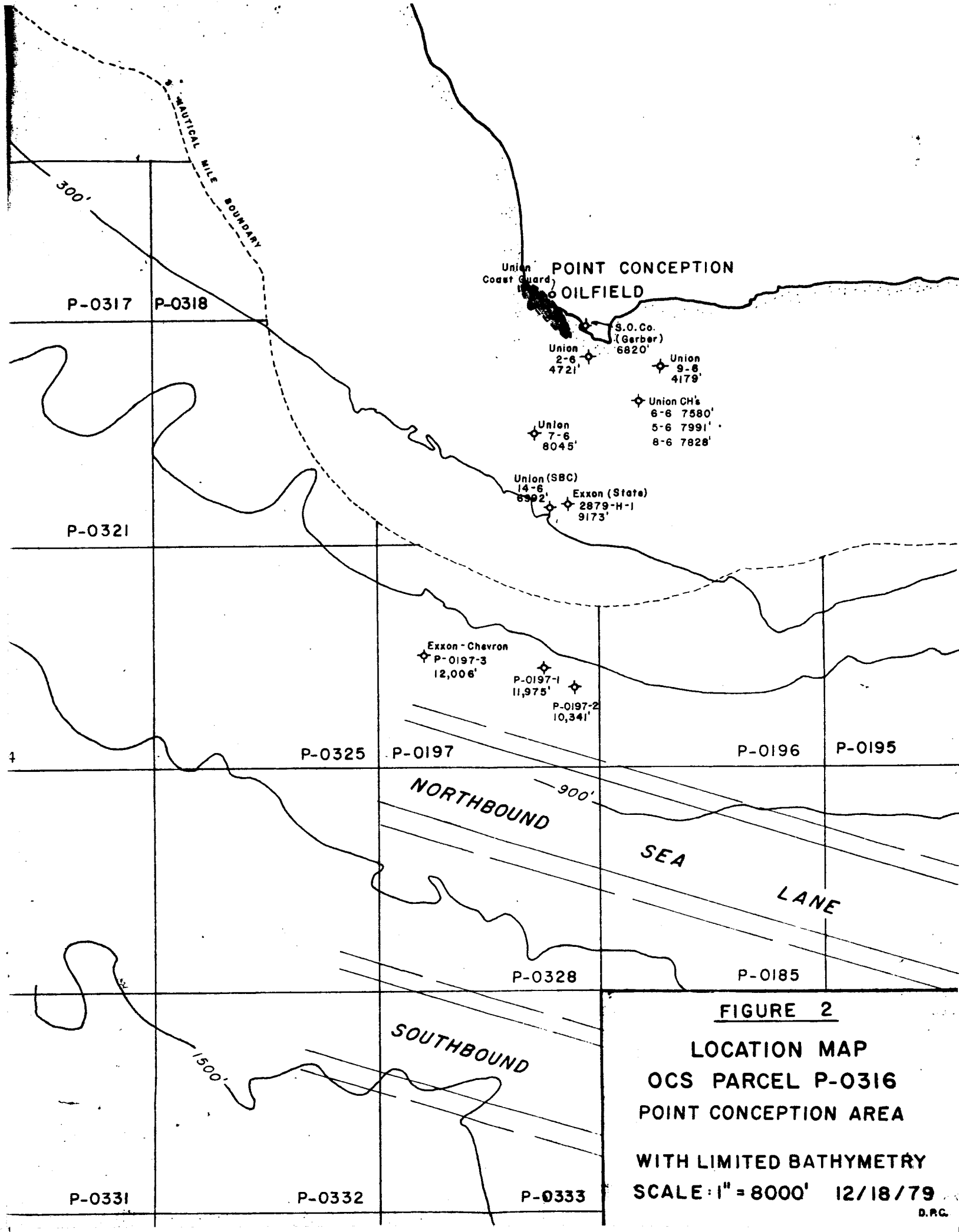
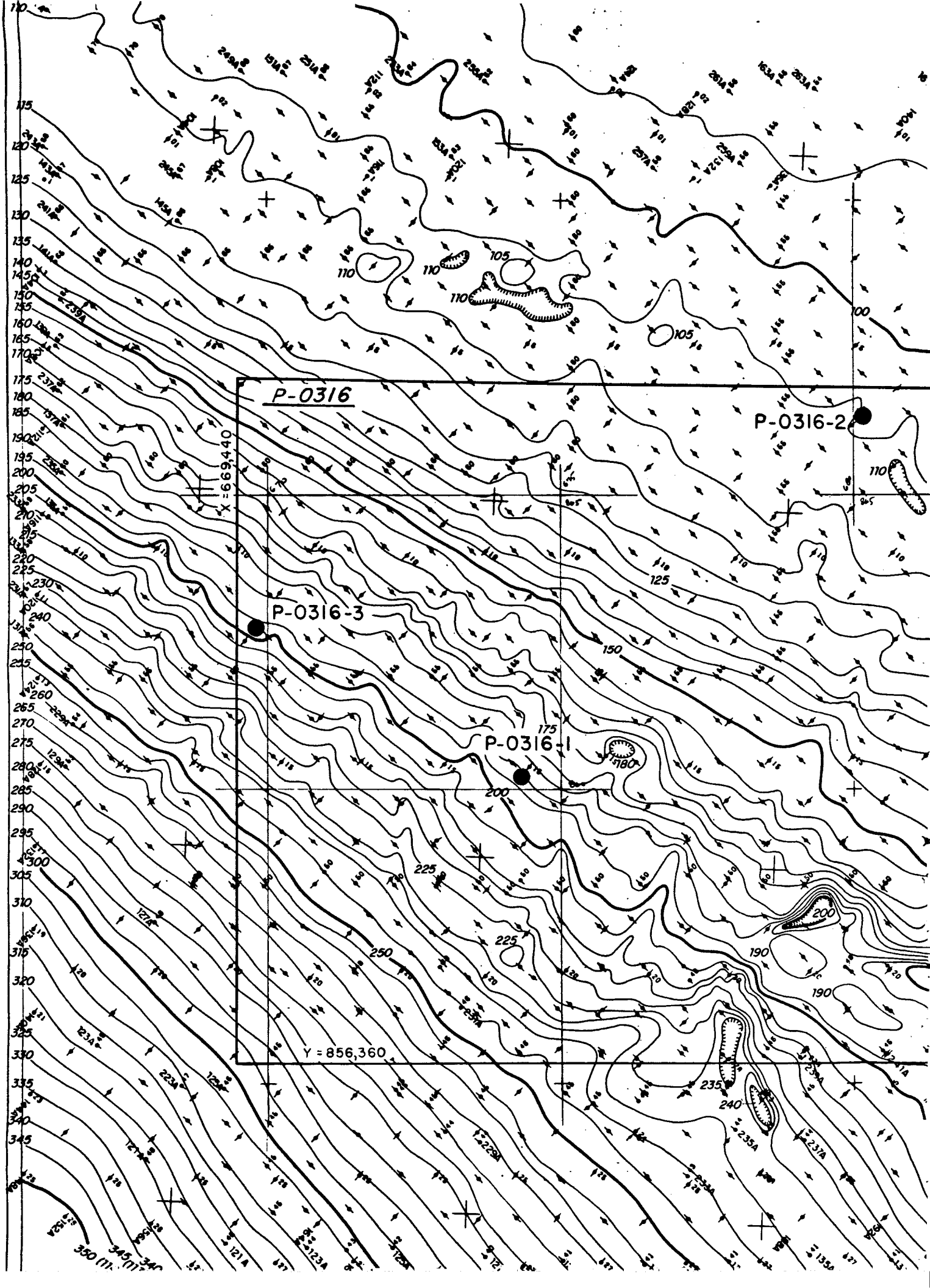


FIGURE 2

LOCATION MAP
OCS PARCEL P-0316
POINT CONCEPTION AREA

WITH LIMITED BATHYMETRY
SCALE: 1" = 8000' 12/18/79

D.R.G.


P-0316
P-0316-2
P-0316-3
P-0316-1
X = 669,440
Y = 856,360

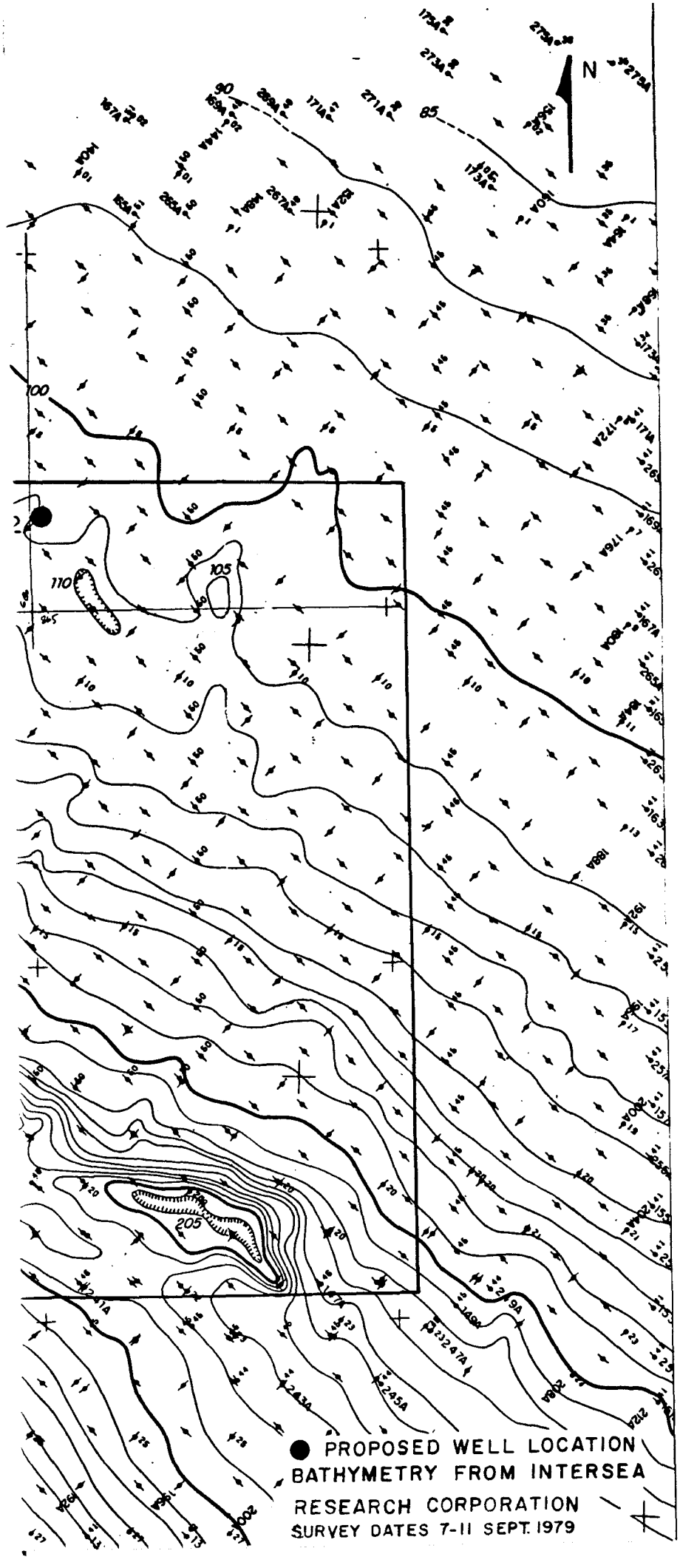


FIGURE 3

BATHYMETRY MAP

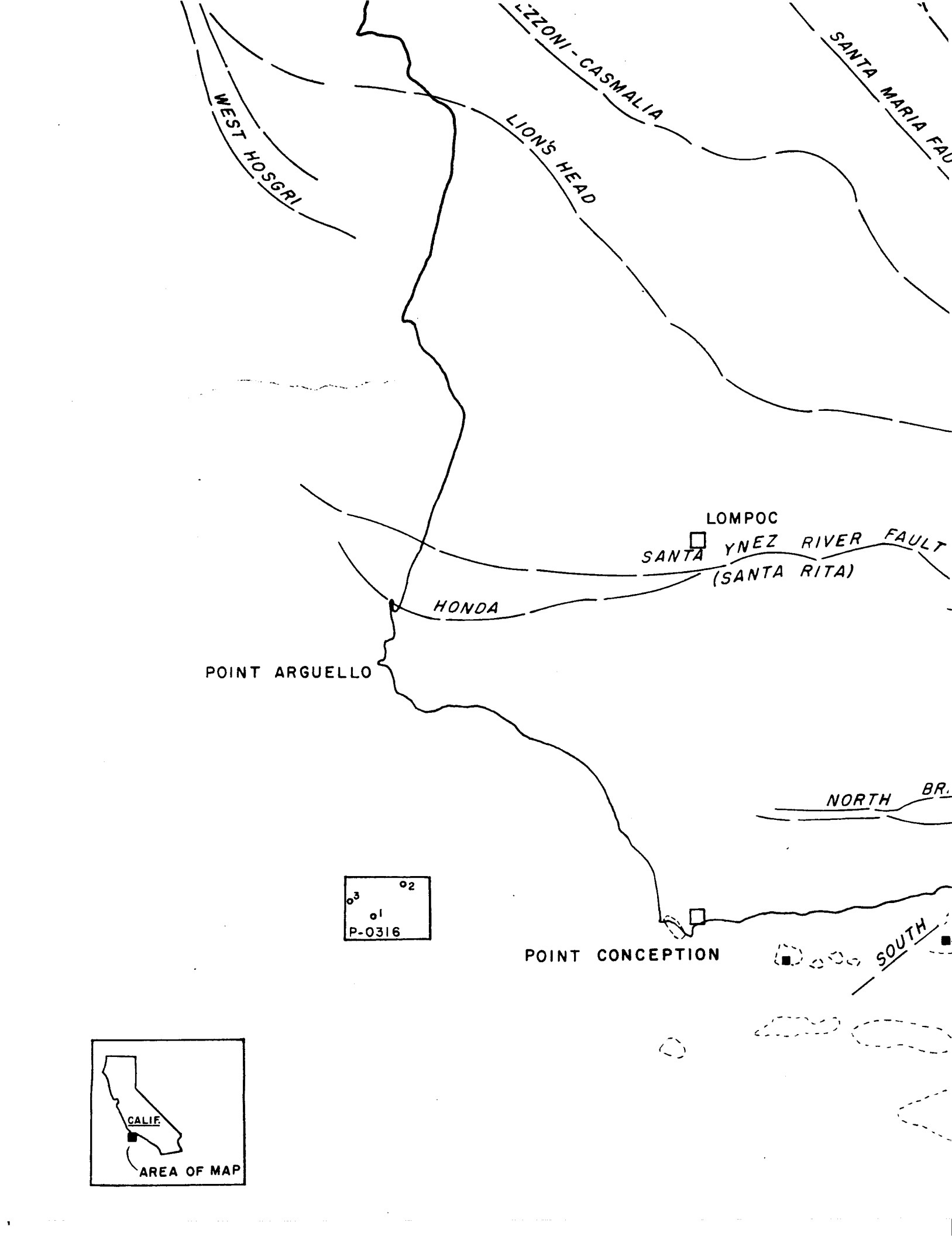
FEDERAL BLOCK OCS P-0316

DATUM: MEAN LOWER LOW WATER

CONTOUR INTERVAL = 5 m.

SCALE: 1" = 2000' 11/20/79

D.P.


WEST HOSGRI
LION'S HEAD
SANTA MARIA FAU
LOMPOC
SANTA YNEZ RIVER FAULT
(SANTA RITA)
HONDA
POINT ARGUELLO
NORTH
BR.
o2
o3
o1
P-0316
POINT CONCEPTION
SOUTH
CALIF.
AREA OF MAP

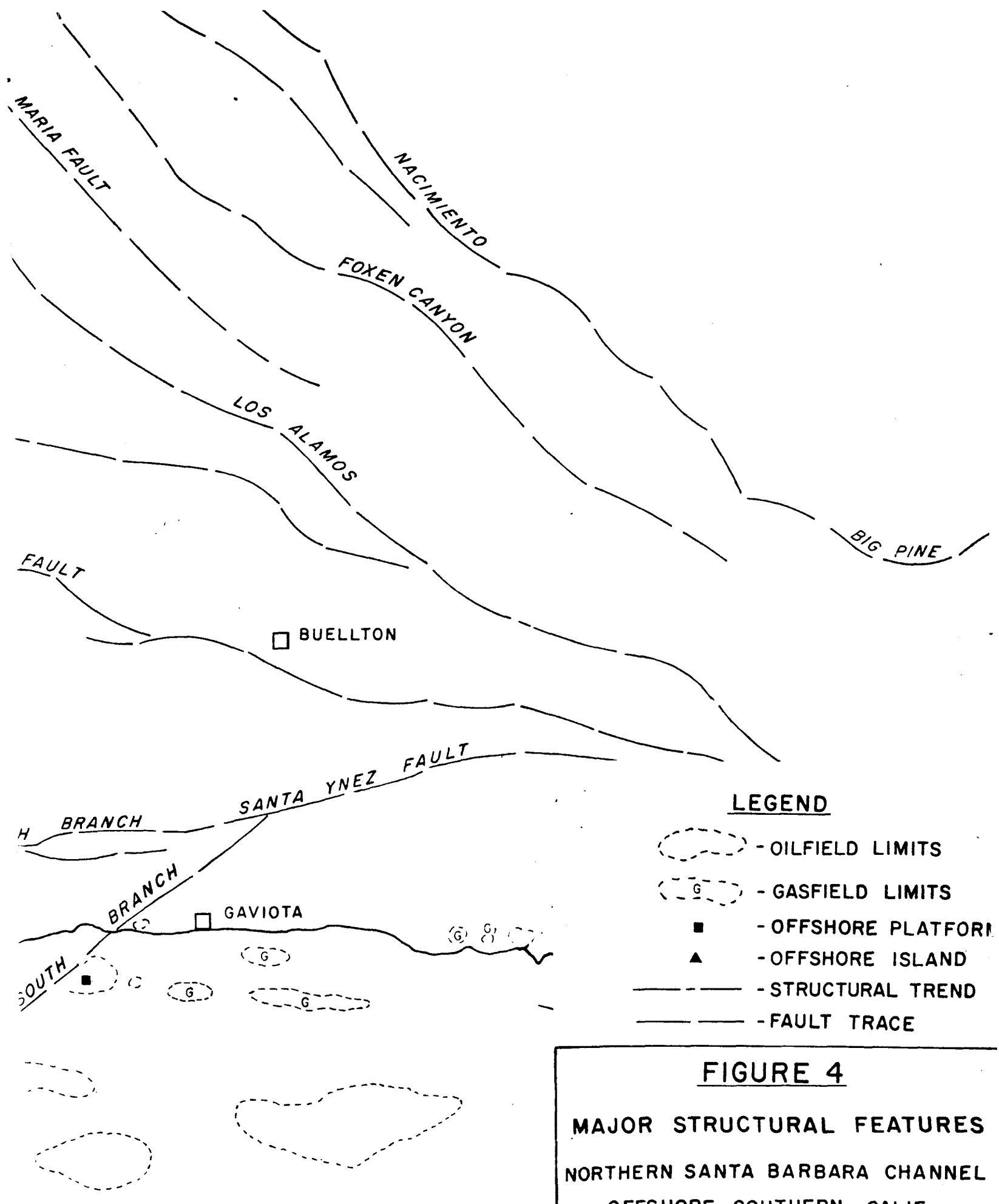


FIGURE 4

MAJOR STRUCTURAL FEATURES

NORTHERN SANTA BARBARA CHANNEL

OFFSHORE SOUTHERN CALIF.

SCALE: 1" = 4 miles

D.P.C.

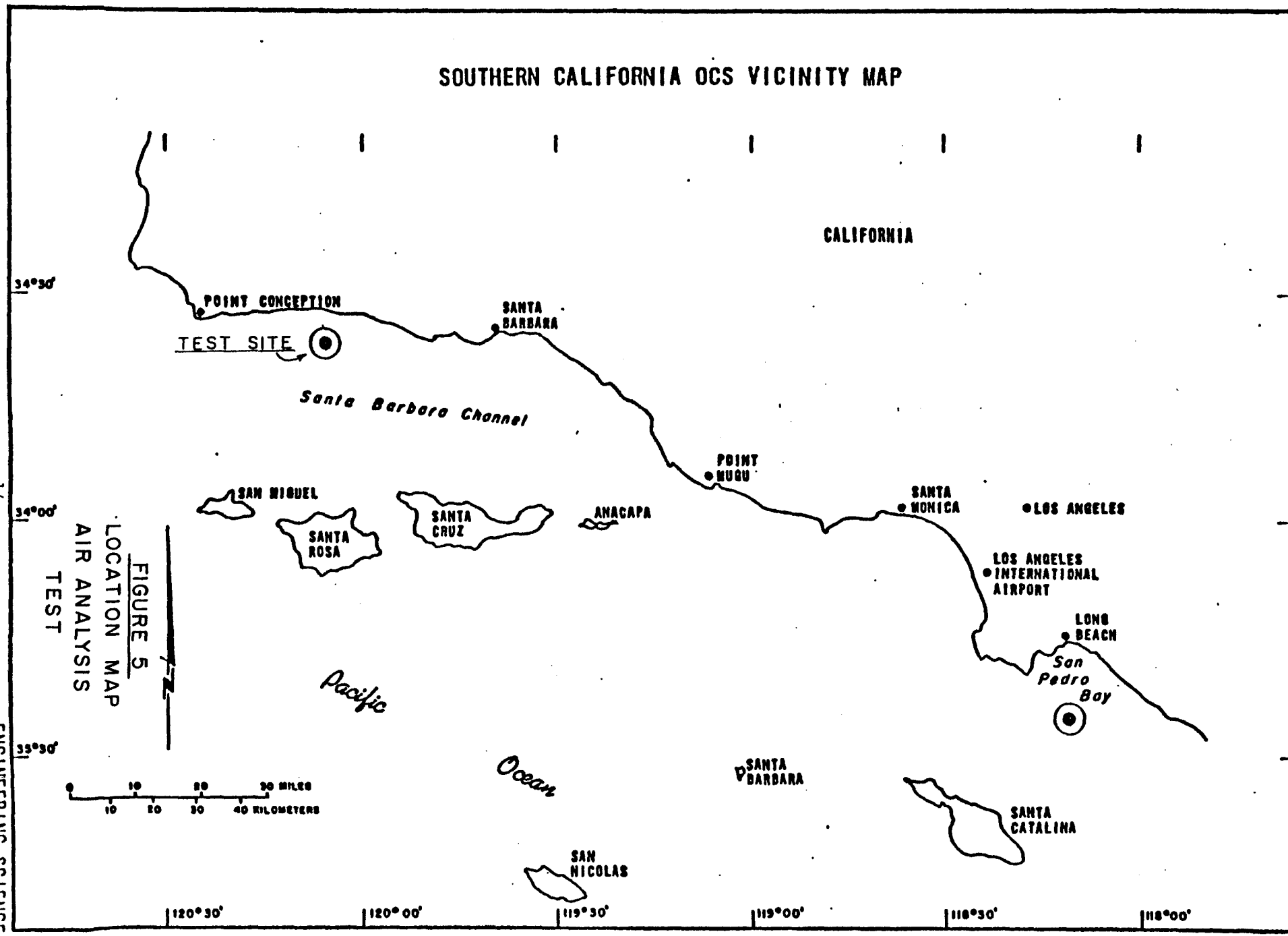
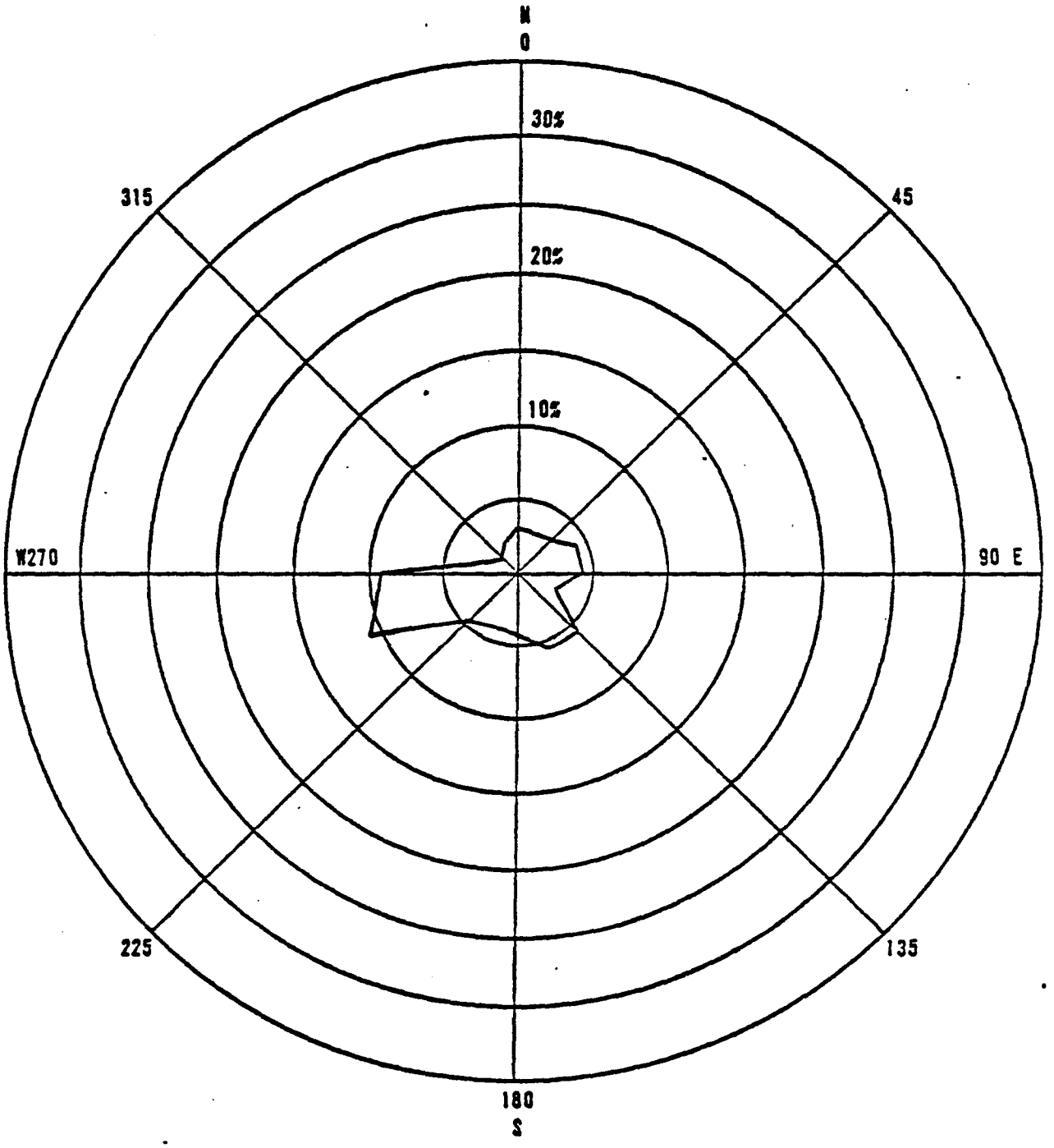


FIGURE 5
LOCATION MAP
AIR ANALYSIS
TEST

ANNUAL WIND ROSE: SANTA BARBARA AIRPORT



PERIOD: 1 SEP. 1976 - 31 AUG. 1977
CALMS: 26.9%
REFERENCE: NATIONAL WEATHER SERVICE

FIGURE 6

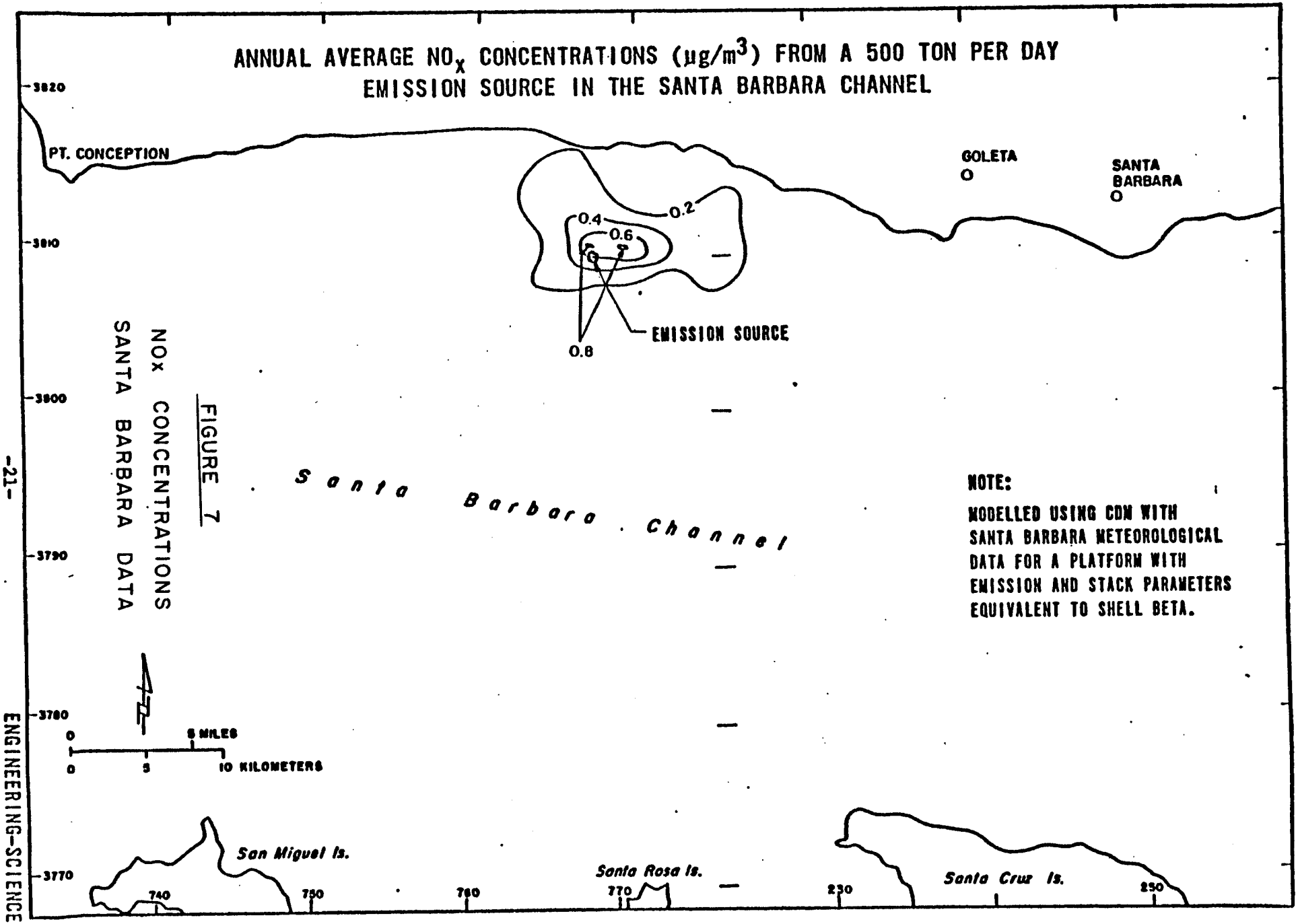


FIGURE 7

NOx CONCENTRATIONS
SANTA BARBARA DATA

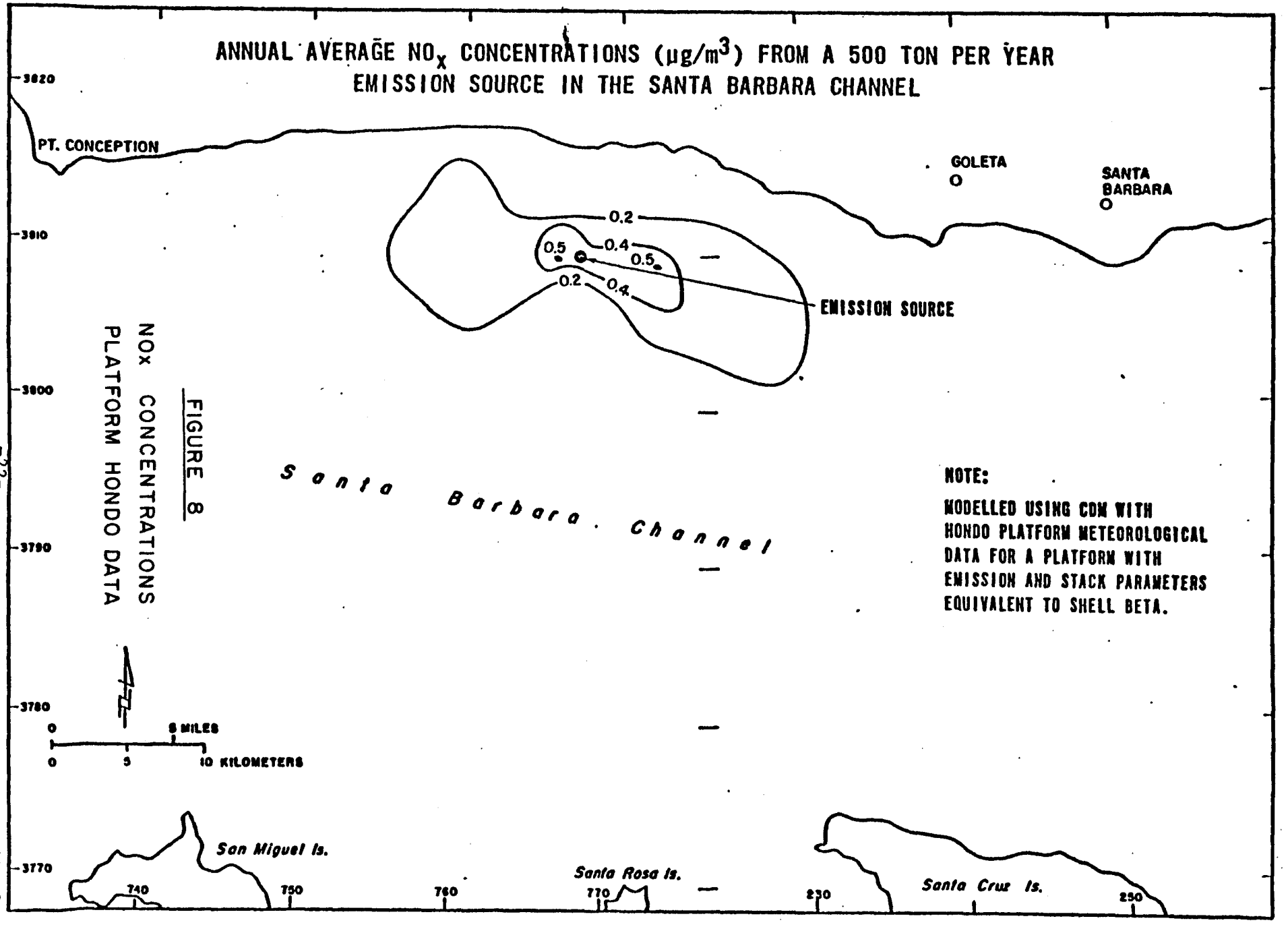


FIGURE 8

NOx CONCENTRATIONS
PLATFORM HONDO DATA