OCS ENVIRONMENTAL ASSESSMENT

Chevron U.S.A. Inc.

Lease OCS-P 0205

United States Department of the Interior
Geological Survey
Pacific OCS Region
Los Angeles, California

OCS ENVIRONMENTAL ASSESSMENT

October 30, 1981

Operator Chevron U.S.A. Inc. Plan Type Exploration - Resubmittal

Lease OCS-P 0205, Santa Clara Unit Block 46 N., 61 W.

Platform NA

Prepared by Office of the Acting Deputy Conservation Manager
Offshore Field Operations, Pacific OCS Region

Related Environmental Documents

U. S. DEPARTMENT OF THE INTERIOR

EA/EIR Platform Gina, and Platform Gilda Project
Final EIS for OCS Sale Nos. 35 and 48
Final EIS for Oil and Gas Development in the Santa Barbara Channel Outer Continental Shelf off California
U. C. Santa Cruz - BLM "Study of Marine Mammals and Seabirds of the Southern California Bight," 1978

ENVIRONMENTAL ASSESSMENT

Chevron U.S.A. Inc.
Operator

Santa Clara Unit

PLAN OF EXPLORATION, OFFSHORE SOUTHERN CALIFORNIA

OCS-P 0205, WELLS NOS. 3 and 4

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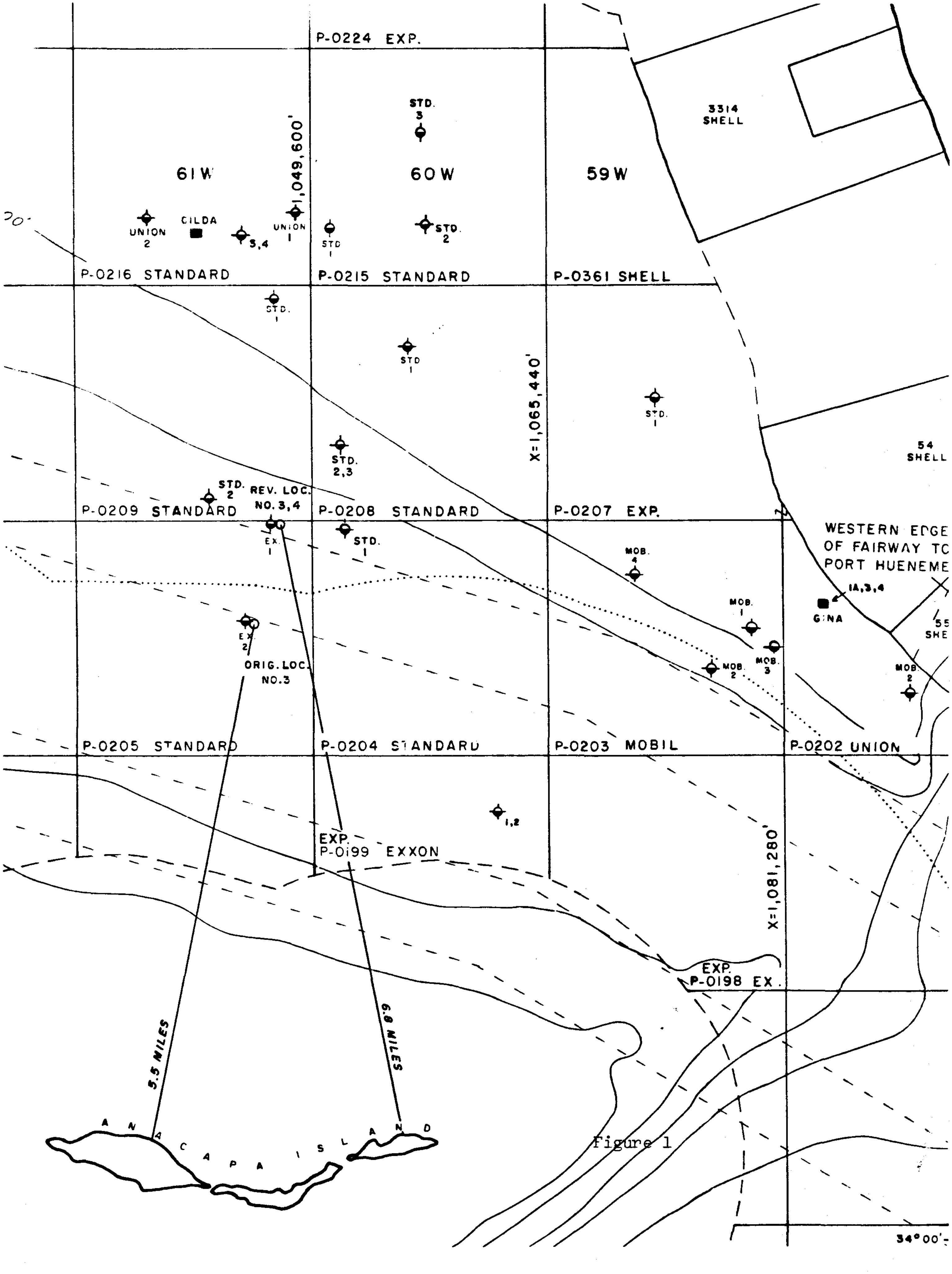
I. Description of the Proposed Action

Chevron U.S.A. Inc. has proposed to drill up to two exploratory wells on Lease OCS-P 0205 in the Santa Clara Unit. The Santa Clara Unit, operated by Chevron, encompasses the boundaries of eight OCS leases located 3.5 to 16 miles offshore Ventura, California. Development operations are currently conducted from two platforms within the Unit, Platform Grace and Platform Gilda.

An exploration plan was previously submitted by Chevron in April 1980 for the proposed drilling of OCS-P 0205 Well No. 3. The April 1980 plan was approved by the U. S. Geological Survey on May 16, 1980 but the California Coastal Commission (CCC) did not grant concurrence with Chevron's consistency certificate. A new surface location has been chosen for OCS-P 0205 No. 3 this time lying outside the Channel Islands Marine Sanctuary boundary. The new location is 6.83 nautical miles north of Anacapa Island and within the northern buffer zone for the northbound lane of the Vessel Traffic Separation Scheme (VTSS). Figure 1 shows the lease location, original well site for OCS-P 0205 No. 3, and the proposed well sites for P 0205 Nos. 3 and 4. Depending on the information obtained from P 0205 No. 3, a side tract of No. 3, P 0205 No. 4, may be drilled. Both wells will be directionally drilled at the same surface location; P 0205 No. 4 will be drilled out of the upper portion of P 0205 No. 3 utilizing the sea-floor facilities and shallow casing strings set for No. 3. (This is a common oil field practice.)

These wells have been proposed in order to delineate proven reservoirs within the southern portion of the Santa Clara Unit. The optimum location for delineating the southern extent of the reservoirs would be within the northbound lane of the VTSS. Because of the traffic hazards associated with drilling in the lane and the CCC's objections to locating within the Marine Sanctuary, a well



P-0224 EXP.
3314
SHELL
STD.
3
61W
60W
59W
1,049,600'
UNION
2
CILDA
5,4
UNION
1
STD
1
STD.
2
P-0216 STANDARD
P-0215 STANDARD
P-0361 SHELL
STD.
1
STD
1
X=1,065,440'
STD.
1
54
SHELL
STD.
2,3
STD.
2
REV. LOC.
NO. 3,4
P-0209 STANDARD
P-0208 STANDARD
P-0207 EXP.
EX.
1
STD.
1
WESTERN EDGE
OF FAIRWAY TO
PORT HUENEME
MOB.
4
IA,3,4
GINA
MOB.
1
EX.
2
MOB.
2
MOB.
3
MOB.
2
ORIG. LOC.
NO. 3
P-0205 STANDARD
P-0204 STANDARD
P-0203 MOBIL
P-0202 UNION
1,2
EXP.
P-0199 EXXON
X=1,081,280'
EXP.
P-0198 EX.
5.5 MILES
6.8 MILES
ANACAPA ISLAND
34°00'

Figure 1

site in the northern buffer zone has been chosen. Chevron has located OCS-P 0205 No. 3 as far away from the lane as can be engineered safely and still obtain the needed geologic information.

Location outside the lane, however, dictates a directional drilling program with drilling angles of up to 50 degrees. High angle holes are not uncommon, but they must be engineered to anticipate and prevent potential downhole problems. A detailed review of the drilling program and casing program has been conducted by USGS petroleum engineers; actual operations will be monitored by personnel of the USGS District Office in Ventura, California.

Additional tests and other safety precautions may be required as needed by the U. S. Geological Survey during the drilling phase.

One of the primary responsibilities of the USGS Conservation Division is to ensure the proper development of oil and gas fields within its jurisdiction. Review of lessee activities is conducted at several phases in the process by USGS petroleum engineers to assure maximum resource recovery. As a part of this review process, the USGS has determined that information obtained from these proposed wells on P 0205 is valuable and may be required for the analysis of further Santa Clara Unit development.

The wells will be drilled by the floating drillship Glomar Coral Sea or a comparable vessel in 220 meters (719 feet) of water. Lambert Grid Zone VI Coordinates, proposed well depths (DD), and water depths are as follows:

Lease OCS-P 0205 Well Number		LGZ VI Coordinates X	Y	(Proposed Depths in Feet) Well	Water
3	S°	1,046,600*	728,490	8,000	719
	BHL°°	1,046,100	726,840		
4	S	1,046,600	728,490	8,500	719
	BHL	1,045,500	723,240		

° S = Surface location
°° BHL = Bottom hole location
* Note: Typographical errors were made in the POE and ER. Note also the (N) coordinate is 34° 7.0' 45" for wells 3 and 4.

Chevron anticipates that drilling of OCS-P 0205 No. 3 could commence in early 1982 if the required permits are granted. If OCS-P 0205 No. 4 is drilled, it would be drilled directly following the abandonment procedures of Well No. 3 while the drillship is on location. It is estimated that a total of 50 to 90 days will be required to drill and evaluate each test well.

Descriptions of the drilling vessel and equipment are included in the Plan of Exploration (POE). Personnel requirements, transportation modes, onshore support systems, safety systems, and monitoring systems are detailed in section 2 of the Environmental Report (ER).

The Oil Spill Contingency Plan, Critical Operations Plan, and H_2S Contingency Plan were previously submitted as Chevron U.S.A. Inc., Western Region Production Department, Oil Spill and Emergency Contingency Plan for the Santa Barbara Channel Outer Continental Shelf. A copy of this document is available for inspection in the USGS Public Information Room in Los Angeles. The Application for Permit to Drill (APD) and detailed site-specific geologic records are submitted to the USGS Ventura District Office for review before final approval for drilling each test well is granted.

In the event any oily discharge occurs, the U. S. Geological Survey and the U. S. Coast Guard will be immediately notified. Spill clean-up equipment placed on board the drilling vessel would be used to clean-up most accidental spills which might occur in the course of normal drilling operations. Should a spill occur greater than 10 barrels, Chevron will utilize Clean Seas, Incorporated located in Carpinteria as its primary source of additional equipment. Other suppliers such as Southern California Petroleum Contingency Organization would be contacted, if needed. Clean Seas estimates the spill response time to Lease OCS-P 0205 is 3 to 4 hours in good weather conditions. We note that the actual spill response time includes notification, travel, and deployment time.

The drilling vessel designated for this project, the Glomar Coral Sea, has been issued National Pollution Discharge Elimination System (NPDES) Permit No. CA 0110057 which authorized the onsite disposal of drilling mud and cuttings. A general NPDES permit has been submitted by EPA for review by other agencies and the public. This permit would allow discharges into all existing leases for OCS oil and gas exploration and development activities off California for the next 2 years. The public hearing on this matter was held by EPA on October 16 in Santa Barbara, California.

Other wastes produced during drilling operations such as deck drainage, washdown water, engine room drainage, and sanitary wastes will be treated and discharged in accordance with the NPDES regulations. The waste disposal, prevention, and reporting procedures are given in sections 2.j. and 2.k. of the ER.

The proposed activity, as described in the POE and ER, was certified by Chevron to be consistent with the California Coastal Commission Management Plan. The USGS has reviewed the POE and ER for completeness and accuracy and finds that these documents provide an adequate description of potential impacts posed by this project. The California Coastal Commission plans to review this Plan of Exploration proposal for consistency at a public hearing scheduled for November or December 1981.

Pacific OCS Orders contain regulations which have been instituted to help insure the safety of operations and personnel, and to minimize the risk of environmental damage. Conformance with these orders is regularly monitored by U. S. Geological Survey personnel. Measures submitted by Chevron to comply with USGS Orders governing operating procedures in the OCS are presented on pages 19 to 21 of the ER. Engineering design of the operator's mud program, logging program, casing program, and drilling procedures are also reviewed as a part of the USGS permitting process.

Personnel on board drilling vessels must attend prescribed USGS certified training programs and pass practical examinations. OCS Standard No. T1 (GSS-OCS-TI, Federal Register 42-251, December 30, 1977, and revised edition Federal Register 45-105, May 20, 1980), gives a complete description of these procedures. Higher level personnel must complete the entire training program every 4 years and attend an annual short-course. Lower level technicians complete specific training, updated with regular drills conducted on the vessel. Drills may also be requested by USGS technicians at any time. Oil spill booms on vessels new to the area must be deployed within 1 week after starting to drill the first well in order to familiarize personnel with the safety equipment available. Vessels which have been drilling in this area must conduct this drill annually. In addition, USGS engineering technicians conduct daily inspections of all drilling operations to monitor conformance of the OCS Orders. Individual exploratory drilling vessels are inspected at least once a week. Comprehensive inspections are conducted prior to each initial well drilled.

Several plans of exploration and development have been approved in the vicinity of OCS-P 0205. These include exploration on Leases OCS-P 0215 and OCS-P 0361 north of P 0205; and development and production wells on Platform Grace located on Lease OCS-P 0217, 5.3 miles northwest of P 0205; Platform Gilda located on Lease OCS-P 0216, 3.6 miles north of the proposed well site; and Platform Gina located outside the Unit on Lease OCS-P 0202, 7.5 miles east of P 0205.

Potential cumulative impacts which may be posed by drilling operations are addressed by the Bureau of Land Management in their Sale 68 DEIS (BLM, 1981).

The U. S. Geological Survey is aware of this potential and will continue to evaluate data as it becomes available. Specific cumulative impacts are addressed in section IV of this document.

Since the proposed wells are exploratory in nature, the transportion of large quantities of oil or gas will not be required. If a well test is conducted during the proposed drilling program, small quantities of oil may be recovered. This produced oil will be transported to Port Hueneme by supply boat for appropriate disposal. Gas, if found, would most likely be flared at the drillsite. Should commercially producible quantities of hydrocarbons be discovered, a separate development and production plan and ER (development/production) will be submitted covering transportation details.

No unique monitoring programs are scheduled for this project. All the H_2S, mud and oil pollution monitoring systems described in the ER will be in operation throughout the drilling program.

An air temperature monitoring study is being conducted by U. S. Geological Survey to collect data from offshore sites over the Santa Barbara Channel. The purpose of the study is to gather information on thermal inversion heights over the Channel. Results of the study will be used to evaluate the effects of emissions from offshore oil and gas development facilities on onshore air quality.

II. Description of the Affected Environment

The physical and biological characteristics of the Santa Barbara Channel have been extensively described in several documents including: BLM's final EIS for Lease Sales 35 and 48; DEIS for Lease Sale 68; USGS's Santa Barbara Channel Oil and Gas Development EIS; and the U. C. Santa Cruz/BLM "Study of Marine Mammals and Seabirds of the Southern California Bight." A recent detailed description of the area surrounding Lease OCS-P 0205 is given in the EIR/EA for Union's Platforms Gina and Gilda prepared jointly by the City of Oxnard and the USGS, Pacific OCS Region (see reference list).

Chevron's Environmental Report and Plan of Exploration for OCS-P 0205 have been included in this document as appendix 5. The U. S. Geological Survey, as part of the permitting process, has reviewed this ER and POE for accuracy and completeness. Copies of the POE and ER have also been provided to 18 Federal and State agencies for review. Comments received as a result of these reviews are included in appendices 6 and 7.

To avoid redundancy, the discussions in this section only include comments which expand upon discussions in the ER.

A. Geology

The geology of the area including submarine geologic hazards, mineral deposits, and freshwater aquifers is discussed on pages 23 to 30 of the ER. This area has been well described due to the number of wells which have been drilled to explore for and develop oil and gas within the Unit. Additional information relating to site specific geohazards in the vicinity of the proposed wells has been furnished by the USGS Resource Evaluation Office and is included in appendix 6.

B. Meteorology

Meteorology and air quality are discussed on pages 31 to 34.

C. Physical Oceanography

Physical oceanography, including information on water temperatures, salinity, currents, tides, and sea states is discussed in the ER, pages 34 to 37. Water quality characteristics of the Santa Barbara Channel are detailed in the draft Environmental Impact Statement for Lease Sale 68 (BLM, 1981). The major sources of marine pollution in the Southern California Bight are municipal and industrial effluents, surface runoff, and atmospheric deposition. Trace metals have been monitored for several years through the California Mussel Watch Program. Results of this program indicate that significant levels of cadmium, lead, silver, and zinc are present in mussels located at sites surrounding Lease OCS-P 0205, including Anacapa Island, San Miguel Island, Point Conception, and from Mugu Lagoon to Latigo Point (BLM, 1981).

The mussels also exhibit higher levels of hydrocarbons, with highest concentrations generally found near harbors and urban centers. Exceptions in southern California are areas with naturally occurring seeps around Coal Oil Point, Santa Barbara, and Point Conception where mussels show elevated hydrocarbon levels. (BLM, 1981)

D. Other Uses of the Area

Supplemental information, more recent than data contained in the ER follows:

1. Commercial Fishing

The Southern California Bight has historically been an important commercial and sport fishing area in the United States (Horn, 1974). In 1976, total landings of fish and shellfish throughout California were estimated at over 900 million pounds, worth more than $182 million to fishermen (Oliphant, 1979). The value of commercial fisheries in the Santa Barbara Channel is generally reflected by the quantity of fish landed at the port of Santa Barbara. In 1976, landings at Santa Barbara accounted for over 69 million pounds with an approximate value of $6.5 million (Oliphant, 1979).

Fish landing data for 1981, compiled through March, reveals that over 10 million pounds of fish and shellfish have been landed at Santa Barbara with mackerel, sea urchins, squid, and rockfish being the dominant species by weight (Oliphant, personal communication). Current prices are: mackerel-$190 per ton; squid-$285 per ton; sea urchins-$200 to $400 per ton; and rockfish-$700 to $1,000 per ton (NMFS, 1981).

Lease OCS-P 0205 is located within California Fish and Game Block 665, which produced 41.3 million pounds of fish in 1975 (California Department of Fish and Game, unpublished data). Northern anchovy was the most abundant species by weight, accounting for 99.6 percent of the total catch.

Purse seining is the predominate commercial fishing method in terms of both quantity of fish landed and value of fish landed. Purse seines are utilized by tuna, mackerel and anchovy boats. Bait and squid fishermen utilize a net which was the forerunner to purse seines called the lampara. Trawls are used for taking midwater and bottom fish as well as shrimp. For the most part, trawlers operate from Point Mugu northward. Larger predators, such as albacore, and billfish are taken by trolling. Lobster and crab are taken with traps or ring nets usually in depths of 91 m (280 feet) or less (BLM, 1978).

2. Sport Fishing

Documentation of sport fishing activities specific to Lease OCS-P 0205 is difficult due to the methods historically employed in reporting sport fishing data. While both party boat and private boat fishing could occur within Lease OCS-P 0205, statistical data is available only for party boats. The most recent marine sport catch data available for the OCS-P 0205 area indicates that approximately 25,000 party boat fishermen annually harvest up to 250,000 fish, the majority of which are rockfish (California Department of Fish and Game, unpublished data).

Private boat fishing undoubtedly occurs in and near Lease OCS-P 0205 due to the close proximity of several fixed structures (existing platforms) which can serve as fish attractors. However, no data are available to indicate the importance of the area as a private boat sport fishing site.

Sport diving likely does not occur on Lease OCS-P 0205 due to excessive water depth and the absence of physical structures on the lease.

3. Shipping

Though, as previously discussed, the optimum location for P 0205 No. 3 would be within the northbound lane, the surface location has been placed within the northern buffer zone to minimize potential hazards to navigation. A location within the northern buffer zone was specifically chosen for this proposal since the original location within the southern buffer zone was opposed by the CCC.

The bottom hole locations for these wells lie underneath the northbound sea lane as given in section I of this document. Potential impacts are discussed in section III.D.3 of this Environmental Assessment.

4. Military Uses

This lease is not located within an area of military activity. Accordingly, there are no stipulations on the lease specifying additional coordination with the military. If this situation changes, coordination will be monitored by the USGS.

5. Cultural Resources

The history of the area and a description of potential cultural resources located in the Santa Barbara Channel region is given in the EIS's for OCS Sale No. 35 and 48 (BLM 1975, 1978).

There are no shipwrecks or cultural resources known to exist in the area of the proposed project. Shipwrecks can occur in deep water; however, recovery at the water depths encountered on these leases would be difficult. If a cultural resource is identified during preparations to commence drilling operations, the site will be avoided.

6. Mariculture

There are no known mariculture activities within the area of the proposed project. Studies to determine the feasibility of culturing *Macrocystis pyrifera* in deep water are now being conducted.

7. Environmentally Sensitive Areas

Anacapa Island, located 6.8 nautical miles north of the proposed site, is included in the Channel Islands National Park and the Channel Islands Marine Sanctuary. This island serves as the principal colonization and breeding grounds for the California population of the endangered brown pelican (*Pelecanus* occidentalis californicus). (See detailed discussions in the ER, appendix 5, and in sections III F, VI, and appendix 1 of this document.)

Environmentally sensitive areas along the coast 10 to 15 miles from the proposed project include Mugu Lagoon, Carpinteria Marsh, and the mouths of the Ventura and Santa Clara Rivers. Federally listed endangered species in Mugu Lagoon and Carpinteria Marsh are the light-footed clapper rail, *Rallus longirostris* ssp. *levipes*, (note species correction from ER) and the salt marsh bird's beak, *Cordylanthus maritimus* ssp *maritimus*. California lists the above two species along with the Belding savannnah sparrow, *Passerculus sandwichensis beldingi*, (which is being considered for Federal listing), and the California Black Rail, *Laterallus jamaicensis coturniculus*, which is considered "rare" (BLM, 1981).

The California least tern, *Sterna albifrons browni* nests and forages in the wetlands at the mouth of the Santa Clara and Ventura Rivers. Refer to the discussion of refuges and environmentally sensitive areas in the ER pages 42 to 43.

8. Other

Pipelines and cables servicing Platforms Grace, Gilda, and Gina lie approximately 5 miles northeast, 4 miles north, and 7 miles east of OCS-P 0205. No ongoing ocean dumping or mineral resource development other than oil or gas is known to exist in the vicinity of the proposed project.

E. Flora and Fauna

1. Pelagic

The following discussion on fishes in the area is provided to supplement the information provided in Chevron's ER.

The marine environment of the Southern California Bight can be generally divided into three recognizable regions: the mainland and island shelf; deep sea basins; and the pelagic zone. The mainland and island shelf region usually encompasses areas with water depths less than 200 meters (656 feet). Deep-water basins are generally areas with depths greater than 200 meters. The pelagic zone is the upper 150 meters (492 feet) of the ocean. Each region is characterized by distinct fish populations, representatives of which occur in the vicinity of OCS-P 0205. Water depths at the lease are greater than 200 m, thus the area would primarily be considered a deep water basin.

Samples collected from 1969 through 1972 indicate that Dover sole (*Microstomus pacificus*) were the most frequently encountered mainland shelf species (SCCWRP, 1973). In addition, flatfishes made up six of the seven most commonly collected species (SCCWRP, 1973). Preferred habitat for most flatfishes is soft bottoms, and most feed on bottom organisms such as shrimp, crabs, molluscs, marine worms, and brittle stars (Hart, 1973).

Pelagic species, such as northern anchovy, Pacific bonito, yellow tail, jack mackerel, and Pacific barracuda migrate extensively throughout the Southern California Bight (BLM, 1978). Northern anchovy is one of the most abundant pelagic species in the region, with the greatest concentrations occurring between San Diego and Santa Barbara within 20 miles of the coast (BLM, 1978). Ecologically, anchovy are an extremely important species in that they consume zooplankton (copepods and euphasuiid shrimp) and in turn are preyed upon by most predator species occurring in California waters (BLM, 1978).

2. Other

A description of the pinnipeds, plytoplankton, zooplankton, and other flora and fauna in the region is given in the ER in section III.

3. Endangered Species

Endangered species currently listed or under review in the Southern California Bight by Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) as of May 1981 are (BLM, 1981):

Common Name	Scientific Name	Status
Gray Whale	(*Eschrichtius robustus*)	Endangered
Right Whale	(*Eubalaena glacialis*)	Endangered
Blue Whale	(*Balaenoptera musculus*)	Endangered
Fin Whale	(*B. physalus*)	Endangered
Sei Whale	(*B. borealis*)	Endangered
Humpback Whale	(*Megaptera novaeangliae*)	Endangered
Sperm Whale	(*Physeter catodon*)	Endangered
Green Sea Turtle	(*Chelonia mydas*)	Endangered
Leatherback Sea Turtle	(*Dermochelys coriacea*)	Endangered
Pacific Ridley Sea Turtle	(*Lepidochelys olivacea*)	Endangered
Loggerhead Sea Turtle	(*Caretta caretta*)	Threatened
Monoplacophoran	(*Vema hyalina*)	Under Review
Southern Sea Otter	(*Enhydra lutris neresis*)	Threatened
California Brown Pelican	(*Pelecanus occidentalis*)	Endangered
California Least Tern	(*Sterna albifrons*)	Endangered
American Peregrine Falcon	(*Falco peregrinus anatus*)	Endangered
Bald Eagle	(*Haliaeetus leucocephalus*)	Endangered
California Condor	(*Gymnogyps californianus*)	Endangered
Light-footed Clapper Rail	(*Rallus longirostris levipes*)	Endangered
Santa Barbara Song Sparrow	(*Melospiza melodia graminea*)	Endangered
San Clemente Sage Sparrow	(*Amphispiza belli clementeae*)	Endangered

(Endangered Species Cont.)

San Clemente Loggerhead Shrike	(*Lanius ludovicianus mearnsi*)	Endangered
San Clemente Island Larkspur	(*Delphinium kinkiense*)	Endangered
San Clemente Island Indian Paintbrush	(*Castilleja grisea*)	Endangered
Salt Marsh Bird's Beak	(*Cordylanthus maritimus* ssp. *maritimus*)	Endangered
Island Night Lizard	(*Klauberina riversiana*)	Endangered
Palos Verdes Blue Butterfly	(*Glaucopsyche lygdamus palos verdesensis*)	Endangered
El Segundo Blue Butterfly	(*Euphilotes [=Shijimiaeoides] battoides allyni*)	Endangered
San Clemente Broom	(*Lotus scoparius* ssp. *traskiae*)	Endangered
San Clemente Island Bush-mallow	(*Malacothamnus clementinus*)	Endangered

The endangered species which may forage or pass through the area of the proposed project include the migratory whales listed on the previous page and the California brown pelican. Generally, the other listed endangered bird species, such as the light-footed clapper rail and the Belding savannah sparrow, rarely leave their marshy/wetland habitats onshore. The California least tern, found in the Santa Clara River basin, feed only in the nearshore areas and would not be expected to fly near the vicinity of the proposed project (personal communication with FWS).

A few southern sea otter individuals have entered the Santa Barbara Channel area as acknowledged by Fish and Wildlife Service. The population has not extended its range south of Point Conception to date (FWS, personal communication). Sea otters would not be in the area of the proposed project since they reside in the nearshore kelp beds.

Current information on the brown pelican was obtained from the FWS Biological Opinion (1981), personal communication with Frank Gress of the U. C. Davis. Though the California brown pelican (Pelecanus occidentalis californicus) has been listed since October 1970, no Critical Habitat has been designated for this species. Anacapa Island and Scorpion Rock serve as the primary breeding areas for the California colony though breeding has occurred historically on other Channel Islands.

The California brown pelican population in the Channel Islands area occupy the extreme northern limit of the current breeding range which extends south along the coast to islands offshore Nayavit, Mexico. Over 100,000 pairs breed in Mexico and the Gulf of California, as compared with approximately 1,500 pairs which currently breed on Anacapa Island. (The only difference between the birds in the Mexican and Anacapa colonies is their choice of breeding location; all are members of the same subspecies.)

The brown pelican was put on the Endangered Species List due to their low reproductivity in successive breeding seasons. Reproductive failure was attributed to the production of thin-shelled eggs due to the presence of DDE, a metabolite of DDT. Brown pelicans are extremely sensitive to pesticide contamination; approximately 50,000 brown pelicans disappeared in Louisiana and Texas after fields where the pesticide endrin had been sprayed, flooded, consequently spilling endrin into the river system where it was absorbed into the food chain.

The breeding population on Anacapa Island crashed somewhere between 1964 and 1968 and almost no young were produced in subsequent years. The dumping of DDE was stopped in April 1970 and it appears that by 1974, the population had recovered from the DDE contamination (see table 1 on page 18 of this EA). In that year the number of young produced on Anacapa Island reached 305 individuals, with a total of 1,105 young being produced in California. In this case, mitigation of this environmental pollution hazard had a very positive result and enabled the reestablishment of the population.

Reproduction was down to a new low from 1976 to 1978 due to the reduced supply of anchovies which constitute an estimated 93 percent of the brown pelican's diet (Gress, personal communication). Productivity values indicative of a stable brown pelican population range between 1.0 to 1.5 with averages in the Gulf of Mexico of 1.4. The Anacapa Island population has been doing comparatively well over the last three breeding seasons. However, as reflected in the productivity figures, there continues to be a high rate of nest abandonment and fledging starvation on Anacapa Island.

The U. S. Fish and Wildlife Service and California Department of Fish and Game biologists believe that the status of the brown pelican could be changed from "endangered" to "threatened" if a productivity of 1.0 is reached with up to 2,000 breeding pairs (Gress, personal communication). A recovery plan for the brown pelican has been drafted and should be released by the Fish and Wildlife Service within 2 months which will hopefully bring the population up to this "threatened status" level.

The foraging range of the pelican fluctuates annually. In general, brown pelicans have a maximum range of 50 kilometers radius from Anacapa and forage within a 30 kilometer radius during breeding. Studies conducted by California Department of Fish and Game and U. C. Davis using 30-mile transect plots found that in 1978 and 1979, the Anacapa population fed almost exclusively in the Santa Barbara Channel. Feeding in 1980 primarily occurred between Anacapa Island and Santa Barbara Island to the south (Gress, personal communication).

TABLE 1

Year	Breeding Site	Nesting Attempts	No. Young Produced	Productivity
1969	Anacapa Island	750	4	.005
1970	Anacapa Island	552	1	.002
1971	Anacapa Island	540	7	.013
1972	Anacapa Island	261	57	0.22
1973	Anacapa Island	247	34	0.14
1974	Anacapa Island	416	305	0.73
1975	Anacapa Island	292	256	0.88
1976	Anacapa Island	417	279	0.67
1977	Anacapa Island	76	39	0.51
1978	Anacapa Island	210	37	0.18
1979	Anacapa Island	1,258	980	0.78
1980	Anacapa Island	2,147	1,438	0.67
	Santa Barbara Island	97	77	0.79
1981	Anacapa Island	estimated 2,600	estimated 1,500 to 1,600	data uncompiled but estimated lower than 1980. (Gress, personal communication)

Reference: Chevron's ER--Information updated by USGS, 1981 from personal communication with Frank Gress on October 21, 1981.

The above information is correlated closely with the movement of the anchovy population. The movement of anchovy schools to areas near Santa Barbara Island is also presumed responsible for the unusual occurance of breeding on Santa Barbara Island, in 1980 (Gress, personal communication).

Mortality among the brown pelican young can be attributed to indirect impacts by man, and direct impacts due to predation and availability of food source. Man's impact felt through the influence of DDE is still present. Though the amount of DDT in the water column has dropped to a "background" level, thin-shelled eggs are still-being observed by research biologists (Gress, personal communication).

Generally, predation only becomes a problem when the colony is disturbed (by man) and adults are forced to leave the nest. Ravens and western gulls are the primary predators. The pelicans will not breed on islands where mammalian predators such as the Island fox are present (Gress, personal communication).

At present, therefore, mortality rates are thought to be most closely correlated to anchovy scarcity, as was evident in 1981. At the beginning of the 1981 breeding season, anchovy were abundant all along the coast. Accordingly, a record number of nesting attempts were observed on Anacapa Island. However, the sharp decline in anchovy abundance in mid-April resulted in abandonment rates approaching 50 percent, with up to 72 percent estimated in some areas, in May of this year. Though the information for 1981 is unpublished, it is believed that productivity levels declined in 1981 because of this high mortality rate (Gress, personal communication).

Young pelicans are considered to be most vulnerable and have the highest mortality from the age of hatching to five weeks of age. When the young reach

10 to 13 weeks, a fat reserve has been developed which allows them to go without food for a few days at a time. Mortality rates are considered high until one year of age. Since the most successful breeding has occurred at the beginning of the breeding season over the last several years, the Brown pelican population is considered to be most vulnerable during the first few months of nesting. In 1980 and 1981, breeding occurred asychronisly as early as late December with young being fledged through October.

From the above discussion and the 1981 FWS Biological Opinion, it can be concluded that the Anacapa Island population of brown pelicans has made a substantial comeback from productivity lows over the last 20 years.

At present, the fluctuation in anchovy abundance is the dominant population regulator and is largely responsible for high mortality rates among fledglings. Though the plight of brown pelicans has steadily improved since 1969, this California population will not be considered stable until productivity levels have reached values characteristic of stable, breeding brown pelican colonies.

F. Socio-economics

A discussion of the travel modes, routes and frequency, personnel requirements, and onshore support systems is provided on pages 6 to 7 of Chevron's ER. No increase in local employment is expected as a result of the proposed project. No unusual public opinion either for or against these exploratory activities on Lease OCS-P 0205 has been made known.

III. Environmental Consequences

A. Geologic Hazards

Geologic characteristics and geologic hazards of the project are discussed in a report provided by the U. S. Geological Survey Resource Evaluation geologists (appendix 6) and in the ER sections 3.a and 4.a (appendix 5). A summary of the potential geologic hazards is as follows:

-- The sea floor at the proposed well site location is generally smooth and regular. An underlying slide deposit, the toe of which is 91 m from the proposed drill site, is not anticipated to affect the drilling of this exploratory well.

-- There is no indication of encountering shallow or deep faults in the drilling of these wells.

-- No shallow gas or hydrocarbon seeps were identified in the area of the proposed well site.

B. Meteorology

Only temporary limitation or suspension of various project activities may occur due to severe weather conditions. As specified in Chevron's Oil Spill and Emergency Contingency Plan for Santa Barbara Channel OCS Leases, critical drilling operations defined in that document will be curtailed when winds exceed 40 knots or when fog is so dense that visibility on the structure is limited. Chevron's Contingency Plans are on file in the USGS Public Information Room in Los Angeles. The Aids to Navigation requirements for Class "A" structures in 33 CFR 67 will apply to this operation.

Short term impacts on air quality can be expected in the immediate vicinity of the proposed drillsites. The emissions anticipated to be released by the proposed project must be below the exemption amounts established in the Code of Federal Regulations (30 CFR 250) by the Department of Interior to receive approval from the USGS. The information supplied regarding the predicted emissions for this project was found to be accurate and complete.

Emissions produced by neighboring Platforms Gina and Gilda have been discussed in the EIR/EA for that project. Both platforms are cable powered; emissions for either platform were not found to exceed the DOI Air Quality Regulations (Union Oil Company, USGS, 1980, page 4.2-27).

Development wells are currently being drilled on Gilda and Grace; Grace has been on production since July 30, 1979. Drilling from Platform Gina will likely commence within the next two or three months.

Also, exploration has been approved on Lease OCS-P 0215 for up to three wells and on Lease OCS-P 0361 for up to six wells. The time for commencement of these activities are not known at this time. The availability of drillships will govern the schedule for drilling these test wells.

Cumulative impacts associated with the addition of drilling on OCS-P 0205 in this area are not considered significant since (1) P 0205 No. 3 is located approximately seven miles from Anacapa Island and approximately 10 miles from shore, (2) the drill site for P 0205 No. 3 is 3.6 to 7.5 miles from other OCS emission sources, (3) prevailing winds are from the northwest and generally blow parallel to the coastline (EIR/EA for Gina and Gilda), and (4) none of the activities individually exceed the DOI air quality emissions factors. For additional information regarding wind trajectories and potential air quality impacts, see BLM's POCS Technical Paper No. 81-7 and the EIR/EA for Platforms Gina and Gilda.

C. Physical Oceanography

Sea temperatures, currents, tides, sea states, and water depths are not expected to have any significant effect on the proposed exploratory drilling activities. Critical drilling operations will be curtailed when significant wave height exceeds 5 feet, as specified in Chevron's Oil Spill and Emergency Contingency Plan. Only short-term delays in operations would be expected from unusual storm conditions.

No significant water quality impacts are anticipated as a result of this project. However, short term degradation of local water quality is possible within the discharge plume and at the well site as a result of the discharge of drill cuttings, drilling mud, some sanitary and domestic waste, and possible release of formation water.

Formation water accidently released may be highly saline with low concentrations of several trace materials (UCLA, 1976). However, with proper drilling techniques and effective mud and casing programs, very little, if any, formation water will enter the water column.

The effects of onsite disposal of drilling mud and cuttings on water quality and marine organisms have received considerable attention (Ecomar, 1978; Houghton et al, 1980). Laboratory data indicate that high concentrations of mud and cuttings are toxic; dilution factors present in the environment reduce the deleterious effects to the immediate vicinity of the discharge point.

The plume will have an adverse impact on planktonic organisms fouled by the discharge. Phytoplankton and zooplankton productivity will be reduced in the volume of water containing the plume, although the reduction will be temporary.

Following completion of drilling activities, most, if not all, organisms will be cleared of mud and cuttings by physical and biological processes (Ecomar, 1978). In addition, Ayers et al (1980), concluded that drilling fluids have a negligible effect on open ocean water quality.

The drillship Glomar Coral Sea has been issued a NPDES permit by the Environmental Protection Agency. All discharges will conform to conditions set forth in that permit.

D. Other Uses of the Area

1. Commercial Fishing

It is not anticipated that this project will significantly impact the local fisheries. Impacts will be slight and of a temporary nature. The National Marine Fisheries Service, which has jurisdiction over OCS commercial fisheries, has reviewed this proposal and determined that the commercial fisheries would not be significantly affected (appendix 7).

2. Sport Fishing

Impacts to the sport fishing activities in the area of P 0205 will be minor and of short duration.

3. Shipping

Wells P 0205 No. 3 and No. 4 share the same surface location which is within the northern buffer zone of the northbound lane of the Vessel Traffic Separation Scheme. Permitting of the site in marine navigational waters must also be approved by the U. S. Coast Guard.

A recent report prepared by the National Maritime Research Center, through a grant by the California Coastal Commission, studies potential risks from placing fixed structures near navigational traffic lanes in the Santa Barbara Channel. This study concluded that there would be a risk to navigation in certain cases defined in the study where fixed structures exist in a gated configuration. Their recommendation was that "If a permanent structure is positioned within 1,000 meters of the nearest lane boundary, no structure should be erected on the opposite side of the traffic lane within 1,000 meters of the opposite boundary for a distance of 2 nautical miles in either direction along the lane from the initial structure." (See U. S. Department of Commerce, 1981).

The placement of the well site within the northern buffer zone eliminates the possibility of a "gated" configuration since no structures are either located on the opposite side of the lane or within 2 nautical miles of P 0205 No. 3.

The U. S. Coast Guard, which has authority and expertise over marine navigational safety has reviewed the location for Lease OCS-P 0205.

A meeting was held by Chevron and the Coast Guard and attended by the USGS and CCC on October 26 to discuss specific location requirements. In addition to the Class "A" aids to navigation and notification requirements, no buoys will be allowed in the traffic lanes or buffer zones and any anchor cables which extend beneath the lane must be at least 125 feet below the surface. Special markings and lights will be required for all buoys marking the anchoring system. (See the U. S. Coast Guard's comments in appendix 7.) In addition, a 24 hour radar watch with VHF radio capability will also be required.

4. Military Uses

There will be no anticipated impact from this project on military activities as this lease does not lie within a use-designated area. Proper notification and coordination will be required if the nature of military activities changes in this region.

5. Cultural Resources

There are no known cultural resources in the area of the proposed project. If an object of cultural importance is found during preparation for or during drilling operations, measures to protect the resource would be evaluated by the USGS and implemented.

6. Flora and Fauna

Impacts on the flora and fauna posed by normal drilling operations on Lease OCS-P 0205 will be localized and of a temporary nature. Some sessile organisms will be impacted as a result of deposition occurring during the discharge of drilling muds and cuttings. Increased turbidity in the localized area of the project may temporarily affect other benthic and nektonic organisms.

A short term disruption of normal migration or marine mammal and seabird foraging patterns may also result. None of the above potential impacts are considered significant. To date there has been no known significant disruption to biological communities as a result of normal exploratory drilling operations.

All practical measures to avoid impacting the marine biota will be taken. Pilots serving OCS lessees have been instructed to fly at 1,000 foot elevations, whenever possible, over California State Ecological Reservoirs, the Channel Islands Marine Sanctuary, and known pinniped breeding/haulout areas.

Impacts which may occur as a result of small or large oil spills are discussed in section III.F. "Accidents".

7. Socio-economics

The socio-economic impact associated with the proposed project is considered negligible. No unusual demand for goods or services will be expected, nor will any onshore support facilities be built or enlarged as a result of this project.

8. Accidents

Discussion of possible minor and major accidents is contained in section 4.G. of the ER and in Chevron's Oil Spill Contingency Plan which is on file in the Public Information Room of USGS in Los Angeles.

Oil Spill Accident

The actual impact of a hydrocarbon spill on the environment depends upon the magnitude and duration of the spill, season, weather, and oceanographic conditions.

Possible impacts are discussed in section 4.g.(3) of the ER and in other referenced documents. The toxicity of oil, the physical presence of oil film which serves to filter the sun's rays, and the tarry components which may adhere to marine animals, are factors which contribute to the impact of a spill in a marine environment. Water current and wind patterns are extremely variable in the area of the proposed project making the prediction of possible oil spill trajectories difficult. (See EIR/EA for Platform Gina and Gilda, 1980.)

Minor Oil Spill

Potential impacts resulting from a minor oil spill, i.e., an oil spill from a fuel reloading process or accidental discharge, are anticipated to be relatively minor. Equipment has been placed on board the drillship which can be readily deployed for clean-up of minor spills. Wind trajectories generally parallel the coastline and would carry the spill away from the coast or Channel Islands during most of the year. Indirect impacts to seabirds would result due to oiling of plankton and anchovy in the area of the spill. Mammals passing through the area may also be oiled, but the anticipated short-duration of this type of impact would minimize the overall impact to marine mammal populations.

Major Oil Spill

Though it is believed that the possibility of a major oil spill occurring from exploratory activities is remote, it is recognized that potential impacts from major oil spills would have both direct and indirect impacts. Spills of a very large size can potentially affect a large area and are difficult to completely clean-up.

The USGS feels the primary way to minimize impacts from major oil spills is to avoid the possibility of a spill during drilling. The risk of a spill can be greatly reduced through the use of state-of-the-art engineering design procedures and consistent personnel training, by employing maximum safety precautions, and by monitoring drilling activities regularly. The USGS Pacific OCS Orders and Notice to Lessees are updated and refined regularly to reflect state-of-the-art technology.

The effectiveness of the USGS regulatory and monitoring program is verified statistically by the infrequent occurance of oil spills in Federal waters. During an 8-year study period between 1971 and 1978, 7,553 new wells were spudded, and oil and condensate production amounted to 2.8 billion barrels. However, total blowout spillage was less than 1,000 barrels (Danenberger, 1980). No significant oil spill (over 238 bbls) has occured in OCS waters as a result of exploratory drilling activities.

Since P 0205 Nos. 3 and 4 are delineation wells of a known reservoir, it is more likely that the wells will penetrate oil reservoirs. However, this increase in probability of encountering oil is offset by the fact that the geology is well known due to information obtained by the drilling of previous exploratory wells. Hence, preparations based on knowledge of abnormal pressures, zones of circulation loss, and characteristics of producing reservoirs largely decreases the possibility of an accident. Blow-out preventer equipment located on the ocean floor will seal off the well should unusual pressures be encountered and well control be jeopardized. Additional test and safety precautions will be required as needed and the USGS will monitor activities throughout the drilling operations.

One of the more sensitive marine populations which could potentially be impacted by a major accident is the endangered brown pelican colony on Anacapa Island. Though wind currents generally parallel the coastline, a spill of large enough size could potentially move toward Anacapa Island. A major effort would be made to place booms and spill clean-up equipment to direct the spill away from sensitive areas such as Anacapa Island. (See the Oil Spill Contingency Plan.) Oil spill clean-up equipment is located in Port Hueneme and Carpinteria and could physically reach the site within 3 to 4 hours. Total response time also includes notification and deployment times.

The brown pelican population could be impacted both as a result of direct effects on individuals such as oiling of feathers or indirect impacts due to ingestion of oiled anchovies. Impacts on the fledglings, in particular, would be most noticeable since: (1) young up to one year of age are most vulnerable to starvation, (2) fledgings are most vulnerable to predation, (3) they congregate in large numbers on the rocks at the waters' surface, and (4) they spend a majority of their time in the water while learning to dive (Biological Opinion, 1981).

The FWS Biological Opinion (appendix 1) discounted arguments made by Chevron and Ralph Schrieber in 1980 regarding impacts to adult pelicans. It is the FWS's opinion that adult pelicans do not avoid oil behaviorially and that data from the Santa Barbara and San Clemente oil spills indicated that "large amounts of oil anywhere within the pelicans' range could cause significant damage at the wrong time of year." (See detailed discussion in the 1981 FWS Biological Opinion, appendix 1.)

Information from the FWS, California Department Fish and Game, and academic consultants agree that a major oil spill reaching Anacapa Island could have severe impacts on the fledgling population and would impact some number of adults as well. Historically, however, it can also be shown that the brown pelican population is fairly resilient and that a loss of fledglings in one year can be tolerated since the pelican has a life-span of approximately 20 years.

The Biological Opinion concluded that: "Since the possiblity of an oil spill occurring from exploration activities is minimal, it is my biological opinion that the leasing and exploration activities are not likely to jeopardize the continued existence of the brown pelican."

Other populations of seabirds and mammals would potentially be impacted from a major oil spill. See discusssion of impacts in the BLM Sale 68 DEIS Section IV.A.1. and in Chevron's ER, appendix 5.

H_2S Accident

The impact and minimization of an H_2S discharge is discussed in Chevron's H_2S Contingency Plan which is on file in the Public Information Room at USGS in Los Angeles. OCS Order No. 2 addresses USGS requirements for H_2S accident avoidance.

IV. Alternatives to the Proposed Action

One alternative to the proposed drilling of OCS-P 0205 Nos. 3 and 4 is disapproving the activity as proposed. Under existing law and terms the Department of Interior must respond to all legitimate Applications for Permit to Drill (APD's) on valid leases provided all terms and conditions are met. Specifically, in the case with P 0205, the USGS considers the information gained by drilling these wells to be important and extremely useful. Regulations within the USGS Conservation Division require that oil and gas fields be developed to maximize conservation of the resource through the strategic placement of platforms within the Unit. Determination of further development needs within the Santa Clara Unit depends upon the information to be obtained from these two wells.

As this environmental assessment has addressed in detail, normal operations do not present any significant impacts to the environment. Additionally, as demonstrated in Federal waters, the possibility of a major oil spill occurring from exploratory drilling activities is remote when proper drilling procedures are employed. Monitoring of activities and the availability of state-of-the-art clean-up equipment also minimize impacts which may result from the unlikely occurance of an oil spill.

In light of the need for domestic sources of oil and gas, and in consideration of the minor, short-term impacts posed to the environment by this proposed action, disapproval is not considered to be a viable alternative.

Another alternative is approving the activity subject to specific operating stipulations. One such alternative would be to relocate the proposed drill sites to different parts of the lease. However, in the case with P 0205, relocation of the well could serve to increase the potential for environmental impacts either by decreasing the ability to safely drill the well or by increasing potential navigational hazards.

Alternatives to the on-site disposal of oil-free drilling mud, drill cuttings, and cement are (1) disposal at a different ocean location or (2) disposal onshore. Considering the minimal impact of on-site disposal, and the increased engine exhaust which would result from the barging of these materials, these alternatives are not acceptable as long as on-site disposal is possible.

V. Unavoidable Adverse Environmental Effects

There are some unavoidable adverse environmental effects which will occur as a result of drilling the proposed exploratory wells. These include the following:

-- Short-term disturbance of bottom sediment;

-- Short-term increase in local turbidity, with associated effects on water quality and marine biota;

-- Minor short-term decrease in local (OCS) air quality;

-- Short-term preclusion of the area from competing uses such as commercial and sport fishing;

Additional adverse environmental effects which may occur include the following:

-- Possible temporary disruption of normal activities of marine mammals;

-- Possible disruption of use/activities and resources due to an oil spill;

All practical measures to eliminate, or at least decrease these adverse environmental effects, will be taken.

VI. Controversial Issues

Issues related to this project pertain to (1) necessity of placing the well site within the buffer zone of the VTSS, (2) potential impacts on the endangered brown pelican from an oil spill accident, and (3) air quality impacts.

The placement of the well site within the buffer zone has been discussed in several sections of the EA. Chevron has demonstrated the need to drill from this surface location to both the U. S. Coast Guard and the U. S. Geological Survey's satisfaction.

Potential impacts on the brown pelican have been discussed in detail in section IV.6, 8 and appendix 1. The USGS believes that the possibility of a major oil spill resulting from exploratory activities is remote. The FWS has also determined that the activity proposed on Lease OCS-P 0205 does not jeopardize the existence of the endangered brown pelican (appendix 7).

Discussion of air quality impacts was covered in section IV.A. This project does not exceed the DOI air quality regulations and cumulative impacts are determined not to be significant.

VII. Finding of No Significant Impact (FONSI)

The USGS has examined the impacts of the proposed action, up to two exploratory wells on OCS-P 0205 in the preceding pages of the Environmental Assessment. The following summary shows the evaluation of these impacts against each of the parameters listed for "significance" in 40 CFR 1508.27 and the background impacts references for our reasons for determining the no-impact or no-significant-impact category.

Key
NI - No impact
NS - No significant impact

CEQ Parameter 40 CFR 1508.27(b)	Severity of Impact Level/Degree of Significance	EA Section Reference
1. Beneficial and/or adverse effects.	NS	Section V
2. Public health & safety.	NS	Section III
3. Unique characteristics of the geographical area.	NS	Section II, III
4. Effects highly controversial.	NS	Section VI
5. Highly uncertain effects or unique or unknown risks.	NS	Section I
6. Establishes precedent for future actions or is a decision in principle about future action.	NI	
7. Assessment of cumulative actions and impacts thereof. Note 400 CFR 17.	NS	Section III, V
8. Effect on districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural historical resources.	NI	Not Applicable
9. Effects on endangered or threatened species or their habitat that have been determined to be critical under the Endangered Species Act of 1973.	NS	Section III
10. Threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.	NI	Not Applicable
11. Other related NEPA and environmental documents.		Cover sheet, Section II, IX

VIII. Environmental Assessment Determination

In my opinion, approval of Chevron's proposed action involving the drilling of up to two exploratory wells on OCS-P 0205 described in this Environmental Assessment, does not constitute a major Federal action significantly affecting the quality of human environment in the sense of NEPA Section 102(2)(c). In rendering this opinion, I have given special consideration to 30 CFR 250.34-4 (compliance with NEPA).

Gerald D. Rhodes 10-30-81

Gerald D. Rhodes
Acting Deputy Conservation Manager
Field Operations, Pacific OCS Region

Date

I determine that preparation of an Environmental Impact Statement is not required.

Reid T. Stone 10-30-81

Reid T. Stone
Regional Conservation Manager
Pacific OCS Region

Date

IX. References

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USGS/City of Oxnard, 1980. Environmental Assessment/Environmental Impact Report for the Union Oil Company Platform Gina and Platform Gilda Project, offshore Ventura County, California, Volumes 1 to 4. Dames & Moore, Santa Barbara, CA.

Also, see references cited in Chevron's Environmental Report, the cover page of this Environmental Assessment and the appendices.

X. Appendices

Appendix 1 - Opinions from U. S. Fish and Wildlife Service and National Marine Fisheries Service.

Appendix 2 - Cultural Resource Surveys - See Appendix 2 of Chevron's Environmental Report.

Appendix 3 - Contingency Plans - The H_2S and Oil Spill Contingency Plans are on file in the Public Information Room, USGS, Los Angeles.

Appendix 4 - Maps and Diagrams - See text of ER and POE (appendix 5).

Appendix 5 - Nonproprietary Copy of the Plan of Exploration (POE) and Environmental Report (ER).

Appendix 6 - Input from USGS Deputy Conservation Manager, Resource Evaluation.

Appendix 7 - Review Comments and Related Correspondence from Other Agencies and/or the Public.

APPENDIX 1

FWS Biological Opinion for Oil and Gas Leasing
in the Santa Barbara Channel
NMFS Biological Opinion for Oil and Gas Leasing
in the Santa Barbara Channel

USGS

ADDRESS ONLY THE DIRECTOR
FISH AND WILDLIFE SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

RECEIVED

In Reply Refer To:
FWS/OES BLM/GS 81-1

APR 29 1981

APR 29 1981

OFFICE OF THE DIRECTOR
BUREAU OF LAND MANAGEMENT

Memorandum

To: √Director, Bureau of Land Management
Director, U.S. Geological Survey

From: Associate Director

Subject: Section 7 Biological Opinion, Proposed Outer Continental Shelf Oil and Gas Leasing and Exploration in the Southern California Bight (OCS Sale No. 68)

By memorandum of January 13, 1981 (copy attached), the Bureau of Land Management (BLM) and the U.S. Geological Survey (GS) requested joint formal consultation on the proposed leasing of the Southern California Outer Continental Shelf (OCS) for oil and gas exploration as indicated in the 5-Year Leasing Schedule released in June 1980. The proposed lease sale in the Southern California Bight (SCB) region is Sale No. 68. This consultation includes all existing OCS activities, Sale No. 68 activities pertaining to OCS oil and gas leasing and exploration in the area of southern California from Point Conception south to the U.S./Mexico border and additional OCS sales anticipated for this area through 1984. In May 1978, the GS requested a formal Section 7 consultation and on November 1, 1979, received a biological opinion on a previous SCB Lease Sale (Sale No. 48).

In response to your request, a consultation team was appointed by memorandum of February 6, 1981 (copy attached), to assist me in determining whether the proposed OCS sale and subsequent exploration are likely to jeopardize the continued existence of species which are federally listed as Endangered or Threatened or result in the destruction or adverse modification of Critical Habitat.

On February 17 and 18, 1981, the Fish and Wildlife Service (FWS) consultation team met with your representatives and representatives from the National Marine Fisheries Service (NMFS) to discuss the proposed leasing and exploration (see attached attendance list). Through prior correspondence between the FWS and the Pacific OCS Office (POCS), it was determined that the listed species which may be affected by the proposal and that fall under the jurisdiction of the Department of the Interior are as follows: southern sea otter (*Enhydra lutris nereis*), brown pelican (*Pelecanus occidentalis*), California least tern (*Sterna albifrons browni*), American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), California condor (*Gymnogyps californianus*), light-footed clapper rail (*Rallus longirostris levipes*), Santa

Barbara song sparrow (Melospiza melodia graminea), San Clemente sage sparrow (Amphispiza belli clementeae), San Clemente loggerhead shrike (Lanius ludovicianus mearnsi), Island night lizard (Klauberina riversiana), Palos Verdes blue butterfly (Glaucopsyche lygdamus palos verdesensis), El Segundo blue butterfly (Euphilotes [=Shijimiaeoides] battoides allyni), San Clemente broom (Lotus scoparius ssp. traskiae), San Clemente Island bush-mallow (Malacothamnus clementinus) San Clemente Island larkspur (Delphinium kinkiense), San Clemente Island Indian paintbrush (Castilleja grisea), salt marsh bird's beak (Cordylanthus maritimus ssp. maritimus), and Critical Habitat for the American peregrine falcon, California condor, and the Palos Verdes blue butterfly.

There are no proposed species in the project area. After reviewing the proposed activities and biological data on the above species, we have determined that the following species will not be affected because they are outside the area expected to be impacted by the proposed oil and gas leasing and exploration activities: the California Condor and its Critical Habitat, San Clemente loggerhead shrike, San Clemente sage sparrow, San Clemente broom, San Clemente Island bush-mallow, San Clemente Island larkspur, San Clemente Island Indian paintbrush, and the Island night lizard. Because they will not be affected, they were not considered in this consultation.

There is general agreement among ornithologists who have searched for song sparrows on Santa Barbara Island during the breeding season that the Santa Barbara song sparrow is extinct. Therefore, the Santa Barbara song sparrow is not considered in this consultation. Should new information indicate that this species may occur on Santa Barbara Island, Section 7 consultation will be required if a "may affect" determination is made.

The consultation team reviewed numerous reports, publications, and other information including the Final Environmental Impact Statement for Sale No. 48 and the draft Oilspill Risk Analysis (OSRA) for the Southern California (Proposed Sale No. 68) Outer Continental Shelf Lease Area, GS Open File Report 80. On February 19, 1981, a member of the consultation team met with Frank Gress and Dan Anderson in Davis, California, to discuss oil and gas leasing, exploration, and development in the SCB relative to the listed brown pelican. In addition, numerous telephone contacts were made with knowledgeable experts. Copies of pertinent reports, documents, and records are maintained in an administrative record at the Office of Endangered Species (OES) and are incorporated by reference in this opinion.

Project Description

BLM acts as the Secretary of the Interior's agent in arranging for and processing bids on offshore oil and gas lease sales. After the issuance of the leases, GS assumes the authority to administer the lease areas. Among other things, this includes the approval of exploratory and development/production plans submitted by the lessee.

As per your January 13, 1981, request for a regional consultation on the OCS oil and gas program in the SCB, this biological opinion considers all existing operations pertaining to oil and gas leasing and exploration in the offshore area from Point Conception south to the U.S./Mexico border and the planned OCS Sale No. 68, and additional sales anticipated in this area through June 1984. Although this consultation considers the proposed sales through June 1984, BLM and GS should remain in close contact with OES to insure that new circumstances which may develop do not impact listed species and that agency obligations to conserve listed species are effectively met. OES concurs with BLM's contention that future sales proposed for this region constitute new information and that formal consultation should be reinitiated at the appropriate time. Should new species be listed which may be affected, this consultation should be reinitiated. In addition, BLM and GS are required to confer with OES if species which may be impacted by OCS activities are proposed for listing as Endangered or Threatened.

Lease Sale No. 68 consists of 218 blocks with a total area of about 1,112,975 acres (445,190 hectares), to be offered for lease in June 1982. BLM has indicated that a reduction in the number of tracts offered in Lease Sale No. 68 can be expected before the actual sale takes place. Included within such a reduction would be 11 complete tracts and portions of 26 others which are contained within the Channel Islands National Marine Sanctuary because leasing would conflict with the sanctuary status. However, in the March 30, 1981, Federal Register (46 FR 19227), the National Oceanic and Atmospheric Administration (NOAA) published a Notice of Deferral regarding regulations which would prohibit hydrocarbon development within the Sanctuary, pending reconsideration in accordance with Executive Order 12291. Oil and gas activities within the Marine Sanctuary near Anacapa Island would increase the degree of threat from oilspills to brown pelicans breeding on the Island.

The tracts being offered for lease comprise three subareas: the Santa Barbara Channel containing the Western and Eastern Santa Barbara Channel; the Inner Banks containing the Anacapa Area, Santa Monica Basin and the San Pedro Area; and the Outer Banks containing the area south of Santa Rosa Island, San Nicholas Basin, Dall Bank, Southeast Tanner Bank and Santa Tomas Knoll. The tracts range from Point Conception to south of San Clemente Island and lie in waters from about 150 to 4,900 feet (46 to 1,500 meters) deep. The tracts are no closer than 3 statute miles from shore and range seaward to 84 miles. A draft Environmental Impact Statement (EIS) on this proposed Sale is scheduled for publication in May 1981, with a final EIS scheduled for release in November 1981.

Exploration of the OCS requires certain onshore support facilities including office space, helicopter and/or fixed-wing aircraft facilities, docks for boating activities, and supply bases. Due to the uncertain nature of oil exploration, companies are generally unwilling to construct new facilities to support exploration activities and usually prefer to utilize existing areas and facilities. At present, the numerous onshore facilities in southern California which are being used for Sales Nos. 35, 48, and other exploration activities will support any proposed new exploration.

There is a possibility of oilspills occurring during the exploratory phase of OCS activity. Spills may be from two sources: 1) small spills which occur during the handling of fuel oil, and 2) blowouts of exploratory wells. The first source is minor and is not expected to result in any noticeable increase in oil pollution. Therefore, this impact is considered negligible. A blowout, however, can cause the release of significant amounts of hydrocarbons into the marine environment and may affect listed species. The Campeche, Mexico, oilspill is a dramatic example of an exploration blowout. While the exact causes of the Campeche blowout are likely to remain unknown, it appears that operational procedures, rather than technology, were at the root of the accident. It is thought that this spill could have been avoided had operating procedures used in the United States been employed.

In the United States, OCS Operating Orders require that a number of safety devices and procedures be employed to prevent such an accident. These include the use of blowout preventers, strict drilling procedures, regular testing of safety equipment, training of personnel, regular inspection by GS personnel, and approval by GS of all drilling plans and modifications. According to statistics compiled by GS, the probability of a blowout occurring during exploration in the offshore waters of the United States is remote.

This biological opinion considers all existing OCS operations pertaining to oil and gas, the leasing and exploration phases of planned OCS Sale No. 68, and proposed sales in the SCB area through June 1984 and assumes that existing onshore facilities will continue to be utilized for exploration activities. Should the use pattern of these facilities be changed or additional onshore facilities be required which may affect listed species or their habitats, you must reinitiate consultation. Development and production phases are included only in an advisory and cumulative sense. Should exploration activities reveal the presence of significant amounts of hydrocarbons, this consultation must be reinitiated prior to entering the development and production phases of OCS activities.

BIOLOGICAL ACCOUNTS

Accounts of the biological information considered in this biological opinion follow:

American Peregrine Falcon (*Falco peregrinus anatum*)

The American peregrine was listed as Endangered on June 2 and October 13, 1970, and a portion of the peregrine's Critical Habitat was designated in the August 11, 1977, *Federal Register*. This subspecies once occurred widely throughout much of North America from southern Alaska and Canada, to northern Mexico. This peregrine is migratory in the northern portion of its breeding range, but exhibits less migratory behavior toward the southern portion of its range. In California, the species once occurred throughout the State where cliff faces and steep rocky slopes provided suitable nesting locations. The mountains, sea coast, and Channel Islands historically harbored significant populations.

The principal cause of the peregrine's decline has been contamination by chlorinated pesticides. Other factors contributing to the birds' decline include shooting, predation, egg collection, disease, falconers, human disturbance at nesting sites, collisions with power lines, and loss of habitat due to human encroachment. There were 39 known nesting pairs of peregrine falcons in California in 1980, up from 31 nesting pairs in 1979. The increased numbers of known breeding pairs are due to increased observation efforts and a probable limited increase in the population. It is estimated that 50 to 60 pairs of peregrine falcons presently occur in California.

Several historic eyries are located along the coast from Point Conception south to the Mexican border. At present, however, there are no known active sites south of the eyrie at Morro Bay. Considerable effort is currently being expended toward recovery of this species, chiefly through captive propagation and reintroduction. The Channel Islands include several sites where reintroduction efforts may eventually be made. Natural expansion of American peregrines is anticipated with the decreased usage of residual pesticides.

Three potential sources of impact to peregrine falcons may occur from OCS leasing and exploration activities in southern California: disturbance to eyrie sites resulting from development of onshore facilities and increased human activity, the possibility of an oilspill reaching the coast and contaminating its food sources, and the possibility of a falcon coming in contact with oil and contaminating its eggs. The diet of peregrine falcons is almost exclusively birds, and like most raptors, the peregrine is an opportunistic feeder. Birds such as ducks and shorebirds which become contaminated as a result of an oilspill would be compromised in their ability to fly and to avoid capture. Oiled birds would be easy prey for the peregrine falcon, which might suffer potentially lethal effects from consuming petrochemically contaminated prey.

Dr. F. Prescott Ward, Ecology Branch, Department of the Army, captured and released an oiled peregrine in the course of his peregrine falcon migration study at Chincoteague National Wildlife Refuge (NWR) in Virginia. The bird was subsequently encountered a total of 36 times by Dr. Ward, during which time the effects of oiling on the peregrine were documented. Generally, feather wear was quite dramatic, as feathers became matted and eventually were worn or broken. This condition likely compromises the flight and predatory capabilities of the peregrine, thereby reducing the likelihood of survival.

Presently, the threats to peregrine falcons from oil and gas activities in the SCB are minimal. As true migration probably does not occur with the American peregrine falcon in southern California, and the Arctic peregrine falcon (Falco peregrinus tundrius) is considered a rare migrant along the Pacific coast, there would not be a seasonally susceptible influx or concentration of peregrines in the SCB. In addition, the BLM and GS have determined that the probability of a spill occurring during exploration activities is minimal.

Therefore it is my biological opinion that the proposed leasing and exploration activities in southern California are not likely to jeopardize the continued existence of the American peregrine falcon, and as its Critical Habitat is not in the project area, it is not likely to result in the destruction or adverse modification of the Critical Habitat.

However, the Service would like to alert the BLM and the GS to the possibility of future releases of peregrine falcons in southern California, particularly in the Channel Islands area. The Draft Recovery Plan indicates an intent to establish a minimum of five pairs of peregrine falcons on the Islands, probably by hacking (a modified version of the falconer's technique for training raptors for release into the wild). Should this recovery effort be initiated, the BLM and GS would be required to reinitiate Section 7 consultation if it is determined that OCS activities may affect the peregrine falcon.

California Least Tern (Sterna albifrons browni)

The California least tern was listed as Endangered in the Federal Register on October 13, 1970. Critical Habitat has not yet been designated for this subspecies. The least tern migrates from Mexico each spring to establish breeding colonies on the California coast. From April to September it occupies coastal habitats between the Pacific coast of Baja California and the San Francisco Bay.

The least tern usually chooses a nesting location in an open expanse of sand, dirt, or dried mud close to a lagoon or estuary where food can be obtained. Prey consists of small fish such as the northern anchovy, deepbody anchovy, jacksmelt, topsmelt, California grunion, shiner surfperch, California killifish, and mosquitofish. The reduction in numbers of least terns has resulted from the loss of feeding and nesting habitats and disruption of nest sites by human-associated activities.

Potential threats to the California least tern from oil and gas activities are related to oilspills and increased human activities in coastal areas where nesting colonies occur. The birds could be contaminated by a spill as they dive for food. This may contribute to direct mortality or result in reduced hatchability of eggs oiled from the fouled plumage of an adult bird. Toxicology studies have indicated that even small amounts of oil applied to an egg are toxic to the embryo. Oilspills cause severe damage when they enter coastal wetlands, and could contaminate prey species and/or their habitat thus destroying essential feeding areas for the terns.

As onshore development is expected to be limited to existing facilities during the exploratory phase, no disturbance to least tern habitat is expected to occur as a result of leasing and exploration activities. In addition, the probability of a spill occurring during exploration activities is remote.

Therefore, it is my biological opinion that leasing and exploration activities are not likely to jeopardize the continued existence of the California least tern.

To assist GS in implementing its responsibility for the conservation of the species, the following recommendation is given: GS should require that all

Oilspill Contingency Plans include provisions for the deployment of adequate containment equipment into the areas listed as essential habitat in the California Least Tern Recovery Plan. The necessary equipment must be located so that it can be onsite and deployed within 2 hours to protect least tern areas that are threatened by a spill.

The areas identified in the California Least Tern Recovery Plan as essential habitat for least terns are: Mission Bay; Sweetwater Marsh Complex; Tijuana River Estuary; South San Diego Bay; North San Diego Bay; Los Penasquitos Lagoon; San Diequito Lagoon; San Elijo Lagoon; Batiquitos Lagoon; Aqua Hedionda Lagoon; Buena Vista Lagoon; Santa Margarita River; Santa Ana River; Anaheim Bay/Huntington Harbor; San Gabriel River/Alamitos Bay; Harbor Lake; Terminal Island; Playa del Rey; Mugu Lagoon; and Ormond Beach. Maps of these areas were included in the November 1, 1970, biological opinion to GS.

Palos Verdes Blue Butterfly (*Glaucopsyche lygdamus palosverdesensis*)

The Palos Verdes blue butterfly was listed as Endangered in the *Federal Register* on July 2, 1980. The three localities on the Palos Verdes Peninsula (Los Angeles County) where the only known populations occur are designated as Critical Habitat.

This butterfly was once known from four restricted localities on the Palos Verdes Peninsula. The Palos Verdes blue butterfly has been extirpated from one area due to housing development, and two other localities have been adversely affected by weed control practices that threaten the coastal chapparal colonies of *Astragalus trichopodus leucopsis* (the butterfly's only host plant). The rototilling of weeds for fire prevention and other similar land management practices, in addition to housing development and increased recreational use (especially at one locality that has been designated a city park) threaten the continued existence of the Palos Verdes blue butterfly.

As onshore development during the exploration phase is expected to be limited to existing facilities, no disturbance to the Palos Verdes blue butterfly's Critical Habitat is expected to occur as a result of leasing and exploration activities.

Therefore, it is my biological opinion that the leasing and exploration activities are not likely to jeopardize the continued existence of the Palos Verdes blue butterfly or result in the destruction or adverse modification of its Critical Habitat. However, any activity authorized, funded, or carried out by a Federal agency, particularly activities associated with OCS development and production, will require Section 7 consultation if the Palos Verdes blue butterfly and/or its Critical Habitat may be affected.

Light-footed Clapper Rail (*Rallus longirostris levipes*)

The light-footed clapper rail was listed as Endangered in the *Federal Register* on October 13, 1970. Critical Habitat has not yet been designated for this subspecies. Historically, the clapper rail's range extended from Santa Barbara County, California, to San Quintin Bay, Baja California, Mexico. Currently, this subspecies probably occurs in 16 California marshes (from Goleta Slough in Santa Barbara County south to the Tijuana Estuary in San Diego County) and at least two marshes in Baja California. The distribution is markedly interrupted because of discontinuous habitat. Over harvesting may have occurred in some areas of the clapper rail's range, but reductions in populations can be attributed almost entirely to loss of habitat. It has been estimated that over 65 percent of its former habitat has been lost through reclamation of marshes, water diversion, restriction of tidal flow, and degradation by water pollution.

The light-footed clapper rail is found in saltwater marshes traversed by tidal sloughs, where cordgrass (Spartina foliosa) and pickleweed (Salicornia) are the conspicuous plants. Food consists of various invertebrates (crustaceans, mollusks and annelids) found in tidal coastal marshes.

Estimates now indicate a total population of about 250 birds on the basis of work in Santa Barbara and Ventura Counties at Anaheim Bay and at Tijuana Estuary. Through the efforts of the Light-footed Clapper Rail Recovery Team, a plan to stabilize this species through land acquisition and marsh management has been approved.

Potential threats from oil and gas activities could be from oilspills and increased human activities in the estuaries where existing rail populations occur. However, BLM and GS have determined that the possibility of an oilspill during leasing and exploration activities is remote, and it is expected that existing onshore facilities will be utilized during these phases of OCS activities.

Therefore, it is my biological opinion that the leasing and exploration activities are not likely to jeopardize the continued existence of the light-footed clapper rail.

To assist GS in implementing its responsibility for the conservation of the species, the following recommendation is given: GS should require that all Oil-spill Contingency Plans include provisions for the deployment of adequate containment equipment into the areas listed as essential clapper rail habitat. The necessary equipment must be located so that it can be onsite and deployed within 2 hours to protect clapper rail areas that are threatened by a spill. Those areas considered to be essential to clapper rails are: Mission Bay; Sweetwater River complex; Tijuana River Estuary; South San Diego Bay; San Diego River mouth; Los Penasquitos Lagoon; Upper Newport Bay; Anaheim Bay; Mugu Lagoon area; Carpinteria Marsh; and Goleta Slough. Maps of these areas were included in the November 1, 1979, biological opinion to GS.

El Segundo Blue Butterfly (Euphilotes [=Shijimiaeoides] battoides allyni)

The El Segundo blue butterfly is an insect endemic to the southern California coastal strand. This species was listed as Endangered in the Federal Register on June 1, 1976. Critical Habitat has not yet been designated for this species. This butterfly is limited to two small remnants of the once extensive El Segundo Dunes system (36 square miles) extending from the Los Angeles Airport to San Pedro, in Los Angeles County. Its current distribution is limited to dunes adjacent to the Los Angeles Airport and a small parcel of commercially owned land on the Chevron oil refinery in El Segundo.

The El Segundo blue is dependent upon coastal dune habitat which contains two species of buckwheat (Eriogonum ssp.) that provide the butterfly with nesting, feeding, and resting habitat. The conversion of this essential dune habitat to urban development threatens the continued survival of this species.

Onshore activities such as the expansion of refineries and the placement of pipelines present the greatest threat to the destruction of this species' habitat. Possible development scenarios for OCS Sale No. 68 identify a proposed offshore pipeline route for the Anacapa-Santa Monica Basin, with a temporary operational support base near El Segundo. There could be approximately 3 kilometers (2 miles) of buried onshore pipeline at El Segundo. Once the precise location of the above structures has been determined in future development plans, it will be necessary to reinitiate Section 7 consultation if a "may affect" determination is made.

However, since existing onshore facilities are to be used during OCS leasing and exploration, it is my biological that these phases of oil and gas activities are not likely to jeopardize the continued existence of this species.

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle was initially considered to have two distinct subspecies. The southern bald eagle was listed in the Federal Register as Endangered on March 11, 1967. The entire species was listed as Endangered in 43 of the conterminous 48 States (including California) and Threatened in the remaining five States on February 14, 1978. Critical Habitat has not been determined.

This large bird occurs from Alaska to northern Mexico, and lives in association with aquatic habitats such as lakes, large rivers, and estuaries. Historically the Channel Islands had a minimum of 24 nesting pairs of bald eagles. The birds were known to have nested on the Islands until the mid 1950's. The extirpation of nesting bald eagles on the Channel Islands was attributable to a number of causes. Tourists and sheepherders annually killed eagles. Egg collecting, and increased use of the Islands by tourists and residents, and sonic booms from military jet aircraft all contributed to the decline.

The possible role of DDT in the decline of the bald eagle on the Channel Islands is unclear. DDT was introduced into the southern California marine ecosystem in the late 1940's. It is generally accepted that DDE (a DDT metabolite) was the agent involved in the egg shell thinning and subsequent decline of the populations of brown pelicans and double-crested cormorants occupying the Channel Islands. It is possible that the reproduction of the remnant bald eagle population on the larger islands was impacted, thus dealing the final blow to the Channel Islands population.

In 1980, the Institute for Wildlife Studies (IWS), Arcata, California, released (translocated) six immature bald eagles from Washington State on Santa Catalina Island in an attempt to reestablish eagles on the Channel Islands. It is believed that five of the six birds have adapted to Santa Catalina, and the IWS has plans for the release of an additional six eagles in 1981 (and in subsequent years), pending receipt of the appropriate Federal Fish and Wildlife Permit. Ron Jurek, the Pacific Bald Eagle Recovery Team Leader, has identified the Channel Islands as the highest priority area for reestablishing bald eagles in California through translocation efforts.

The potential impacts to the eagle from oil and gas activities are disturbances to its nesting areas resulting from onshore activities, and the possibility of an oilspill reaching the coast and subsequently oiling the eagles and/or contaminating their food source. Oiled eagles returning to the nest could contaminate the eggs or nestlings. Toxicological studies have indicated that even small amounts of oil applied to an egg are toxic to the embryo.

No onshore oil and gas development is proposed for the Islands. Currently there are no eagles nesting on the Islands, although that is an objective of the translocation project. Further, it has been the observation of the IWS that eagles released on Santa Catalina Island are foraging heavily on feral pigs and goats (including carrion). This pattern of feeding behavior reduces the likelihood of negative impacts from oilspills, specifically the ingestion of petrochemically contaminated fish.

Therefore, it is my biological opinion that OCS leasing and exploration in the area is not likely to jeopardize the continued existence of the bald eagle in southern California. However, any activity or program authorized, funded, or carried out by a Federal agency, particularly activities associated with development and production, will require Section 7 consultation if the bald eagle may be affected. Should significant new information relative to the bald eagle become available, you must reinitiate Section 7 consultation.

Salt Marsh Bird's Beak (Cordylanthus maritimus ssp. maritimus)

Salt marsh bird's beak is an annual herb (15-30 cm high) with purple flowers, that inhabits the upper elevations of tidal salt marshes. Populations of bird's beak are associated with pickleweed (Salicornia) and salt grass (Distichlis) near elevations at and above high tide. The bird's beak was listed in the Federal Register as Endangered on September 28, 1978. Critical Habitat has not yet been determined.

Historically, this subspecies occurred from Carpinteria in Santa Barbara County south to San Diego County and Northern Baja California, Mexico. Today, distribution is restricted to the Sandyland Marsh (Carpinteria) in Santa Barbara County, Point Mugu in Ventura County, and the Tijuana River Estuary in San Diego County. Destruction of coastal salt marshes is the major factor responsible for the elimination of this wetland species.

The Carpinteria Marsh area and the Tijuana River Estuary are in public ownership; and since existing onshore facilities will be utilized, the potential for further destruction of the existing habitat of the bird's beak from OCS activities has been reduced. The probability of an oilspill reaching this species' habitat is minimal.

Therefore, it is my biological opinion that OCS leasing and exploration in the southern California area is not likely to jeopardize the continued existence of the salt marsh bird's beak.

To assist GS in implementing its responsibility for the conservation of the species, the following recommendation is given: GS should require that all Oilspill Contingency Plans include provisions for the deployment of adequate containment equipment into the Sandyland Marsh (Carpinteria), Point Mugu, and Tijuana River Estuary. The necessary equipment must be located so that it can be onsite and deployed within 2 hours to protect bird's beak habitat threatened by a spill.

Any activity or program authorized, funded, or carried out by a Federal agency, particularly activities associated with development and production, will require Section 7 consultation if the salt marsh bird's beak may be affected.

Southern Sea Otter (Enhydra lutris nereis)

The population of sea otters in California was listed as Threatened in the Federal Register on January 14, 1977 (42 FR 2968). Critical Habitat has not been determined for this species. The listing notice stated that "A major spill of oil from a tanker in the waters in the vicinity of the range of the southern sea otter is probably the most serious potential threat to these animals; and indeed, they are more susceptible to this problem than most species."

The historic range of sea otters extended from Morro Hermoso, Baja California, northward along the coast, becoming continuous with the populations now found along the Alaska Peninsula and westward. Historic abundance of otters in California was estimated at about 16,000 animals.

Sea otters were heavily exploited for their pelts by Russian and American fur traders from 1786 through the early 1900's. The California population of the sea otter was so depleted that it was thought to be extinct by the turn of the century. The "rediscovery" of the southern sea otter by the scientific community occurred in 1938 when a group of approximately 50 otters were observed near Bixby Creek, just north of Point Sur (Figure 1). The International Fur Seal Treaty of 1911 and California State laws enacted since 1913 established legal protection for the species by prohibiting the taking and possessing of sea otters. In 1941 the California Sea Otter Refuge was established to further protect the otter from being shot. The Marine Mammal Protection Act of 1972 and the Endangered Species Act (ESA) of 1973 have increased the legal protection of the California sea otter population.

The range expansion of the southern sea otter population from its nadir in 1914 to its occupied range in 1979 averages 1.80 miles per year southward and 1.06 miles per year northward. In the last 5 years, however, the southward expansion of range has averaged 4 miles per year. The current range extends along approximately 200 miles of coast between Soquel Point in Santa Cruz County, south to Oceano, San Luis Obispo County. A few wandering individuals have been sighted to the north and south of these range limits. Provided the population continues to increase, the population should eventually extend its range south to the Channel Islands and north beyond Point Ano Nuevo. At the current rate of expansion it is possible that the otter's range could reach Point Conception, the northern limit of Sale No. 68, in the next 12 to 14 years (1993-1995). This natural rate of expansion, would extend the range of the sea otter to include the Channel Islands Marine Sanctuary, by 1995. This timeframe is well within the production life of Sale No. 68, estimated to be from 1987 through 2006, and will be within the timeframe of future sales in this same area.

The California Department of Fish and Game (CDFG) has attempted to monitor sea otter population growth (Figure 2, Table 1 attached). Based on estimates of population size between 1940 and 1969, the average annual rate of increase was 5.4 percent. This rate of increase is comparable to that seen in Alaskan populations. A CDFG census in 1976 estimated the population to be approximately 1,760 animals. A similar census in 1979, estimated the population at 1443 individuals. Although this census was impaired by poor weather conditions, the best available data does not indicate a change in the population size. FWS biologists believe that the approximate size of the present population has not changed substantially since 1976, and probably numbers about 1800 animals. In comparison with open-ended populations in Alaska, the California population is growing at a rate slower than one would expect. There are three general explanations for this: (1) age-specific fecundity is different; (2) age-specific survival is different (including human-caused mortality); and (3) animals are being lost through emigration. It is not known which of the three theories, or which combination of them, is responsible for the slow rate of population growth.

The southern sea otter exhibits a dumbbell shaped distribution pattern along the California coast. The largest concentrations are located at the periphery of the range. These groups (fronts) are predominently composed of both breeding and non-breeding males. The size of frontal groups varies seasonally. Peak numbers occur in late winter and early spring. Breeding females, juvenile females, and dependent pups are principally distributed throughout the center of the range. Kelp beds die back in the winter and storms further reduce the remaining beds. Consequently, the concentrations of otters rafting in the remaining kelp beds become larger, and the distribution of otters tends to become more clumped during the winter.

Insulation from cold seawater is provided entirely by air trapped in the dense sea otter fur. They maintain a high metabolic rate which partially compensates for the lack of an insulation layer of subcutaneous fat. Otters consume about 25 to 35 percent of their body weight per day, and foraging occurs intermittently throughout each day. Sea otters consume a variety of invertebrate species. Sea urchins, abalone, rock crabs, and pismo clams appear to be selectively preyed upon whenever they are available. As areas are occupied for longer periods by sea otters, the availability of large invertebrates decreases and smaller species such as turban snails, kelp crabs, mussels, and octopuses are more readily consumed. Sea otters show a great capacity for adapting to the availability of prey in different habitats. A major factor limiting the sea otter's range of foraging is the availability of food. Southern sea otters rarely dive beyond 20 fathoms when foraging since most food species become more scarce at greater depths. The greatest abundance and diversity of food items occur in areas with rocky bottoms. This may account for the relatively slow rate of expansion that occurs in these areas. Conversely, the fastest rates of expansion tend to occur over areas with sandy bottoms.

Southern sea otters rarely emerge from the sea. When resting at sea, they often wrap themselves in kelp to remain stationary. In winter when kelp beds are reduced, they may raft some distance offshore without the benefit of kelp while waiting out a storm, but usually they seek the protection of sheltered coves. Sea otters are non-migratory, although seasonal movements of individuals within the constant range do occur.

An oilspill on the OCS could impact sea otters in several ways. The way in which sea otters are affected by oil is influenced by the type of oil spilled, weather conditions, physical geography of the area, type of local marine flora and fauna, previous exposure of the area to oil, exposure of the area to other pollutants, and treatment of the spill.

Direct contact with oil would mat the fur and decrease the otter's natural insulation against temperature loss, resulting in hypothermia and probable death of individuals. The effects of oiling sea otters was studied by Kooyman and Costa (1979). Their studies indicated that under certain conditions sea otters can sustain low levels of oil contamination when 20 percent or less of the body surface is oiled. Kooyman and Costa concluded that contamination of 30 percent or more of the body surface will probably result in death. These conclusions appear to be supported by the findings of other research specialists. Presently available data do not conclusively demonstrate the effects of low level oil contamination on sea otters.

The ability of sea otters to detect oil in their environment is unknown. It has been reported that otters may react to the repugnant odors of petroleum products and move to avoid them. However, over 100 sea otters died as a result of pollution around Paramushin Island when gasoline and diesel fuel spilled from a tanker that went aground at Vasil' Yeu Cape. Investigations have shown that sea otters in captivity will not avoid oil contaminated areas and even repeatedly enter such areas after initial exposure.

Constant grooming to maintain the insulating quality of their coat would result in the direct ingestion of some petroleum products. Ingestion of petroleum products may also occur while eating contaminated invertebrates. Geraci and St. Aubin (1979) report that ingested oil is potentially toxic to sea otters. Although long-term effects of ingestion are unknown, certain petroleum hydrocarbons are potent carcinogens.

The present range of the southern sea otter population is in close proximity to onshore human communities where offshore oil development and increased transportation is either underway or planned. With the increase in offshore oil development and tanker traffic, there exists an increasing possibility of oil contamination within the otter's range. However, the sea otter does not presently inhabit the area considered in this consultation. The prevailing wind and ocean current patterns offshore southern California indicate a remote possibility that hydrocarbons spilled in the SCB would travel north and impact any portion of the sea otter's present population. This suggests that oilspills from presently leased tracts in SCB and those proposed in Sale No. 68 are not likely to impact sea otters in their current range. Further, BLM and GS have determined that oilspills during OCS exploratory activities are a remote possibility.

Therefore, it is my biological opinion that the leasing and exploration activities are not likely to jeopardize the continued existence of the southern sea otter. Any activity or program authorized, funded, or carried out by a Federal agency, particularly those related to proposed onshore facilities and development/production related activities, will require Section 7 consultation if sea otters may be affected. When the sea otter migrates into this area, you must reinitiate Section 7 consultation.

Brown Pelican (Pelecanus occidentalis)

The California brown pelican was originally listed as Endangered on October 13, 1970 (35 FR 8320). To date no Critical Habitat has been designated for this species. The only regular breeding colonies of this subspecies on the U.S. Pacific coast are located on Anacapa Island and nearby Scorpion Rock. During the 1980 breeding season, pelicans nested and successfully fledged young at Santa Barbara Island for the first time since 1967. The breeding population is augmented from late July through early November by large numbers of pelicans which regularly disperse north from Mexican waters. These migrants are generally gone by early December. However, it has been recently determined that some pelicans from Mexico are regularly recruited into the Anacapa breeding population. Pelicans are rarely found far from salt water, or farther than 20-30 miles offshore. Their major food is small fishes, primarily northern anchovy (Engraulis mordax) which the pelicans capture near the surface by plunge-diving from the air.

During the late 1960's and early 1970's the Anacapa colony suffered catastrophic nesting failure due to DDT and its derivatives accumulating in reproducing adults. A Los Angeles sewage system receiving liquid wastes from a DDT manufacturing plant was discharging effluent into the California coastal marine environment. Subsequent disposal of these wastes in a sanitary landfill resulted in a sharp decline of DDT input into the sea from this sewage system. Thereafter, levels of these compounds decreased in brown pelicans, and while the fledging rate has continued to fluctuate, it has not dropped to the low numbers experienced earlier.

There is a lack of specific information available relative to the effects which an oilspill might have on the population dynamics and reproductive success of pelicans. Contrary to statements made by Chevron U.S.A., Inc. before the

California Coastal Commission (1980), pelicans do not avoid oil. Pelican mortality due to oil fouling in the Gulf of California has occurred on at least two occasions. The only known incident of significant numbers of pelicans being oiled was after a spill from the Navy vessel Manatee in August, 1973. Concentrations of light tar washed up on beaches from San Clemente south into Mexico. Twenty to 25 juvenile pelicans were found oiled. In contrast, no pelicans were reported oiled as a result of the January 1969, Santa Barbara oilspill. Judging only from the location of the spills, the results should have been reversed, but timing was the determinent factor in these cases. The San Clemente spill occurred in the late summer when large numbers of pelicans were dispersed throughout the area. The Santa Barbara spill occurred in the winter, following a severe storm, when relatively few pelicans were in the area and fewer still would have been far from shelter. The San Clemente spill indicates that large amounts of oil anywhere within the pelicans' range could cause significant damage at the wrong time of year. In 1980, the pelican breeding season in southern California was 6.5 months long.

Pelicans may be affected by oilspills through contamination of their plumage since they dive for food or drift on the water surface. This may contribute to direct mortality or result in reduced hatchability of eggs oiled from the fouled plumage of an adult bird. As young pelicans fledge, they often congregate in large numbers on the water surface near the colony or on rocks along the shore. Young pelicans do not at first range far from the colony. If an oilspill occurred during the breeding season and impacted pelican nesting islands, the effects would be detrimental to the young pelicans and likely cause some mortality. In the fall and winter months when pelicans are not breeding, the thousands of Mexican pelicans which join the California coastal birds are vulnerable to oiling as they plunge-dive for food extensively throughout the waters of the SCB.

In southern California, the abundance of the anchovy resource varies almost unpredictably from year to year. "Brown pelicans depend on anchovies; their reproductive rates and survival vary with variations in the availability of anchovies" (Anderson et al. 1980). Unfortunately, there is little data currently available identifying the impacts (if any) which oilspills may have on the anchovy resource and its consequent availability to pelicans. However, three major areas of concern are recognized; 1) an oilslick may obscure the ability of foraging pelicans to visually locate anchovies, 2) petrochemically contaminated anchovies ingested by pelicans may cause lethal or sub-lethal effects, and 3) should a reduction in anchovy biomass occur as a result of an oilspill, this decrease in the prey base available to pelicans would reduce the potential for recovery of this listed species.

Adult pelicans incubating eggs or tending young commonly feed near the colony particularly in the Santa Barbara Channel just north of Anacapa Island. The pelicans depend on nearby food resources (30-50 km) during that period of time when they are incubating eggs or caring for young. Oilspills impacting the waters near Anacapa Island (or any breeding colonies) may reduce the availability of anchovies in critical foraging areas during the breeding season. Adult pelicans would find it necessary to forage greater distances from the colony, thus subjecting the eggs and/or young to increased periods of exposure to the elements and predation.

Since existing onshore oil and gas facilities would be utilized, and the possibility of an oilspill occurring from exploration activities is minimal, it is my biological opinion that the leasing and exploration activities are not likely to jeopardize the continued existence of the brown pelican. However, any activity or program authorized, funded, or carried out by a Federal agency, particularly those related to proposed onshore facilities, development/production related activities, and any OCS activities within the Channel Islands Marine Sanctuary, will require Section 7 consultation.

In accordance with OCS Operating Order No. 7, the proper authorities must be notified in the event of an oilspill occurrence. To insure maximum protection to pelicans, we recommend that following an oilspill GS require that oil containment equipment be deployed to bays and estuaries that might be impacted and that are inhabited by brown pelicans.

Cumulative Effects Resulting From OCS Activities

Cumulative effects are considered to be the direct and indirect effects of actions that are interrelated or interdependent with the action under consideration. Indirect effects of the action under consideration are those that are caused by the activity and are later in time or farther removed in distance, such as the progression from leasing OCS tracts, to exploration and ultimate development/production of the hydrocarbon resources. Other actions will be considered interrelated with the action if they are all part of a larger action, and other actions will be considered interdependent if they do not have significant independent utility apart from the action that is under consideration. The various lease sales, exploration, and development/production activities conducted and/or authorized by BLM and GS offshore southern California are considered part of the total OCS program for southern California. Further, companies involved in the OCS program utilize the same onshore support facilities, helicopter and/or fixed-wing aircraft facilities, docks, supply bases, pipelines, etc., for different OCS sale activities and activities from different sales.

There are currently 23 oil refineries operating in the southern California area that at full capacity are capable of processing 1,365,420 barrels of oil per day. This means that during the probable 25-year life of the Sale 68 fields, 12.5 billion barrels of oil must be provided to fully utilize the existing refineries. Whatever is not produced in the area will have to be imported, and transported oil has historically posed a much higher oilspill risk than drilling and producing locally. GS estimates that during the 25-year period, 7.373 billion barrels of oil will be imported through Los Angeles harbor. California onshore production will contribute 2.6 billion barrels. California State Tidelands will contribute 720 million barrels. Existing Federal OCS leases in southern California will contribute 788 million barrels and Sale 68 leases will contribute 123 million barrels (assuming that the total amount of projected oil is found and produced).

The probability of oilspill occurrence is predicated on the fundamental assumption that realistic estimates of future spill frequencies can be based on past OCS experience. The assumption is made that spills occur independently of each other and that the spill rate is dependent upon the volume of oil produced or transported. Figures 3, 4, and 5 (attached) show the known proposed and existing lease tracts for southern California OCS Sales, and the transportation routes for both OCS oil and imported oil. Table 2 (attached) shows the transportation scenarios for the proposed and existing lease tract group.

GS utilized the above information in combination with the data available in their accident files, production records, and information on tanker accident rates obtained from the published literature, to derive the overall spill predictions shown in Table 3 (attached). Transportation scenario 2 oilspill estimates are slightly higher than scenario 1 as a result of increased use of tankers to transport the oil under scenario 2.

This data supports the determination that there is an existing high probability of an oilspill impacting southern California resources due to the existing State and Federal leases and the high level of imported oil required to support existing refineries (See Figures 4-8 attached). The OSRA predicts that Lease Sale No. 68 could represent a 4 percent increase in spill potential; that is, increase the most likely number of spills from 22 to 23.

Clearly, the major threat to brown pelicans (and other listed species) from oilspills results from existing leases and tanker traffic, and not from Sale No. 68 alone. To further amplify this point, one need only examine the OSRA data for Anacapa Island, the major brown pelican breeding colony in the SCB. The probability of an oilspill (over 1,000 barrels) occurring and striking Anacapa Island within 30 days, is 8 percent when considering proposed tracts in Sale No. 68 only (transportation scenario 1). The probability increases to 78 percent under the same circumstances when existing and proposed leases and tanker traffic are considered. It should be noted that for both of these cases, the probabilities are slightly higher under transportation scenario 2. This demonstrates the futility of recommending specific tract deletions from Sale No. 68 to minimize or reduce oilspill threats to brown pelicans. This problem for pelicans is further complicated with the knowledge that large amounts of oil anywhere within the pelicans' range (which includes the SCB) could cause significant damage to the species if spilled at the wrong time of year (see brown pelican species account).

An ill-timed oilspill could significantly impact and/or reduce the brown pelican population in southern California. But the pelican population has demonstrated a remarkable resiliency over the past 12 years. The Anacapa Island breeding colony recovered from reproductive catastrophies of 4, 1, and 7 young produced from 1969 through 1971, to fledge 1438 young in 1980. While the total number of birds fledged is encouraging, the number of young fledged per nest in 1979 and 1980 was only .78 and .67 respectively. This is still far below the estimated productivity of 1.0 young fledged per nest which is indicative of a stable population. The large number of young fledged is probably a result of immigration of breeding adults from Mexican populations. Recruitment from Mexican pelican populations might mitigate or diminish the negative impacts which an oilspill off southern California might have on pelicans occurring in this area. However, the Service is concerned about the cumulative oilspill risks/impacts to brown pelicans and other listed species from existing and proposed oil and gas activities in southern California. While development scenarios remain speculative pending the results of exploration activities, it is apparent that GS's current cumulative estimate of 23 oilspills (of over 1,000 barrels), approximately one spill per year, in the Lease Sale No. 68 area over the life of the sale, is a threat to pelican populations which occur in the SCB. Whereas a subsequent biological opinion regarding the effects of OCS oil and gas development/production in southern California is dependent upon the results of exploration activities, present GS estimates of the hydrocarbon resource and production scenarios indicate that future development/ production operations may be likely to jeopardize to the potential for recovery of the listed brown pelican.

No pelican losses from OCS activities off southern California or from nearby activities in the State tidelands have been reported to date, but development is just beginning in areas leased in previous OCS lease sales. Additional threats from OCS Sale No. 48 have been reduced by the withdrawal of tracts that were close to Anacapa Island. In addition to existing southern California OCS activities and proposed actions from Sale No. 68, two additional OCS Sales, Nos. 73 and 80, are scheduled for 1983 and 1984, respectively. The exact sale locations have yet to be determined, but should they occur in southern California, this would serve to further increase the cumulative impacts of OCS activities on listed species.

The Service would like to remind the BLM and GS of their continued obligation to conserve listed species throughout all phases of OCS activities. Although, for purposes of this consultation, only leasing and exploration actions relative to Sale No. 68 are considered, it is reasonable to conclude that leasing and exploration leads to the development and production of commercial deposits of hydrocarbons, and the inherent risks of oilspills. Therefore, we recommend that GS require the lessee to assign a high priority and prescribe specific measures for the protection of Anacapa Island, Scorpion Rock and Santa Barbara Island, in all Oilspill Contingency Plans submitted to GS for exploration (or development/production), and for activities that might result in substantially increased tanker traffic over the identified transportation routes. We further recommend that proposed pipeline segment T 17 be eliminated from all transportation scenarios. The OSRA estimates that oil spilled along this route has a 76 percent probability of striking Anacapa Island.

The FWS is encouraged to note that preferred transportation scenario 1 would utilize pipelines from platforms located in the Santa Barbara Channel and Santa Monica area to transport oil to shore. The inherent risks of transporting oil are reduced when using pipelines instead of tankers, thus the risks of oilspills to Anacapa Island are likewise reduced. The FWS urges BLM and GS to incorporate transportation scenario 1 into their future development/productions plans for Sale No. 68.

Currently, the range of the southern sea otter does not extend south of Oceano, San Luis Obispo County. This is approximately 50 miles north of Point Conception, Santa Barbara County, the northern limit for lease Sale No. 68. According to the information provided to the Service by BLM and GS, the sea otter (within its present range) will not be impacted by OCS activities in southern California. However, since 1977 the sea otter has expanded its range south by an average of 4 miles per year. Should this present rate of expansion continue, the sea otter would occur within the Lease Sale No. 68 area during the probable 25-year life of the Sale 68 fields. If the sea otter remains a listed species under the ESA, GS's present estimates of the hydrocarbon resource and production scenarios indicate that future development/production operations may be likely to jeopardize the continued existence of this listed species.

Advisory Statement

The FWS wishes to advise the BLM and GS of a number of activities presently taking place or proposed in the southern California area which may affect listed species. While the following projects/actions are not subject to this consultation, Federal agencies should take these activities into account during their planning process as they strive to accomplish their objectives and meet their obligations to conserve listed species.

1. The present controversy over the commercial fishery/brown pelican utilization of a common resource, the northern anchovy (*Engraulis mordax*), causes concern for the pelican's welfare. Brown pelicans depend on anchovies. Regurgitation studies at nesting colonies indicate that anchovies comprise 90-95 percent of the diet. Obviously, the management of these two species cannot be dealt with separately. Under the Fisheries Conservation and Management Act (FCMA) of 1976, responsible agencies are required to formulate management plans on all important commercial species of fish in order to insure optimum yield, with guaranteed perpetuation of that resource, and minimal impact to the rest of the system that contains that resource, i.e., to minimize the ecological effects of harvest. A major conflict is the multiple-use aspect of the resource: converting the anchovy resource to optimum yield to satisfy needs of all users (including wildlife).

The Anchovy Management Plan (1978) was one of the first management plans prepared under the FCMA. It was prepared by the Pacific Fisheries Management Council, a multi-agency group consisting of fishery biologists and fishery management specialists. In southern California the abundance of the anchovy resource varies almost unpredictably from year to year, but the plan attempts to provide a constant "forage reserve" for wild consumers of about 1 million tons (about one-fourth of maximum abundance) and only allows a proportion of the biomass over that forage reserve to be taken. The California Department of Fish and Game has developed computer capabilities for modeling anchovy populations given different harvest levels. However, one of the major weaknesses in the entire management and monitoring system seems to be the estimations of anchovy biomass and the need to incorporate much more data on the fish and wildlife consumers into the system.

made closest to the captive location have been most successful. While the Service has not identified a specific translocation site, for the southern sea otter, Friends of the Sea Otter, a private special interest organization, has indicated an interest in San Nicolas Island in the Channel Islands. This area is currently being studied under a Service Cooperative Agreement with the Center for Coastal Marine Studies, University of California, Santa Cruz. The broad objectives of this program are: a) to further assess the suitability of San Nicolas Island as habitat for the sea otter, b) to describe the structure and organizations of littoral and sublittoral communities at San Nicolas with the thought that this information will serve as baseline data with which to compare changes following the introduction or natural reestablishment of sea otters, and c) through detailed observational and experimental study, elucidate over time, specific mechanisms responsible for maintaining community structure.

The Channel Islands area may be determined to be the most appropriate translocation site for the sea otters. In this event, commercial and private fishing interests, in conjunction with petroleum development industries, would likely oppose any effort by Federal, State, and private conservation organizations to translocate sea otters to the Channel Islands area. However, with the increase in offshore oil development and tanker traffic, there exists the increasing probability of oil contamination within the otter's present range. Increased threats from oil contamination amplify the urgent need to establish a second population, thus diminishing the potential catastrophic effects of a large-scale oilspill on California sea otters. The BLM and GS should be aware of the possibility of a translocation into the southern California area, and cognizant of their responsibility to reinitiate Section 7 consultation should it be determined that OCS activities may affect the southern sea otter. Should a second population of sea otters be established, BLM and GS would be required to insure that their actions do not jeopardize the continued existence and recovery of this population of southern sea otters.

3. The Space Shuttle may generate over-pressures (sonic booms) detrimental to marine species in general and listed species in particular. There are particular environmental concerns for disturbances to nesting birds (unnatural flushing from the nest may cause egg breakage or subject nest contents to predation), habitat damage from sonic boom induced landslides, and actual physical damage to the inner ears of birds and mammals. The long-term nature of the Space Shuttle Program (through at least 1991) means that wildlife conservation problems will need to be anticipated early, monitoring will need to be continued and measures taken to eliminate the impacts where necessary.

4. Future projects to prevent beach erosion, dredging projects, and port improvement or expansions will cause environmental concerns which may impact coastal listed species.

5. The possible sitings of liquified natural gas and refinery facilities may impact listed species. Impacts could result from the location of the facility and also from the transportation routes associated with the movement of the gas or oil from the offshore area to onshore facilities.

6. The incidence of chronic oil pollution in southern California may impact listed species. There are estimated to be as many as 2,000 to 2,665 natural oil seeps off the Santa Barbara coastline. These seeps may be releasing as much as 670 barrels of oil per day into the marine environment. Estimates are not firm because the rate of seepage is not constant. The impact from these natural spills, together with the expected number of spills from existing and proposed oil and gas activities in southern California, compound the oilspill risks to listed species. This cannot be quantified due to the variable nature of both the seeps and spills.

7. Should the aforementioned Notice of Deferral from NOAA regarding regulations which would prohibit hydrocarbon development within designated Marine Sanctuaries be permanently accepted, the Anacapa Island brown pelican nesting colony might be threatened by offshore hydrocarbon development in much closer proximity than initially believed.

8. The State of California leases tracts within three nautical miles of the coast. These activities generate the placement of pipelines, increased crew boats/supply boats and helicopters servicing the rigs, possible construction of additional processing facilities, and increased tankering which may affect listed species.

Conclusion

Based on my consultation team's review of the above information and other information and data available to the Service, it is my biological opinion that the OCS leasing and exploration activities in the SCB are not likely to jeopardize the continued existence of the listed species considered herein or result in the destruction or adverse modification of their Critical Habitats. Should the use of facilities other than those currently being used for OCS activities be desired, consultation must be reinitiated if listed species may be affected. This biological opinion considers the effects of oil and gas leasing and exploration activities only. Once the results from exploratory activities are known and the specific development/production plans are available in satisfactory detail, BLM and GS must initiate Section 7 consultation if a "may affect" situation is determined and the Service will provide a biological opinion on the impacts of these phases of OCS activities on listed species. While the biological opinion on leasing and exploration indicates no jeopardy to listed species, the discussion throughout this opinion should serve as an early warning to BLM and GS of potentially significant problems to listed species should development and production be warranted. Based on the FWS's analysis of the data presently available and the current (and reasonably foreseeable future) status of listed species in the project area, there is reason to be particularly concerned for the continued existence of sea otters and brown pelicans. In facing these potential problems BLM and GS should be cognizant of their responsibilities under the Endangered Species Act to utilize their authorities for the conservation of listed species. I encourage BLM and GS to work closely with the Office of Endangered Species to overcome these potential problems and insure the continued existence of listed species.

If a new species which may be affected should be listed, or additional pertinent information becomes available, or the project description, as discussed above, is changed, Section 7 consultation must be reinitiated.

Ronald E Lambertson

Attachments

United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

In Reply Refer To:
FWS/OES 375.419
USGS 79-2

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GEOLOGICAL SURVEY
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LOS ANGELES

Memorandum

To: Director, U.S. Geological Survey

From: Acting Director

Subject: Biological Opinion Regarding Oil and Gas Exploration and Certain Development Activities in Southern California

On April 24, 1979, the Fish and Wildlife Service (FWS) sent a memorandum to the U.S. Geological Survey (GS) requesting initiation of consultation under Section 7 of the Endangered Species Act of 1973, as amended, for Outer Continental Shelf (OCS) oil and gas exploration, development, and production activities on tracts in the OCS Sale No. 35 area (Southern California). By memorandum dated May 18, 1979, (Attachment 1) GS requested consultation with the FWS and expanded the scope of the request to include all lease sale activities off Southern California not previously subject to Section 7 consultation.

In response to this request, I appointed a consultation team by memorandum dated May 30, 1979, (Attachment 2) to assist me in determining whether the subject exploration, development, and production activities off Southern California are likely to jeopardize the continued existence of Endangered or Threatened species or result in the destruction or adverse modification of Critical Habitat of such species.

The team was comprised of Nancy Sweeney, Brian Kinnear, Steve Tonjes, and David Watts, Office of Endangered Species, Washington, D.C.; and Ralph Swanson, Sacramento Area Office, FWS.

On June 5 and 6, 1979, the FWS consultation team and National Marine Fisheries Service (NMFS) representatives met with GS representatives in Los Angeles, California, to discuss the exploration, development, and production activities in Southern California and their impact on Threatened and Endangered species within the area. A list of the participants is attached (Attachment 3).

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The consultation team reviewed reports, publications, and correspondence from knowledgeable sources on the species considered in this consultation identified below, and numerous telephone contacts were made with other experts. Information contained in the Final Environmental Impact Statements (FEIS) for OCS Sales 35 and 48, Southern California, was carefully evaluated to ascertain the effects of the exploration activities on listed species and their habitats. In addition, development plans were reviewed for seven development tracts. Copies of pertinent records and documents are included in an administrative record maintained at the Office of Endangered Species and are incorporated herein by reference.

Project Description

GS has primary regulatory authority for exploration, development, and production activities in the OCS after the issuance of the leases by the Bureau of Land Management (BLM).

Exploration of the OCS requires certain onshore support facilities including office space, helicopter and/or fixed-wing aircraft facilities, docks for boating activities, and supply bases. Due to the uncertain nature of oil exploration, companies are generally unwilling to construct new facilities to support exploration activities and usually prefer to utilize existing areas and facilities. At present, the numerous onshore facilities in Southern California being used for exploration activities will support any proposed new exploration.

Therefore, the biological opinion is based on the assumption that existing onshore facilities will continue to be utilized for exploration activities. Should the use pattern of these facilities be changed or additional onshore facilities be required which may affect listed species or their habitats, GS must reinitiate consultation.

Development and production (development/production) activities planned for seven specific tracts are included in this consultation. In the future, GS will review each development/production plan to insure compliance with Section 7.

Development/production plans include the location for the platform placement, possible transportation routes (pipelines and/or barges, tankers), and identification of specific onshore facilities and their intended use, i.e. storage, refinement, etc. These plans have more specific information than do the exploration plans.

Your request for consultation included the following species: bald eagle (Haliaeetus leucocephalus), American peregrine falcon (Falco peregrinus anatum), southern sea otter (Enhydra lutris nereis), brown pelican (Pelecanus occidentalis), California least tern (Sterna albifrons browni), light-footed clapper rail (Rallus longirostris levipes), Aleutian Canada goose (Branta canadensis leucopareia), San Clemente loggerhead shrike

(Lanius ludovicianus mearnsi), San Clemente sage sparrow (Amphispiza belli clementae), Smith's blue butterfly (Shijimiaeoides enoptes smithi), San Clemente broom (Lotus scoparius ssp. traskiae), San Clemente Island bushmallow (Malacothamnus clementinus), San Clemente Island larkspur (Delphinium kinkiense), San Clemente Island Indian paintbrush (Castilleja grisea), olive Ridley sea turtle (Lepidochelys olivacea), green sea turtle (Chelonia mydas), loggerhead sea turtle (Caretta caretta), and leatherback sea turtle (Dermochelys coriacea).

After reviewing the proposed activities and biological data on the above species, we have determined that the following species will not be affected because they are not known to occur in the impact area from the proposed exploration and the specific development/production activities. They are the Aleutian Canada goose, San Clemente loggerhead shrike, San Clemente sage sparrow, Smith's blue butterfly, San Clemente broom, San Clemente Island bushmallow, San Clemente Island larkspur, and San Clemente Island Indian paintbrush. Therefore, they are not considered in this consultation.

The sea turtles listed above were also included in your consultation request. The NMFS has jurisdiction over Endangered and Threatened sea turtles while they are in the aquatic enviroment; they are under the jurisdiction of the FWS onshore. Since these four sea turtles have no known nesting sites within the proposed project area, we defer consultation to NMFS.

We feel that two additional species should be included in this consultation: El Segundo blue butterfly (Shijimiaeoides battoides allyni) and salt marsh bird's beak (Cordylanthus maritimus ssp. maritimus).

The following species are included in this biological opinion: El Segundo blue butterfly, bald eagle, American peregrine falcon, southern sea otter, California brown pelican, California least tern, light-footed clapper rail, and salt marsh bird's beak.

After evaluating the proposed activities and their effects on the following eight species, it is my biological opinion that these activities, as proposed, are not likely to jeopardize the continued existence of the species.

A summary of the biological data and considerations of the consultation team are provided for each of the eight species.

El Segundo Blue Butterfly (Shijimiaeoides battoides allyni)

The El Segundo blue butterfly is an insect endemic to the Southern California coastal strand. This species was listed as Endangered on June 1, 1976. Critical Habitat has not yet been designated for this species.

This butterfly is limited to two small remnants of the once extensive El Segundo Dunes system (36 square miles) extending from the Los Angeles Airport to San Pedro, in Los Angeles County. Its current distribution is limited to dunes adjacent to the Los Angeles Airport and a small parcel of commercially owned land on the Chevron oil refinery in El Segundo.

The El Segundo blue is dependent upon coastal dune habitat which contains two species of buckwheat (Eriogonum) that provide the butterfly with nesting, feeding, and resting habitat. The conversion of this essential dune habitat to urban developments threatens the continued survival of this species.

Onshore activities such as the placement of pipelines and the location of refineries, present the greatest threat to the destruction of this species' habitat. However, since existing onshore facilities are to be used, proposed oil and gas exploration or development/production activities are not expected to jeopardize the continued existence of this species.

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle was listed as Endangered in 43 of the contiguous 48 States including California, and Threatened in the remaining five States on February 14, 1978. Critical Habitat has not yet been determined for this species. This large bird occurs from Alaska to northern Mexico and lives in association with aquatic habitats such as lakes, large rivers, and estuaries.

Bald eagles nested on the Channel Islands until the mid 1950's. Reproductive failure, probably due to pesticide contamination of its food sources, and habitat losses have been the chief causes for the eagle's decline and present status. The reintroduction of the bald eagle to the northern Channel Islands is planned for the future. In addition, Santa Catalina is also being considered for eagle hacking within the near future.

Successful reintroduction of bald eagles to their former nesting range in California will result in the increased numbers utilizing coastal areas.

The potential impacts to the eagle from proposed oil and gas exploration and development/production activities are disturbance to its nesting areas resulting from onshore activities and the possibility of an oil spill reaching the coast and subsequently oiling the eagles and/or contaminating the food source. Oiled eagles returning to the nest to incubate could contaminate the eggs or nestlings. Toxicological studies have indicated that even small amounts of oil applied to an egg are toxic to the embryo.

Recent information indicates that bald eagles may be wintering on the Channel Islands. Since no onshore development is proposed for the Islands, the impacts from an oil spill to wintering eagles would be limited to the contamination of the eagle's food source or feather contamination of individual eagles.

However, the present concentrations of California's eagle population are located along inland lakes and rivers, and are removed from the impacts of coastal oil and gas development activities.

American Peregrine Falcon (Falco peregrinus anatum)

The American peregrine was listed as Endangered on June 2 and October 13, 1970, and a portion of the peregrine's Critical Habitat was designated in the August 11, 1977, Federal Register. This subspecies once occurred widely through much of North America from southern Alaska and Canada, to northern Mexico. This peregrine is migratory in the northern portion of its breeding range, but exhibits less migratory behavior toward the southern portion of its range. In California, the species once occurred throughout the State where cliff faces and steep rocky slopes provided suitable nesting locations. The mountains, sea coast, and Channel Islands historically harbored significant populations.

The species has suffered a drastic decline throughout its range primarily due to reproductive failure resulting from pesticide contamination of its avian prey. Currently, less than fifty known pairs remain in California and the species has been extirpated from the Channel Islands.

Several historic eyries are located along the coast from Point Conception south to the Mexican border. At present, however, only one active nest site, located west of Santa Barbara, exists along this reach of the coast. Considerable effort is currently being expended toward recovery of this species, chiefly through captive propagation and reintroduction. The Channel Islands include several sites where reintroduction efforts may eventually be made. Natural expansion of American peregrines is anticipated with the decreased usage of residual pesticides.

The falcons prey heavily upon coastal birds. The potential impacts on the American peregrine falcon from oil and gas exploration and development/production activities are identical to those on the bald eagle.

At this time, there are no proposals for new onshore facilities along the Southern California coast, particularly in the vicinity of Point Conception. Should additional facilities be proposed, GS must reinitiate Section 7 consultation. The Oilspill Risk Analysis, prepared by GS for the Southern California (Proposed Sale 48) Outer Continental Shelf Lease Area, arbitrarily divides the California coast into segments and projects the probability of oil impacting these segments from various offshore lease locations. According to this analysis,.the probability of an OCS related oil spill reaching the vicinity of the one active peregrine nest is less than ten percent. Since the Critical Habitat is outside of the area considered in this consultation, that habitat will not be destroyed or adversely modified by the proposal.

Transient American peregrines may be found in small numbers along the coast, especially during migration and winter periods. We recommend that the majority of the estuaries, bays, lagoons, and rivers have available cleanup equipment to close off these areas within two hours of a spill occurrence. This action would minimize the impact of the oil, should it reach the shore.

Southern Sea Otter (<u>Enhydra</u> <u>lutris</u> <u>nereis</u>)

The southern sea otter was listed in the <u>Federal Register</u> as Threatened on January 14, 1977. Critical Habitat has not yet been determined for this species.

Historically, the southern sea otter was found in relative abundance along the California coast. The principal population decreases resulted from commercial harvest by fur traders during the 1800's, and the population was brought to near extinction at the turn of the century.

In 1938, the southern sea otter was identified off Point Sur, California and that population has expanded to an estimated high of 1,856 individuals (1976 census) with a range between Point San Luis (San Luis Obispo County) to Ano Nuevo Point (Santa Cruz County). A few wandering individuals have been sighted to the north and south of these range limits. Provided the population continues to increase at the current census rate, it is presumed that the population will extend its range to the Channel Islands and mainland south of Point Conception. Because the area considered in this consultation is part of the southern sea otter's historical range, it will be considered in this consultation.

The southern sea otter is an opportunistic predator which forages in both the rocky and soft sediment communities, seldom ranging beyond the 20-30 fathom depth curve.

An oil spill could affect sea otters in several ways. When trying to determine these effects, the physical configuration and the amount of oil on the surface of the water must be considered. The oil is influenced by environmental factors including wind, waves, temperature, suspended sediments, and time. Direct contact with oil would mat the coat and decrease the otter's natural insulation against temperature loss. Constant preening to maintain the insulating quality of the coat would result in the direct injestion of some petroleum products. As stated in the DES for Sale No. 48, "Accidental exposure of two sea otters to a small but unknown amount of oil (probably diesel) in an experimental holding pool on Amchitka Island resulted in fur matting, progressively severe distress, emergence from the water, and death by exposure within several hours" (K.W. Kenyon, unpublished data). "The oil in this case formed a visible sheen comparable to that sometimes present in harbor areas where gulls appear unaffected by it."

The sea otter feeds on benthic organisms such as abalone, pismo clams, and urchins.

There are natural factors which affect the persistence of oil such as dilution, evaporation, photo-oxidation, sedimentation by adsorption on suspended particles and microbial degradation. Because of these factors, it makes it difficult to determine the effects of oil on benthic communities. Oil which settles to the bottom, depending upon the factors identified above, could kill benthic organisms by smothering the organisms or from its toxic effects.

In the event of an oil spill, another major effect on otters would be the local loss of food sources. The secondary effect would be the long term contamination of shellfish populations which may also result in the injestion of petroleum products by the sea otters.

The southern sea otter does not presently inhabit the area considered in this consultation. Should the otter move into this area during the life of these activities, GS must reinitiate Section 7 consultation to determine whether the ongoing activities are likely to jeopardize the continued existence of the sea otter.

California Brown Pelican (Pelicanus occidentalis californicus)

The California brown pelican was originally listed as Endangered on October 13, 1970. Critical Habitat has not yet been determined for this species. All subspecies of brown pelicans were listed on December 2, 1970.

The only regular breeding colonies of this subspecies in the United States are located on Anacapa Island and nearby Scorpion Rock. This nesting population is augmented from late July through early November by large numbers of pelicans which regularly disperse north from Mexican waters. These migrants are generally gone again by early December; however, it has been recently determined that some may be recruited into the Anacapa breeding population.

Pelicans rarely are found far from salt water, or farther than 20-30 miles offshore. They forage intensively in the Santa Barbara Channel. Their major food is small fishes (primarily anchovy), which they capture near the surface by plunge-diving from the air.

During the late 1960's and early 1970's, the Anacapa colony suffered catastrophic nesting failure induced by DDT and its derivatives accumulating in the reproducing adults. Following the ban on this pesticide, the fledging rate has continued to fluctuate widely but has not dropped to the low numbers experienced earlier.

Pelicans may be affected by oil spills through contamination of their plumage as they dive for food or drift on the surface. This may contribute to direct mortality or result in reduced hatchability of eggs oiled from the fouled plumage of an adult bird. Individual pelicans that have been found oiled have responded well to treatment.

In accordance with the Oilspill Risk Analysis, we have identified ten segments which contain habitats important to the listed species and are susceptible to damage from oil (Attachment 4). Of these ten, Anacapa, Segment 50, has the greatest projected likelihood of being hit by oil from the greatest number of sources (Attachment 5).

It is difficult to predict from oil spill probabilities what the effects of oil activities might be on Anacapa. The only known incident of significant numbers of pelicans being oiled was after a spill from the Navy vessel Manatee in August 1973. Concentrations of light tar washed up on beaches from San Clemente south into Mexico. Twenty to 25 juvenile pelicans were found oiled. In contrast, no pelicans were reported oiled as a result of the January 1969, Santa Barbara blowout. Judging only from location of the spills, the results should have been reversed, but timing was the determinant in these cases. The San Clemente spill occurred in the late summer, when large numbers of pelicans were dispersed throughout the area; the Santa Barbara spill occurred in the winter, just following a severe storm, when relatively few pelicans were in the area and fewer still would have been far from shelter. While the breeding grounds and feeding areas surrounding Anacapa Island are extremely vulnerable locations, the San Clemente spill indicates that large amounts of oil anywhere within the pelicans' range could cause significant damage at the wrong time of year.

No pelican losses from OCS activities off Southern California have been reported to date, nor from nearby activities in the State tidelands. Additional threat from OCS Sale 48 has been considerably reduced by the withdrawal of tracts that were close to Anacapa.

To assist GS in carrying out their responsibility for the conservation of the listed species, the following recommendations are given.

From Attachment 5, the following tracts, transportation routes, and pipeline routes indicate a high probability of an oil spill contacting Anacapa Island. Tracts leased before Sale No. 48: 166, 202, 203, 204, 205, 208, 210, 215, 216, 217, 233, 234, 240, and 241. Tracts leased in Sale No. 48: 337, 346, 347, and 361. Transportation Route: T6 and T7. Pipleline Route: L4 and L6.

We recommend that GS require the lessee to assign a high priority and prescribe specific measures for the protection of Anacapa Island in all Oil Spill Contingency Plans submitted to GS for exploration or development/production within the above listed tracts, and for activities that might result in substantially increased tanker traffic over the identified transportation routes.

In accordance with OCS Operating Order No. 7, the proper authorities must be notified in the event of an oil spill occurrence. We would like to insure maximum protection to Anacapa Island by further recommending that GS require the oil spill containment equipment, which is maintained on the invididual platforms, also be required to respond to a spill from another platform in the area.

California Least Tern (Sterna albifrons browni)

The California least tern was listed as Endangered in the Federal Register on October 13, 1970. Critical Habitat has not yet been designated for this subspecies.

The least tern migrates from Mexico each spring to establish breeding colonies on the California coast. It occupies coastal habitats from the Pacific coast of Baja California to the San Francisco Bay from April to September.

The least tern usually chooses a nesting location in an open expanse of sand, dirt, or dried mud close to a lagoon or estuary where food can be obtained. Prey consists of small fish such as the northern anchovy (Engraulis mordax), deepbody anchovy (Anchoa compressa), jacksmelt (Atherinopsis californiensis), topsmelt (Atherinops affinis), California grunion (Leuresthes tenuis), shiner surfperch (Cymatogaster aggregata), California killifish (Fundulus parvipinnis), and mosquitofish (Gambusia affinis). The reduction in numbers of least terns has resulted from the loss of feeding and nesting habitats and disruption of nest sites by human-associated activities.

Potential threats to the California least tern from oil and gas activities are related to oil spills and increased human activities in coastal areas where nesting colonies occur. The birds could be contaminated by a spill as they dive for food. This may contribute to direct mortaility or result in reduced hatchability of eggs oiled from the fouled plumage of an adult bird. Oil spills cause severe damage when they enter coastal wetlands, and could destroy essential feeding areas for the terns.

To assist GS in implementing its responsibility for the conservation of the species, the following recommendation is given. GS should require that the Oil Spill Contingency Plans include provisions for the deployment of adequate containment equipment into the areas listed below to prevent the entry of an advancing oil spill. The necessary equipment must be onsite, within two hours, on any of these areas that are threatened by a spill.

The areas identified in the Recovery Plan as essential habitat for least terns are: Mission Bay; Sweetwater Marsh Complex; Tijuana River Estuary; South San Diego Bay; North San Diego Bay; Los Penasquitos Lagoon; San Dieguito Lagoon; San Elijo Lagoon; Batiquitos Lagoon; Aqua Hedionda Lagoon; Buena Vista Lagoon; Santa Margarita River; Santa Ana River; Anahiem Bay/ Huntington Harbor; San Gabriel River/Alamitos Bay; Harbor Lake; Terminal Island; Playa del Rey; Mugu Lagoon; and Ormond Beach (Attachment 4).

Light-footed Clapper Rail (Rallus longirostris levipes)

The light-footed clapper rail was listed as Endangered on October 13, 1970. Critical Habitat has not yet been designated for this subspecies. Histori-

Today, distribution is restricted to the Sandyland Marsh (Carpinteria) in Santa Barbara County, Point Mugu in Ventura County, and the Tijuana River Estuary in San Diego County.

Destruction of coastal salt marshes is the major factor responsible for the elimination of this wetland species.

The Carpinteria Marsh area and the Tijuana River Estuary are in public ownership; and since existing onshore facilities will be utilized, the potential for further destruction of the bird's beaks' existing habitat from OCS activities has been reduced. The probability of an oil spill reaching this species' habitat is minimal.

Although the remaining populations of the salt marsh bird's beak are located inside protected estuaries and along the upper elevations of tidal salt marshes, the potential for inundation by an OCS related oil spill still exists.

In order to assist GS in carrying out their responsibility to conserve the listed species, it is recommended that GS require the necessary containment equipment be deployed to those three areas identified above within two hours of an oil spill. This requirement should be a part of the Oil Spill Contingency Plan for each exploration and development/production plan.

Development Plans

This consultation includes three existing development activities and four proposed development plans. A discussion of these development tracts follows:

The three existing development tracts are located in the Santa Barbara Channel (tracts 166, 240, and 241). The proposed development plans for tracts 188, 202, and 217 are also located in the Santa Barbara Channel. The remaining development plan (tract 300) is located south of Long Beach.

There are two platforms on tract 166—Hogan and Houchin--located five miles south of Carpinteria. These platforms are sending 4,600 barrels of oil per day via pipeline to existing facilities at La Conchita. Crew boats make two or three round trips a day from existing facilities at Carpinteria.

Another tract under development, tract 241, has three platforms sending 20,024 barrels of oil per day via existing pipeline to the Rincon facilities. These platforms require two to three crew boat trips a day from Carpinteria.

The third producing tract is tract 240, containing platform Hillhouse. This tract is located ten miles south of Summerland. The platform is serviced by two or three crew boats a day from Carpinteria. The 7,752 barrels of oil per day is transported by connecting pipeline to the tract 241 pipeline which goes to the Rincon facilities.

There are four proposed development plans being considered in this consultation. The first is a proposal for tract 217 for platform Grace. The estimated production is 16,000 barrels of oil per day by 1982. The tract is located 12 miles south-southwest of Rincon. It is proposed to connect this platform to the State platform Hope via pipeline, then to Carpinteria via existing pipeline. An additional pipeline proposal associated with this platform, is a 5.8 mile overland pipeline from Carpinteria south to Ventura. This pipeline is south of Carpinteria Marsh.

Tract 188 is located five miles south of Refugio Cove and platform Hondo will be placed on the tract. It is estimated that a production rate of 60,000 barrels of oil per day will be produced by 1982. The oil will be transported by pipeline to an offshore storage and transport (OS&T) vessel. This OS&T vessel will be located within the same tract. It is anticipated that two to three crew boat trips per day will originate from Carpinteria and two helicopter trips per week out of Ventura or Santa Barbara will be servicing this platform. From the OS&T vessel the oil will be tankered to an existing onshore facility.

Platform Girty is proposed for tract 202, located four miles southwest of Oxnard. Oil production is estimated to be 6,000 barrels per day and will travel via pipeline to a proposed onshore facility south of McGrath Lake at Ventura. It is estimated that three boat trips a day and three to four helicopter trips a month from Ventura will be needed to service this platform. From the proposed facility in Ventura, the oil will go to the Carpinteria facilities and then to Rincon facilities. There are two proposed onshore pipeline routes from Carpinteria to Rincon—one directly to Rincon, the other from Carpinteria to Rincon via La Conchita.

The fourth proposed development plan is located on tract 300, seven miles south of Long Beach. There will be two platforms on this tract, Ellen and Elly, with an estimated production rate of 16,000 barrels of oil per day by 1982. A proposed pipeline will connect these platforms to Long Beach refinery facilities. Three to four crew boats a day and two helicopter trips per week from Huntington Beach are anticipated to serve this tract. There is a proposal to place a platform, Eureka, on the adjacent tract, number 301. This platform will be joined to those on 300 by pipeline.

The four proposed development plans (tracts 188, 202, 217, and 300) specifically address the proposed pipeline routes and the onshore facilities to be used. We have reviewed the proposals and believe that the proposed pipeline routes and the construction of the onshore facility are not likely to jeopardize the continued existence of the listed species or destroy or adversely modify the Critical Habitat of the American peregrine falcon. However, Section 7 consultation must be reinitiated should any of the following occur which may affect listed species or their Critical Habitats: (1) alternative pipeline route be planned; (2) the construction of additional onshore facilities; (3) a change in the use pattern be conducted at the onshore facilities mentioned above; or (4) a new species be listed.

Cumulative Effects

There are numerous offshore and coastal projects and activities in Southern California. Those known to the Office of Endangered Species which could have an impact on the Endangered and Threatened species are considered in this consultation.

The Standard Oil Company of Ohio (SOHIO) pipeline project proposes to transport Alaskan crude oil from Valdez, Alaska to a new (unconstructed) unloading facility at Long Beach, California by tanker. Fourteen tankers will be required, each making 23 round trips per year, to transport the oil. From Long Beach, 500,000 barrels of oil per day will be transported by pipeline to Midland, Texas.

Additional increases in tankers carrying oil out of California can be attributed to the Naval Petroleum Production Act transporting oil from Elk Hills in the San Joaquin Valley to Port Hueneme via pipeline. It is proposed that 350,000 barrels of crude oil a day be sold to any interested party, which makes it difficult to predict the transport routes. However, it could possibly go to the Los Angeles/Long Beach area or even to the east coast traveling through the Panama Canal.

The Chanslor-Western Oil and Development Company has proposed to explore the Vaca Tar Sands. Because the oil would be extremely viscous, an oil processing plant or coking facility would probably be needed at the project site before being shipped by pipeline.

Additional vessel traffic can be expected in the San Pedro and Santa Barbara Channels from the Space Shuttle program.

There are two nuclear power plant proposals. The first, at Diablo Canyon in San Luis Obispo County, has been constructed, but start-up has not been granted. The second plant is in operation but has proposed to expand the facilities. This one is located at San Onofre, Orange County.

There are several Liquified Natural Gas (LNG) facilities proposed for Southern California. None have received approval yet. The onshore LNG plant would be at Point Conception and the offshore sites being considered are: Beachers Bay; Chinese Harbor; San Pedro Point; Smugglers Cove; East Channel Shelf; and Camp Pendleton. If the onshore LNG facility at Point Conception is approved, it will be processing gas from Alaska (400 million cubic feet a day) and from Indonesia (500 million cubic feet a day). This would increase tanker traffic (190 trips a year) into Point Conception.

The Office of Coastal Zone Management (OCZM) has proposed a marine sanctuary be designated around the northern Channel Islands and Santa Barbara Island which would exclude oil and gas activities within six nautical miles of the islands. Concurrently, the OCS Sale No. 48 excluded those tracts within six nautical miles of the Channel Islands and Santa Barbara Island.

The State of California leases tracts within three nautical miles of the coast. These activities generate the placement of pipelines, increased crew boats/supply boats and helicopters servicing the rigs, possible construction of additional processing facilities, and increased tankering.

There are several U.S. Army Corps of Engineers projects in the area including maintenance dredging, beach erosion, and harbor deepening projects.

All of the above projects potentially increase the disturbance to Endangered and Threatened species' habitat and/or increase the possibility of an oil spill occurring within the Southern California area considered in this consultation.

An individual project or activity may have no significant impact upon the listed species, but when considered in light of the numerous projects within the same area, significant impacts could occur.

With accelerated offshore oil and gas activities, the probable risk of oil spills also increases. Additional oil spillage could increase the impacts to Endangered and Threatened species. Due to this, immediate oil spill containment response is extremely necessary.

An increase in onshore activities presents another possible impact to the listed species. There are numerous coastal activities in this area. Due to the stress on the coastal area, changes in OCS related onshore activities must be evaluated carefully.

Conclusion

This biological opinion covers the oil and gas exploration activities for those tracts leased prior to OCS Sale 35, and those leased in OCS Sale 35 and 48. It also covers the seven development tracts identified above.

We have rendered our conservation recommendations for the protection of the El Segundo blue butterfly, the California brown pelican, the California least tern, the light-footed clapper rail, and the salt marsh bird's beak. Any activity or program authorized, funded, or carried out by a Federal agency which may affect any listed species or its Critical Habitat, will require Section 7 consultation.

The GS is reminded of their continuing responsibility to review their activities in light of their Section 7 obligations. Should additional onshore facilities be proposed, or the use pattern of existing facilities be changed, or a new species be listed that may be affect by exploration activities, Section 7 consultation must be initiated if a "may affect" determination is made. Also, should the construction of additional onshore facilities be proposed, different pipeline routes be proposed, a change in the use pattern of the existing onshore facilities be proposed, or a new species be listed which may be affected by the development plans contained in this consultation, Section 7 consultation must be reinitiated.

GS must review all development/production plans not covered by this consultation in light of Section 7(c) of the Endangered Species Act of 1973, as amended.

We would like to thank GS for their consideration in providing the necessary information needed to conduct this consultation.

Robert S. Cook

Robert S. Cook

Attachments (5)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Washington, D.C. 20235

F6:TRL

SEP 25 1979

Mr. J. S. Cragwall, Jr.
Acting Director
Geological Survey
U.S. Department of the Interior
Reston, Virginia 22092

Dear Mr. Cragwall:

This letter responds to your May 18, 1979, request for formal consultation pursuant to Section 7 of the Endangered Species Act, as amended, regarding the possible impact to listed species from Outer Continental Shelf (OCS) oil and gas exploration activities in southern California. The enclosed biological opinion concludes that the identified activities are not likely to jeopardize the continued existence of listed species.

The opinion recommends that the Geological Survey allow the utilization of offshore storage and treatment facilities only under the most stringent safety guidelines possible and only when no other alternatives are available.

I look forward to continued cooperation in future consultations.

Sincerely yours,

Winfred H Meibohm
for Terry L. Leitzell
Assistant Administrator
for Fisheries

Enclosure

2:476

Endangered Species Act

Section 7 Consultation

Agency:	United States Geological Survey
Activity or Program:	Development of Outer Continental Shelf Oil and Gas Reserves in the Southern California Bight
Consultation Conducted by:	National Marine Fisheries Service, Regional Director, Southwest Region

Summary:

By memorandum of May 18, 1979, the Director of the Geological Survey (GS) requested formal consultation on all Outer Continental Shelf (OCS) oil and gas exploration, development, and production activities in the Southern California Bight according to regulations promulgated under Section 7 of the Endangered Species Act of 1973, as amended. To assist me in responding to the request, a team was appointed consisting of representatives from National Marine Fisheries Service (NMFS) Southwest Region and Central Office. Although not participating as team members, the Southwest Fisheries Center and the Northwest and Alaska Fisheries Center were helpful in providing information used in the formulation of our biological opinion.

The team met June 5-7, 1979, with representatives of GS and the Fish and Wildlife Service consultation team to discuss ongoing and proposed GS activities in the Southern California Bight. These activities are the result of development of tracts leased in pre-lease sale 35 offerings, lease sale 35, and lease sale 48.

After reviewing available information and discussing effects of ongoing and proposed activities with GS, the consultation team recommended that GS allow the utilization of offshore storage and treatment (OS&T) facilities only under the most stringent safety guidelines possible and only when no other alternatives are available. The team also recommended that GS work with NMFS, Fish and Wildlife Service and any other concerned agencies to establish a program to monitor cumulative impacts of OCS oil and gas development on the threatened and endangered species in the area. The team concluded that the identified activities are not likely to jeopardize the continued existence of any of the endangered or threatened species in question.

Proposed Action

The project area includes the U.S. contiguous zone from Point Conception to the California-Mexico border. Five groups of tracts within the project area have been identified as potential oil and gas producing areas. These areas are the Santa Barbara Channel, the Santa Rosa Ridge, Santa Barbara Island, San Pedro Bay, and Tanner-Cortes Bank.

There are currently 15 platforms located in the Santa Barbara Channel, eight in State waters and seven in Federal waters. The majority (10) are located southwest of Carpenteria. The other five are located in the west end of the Channel; four are in State waters between Coal Oil Point and Point Conception, and one, the Hondo platform, is in Federal waters approximately five miles south of Refugio Cove. Forty subsea completions have been installed in the Santa Barbara Channel, all in State waters. An OS&T is planned for installation near Hondo platform as soon as it receives Environmental Protection Agency approval. The OS&T will separate the crude oil from the oil-water emulsion that comes from the wells. The crude oil will be stored and water will be piped back to the platform for injection into the formation. At regular intervals, depending on the rate of production, the OS&T will transfer the crude oil to shuttle tankers for transport to onshore refineries.

The only other existing platforms in the Southern California Bight are two in State waters south of Huntington Beach. There are, however, four platforms planned for installation in late 1979. Two of these will be placed in the east end of the Santa Barbara Channel and two will be placed in San Pedro Bay. There are no platforms or subsea completions in any of the other groups of tracts.

GS has estimated that approximately 371 wells will have to be drilled to adequately explore leased tracts for oil deposits. Exploration of leased tracts is currently being conducted by four drilling ships. Since there are no plans to bring in additional exploration vessels, the necessary exploratory wells will be drilled without an increase in the current overall level of activities related to exploration during the course of the project. If more drilling ships are required in order to speed up the exploration process, the cumulative environmental impacts would probably remain the same, but the increased level of activity in the short term would be more likely to have an immediate adverse impact on the species involved. An additional 87 platforms, 86 subsea completions, and over 1,000 miles of pipelines have been estimated to be required to fully develop these offshore fields. The length of time necessary for this development is 25 years and the total life of the project is estimated to be 40 years.

The distribution of the oil fields in the OCS appears to be patchy. The subsea completions are expected to be concentrated around the deep water (300m.) oil fields at the west end of the Santa Barbara Channel, in the southern half of the San Pedro Bay group of tracts, and around the Tanner-Cortes Bank. Where ecologically and economically feasible, pipelines will be used to bring crude products to existing refineries on shore. When pipelines prove infeasible, OS&T's coupled with tanker and barge transportation will be utilized. GS estimates that four OS&T systems may be required during the development of the Southern California Bight oil and gas reserves.

Endangered Species Present in the Project Area

The species of concern in the consultation were as follows:

blue whale (*Balaenoptera musculus*)
fin whale (*B. physalus*)
sei whale (*B. borealis*)
humpback whale (*Megaptera novaeangliae*)
sperm whale (*Physeter catadon*)

gray whale (Eschrictius robustus)
right whale (Eubalaena glacialis)
Pacific ridley turtle (Lepidochelys olivacea)
green sea turtle (Chelonia mydas)
loggerhead turtle (Caretta caretta)
leatherback turtle (Dermochelys coreacea)

All of these are either casual visitors or migrants through the Southern California Bight.

The North Pacific population of blue whales is approximately 1,700 individuals. A significant portion migrates through the project area from May through July on their way to their summer feeding grounds and again from September to February during their return migration to their wintering grounds in the warm waters off southern Baja California. The probable migratory pathway and distribution of the blue whale in the Southern California Bight has been described as generally offshore, very near or outside of the Channel Islands, and along the Santa Rosa Ridge to Tanner-Cortes Banks. While they are frequently observed around the Channel Islands, they are seldom seen from shore.

The North Pacific population of the fin whale numbers approximately 17,000 individuals. Fin whales may be found west of the Channel Islands year round. They are, however, most abundant in late spring or early summer.

Sei whales in the North Pacific number about 9,000 whales. Little is known about their migratory habits. Sei whales may be found off Southern California, west of the Channel Islands during the late summer or early fall. There is also a possibility that these whales may be feeding in the southern California Bight.

Sperm whales are the most abundant of the large whales in the North Pacific, numbering about 300,000 individuals. They are common in the project area from April until the middle of June and again from late August to mid-November, indicating a northward migration in the spring and return migration in the fall. The boundaries of the migratory path are not well known but probably are quite broad.

The humpback whale is one of the most severely depleted of the whale stocks. The North Pacific population is estimated at approximately 850 individuals. A portion of this population migrates from Alaska south to its calving and breeding grounds off the western coast of Baja California, where it spends the winter months. During the summer these whales may be found in any portion of their range.

The most prominent whale occurring in the Southern California Bight is the gray whale. The current population is estimated at about 15,000 whales. Its rather narrow migratory path along the California coastline makes it the most frequently observed endangered whale as well as the species most likely to be adversely impacted as a result of OCS development. Essentially, the entire population of gray whales migrates through the project area from late September through December on its southern migration to the calving and breeding grounds in Baja California, and again on its northward migration between February and June. Juvenile gray whales have been known to take up residence for extended periods in the kelp beds along the coast and around the Channel Islands, in order to feed on the crustaceans living in the kelp canopy.

The most depleted species stock is the North Pacific population of Pacific right whales which numbers only about 220 individuals.

Individuals of all four species of listed sea turtles may be found in the project area. They are probably transient portions of their respective populations feeding at the northern limits of their ranges. They are not known to nest here. There is no historical evidence of any nesting beaches north of Guerro Negro Lagoon, Baja California Sur, Mexico, and there are no known nesting beaches remaining on the Baja Peninsula.

Probable Impacts

The most probable source of adverse impacts on endangered species in the project area are oil spills from various sources; increased vessel traffic due to the greater number of platform support vessels as well as increased tanker and barge traffic; and increased levels of noise resulting from exploration, construction, and production activities.

The severest impacts are likely to result from a catastrophic event resulting in a large oil spill. Such events include blowouts, the sinking of or breaking up of tankers, and accidents involving OS&T's. The probability of an oil spill occurring during the life of this project has been estimated by GS to be 100%. In the light of this high probability we recognize that the availability of oil spill containment and clean-up equipment reduces the likelihood of severe impacts resulting from a spill when it does occur.

There are few data available pertaining to the effects of oil on endangered species. Some anecdotal information indicates that gray whales swim through naturally occurring oil slicks in the Santa Barbara Channel. There is no way to access the long term or chronic effects of contacting oil. Some of the adverse effects which could result from contact with an oil spill include eye damage, inhalation of toxic fumes or aerosols, ingestion of oil, and the fouling of baleen plates.

The species most likely to be impacted by an oil spill is the gray whale. If a large spill occurred during the whales migration, a significant portion of the population could encounter the spill, and possibly suffer one or more of the adverse effects listed above.

A catastrophic spill would have the most severe impact on the North Pacific population of right whales. The probability of right whales encountering such a spill is small, because their population is so depleted. Although there has not been a documented sighting of a right whale in the project area since 1956, the elimination of just a few individuals could result in the loss of the recruitment of an entire season.

We are not aware of any information on the effects of oil on sea turtles. Presumably they would be susceptible to the same sorts of ill effects as the cetaceans. Since the few sea turtles occurring in the project area are feeding at the northern extent of their range and since there are no nesting beaches in or near the project area, the impacts of a spill on the sea turtle populations is expected to be slight.

OS&T's appear to represent a threat to the environment because they require unnecessary handling of oil at sea. The OS&T planned for installation near the Hondo platform in the Santa Barbara Channel will be located outside of the three-mile territorial sea where it will encounter the full force of the severe winter storms that occur in the Channel. Although the mooring system is designed to withstand a hundred year storm, should the the OS&t break loose it would probably ground and break up, resulting in a spill of up to 200,000 barrels of oil. There is also the threat of a collision between the OS&T and the shuttle tankers that it would load. Even though the possibility of such accidents is remote, the threat of such accidents could be eliminated by utilizing onshore storage and and treatment facilities coupled with nearshore marine terminals for shuttle tankers.

Increased vessel traffic increases the probability of the occurrance of whale-vessel collisions. Every year a few whales wash ashore with definite signs of injury resulting from confrontations with large vessels. We do not know how many whales are killed or seriously injured in this manner each year nor do we know the impact of this mortality on endangered species populations.

The gray whale is most likely to be impacted by increased vessel traffic because it is most abundant endangered species in the project area and its migratory route coincides with traffic lanes in the Southern California Bight. Vessel traffic could be one of the stimuli pushing the gray whale migration offshore.

Noise in the Southern California Bight issues from several sources, including commercial vessel traffic, pleasure craft traffic, fishing operations, military operations and OCS mineral development. There are no data available that indicate the relative amounts of noise contributed by each of these sources. Therefore, we are not able to predict what the impacts of noise from OCS oil and gas development on endangered species will be.

However, increased activities will increase noise levels by some degree. Our concern is that noise levels in the Southern California Bight may reach a threshold resulting in the abandonment of migratory routes and feeding grounds by endangered whales.

Estimates prior to the mid-1960's indicated only 5-10% of the gray whale population migrated along offshore routes. Recent observations indicate a higher percentage of the population is utilizing offshore routes around the Channel Islands. The reasons for this apparent offshore shift are not clear. The increasing population, currently 15,000 whales, up from 3,000 in 1952, may be expanding the migratory path seaward as a result of population pressures, or the gray whales may be migrating further offshore in an effort to avoid noise from human activities, which have increased substantially in the last 20 years.

In October, 1978, humpback whales were observed feeding on Northern anchovies over the Santa Rosa Ridge. Additional feeding areas may be found around the Tanner-Cortes Bank. If noise levels reach a threshold the whales may abandon these areas, thus diminishing available feeding areas and increasing competition on remaining feeding grounds.

Conclusions:

Based on current population estimates and data on distribution of species, NMFS concludes that development of OCS oil and gas reserves in the Southern California Bight is not likely to jeopardize the continued existence of any of the endangered species under consideration.

With the exception of the gray whale, endangered cetaceans are widely distributed in the North Pacific. Their distributions serve to protect them from being inundated by activities in a relatively small portion of their ranges.

The gray whale is the species most likely to be impacted by this project because of its biannual migration through the project area. This population is recovering from heavy exploitation by commercial whalers and is approaching pre-exploitation levels. Based on this resiliency and the fact that it is a migrant through the area and not a resident, NMFS has determined that the continued existence of this species is not likely to be jeopardized.

The right whale population, if impacted by the project, is likely to suffer severely. However, the small population is widely distributed and no individuals have been reported in the project area in over 20 years. Therefore, the probability of this project jeopardizing this species is small.

The distribution and migration of Pacific ridley, green, loggerhead, and leatherback sea turtles in the eastern North Pacific is poorly known. There are no nesting beaches in the project area nor are there any nesting beaches outside the project area that would be impacted by oil from a catastrophic spill in the project area. The sea turtles found in the project area are apparently feeding near the northern limits of their ranges and, although a few individuals of each species may suffer impacts from the project, the project is not likely to jeopardize the continued existence of any of the endangered sea turtle populations.

Recommendations:

We recommend that GS establish a program to monitor the impacts of OCS oil and gas development in the Southern California Bight. The purpose of this program would be to centralize information already available to various offices within GS, so that other agencies could have access to that information. The type of information we are interested in includes, among other things, location and cause of chronic pollution, results of exploratory activities so that we may anticipate the development of areas which may be important to endangered species, and any reports on behavior of animals around drill-ships and platforms.

We recommend that GS cooperate with NMFS in the placement of observers aboard exploratory vessels and platforms when in the opinion of the Regional Director, Southwest Region, NMFS the placement of an observer may yield data useful in the determination of impacts of oil and gas development on endangered species. The Southwest Region currently reviews Environmental Reports for plans of exploration and development and could as part of the review consider the benefit of placing an observer on board a particular vessel or platform without consuming much additional time. Should the Regional Director decide to place an observer aboard a vessel or platform we would expect GS assistance in providing support.

We recommend OS&T's be utilized only when onshore storage and treatment facilities and near shore marine terminals are not feasible. NMFS is concerned with the use of OS&T's. OS&T's require extra handling of oil while at sea thus increasing the chance of a spill that could impact endangered species. We further recommend that any OS&T's that are installed be closely monitored by GS and that GS in consultation with Coast Guard — and NMFS develop and implement strict procedural guidelines, for the safe transfer of oil from the OS&T to shuttle tankers, prior to the initiation of the proposed operations. These guidelines should include, among other things, criteria for the cessation of transfer of oil during high seas or inclement weather.

We recommend that GS contact the Regional Director, Southwest Region, NMFS to initiate development of a monitoring program and OS&T operational guidelines.

Finally, we recommend that consultation be reinitiated in the event that studies, being funded by the Bureau of Land Management, on the effects of noise and oil pollution on marine mammals produce information relevant to this opinion, or data indicating potential adverse impacts on listed species of whales and sea turtles become available, or should another species in the project area be listed as threatened or endangered.

APPENDIX 2

Cultural Resource Surveys

(See appendix 2 of Chevron's Environmental Report)

APPENDIX 3

Contingency Plans

(The H_2S and Oil Spill Contingency Plans are on file in the Public Information Room, USGS, Los Angeles.)

APPENDIX 4

Maps and Diagrams

(See ER and POE Appendix 5)

APPENDIX 5

Nonproprietary Copy of the Plan of Exploration (POE)
and Environmental Report (ER)

AMENDED EXPLORATION PLAN
WELLS P-0205 #3 & #4
SANTA CLARA UNIT AREA

OUTER CONTINENTAL SHELF
SANTA BARBARA AREA
OFFSHORE CALIFORNIA

CHEVRON U.S.A. INC.
OPERATOR

8-31-81

AMENDED EXPLORATION PLAN
P-0205 #3 & #4

TABLE OF CONTENTS

Appendixes D, E and F have been submitted previously as part of the Chevron U.S.A. Inc., Western Region Production Department, Oil Spill and Emergency Contingency Plan for Santa Barbara Channel Outer Continental Shelf, on file with the U.S. Geological Survey, California Coastal Commission and other agencies.

List of Tables and Figures

Confidential Enclosures

*1. Panel No. 508514 including the following: Monterey Structure Contour Map showing locations of the proposed well (surface and bottomhole), geologic and seismic sections; and geologic sections AA' and BB'.

*2. Annotated half-scale seismic sectionsd D-76-156 (No. 508513) and DN 77-79 (No. 508512).

*3. Velocity Analyses for seismic lines: DN77-79 and D76-156.

*4. Maps at 1:12,000 scale (with proposed well location added) to accompany Geological Drilling Hazard Report covering portions of Federal OCS Lease Blocks 2[illegible], 205, 208 and 209 prepared by Nekton Inc., as follows:

   a. Shot Point Base Maps (1a-Fathometer and Magnetometer, 1b-Minisparker Resurvey, 1c-Sparker Resurvey, and 1d-Side Scan Sonar and Sub-bottom Profiler) (Plate 1)
   b. Bathymetry (No. 2)
   c. Structure (No. 3)
   d. Isopach of Late Quaternary Unit (No. 4)
   e. Seafloor and Water Column Anomaly (No. 5)

   NOTE: Text and geophysical lines previously submitted with original Exploration Plan.

*Not submitted with copies intended for transmittal to the recipients identified in 30 CFR, paragraph 250.34-1(b)(1), as Chevron, pursuant to 30 CFR paragraph 250.34-1(a)(5), believes such are exempt from disclosure under the Freedom of Information Act (5 U.S.C. 552) and the implementing regulations (43 CFR Part 2). The general subject matter of such exempt portions is discussed in Part 5 (Geological Information).

INTRODUCTION

This Amended Exploration Plan for Federal OCS Lease P-0205 supplements the Santa Clara Unit Plan of Chevron U.S.A. Inc. It is being resubmitted, per 30 CFR 250.34-1(g) and 15 CFR 930.83 and 930.84, to accommodate objections by the California Coastal Commission to the original Exploratory Plan, Santa Clara Unit, Well P-0205 #3, which was approved by your office June 29, 1980.

This Amended Exploration Plan specifically describes the modifications made to the original OCS plan, and the manner in which such modifications will ensure that all of the proposed Federal license or permit activities described in detail in the amended plan will be conducted in a manner consistent with the California Coastal Management Program (CCMP). The Environmental Report (Exploration) which accompanies this Amended Plan includes an amended consistency certification and data and information necessary to support the new consistency determination.

1. TYPE AND SEQUENCE OF EXPLORATION ACTIVITIES

A. Objectives

This Amended Exploration Plan for OCS P-0205, located approximately 11 miles southwest of Ventura (Figure 1), calls for the drilling of one or two delineation wells from a common surface location (see Figure 2, and Panel 508514) on the northern edge of the Sockeye Field. These wells are to be directionally drilled southward to evaluate the central and southern portions of that oil and gas accumulation. Prior drilling of the P-0205-1 and P-0209-2 wells, also in the northern part of the Sockeye structure, found oil and gas in various zones including the Monterey Formation. Other delineation wells--the P-0204-1 to the east, and the P-0205-2 on the southern edge of the structure--failed to find potentially commercial hydrocarbons. The wells proposed herein will evaluate the reservoir characteristics and problematical southern extent of the known oil and/or gas reservoirs, and test deeper zones at an optimal structural position.

When the original plan was under review, it appeared possible that reserves in the proven zones on the north flank of the structure, adjacent to the P-0205-1 and P-0209-2 wells, were sufficient to warrant a platform, whether or not additional reserves were found in deeper zones or on the southern portion of the structure. Since that time, experience in development drilling from Platform Grace, 5 miles to the northwest, has forced a more conservative approach to reserves estimation in some of the proven zones in Sockeye. For that reason, further detailed testing and evaluation of these zones must be performed before Chevron can commit to construct a platform. The drilling of the proposed wells is an essential prerequisite to a final decision on platform construction. If results are favorable, data from the wells will be essential to platform and facility design. Progress on this project cannot continue unless the operations proposed in this Amended Exploration Plan are expeditiously accomplished.

Figure 3 illustrates the two wells proposed in this Amended Exploration Plan, the P-0205-3 well as originally proposed, and prior wells. It also shows the constraints imposed on well locations due to the position of the Sockeye structure directly beneath the northbound sea lane. As proposed in this Amended Plan, the P-0205-3 well will obtain detailed reservoir data, in the central part of the structure, from those zones already proven productive farther to the north. A detailed program of coring and testing these zones will provide data for the subsequent laboratory studies and analyses necessary to develop an accurate estimate of their recoverable petroleum reserves. This well will also test deeper, unproven zones on the highest part of the structure.

Unless the P-0205-3 conclusively disproves the economic viability of Sockeye development, a second well will be drilled to evaluate the extent, thickness and reservoir quality, on the southern part of the structure, of the zones proven productive to the north. This second well, the P-0205-4, will be drilled from the same surface location as the P-0205-3.

As shown in Figure 3, the original proposal for the P-0205-3 well would have penetrated the zones of primary interest in a more optimal location than the proposed P-0205-4 will achieve. The original well would have tested the deeper zones at a location comparable to that provided in the Amended Plan. In addition, the original plan had a secondary objective not retained in this Amended Plan: the evaluation of a shallow heavy-oil zone which had yielded minor oil in prior wells on Sockeye. Based on recent studies, that zone is no longer believed capable of commercial production.

As previously noted, the wells proposed in this Amended Plan will provide a detailed evaluation of the main reservoir zones in the central part of the Sockeye Field. This is an objective the importance of which was not known when the original P-0205-3 proposal was submitted.

B. Proposed Well Courses and Programs

In order to penetrate the main reservoirs at a near-optimum position, the P-0205-3 will be directed toward the south below the 20-in. surface casing, building angle at the maximum feasible rate of 5° per hundred feet until it reaches the maximum deviation of 50° from the vertical. The drilling angle cannot exceed this limit if the extensive program of coring, logging and testing planned for this well is to be accomplished. Casing (13-3/8-in.) will be set through the bend, and the well taken to 2,900 ft. drilled depth. From that point it will be deviated back toward the vertical at a rate of 3° per hundred feet. When it reaches its target at the top of the upper proven zone, and 1600 ft. south of the surface location, 9-5/8-in. casing will be set through the lower bend. The well will then be at an inclination of 5° from the vertical, and will maintain that inclination to its proposed total depth of 8000 ft. (drilled depth). That inclination will permit the well course to remain at or near the highest portion of the structure as it penetrates successively deeper zones. The 5° deviation is also the maximum deviation from the vertical which still permits the successful completion of zone-by-zone open-hole formation testing which is the primary objective of this well.

Depending on satisfactory results from the P-0205-3 well, the drilling of the P-0205-4 may follow immediately. This second well would utilize the sea-floor facilities (e.g., template, blowout preventer) and shallow casing strings set for the initial well to the shoe of the 13-3/8-inch casing at 2400 ft. drilled depth. The initial hole will be plugged and abandoned below that depth, the 9-5/8-inch casing cut and recovered above +2500 ft., and the new hole drilled directionally at the same deviation (maximum of 51° from the vertical) as above the 13-3/8-inch casing shoe. This well, the P-0205-4, will penetrate the top of the upper zone at a distance of 3,400 ft. from the surface drillsite, and 9-5/8-inch casing will be set at this point. This well will not quite reach the optimal upper-zone target area; to do so would require a deviation beyond the limits of feasible logging and evaluation operations. Below the 9-5/8-inch casing shoe, the 50°-51° hole angle will be maintained to proposed total depth of 8500 ft., penetrating both of the reservoir zones that have been proven productive in the northern part of the Sockeye structure.

As compared to the previously proposed P-0205 Exploration Plan, this amended program will:

1) Require 13,500 to 14,000 ft. of drilling, versus 9,700 ft. per the original plan;

2) Require an additional 50 to 80 days on location;

3) Provide a detailed evaluation of the main reservoir zones in the center of the structure;

4) Provide a somewhat better test of the unproven deeper zones;

5) Evaluate the southern flank of Sockeye at a less-than-optimal position;

6) Provide less information about the shallow heavy-oil zone which is now regarded as non-commercial.

C. <u>Alternatives to the Proposed Program</u>

i - Surface Location North of Buffer Zone.

This location would be 1300 ft. north of the proposed drillsite (see Figure 3). The P-0205-3 well would require a maximum deviation of 80° from the vertical (that is, nearly horizontal) in order to reach its target at the top of the upper proven zone at the near-vertical inclination required for open-hole testing. Such an extreme deviation is at or beyond the present limits of drilling technology, and if it could be drilled, would not permit the passage of wire-line logging devices. The curvature of the hole would inevitably lead to severe mechanical problems; it is highly unlikely that such a well could achieve more than a small part of its objectives.

If the P-0205-4 well were to be drilled from this northern location it would require a deviation of 61° from the vertical in order to reach the proposed target area at the top of the upper zone, before dropping angle to penetrate the lower principal reservoir. Maintaining this amount of inclination for nearly 5,000 ft. would probably lead to mechanical difficulties. Also, this inclination is at the upper limit of feasible open-hole logging capabilities. Alternatively, if the P-0205-4 maintained a uniform course to the proposed bottom-hole location, the deviation would be reduced to 56°, but the well would penetrate the upper zone much closer to the P-0205-3 well-course, and provide little additional information.

ii - Surface Location South of Sea Lane.

This is the original location rejected by the Coastal Commission in August, 1980. The Commission did not concur in Chevron's consistency certification for the following reasons: 1) The surface location of the well presented potential conflicts with vessel traffic, according to the Commission but not the U.S. Coast Guard (see Appendix G); 2) The surface location was within the proposed (now existing) Channel Islands Marine Sanctuary; and 3) The surface location was less than 6 nautical miles from the Anacapa Island brown pelican rookery. An alternative location south of the Buffer Zone was evaluated in the original plan. This would have eliminated the chance of interference with shipping traffic. It was rejected because:

1) It was closer to Anacapa Island; and

2) It would have required well-bore deviations sufficiently extreme as to render unlikely the chances of successfully achieving the well's objectives.

iii - Not Drill the Well.

Because of the present uncertainties concerning the volume and economic viability of the Sockeye accumulation, this alternative would preclude the proper evaluation and subsequent development of a potential significant domestic energy resource.

D. Accommodation to Coastal Commission Objections

On August 19, 1980, the California Coastal Commission objected to Chevron's consistency certification for the original P-0205 #3 Exploration Plan, on the grounds that the Plan failed to meet the requirements of five sections of the California Coastal Act. Listed below are the cited sections, the basis for each finding of inconsistency (summarized), and a description of the modifications made to that original plan which now ensure that the Amended Exploration Plan is consistent with the State's management program.

i- Section 30230 (Protection of Marine Resources) and Section 30240 (Environmentally Sensitive Habitat Areas).

These two sections were invoked jointly because the original P-0205-3 drillsite was within the proposed Channel Islands Marine Sanctuary, and 5.7 nautical miles from the brown pelican rookery on West Anacapa Island. The Marine Sanctuary has since been created by Act of Congress. Both the Act, and the Coastal Commission's policy (adopted January 3, 1980), would permit drilling of this delineation well within the Sanctuary because it is on a lease which pre-dates the creation of the Sanctuary.

The Amended Exploration Plan eliminates or substantially mitigates these perceived conflicts because; 1) the drillsite has been relocated to a position outside of the Marine Sanctuary, and 6.83 nautical miles from West Anacapa; and 2) the new location provides at least 20% more distance (and hence, time) for the containment and/or dispersion of an oil slick in the very unlikely event of an oil spill associated with the proposed activity.

ii- Section 30232 (Protection Against Spillage)

The Commission's objection was based, in part, on inadequacies of a containment boom deployment drill held on June 24, 1980. Since that time several successful drills have been conducted, including one off Pt. Conception on December 16, 1980, in which 1500 ft. of boom was completely deployed just 16 minutes after the standby boat had first been contacted.

Other commission objections are related to the present state-of-the-art of containment and clean-up capabilities.

iii- Section 30260 (Inconsistent Activities May Be Permitted)

The Commission has used this section as the basis for approving other OCS Exploration Plans which they held to be inconsistent due to the present state-of-the-art of spill containment and clean-up equipment. Section 30260 sets forth three criteria for the permitting of inconsistent projects, including: "(1) alternative locations are infeasible or more environmentally damaging." In their objection dated August 19, 1980, the Commission advanced the theory that the P-0205-3 delineation well could be drilled from the production platform after it was built. This theory assumed that a platform would be built whether or not the delineation well was drilled, and further, that results from the well were not necessary for the design and positioning of the platform.

As discussed in Section 1.A above, estimates of proven and risked reserves based on more detailed studies using reservoir data from Platform Grace are not sufficient to justify a platform. Unless additional, and favorable, data can be obtained by drilling the wells described in the Amended Exploration Plan, development of the Sockeye Field will be suspended indefinitely.

iv- Section 30262 (Vessel Traffic)

The Commission asserted that location of a drillship within the buffer zone to the sea lane presented a substantial hazard to navigation (notwithstanding a Coast Guard statement to the contrary; see Appendix G) and consequently a threat of oil spills from vessel collision. In support of this, they cited preliminary results from a Santa Barbara Channel Risk Management Study then in progress.

Final results of that study are discussed in Section 3(d)(2) of the accompanying Environmental Report (Exploration) for P-0205-3&4. They indicate that the original location in the southern buffer zone, by creating a "gated" situation between the drillship and Platform Grace, 5.2 nautical miles distant but on the opposite side of the sea lane, would have presented a potential navigational problem. The Amended Exploration Plan locates the drillship in the northern buffer zone, on the same side of the sea lane as Platform Grace. Because there will be ample sea room within and south of the sea lane, the "gated" situation and its consequent impediment to navigation has been avoided.

E. Timing.

Drilling of these wells could commence the beginning of 1982, depending on receipt of permit approvals and availability of a drilling vessel. The active drilling phase for P-0205-3 will require 50 to 60 days, with evaluation and abandonment procedures lasting another 5 to 25 days. If results from that well call for drilling the P-0205-4, only the lower portion of the first well will be plugged and abandoned, and the P-0205-4 drilled from a depth of about 2400 ft. in the original hole. About 40 to 50 days will be required to drill and complete the P-0205-4, plus 5 to 25 days for evaluation and abandonment. It will take about 6 days to move on and off of the location. This results in a total of about 50 to 90 days for each of these wells.

2. DESCRIPTION OF DRILLING VESSEL

The proposed wells will be drilled by a floating drillship. At present it is planned to use the Glomar Coral Sea, a 400-foot-long shipshaped drilling vessel (see Appendix B for a detailed description). The vessel will be moored at the drillsite with twelve 30,000-lb. anchors.

The following Sections contain a description of procedures, personnel, and equipment for preventing, reporting, and cleaning up spills of oil or waste materials.

A. Prevention

Prevention of oil spills during the proposed exploratory drilling operations 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 of BOPE; and training of personnel. These measures are designed to 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 hereinafter described. All other activities related to the exploratory drilling will be conducted in an orderly fashion at all times, to 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 (CA0110087) issued by the EPA to Global Marine for the drillship Glomar Coral Sea.

B. 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. That Plan has been previously submitted to the U.S.G.S. as part of the Plan of Development for the Santa Clara Unit, and is also applicable to Parcel 0205.

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 described in the accompanying Environmental Report (Exploration). Briefly, these steps include:

i- Alert the local spill cooperative immediately, so that supplementary equipment can be delivered promptly if it becomes apparent that the "on-board" equipment cannot handle the spill.

ii- Assess wind and current direction to determine the possible path of the spilled hydrocarbons, and deploy the on-board containment boom to surround the spill.

iii- Use on-board skimmer to recover oil retained by the boom and absorbent material to remove final traces of hydrocarbons.

3. TYPES OF GEOPHYSICAL EQUIPMENT TO BE USED

This Amended Exploration Plan for Parcel P-0205 does not include additional geophysical surveys. Prior geophysical surveys conducted on this tract included the usual exploratory methods (digital common-depth-point reflection seismic, shipboard gravimeter, airborne magnetometer) and shallow hazards surveys (analog and digital Fairflex, sub-bottom profiler, and echo sounder).

4. PROPOSED WELL LOCATIONS

Table 2 shows the proposed surface location, total depth and water depth for each of the two wells included in this Amended Exploration Plan. Figure 2 also shows well location and water depth in map form. Appendix C indicates the estimated depths of geologic horizons.

5. GEOLOGICAL INFORMATION

The two wells included in the Amended Exploration Plan will accomplish two major objectives necessary to proving the economic viability of the Sockeye Field (see Figure 3):

a) Determine the reservoir characteristics and potential productivity of the Miocene zones previously tested in the P-0205 #1 and P-0209 #2 wells. This objective will be achieved by the program of detailed coring and testing of these zones which is planned for the P-0205 #3 well.

b) Further delineate the Sockeye Field, by:

  1) drilling the P-0205 #4 well to provide south flank structural and reservoir control for Miocene zones within the low-amplitude domal closure, present in sedimentary horizons ranging from Upper Pliocene to Cretacous in age, which has been defined by reflection seismic mapping; and

  2) carrying the P-0205 #3 well into potentially productive pre-Miocene zones at a location near the highest part of the domal structure, so that they can be tested at this optimum position.

The enclosures submitted with this Amended Plan (see accompanying list) include a structural map contoured (in feet) on the top of the Monterey Formation, two schematic geologic cross-sections and relevant portions of two seismic sections. These sections and map illustrate the present interpretation of folds and faults and the position of the several potential hydrocarbon-bearing zones. The velocity analyses (Enclosure 3) allow a semi-quantitative conversion from seismic reflection time to subsea depth. Procedures and results of the hazards and cultural resource survey (submitted with original Plan; maps showing amended well location are included as Enclosure 4) are discussed at length in the accompanying Environmental Report (Exploration). Basic data from that hazards and cultural resource survey, which document the specific conclusions regarding the proposed drilling site, were submitted with the original Plan. The enclosure material is of a competitive nature and is exempt from disclosure under the Freedom of Information Act (5 U.S.C. 552) and the implementing regulations (43 CFR Part 2). For that reason, these enclosures are not included with those copies of this Plan intended for distribution according to 30 CFR, paragraph 250.34-1(b)(1).

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)) To be used only with the) permission of the cognizant) on-scene coordinator.

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 drillsite.)

TABLE 2 - DETAILS OF PROPOSED WELLS

WELL	COORDINATES ZONE 6				PROPOSED TOTAL	WATER	ESTIMATED DAYS	TIME
P-0205	X	Y	(N)	(W)	DEPTH (feet)	DEPTH (feet)	DRILLING	TOTAL
#3	1,046,660	728,490	34° 7.0' 45.1"	119° 24' 1.9"	8,000(DD)	719	50-60	50-90
#4	1,046,660	728,490	37° 7.0' 45"	119° 24' 1.9"	8,500(DD)	719	40-50	50-90

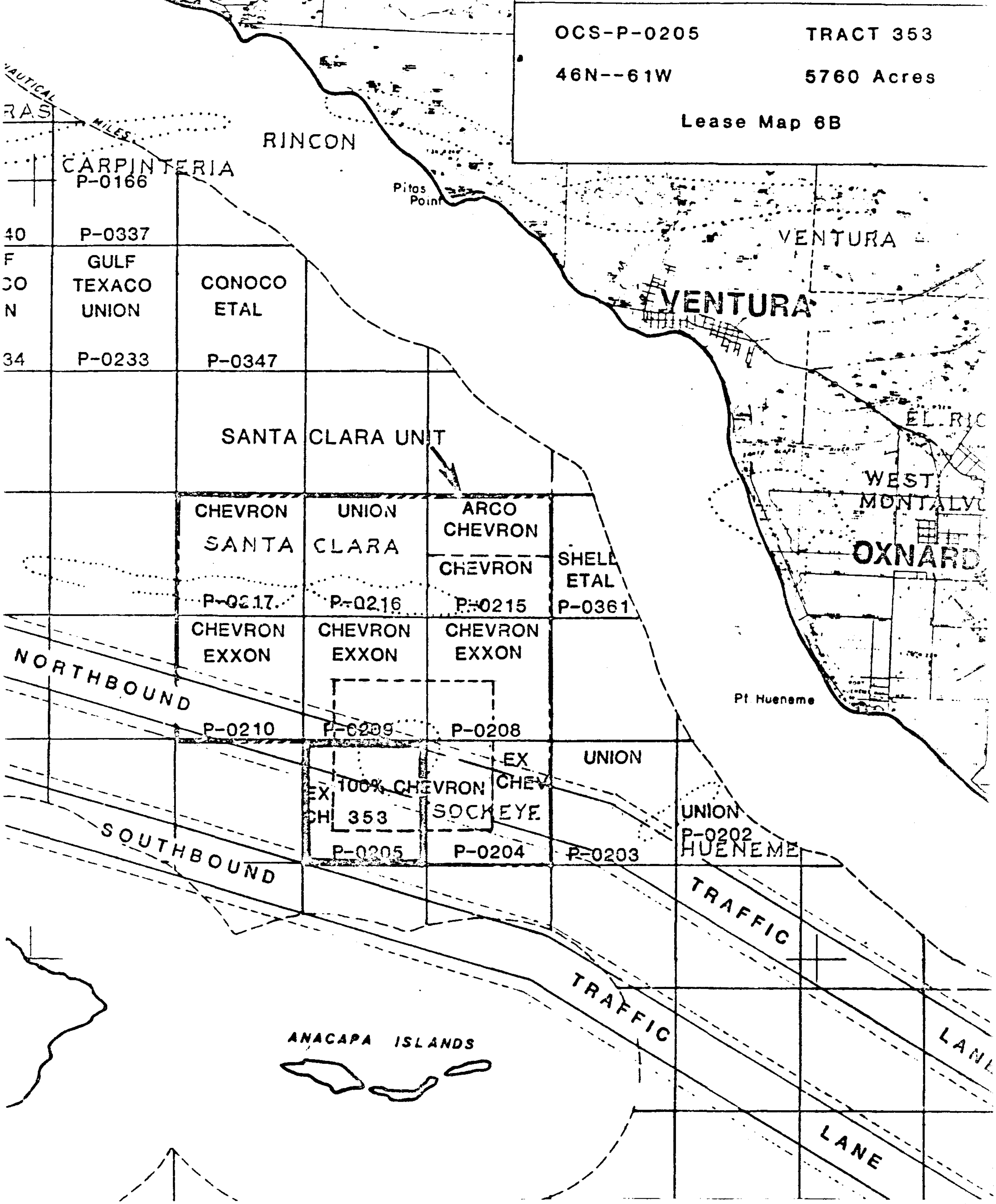
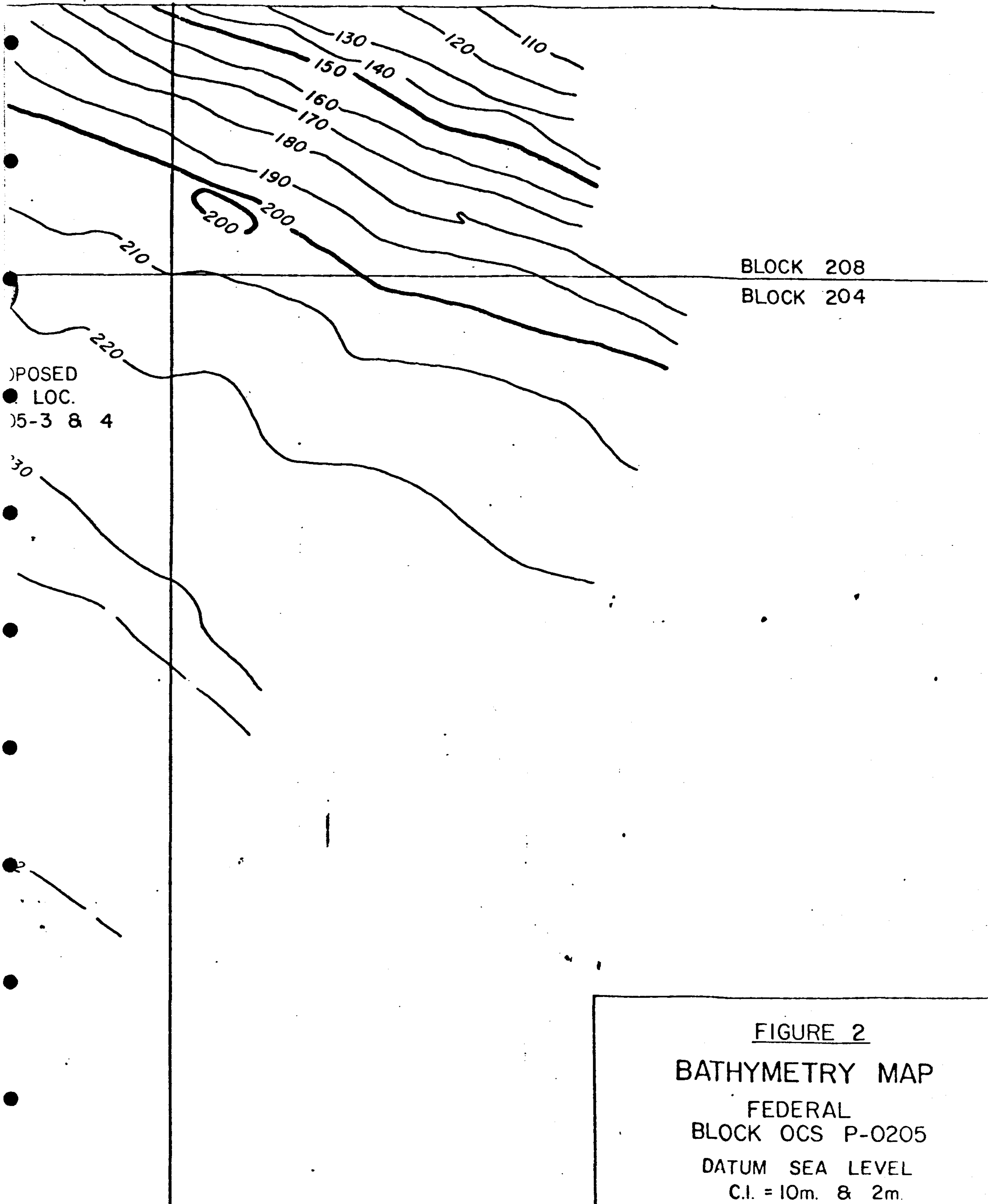


FIGURE I

GENERAL LOCATION OF PARCEL P-0205



TRY FROM GENERAL OCEANOGRAPHICS
DATED 9/5/78 (MODIFIED BY CHEVRON 5/19/81)

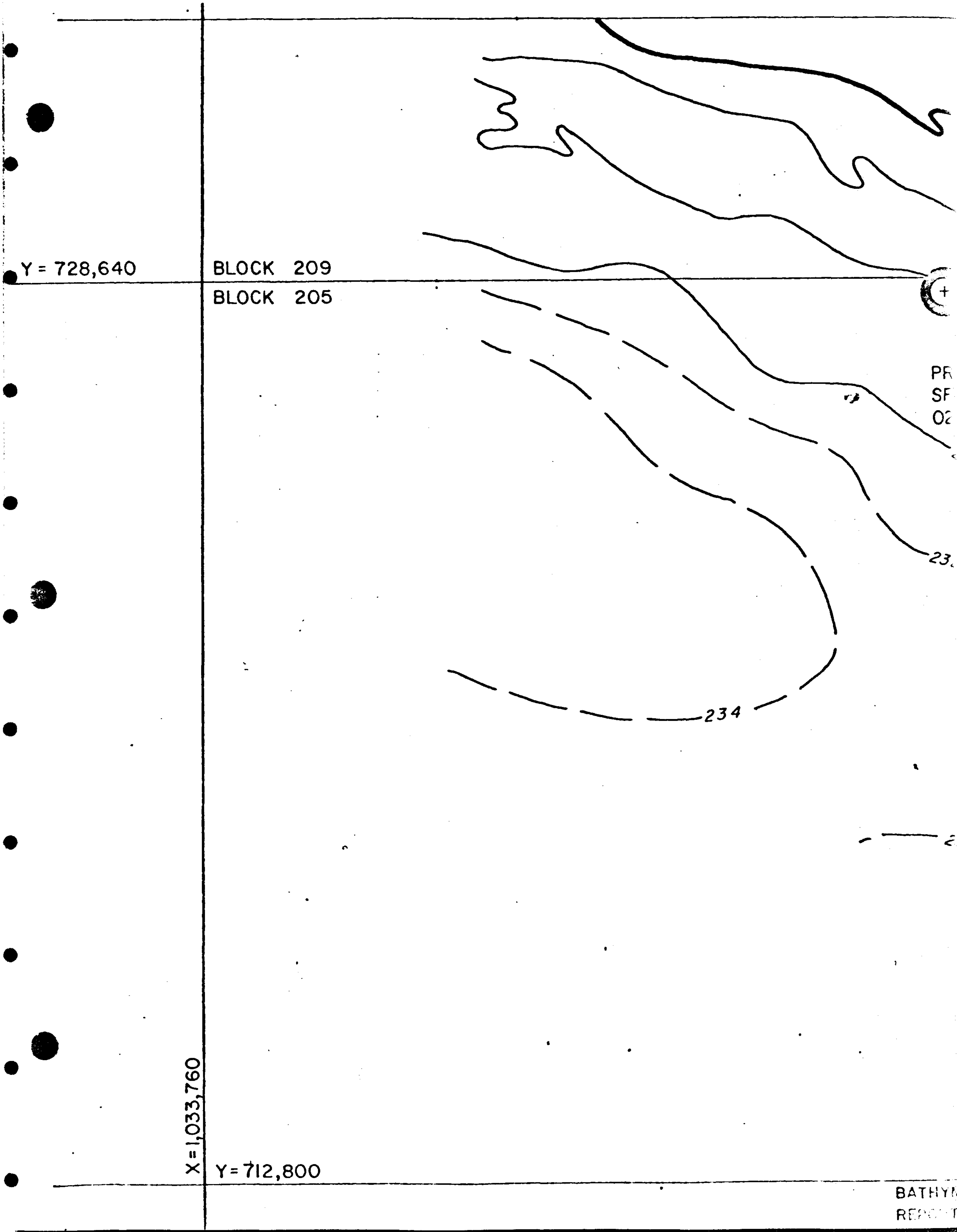
FIGURE 2

BATHYMETRY MAP

FEDERAL
BLOCK OCS P-0205

DATUM SEA LEVEL
C.I. = 10m. & 2m.

SCALE: 1" = 2000' 5/19/81



Y = 728,640
BLOCK 209
BLOCK 205
234
X = 1,033,760
Y = 712,800

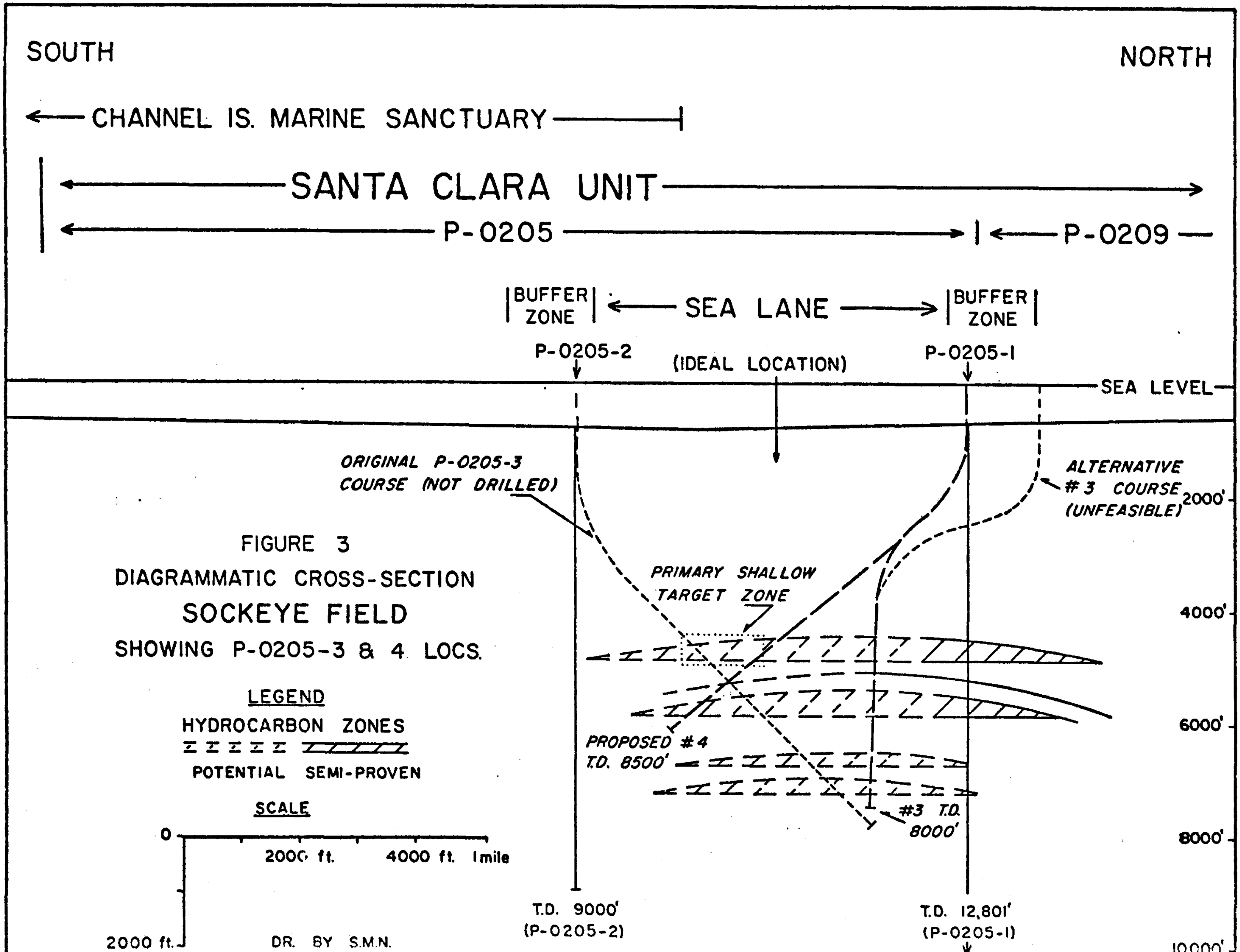


FIGURE 3
DIAGRAMMATIC CROSS-SECTION
SOCKEYE FIELD
SHOWING P-0205-3 & 4 LOCS.

APPENDIX A

APPLICATION FOR PERMIT TO DRILL

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. TYPE OF WORK
DRILL [X] DEEPEN [ ] PLUG BACK [ ]

b. TYPE OF WELL
OIL WELL [X] GAS WELL [ ] OTHER SINGLE ZONE [ ] MULTIPLE ZONE [ ]

2. NAME OF OPERATOR
Chevron U.S.A. Inc

3. ADDRESS OF OPERATOR
P.O. Box 5585, Oxnard, Ca 93031

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface
Lambert Zone 6 X = 1,046,600' Lat. 34° 7' 45.10" N
At proposed prod. zone Y = 728,490' Long. 119° 24' 01.92" W

5. LEASE DESIGNATION AND SERIAL NO.
OCS-P-0205

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
---

7. UNIT AGREEMENT NAME
---

8. FARM OR LEASE NAME
OCS-P-0205

9. WELL NO.
3

10. FIELD AND POOL, OR WILDCAT
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Block 46-N, 61-W
California Map 6B

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*
11± miles southwesterly from Ventura, California

12. COUNTY OR PARISH
Federal Waters

13. STATE

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any) 150'

16. NO. OF ACRES IN LEASE
5760

17. NO. OF ACRES ASSIGNED TO THIS WELL
---

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT. ---

19. PROPOSED DEPTH
----

20. ROTARY OR CABLE TOOLS
Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.)
Water depth = 720' D.F. = 32'

22. APPROX. DATE WORK WILL START*
1982

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT

PUBLIC INFORMATION COPY

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.
SIGNED M. E. Miller TITLE Sr. Drilling Eng. DATE Sept. 22, 1981

(This space for Federal or State office use)

PERMIT NO. ______ APPROVAL DATE ______

APPROVED BY ______ TITLE ______ DATE ______
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions On Reverse Side

CLASSIFIED

DRILLING PROGRAM

This well to be drilled with a drill ship using subsea wellhead and blowout preventers complete with marine riser.

1. Drill 36" hole to 160'± below ocean floor with seawater. Returns to be left on ocean floor. Run and cement 140' of 30", 310# casing, 30" wellhead housing, and permanent guide structure with sufficient cement to fill to ocean floor.

2. Install diverter and diverter system.

3. Drill 17-½" hole to 520' below ocean floor. Run open hole logs. Open hole from 17-½" to 26".

4. Check for flow. After it is determined that the well is completely dead, pull marine riser and run 20", 133#, K-55 casing and 20" x 18-3/4" wellhead housing on drill pipe to 500' below ocean floor. Land and lock the 18-3/4" wellhead housing into the 30" wellhead housing. Cement the 20" casing at 500' below ocean floor through drill pipe with sufficient cement to fill to ocean floor.

5. Run 18-3/4", 10,000 psi, Class IV BOP stack on 21" O.D. marine riser and latch onto the 18-3/4" wellhead housing. Test BOP per Chevron Operating Instruction D-17 and OCS Order #2.

6. Drill 17-½" hole to 1220' below ocean floor and run open hole logs.

7. Run and cement 13-3/8" 61# K-55 buttress casing at 1200' below ocean floor with sufficient cement to fill to ocean floor.

8. Drill 12-¼" hole to 50' below 13-3/8" shoe and make leak off test. Directionally drill 12-¼" hole to 3500' below ocean floor and run open hole logs.

9. Run 9-5/8", 43.5#, N-80, buttress casing and land near 3500' below ocean floor. Land in 18-3/4" wellhead housing and cement with sufficent cement to fill 200' below the 13-3/8" shoe.

10. Drill 8-½" hole to 50' below 9-5/8" shoe and make leak off test.

11. Directionally drill 8-½" hole to 8000' (6988' B.O.F.) total depth and run open hole logs.

12. Completion or abandonment programs to be furnished.

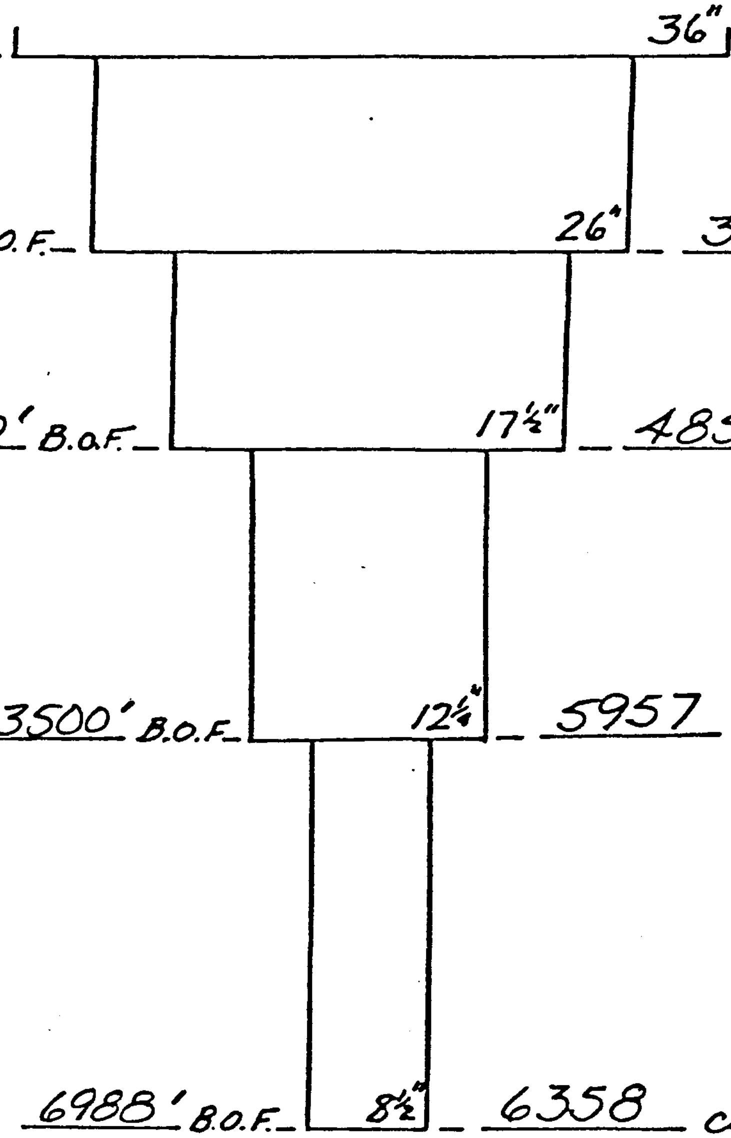
Oxnard, California
Sept. 22, 1981

M.E. MILLER

WELL: OCS-P-0205-3

WATER DEPTH = 720 ft.
DERRICK FLOOR = 32 ft.
D.F. to O.F. = 752 ft.

DRILLED DEPTH TO CASING SETTING POINT	Hole	RISER* & HOLE VOLUME
30" 140' B.O.F.	36"	2940 cu. ft.
20" 500' B.O.F.	26"	3712 cu. ft.
13 3/8" 1200' B.O.F.	17½"	4850 cu. ft.
9 5/8" 3500' B.O.F.	12¼"	5957 cu. ft.
7" 6988' B.O.F.	8½"	6358 cu. ft.



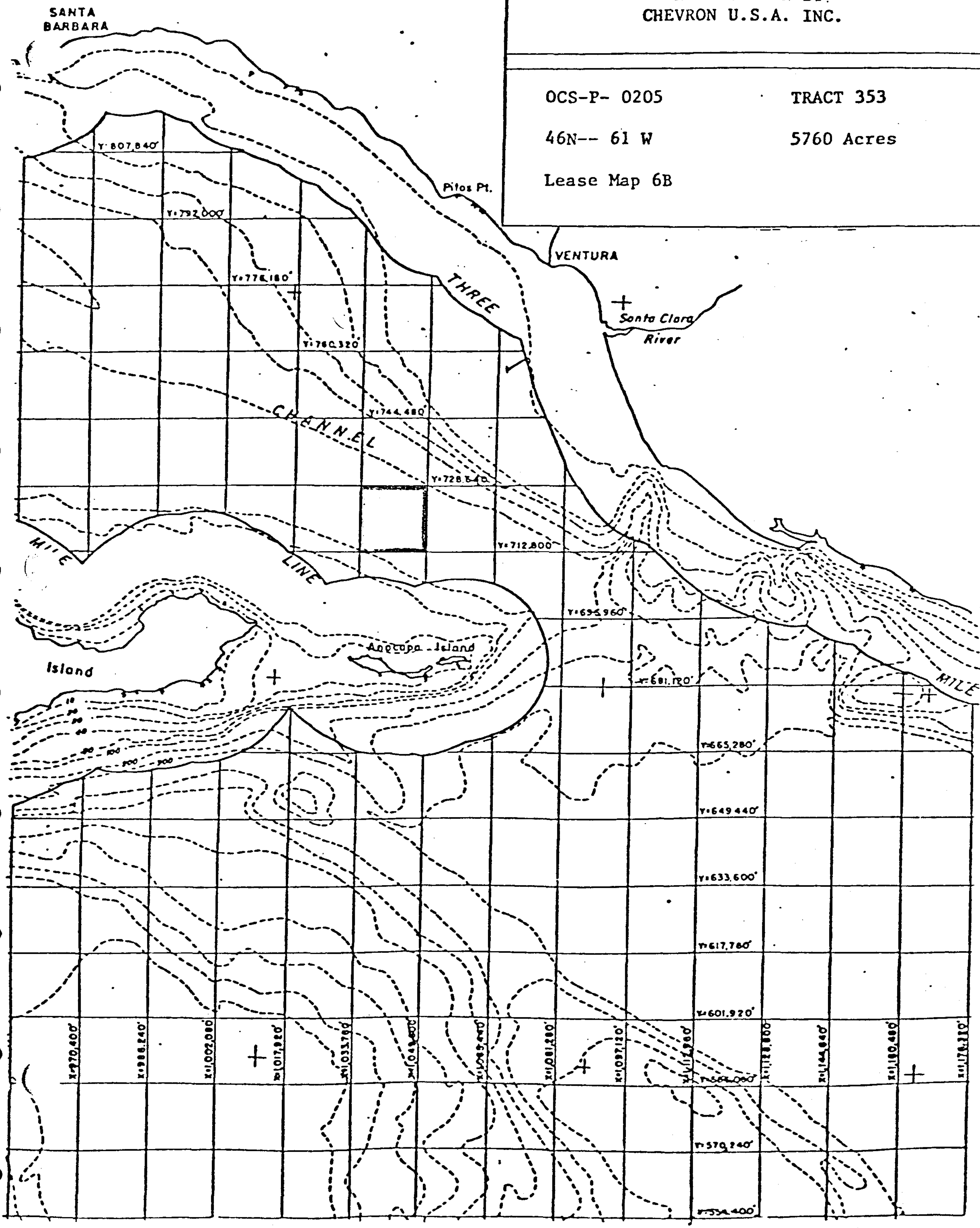
*RISER VOLUME = 1809 cu. ft.

APPLICATION BY
CHEVRON U.S.A. INC.

OCS-P- 0205 TRACT 353

46N-- 61 W 5760 Acres

Lease Map 6B



LEASE LINES ARE IN ACCORDANCE WITH THE BUREAU OF LAND MANAGMENT OUTER CONTINENTAL SHELF LEASING MAP NO.6 B DATED AUG.8,1966. ALL BLOCKS ARE BASED ON THE CALIFORNIA (LAMBERT) PLANE COORDINATE SYSTEM ZONE 6

X-ORIGIN = 2,000,000' AT 116° 15' 00"

Y-ORIGIN = 0,000' AT 32° 10' 00"

N

Chevron

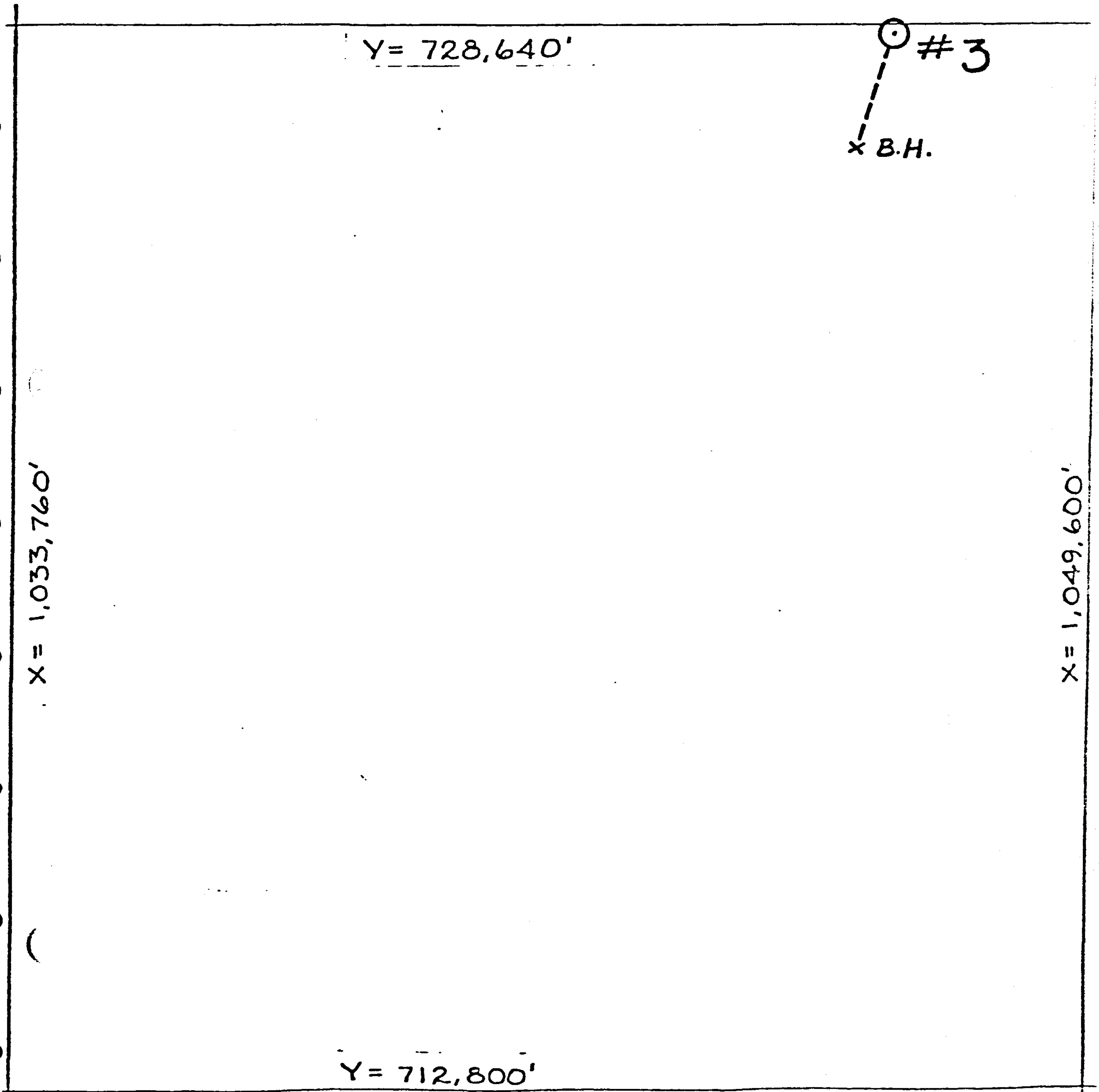
Chevron U.S.A. Inc.

APPLICATION FOR

WELL NO. OCS-P- 0205-3

Scale: 1" = 2,000' Tract 353

DR. APP. [illegible] Date 6/29/5[illegible]



Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. TYPE OF WORK
DRILL [X] DEEPEN [ ] PLUG BACK [ ]

b. TYPE OF WELL
OIL WELL [X] GAS WELL [ ] OTHER SINGLE ZONE [ ] MULTIPLE ZONE [ ]

2. NAME OF OPERATOR
Chevron U.S.A. Inc.

3. ADDRESS OF OPERATOR
P.O. Box 5585, Oxnard, CA 93031

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface
Lambert Zone 6 X = 1,046,600'
At proposed prod. zone Y = 728,490'

5. LEASE DESIGNATION AND SERIAL NO.
OCS-P-0205

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
---

7. UNIT AGREEMENT NAME
---

8. FARM OR LEASE NAME
OCS-P-0205

9. WELL NO.
4

10. FIELD AND POOL, OR WILDCAT
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Block 46-N, 61-W
California Map 6B

12. COUNTY OR PARISH 13. STATE
Federal Waters

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*
11± miles southwesterly from Ventura, California

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any) 150'

16. NO. OF ACRES IN LEASE
5760

17. NO. OF ACRES ASSIGNED TO THIS WELL
---

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT. ---

19. PROPOSED DEPTH
----

20. ROTARY OR CABLE TOOLS
Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.)
Water depth = 720' D.F. = 32'

22. APPROX. DATE WORK WILL START*
1982

23.
PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT

PUBLIC INFORMATION COPY

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.
SIGNED M. E. Miller [signature: M.E. Miller / HL Deare] TITLE Sr. Drilling Eng. DATE September 23, 1981

(This space for Federal or State office use)

PERMIT NO. ______ APPROVAL DATE ______

APPROVED BY ______ TITLE ______ DATE ______
CONDITIONS OF APPROVAL, IF ANY:

DRILLING PROGRAM

This well to be redrilled with a drill ship using subsea wellhead and blowout preventers complete with marine viser.

1. Cut and recover 9-5/8" casing from well OCS-P-0205 #3.

2. Plug 9-5/8" casing stub at ±2200'.

3. Directionally drill 12-1/4" hole to 3500' below ocean floor and run open hole logs.

4. Run 9-5/8", 43.5#, N-80, buttress casing and land near 3500' below ocean floor. Land in 18-3/4" wellhead housing and cement with sufficient cement to fill 200' above the 13-3/8" shoe.

5. Drill 8-1/2" hole to 50' below 9-5/8" shoe and make leak off test.

6. Directionally drill 8-1/2" hole to 8675' (5380' B.O.F.) total depth and run open hole logs.

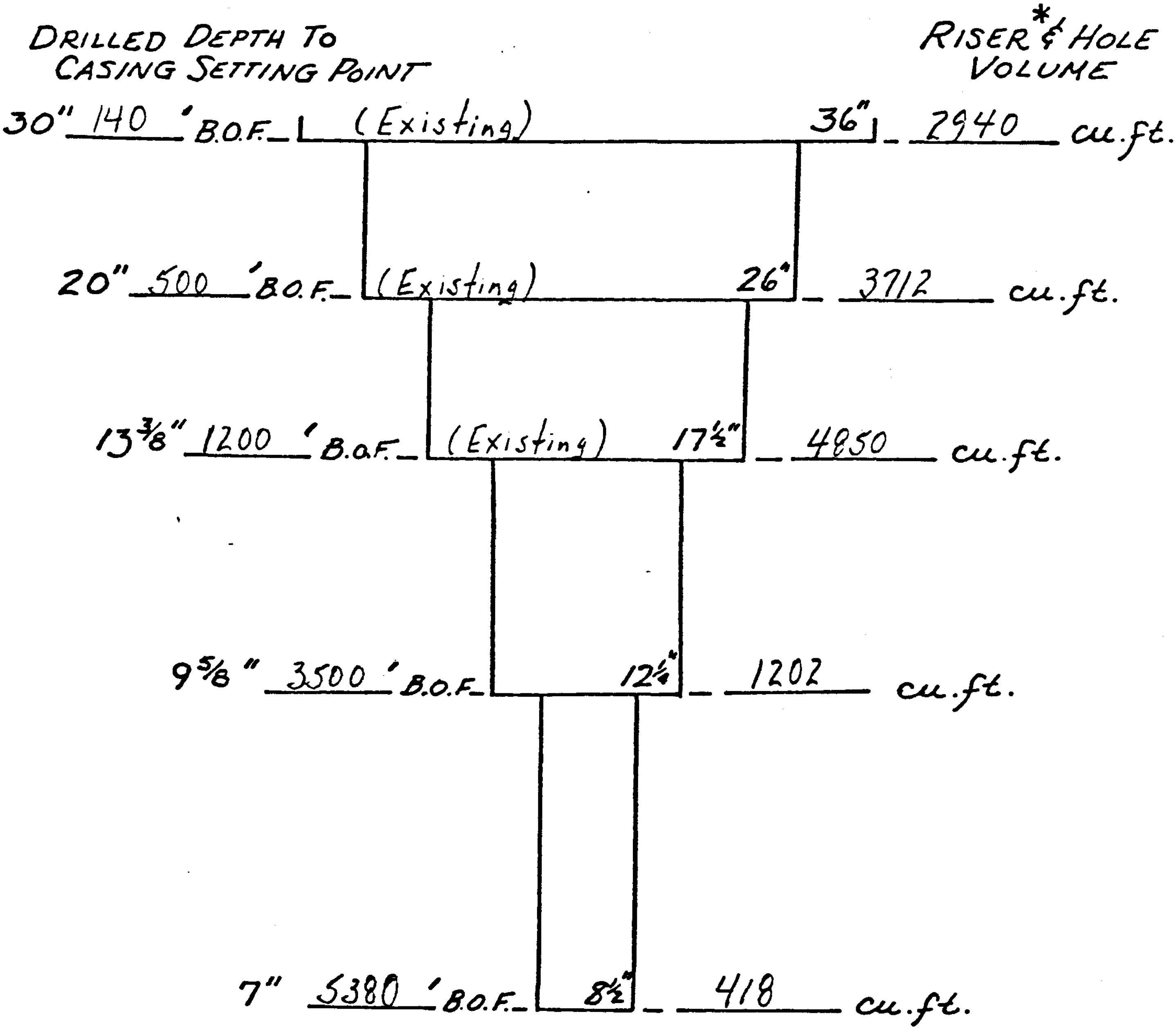
7. Completion or abandonment programs to be furnished.

M.E. Miller / H [illegible]
M. E. MILLER

Oxnard, California

WELL: OCS-P-205-4

WATER DEPTH = 720 ft.
DERRICK FLOOR = 32 ft.
D.F. to O.F. = 752 ft.



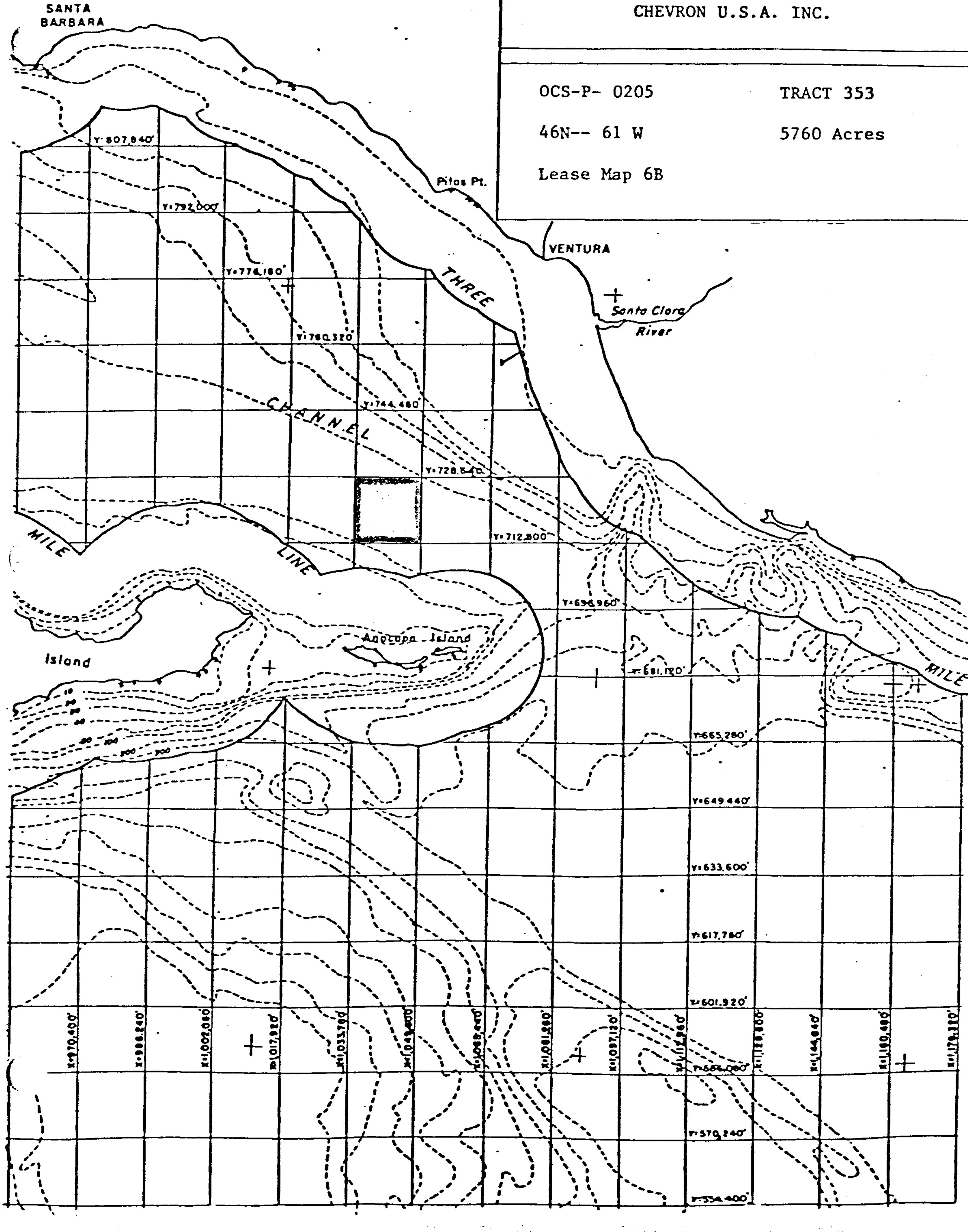
*RISER VOLUME = 1809 cu.ft.

APPLICATION BY
CHEVRON U.S.A. INC.

OCS-P- 0205 TRACT 353

46N-- 61 W 5760 Acres

Lease Map 6B



LEASE LINES ARE IN ACCORDANCE WITH THE BUREAU OF LAND MANAGMENT OUTER CONTINENTAL SHELF LEASING MAP NO.6 B DATED AUG.8,1966. ALL BLOCKS ARE BASED ON THE CALIFORNIA (LAMBERT) PLANE COORDINATE SYSTEM ZONE 6

X-ORIGIN = 2,000,000' AT 116° 15' 00"

Y-ORIGIN = 0,000' AT 32° 10' 00"

N

Chevron

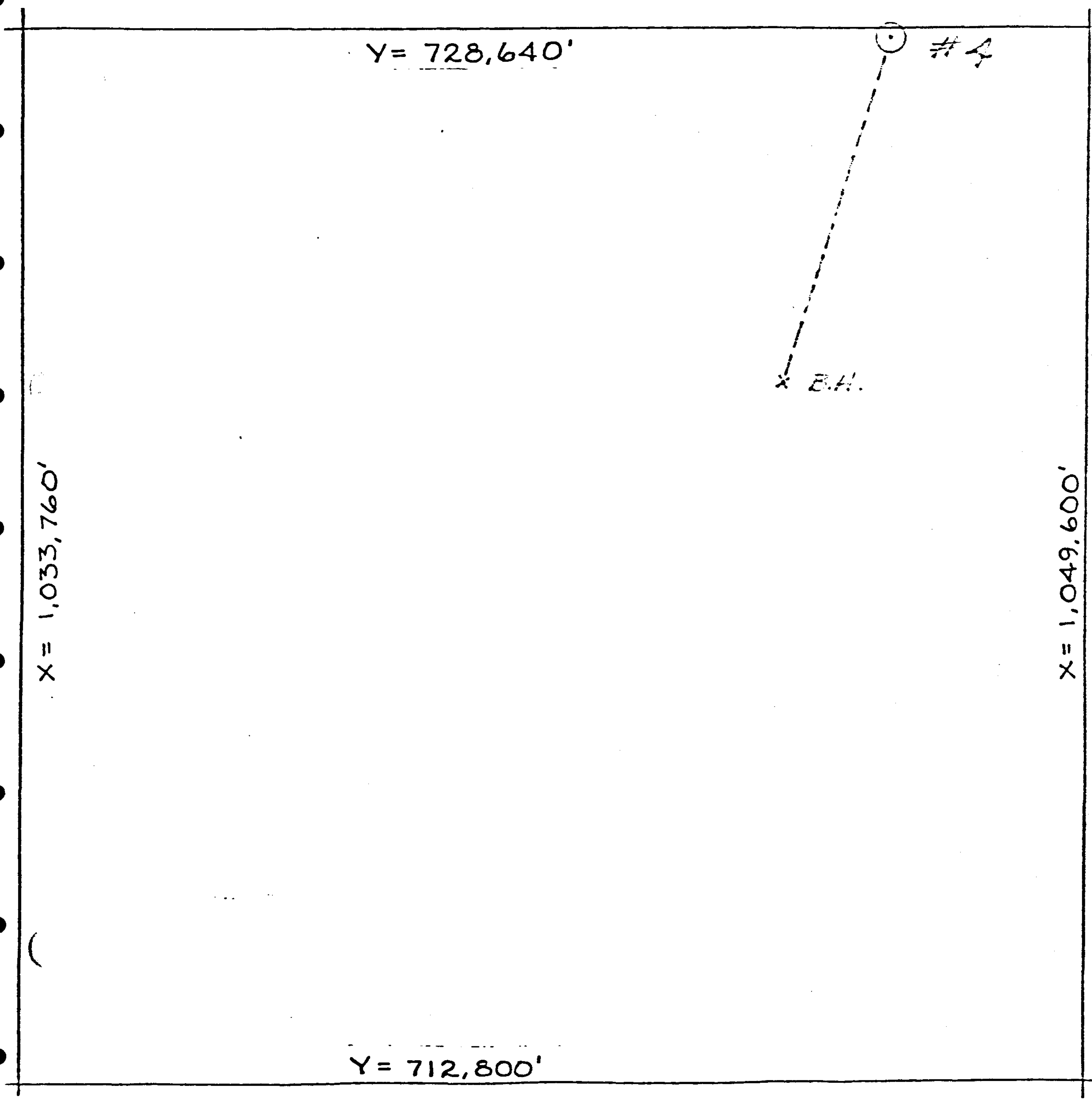
Chevron U.S.A. Inc.

APPLICATION FOR

WELL NO. OCS-P- 0205-4

Scale: 1" = 2,000' Tract 353

DR.APP. [illegible] Date 6/29/81



APPENDIX B

DESCRIPTION OF DRILLING VESSELL

Length, Beam, Draft:
Length 4[illegible] — Beam, 65'2" — Draft 11'½" (light ship)

Displacement:
6,255 L.T. (light ship)

Centerwell:
20' x 22'

Propulsion:
Diesel electric, twin screw, driven by GE 752 RI electric motors.

Ground Tackle:
12 — 30,000 lb. anchors, 8 with 4000' 2¾" stud link chain, 4 with 2000' 2¾" stud link chain used with 2¾" wire rope

Anchor Winches:
8 — wildcat chain windlasses, hydraulic driven
4 — hydraulic wire line winches

Electric Power:
6 — 800 KW, 600V, 3 phase, 60 cycle generators driven by 6 Caterpillar D-399 diesel engines
1 — 175 KW emergency generator driven by 1 GMC 8V-71 diesel engine

Cranes:
1 — Link Belt ABS-138, 63 tons, diesel driven.
1 — Link Belt ABS-48, 19.7 ton cap., driven by GM 3-53 diesel engine

Auxiliary Pumps:
2 Fuel
2 drillwater
2 fresh water circulating
2 Salt water cooling
2 fire
2 Bilge
1 Sanitary

Compressed Air System:
2 — 632 CFM 125 PSI air compressors with after coolers

Water Distillation Unit:
2 — Aqua Chem, 7600 gallons per day.

Radio:
Radiomarine hi-seas radio, Model CRM-C8B.

Radar:
2 — Decca RM-914

Fathometer:
Raytheon Model DE-7[illegible]

RDF Unit:
CEC Benmar, Model ADF-200

Intercom System:
Sound powered telephone system.

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:
14,493 barrels

Bulk Mud:
9,350 cu. ft.

Bulk Cement:
6,150 cu. ft.

Sack Material Storage:
12,000 sacks

Fuel:
10,260 barrels

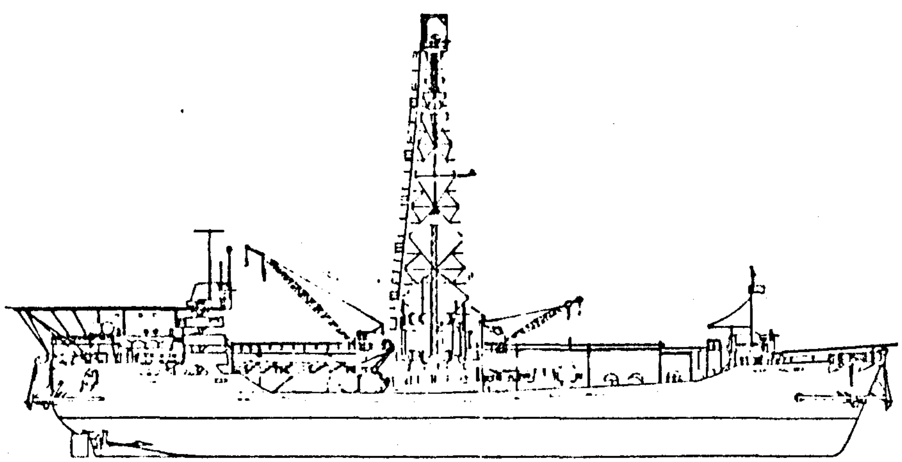
Potable Water:
512 barrels

Derrick:
142' x 61' x 38' special design galvanized with 1,000,000 lb. hookload capacity, API rating.

Drawworks:
National type, 1625 DE, with 6" RC single Parkersburg Hydromatic Brake; driven by 2 GE 752 RI electric motors 6,500' 1⅜" drilling line, Sand reel with 20,000' 9/16" wire rope.

Rig Power:
Electric

GLOMAR CORAL SEA



Rotary Table:
National type C-495, 49½" opening, independently driven by GE 752 RI DC motors, 750 HP

Mud Pumps:
Continental Emsco type, F-1600 triplex driven by dual GE 750 HP motors.

Mud Mixing Pump:
Ingersoll-Rand

Cementing Unit:
2 — Halliburton HT-400

Traveling Block:
Vetco motion compensator, single cylinder, 6 sheave.

Seivel:
National type P-6520, 550 ton.

Air Tuggers:
Ingersoll-Rand

Rotary Hose:
3½" x 75'

Crown Block:
650 ton, split type, GMI design.

Master Bushing:
Varco, hinged

Drill Pipe:
5" drill pipe, Grade E, 19.5 lb./ft. Range 2
3½" drill pipe, Grade E, 13.3 lb./ft. Range 2

Drill Collars:
6-½" OD x 30'
8" OD x 30'

Logging Unit:
Schlumberger

BOP Control System:
Koomey 320 gallon accumulator with direct and remote controls and dual sub-sea pods.

BOP Stack:
Hydril 18¾, 5,000 PSI
Cameron 18¾, 10,000 PSI, 2 DBBL
Vetco H4 wellhead connector.

Riser Tensioning:
Vetco, single cylinder 6 ea @ 80K, 50' stroke

Guideline Tensioning:
Vetco, single cylinder,
4 ea @ 16K, 40' stroke.

Marine Riser:
Regan, FCF 7 Air can buoyancy, 2 line integral, 10,000 PSI for H₂S service.

BOPE DESCRIPTION

1. A diverter will be installed after the 30" casing installation.

2. An 18-3/4" BOPE stack will be installed after the 20" casing installation and cementing. It will consist of 4 rams rated at 10,000 psi and two annular preventer rated at 5,000 psi. This stack will be in place for the remainder of the program. (See attached drawing of BOP stack assembly).

3. All pipe rams will be at a size to fit the drill pipe in use and the bore of all BOPE's and spools will permit the running of the largest tools that the casing below the preventers can accommodate.

4. All BOPE's will be equipped with:

   a. A hydraulic actuating system that provides sufficent accumulator capacity to close all blowout prevention equipment units with a 50 percent operating fluid reserve at 1,200 psi. A high pressure nitrogen or accumulator backup system will be provided, with sufficent capacity to close all blowout preventers and hold them closed. Locking devices will be provided on the ram type preventers.

   b. Two control stations, one at the driller's station and one remote in Tool Pusher's Office. Manual control can also be accomplished at the accumulator unit.

5. The kill line will have a fail safe valve located next to the BOP stack. Auxiliary connections for an emergency kill or choke line will be provided below any preventer that is likely to be closed (see drawings).

6. The kill line will have at least one control valve in addition to the master gate valve.

7. All valves, pipe and fittings that can be exposed to pressure from the wellbore will be of a pressure rating at least equal to that of the blowout prevention equipment.

8. A top kelly cock will be installed below the swivel, and another will be installed at the bottom of the kelly and so designed that it can be run through blowout preventers.

9. A back-pressure valve shall be used in the drill string.

10. An inside blowout preventer and a full opening drill string safety valve in the open position will be on the rig floor at all times while drilling operations are being conducted. Valves will be on the rig floor to fit all pipe sizes that are in the drill string. A safety valve will be available on the rig floor to fit the casing string as it is being run in the hole.

11. The borehole shall be kept full of mud at all times. To assure early detection and thereby early reaction to swabbing, lost circulation or influx of formation fluids, the following mud system monitoring equipment (with derrick floor indicators) will be installed and used throughout the period of drilling after setting and cementing the conductor (20") casing.

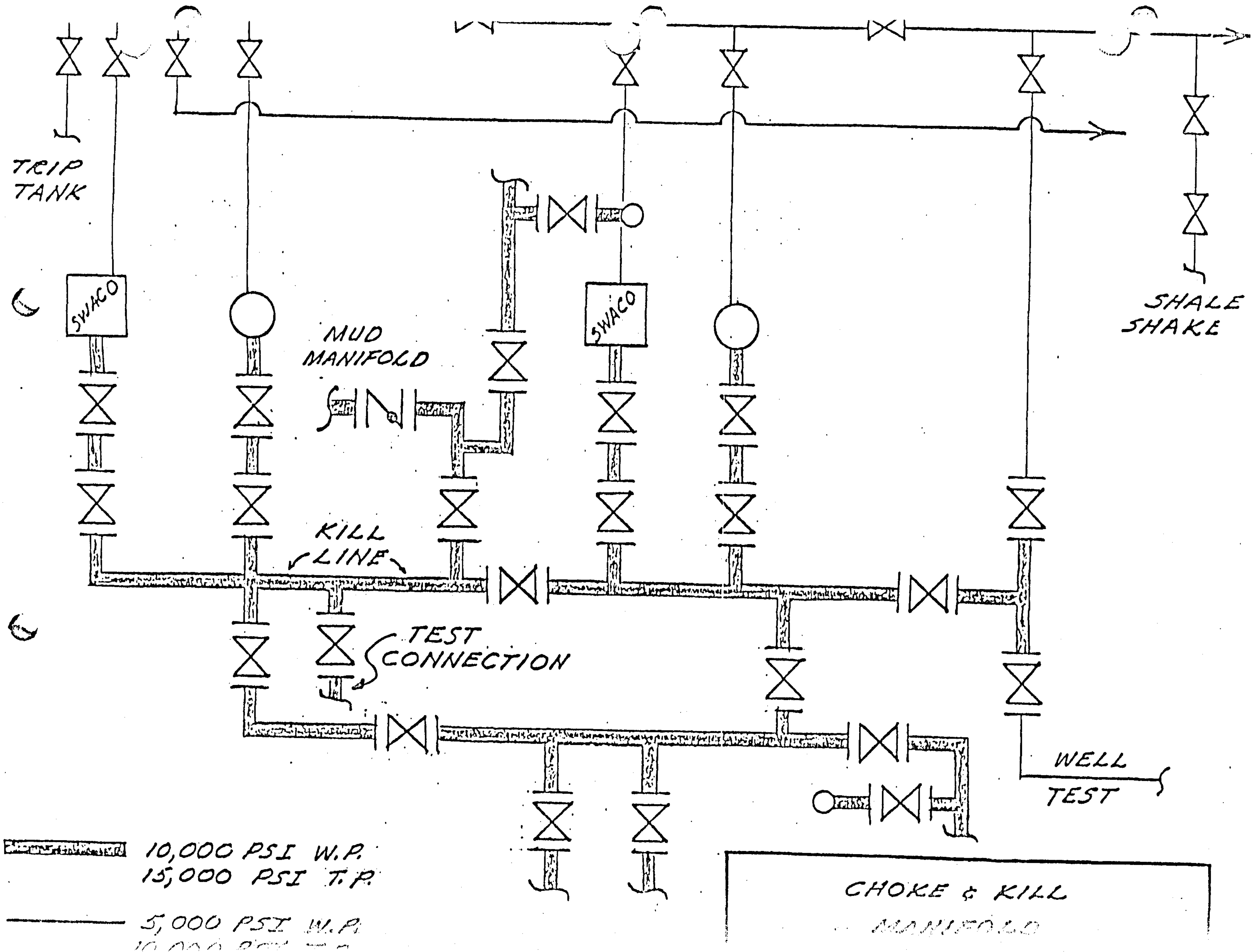
    a. Recording mud pit level indicator to determine mud pit volume gains and losses. This indicator shall include a warning device.

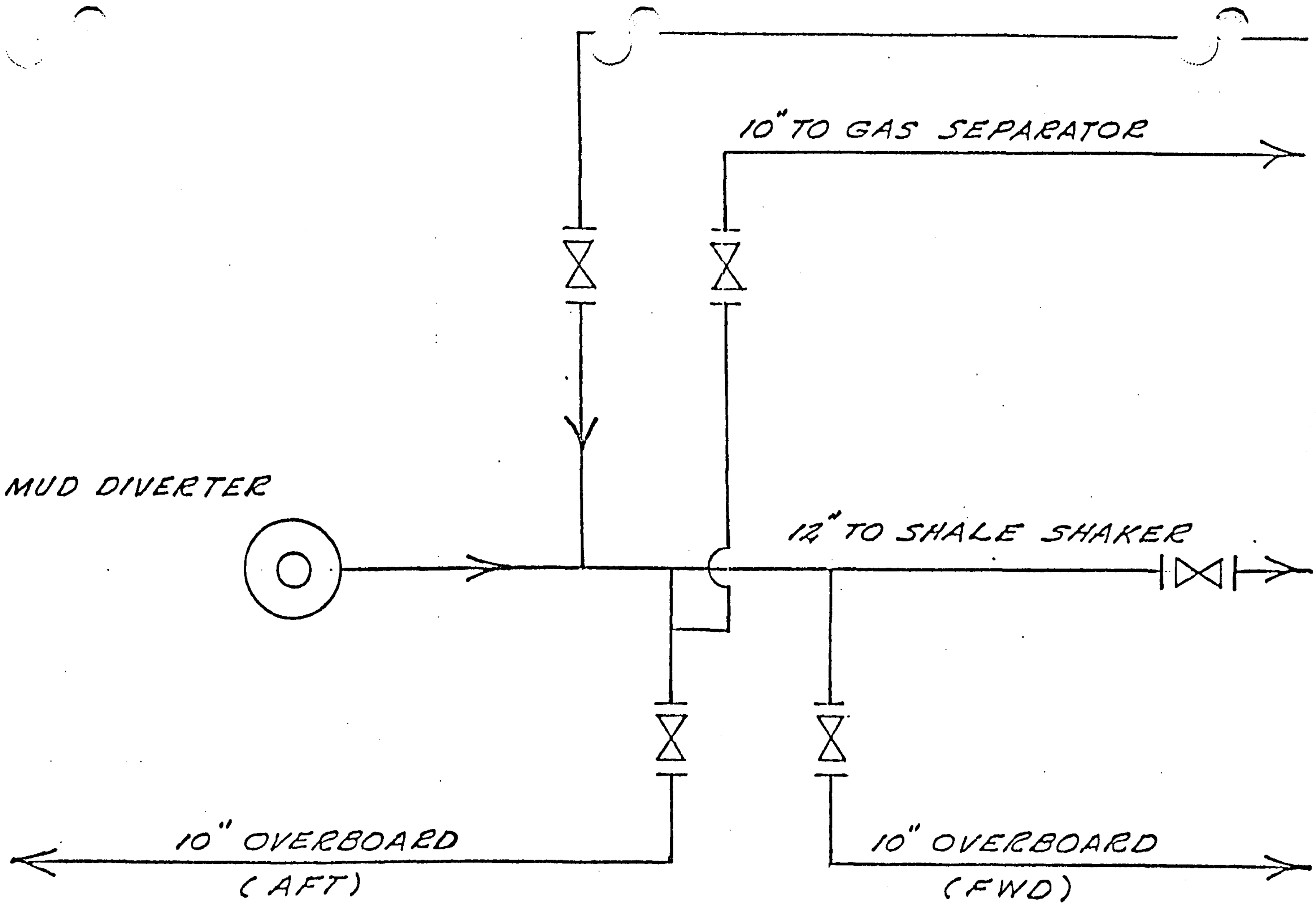
    b. Mud volume measuring device for accurately determining mud volumes required to fill hole on trips.

    c. Mud return or "full hole indicator."

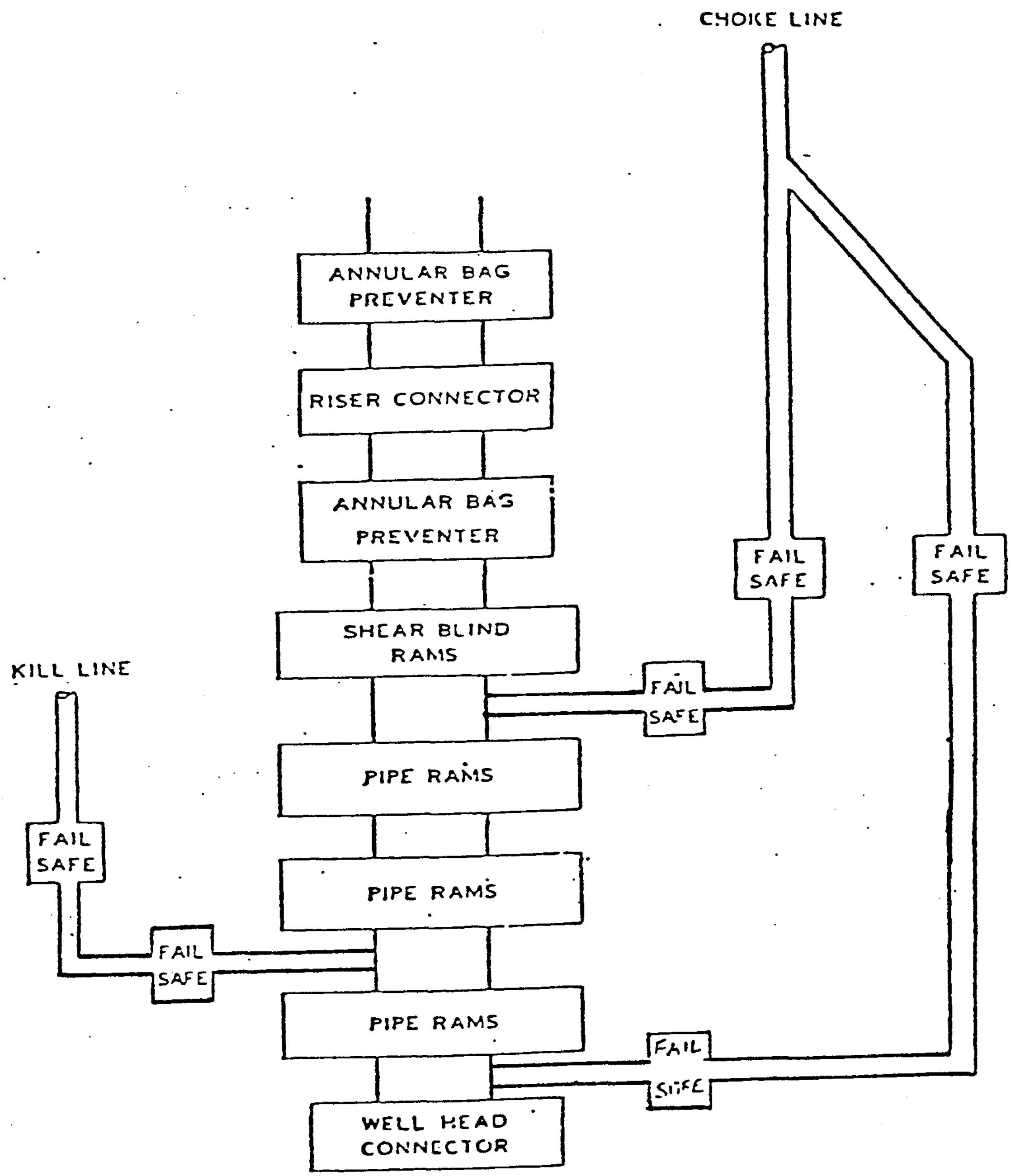
    d. Trip tank.

12. All BOPE's and associated equipment will be installed, tested and operated in accordance with OCS Order #2.


TRIP TANK
SWACO
MUD MANIFOLD
SWACO
SHALE SHAKE
KILL LINE
TEST CONNECTION
WELL TEST
10,000 PSI W.P.
15,000 PSI T.P.
5,000 PSI W.P.
CHOKE & KILL MANIFOLD



DIVERTER SYSTEM SCHEMATIC



GLOMAR CORAL SEA BLOWOUT PREVENTER STACK SCHEMATIC

1300.22MAR76

SUPERVISION AND TRAINING

A Chevron U.S.A. Inc. Drilling Representative will supervise operations 24 hours per day. All Chevron U.S.A. Drilling Representatives in the Southern California Division have extensive experience and are familiar with all phases of drilling including blowout or kick control. Their experience includes Company blowout schools with classroom lectures and working with a simulator to provide experience in controlling kicks. In addition the Representatives have several years of actual field drilling experience.

Safety meetings will be held on the drilling vessel at least once a week. Subjects for discussion and instruction will include all aspects of well, rig and vessel safety including H_2S Safety requirements. Emphasis will be placed on blowout prevention.

The BOPE will be inspected and tested in accordance with OCS Order #2.

The Chevron U.S.A. Inc. Drilling Representative will schedule weekly drills for each drilling crew to insure that all equipment is operational and that crews are trained properly to carry out emergency duties.

CHEMICALS (MUD ADDITIVES)

Based on circumstances, the following additives could be used aboard the Global Marine (Coral Sea) to drill wells on the OCS Leases for Chevron U.S.A.

PRODUCT	CHEMICAL DESCRIPTION	MAKE-UP DOSAGE, lb/bbl.
Aquagel	Sodium type montimorillonite powder.	10-25
Baroid	Powdered natural barium sulfate	0-400
K-Lig	Potassium Lignite	3-20
Carbonox	Lignitic humic acid powder	3-20
CC-16	Solubilized sodium salt of lignitic humic acid	3-10
Q-Broxin	Ferrochrome lignosulfonate powder	1-20
Caustic Soda	Sodium hydroxide flake $NaOH$	0.1-3
Soda Ash	Sodium carbonate powder $Na_2 CO_3$	0.5-2
Bicarb of Soda	Sodium Bicarbonate powder $NaH CO_3$	0.5-2
Caustic Potash	Potassium Hydroxide, flake and Liquid	0.1-3
Calcium Choride	Calcium Chloride, $CaCl_2$	10-350
Aktaflo-S (DMS)	Mixed oxyethylated phenols-liquid	2-6
Cellex	Sodium carboxymethylcellulouse	0.1-2
Sodium Nitrate	Sodium Nitrate, $Na_2 NO_3$	.05-1
Micatex	Mica flakes	2-15
Wall-Nut	Granular nut hulls	2-10
Torq-Trim	Blended liquid triglycerides & Alcohols	2-6
Con-Det	Anionic Surfactants	0.1-0.8
Lime	Calcium hydroxide powder $Ca\ (OH)_2$	0.5-8
Drispac	Polyanionic cellulose powder	0.1-2

CORAL SEA DRILLING VESSEL

Liquid and Dry Storage Capacity

4 - 550 bbl (3088 Cu. Ft.)	storage tanks for liquid mud	12,352 Cu. Ft.
1 - 600 bbl (3369 Cu. Ft.)	Active tank	3,369 Cu. Ft.
3 - 2050 Cu. Ft.	tanks for bulk barite	6,150 Cu. Ft.
3 - 2050 Cu. Ft.	tanks for bulk cement	6,150 Cu. Ft.
4 - 800 Cu. Ft.	tanks for bulk gel	3,200 Cu. Ft.
2 - 800 Cu. Ft.	tanks (Surge bins)	1,600 Cu. Ft.
	Total	32,821 Cu. Ft.

Maximum Storage Capacity for dry mud materials 12,000 Sacks

Appendix D	-	OIL SPILL CONTINGENCY PLAN
Appendix E	-	CRITICAL OPERATIONS
Appendix F	-	H_2S CONTINGENCY PLAN

Appendices D, E and F have been submitted previously as part of the Chevron U.S.A. Inc., Western Region Production Department, Oil Spill and Emergency Contingency Plan for Santa Barbara Channel Outer Continental Shelf, on file with the U.S. Geological Survey, California Coastal Commission and other agencies.

APPENDIX G

LETTER FROM U.S. COAST GUARD

TO

CALIFORNIA COASTAL COMMISSION,

Dated 15 August 1980

(m)

16650
15 August 1980

Mr. M. L. Fischer
Executive Director
California Coastal Commission
631 Howard Street
San Francisco, CA 94105

Dear Mr. Fischer:

I received a copy of the staff recommendation on Consistency Certification No. CC-7-80 (CHEVRON USA) for exploratory Well No. 3 in OCS Parcel P-0205 today, and note that it will be considered again at a public hearing on 19 August 1980.

Section II.D. of the Findings and Declaration section on page 10 addresses the nonobjection of the Coast Guard to the proposed activity, and made the following incorrect statement: "Staff consulted with the Coast Guard on the issue of the drillship creating a hazard to navigation. The Coast Guard does not deny that the site of the drillship in the buffer zone could create a substantial hazard to navigation safety". (Underscoring added.)

The Coast Guard did not say that it would be a "substantial hazard" in our letter to you dated 16 July 1980, nor in either my verbal or written statements before the Commission at the hearing in San Diego on 22 July 1980. On the contrary it should be prima facie from our statement of nonobjection that we do not consider the site, which would be 400 feet away from the left side of the vessel traffic lane boundary, to be a substantial hazard to navigation.

Some level of the risk to navigation is presented by each exploratory drilling operation that is located in an area of vessel navigation. The assessment of risk includes several considerations. Our assessment which has previously been discussed was that proposed activity was not an unacceptable hazard to navigation. Additional mitigation measures are applied due to the site's close proximity to the traffic lane.

A copy of my statement to the Commission dated 22 July 1980 is attached. A copy of the definitions of "development" and "exploration" is also attached. These

(m)
16650
15 August 1980

are pertinent to Section 30262 of the California Coastal Management Plan which addresses oil and development, not exploration.

Sincerely,

D. M. TAUB
Captain, U. S. Coast Guard
Chief, Marine Safety Division
Eleventh Coast Guard District
By direction of the District Commander

Encl: (1) Statement of 7-22-80
(2) Definitions

Copy to: Mr. W. Ahern, CCC Staff
Ms. M. Rourke, CHEVRON

ENVIRONMENTAL REPORT (EXPLORATION)
FOR
PROPOSED EXPLORATORY WELLS
P-0205-3 and -4
EASTERN SANTA BARBARA CHANNEL
OFFSHORE SOUTHERN CALIFORNIA
FEDERAL OCS LEASE BLOCK P-0205
CHEVRON U.S.A., INC.

JULY 12, 1981

Address inquiries to:
Mr. Clair Ghylin
Chevron U.S.A. Inc. - Western Region Land
2120 Diamond Boulevard
Concord, CA 94520
Phone (415) 680-3333
or
Mr. C. N. Segnar
Chevron U.S.A. Inc. - Western Region Production
575 Market Street
San Francisco, CA 94105
Phone (415) 894-2851

Previous related environmental reports, assessments and/or impact statements are listed in Section 7 (References), items 1 thru 3.

TABLE OF CONTENTS

11. APPENDIX 7 - TABLES

ENVIRONMENTAL REPORT (EXPLORATION)

1. INTRODUCTION

This Environmental Report (Exploration) accompanies the Amended Exploration Plan for Federal OCS Lease P-0205 which will be submitted as an Supplement to the Santa Clara Unit Plan by Chevron U.S.A., Inc., and 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 accompanying Amended Exploration Plan is being resubmitted, per 30 CFR 250.34-1(g) and 15 CFR 930.83, to accomodate the California Coastal Commission's objections to the original Exploratory Plan, Santa Clara Unit, Well P-0205 #3, which was approved by your office JUne 29, 1980. The Amended Exploration Plan specifically describes modifications made to the original OCS plan. This revised Environmental Report (Exploration) includes an amended consistency certification as well as data and information necessary to support the new consistency determination; it describes the manner in which such modifications will ensure that all of the proposed Federal license or permit activities described in the Amended Plan will be conducted in a manner consistent with the State's coastal management program.

The format of this report has been revised to conform to the guidelines set forth in NTL 80-2, "Minimum Requirements for Environmental Reports," dated March 20, 1980. Although 30 CFR 250.34-3 enumerates significantly different data requirements for the Environmental Report (Exploration) versus the Environmental Report (Development/Production), NTL 80-2 prescribes a single format for both kinds of environmental report. Thus, the prescribed format includes various topics which are neither required nor relevant in an Environmental Report (Exploration). In recognition of this, NTL-80 (Sections VII A and B) states that "only those items that are relevant should be discussed in the environmental report" "and depending upon the nature of the proposed action." Accordingly, many of the topics enumerated in Section VIII are not discussed in this report. We have endeavored to ensure that the report also includes any items required by 30 CFR 250.34-3 which might not be listed in NTL 80-2.

Our reading of the guidelines indicates that: Section 3 should describe all relevant environmental parameters; Section 4 "need only discuss those adverse impacts that are not effectively minimized by proposed mitigating measures" (such measures are discussed in Section 2); Section 6 will summarize unavoidable adverse impacts, if any.

As stipulated in Section II of NTL 80-2, information contained in other reports or surveys has not been duplicated, but is referenced extensively and summarized in this report. Information applying specifically to this project has been furnished by the professional staff of Chevron U.S.A. Inc., or affiliated companies.

Copies of referenced material are available at many universities or college libraries in California, at U. S. Geological Survey libraries in Menlo Park and Los Angeles, 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 on the title page 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.

<u>The impacts of the proposed project on the environment, as analyzed in the following presentation, are concluded to be negligible in magnitude and temporary in nature</u>. 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. DESCRIPTION OF THE PROPOSED ACTION

This section (especially Parts c, e, h, j, l and n) supplements the accompanying Amended Exploration Plan and should be read in conjunction with that document.

a. Operator

Chevron U.S.A., Inc.

b. Lease Numbers and Location

OCS Parcel P-0205 located in the northeastern Santa Barbara Channel approximately 24 miles southeast of Santa Barbara, 11 miles southwest of Ventura and 10 miles west-southwest of the nearest mainland shore north of Port Hueneme. (See Index Map, Figure 1.)

c. Objectives

The objectives of the proposed activities, as described in the Amended Exploration Plan (Section 1) are to evaluate the reservoir characteristics and problematical southern extent of oil and/or gas reservoirs encountered in the P-0205 #1 and P-0209 #1 wells, and to test deeper zones at an optimum structural position. The original Plan would have achieved these objectives with a single well located south of the Northbound Vessel Traffic Lane and directionally-drilled northward beneath the lane. The Amended Exploration Plan comprises two wells directionally-drilled from the same drillsite and utilizing the same shallow casing strings and temporary sea-floor facilities. The drillsite herein proposed is located 6.83 nautical miles north of Anacapa Island, on the north side of the Northbound Vessel Traffic Lane, and the two wells will be directionally-drilled southward beneath the lane. The drillsite now being proposed is 1.13 nautical miles north of the location described in the original plan. It accomodates the Coastal Commission's objections to the original location in that it:

1) is outside the boundaries of the Channel Islands Marine Sanctuary and thus will have substantially less impact on marine life within the Sanctuary;
2) is 20% farther from Anacapa Island, providing an additional margin of time for containment and/or dispersion in the exceedingly unlikely event of an oil spill associated with the proposed activity (see Section 4g(1)); and

3) offers significantly less potential interference with vessel traffic in the northbound sea lane (see Section 3d(2)).

The Amended Plan should accomplish essentially the same basic objectives as the original Plan, though with certain significant differences which will be described below. The need to drill two wells instead of one will result in a substantial increase in the duration of the proposed activities, and in their cost.

Figure 2 of the Amended Exploration Plan illustrates the significant differences from the original Plan. The well initially proposed would have penetrated the upper reservoirs - previously tested and proven productive along the northern edge of the structure -- on its untested southern flank, where their existence and productivity are as yet unknown. That same well would have tested deeper potential zones on the highest part of the structure. When the original Exploration Plan was submitted, preliminary studies had suggested that reserves in the upper reservoirs on the northern part of the structure, proven by the P-0205-1 and P-0209-1 wells, were sufficient to justify a development platform even if no additional reserves could be proven on the southern flank or in the deeper zones. A subsequent reservoir analysis using data from recent development drilling elsewhere in the Santa Clara Unit indicates that this may not be the case. Further detailed coring and testing of the upper zones, not included nor possible in the original plan, is required to establish the economic viability of the project and so permit platform construction to go forward.

As described in the Amended Exploration Plan, the P-0205-3 well will be directionally-drilled to the south to penetrate the upper reservoirs at the highest part of the structure, about 1600 ft. south of the drillsite location. An extensive program of coring and open-hole, zone-by-zone formation testing will evaluate all of the known and potential reservoirs. This program requires that the well-bore be straight, and nearly vertical, throughout the entire interval to be tested.

Depending on the results obtained in the P-0205-3 well, a second well -- designated the P-0205-4 -- may be drilled out of the upper portion of the P-0205-3.

(The lower part of the P-0205-3 would first be plugged and abandoned.) The P-0205-4 would penetrate the upper and intermediate reservoirs on the southern flank of the anticline. As illustrated on Figure 2 of the Amended Exploration Plan, the P-0205-4 would penetrate the upper reservoir to the north of the optimum target area; a well-course reaching that optimum area would have a deviation so extreme as to preclude the logging and testing operations essential to an exploratory well. Drilling of the P-0205-4 well is dependent on results of the P-0205-3. Should the first well conclusively disprove the economic viability of field development, the second well would not be drilled.

Drilling of either of these wells from a more northerly location -- and especially from north of the "buffer zone" to the sea lane -- is not feasible from a technical standpoint. Figure 2 of the Amended Exploration Plan shows that from such a location the P-0205-3 would reach a deviation of 80 degrees from vertical in order to enter the upper reservoir at the requisite area and angle. Such an extreme deviation and abrupt S-curvature would preclude most types of open-hole logs that are needed to evaluate the well, would probably prevent formation-testing of the reservoir intervals, and would virtually ensure severe mechanical problems such as casing wear, "key-seating", twist-offs, and eventually, loss of the hole before its objectives were accomplished. If the P-0205-4 were drilled from that northerly location, it would penetrate the upper reservoir in the same area as did the P-0205-3 and provide no data on its more southerly extent, thus obviating the purpose of the well.

Proposed total drilled depths will be 8,000 ft. for P-0205-3 and 8,500 ft. for P-0205-4, unless the operator determines that drilling to these depths would be unwarranted or impractical. Total proposed footage for the two wells would be about 13,500 ft., compared to 9,700 ft. for the original plan. Consequently, the drilling vessel will be on location an additional 50 to 80 days.

d. <u>Description of Vessel</u>

The floating drillship Glomar Coral Sea, a 400-foot-long ship-shaped drilling vessel, will be used. The self-propelled Coral Sea (described fully in Appendix B of the Amended Exploration

Plan) carries a 142-ft. derrick with a 1-million-lb. hook load capacity, drilling through a 20 x 22 ft. centerwell. Electric power for the rig is supplied by diesel generators - 6 main plus 1 emergency. The vessel is held on location by 12 30,000-lb. anchors.

e. Time Frames

This project will be of temporary duration. The active drilling phase for P-0205-3 will require 50 to 60 days, and for the P-0205-4, 40 to 50 days. Evaluation and abandonment procedures for each well will probably last another 5 to 25 days. It will take about 6 days to move in and out of each location. This results in a total of about 50 to 90 days for each of these wells.

Drilling of this well could commence the beginning of 1982, depending on receipt of permit approvals and availability of a drilling vessel. As discussed above (Section 2c), drilling of the P-0205-4 will depend upon results from the P-0205-3. The decision would be made before the P-0205-3 reached total depth, and drilling of the P-0205-4 would follow immediately, without movement of the drillship or alteration to the sea-floor facilities. For these reasons, the actual period of on-site activities cannot be predicted at this time.

f. Travel Modes, Routes and Frequency

A contracted crew boat will transport personnel to the well site from the pier at Port Hueneme. The current plans call for about 25 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 20 trips per month from Port Hueneme are anticipated.

Helicopter service to the drilling vessel is expected to originate from the Oxnard or Ventura Marina. Helicopter service will operate as required (emergencies and special situations) with an estimated 50 trips per month.

g. Personnel Requirements

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). Local vendors furnishing various materials and offering services will also be employed in support of this exploratory activity.

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.

h. Equipment and Safety, Monitoring and Onshore Systems

The equipment on board the drilling vessel and its general layout are described in Appendix B of the Amended Exploration Plan. In addition, a workboat remains within 15 minutes travel-time of the drilling vessel throughout the drilling operation to provide assistance in the event of an emergency. The subsea blowout-preventer system is described in detail in the Application For Permits to Drill which accompany the Amended Exploration Plan; these BOP's are tested upon installing, before drilling out after cementing each string of casing, and at least once each week otherwise. Other safety systems include fire sensors, a dry-chemical fire smothering system, and pit-level, gas-detection and other mud-system monitoring equipment.

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.

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.

i. New or Unusual Technology

The use of new of unusual technology on this project is not anticipated, nor are there drilling or operating conditions which might indicate the need for any such special technology.

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

Procedures for prevention of oil spills and for dealing with minor spills of oil or waste materials are discussed in detail in Section 2 of the accompanying Amended Exploration Plan, which describes: personnel training and supervision; oil-spill equipment and materials carried on the drillship or on the accompanying workboat; procedures for handling minor spills. Additional details regarding handling of waste materials will be found in the NPDES Permit (CA0011087) (Appendix 5) issued by the EPA to Global Marine for the drillship Glomar Coral Sea.

(1) Pollution Prevention Procedures

The procedures which will be followed in order to prevent pollution are described in Section 2(k) and Appendix 5 of this report and in Sections 2A of the accompanying Amended Exploration Plan. In summary, these procedures include: use of water-based drilling fluid; cleaning of cuttings prior to their discharge into the ocean; processing of sanitary wastes in on-board sewage plant; hauling trash ashore for disposal; collection of all deck drainage, and its processing through an oil-water separator; on-shore disposal, at an approved site, of oily waste-water, oily water from testing, oily cuttings, and material contaminated in the clean-up of spills. In order to prevent accidental spills related to the drilling process, the operator will utilize all of the equipment, techniques, and personnel training specified in OCS Order No. 2 for the Pacific Region.

(2) Personnel Implementing Contingency Plans

Procedures for reporting, control and clean-up of oil (or waste material) spills are fully described in Chevron's Oil Spill and Emergency Contingency Plan for Santa Barbara Channel OCS Leases (Ref. 4) and in Clean Seas, Inc. Oil Spill Clean-Up Manual (Ref. 5), both of which have been previously submitted to the U.S. Geological Survey, California Coastal Commission and other agencies.

Clean-up of small spills and the initial response to larger spills will be handled by the contractor's on-board personnel. If drilling or well-control activities at the time of a spill require the full attention of the drilling crew, the 20-man off-shift crew (which sleeps on board the vessel) would be turned out, thus providing immediate response. In the event of a spill, Chevron's On-site Operating Foreman (or, in his absence, the contractor's Drilling Foreman) is responsible for immediate control and containment action and notification of the Coast Guard, the U.S. Geological Survey, and Chevron's Drilling Superintendent (an additional ten persons in the Chevron organization are listed to provide back-up).

In the event of a spill of 10 barrels or more, or a continuing discharge, Chevron will activate their Major Oil Spill Contingency Plan. Directly or through deputies, Chevron's Southern Division Operations Superintendent (Production) would contact 16 Chevron employees, each of whom has specific duties relating to spill control, containment and clean-up, wildlife preservation, communications, transport, supplies and services, volunteer help, oceanographic and other technical factors, and contact with outside agencies and the public. Each of these persons has a back-up, and all live and work in the Southern California area -- half in Santa Barbara or Ventura counties.

(3) Relationship to Regional Contingency Plans

Chevron is a member of Clean Seas, Inc., the regional oil spill cooperative responsible for containment and clean-up operations in the Santa Barbara Channel and vicinity. Clean Seas will be called in the event of any oil spill exceeding 5 to 10 barrels. In addition to its full-time manager and staff of approximately 4, Clean Seas has primary and secondary response staffs composed of member-company personnel, nearly all living within one hour of Santa Barbara.

(4) Clean-up Activities and Equipment

The drilling vessel and/or its standby boat carry containment and clean-up equipment sufficient to handle a spill of up to 15 barrels of oil: this equipment is listed in Table 1 of the accompanying Amended Exploration Plan. The steps involved in cleaning up a spill are as follows:

(a) If the spill appears to exceed five (5) barrels, 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 is 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 sites within 3-4 hours.

(b) Assess wind and current direction to determine the possible path of the spilled hydrocarbons.

(c) Deploy the containment boom stored on the vessel and surround the spill.

(d) Use skimmer stored on board the vessel to recover oil retained by the boom.

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

(f) Use absorbent goods to remove final traces of hydrocarbons.

In the event of a major spill, Clean Seas would provide equipment from its depots at Carpinteria and Port Hueneme. Much of the equipment is trailer-mounted and ready to launch; a complete listing including types and capacity of equipment will be found in the Clean Seas Oil Spill Clean-Up Manual (Ref. 5).

k. Solid, Liquid and Gaseous Wastes and Pollutants

The various discharges to the environment from the drilling vessel will be divided into two categories: solid and liquid wastes, and gaseous pollutants. The solid and liquid wastes will be treated and discharged according to the NPDES permit (Appendix 5) or as described in (k)(2) below. Besides the exhaust and combustion products from diesel-electric power generation engines, the only other gaseous emissions will be from transport and supply activities and the flaring of natural gas during drill-stem tests.

(1) Solid and Liquid Wastes

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) Garbage wastes, biodegradable and trash
(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 still

Depending on operating circumstances, it may be necessary to dispose of some drilling muds at the drillsite. This mud 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. 6, 7, 8, 9 & 10). 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 8,500 to 8,750 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 up to 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 paragraph refer to the Ecomar, Inc. and Shell Oil Co. study at Tanner Banks (Ref. 6).

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 7000 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 50 and 100 gallons per day. Normally this water will be processed through an approved separator. 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 (2,896,000 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) Sites and Methods of Disposal

Oil/water mixtures which have been recovered and are contained in tanks or other containers can be separated in temporary on-site separators or in treatment tanks at local oil production facilities (such as Chevron's Carpinteria plant) and the recovered oil then sent to a refinery.

Oil-contaminated sorbents and debris and non-reclaimable liquid oil would be taken by truck or boat-and-truck to an approved Class I disposal site for burial. These sites include:
Simi Valley Landfill (Ventura Co.)
Casmalia Landfill (Santa Barbara Co.)

In the near future, biodegradable oily wastes may be disposed of by land-farming at several sites now being developed or planned in Southern California.

(3) Gaseous Emissions

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 each proposed well, estimated at 50 to 90 days. The specific emission sources include:

1. Diesel generators used to supply all drilling, motive and auxillary power for the drillship (see Section 2(d), and Appendix B of the Exploration Plan).

2. Natural gas flaring.

3. Supply and crewboat engines and helicopters.

4. Drillship movement to and from the proposed site (diesel electric).

Short term emissions which result from flaring do have an impact in the immediate vicinity of the drillship. However, due to the temporary nature of the flaring activity (estimated 5 hours per well) long term emissions are not considered significant.

Appendix 6 contains detailed calculations of the composition and estimated quantity of the emissions from each exploratory well on OCS P-0205. The quantities were developed using known hourly fuel consumption for the vessel in applicable operation (drilling, movement to site, site preparation, etc.), and EPA AP-42 factors, and are tabulated in Appendix 6. The emissions from supply and crewboats and helicopter operations will total, for the maximum-case well (8,500 ft. D.D., 90 days maximum time): CO, 1.74 tons; TSP, 0.03 tons; SO_2, 0.31 tons; NOx, 4.57 tons; VOC, 0.68 tons.

l. Maps and Diagrams of Project Layout

Regional and detailed location maps are included as Figures 1, 2 and 3 of this report (Appendix 4). The accompanying Exploration Plan contains a detailed diagram of the drilling vessel (Appendix B).

m. Certificate of Coastal Zone Consistency

The proposed activities described in detail in the accompanying Amended Exploration Plan comply with California's Coastal Management Program and will be conducted in a manner consistent with that program.

The policies of the CCMP which might relate to the proposed activity are contained in Sections 30230, 30232, 30240 and 30262 (d). No other policies of the CCMP are relevant to the proposed permitted activity and, therefore, this statement in support of Consistency Certification addresses only those sections which are discussed below.

Section 30230, Protection of Marine Environment

> Marine resources shall be maintained, enhanced and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, receational, scientific and educational purposes.

The proposed activities will not adversely affect the living resources of the marine environment. The proposed drill-sites are not located within an area of special biological or economic significance. Impact upon transient and resident species in the project area will be negligible. There will be no perceptible effect on commercial fishing because the proposed activities are very localized and of short duration.

The chance of adverse impact from a significant oil spill is judged to be extremely slight, in view of the excellent safety record of exploratory drilling in U.S. waters to date. Protective measures are discussed in a separate CCMP policy.

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 Amended Exploratory Plan protects against the spillage of crude oil, gas, petroleum products and hazardous substances and, in compliance with Pacific Region OCS Order No. 7 of the U.S. Geological Survey, provides effective containment and cleanup facilities and procedures for any accidental spills which might occur. 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.

<u>Section 30240, Environmentally Sensitive-Habitat Areas</u>

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas.

The proposed activities will not take place within an environmentally sensitive habitat area. The nearest such area is Anacapa Island, 6.83 nautical miles to the South. Traffic to and from the proposed drilling site will not pass over or near this or any other sensitive areas.

<u>Section 30262 (d), Hazards to Navigation</u>

"Oil and gas development shall be permitted in accordance with Section 30260, if the following conditions are met:...

"(d) Platforms or islands will not be sited where a substantial hazard to vessel. traffic might result from the facility or related operations, determined in consultation with the United States Coast Guard and the Army Corps of Engineers."

This section is not applicable to the proposed drilling of an exploratory well as it relates to oil and gas development operations as distinguished from the drilling of exploratory wells. However, the Coastal Commission has expressed concern about exploratory drilling within the Marine Vessel Traffic Scheme and has cited this section of the CCMP as support for their opposition to exploratory drilling in this area. Therefore, we wish to comment upon this provision in relation to the drilling of the proposed exploratory wells (P-0205-3 and P-0205-4) within 500 meters of a marine vessel traffic lane. The Coast Guard has determined that the drilling of P-0205-3, as originally proposed, did not constitute a substantial hazard to vessel traffic provided it receives 120 days' advance notice of the drilling of the well and the drilling vessel is equipped with Class A aids to navigation. Chevron will comply with these requirements imposed by the Coast Guard. In addition, Chevron will have the radar/radio equipment on the drilling vessel manned 24 hours per day.

Permitting the proposed exploratory wells to be drilled from a surface location within the outer buffer zone of the Northbound sea land is consistent with a recommendation in the "Santa Barbara Channel Risk Management Program" (April 1981) prepared by the National Maritime Research Center, a part of the U.S. Maritime Administration. The pertinent recommendation reads, in part, as follows:

> "Drill ships, drilling rigs, or other resource recovery-related obstacles should be permitted to operate up to the boundary of an existing traffic lane (but no within the lane itself)...provided that, if the obstacle is located within 1000 meters of the lane edge, a clear and unobstructed zone should be required outside the opposite lane boundary of not less than 1000 meters in width and extending in either direction along the traffic lane for at least two nautical miles from the drill ship..."

The proposed drilling activities do not create the "gated" situation which the proviso to the above recommendation seeks to protect against. Since the surface location has been moved from the inner to the outer buffer zone of the northbound sea land, there is an unobstructed zone between the surface location and the "opposite" boundary of the northbound sea lane. This unobstructed zone extends through the entire width of the northbound lane, the separation zone and the southbound lane. Also, this unobstructed zone extends in either direction along the northbound lane for much more than two nautical miles from the proposed surface location.

The impact of drilling exploratory wells on the Outer Continental Shelf, as analyzed in the accompanying Environmental Report, is negligible in magnitude and temporary in duration.. 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 by 15 CFR 930.

At its March 19, 1980 meeting, the Commission resolved that exploratory drilling activities beyond 1,000 meters from State waters did not require consistency certification of discharges under the U.S. Environmental Protection Agency's NPDES permits. The surface location for P-0205 #3 and #4 is 4.4 miles outside of State waters and 6.83 nautical miles away from Anacapa Island. Therefore, this consistency certification does not specifically address the NPDES permits.

n. <u>Measures to Comply with OCS Orders and Regulations</u>

This Environmental Report (Exploration), which is to accompany the Amended Exploration Plan for OCS Lease P-0205, is submitted in accordance with 30 CFR 250.34-1(a)(2)(i), 250.34-3, OCR Order No. 2 and NTL 77-1. By letter dated July 1, 1981, the California Coastal Commission was advised that this submission would be made (see 15 CFR 930.75 and Section 13660.1 of Title 14 of the California Administrative Code). Certification of consistency with California's Coastal Management Program will be obtained as required by the Coastal Zone Management Act (16 U.S.C. Section 1456(c)), 15 CFR Part 930 and Title 14, Chapter 10, Subchapter 1 of the California Administrative Code. The drilling vessel will be marked in accordance with OCS Order No. 1, paragraph 2.

Measures taken to comply with OCS Order No.2 include:

(a) Filing of Application for Permit to Drill (also follows NTL 77-1);

(b) Submitting evidence of fitness of drilling unit, including operational limitations under anticipated conditions, and the necessary safety, fire-fighting and pollution-prevention equipment;

(c) Conducting shallow geologic hazard surveys and submitting a shallow geologic hazards report (conforms in detail with NTL 77-2);

(d) Establishing an appropriate well casing and cementing program, including testing;

(e) Conducting the requisite directional surveys;

(f) Installing, testing, operating and maintaining the requisite blowout-preventers and conducting the requisite blowout-preventers drills;

(g) Establishing an appropriate mud program and conducting the requisite mud test;

(h) Observing the requirements as to the supervision, surveillance and training of drilling personnel; and

(i) Conducting drilling operations in accordance with the Critical Operations and Curtailment Plan on file with the U.S.G.S.

Each well will be plugged and abandoned in compliance with OCS Order No. 3. An application for "Determination of Well Producibility" shall be made for each exploratory well, in accordance with OCS Order No. 4.

Drilling rigs on the drilling vessel shall be operated in compliance with the following portions of OCS Order No. 5:

(a) Paragraph 1, "Use of Best Available and Safest Technologies (BAST)."

(b) Sub-paragraph 5.4, "Welding Practices and Procedures."

(c) Paragraph 8, "Employee Orientation and Motiviation Programs for Personnel Working Offshore."

OCS Order No. 6 relates to well completions and is not applicable to the proposed activities.

Pollution prevention and control measures taken in compliance with OCS Order No. 7 will include:

(a) Reporting of drilling mud components.

(b) Disposal of excess mud and drill cuttings pursuant to an EPA-issued NPDES permit.

(c) Installing curbs, gutters and drains to collect contaminants associated with exploratory drilling operations.

(d) Transporting containers and similar solid waste materials for onshore disposal.

(e) Conducting necessary instruction, training and drills, so that personnel will be familiar with pollution-control equipment and operational procedures.

(f) Conducting daily pollution inspections and reporting all spills.

(g) Adhering to Chevron's Oil Spill and Emergency Contingency Plan on file with the U.S.G.S.

(h) Assuring the availability of the requisite pollution-control equipment and materials.

OCS Order No. 8 (Platforms and Structures), No. 9 (Pipelines), and No. 10 (Twin Core Holes) do not apply to the proposed activities.

Those portions of OCS Order No. 11 which relate to the location and spacing of exploratory wells will be complied with. The filing of reports, including public information copies will conform to OCS Order No. 12.

The U.S. Geological Survey's Oil and Gas Supervisor, Pacific Area, has determined by letter of September 10, 1979, that NTL 78-1, which requires biological and cultural surveys, does not apply to Parcel P-0205.

Chevron will obtain a Navigation Permit from the U.S. Army Corps of Engineers before commencing operations. Also, Chevron will notify the U.S. Coast Guard, at least two weeks prior to commencing operations.

o. <u>Nearby Pending Actions</u>

Continuing development drilling on Chevron's Platform Grace (5.3 miles northwest), development drilling on Platform Gilda (3.6 miles north), now under construction, and proposed exploratory wells on Parcel P-0215, 4.4 to 5.1 miles north-northeast, and on Parcel P-0217, 5.5 to 8 miles northwest of the proposed drilling site.

p. <u>Transportation of Oil and Gas to Shore</u>

Not required for Exploration Plans or their accompanying Environmental Report (Exploration).

q. Monitoring Systems

On-board monitoring systems are described in part h, above. Chevron is contracting for wind and current data to be obtained on the drill-ship while on location at each drill-site. Throughout the broader area of the Santa Barbara Channel, many agencies currently regulate or have authority over specific activities and particular natural resources. No single authority has the responsibility for monitoring the entire system. The proposed exploratory well activities will generally have minimal impact on the area; however, the operators, who will be drilling the wells, and the USGS Pacific Region Conservation Division will be maintaining close surveillance during the exploration drilling. As an element of U.S.G.S. supervision, 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. Onshore ambient air quality is monitored by the Santa Barbara Air Pollution Control District and the Ventura Air Pollution Control District. A study of ambient noise levels and the resulting impact on bird and pinniped populations is currently being conducted by J. Jehl and funded by the U.S. Air Force. This study includes such noise sources as sonic booms and air and vessel traffic.

r. Other Planned Environmental Protection Measures

In addition to the specific protective and mitigating procedures described above, the preeminent mitigating measure will be the utilization of safe and proper operating procedures in all phases of the exploratory drilling program.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

This section discusses the existing environment at or near OCS Parcel P-0205. It addresses all of the environmental parameters listed in NTL 80-2. In those instances where the proposed activities might affect, or be affected by, a specific environmental value, the potential effects have been addressed, or the relevant mitigating measures described in sections 2, 3 and/or 4. The effects of unexpected, low-probability events (e.g., a major oil-spill) are discussed in Section 4.

a. Geology

(1) Bathymetry

A bathymetric map of the northeastern portion of Parcel P-0205 is included as Figure 3 of this report (Appendix 4). This map is based upon detailed mapping by General Oceanographics (Ref. 12) utilizing waterborne surveys. This mapping is in general agreement with the more regional bathymetry shown on the NOAA charts of the area (Ref. 13).

Water depth at the proposed drill-site is 719 feet.

The sea floor in the northern part of Parcel P-0205 slopes uniformly to the southwest at 45 ft. (14 m) per mile, or 0.85 percent (0°29'). The sea-floor within the Tract boundaries is quite smooth; there are no bathymetric features which might be related to sea floor geologic hazards. More than 2,000 feet to the north, in Parcel P-0209, a hummocky seafloor is apparently related to relatively recent slumping of surficial sediments (see Section 3a(3)(b)).

Sea-floor sediments were sampled and evaluated by Woodward-Clyde (report in preparation). Dart cores taken 400 feet to 1,300 feet from the proposed site penetrated 79 in. to 116 in. and recovered 36 in. to 47 in. of sediment, consisting of fine sandy or silty clay or fine sands, overconsolidated, and with high plasticity. Thickness of these surficial sediments , as mapped by Uniboom (Woodward-Clyde, report in preparation) is 50 feet. Underlying these surficial sediments are Pleistocene sediments that are predominantly silt with varying amounts of clay and fine sand.

(2) General Description of Geology

The proposed drilling site in Parcel P-0205 is located at the eastern end of the Santa Barbara Channel (Figure 1) about 11 miles southwest of the City of Ventura. The regional geology of the Channel area has been described in considerable detail by Vedder and others (Ref. 14), the U.S. Geological Survey (Ref. 2) and Sylvester and Darrow (Ref. 15). These reports provide a comprehensive geologic summary of the stratigraphy and structure of the region. Figure 4 shows the relationship of Parcel P-0205 to the significant structural features of the area. The east-west trends of the Transverse Range Province began to develop in Late Miocene time; from Late Pliocene to the present, the Ventura Basin and Santa Barbara Channel have been strongly compressed to form a series of east-west-trending folds and reverse faults. The Santa Clara Unit lies astride one of these features, the Montalvo or 12-Mile Trend. This structural feature is part of an anticlinal trend that extends westward from the offshore part of the West Montalvo oil field for about 20 miles. Offshore, this broad anticlinal trend is bounded at depth on the north by a reverse fault that is referred to in numerous reports as the Oakridge fault. The history of tectonic activity along this trend as well as within the Santa Barbara Channel has been discussed in reports by Greene (Ref. 16), Vedder and others (Ref. 14), and two reports by Dames and Moore (Refs. 64 and 65).

The Montalvo Trend oil accumulation is located in OCS Parcels P-0215, P-0216, and P-0217 approximately three miles north of a parallel structure on which this well is to be drilled. The trapping structure in parcels P-0204 and P-0205 is a symmetrical east-west anticline. Minor faulting is associated with this structure. There is no evidence from the shallow geophysical data that these faults extend above minus 4,000 ft. sub-sea.

Also, within the Santa Clara Unit no significant shallow faults have been noted from any of the shallow high-resolution geophysical surveys. Based on limited drilling information, the deeper portion of the structure appears to be cut by an occasional northeast-trending tension fault which likewise does not extend above minus 4,000 ft. sub-sea. The sedimentary strata penetrated in the Unit area range from Upper Cretaceous to Recent. The deepest stratigraphic penetration on the Unit is in the Exxon well, P-0205, No. 1, (Figure 2) which bottomed in Cretaceous-age interbedded marine sandstones, siltstones, and shales at a drilled depth of 12,801 feet.

A review of wells drilled in the lease blocks 0215, 0216, and 0217 indicates that the following strata will be penetrated:

Age	Formation	Rock Unit
Recent-Upper Pleistocene		Unconsolidated sand and mud
Lower Pleistocene	San Pedro	Marine and non-marine mudsto sandstone, siltstone, and conglomerate
Upper Pliocene	Repetto	Marine sands, clays, siltsto
Miocene	Santa Margarita	Siltstone and shales
Miocene	Monterey	Marine chert, siliceous shale with limestone to siltstones and sands at base
Miocene	Topanga	Marine sands and shales
Oligocene-Upper Eocene	Sespe	Non-marine sands, shales, conglomerates

Oil and/or gas accumulations are expected in the Pliocene, Miocene and Oligocene rocks and will range in depth from approximately 3,000 to 7,000 feet subsea.

(3) Submarine Geologic Hazards

(a) Unstable Bottom Sediments

Nekton (Ref. 12) has not noted any potentially unstable bottom bottom sediments in the proposed drillsite area, and this is confirmed by the recent Woodward-Clyde investigations. Gasified sediments, present in some other parts of the Santa Clara Unit, do not occur in this vicinity. (However, similar gas-charged surficial sediments have been drilled through elsewhere in the Channel without incident.) Sea-floor slopes at the proposed location do not exceed 1.0 percent and therefore are not generally susceptible to slumping. There appears to be no hazard from sea-floor instability which would affect the proposed activities.

(b) Mass Wasting Phenomena

Nekton (Ref. 12) did not detect any features indicative of recent submarine landslides or slumping within Parcel P-0205. Upslope to the north of the parcel, 2,000 feet to 6,000 feet north of the proposed drillsite, a zone of hummocky sea-floor topography immediately below the shelf break suggests possible slide activity within the geologically recent past. To the south of the proposed drill-site, Nekton (Ref. 17, p. 10) has described what they interpret to be buried submarine fan underlying a part of the basin floor (see Fig. 3). This feature is clearly shown on the sparker, and especially the minisparker, lines. It consists of a zone of disturbed or incoherent bedding which extends to a depth of up to 75 ft. below the sea floor. The zone has many of the features of a submarine landslide. Its internal structure suggests that much of the deposit moved downslope as a sheet which crumpled as it came to rest, producing transverse ridges parallel to the toe of the slide. The head of this ancient slide has rotated into the slope, and appears to form a stable buttress in the vicinity of the proposed well. The slide was apparently the result of Plio-Pleistocene uplift of the Montalvo or 12-Mile Trend to the north of P-0205. Poorly-consolidated sediments on the over-steepened south flank of that structure moved onto the basin floor as an earth block slide and earth flow. By this process of slope reduction and basin filling, the sea floor has achieved a stable equilibrium condition. The age of the slide is indicated by the layer, up to 20-30 feet thick, of post-deformational sediments which overlie the slide. Pockets between the transverse ridges contain up to 50 ft. of well-bedded horizontal sediments. The average rate of deposition in the deep central portion of the Santa Barbara Basin is about 2 mm per year (Ref. 11, p. II-43), which would suggest that the slide was at least 3,000 to 7,500 years old. The sea floor in the area of the proposed drill-site is obviously stable; the P-0205-1 well was drilled through the disturbed zone only 200 feet from the proposed drillsite without any problems or unusual conditions.

(c) Shallow Gas

There is no evidence of shallow gas in the vicinity of the proposed drillsite. No water-column anomalies or seismic amplitude anomalies were observed in the Nekton survey (Ref. 12) in that area. The P-0205 #1 well, drilled less than 500 feet west of the proposed location, did not encounter significant shallow gas, nor did several 500-foot soil borings recently drilled within 7,000 feet of the drillsite (Woodward-Clyde; report in preparation).

No oil seeps have been found in the Santa Clara Unit. The nearest are along the Rincon offshore trend, 16 miles north of Parcel P-0205, and 7 miles to the southeast between Pt. Mugu and Anacapa Island (Ref. 1, Visual 9).

(d) Geopressured Zones

As in any deep drilling, the proposed wells may be subject to potential hazards associated with geopressured zones and intervals of lost circulation. Any such potential hazards will be mitigated by Chevron's drilling procedures, including casing programs and mud control practices, which follow prudent and tested methods, and conform to OCS Order No. 2 - Drilling Operations.

The deepest hole drilled in the area, Exxon P-0205-1 (Figure 2), went to a depth of 12,801 feet. Like the other three exploratory wells drilled in the immediate area, no above-normal formation pressures were encountered. Some lost circulation has occurred within the Monterey Formation. Any such problems are taken care of by modern drilling techniques and a proper casing program.

(e) Shallow Faulting

No shallow faults were noted from the surveys run by Nekton (Ref. 12) or Woodward-Clyde (report in preparation). Beneath the shallow disturbed zones noted in Section 3a(3)(b), above, the high-resolution seismic profiles show continuous reflections, without break or offset, to depths of 500 feet or more.

(f) Seismicity

Earthquake activity in the Santa Barbara Channel has been adequately documented by the Bureau of Land Management in their 1978 report (Ref. 1), the U.S. Geological Survey's 1969 and 1976 reports (Refs. 14 & 2) and the earthquake reports of 1973 and 1976 by the Seismological Laboratory at the California Institute of Technology (Ref. 17 & 18).

There are no known active faults in the area of the proposed drilling site. The nearest active fault is the Santa Cruz Island fault, an east-west-trending left-oblique fault whose surface trace is about 9 miles south of the proposed drillsite (Figure 4). This is also the dominant potentially active fault within the range of Chevron's operation (Table 2) 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 drillsite which could exceed those from a possible magnitude 7.0 Richter scale earthquake on the Santa Cruz Island fault. It is estimated from Schnabel and Seed (Ref.

22) that such an earthquake could cause ground accelerations of about .39 g at the drillsite. Since this degree of acceleration is expected to occur during the high-frequency part of the ground shaking spectrum it should have little or no effect on the ocean-bottom equipment.

Earthquake Related Damage

i. Ground Rupture

A study of the published literature and an analysis of the high-resolution surveys (Ref. 12) indicates that there are no shallow fault traces beneath or near the proposed site or well-courses. Therefore, ground rupturing will not be a hazard during any nearby earthquakes.

ii. Ground Failure

The only ocean-floor equipment involved in the proposed exploration is the wellhead assembly and the drilling vessel anchors. The near-surface sediments (Nekton, Ref. 12) at the proposed drillsite do not present a liquefaction hazard to these installations. There is a slight possibility that earthquake-related slope failure might occur 2,000 feet or more north of the proposed location (see Section 3a(3)(b)). Based on the indications of past slumping, this would be expected to result in localized minor block movement at least 2,000 feet distant from the site; possible density flows of suspended sediment would have no effect upon sea-floor equipment.

iii. Tsunami

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

(g) Other

Hydrogen sulfide gas is a potential hazard when drilling certain formations in some parts of the Santa Barbara Channel. Drilling and testing operations in the proposed well, as elsewhere in the region, will use equipment and procedures developed for the safe handling and disposal of this gas, and as required by OCS Order No. 2.

The high-resolution geophysical surveys (Ref. 12) found no buried channels within the shallow sediments in the drillsite area. Neither karst topography nor hazards from volcanism are to be expected in the geological environment of the area.

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

(4) Mineral Deposits

There appear to be no known mineral deposits of either commercial or sub-commercial value on or adjacent to Parcel P-0205.

(5) Freshwater Aquifers

Prior drilling on Parcel P-0205 has found no indications of freshwater aquifers in this area. Because of the distance from shore, and the various structural and erosional interruptions affecting deeper Pleistocene strata, it would be very unlikely that any such aquifers might exist in the area of the proposed activities.

b. Meteorology

(1) 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-0205 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 on Santa Cruz Island range from the high 50's in winter to the upper 60's in late summer and early fall, with mean minimums from 40 in winter to the mid 50's in late summer. Extremes of 31 F and 102 F have been recorded (Ref. 2, p. II-160).

The dominant cloud type over the area is stratus, occurring with greatest frequency from April into October (Ref. 20, p. 109). Visibility is sometimes restricted by fog, which occurs most frequently and most extensively during the summer. From June through October, visibility is reduced to 2 miles or less an average of ten percent of the time. From November through May, the same reduction occurs only two percent of the time (Ref. 20, p. 110). Subsidence inversions, which may persist long enough to trap pollutants in the adjacent mainland areas, are common in late summer and autumn (Ref. 1, p. 70).

Prevailing winds are from the west-northwest throughout the year (Ref. 1, p. 64, 65), strongest in spring and summer, and average 9 to 10 knots, with a maximum velocity of 35 knots (though gusts to 90 knots have been estimated for a recurrent interval of 100 years - Ref. 2, p. II-174). Winter winds are more variable; "Santa Ana" winds from the northeast may reach velocities of 45 knots (Ref. 1, p. 65). Infrequent strong storm winds may blow from the east or southeast, veering through south to west and northwesterly as the storm passes.

Average annual rainfall at Parcel P-0205 is estimated at 14 in. (Ref. 20, p. 124) compared to 17.6 in. at Santa Barbara where the annual total has ranged from 4 to 41 inches (Ref. 2, p. II-163). 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. 2, p. II-158). 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. 20, p. 125).

Even the most extreme weather conditions which might occur in the area of Parcel P-0205 is much less severe than those in many other parts of the world where drilling vessels have operated without difficulty.

(7) Air Quality

(a) Onshore

The onshore areas of Santa Barbara and Ventura counties are within the South Central Coast Air Basin. The Santa Barbara Air Pollution Control District is classified a non-attainment area for photochemical oxidants, carbon monoxide and total suspended particulates. In 1977, the Ventura Air Pollution Control District was classified as non-attainment for total suspended particulates and photochemical oxidants. A number of reports are available giving specific ambient air quality data for these districts (Refs. 1, 2, 22, 23). 1977 is the latest year for which reasonably complete information is available.

(b) Offshore

Several studies have noted that there is a lack of air quality data in the offshore area. The nearest stations to the proposed OCS project are located at the foot of Figueroa Street in Ventura (Ventura Station) and a Chevron U.S.A. sponsored station in Carpenteria (Carpenteria Station).

The Ventura Station is relatively new; operating since October 1979, and records ozone concentrations only. The monitor recorded ozone concentrations above the Federal standard, 0.12 ppm on three occasions in 1980, and concentrations exceeding the State standard; 0.10 ppm, on three occasions (excluding Federal standard exceedances) in 1980. The meterological conditions generally triggering these exceedances corresponded to post Santa Ana conditions where the wind was blowing offshore or stagnant conditions. The station's readings are probably good indicators of near offshore air quality during shore breeze meterological conditions. The monitor generally read low ozone concentrations in 1980 which indicates the near offshore air quality is good. The Ventura Station is located approximately 11 miles northeast of the proposed drillsite.

The Carpinteria Station is located approximately 200 yards from the beach and is also a good monitor of near offshore air quality during onshore flow meterological conditions. This monitor, operated under contract from Chevron U.S.A. by Aeroenvironment, measures O_3, NOx and SO_2, as well as meterological data. NOx and SO_2 did not exceed State or Federal standards in 1980 at Carpenteria. The State ozone standard (0.10 ppm) was exceeded for 1 hour on 2 days in 1980. Nevertheless, the air quality as monitored is generally very good. The Carpinteria station is located approximately 18.8 miles north of the proposed project.

As can be seen from the low number of exceedances at the two coastal stations sited above, the air quality in this coastal region is considered very good. The Federal standards are undoubtedly not exceeded at the drill-site as it is several miles offshore and is adjacent to only one major emission source, Platform Grace. The application of Federal air emissions standards to the proposed project is discussed in Section 4 (b) (2).

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. Thus the proposed project will have no appreciable effect on the air quality of Ventura or Santa Barbara Counties.

c. Physical Oceanography

(1) Sea Temperatures and Salinity

Surface water temperatures in the eastern Santa Barbara Channel fluctuate annually between about 12°C and 16°C (Ref. 2, p. II-189). 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 south 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 1957 to 1960 off Santa Barbara were shallow relative to the rest of the Bight, ranging from 3 m to 11 m in July and 8 m to 19 m in April, with the thermocline eliminated in January due to upwelling (Ref. 26, p. 42). These deeper waters range in temperature from 9°-13°C at 60 m depth, to 6°C in the deepest part of the basin (Ref. 21, p. 108).

The salinity of the area waters varies between about 33.5 o/oo (parts per thousand) and 35.0 o/oo (Ref. 1, p. 93). These fluctuations are caused by precipitation and evaporation at the surface, by freshwater land runoff, advection, and by upwellings.

(2) Currents

As the northwesterly-flowing Southern California counter-current enters the Santa Barbara Channel, it is shaped by mainland and island coasts and by the California Current into one or more gyres that vary seasonally on a regular basis (Ref. 29). From July to November the current flows northwesterly across the project area, forming the southern portion of a clockwise gyre which occupies the eastern Channel. From November to mid-February the Davidson Current surfaces, forming a complex pattern in the eastern Channel; in the project area, the resulting flow is generally to the south and into the gyre. From mid-February to August, longshore winds cause upwelling and a locally variable current pattern. The surface currents in this area of the Santa Barbara Channel are not strong, ranging in velocity from 0.3 to 0.6 knots in summer to 0.5 to 0.7 knots in winter. Subsurface Channel currents are primarily related to tides and sea floor topography. They usually have a lower speed than surface currents and differ most widely from surface currents in both speed and direction during the summer months. Intersea Research Corporation (Ref. 77) found that the subsurface currents had the same general direction as the surface currents during their studies for the proposed Santa Clara Unit pipeline 5.3 miles or more north of P-0205.

Bottom currents, related primarily to tides and sea-floor topography, were measured (Ref. 22) in the area of the Santa Clara Unit subsea pipeline, where maximum velocities were 0.5 knots. In the deep portion of the Santa Barbara Channel, maximum measured bottom currents were less than 0.6 knots, and maximum mid-depth currents were 0.2 to 0.3 knots.

(3) Tides

Tides in the region are the result of interference between diurnal and semi-diurnal components, producing an asymmetry such that there is usually one cycle of greater range and one of lesser range. There are generally two high tides and two low tides each day, with the time between successive high (or low) tides varying from about 10 to 14 hours. Tidal heights along the Southern California coast range from 1 ft. to 8.7 ft., with a mean of 3.7 ft. (Ref. 21).

(4) Sea State

Surface wave conditions in the eastern portion of the Santa Barbara Channel are quite mild because of the few storms passing through the area, and because of the protection from northwesterly winds afforded by the Santa Ynez Mountains.

Average significant wave heights are less than 6 ft. Wave direction is generally from west and northwest because of the prevailing winds from this direction (Ref. 2). Storm (wind generated) waves in the eastern part of the Channel are of lesser magnitude than those in the western portion. In the vicinity of the proposed wells Riffenburgh's studies indicate a 95% probability that the maximum 100-year-wave will not exceed 36 ft. in height and 790 feet in length (Ref. 2). Moderate swells generated by the prevailing westerly winds may travel eastward through the Channel to reach the project area but it is sheltered, by the Channel Islands, from occasional southerly swell caused by tropical storms or the Hawaiian Lows (Ref. 1, p. 88). 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 significant hazard; at the proposed drilling site, the water depth is greater than 700 ft.

Compared with many areas where drilling vessels have operated successfully, the currents and waves in the eastern Channel are not at all severe, and should present no problems.

(5) Water Quality

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. 2, p. II-214 through II-226) and the EIS Proposed 1979 OCS Sale No. 48 (Ref. 1, p. 95 through 119).

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, and 0.20 mg/l to 0.40 mg/l at 90 m depth. Phosphate varies from about 0.01 mg/l to 0.08 mg/l at the surface and 0.09 mg/l to 0.20 mg/l at 300 m 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 m.

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 uncertain physical/chemical states of the constituents. Concentrations vary with depth, nearness to shore, upwellings, storm runoff, or depletion by plankton populations.

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

Natural oil seepages are a constant source of crude oils which mingle with Channel waters. On a worldwide basis, such natural seeps are estimated to provide 10% of the total petroleum hydrocarbons introduced into the oceans, while offshore petroleum activities (normal operations plus accidents, including major spills) contribute 1.3% (Ref. 27, p. 1-5). Natural oil seeps abound in the Santa Barbara Channel; those at Coal Oil Point are probably the most prolific, with an average flow of 50 to 70 barrels of oil per day (Ref. 2, p. II-153). Because of these many prolific seeps, the background (regional normal) hydrocarbon content of Channel waters is 5 to 10 times that of the open ocean, as determined by marine "sniffer" surveys (Ref. 28).

d. Other Uses of Area

(1) Commercial Fishing

Fish populations also show very high abundance and diversity due to sharing of species from different biogeographical provinces.

The highest mean catch in the northern Channel Islands/Santa Barbara Channel area west of Anacapa Island from 1970-1974 was in Fish Block 665 next to the mainland coast. The annual catch in this block is 5-9 million pounds, compared to nearby Fish Blocks 683 and 664 and also 684 (which extends north from Anacapa and includes the proposed drilling site), where catches are in the range of 1-4 million pounds annually (Ref. 3). These fish blocks showed catches well below the most productive fishing area in the Bight, located off San Pedro. Table 3 shows five-year averaged data from the California Department of Fish and Game for Fish Block 684 (Ref. 50). The most important commercial catch in this area was the northern anchovy, followed by rockfish (species lumped together). The rockfish is an inshore species caught on the island shelf, but not at site P-0205. Other commercially important species include sea urchin, English sole, and Pacific bonito.

Although vessel traffic will be increased in the area, no significant impact on commercial fishing is expected to occur as a result of exploratory activities.

(2) Shipping

The location of P-0205-3/4 is in the buffer zone of the northbound sea lane. A recent comprehensive study of potential conflicts with vessel traffic in the Santa Barbara Channel concluded (Ref. 78, p. 9-1) that:

> "It has been shown that stationary structures located near, but not actually in, the ship traffic lanes will result in evasive maneuvers by ships travelling the lanes. The maneuvers executed by the ship masters are made so as to produce what they deem is a safe passing distance. For

platforms located at the very edge of the traffic lane, vessel masters sometimes maneuver to the opposite edge of the lane, and in some cases maneuvered out of the traffic lane on the side opposite the structure. This course was deemed safe by the vessel masters provided there was no obstruction on the opposite side of the traffic lane to prevent such a safe passing. Structures located at the edge of the buffer zone (500 meters from the edge of the traffic lane) produced lesser evasive passing maneuvers, but many ship masters did make course changes to achieve what they considered a low-risk pass of the obstacle.

When presented with a situation in which structures were located at both sides of the traffic lane, either at the edges of the lane itself or at the edges of the buffer zones, the risk was unacceptable to the ship masters as evidenced by drastic changes in speed or course of both. Such a "gated" situation would only be made worse by the presence of additional structures further from the traffic lanes but in the vicinity of the gate."

The original plan presented such a "gated" situation; vessels would have passed between the drillship, sited immediately south of the traffic lane, and Platform Grace, 2 nautical miles north of the lane (though 5.2 nautical miles beyond the drillship). The Amended Plan, by moving the drillship north of the traffic lanes, avoids the "gated" situation. That same study (Ref. 78, p. 9-10) further concludes that:

"In the short term, such as the temporary presence of a drilling ship or rig near the traffic lanes, the study has shown that passing manuevers may be made safely, provided that there is sufficient clear maneuvering space to effect the pass. No obstacles should be in the traffic lanes themselves, but temporary drilling activities may take place in the buffer zones; the study experiments confirmed that such situations do not pose unacceptable risk if there is open sea in which to maneuver past safely."

Thus, the proposed activities should not involve any conflict or hazard related to vessel traffic. The drilling vessel will be readily visible to passing boatsman during the day and night. The derrick lights will enable the ship to be easily located at night.

(3) Military Use

The area of the proposed activity is not subject to any military uses other than the danger zones controlled by Vandenberg Air Force Base, whose operations consist of the launching of orbital missiles and the planned Space Shuttle Vehicles (Ref. 1, p. 45-46, 373). 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. 1, p. 1371-1373).

(4) Recreation

Sport fishing is an important industry in Southern California and may equal commercial fishing in economic value. The high productivity on the mainland shelf makes this area popular for sport fishing. The Channel Islands DEIS (Ref. 3, p. E-79-80) shows a cumulative density of from 100,000 to 250,000 party boat fish landings in the area of the well sites between 1973 and 1975. The cumulative density of anglers fishing from party boats is lower (10,000-25,000) than some nearby areas (more than 200,000). These statistics do not include fishing from private boats; availability of the mainland shelf makes it a popular area for both commercial and private sport fishing.

Four kinds of sport fishing occur in Southern California, party boat, private boat, pier and jetty fishing, and open coastline fishing. Fisheries data on the different types of sport fishing from 1963-1966 showed that for both party boats and private boats, kelp and sand bass, Pacific bonito and rockfish were important species (Ref. 2, p. 482). For both pier and jetty fishing and fishing in inland bays, white croaker and queenfish were the principal species. For open coastline angling, the surfperches were the most important group (Ref. 2).

Pinkas et al (Ref. 2, p. 482) compared the four main types of sport fishing in Southern California and found that party boats accounted for nearly 50% of all sport-caught fish. Party boats also had the highest catch-per-man hour of fishing while shoreline fishing has the lowest. Skin diving and scuba diving have been steadily increasing (Ref. 2). Divers' catch from 1965-1970 was dominated by abalone (54%-59% of total catch), spiny lobster (12%-17%), rock scallop (10%-15%), sheephead (8%-9%), and kelp bass (4%-6%) (Ref. 2, p. 485). According to Young (Ref. 2, p. 485) three species (rock scallop, sheephead, and giant sea bass) are relatively vulnerable to divers and could be overexploited.

Although vessel traffic will increase temporarily in the area, no adverse effect on sport fishing is expected from exploratory operations.

(5) Kelp Harvesting and Mariculture

No mariculture occurs at the lease site.

Macrocystis pyrifera, or giant kelp, occurs in beds around Anacapa Island down to about 100 feet, which are located primarily on the southern side of the island and extend down no greater in depth than about 100 feet (Ref. 66). These beds provide food and habitat for fish and invertebrate and commercial and sport fish species, as well as their larvae. Kelp is harvested from all the northern Channel Islands, including Anacapa, which provides a small portion of the harvest, which averaged 15,364 wet tons annually from 1974-78 (Ref. 3).

(6) Cultural Resources

The proposed exploratory drilling described herein is located where the water depth is about 719 feet. Therefore, a cultural and archeological evaluation was not made in accordance with NTL 77-3 (dated March 1, 1977).

As a consequence of waterborne geophysical surveys run by Nekton (Ref. 65), no significant obstructions were noted on the sea floor in the area of the proposed exploratory wells (Figure 2), and no archeological or cultural finds were observed to be present.

(7) <u>Refuges and Other Environmentally Sensitive Areas</u>

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 5). Most of these areas are a considerable distance from the proposed activities and for these, no detailed discussion is contained herein, but references for some are indicated. As described in Section 3(e), these areas include various critical habitats (Ref. 29, Chapters 6 and 16); that reference also suggests that recreational and economic activities (such as tourism and fishing) 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. 5), (Ref. 29, p. 339), 21 miles to the northwest. This was originally so designated to preclude offshore drilling within close proximity to Santa Barbara's beaches.

2. San Miguel, Santa Rosa, Santa Cruz and Anacapa Islands (Nos. 2 and 3, Fig. 5) including adjacent waters to a distance of one nautical mile offshore or to the 300 ft. isobath, whichever is the greater distance, and Mugu Lagoon to Latigo Point (No. 4, Fig. 5). These are designated as Areas of Special Biological Significance (ASBS) by the State Water Resources Control Board because they contain biological communities of "extraordinary" value. In addition to their status as an ASBS, State waters surrounding the northern Channel Islands

have been designated a State Oil and Gas Sanctuary (see Ref. 2, p. II-600, Ref. 29, p. 338, and Ref. 30). The southernmost edge of Parcel P-0205 is 56 miles northeast of San Miguel Island, 36 miles northeast of Santa Rosa Island, 7 miles northeast of Santa Cruz Island and 5 miles north of Anacapa Island.

3. The recently-created Channel Islands National Park (No. 5, Fig. 5) has absorbed the previous Channel Islands National Monument and also includes San Miguel, Santa Rosa and Santa Cruz Islands.

4. Federal Ecological Reserve and Buffer Zone (No. 6, Figure 5). This area lies about 15 miles northwest of the proposed project (Ref. 2, p. II-11). The area was created to prevent drainage from the State Oil and Gas Sanctuary, and to extend that area farther offshore.

5. Channel Islands Marine Sanctuary (No. 7, Figure 5). Created on September 22, 1980, this sanctuary includes the waters surrounding the northern Channel Islands and Santa Barbara Island, extending from the mean high tide line seaward six nautical miles (Ref. 3). Sanctuary regulations permit hydrocarbon exploration, development and production on any lease executed prior to the effective date of regulations. Pipeline laying within the sanctuary is also permitted, but no future leases within the sanctuary will be granted. Parcel P-0205 is 1.5 miles north of the sanctuary boundary at its closest point.

(8) <u>Other</u>

There are no submarine pipelines or cables in or near Parcel P-0205. There are no known or potential mineral deposits in the immediate area, nor are there any ocean dumping activities anywhere in the Santa Barbara Channel.

e. Flora and Fauna

The northern Channel Islands region of the Southern California Bight is significant due to its location at a major transition point between two biogeographic coastal provinces, the temperate Oregonian and the subtropical Californian (or San Diegan). The biota of this transition zone includes species from the northern Subarctic and Southern Equatorial water masses, along with endemic species and elements from the Central Pacific water mass. Species diversity is higher in this area (approximately 150 miles long) than on either side. The Channel serves as a funnel for migrating birds, especially shearwaters and brant, as well as a migratory route for gray whales. San Miguel, Santa Rosa, Santa Cruz, and Anacapa Islands have been designated as Areas of Special Biological Significance (Ref. 1, p. 330). In addition, the Office of Coastal Zone Management has designated as a marine sanctuary the waters surrounding the northern Channel Islands and Santa Barbara Island, extending from the mean high tide line seaward 6 nmi (Ref. 3).

(1) Pelagic Environment

(a) Phytoplankton

Composition and abundance of the plankton community in the Southern California Bight is determined by the relative contributions of the different water masses, as well as by upwelling and other seasonal and annual parameters.

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. depth), the seasonal northward surface countercurrent, and the seasonal northward Davidson Current in the winter (60 km offshore) (Ref. 1). In the fall, oceanic species are introduced from the Pacific Central Water Mass. Large concentrations of diatoms may be found during upwelling periods. Ryznik (Ref. 33) found 17 dominant species in the Santa Barbara Channel area, including *Ceratium furca*, *C. fuscus*, *Peridinium spp*, *Bacteriastrum delicatulum*, *Chaetoceros compressus*, *C. decipiens*, *C. didymus*, *Coscinodiscus spp.*, *Licmophora abbreviata*, and *Skeletonema costatum*.

Productivity and chlorophyll *a* concentrations in the Southern California Bight and particularly in the Santa Barbara Channel area are higher than in more oceanic waters. Table 4 lists chlorophyll *a* values at stations in the immediate lease site area at the surface and integrated over the euphotic zone for quarterly periods in 1969 (Ref. 34). A typical annual cycle of phytoplankton productivity is seen where highest values occurred from April through September, with lower values in the late fall and winter. Localized upwellings occur at Pt. Conception and somwhat farther south, as evidenced by discrete areas of high phytoplankton and zooplankton productivity and/or abundance.

Due to the transient nature of the plankton, no impacts are expected as a result of usual exploratory activities.

(b) Zooplankton

The same general considerations of community structure apply for the animal component of the plankton community in the Santa Barbara Channel area. As with phytoplankton species, the most abundant zooplankton species in the Santa Barbara Channel area are of Subarctic and Transitional origin, with the presence of Equatorial and Eastern Central Pacific species depending on the circulation conditions at any given time. There are also endemic nearshore species. Ebeling's study of zooplankton community structure in the area (Ref. 35) included the species listed in Table 5 as characteristic of the Santa Barbara Basin. This study did not identify copepods; copepod species encountered in abundance in the Southern California Bight include *Calanus pacificus*, *Acartia clausi*, *Acartia tonsa*, *Corycaeus spp.*, *Paracalanus parvus*, *Rhincalanus nasutus* (Ref. 36). Discrete areas of high zooplankton on the coast due to upwelling coalesce into a band of high productivity (256-1024 ml/m3) in March/April and September/October (Ref. 37). This seasonal cycle is subject to considerable variability due to patchiness and other longer-period cycles.

Fish larvae and eggs are an important part of the plankton. Kramer and Smith (Ref. 38) documented the presence in the northern Channel Islands area of the larvae of sauries, anchovies, and rockfish, among others. Kramer and Ahlstrom (Ref. 38) sampled larval populations of Engraulis mordax over the period 1951-1965. Numbers were relatively low in spring, summer, and fall (0-100) compared to January, where numbers fell in the range of 1,000 to 100,000 per 1000 m^3. This distribution reflected the general pattern for this species, where high concentrations at certain times were distributed off Baja California, and smaller high density loci occurred south of Pt. Conception on the mainland shelf. Abundance is subject to extreme fluctuations in the Bight.

As with phytoplankton, no impact on the zooplankton is expected as a result of exploratory operations.

(c) Fishes

The Santa Barbara Basin is relatively shallow (600 m), such that it has no true bathypelagic zone. The distribution of resident and transient species sorts according to depth, basin, water mass, and vertical migratory behavior (Ref. 35). Midwater fishes typical of Santa Barbara Basin include Leuroglossus stilbius, Stenobrachius leucopsarus, and Cyclothone signata. Larval fish in the basin include the larvae of anchovy, rockfish, sanddab, Dover sole, and Pacific hake, as well as those of various noncommercial nektonic species.

Pelagic fishes include those discussed under commercial fisheries (Sec. 3d(1)) as well as some noncommercial species for which little information is available. Neither these nor midwater species should be affected by exploratory operations. Particular schooling patterns occurring on the Santa Barbara/Ventura Flats (Ref. 61) contribute to successful commercial fishing.

(2) Benthic Environment

Drillsite P-0205-3/4, at 719-ft. depth, is located on a soft mud bottom. The distribution of benthic macrofauna is determined primarily by depth. Fauchald and Jones (Ref. 39) in a study including the Santa Barbara Channel descriptive area, showed that densities were lower in the basin than on the mainland or on insular shelves, the abundance at the site being approximately $1400/m^2$. The species richness also declined with depth (30/sample), while the standing crop was higher at greater depths ($780\ g/m^2$), probably due to occasional large specimens. At their station 878 near lease site P-0205 at 288 m. depth, polychaetes and crustaceans dominated in the samples. Table 6 lists the faunal composition and abundance at station 878. (It is important to note that it requires several years, at least three, and many replicate samples to adequately assess the various kinds of variability inherent in benthic communities.)

Those few benthic animals directly on the drill site may be smothered due to the drilling operation. Other individuals will be unaffected, even by discharge of drilling muds and cuttings, which will be dispersed in the water column (719 ft. at this site).

(3) Breeding Habits, Migration Routes

(a) Marine Mammals

(i) Pinnipeds

A study of marine birds and mammals in the Southern California Bight was conducted by the University of California at Santa Cruz (Ref. 40-43). Results from this study suggested that marine animals and birds concentrate over areas of high relief, such as island and mainland shelves, rather than over the deep basins. They also showed that the northern Channel Islands are a significant area of activity for pinnipeds, about 54 percent of pinnipeds in the Southern California Bight residing on San Miguel Island. The Santa Barbara Channel is a primary feeding ground for several pinniped species, especially California sea lion and the harbor seal.

The California sea lion is the most abundant pinniped in the Bight and is more commonly encountered at sea than any other pinniped species (Ref. 41, p. II-108). Its distribution is discontinuous, nonuniform and nonrandom. In 1975, the greatest densities in the Santa Barbara Channel were recorded in October at greater than 10 animals/km^2. At sea the distribution of California sea lions in early January was patchy and density was low (0.276 animals/km^2). In mid-March low to moderate densities were recorded in the eastern shelf of the Channel and the western half was increasingly used.

The northern fur seal prefers the colder water of the California current and was seen in the Channel. Harbor seals foraged extensively in the Santa Barbara Channel but were rarely seen at sea due to a small total population size and their nearshore habitat preference. The Guadalupe fur seal, listed by the state as a rare species, breeds only on Isla de Guadalupe and is the rarest pinniped in the waters off Southern California. It has been observed occasionally hauled out on San Miguel Island.

Pinnipeds are most impacted at the rookery or haulout area by noise and/or human disturbance. The bulk of pupping, breeding, and molting occurs primarily on the northern Channel Islands, and no impact from normal operations on these populations is anticipated. Sea lions at sea have been observed in the immediate vicinity of platforms and have hauled out on workboats, which suggests that there is little or no adverse impact on pinnipeds at sea, although an increase in vessel traffic might provide some degree of navigational hazard.

(ii) Cetaceans

The Santa Cruz report (Ref. 41, 42) included a survey of cetaceans. Table 7 shows sightings reported by the U.C. Santa Cruz study in the Santa Barbara Channel in 1975-1976. These sightings were all concentrated over the island and mainland shelves.

The endangered California gray whale migrates southward to winter in Scammon's Lagoon and northward in spring to summer in the Arctic. The U.C. Santa Cruz study (Ref. 41, 42) sighted gray whales in the Santa Barbara Channel only in spring when they follow the coastline. C.D. Woodhouse, Santa Barbara Museum of Natural History (pers. comm.), reports that gray whales also use the Channel on their southward migration, although most sightings have been farther offshore. This population has increased in recent years and may now be approaching stability.

The fin, blue, sei, Pacific right, sperm, and humpbacked whales, which have been sighted in the Southern California Bight and may use the Channel as a migration route, are listed as endangered species (Ref. 1, pp. 336-340).

There is currently no evidence that structures such as oil platforms disturb cetaceans. The Santa Cruz study reported sightings of gray whales outside the Channel Islands, which might indicate an alteration in migration route, possibly due to increased human usage of the inner Bight waters. 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 formerly 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 Santa Barbara, April 1981. Prior to this incident, the last sighting of a right whale was near San Diego in 1955. One sighting every 20 to 25 years is typical for this species. Drs. Cummings and Gilmore both stated their opinion that exploratory drilling of the type proposed does not pose any threat to the whales or their migratory patterns.

A recent report by the National Marine Fisheries Service (Ref. 32) was based on observations from a drillship operating in the migration route through San Pedro Bay during the peak winter migration season. Between 74 and 105 gray whales were observed on 30 occasions. The report noted that "gray whales were not adversely impacted by exploratory drilling activities; none of the whales sighted reacted to the presence of the drilling vessel in a manner detectable by the observer. Either the noise generated by the drilling vessel did not bother the whales or adjustments to the noise (i.e., course changes) were made before the whales swam into the view of the observer.

(b) Marine Birds

The northern Channel Islands and Santa Barbara Channel are a very important resource area for marine birds, where both numbers and diversity are high (Ref. 3). The islands serve as a nesting habitat for more than 60 species of Southern California's breeding sea birds. The San Miguel-Prince Island complex is the most important rookery in the Bight, followed by Anacapa. Table 8 shows the estimated population in 1975-76 of breeding species on Santa Cruz and Anacapa Islands.

Moderate to very high densities of seabirds (7.5 to 180.7 birds/km^2) were encountered in the spring in the western Santa Barbara Channel, comprising mainly shearwaters, Western gulls, and Cassin's auklets. Inshore on the island shores and mainland beaches, Brandt's cormorant, Western and California gulls, pigeon guillemots and Cassin's auklets were abundant (Ref. 41, 43, p. II-237). Migratory movements of loons (mostly Arctic and Red-throated), grebes, surf scoters, and northern phalaropes were noted in spring between Anacapa and the mainland and near Pt. Mugu. Total avian density at sea varied from July-September 1975, and in October-December it was moderate in midchannel to very high in the Santa Barbara and Ventura flats (286-341 birds/km^2) (Ref. 43, p. II-244). Along the Ventura County coastline brown pelicans, Western, California and ringbilled gulls were abundant. Longshore migrations of loons, grebes, and scoters were observed in November and December at McGrath State Beach. Overall bird density was very high in the channel from January-March. Cormorants, brown pelicans, several species of gulls, scoters, and grebes were found in very large numbers at roosts and in nearshore waters along the mainland and islands. The eastern half of the Channel harbored large numbers of loons, grebes, murres, and gulls (20 to 238 birds/km^2) (Ref. 43, p. II-245).

The brown pelican (Pelecanus occidentalis californicus), a common seabird of the West Coast, ranges from Mexico as far north as southern British Columbia during its nonbreeding period. The California Brown Pelican, a subspecies, now has breeding colonies in this area on West Anacapa Island (and possibly Scorpion Rock) and on Isla Coronado Norte. Anderson and Anderson (1976) suggest that this population constitutes a separate ecotype due to difference in breeding seasons and competition for food.

The breeding range has extended historically as far north as Bird Island off Point Lobos in Monterey County, but successful nesting has not occurred there since 1959. Irregular nesting has occurred in the past on Santa Catalina, Santa Cruz, San Miguel, and San Nicolas (Ref. 76). Santa Barbara Island supported a substancial breeding colony early in this century, but has not done so until this year (P. Kelly, pers. comm.). The current breeding range of the brown pelican extends from Anacapa Island south along the coast to Isabel Island and the Tres Maris Islands off Nayarit, Mexico. Thus, the California population constitutes the extreme northern limit of the breeding range. The bulk of the breeding population is located in Mexico and the Gulf of California, where over 100,000 pairs breed (Ref. 76).

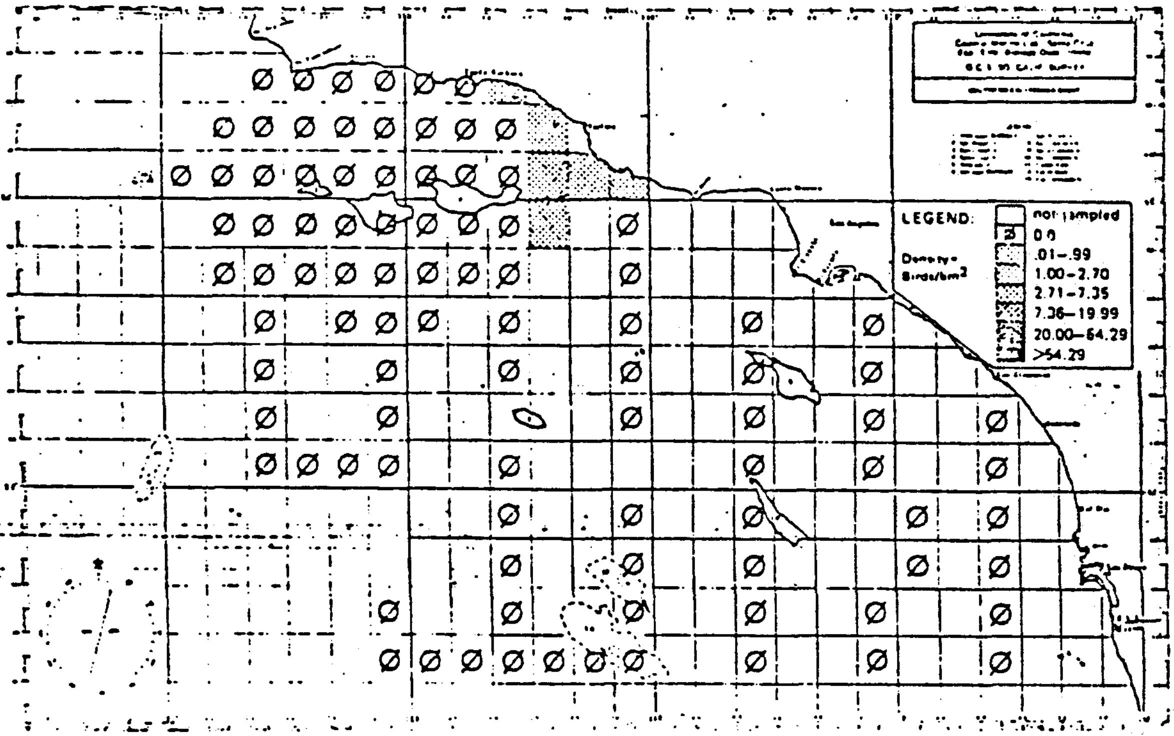
Dispersal along the Pacific Coast occurs between breeding seasons. Anderson and Anderson (Ref. 67) related the seasonal movement patterns of pelicans to shifts in offshore water masses. The records of northward dispersal in the later summer correlated with the northern movement of warmer water off California, which is probably also accompanied by northern movements of southern warm-water fish species which constitute the pelican's food supply (Ref. 76). The Mexican colonies breed earlier than the California population. Their likewise earlier migratory pattern results in a large influx of birds to the Channel Islands in the late summer and fall, often arriving before Anacapa's young have fledged. Most of the Gulf of California population have left the Southern California Bight by early December, and in the winter a different population, associated with the Davidson Current, is present (Ref. 76).

Pelicans are also reported inland from British Columbia through California, Utah, Nevada, Arizona, and Sonora, Mexico, although these sightings probably do not represent colonization. Birds from Anacapa populations have not been recovered further inland than 10 km (Ref. 76).

A comprehensive study of pelican habitat utilization was conducted by the University of California at Santa Cruz for the Bureau of Land Management over the period 1975-1978 (Ref. 68). A summary of data from that study is presented here.

Pelican population levels in the Bight fluctuate widely throughout the year, with maximum abundances occurring after early June with the annual influx of birds from Mexican nesting colonies. Some 5000 birds were estimated present on land and in open areas in March, April, and May, 1975-1978. Maximum island populations in excess of 10,000 were recorded in September and October 1977, and open ocean estimates exceeded 70,000 individuals in October 1977. The total population estimate at this time was 94,000 birds, approximately 20 times greater than the spring population.

In spring, the populations exhibited an annual low and were centered around the Anacapa nesting colony (Fig. 3b-1). In early fall, when most abundant, pelicans were concentrated in eastern Santa Barbara Channel, Santa Monica Basin, and around shallow island shelves (Fig. 3b-1). In late fall (November and early December) as southeastward shift in sightings occurred, and by early winter, most pelicans were located either in the Santa Monica Basin-



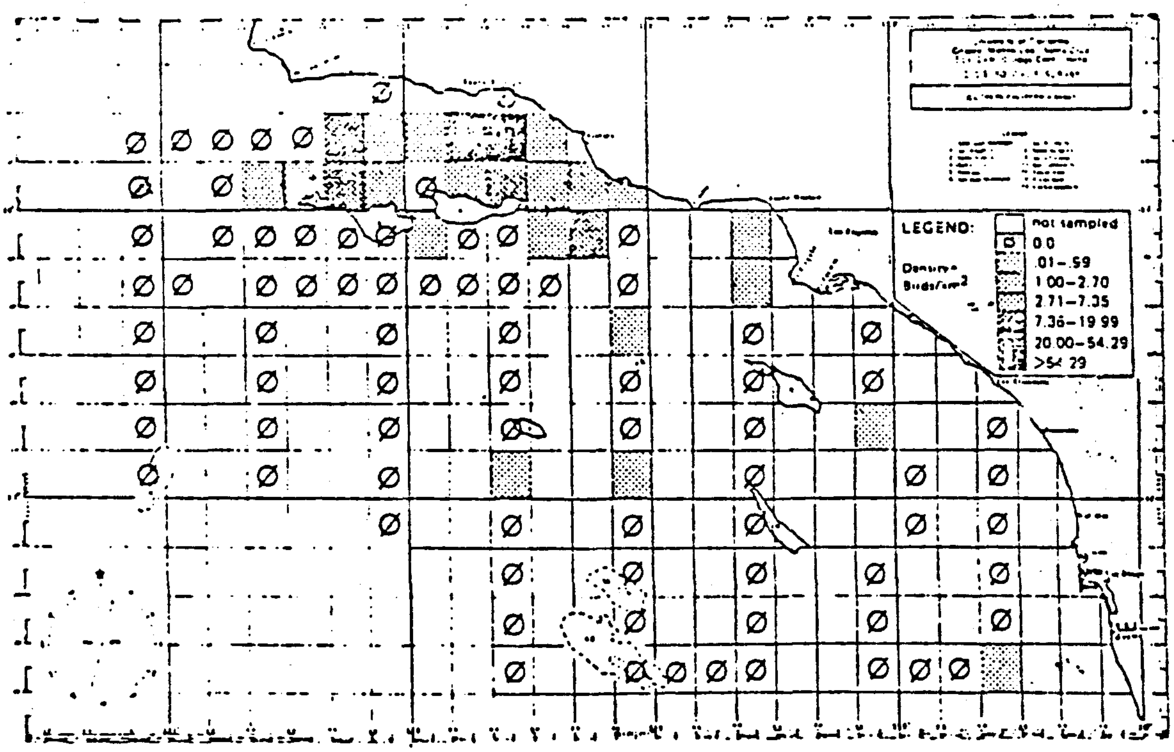


Figure 3b-1 Densities of Brown Pelicans observed during May 1976 (top) and September 1977 (bottom) aerial surveys.

Source: Hunt et al. (Ref. 68)

Santa Barbara Island area or between San Clemente Island and the mainland (Fig. 3b-2). Projected density distributions of Brown Pelicans in the Bight were calculated from sighting data. Fig. 3b-3 shows examples for November 1976 and September 1975 and illustrates the typically greater abundance in the Bight in late summer due to traffic of migratory birds from Mexican colonies.

A similar population distribution in 1979 was reported by Gress (Ref. 69) based on radial transects from Anacapa, with highest concentrations (to 1.99/km^2) in transects south of Santa Cruz and in the Santa Barbara Channel north and northwest of Anacapa. Higher concentrations (to 3.89/km^2) occurred in feeding flocks in June and July.

Seasonal variations on Anacapa relate to the nesting season. Total counts from Anacapa Island were shown graphically for two years, 1976-7 and 1977-8 (Ref. 68). Maximum abundances occurred in May (approximately 400) and June (1000), respectively, and minimum in January and December (less than 50).

The age ratio of pelicans found along the Southern California mainland was heavily biased toward immatures, especially from August through November. Adults comprised 70% of island population from July onward, and open ocean sightings 80%. This suggests differential habitat selection between age groups.

Anderson (in Ref. 68) reported the following food species and their percentage of the diet during the breeding season off the California Coast: northern anchovy (Engraulis mordax), 87.6%; Pacific saury (Coloabis saira), 8.8%; Pacific mackerel (Scomber japonicus), 3.4%; and blacksmith (Chromis punctipinnis), 0.1%. Pelicans were also observed feeding on California grunion (Leuristhes tenuis) when available, although this species was not recovered from gut analyses. Gut analyses indicated that

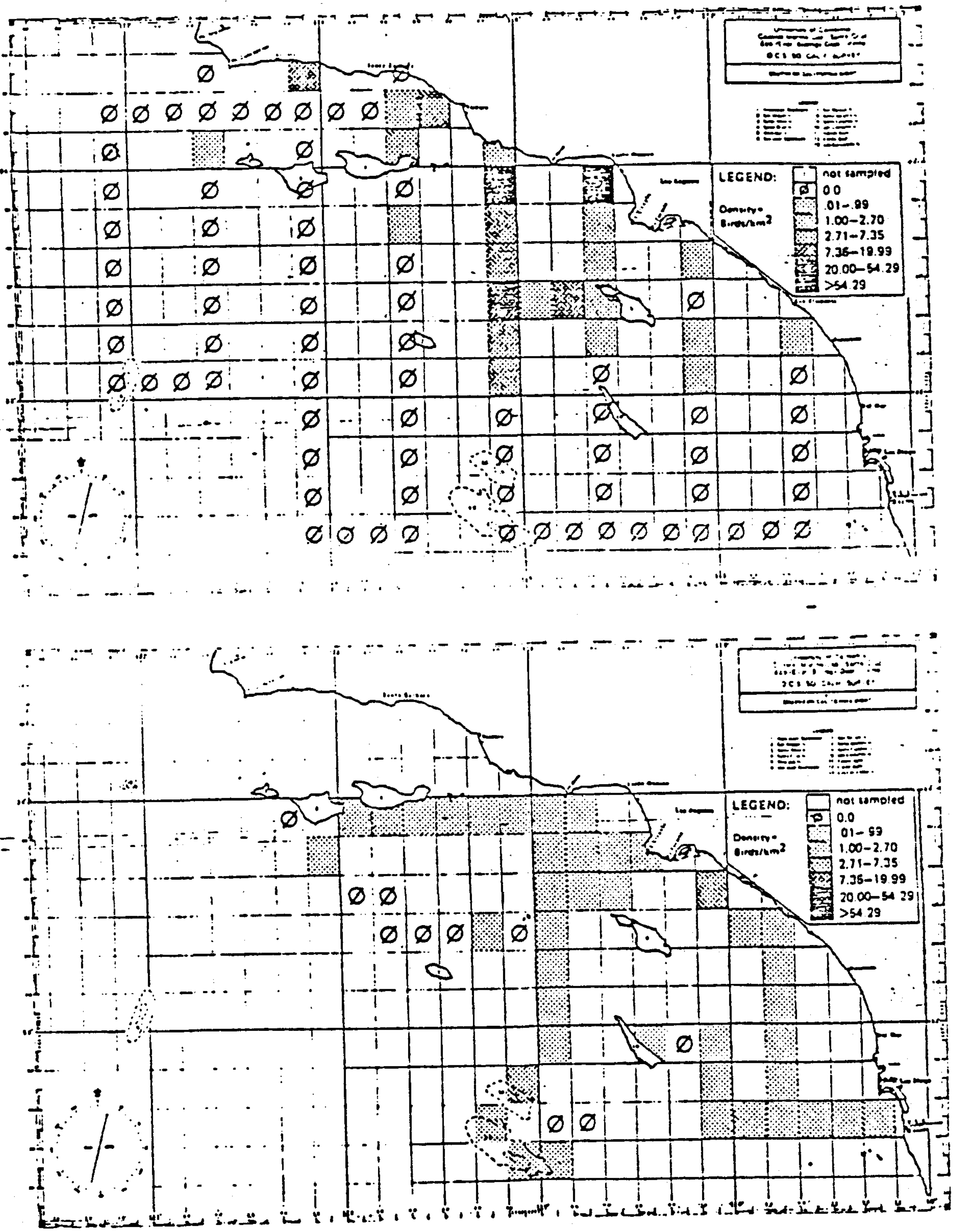


Figure 3b-2 Densities of Brown Pelicans observed during October 1977 aerial surveys (top) and February 1978 ship surveys (bottom).

Source: Hunt et al. (Ref. 68)

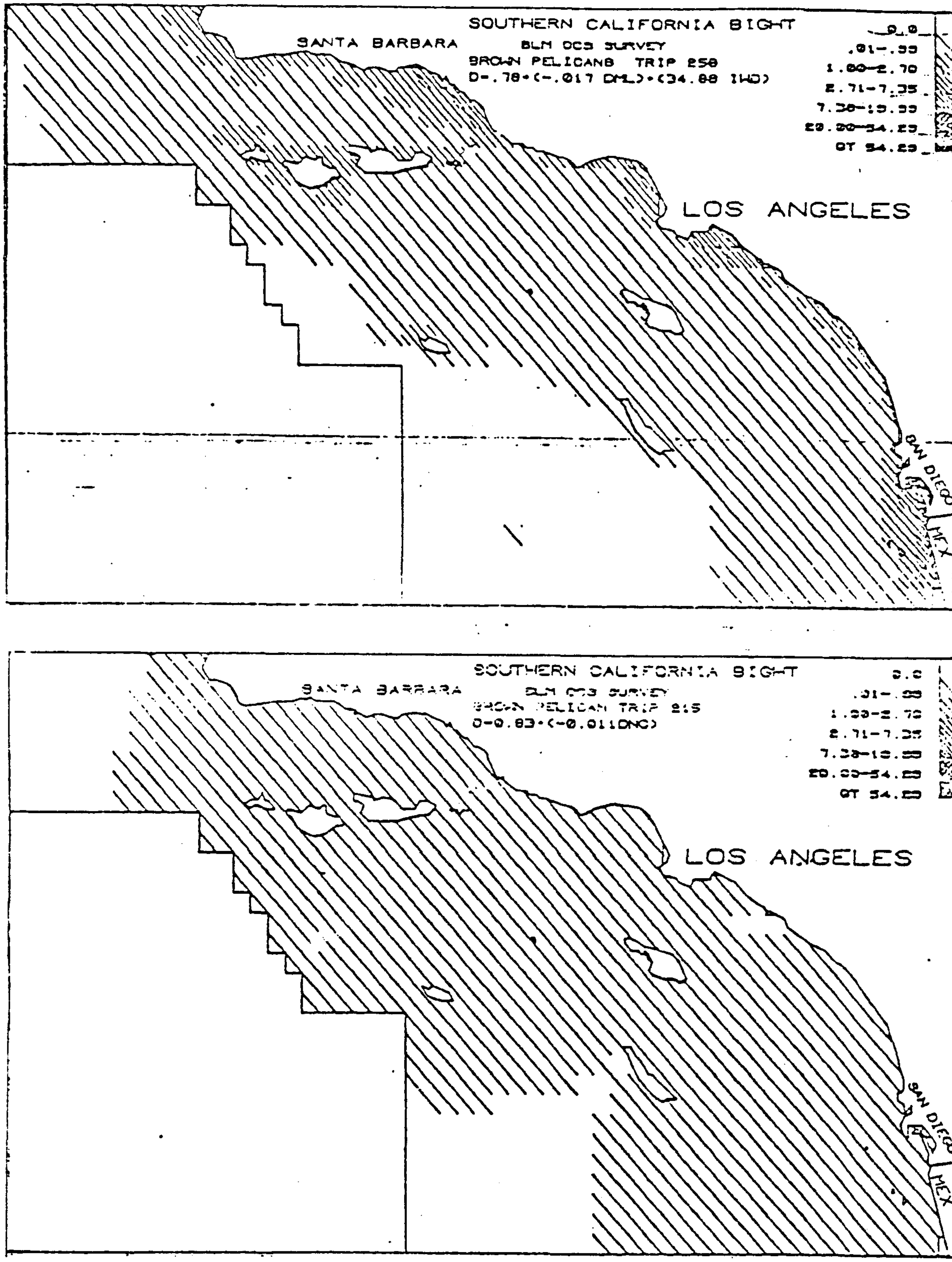


Fig. 3b-3 Projected density distributions of Brown Pelicans (upper) late Nov. 1976; independent variables: DML, IWD; (lower) late Sept. 1975, independent variable: DNC.

Source: Hunt et al. (Ref. 68)

anchovies under 300 mm were taken (Ref. 69). The young are fed partially-digested, regurgitated fish at the nest. Food habits at other times of the year have not been adequately studied.

Foraging occurs in schools of anchovies and involves diving from the surface. Unlike the white pelican, the brown pelican does not feed cooperatively. Foraging ranges depend on the distribution and type of fish schools and can extend as far as 25 miles from the nesting site. Some feeding occurs in kelp beds adjacent to Anacapa, but most foraging occurs along the mainland shelf (R. Schreiber, pers. comm.). Feeding flocks were observed in June and July of 1979 (Ref. 69) on the island shelf of Santa Cruz and on the mainland shelf north of Santa Cruz and showed densities of $2.92/km^2$ and $3.89/km^2$. Feeding flocks in mid-channel north of Anacapa at the time had a density of $1.50/km^2$. Feeding flocks seemed to be located where water depths did not exceed 40 to 50 ft. (Refs. 68, 69). Nestlings can survive long periods without feeding, but starvation is a major cause of mortality when food supplies are low, particularly for late-season nestlings (Ref. 70).

In a study of the effect on seabirds of the Santa Barbara oil spill in 1969 (Ref. 55), it was observed that live birds tended to avoid oiled water if possible. This was borne out by data for the Pelicaniformes which showed that 6 dead birds and 31 live birds were collected from an oiled area, while from an unoiled area, 6 dead birds and 260 live birds were found.

Pair bonds are not permanent, lasting for one breeding season only. Brown pelicans are colonial nesters, a characteristic which may have evolved as a response to increased benefits of cooperative feeding and defense of nests and young from predaceous gulls (Ref. 76).

The nesting season for any given pair requires about 18 weeks (Ref. 76). Nesting occurs in the heavy Coreopsis growth on the upper steep slopes of West Anacapa. Fig. 3b-4 shows the distribution of breeding colonies on the island. New nests are constructed each season and are woven of twigs and branches of native shrubs and lined with herbaceous material. Nesting usually begins in late January, but the timing of the breeding season varies from year to year. Breeding in the 1980 season commenced in mid-December on Santa Barbara and the first week in January on Anacapa (P. Kelly, per. comm.). Eggs are incubated for 30 to 35 days and the nestling stage lasts 9-12 weeks. Consequently, some 3 to 6 months can separate the time of the first and last fledging (Ref. 70). Most young have fledged and left the colony by late August (Ref. 68). The brown pelican exhibits deferred maturity. Three-year-old birds breed if conditions are optimal; more often, breeding is begun from four to seven years (Ref. 43).

Post-fledging mortality rates are high while the young birds are learning feeding skills, but after this stage, the life span is approximately 30 years (Ref. 70).

Schreiber (Ref. 70) studied brown pelican reproductive success in Florida, and his findings are generally applicable to the California population. The normal clutch size is two or three, and the means for early, middle, and late laying periods were 2.5, 2.6, and 2.2 eggs per clutch. Hatching success for these periods was 84%, 70%, and 43%. Similarly, early and middle periods were more successful than late periods in fledglings produced per total nests. Schreiber cites similar findings by Keith for Baja Californian populations, where diminishing food supply in August was identified as the primary factor in the decreased success of late nests.

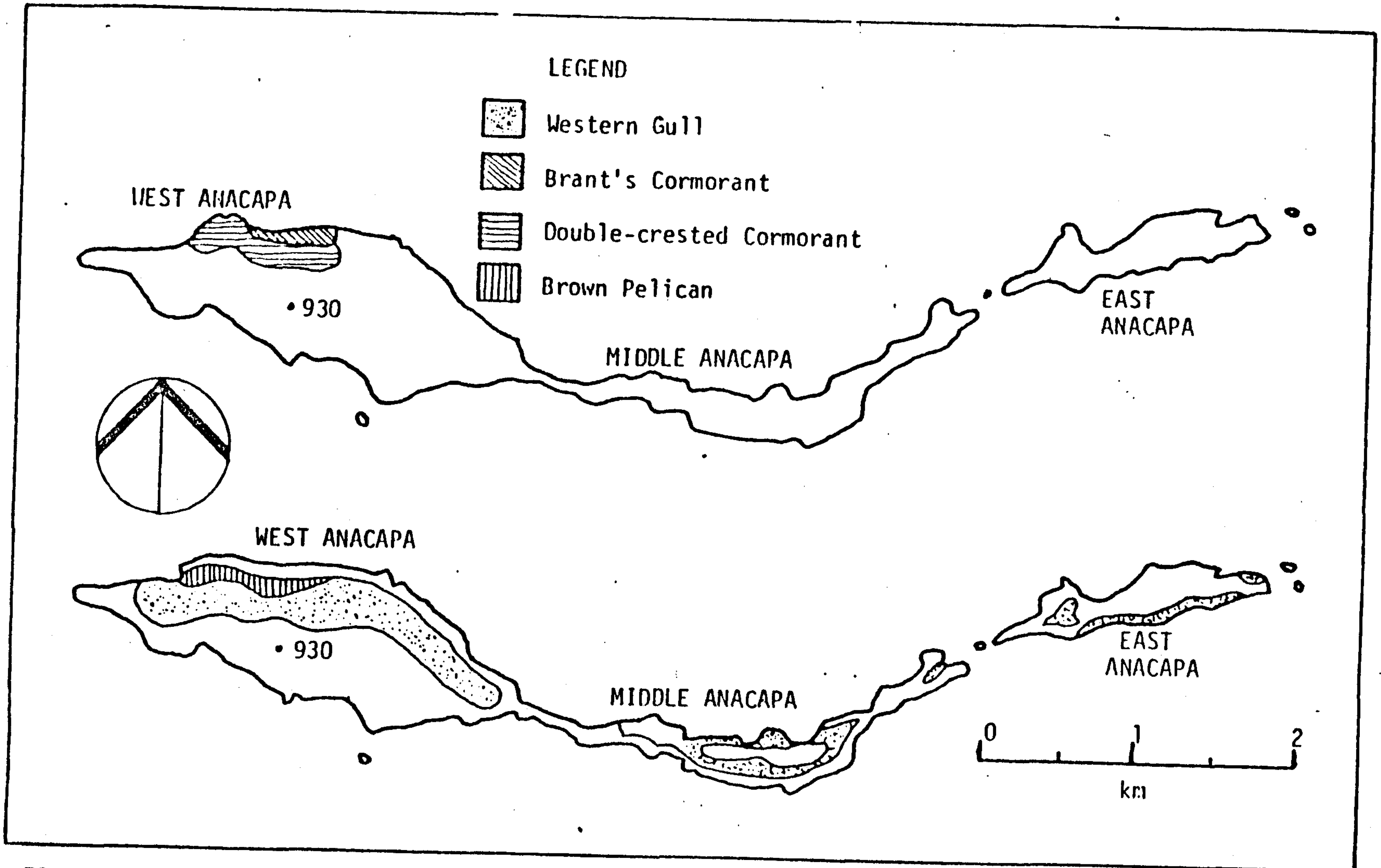


FIGURE 3b-4 Distribution of nesting colonies on Anacapa Island (Distribution of Brandt's cormorant incompletely known).

Source: Briggs et al. (Ref. 43)

In this study, clutch size and hatching success did not vary significantly over a period of eight years, while fledglings per total nest varied between 1.7 and 0.31 with a mean of 0.93. This parameter is the best measurement of total productivity, and it demonstrates that even in "stable" populations, wide differences occur in reproductive success from year to year, depending on particular conditions such as food supply. Low production was due primarily to mortality during the nestling stage. Schreiber feels that this mean figure centering around or slightly below one young fledged per nest is representative of stable populations in general and represents "normal" nesting success in brown pelicans, in contrast to higher figures of 1.2 to 1.5 cited by Anderson et al., (Ref. 71). The species is adapted to a variable, unpredictable food source, and an optimal clutch size of three allows production of several young when food is available.

This study emphasized the need for long-term studies (on the order of 20 years) to adequately assess population parameters of the brown pelican.

Historical estimates of the breeding population on Anacapa (Ref. 68) indicate that some 1000-2000 pairs were nesting from 1914-1917, peaking in 1920 at over 5000 pairs. From 1935-1940, the estimated number of pairs was estimated at about 2000 pairs. In 1963 and 1964, observers estimated around 1000 pairs to be nesting. In 1968, some 200 pairs were present, but apparently were not breeding, and in 1969 only four young were fledged (Ref. 71). The breeding population crashed sometime between 1964 and 1968. Reproductive failure in this and subsequent years was attributed to the production of thin-shelled eggs due to the presence in the Bight of DDE, a metabolite of the pesticide DDT. The number of young fledged increased to 305 in 1974 (Ref. 71). Fledging success declined and was very low in 1978 due to reduced food supply (Refs. 76, 71). In 1979, 980 young fledged (Ref. 69). The 1980 nesting season was similar to 1979. In addition, around 45 pairs of birds are now nesting on Santa Barbara Island (P. Kelly, pers. comm.). Nesting at Scorpion Rock was successful in 1975 (80 pairs), but not in the subsequent two years (Ref. 68).

Chlorinated hydrocarbon residues are concentrated in vertebrate lipid-storing tissues, especially during periods of stress or starvation. Being at the top of the food web, pelicans are especially vulnerable. They are also among the most sensitive of all birds to the effects of DDE in causing egg-shell thinning. DDE apparently blocks an active transport process that moves calcium from the bloodstream to make it available for deposition in the shell gland (Ref. 76). Studies by Anderson and Hickey (Ref. 72) showed that while normal shell thickness was 0.572 ± 0.010 mm, the many crushed shells that were found were 50-54% thinner than normal, and shells of intact eggs were 20-32% thinner than normal. Twenty percent thinning seems to represent a lower limit above which breakage occurs.

Levels of residues of total DDT metabolites were extremely high, over 1200 ppm on a lipid weight basis. Both shell thinning and contamination were the highest measured anywhere in the pelican range, and the highest measured in any species of bird (Ref. 43). Reproductive success was less than 0.01 young per nest during that time.

High DDE levels in the Bight resulted from the dumping of waste from the major DDT manufacturing plant into the Los Angeles sewer system. When the dumping was stopped, DDE levels in indicator organisms declined and continued to do so for some time. DDE levels in California waters have now apparently stabilized. Egg shell thickness increased from a mean of 0.288 mm (crushed shells) in 1969 to 0.482 mm in 1974 (intact shells). Corresponding DDE levels in anchovy whole bodies decreased from 3.24 ppm in 1969 to 0.20 ppm in 1974, and in egg contents, from 115.3 ppm to 96.6 ppm. Egg shell thinning in 1975 was 16% (Ref. 71).

Table 3B shows reproductive success from 1969-1980 in the California population. The number of young fledged in the Anacapa/Coronados population increased from 4 to 1185 over this time period, representing a reproductive success of 0.004 and 0.922, respectively. This latter value approximates the figure considered by Schreiber to characterize stable pelican populations elsewhere. The Coronados population recovered somewhat more rapidly than the Anacapa colony and was considered stable as of 1974. The Anacapa population increased to 0.88 in 1975. Very low productivity in 1976-1978 was due to reduced food availability, not to DDE contamination. Productivity returned to 0.78 in 1979, and a similar success is expected for 1980. Whether this productivity figure is sufficient for stability can only be assessed over the long term.

TABLE 3B

PRODUCTIVITY (FLEDGLING PER NEST) FOR
NORTHERN COLONIES OF THE
CALIFORNIA BROWN PELICAN, 1969-1979

Year Total	Nests Attempted			No. Young Produced			Productivity		
	Anacapa	Coronados	Total	Anacapa	Coronados	Total	Anacapa	Coronados	
1969	750	375	1125	4	0	4	0.005	0	0.
1970	552	175	727	1	3-5	-	0.002	-	-
1971	540	110	650	7	30-40	-	0.013	-	-
1972	261	250	511	57	150	207	0.22	0.60	0.
1973	247	350	597	34	50-150	-	0.14	-	-
1974	416	870	1286	305	880	1105	0.73	1.01	0.
1975	292	-	-	256	-	-	0.88	-	-
1976	417	-	-	279	-	-	0.67	-	
1977	76	-	-	39	-	-	0.51	-	-
1978	210	265	475	37	62	99	0.18	0.23	0.
1979	1258	960	2218	980	920	1900	0.78	0.96	0

Source: 1969-1977 data compiled from Power (Ref. 50). Anderson et al. (Refs. 51, 57), and 1978-1979 data from Gress et al. (Ref. 53).

Although residual effects of DDE may still be operative, it is apparent from these data that the pelican population has responded positively to mitigation of an environmental pollution hazard and is now again influenced primarily by natural biological control factors.

Intervals of high abundance of pelicans in the Bight accompany periods of oceanic warming. A clear relationship exists between abundance and mean surface temperature (Ref. 68). Migratory birds from Mexican colonies enter the Bight with the influx of warmer water in the winter, along with associated fish fauna and especially anchovies. Peak abundances in 1977 were accompanied by large anchovy biomass. This phenomenon has occasionally led to misinterpretation of reproductive status of the California population. The population falls to an annual low in spring and summer when only the endemic population is resident.

Dependence of seabird populations on availability of a fish food supply has been documented for several species. The collapse of the Peruvian anchoveta fishery attendant on the invasion of warm water known as El Nino in 1975/1958 and again in 1965 was accompanied by over four-fold decreases in guano bird populations (Refs. 73, 74). Related events occurred in the South African pilchard fishery and seabird populations (Ref. 74).

Experimental studies cited by MacCall (Ref. 74) showed that when food availability was reduced to 90% of satiety, reproductive success in ring doves decreased to 50%. Productivity was zero for birds restricted to 70% of food required for satiation.

In the Southern California Bight, brown pelican breeding is heavily dependent on abundance and/or availability of anchovies during the prebreeding and breeding periods (Ref. 74).

Availability in the local situation is usually related to overall abundance in the Bight. Feeding areas are variable due to mobility of the anchovy. At Anacapa, pelicans feed mostly in the Santa Barbara Channel during the later phases of the breeding season, but feed wherever the fish are earlier (Ref. 74). Because of the unpredictability of anchovy distributions, these areas cannot be delineated.

Pelicans in the Bight have shown highest reproductive success (measured by number fledged per nest) during periods of high anchovy abundance (Fig. 3b-5), or when anchovies are locally abundant, as occurred at Anacapa in 1979 (Ref. 74). High productivity, accompanied by high abundance, occurred in 1974 and 1975 (Refs. 76, 62), as well as a similar period in the mid-1960s. Decreased productivity from 1976-1978 was correlated with low anchovy abundance (Ref. 69).

Anderson and coauthors (Ref. 74) have interpreted Fig. 3b-5 to indicate that the estimated minimum anchovy school area necessary for effective pelican reproduction (Bmin) is 43 sq. mi., or an extrapolated 2.15×10^6 short tons. They emphasized that this corresponds to a productivity of only 0.6 fledglings/nest. This biomass represents about 78% of the long-term mean estimated for the central stock of anchovies and is twice the forage reserve recommended in the Anchovy Management Plan. A more conservative estimate might be about 60 square miles, which would require a larger foraging reserve.

The pelican population actually consumes negligible proportions of total anchovy biomass. An estimate based on a resident population of 6000 birds with a food requirement of 2 lbs/day, of which 2000 breeders produce 900 young per year which consume 150 lbs. each to fledge, resulted in an estimated total requirement of 2,250 short tons/year (or 67.5 short tons/year to produce young), which represents 0.08% of

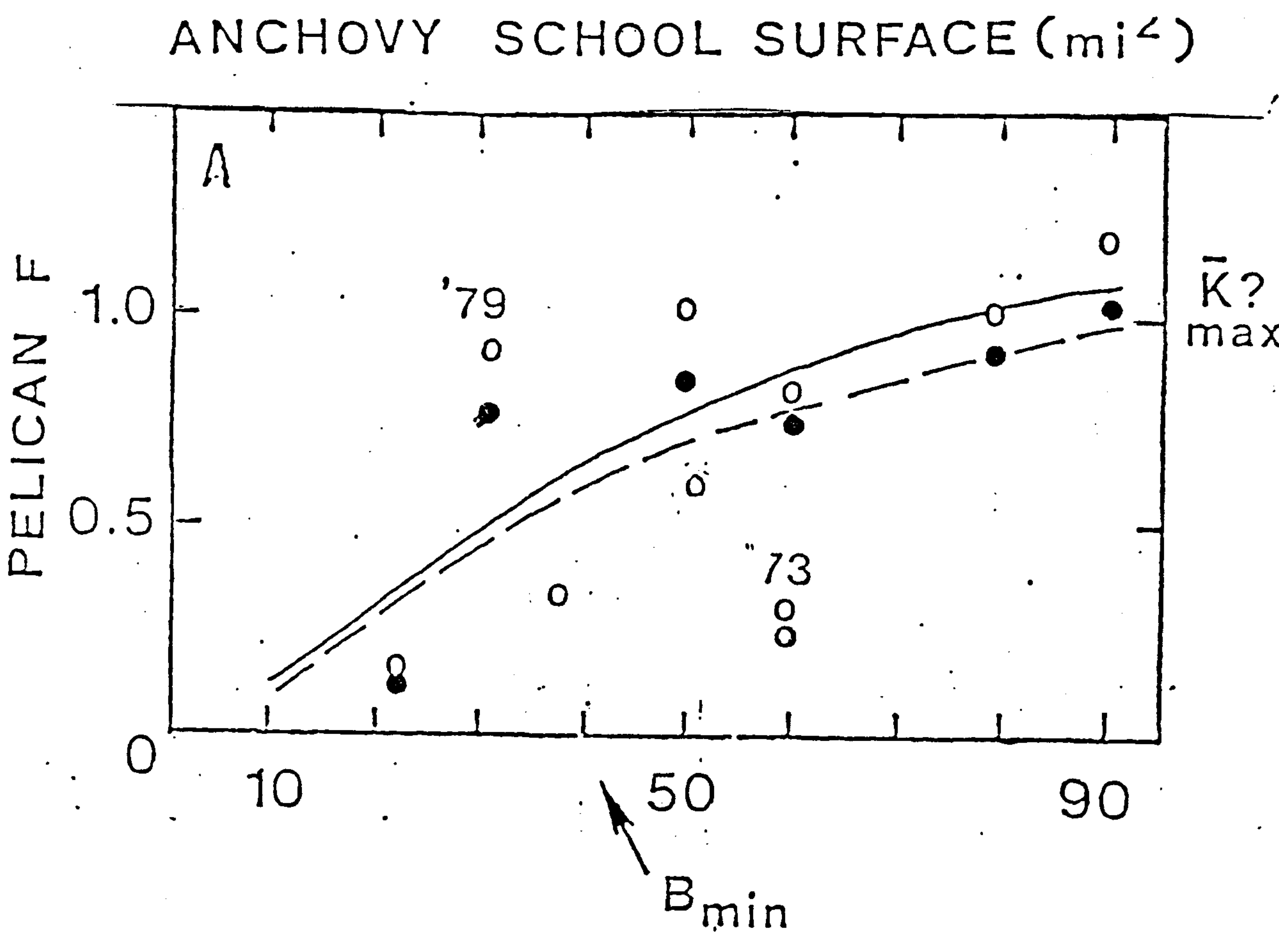


Figure 3b-5 Relationships between brown pelican fledgling rates (F=young fledged/nest) at Anacapa Island (closed circles) and Isla Coronado Norte (open circles) and surface area indices of general anchovy abundance in the Southern California Bight. K represents maximum observed carrying capacity for pelican reproductive rate as represented by anchovy biomass estimates. B_{min} represents minimum anchovy biomass for effective pelican reproduction under average conditions.

Source: Anderson et al. (Ref. 74)

the mean anchovy biomass (Ref. 74). If migrant pelicans were included in this estimate (75,000 birds for three months), the requirement increased to 0.33%. However, the total abundance of the food resource is the controlling factor in determining the status of pelican populations, since a much larger population size is required to produce availability levels such that this ration could actually be consumed.

Anderson (Ref. 74) presented catch data which illustrated that prior to 1979, commercial anchovy catches had no particular effect on pelican populations. He concluded that up to that time, quotas and catches were no adversely affecting either anchovy stocks or pelicans.

Anderson discussed dynamic interactions between pelican and anchovy populations (Ref. 74). Pelican productivity levels off asymptotically at higher levels of abundance of prey more rapidly than does human predation. Clutch size, which is genetically fixed in this K-selected species, provides an upper physiological limit to maximum reproductive output. Density-dependent behavioral changes in the prey could result in different school sizes, densities, or distributions which affect the efficiencies of both predators, but not necessarily in the same manner. For example, very dense schooling would render the anchovy population proportionately less vulnerable to pelican predation, but more amenable to purse seining. The result of these kinds of interactions is that carrying capacity (K) for the pelicans may be at a maximum, while biomass continues to increase, and predation by man could continue to increase and possibly affect prey availability to the pelican. Commercial fishing might also be affected alternatively or additionally by the density-independent factor of profitability.

These theoretical aspects of a two-predator system have become relevant to the pelican population in the Southern California Bight since potential increases in commercial harvest of anchovies have been provided recently by the Pacific Fisheries-Management Council in the form of increased quotas. Furthermore, the Mexican fishery is increasing. It is not clear at this time whether these factors will reduce food availability for California pelicans (Ref. 74). A management plan for seabird resources has not yet been developed by the appropriate agencies.

MacCall (Ref. 75) has modeled the effects of differential food availability on pelican reproductive success. This simulation illustrated theoretically that where productivity is dependent on food supply, reduced food availability can shift a normally K-selected dynamics to a response more typical of R-selected species, resulting in recurrent periods of reproductive failure and population decimation. MacCall (pers. comm.), a coauthor of the Anchovy Management Plan, emphasizes that in addition to censusing, research to provide life table data is necessary to provide adequate information for formulation of a fisheries plan which will adequately protect the pelican.

Anchovy carrying capacity varies considerably due to environmental stochasticity. The anchovy in Southern California is at the northern end of its range and is associated with southern water. The Southern California Bight is a transition area where several water masses meet, and the relative composition of each varies seasonally and annually. Hence, the abundances in the Southern California Bight cannot be predicted accurately. Anchovy abundance and biomass are also difficult to assess accurately. The several methods currently in use sample the population in a biased manner and produce different estimates.

One measure of anchovy abundance is the commercial harvest. When plotted by California Department of Fish and Game statistical blocks, it does not appear that anchovy harvests near Anacapa have contributed a major portion of the total catch in the Bight (Fig. 3b-6). Anderson (Ref. 74) calculated that loss of the area near Anacapa to fishing from an oil spill would amount to a loss of about 15% to 20% of California's anchovy fishing waters. Fig. 3b-6 also illustrates that anchovy abundance was greater in mid-channel and along the mainland coast than in the immediate vicinity of Anacapa.

Anchovy distributions have also been estimated by trawling and by acoustic methods. These two methods are also limited in the accuracy of determining biomass, the former due to net avoidance, particularly in the daytime, and the latter due to detection limitations of acoustic equipment at low anchovy densities. Mais (Ref. 62) conducted acoustic surveys which indicated that densities of anchovies were lower in shallow (less than 50 ft.) banks and inshore waters than over the basins of the Bight. However, he commented that the technique may have underestimated densities in these areas since schooling there is diffuse. The better inshore concentrations were located between Port Hueneme and Santa Barbara. Anchovy distribution varied seasonally, with a large portion of the population in the fall located inshore and in the more northern part of the Bight, while in late winter, an offshore and southeastward movement occurred coinciding with the onset of major spawning activity (February through May). At this time, the population was spread over areas offshore and south of San Pedro. Schools became extremely numerous and small, reaching peak numbers in April and May. In mid-March to June, a northward movement was seen with formation of large daytime surface schools during some years. The timing, as well as actual distributions, of these events varied from year to year.

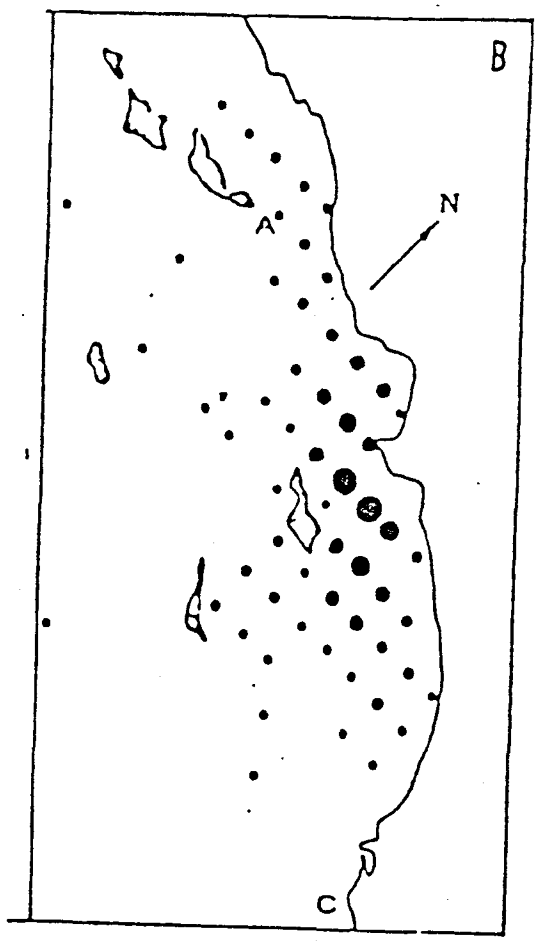


Figure 3b-6 Total anchovy reduction catches by California DFG for 1972 through 1977 in the Southern California Bight during the brown pelican breeding period (February through May). Increasing sizes of circles indicate catches in 10-min. blocks of 1000 1-5000, 5-25,000, 27-75,000, and 75,000 lbs. x 10^6.

Source: Anderson et al. (Ref. 74)

Mais described several different types of schooling behavior and discussed their effect on abundance measurements and suitability for commercial trawling. The most common schooling behavior observed was very small low-density, near-surface schools during daylight hours. These schools were usually 5 to 30 m. in diameter and 4 to 15 m. thick, occurring from the surface to 9 to 18 m. Several patterns of dense schooling suitable for trawling were also described.

Mais did not discuss suitability for pelican predation. However, several types of schooling behavior were described in the areas where pelicans feed. A schooling behavior seen in spring or early summer occurring at or near the surface during daylight hours was observed over the basins and channel within 20 miles of shore. Another schooling behavior observed in daylight hours in the flats between Ventura and Santa Barbara throughout the year consisted in a loose extensive scattering layer which could not be enumerated and was not suitable for commercial harvest. This type of schooling also occurred over deeper offshore water. The least common behavior observed in Southern California was the formation of dense schools in shallow inshore areas which normally lay on the bottom, but occasionally appeared at the surface during daylight. This was observed mainly in the Ventura-Santa Barbara area in summer and fall.

Data from these studies by Mais were used in calculations of and relationship to reproductive success (Ref. 71).

It is clear that human disturbance, particularly at the nesting site, has been detrimental to seabirds (Ref. 70). Several species used to breed on Anacapa and no longer do so, and this has been attributed to human disturbance (Ref. 68). The brown pelican colonies were originally located on East Anacapa and relocated to West Anacapa around 1939, which corresponds to the construction of the lighthouse on the eastermost island. However, very few data are available. A study of the effects of sonic booms, aircraft, and boat noise on bird and mammal populations on San Miguel Island is currently being conducted (R. Schreiber, pers. comm.). Hopefully, this study will provide reliable information concerning this problem.

The available literature concerning the California brown pelican describes a species which is particularly sensitive to environmental perturbations, whether natural or man-made. Salient factors in this sensitivity are the following:

1. The California population is at the extreme northern limit of the breeding range. Such populations are inherently unstable and naturally exhibit high variations in abundance over time, although adverse fluctuations in border populations do not necessarily have significant effects on the success of the species as a whole.

2. This subspecies has become almost entirely dependent on the northern anchovy for food. Reproductive success is heavily dependent on abundance and availability of this resource. Population numbers in the Southern California Bight are also governed by this factor. Both total anchovy abundance in the Bight and local availability, to a lesser degree, are important in this regard. Anchovy distribution is highly unpredictable, and although pelicans are adapted to deal with this variability, there are physiological limits, and hence, shortages in this food resource can lead to reproductive failure and population crashes.

3. Anchovy distribution is highly variable due to environmental stochasticity inherent in the complex oceanographic character of the waters of the Southern California Bight. The anchovy is also at the northern limit of its range, and its actual distribution varies seasonally and annually depending on the source of water circulating in the Bight. Abundance is greater elsewhere in the Bight than near Anacapa.

4. Anchovies are a prey species for two predators, birds and man. Commercial fisheries have been regulated up to the present in a manner which seems not to have allowed interference with pelican food requirements. However, the current liberal policy, coupled with increased Mexican fishery, may result in a reduced availability of anchovies to pelicans and other seabirds. A management policy, including both anchovies and seabirds, is necessary to circumvent this possiblity.

5. Pelicans are extremely vulnerable to organochlorine pollutants. The population has apparently largely recovered from the effects of DDE contamination in the Bight, but reproductive success at Anacapa may still be somewhat lower than desirable for maintenance. The potential remains for a similar crash from other chemical pollutants, such as PCB, and monitoring programs are necessary to prevent recurrences.

6. A worst-case oil spill, occuring during the breeding season and beaching on Anacapa could affect foraging efforts near Anacapa, but would not affect other available foraging areas. Birds tend to stay out of oiled areas. The effect on primary and secondary productivity (phytoplankton and anchovies) would be minimal due to the nature of their distribution in the Bight. Although such an oil spill would certainly have some adverse effects, the impact is probably less significant to pelican population dynamics than the several other factors involved.

For many avian species, the adjacent shelf areas serve as foraging areas, most foraging occurring within 25 km of the islands. Brandt's cormorant, pigeon guillemot, and Xantus' murrelet were observed foraging close to San Miguel, while Cassin's auklet ranged as far as 30 km from the island. Western gulls also forage widely. Large numbers of birds are also found along the mainland coast and migrate and forage there.

Sea birds in the Santa Barbara Channel area are continually exposed to floating oil from the natural seeps in the area. A survey of beached birds along the coastline of the

Bight and Santa Cruz Island in 1975-1976 (Ref. 43) showed that the highest percentages of oiled beach-cast birds were found on the north side of Santa Cruz Island (46.9%) and the northern section of coastline (32.7%) as compared to 13.5% in the southern section. It was estimated that about 33% of the oiled birds had died due to oiling. Rates of beaching were highest from February to April when large numbers of wintering and migrating birds were present and when weather conditions were most severe. Alcids, loons, grebes, and scoters (diving birds) were considered a highly critical group when rated for susceptibility to oiling, shearwaters, fulmars, and kittiwakes an intermediate group, and gulls and terns a low susceptibility group. Pelicans and cormorants are probably also moderately or highly susceptible. In spite of the high incidence of oiled birds in the area due to natural seeps, the Santa Barbara Channel supports the highest seabird population in the Southern California Bight.

Like pinnipeds, seabirds are most affected by noise and human disturbance at their rookeries. The proposed drill-site is sufficiently distant to avoid this impact.

Significant numbers of shorebirds, waterfowl, and water associated birds are dependent on Santa Barbara/Ventura wetlands, which are concentrated in a few localities. Of a total of 900 acres of Santa Barbara County-owned wetlands, 80% are located at Goleta Slough, Carpinteria Marsh, and at Santa Ynez River. The wetlands north of the proposed site (about 19 miles) is Carpinteria Marsh (El Estero), a 200 acre wetland comprised of 150 acres of marshland, 15 acres of water, and 35 acres in mudflats. This area provides an estimated 170,000 bird-day's use annually. Weekly counts in 1966-67 showed that the marsh was used by 44,000 ducks.

It is estimated that in excess of 120 species utililize wetland habitats of Ventura County, primarily Mugu Lagoon (180 acres) (Ref. 60, p. II-236). This location, some 11 (eleven) miles distance from the wellsites, contains 95% of Ventura County's wetlands. Bird day's use has not been documented but it is estimated to be similar to that of Santa Barbara County. The light footed clapperail, Rallus congistrus, and the California least tern, Sterna albifrons browni, both endangered species, are found at Mugu Lagoon. The Mugu Lagoon to Latigo Point Area has been designated an area of Special Biological Significance and has been the subject of an investigation characterizing its ecosystem constituents (Ref. 60). This area has a widely varied ecosystem with several unique components and is at present one of the least impacted regions on the mainland of Southern California (Ref. 60, p. 1). No adverse impacts are expected in this important area due to the considerable distance of the well sites.

Natural oil seeps along the coast provide a high background of crude oil along the mainland coast (Ref. 60), but have not hindered the high productivity of this area. Generally no adverse effects from normal operations are expected to affect the several wetlands in the area.

(4) Sensitive Underwater Features

No underwater features of a sensitive nature are known to occur on this lease.

(5) Endangered Or Threatened Species

Endangered seabird species found in this area include the clapperail and the California least tern, found primarily at Point Mugu. The California brown pelican roosts or loafs on the northern Channel Islands but only breeds on Anacapa. The Anacapa Island rookeries are more than 8 miles south of the proposed drilling site. A detailed discussion of the California brown pelican is contained in Section 3(e)3(b). The Guadalupe fur seal, an occasional visitor to San Miguel Island, is being considered by the National Marine Fisheries Service for endangered status. Endangered whale species in the Southern California Bight include the gray whale, the blue, fin, and humpbacked whales, which are sighted occasionally in the Southern California Bight, and the sei, sperm, and Pacific right whales which are listed as occurring in the area (see Section 2(e)(3)(ii)).

f. Socio-Economics

Personnel requirements and onshore support facilities have been described in Section 2(g). The expected demands for supplies, services and energy are detailed in Section 4(f)(2). The proposed activities will help maintain the current level of offshore-related employment in the area but are not expected to result in any growth in the local population. Existing highway and railroad networks and port facilities at Port Hueneme, and the major urban centers in Santa Barbara County (population 290,000 in 1980) and Ventura County (population 527,900 in 1980) are more than adequate to support the proposed activities.

Public opinion relating to the proposed activities tends to be divided into three distinct segments:

--a small minority which vocally opposes offshore petroleum development in any form; this group includes the officers, employees, and many of the active members of various environmental special-interest groups, plus some persons in the fishing and tourist industries.

--a small minority which (less vocally) supports offshore petroleum development; this group includes officers and many employees and stockholders of oil, service and support companies, as well as some local businessmen who view an increase in oil company and related activity as a stimulus to long-term economic growth.

--a large majority which appears to be neutral toward the proposed activities.

In view of the limited and temporary nature of the proposed activities, the socio-economic effect will be negligible.

4. ENVIRONMENTAL CONSEQUENCES

This section is intended to describe "the direct, indirect, and cumulative effects on the onshore and offshore environments expected to occur as a result of implementation of the plan" (NTL 80-2, p. 9). Further, "this discussion need only include those adverse impacts that are not effectively minimized by proposed mitigating measures."

Section 3 has reviewed the environmental values that may affect, or be affected by, the proposed activities. For those few aspects which might involve the potential of adverse impact, the mitigating measures have been described in Sections 2 and 3. (These include, for example, the dispersion of gaseous emissions and the rapid dispersion, by currents, of dumped clean cuttings and any excess drilling mud.) For the reader's convenience, however, all of the environmental values are recapitulated in this section. In summary, the proposed activities are not expected to result in any significant adverse environmental impacts.

a. Geologic Hazards

Section 3(a) has described the geologic characteristics of the project area, indicating that there are no potential hazards related to unstable bottom sediments, mass-wasting phenomena, shallow gas, geopressured zones, karst topography, shallow faults, fill facies, subsidence or volcanism. Seismicity is discussed in Section 3(a)(2)(k); the maximum expected seismic shaking will have little or no effect on the ocean-bottom equipment to be used.

b. Meteorology

(1) Weather

Weather patterns have been described in Section 3(b)(1); they will have no effect on the proposed activities other than possible infrequent, short-duration limitation or suspension of operations during unusually high winds.

(2) Air Quality

Present onshore and offshore air quality has been discussed in Section 3(b)(2). The assessment of potential impacts of the proposed activities is stipulated by 30 CFR 250.2, 250.34-3, and 250.57. Related onshore activities are discussed in sections 2(g), 2(h), 3(f) and 4(f) of this report; all are diverse, presently-existing activities not increased by nor directly associated with the proposed exploratory operations.

With regard to the OCS facility (as defined in 250.2, the drillship but not including support vessels), section 250.34-3(a)(4)(ii) requires that the lessee "shall submit only that information ... needed to make the findings under 250.57." The application of exemption formulas as provided in 250.57-1(d) has been documented in Table 9, and is discussed below. Because the amount of these projected emissions is less than the emission exemption amount "E" for each pollutant, "the facility is exempt ... from further air quality review required by paragraphs (e) through (i) of this section" (250.57-1(d)). Thus, the information "needed to make the findings" includes only:

> 250.34-3(a)(4)(ii)(A)(1)(i-iii). Source, facility, composition, emission rates and total quantities of pollutants, and fuel type are described in Section 2(k)(3) and Appendix 6;
> (iv) Well site location is listed on Table 1, and shown schematically in Figures 2, 3 and 4;
> (2) Distances are provided in Table 8. For location P-0205-3/4 the nearest land mass is Anacapa Island 8 miles to the south.

Section 250.57-1(d) also calls for the emission exemption amount "E" to be expressed in tons per year. Table 9 lists the exemption limits and total pollutants for each well. To drill both wells as an uninterrupted series would take 170 days and the maximum total emissions for both wells (e.g., 75.54 tons of NOx) is less than the minimum exemption limit "E" of 266.40 tons/yr.

As shown on Table 9, the emissions of all other pollutants are substantially less than for NOx and do not approach the respective exemption limits (E). In summary, there is no possible way that the emissions from this project could exceed the exemption limits.

c. Physical Oceanography

(1) Effects on Proposed Activities

Water depths and oceanographic factors have been described in sections 3(a)(1) and 3(c); they will have no effect on the proposed activities other than possible infrequent, short-duration limitation or suspension of operations during abnormal sea states.

(2) Effects on Water Quality

Discharges into the marine environment and the related preventive or mitigating factors as required by the U.S. Geological Survey (OCS Orders No. 2 and 7) and the Environmental Protection Agency (see Appendix 5, NPDES Permit) are discussed in detail in sections 2(j)(1), 2(k)(1), and 2(n) of this report. Such discharges are strictly regulated by the above agencies, do not contain hydrocarbons, and are well below any possibly toxic levels of other substances. Water depth and currents in the project area ensure maximum dilution of all allowed discharges of processed waste fluids from the drillship. Clean well cuttings will be dispersed by currents to settle eventually on the sea floor; because they are composed of sedimentary rock, any portion which became suspended in the water would be indistinguishable from naturally-derived modern sediments already present. Therefore no significant degradation of water quality is anticipated. Section 3(c)(5) describes existing water quality including continuing pollution from natural oil seeps in the Santa Barbara Channel.

d. Other Uses of Area

As discussed in Section 3(d), the proposed activities will have little or no effect on shipping, commercial and sport fishing or military use. The area contains no existing pipelines, cables, or other known mineral or cultural resources, or mariculture activities. Military uses controlled by Vandenberg Air Force Base may require temporary suspension of operations, as described in Section 3(d)(3).

e. Flora and Fauna

Pelagic and benthic environments in the project area are described in Section 3(e)(1) and (2), and will not be affected by the proposed activities except for those few benthic animals within an area of less than 100 square meters at each drillsite which may be smothered. Available evidence indicates that the total exposure of the flora and fauna which occupies the project area, to the discharge of drilling fluids and drill cuttings will have no significant effect on measurable numbers of these organisms (Refs. 31 and 6). Clean drill cuttings and excess drilling mud will be dispersed in the water column (more than 200 ft. deep in this area); see also Section 4(c)(2), above), or may form a very localized deposit which will be re-colonized by resident benthic species in a few years.

Transportation routes to and from the proposed drillsite will be many miles distant from sea bird and pinniped breeding and resting areas and will not disturb them.

There are no known rare or endangered species of flora or fauna residing in the proposed project area. Several species of endangered whales migrate through the Santa Barbara Channel but, as discussed in Section 3(e)(3)(a)(ii), will not be affected by the proposed activities, nor will the endangered brown pelican (see Section 3(e)(3)(b)).

Significant impacts on biological conditions further removed from the proposed drillsite could only result from a major oil spill (i.e., over 1000 barrels). Section 2(h), 2(j) and 2(n) describe the oil spill preventive measures to be employed by Chevron during the drilling. The sections of coastline nearest to the proposed activity include the Ventura County shoreline. A major oil spill might impact areas of special biological importance, which may be within a potential spill trajectory due to prevailing winds.

Anacapa Island, which supports the second largest number of sea birds including a rookery for the endangered brown pelican (Pelecanus occidentalis), falls within the potential spill trajectory. As described in detail in Section 3(e)3(b), the nesting and feeding habits of the brown pelican are such than an oil-spill at the P-0205-3/4 location would have minimal direct impact on the species. Nests are on cliffs high above any surf-carried oil. Foraging (including young birds as soon as they are able to leave the nest) is at great distances, chiefly along the mainland shelf; additionally, The birds have been observed to avoid oil slicks. An oil-spill might have an indirect impact on the brown pelican if it were to affect lower levels on the food chain; the pelican feeds chiefly on anchovy, which feed on plankton. However, there is no evidence that the active oil seeps at Coal Oil Point west of Santa Barbara, which introduce an average of 50 to 70 barrels of oil per day into the Channel waters (Ref. 2, p. II-153), have had an adverse effect on biological productivity. Fish block data, for example (Ref. 3, Fig. E-20), are as high or higher near Coal Oil Point as in more distant portions of the Channel. When the ultimate effect is several steps along the food chain (as from phyloplankton to zooplankton to anchovy to pelican), it is inevitably obscured by the action of currents which transport and diffuse these organisms throughout the Southern California Biight. Thus, an oil spill at the P-0205-3/4 location would have no greater an impact on the brown pelicans' food supply than if an equivalent spill occurred in a more distant part of the Bight--and no greater an impact than the equivalent flow of oil from natural seeps.

The Harbor seal (Phoca vitulina) has been observed to use Anacapa Island for breeding and pupping. The area is speculated to be a possible rookery and a definite haulout for the California sea lion (Zalophus californianus). The possibility and potential impact of a major spill are discussed in Section 4(g).

f. Onshore Impacts

(1) Socio-Economics

As discussed in Sections 2(g) and 3(f), the proposed activities will serve to maintain existing levels of onshore employment and services but will have no other perceptible impact on local employment, population and industry, community services, public opinion, transportation systems and facilities, or scarce coastal resources.

(2) Demand for Goods and Services

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.

(a) Supplies and Equipment

The following demands for supplies and equipment required for the actual drilling work, average per well, are estimated to be:

300 tons oilfield casing (less any recovered).
6,200 cubic feet cement (neat).
16,000 cubic feet mud (barite, bentonite and miscellaneous mud additives).
25 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.

(b) Water

There will be no demand on onshore water supplies. Water for drilling and crew requirements will be provided by onboard desalinization.

(c) Energy

Consumption of diesel fuel by the drilling vessel, for electric power generation including drilling, plus desalinization of water, will average approximately 5,500 barrels per well. Transportation services per well will utilize, on the average, 5,100 barrels of diesel fuel for crew and supply boats, and 85 barrels of aviation gasoline for helicopters.

(d) Other Resources

In addition to the above, the following services will be required during the proposed drilling operations: directional services, well logging, perforating, well testing, drilling fluids engineering, mud logging and oilwell cementing.

(3) Environmental Impacts

The proposed project does not involve construction of additional onshore support facilities, nor any other activities which might impact the onshore socio-economic environments.

g. Major Accidents

In addition to the above considerations of the expected effects of the proposed activities, NTL 80-2 (Section VII.A.(4)(g)) calls for a discussion of the potential for accidents, and of the possible impacts on the environment which might result from a major accident. In the context of the proposed activities, the only type of accident which might result in substantial adverse environmental impact is a major oil spill. A major oil spill is defined in recent useage (Ref. 1, p. 743-756) as 1000 barrels or more; that definition will be followed in this report. By way of examples, the 1969 Santa Barbara oil spill was estimated at 77,000 barrels (Ref. 2, p. III-115; Ref.

29, p. 51), the tanker Torrey Canyon (1967) at 860,000 barrels (Ref. 27, p. 75).

Smaller accidental spills such as might result from leaks or fuel transfer accidents would have no significant adverse effects because any oil not promptly contained and collected by the boom, skimmer and other on-site equipment would be rapidly dispersed and would not be detectable above the normal background hydrocarbon content of Channel waters (see Section 3(c)(5)).

(1) Potential for Major Oil Spills

The potential for a major oil spill is exceedingly low. There has never been a spill of crude oil anywhere in U.S. waters as a result of exploratory drilling -- with more than 6000 exploratory wells drilled to date. In worldwide exploratory drilling, there has been only one major spill, Mexico's Ixtoc #1; control of that well was lost as a result of practices which are banned in U.S. offshore operations (Ref. 44). The record for offshore exploratory drilling is somewhat better than for offshore development drilling; this suggests that the costly safeguards incorporated into drilling, casing and mud programs for offshore exploratory wells more than compensate for any extra hazards related to unknown subsurface conditions. Another obvious reason is that only a small proportion of exploratory wells actually discover significant oil resources; if no oil is found, none can be spilled.

Several different factors involved in offshore drilling might lead to a major oil spill; these include above-normal subsurface pressures, severe damage to facilities at the sea floor or on the drilling vessel, and collisions between vessels. The multitude of operating practices and governmental regulations have evolved to minimize these possibilities. Casing, mud and drilling programs will recognize and control high-pressure zones -- but local and regional geological data indicate that no such zones will be encountered. At the proposed drilling site, there are no hazards which might cause significant damage to sea-floor facilities. In the very unlikely event that a major accident on the drilling vessel, or a ship collision, should occur at a time when the well was open to a hydrocarbon-bearing zone, seafloor blowout-preventers would close the hole. The chance of a passing vessel colliding with a drillship that is brightly lighted night and day, and standing 24-hour watch must be extremely small.

The statistical probability that the drilling of a particular exploratory well will result in a major oil spill cannot be estimated with any certainty, but is very, very slight. In U.S. waters, more than 6000 exploratory wells have been drilled to date and there have been no significant spills. Worldwide, an estimated 12,000 to 15,000 offshore wildcats have been drilled, with one major spill. As a first approximation, therefore, the chance that a major oil spill might result from an individual offshore exploratory well is less than 1 in 6000 (0.017%) and something like 1 in 12,000 (0.008%).

(2) Parameters for a Major Spill

To assist in an objective assessment of possible adverse impacts due to the accidental introduction of hydrocarbons into the environment, this section summarizes information on the fate and effects of oil spilled at sea. The previous section has shown that the probability that a major spill might occur during the drilling of an exploratory well is very, very low.

In evaluating the impact of any oil spill, it is necessary to consider the physical and chemical behavior of oil spilled on the surface of the sea. The physical and chemical behavior of a spill can be modified by response measures, which may include chemical treatment by dispersants. Modification also results from several natural factors, which include oceanographic and meteorological conditions at the time of and during the life of the spill.

All of these factors are critical in determining the eventual fate and effects on the biota of spilled oil. These several parameters will be introduced in the following sections.

(a) Behavior of Oil Discharged on the Sea Surface

Petroleum discharged on the sea surface undergoes physical, chemical, and biological alteration (Ref. 27, p. 2). Rapid physical and chemical processes include spreading, movement with winds and water currents, evaporation of volatile components, dispersion into the water column through emulsification, solution into the water column, spray injection into the air, photochemical oxidation, adsorption, and sedimentation. These processes occur in three stages.

Initially, oil on water spreads rapidly due to gravity, surface tension, and wind conditions, spreading usually in an elongate fashion with nonuniform thickness at about 3-3.5% of the wind velocity (ref. 27, p. 44; Ref. 45, p. 19) and at an angle of about 5°-20° to the right of the wind (Ref. 22, p. 10-22; C.D. McAuliffe, pers. comm.). This increases the surface area exposed to water, air, and light and speeds weathering.

Evaporation is the predominant dispersal process at this stage, and its rate increases with wind, sea state, and further spreading. Evaporation alone can remove up to 50% of oil spill volume in an "average" crude oil in 24 hours (Ref. 27, p. 45). The fraction of total hydrocarbons spilled which is removed by evaporation depends on the composition of the oil; a No. 2 fuel oil is weathered more rapidly than a heavy Bunker C, for example.

Virtually all volatile shortchain hydrocarbons (containing less than about C_{15}), which are more toxic to marine life, will be lost from sea surface slicks by evaporation within a few hours to a few days (Ref. 45, p. 23; Ref. 46, p. 29; Ref. 27, p. 46). Solution of oil in water is low relative to evaporation and involves primarily short-chain hydrocarbons. Measured concentrations ranged from 0 to 60 ppb (parts per billion) (Ref. 46, p. 29).

A second important mode of dispersion is emulsion, which is enhanced by wind and wave action (Ref. 45, p. 20; Ref. 27, p. 47). Some crude oils form water-in-oil emulsions called "chocolate mousse", which remain at the surface. The general tendency, however, is to form oil-in-water emulsions, which under wind and wave action break into droplets in the water column and move more slowly than oil at the surface (Ref. 45, p. 27; Ref. 47, p. 1). Oil once dispersed tends to remain in the water column as particles or droplets, and not in solution. Only high density, viscous oils such as Bunker C are likely to sediment in unaltered form (Ref. 45, p. 20).

Via these several dispersive processes, a slick disappears fairly rapidly from the surface. Field observations indicate that slicks disappear within several hours to five days, depending on oil type, weather conditions, etc. Spill half-life may be on the order of one day (Ref. 45, p. 20).

After most of the volatile hydrocarbons have evaporated, photochemical and biological degradation assume a dominant role. Photo-oxidation degrades hydrocarbons slowly, especially aromatics which, like short-chain hydrocarbons, are toxic to marine life (Ref. 45, p. 26). The total rate of decomposition corresponds to the destruction of a 2.5 um slick in 100 hrs. (Ref. 27, p. 48). Hydrocarbon oxidation by micro-organisms is probably the major way hydrocarbons are removed from the environment (Ref. 45, p. 25). Biodegradation also enhances the rate of natural dispersion of the oil (Ref. 48, p. 14). Studies have shown no evidence of hydrocarbon buildup in the ocean despite large contributions of petroleum hydrocarbons through geological time as from seeps (Ref. 46, p. 31; Ref. 49, p. 513).

(b) Effect of Dispersants on Oil Behavior

Modern dispersants are biodegradable surfactants which increase the formation of oil-in-water emulsions (small droplets) resulting in rapid dilution and downward mixing (Ref. 45, p. 27). Thus a dispersed slick does not increase in size, or travel as far as an undispersed slick. In a large Gulf of Mexico spill, treated oil traveled 1 to 1.5 miles from the origin, while control slicks extended usually 6 to 9 miles and occasionally 40 to 50 miles (Ref. 45, p. 27). Furthermore, chemical dispersion of oil increases photo-oxidation, weathering, and biodegradation, and lessens oil adherence to solid surfaces and thus the amount of oil that may sediment (Ref. 45, p. 30) or cling to rocks.

Considerable research is being conducted toward the development of effective dispersant chemicals and their application which indicates that this can be a valuable response tool, and one that can be used when booms and mechanical skimming devices are not effective because of high winds and waves.

(c) Potential Spill Trajectories

In the very unlikely event that an oil spill occurred in the course of exploratory drilling on parcel P-0205, the direction and speed of its drift toward any nearby shoreline would be determined by the currents and the wind direction and velocity prevailing at the time and place of the spill. Currents have been discussed in Section 3(c)(2), and winds in Section 3(b)(1).

Parcel P-0205 is in the southeastern part of the generally persistant clockwise gyre in the eastern Channel, and for that reason currents are generally not over 0.2 knots, and vary within seasons as the gyre shifts. Winds will have a much greater influence on spill trajectories: wind-induced surface currents move at about 3.5% of the wind speed, and in a direction about 20° to the right of the wind direction (Ref. 1, p. 766). In the eastern Channel, winds vary seasonally both in strength and direction, although prevailing winds are from the west-northwest throughout the year. Such winds are strongest and most predictable in spring and summer, increasing in the afternoon and abating at night or in the early morning hours. Winter winds are somewhat more variable; "Santa Ana" winds from the northeast may blow for periods of several hours to several days, while infrequent strong east or southeast winds may accompany storms. Such winds are of short duration and so would not generate consistent long-term movement of any spill.

Because of these conditions, a spill in the area of Parcel P-0205 would probably drift in a southeasterly direction, parallel to the coastline between Ventura and Point Mugu. South-southwesterly drift toward Santa Cruz Island, 7 miles distant, would be infrequent and of fairly short duration.

(d) Response Time

The local oil spill cooperative, Clean Seas, Inc., can reach the proposed drill site in three to four hours with major equipment (see Section 2j) from its depots at Carpinteria and Port Hueneme. For large or continuing spills, Clean Seas can call out a tanker-mounted skimmer which is on standby at Long Beach. The Southern California Petroleum Contingency Organization (SC-PCO) has a four-engine DC-4 aircraft under contract and on constant standby to spray chemical dispersants. It is located in Mesa, Arizona, and can be in Santa Barbara in four hours.

(e) Weather Factors

Wind speed and direction and sea state affect the behavior of oil slicks. Wind direction and the variability in this direction affect the trajectory of a spill, while wind speed affects the rate of travel, as discussed in Section 4g(2)(c). Higher sea states increase the degree of dispersion of the oil into the water column (Ref. 59), which has the effect of slowing the rate of movement of the slick with the wind and reducing the amount of oil arriving on land. This may offset the effect of rough seas on response operations, since currently available booms and skimmers are relatively ineffectual where wave heights exceed about six to eight feet. In the Santa Barbara Channel, wave conditions exceed the present operational limits of containment and cleanup equipment less than 17.5% of the time, most commonly in spring and winter (Ref. 2, Table II-6, summed). During such conditions, dispersion and evaporation rates will be increased, and volumes arriving on shore will be decreased, although arrival times will also be decreased. (It should be noted that Chevron's Critical Operations and Curtailment Plan (Ref. 4, Sec. VII) requires that when such wave conditions occur or are forecast, all operations which present any significant risk of a spill must be suspended.)

The trajectory of any spill will be controlled primarily by wind direction. Prevailing winds are from the west and northwest, with other winds infrequent and generally of short duration. During normal, moderate wind conditions, a spill would drift slowly toward the southeast; containment and cleanup equipment could be deployed in an effective and timely manner. Less commonly, strong persistant winds will generate seas higher than the 8-to-10-ft. limit of state-of-the-art containment and cleanup equipment. Under such conditions (Ref. 59), break-up and dispersion of the slick (possibly aided by the use of chemical dispersants) would destroy the coherent slick by distributing the oil throughout the upper water column. In this dispersed form, the potential impact of the oil on marine birds and mammals and on the shoreline would be significantly reduced.

Of the various coastal and island areas, the Ventura County shoreline is most "at risk"; ready access by road and the availability of clean-up equipment at Carpinteria and Point Hueneme would tend to minimize impact. Risk to Santa Cruz and Anacapa Island is slight. This is because drift toward the south would be modified as prevailing westerly winds resumed (see Section 4g(2)(c)); the resulting non-linear trajectory would allow an adequate margin of time for deployment of response equipment along with reasonable weathering of the spill at sea.

Although exact volumes and compositions of oil actually arriving cannot be rigorously treated, Section 4(g)(2)(a) has discussed the kinds of losses which have been observed in slick volumes and oil components, especially toxic short-chain and aromatic hydrocarbons, which would operate to reduce impact, on the various ecosystems, of a slick originating at Parcel P-0205.

(3) Potential Impact for Major Spills

This section will address the likely characteristics and behavior of a spill in the Santa Barbara Channel and the impacts of such a spill on the local ecosystem.

(a) Oil Spills in the Santa Barbara Channel

The impact of an actual oil spill on the biota in any area is difficult to predict due to the many factors involved. These include the type and amount of oil spilled, trajectory and weather conditions, distance from land, and response measures employed. These parameters will determine how much oil is dispersed into the water column, the degree of weathering before impacting a shoreline, and the final amount, concentration, and composition of the hydrocarbons at the time of impact, as discussed in section 4(b)(2).

The worst-case spill situation (i.e., where the greatest damage may be done to marine life) will occur: 1) when oil is confined, as in a shallow body of water such as a bay; 2) when the oil is a light refined oil; or 3) when there is a high load of fine sediment in the water column caused by storms, heavy surf, or river discharge (Ref. 48) where oil will be incorporated into the sediment.

Crude oils which have been found and produced in and adjacent to the Santa Barbara Channel are predominantly of low to medium gravity (i.e., heavy to medium weight) (Ref. 51, pp. 13-27, Ref. 29, pp. 660-661). Oil fields and exploratory wells in the Channel have not encountered abnormal reservoir pressures which sometimes contribute to blowouts and major oil spills (as in the Ixtoc spill). The potential volume of any future spill cannot, of course, be predicted. The volumetric range for the seven major U.S. platform spills to date (1589 to 77,400 bbls., with an average of 25,000 bbls.) is an order of magnitude less than for major tanker spills (Ref. 2, pp. II-106-109); the impact of most tanker spills is greatly magnified because they occur directly on or adjacent to a shoreline instead of miles offshore as with platform spills. To date, all spills resulting in substantial, long-term impact to marine life have been tanker accidents (Ref. 27, p. 74-75).

Natural oil seeps, as discussed in Section 3(c)(5) provide a continuous input of hydrocarbons to the environment, i.e., 50-70 bbl/day at Coal Oil Point (Ref. 2, p. II-153). These seeps are located throughout the Channel in great abundance east of Pt. Conception to Coal Oil Point and beyond, as well as north of San Miguel Island, west of Santa Cruz Island and east of Anacapa (Ref. 21, p. 517; Ref. 1, Visual No. 9). Koons (Ref. 49, p. 514) recorded total dissolved C_3-C_8 concentrations at the surface of 0.07 to 0.29 ppb, decreasing with depth. The aromatics benzene and toluene were 0.04 and 0.08 ppb, with C_8 aromatic concentration not detected (0.01 ppb sensitivity). These concentrations of light hydrocarbons are higher than those from non-seep locations, but are still very low. The content of heavy hydrocarbons (C_{15}+) was 2 or 3 orders of magnitude greater than the content of light hydrocarbons (up to 16 ppb). Highest concentrations are at the surface, indicating rising undissolved particles, and Koons concluded that environmental effects would probably be restricted to that portion of the water column (Ref. 49, p. 515). The highest concentrations of soluble organic matter (3315-8890 ppm) and C_{15}+ hydrocarbons (404-2359 ppm) were found in benthic sediment samples at Coal Oil Point. These were some 25 times the averages (about 160 ppm) in offshore California bottom sediments (Ref. 49, p. 513, 515).

Straughan's study of chronic exposure to petroleum in the Southern California Bight (Ref. 52) indicated water-column levels of total carbon-tetrachloride-extractable organics to be 0.1-0.5 mg/l (ppm) compared to 0.1-0.3 mg/l (ppm) at Catalina Island, which also suggested little contamination of the water at Coal Oil Point by petroleum hydrocarbons. At Coal Oil Point, however, levels in the sediments ranged between 10-90,000 mg/l (ppm) compared to levels of 11-92 mg/l (ppm) at Santa Catalina Island. These studies found that hydrocarbons were not evenly distributed in the water column or in the sediments within the Channel or Bight. Both Koons (Ref. 49) and Straughan reported that the hydrocarbons at the seeps did not appear to have moved over a wide area or have built up in sediments or the water column elsewhere. These variable and occasionally very high background levels must be taken into consideration when assessing the possible impact of introduction of additional hydrocarbons. The effect on the biota of this natural pollution will be discussed in section 4(g)(3)(b).

Topographic and oceanographic factors also affect the impact of an oil spill in the environment. The Santa Barbara Channel covers an area of 1750 sq. miles where considerable dilution can occur and is open at the west and east such that general tidal and current conditions (see section 3(c)(2)) allow for water exchange with other basins and hence flushing (Ref. 21, p. 97-132). A counterclockwise gyre in the Santa Barbara Channel and a localized clockwise gyre in the eastern portion of the channel provides recycling of water of California Current origin at a background current of approximately 0.2 kn (Ref. 50, p. 3), which, in combination with prevailing winds, would commonly move a spill along the Ventura County coast, about 11 miles distant. The ecosystems associated with these geographic features are considered in Section 3(e) and 4(g)(3)(b).

(b) Impacts of Oil Spills on the Marine Ecosystem

Severe environmental damage has obviously occurred from those tanker accidents which have spilled large volumes of oil directly onshore (as contrasted with exploratory activities, many miles offshore). Reports following these spills have claimed degrees of damage virtually throughout the ecosystem; for example, Reference 27, pp. 74-75 summarizes studies of several such major oil spills (primarily tankers) and their effects. This summary indicates various degrees of acute damage and affected bicta, and provides information on recovery, where available. Effects varied from minor damage with rapid recovery to recovery times on the order of years.

Previous sections have discussed difficulties inherent in predicting the impact of an oil spill due to various abiotic factors. Biotic factors provide an equally complex set of variables, including the types and composition of species assemblages and individual, species and population responses (including seasonal responses) to pollution.

The effects of oil spills may be acute or chronic in nature. Acute effects on the biota are those resulting from a single exposure of the marine environment from an accidental spill. Mortalities may occur at the time of the spill or for some period thereafter. Chronic effects occur from continuous or intermittent releases of oil which may cause various sublethal effects on individuals or populations. A major accident involving an exploratory well may have a discernable acute impact, while less is known of possible chronic effects. The impacts of natural seeps in the Santa Barbara Channel are chronic in nature, and some data are available on this aspect.

Information concerning effects on the ecosystem has derived either from experimental studies, usually in the laboratory, but sometimes in the field, and both acute and chronic, and from after-the-fact assessments of actual oil spills. Experimental studies in the laboratory may be directed toward assessing toxicities of pollutant oil or its components or toward effects on specific physiological, developmental, growth or behavioral aspects. Experimental field studies involve controlled oil spills and compare various parameters of test and control areas such as changes in productivity, abundance, species composition, population recovery, etc. Assessments of actual oil spills usually do not have comprehensive baseline studies which can serve adequately as controls. Consequently, acute effects, if they occur, are measured, followed by reassessment at various intervals until the populations are considered to have returned to "mature" or "equilibrium" conditions, which are taken to serve as equivalent to control levels, although this assumption is tenuous at best. It is outside the scope of this environmental report to review comprehensively the extensive body of literature dealing with effects of oil pollution. Some general results and specific studies will be discussed with particular emphasis on relevance to the Santa Barbara Channel.

A spill at sea might adversely affect benthic, planktonic and nektonic communities. Laboratory research has indicated generally that short-chain hydrocarbons, aromatics, and the water soluble fractions are more toxic than crude oils to zooplankton, phytoplankton, crustaceans and fish (Ref. 53, p. 5; Ref. 27, p. 86). Zooplankton are known to ingest oil particles; they are generally egested in fecal pellets (Ref. 27, p. 63). Although uptake is in some cases rapid, depuration times are likewise rapid (Ref. 53, p. 5; Ref. 27, p. 61, 66) and this has led several investigators to conclude that foodweb magnification would not be a significant consequence of an oil spill (Ref. 53, p. 6; Ref. 27, p. 66). Experimental data concerning the effects of hydrocarbons on phytoplankton have been confusing at best. Some species are inhibited at all or some concentrations, where others may be stimulated (e.g., Ref. 54). The effects on larvae, both acute and chronic, seem to be least studied and this component of the plankton may be more at risk.

The effects of a major spill on offshore plankton and nekton would be substantially reduced by dilution factors and the transient nature of the plankton. A large recruitment capacity from the widespread populations in the area and high reproductive rates would also contribute to an insignificant impact in terms of the whole population.

The potential impact on benthic communities is difficult to assess due to insufficient evidence concerning sedimentation processes of hydrocarbons. Studies on test slicks showed that oil dispersed rapidly with depth approaching background levels, which may be quite high due to natural seeps in the area. The water depth at the proposed wellsite will allow a significant portion of oil to disperse naturally into the water column, the amount and form dependent on the volume and type of oil spilled, wind and wave action, etc. Microbial degradation, as mentioned previously, is the major means of removal of hydrocarbons from the environment. The availability of a hydrocarbon source has resulted in rapidly increased numbers (blooms) of these populations and increased degradation (Ref. 45, p. 25; Ref. 27, p. 52). Where hydrocarbon concentrations are chronically high due to natural seeps, normal bacterial populations are also continually maintained at high levels (Ref. 45, p. 25).

Serious adverse effects are more likely to occur as a result of oil nearshore or impacting a shoreline. The most serious damage appears to occur in enclosed areas with poor flushing characteristics, such as occur in bays, estuaries, and marshes. Important wetlands occur in this area and have been discussed in section 3e(3)(b). Fortunately these vulnerable areas at Carpinteria Marsh and Mugu Lagoon can be protected by deploment of booms at the mouths of these wetlands, which have been used successfully in the past (J. Siva, pers. comm.). Other communities here which might sustain an impact include sandy beaches, rocky intertidal areas, subtidal communities, including nearshore benthic, and marine bird and mammal populations associated with the Channel. The mainland location of these areas of potential impact allows rapid, easy acess of contingency equipment to rocky shores and sandy beaches. The nearshore location of the proposed wells also results in less inclement sea conditions than at offshore sites, increasing the proportion of time in which clean-up operations can be utilized. Once again, the degree of impact depends on the conditions attendant on a particular spill and the affected ecosystem, and therefore other spills cannot be considered directly comparable. In this light, the most relevant data concerning possible effects of an oil spill in the Santa Barbara Channel derives from studies conducted in the area, including experimental test spills conducted under controlled conditions, studies conducted after the 1969 Santa Barbara oil spill, and investigation in the areas of natural seeps in the Channel.

The Santa Barbara oil spill began in January 1969 from Platform A, and over a period of months released an estimated 77,000 barrels of oil (Ref. 29, p. 51) from fractures in the sea floor adjacent to the platform. An estimated 4508 tons (30,600 bbls.) landed primarily on the mainland shore (Ref. 55, p. 404) due to storms. Given these conditions, this spill also is not the best for comparative purposes, but it does provide data for the particular ecosystem in question. The Allan Hancock Foundation conducted a survey following the spill (Ref. 55). In summary, results showed (p. 401-417):

1. No evidence of gross effects on phytoplankton.

2. Benthic faunal changes were not a result of the spill.

3. Sandy beach fauna showed no direct effects.

4. Smothering and mortality affected intertidal _Chtalamus fissus_ (barnacle), _Hesperophycus harveyensis_ (upper intertidal alga), and _Phyllospadix torreyi_ (eel grass), but recolonization began in the intertidal within seven weeks and recovery was observed in six months. Some other invertebrates covered with oil were healthy. No reduction in breeding occurred in two surviving oiled barnacle species, while it was reduced in a third. Larval settlement on oiled surfaces was delayed in some species.

5. Oil did not deplete the fish population.

6. Whales and elephant seals appeared unharmed, but some mortality which occurred in sea lions may have been a result of the spill.

7. High mortality was recorded in pelagic bird populations, especially in certain species such as grebes and loons. A possible loss of 50% of the population of these species may have occurred.

8. The study concluded that damage was limited to certain species and that the area was recovering (as of 1971, two years after the spill).

In the aftermath of the Santa Barbara oil spill, a series of field surveys supplemented by laboratory research was conducted in 1972-74 to study sublethal effects of natural chronic exposure to oil of organisms in field situations, viz. Coal Oil Point (Ref. 52). Control sites were located in non-seep areas. The most significant results were as follows (Ref. 52, p. i-vi):

1. Animals inhabited areas of Coal Oil Point with high levels of hydrocarbons in the sediments.

2. No malfunctions were observed in organisms examined from Coal Oil Point.

3. There was no change in total biomass or in biomass of major groups related to the presence of hydrocarbons in the sediments.

4. Food species (abalone and lobster) did not contain petroleum hydrocarbons in the edible muscle portion although hydrocarbons were present in the viscera. Sea urchins and mussels (also edible) did contain hydrocarbons.

5. No adverse sublethal effects were demonstrated in studies on populations and reproduction in abalone and sea urchins or mussels; in fact, tolerance seemed to have developed.

6. Brooding rate in two barnacles was not changed, while it was reduced in a third; larval development of

Strongylocentrotus _purpuratus_ (sea urchin) may be impaired when adults contain hydrocarbons.

Dr. Straughan commented (p. 107) that the larvae of these species are pelagic and therefore were not exposed to oil arrival at Coal Oil Point. Hence, tolerance increases were due to selection and adaption to petroleum within each generation. Hydrocarbon concentrations in the water and sediments in the Santa Barbara Channel are unevenly distributed. Straughan concluded that there was no evidence for buildup of hydrocarbons in tissues of marine organisms at Coal Oil Point (Ref. 52, p. 109). The existence of an abundant biota at Coal Oil Point implies that communities can and do successfully persist in the presence of chronic hydrocarbon pollution.

Experimental test slicks were studied in 1975 in the Southern California Bight (Ref. 56). Oil concentrated under test slicks produced total hydrocarbon concentration in the water column not exceeding those reported at Coal Oil Point in the presence of natural seeps (see section 4(b)(3)(a)). Bioassays accompanying these experimental spills revealed no adverse effects on the zooplankton or phytoplankton (Ref. 56).

The above summary has shown that, in the very unlikely event that a major oil spill occurs as a result of the proposed activities, significant adverse impact would be concentrated on one component of the environment: the shoreline.

The shorelines of the Northern Channel Islands are at some distance from the wellsites, thus reducing their vulnerability. The mainland shores are already subjected to high concentrations of hydrocarbons from natural seeps. In addition, the shoreline is readily accessible for cleanup operations.

Vulnerable aspects include sandy beaches, rocky intertidal areas, subtidal communities (including nearshore benthic), and associated marine bird and mammal populations. Section 3(b) has referenced studies indicating the lack of significant impact on beach and benthic faunas and the intertidal populations. Certain other communities or species are highly vulnerable to oil spills and require particular consideration.

The discussion of beached sea birds in Section 3(e)(3)(b) reported that Santa Barbara Channel showed the highest incidence of oiled bird mortality in the Bight, due to the presence of natural seeps. Nevertheless, the Channel still maintains the highest sea bird population; thus, population strategies have compensated for an already abnormally high level of hydrocarbon. Seasonality is a factor here. Certainly spills during nesting and fledging seasons (spring and summer) would have a serious impact.

The northern Channel islands are the location of major pinniped and seabirds rookeries and haulout areas for the Southern California Bight. Anacapa Island with its seabird rookeries is located 9 miles south of the proposed wellsite. There is little probability that the island will be adversely affected by the proposed drilling. Oil spill trajectory studies (Ref. 2, 27), current pattern studies (Ref. 2), and prevailing wind patterns (Ref. 2) indicate there is little likelihood that an oil spill will move inward towards the island.

5. ALTERNATIVES TO THE PROPOSED ACTION

Not required in environmental reports for plans of exploration. (NTL 80-2, p. 12). The alternative to offshore disposal of drill cuttings and excess mud has been discussed in Section 2(k)(2).

6. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Several minor and short-term impacts are expected to occur as a result of the proposed activities, including:

- slight decrease in offshore air and water quality;
- moderate very local disturbance of sea floor, and local turbidity;
- potential aesthetic impact related to the visibility of the drilling vessel to persons on shore. This impact is minimized by the location of two other platforms in the vicinity. The aesthetic disturbance of the additional derrick from the drilling would be insignificant when viewed from beach, railroad or highway level in the vicinity of Ventura. However, the derrick lights may be visible from the mainland at night, and the drillship will be seen by passing boatsmen.

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. 57).

A potential impact could result from a large oil spill. However, any damage sustained at the shoreline, 8 or more miles distant, is expected to be minor and of short duration (Ref. 58), as discussed in Section 4(g) of this report.

In view of the minor and, in most cases, temporary nature of the above impacts, and the extremely slight possibility of a large oil spill occurring, the environmental impact of the proposed project is considered to be insignificant.

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APPENDIX 1

BIOLOGICAL SURVEY

(NOT REQUIRED)

APPENDIX 2

CULTURAL RESOURCE SURVEY

(NOT REQUIRED)

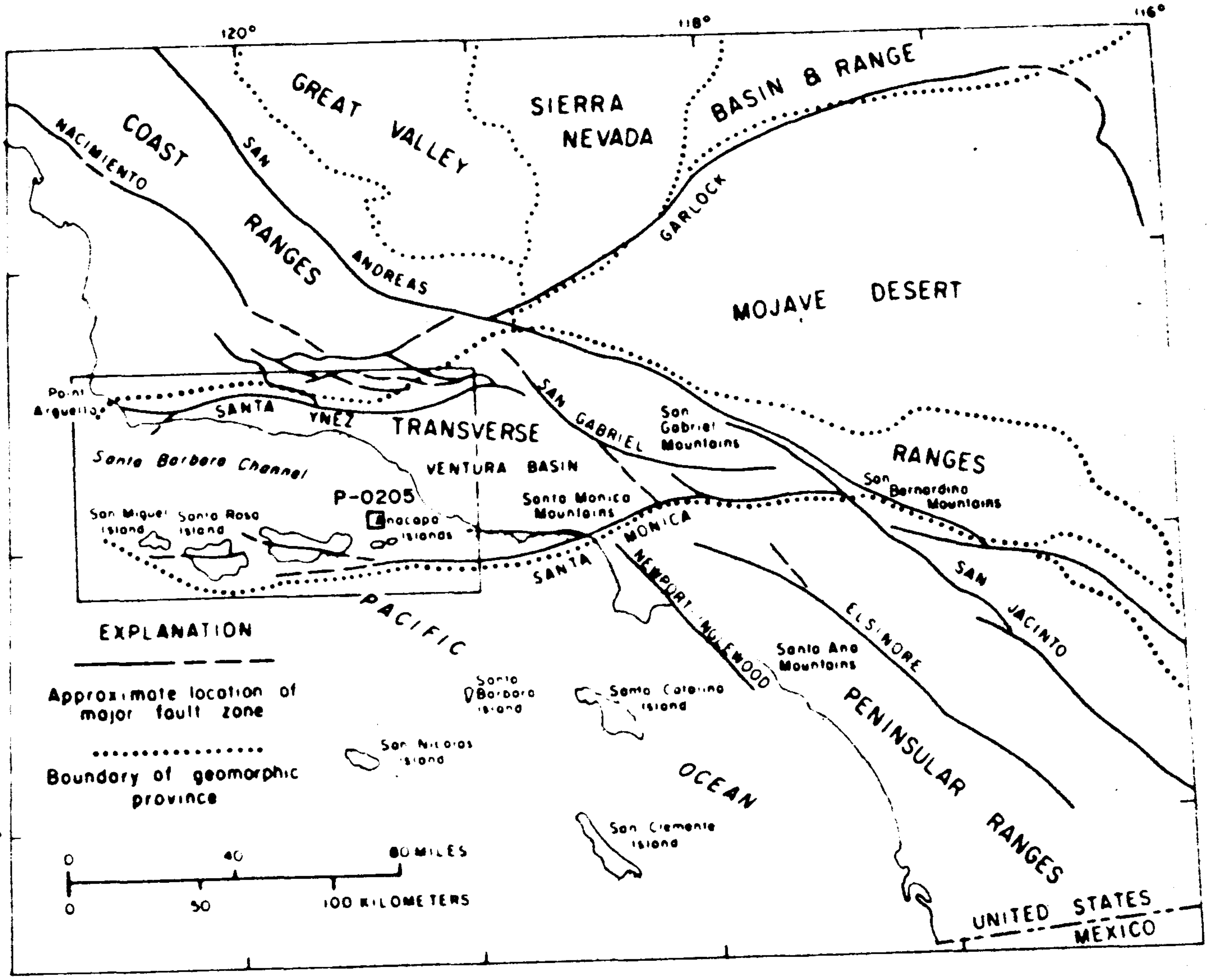
APPENDIX 3

CONTINGENCY PLANS

(SEE SECTION 2(j)(2))

APPENDIX 4

FIGURES



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

Source: - U.S. Geological Survey 1974

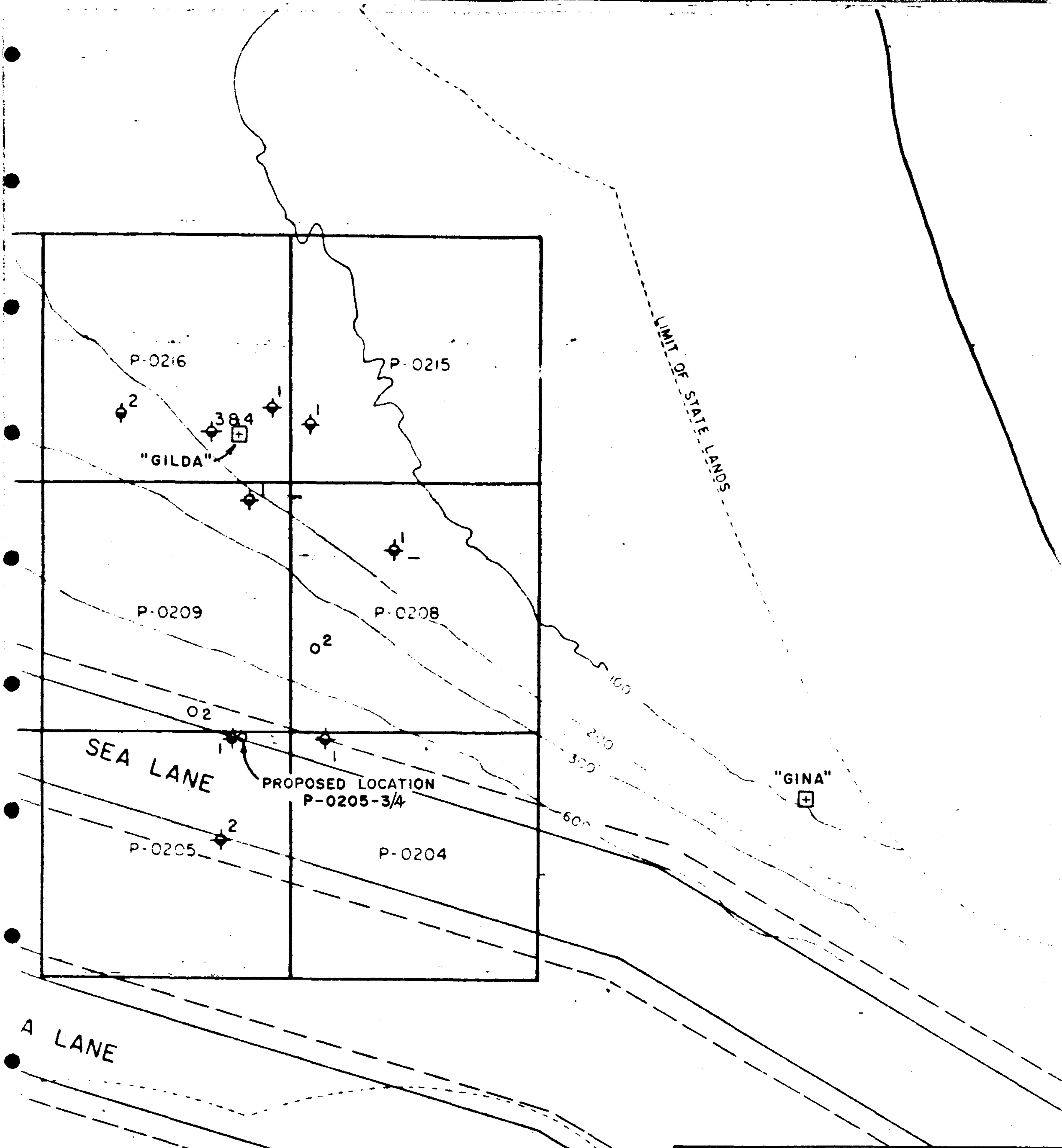
FIGURE 1

Chevron

Chevron U.S.A. Inc.

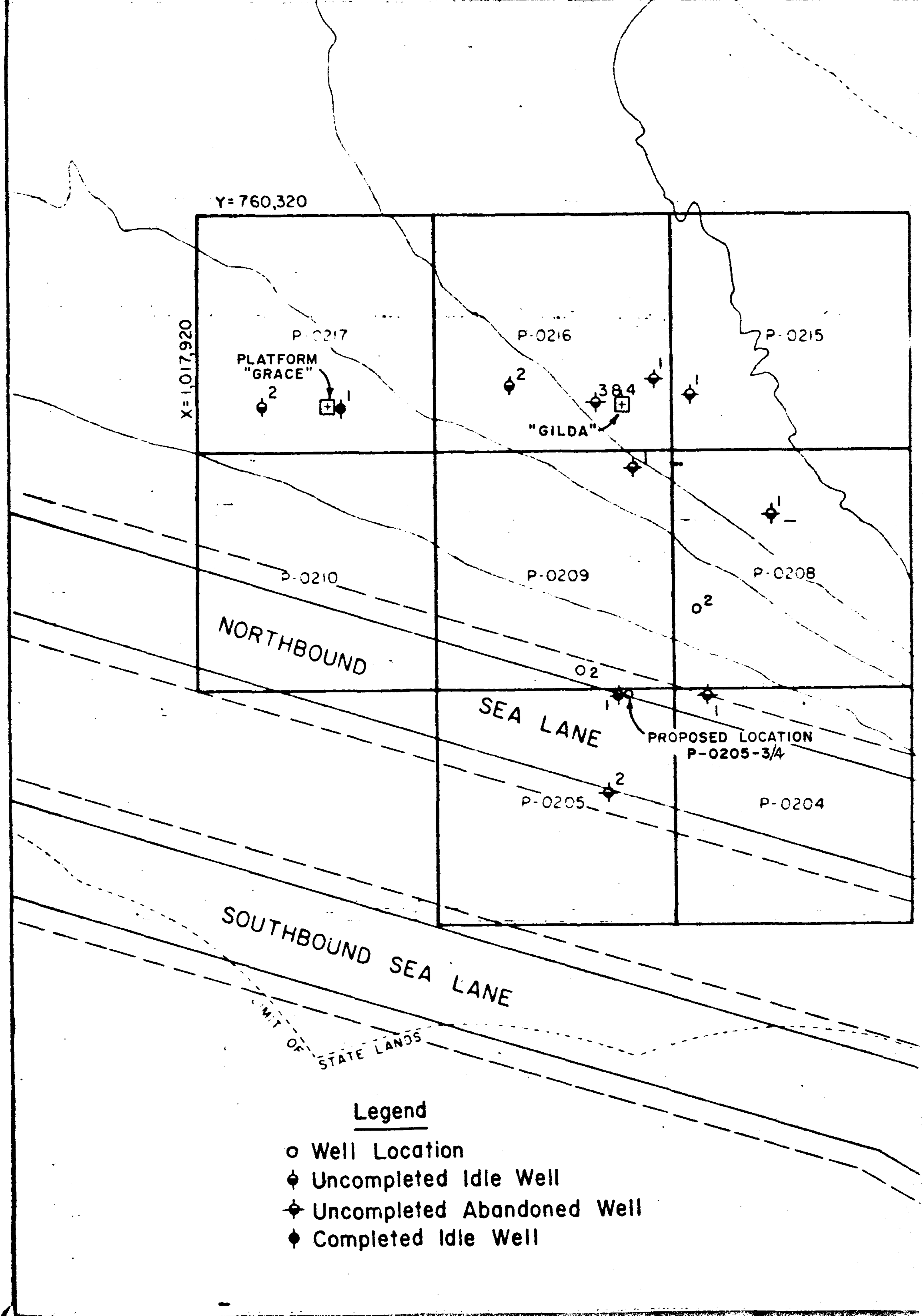
ENGINEERING
DRAFTING
CHECKED
APPROVED

SCALE NOTED
DATE



:tion
ed Idle Well
ed Abandoned Well
Idle Well

FIGURE 2
LOCATION MAP
P-0205
SANTA BARBARA CHANNEL
SCALE: 1" = 8000'   5/19/81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P-0216
"GILDA"
3&4
P-0215
P-0210
P-0209
P-0208
NORTHBOUND SEA LANE
PROPOSED LOCATION P-0205-3/4
P-0205
P-0204
SOUTHBOUND SEA LANE
LIMIT OF STATE LANDS
Legend
Well Location
Uncompleted Idle Well
Uncompleted Abandoned Well
Completed Idle Well

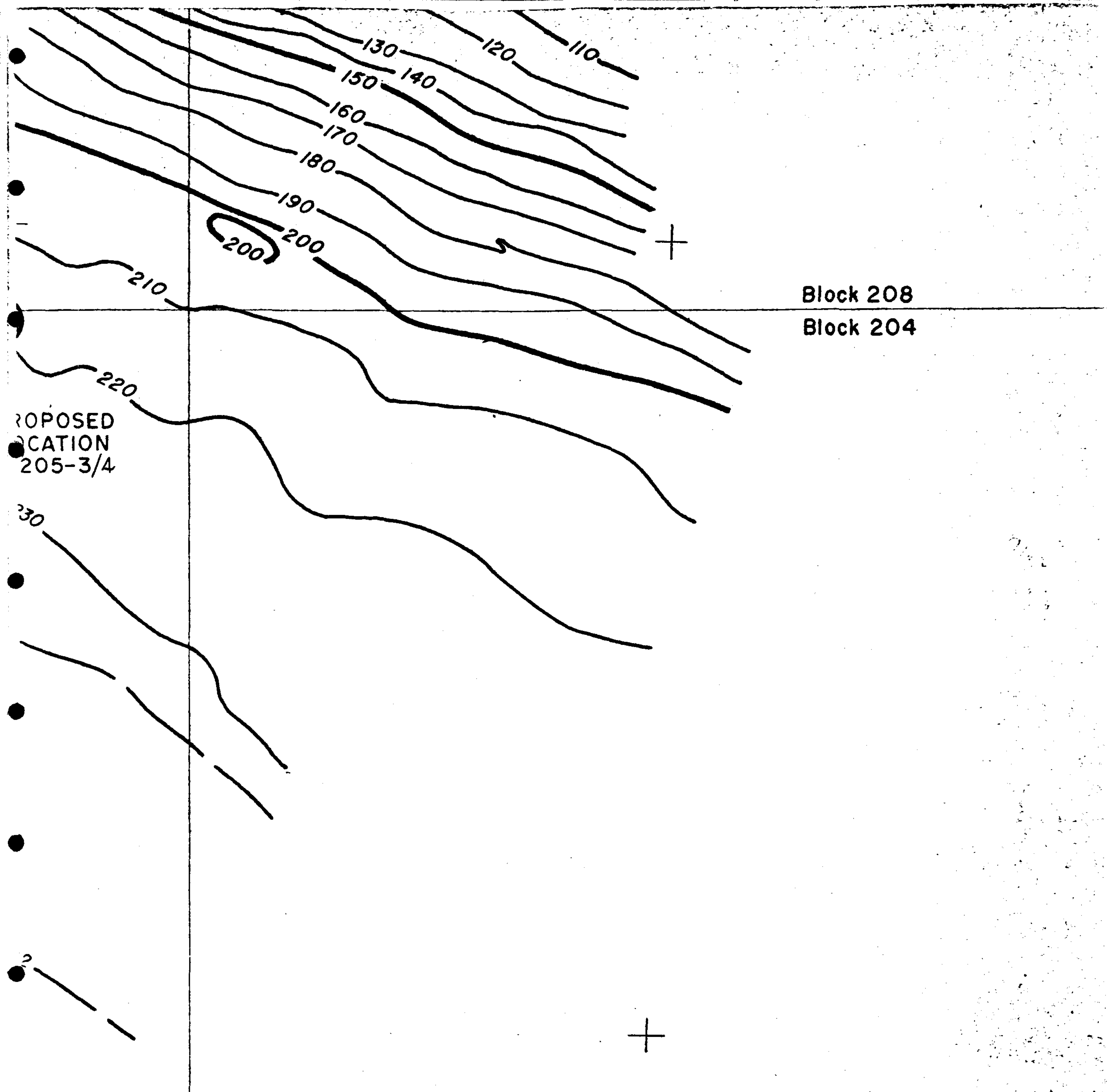


FIGURE 3

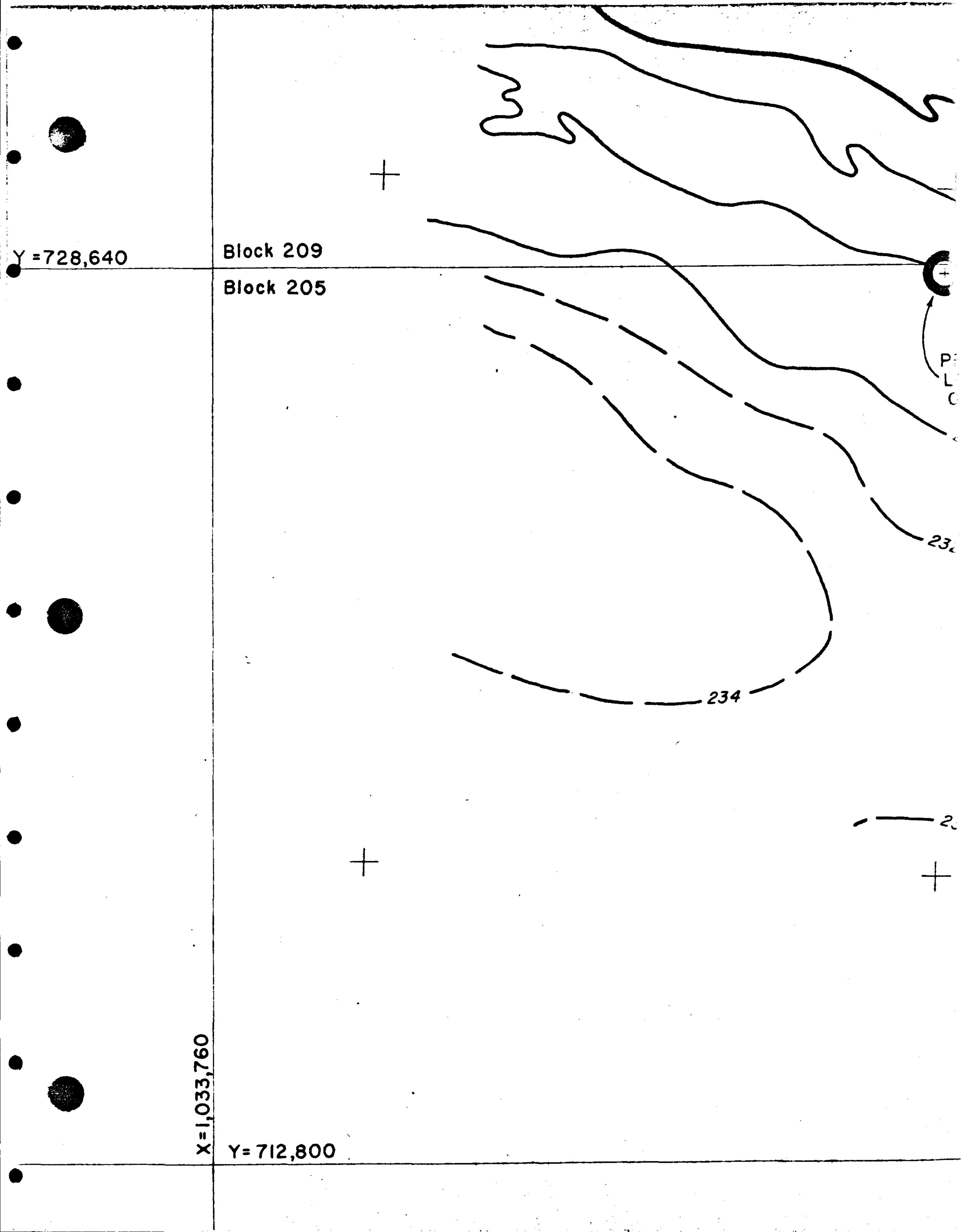
BATHYMETRY MAP

FEDERAL
BLOCK OCS P-0205

DATUM: SEA LEVEL
CONTOUR INTERVAL = 10m. and 2m.

SCALE: 1" = 2000'   5/19/81

BATHYMETRY FROM GENERAL OCEANOGRAPHICS REPORT DATED 9/5/78 (MODIFIED BY CHEVRON 5/19/81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Block 205
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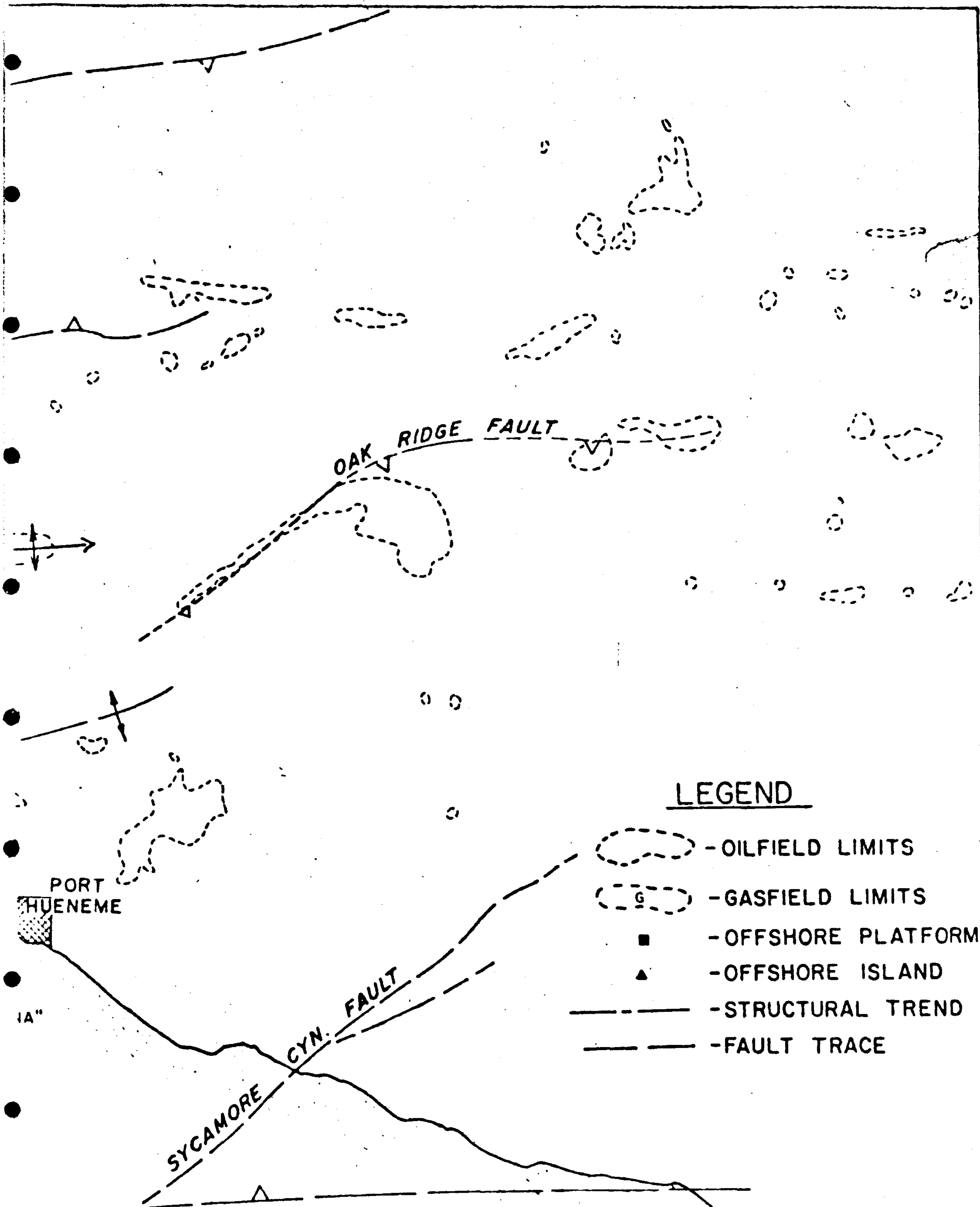


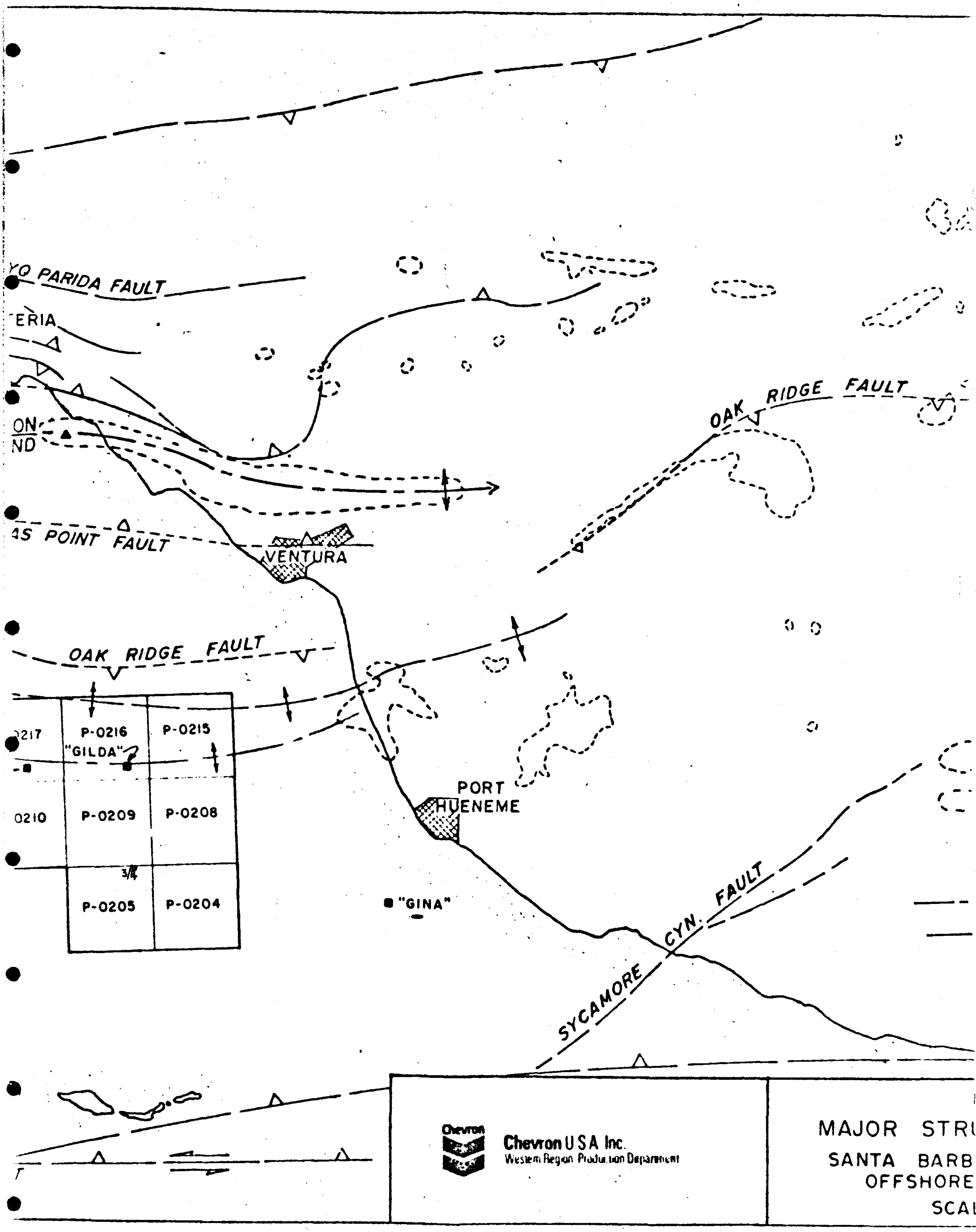
Chevron U.S.A. Inc.
Western Region Production Department

FIGURE 4

MAJOR STRUCTURAL FEATURES

SANTA BARBARA CHANNEL AREA
OFFSHORE SOUTHERN CALIF.

SCALE: 1" = 4 miles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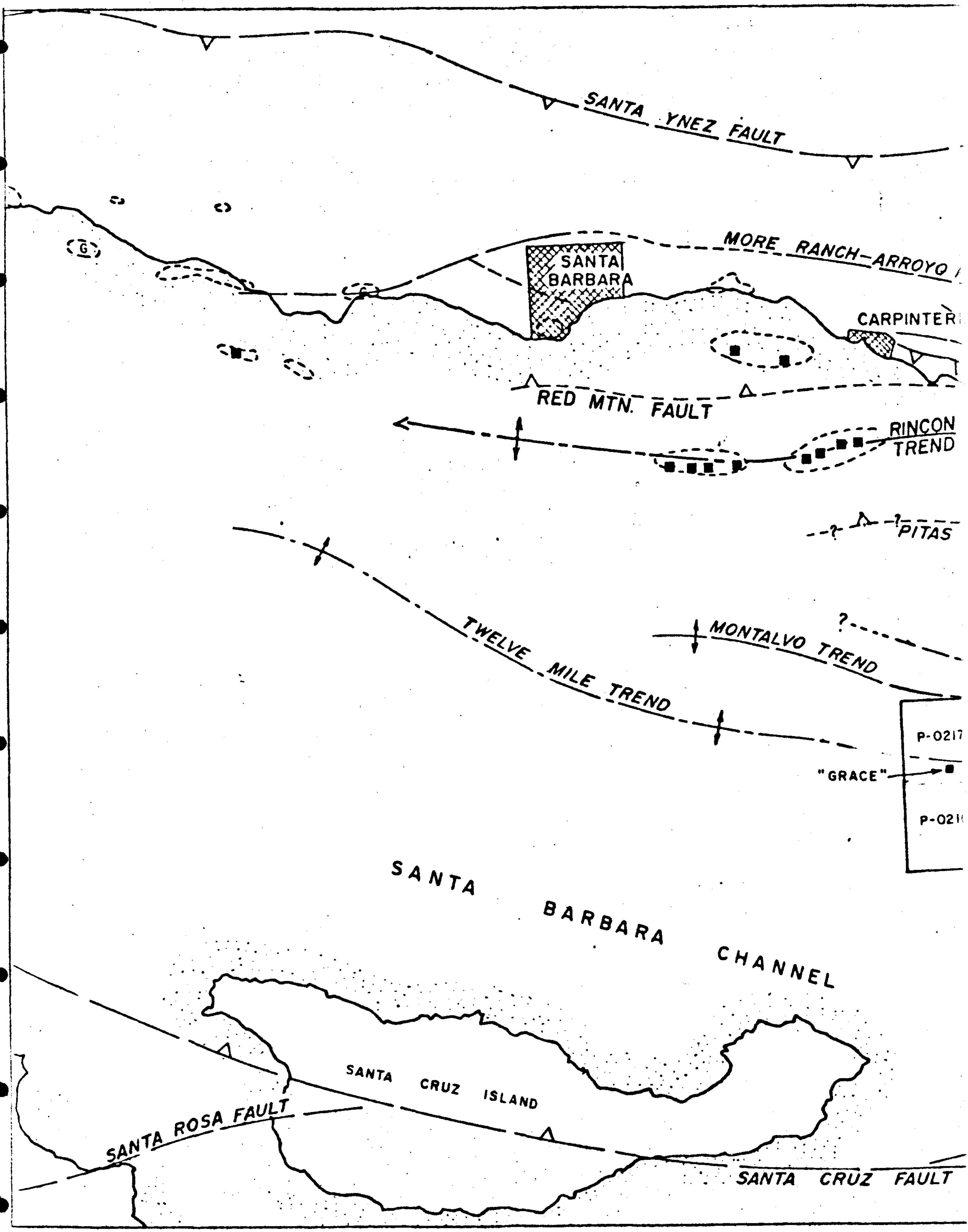
ERIA
ON
ND
AS POINT FAULT
VENTURA
OAK RIDGE FAULT
OAK RIDGE FAULT
0217
P-0216
P-0215
"GILDA"
0210
P-0209
P-0208
P-0205
P-0204
PORT
HUENEME
"GINA"
SYCAMORE CYN. FAULT
Chevron
Chevron U.S.A. Inc.
Western Region Production Department
MAJOR STRU
SANTA BARB
OFFSHORE
SCAL


SANTA YNEZ FAULT
MORE RANCH-ARROYO
SANTA BARBARA
CARPINTER
RED MTN. FAULT
RINCON TREND
PITAS
MONTALVO TREND
TWELVE MILE TREND
P-0217
"GRACE"
P-021
SANTA BARBARA CHANNEL
SANTA CRUZ ISLAND
SANTA ROSA FAULT
SANTA CRUZ FAULT

APPENDIX 5

NPDES PERMIT

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

27 MAR 1980

In Reply Refer to: E-4-1 869.2C

Mr. Norman Dion
Global Marine, Inc.
Global Marine House
811 West Seventh Street
Los Angeles, CA 90017

Dear Mr. Dion:

Enclosed is a signed and dated copy of a modification of a National Pollutant Discharge Elimination System (NPDES) permit for:

Name of Vessel	NPDES Permit No.
Glomar Atlantic	CA0110401
Glomar Pacific	CA0110389
Glomar II	CA0110142
Glomar Grand Isle	CA0110125
Glomar Grand Banks	CA0110109
Glomar Conception	CA0110117
Glomar Coral Sea	CA0110087
Glomar Java Sea	CA0110133

The Regional Administrator has reviewed the NPDES modification in accordance with the Clean Water Act and has also held a public hearing on tentative determination regarding the modification. After considering the expressed views of all interested persons and agencies, and State comments and/or certification of the discharge, the Regional Administrator, pursuant to 40 CFR 124, Subpart G, has made final determinations (the enclosed modification) which do not differ significantly from those in the public notice.

The modification is hereby issued and shall become effective thirty days from the date of signature unless there is a written request for an evidentiary hearing pursuant to 40 CFR 124 Subpart H. Any request for an evidentiary hearing must be submitted within thirty days following the receipt of this letter.

Sincerely yours,

Acting for Clyde B. Eller
Director
Enforcement Division

Enclosures

cc: Cal. RWQCB: Central Coast, Santa Ana, L.A., San Diego
U.S. Fish & Wildlife Service, Laguna Niguel
U.S. Fish & Wildlife Service, Portland
Corps of Engineers, Los Angeles
U.S. Coast Guard, 11th District
Cal. Dept. of Fish and Game, Long Beach
U.S. Geological Survey, Los Angeles
Bureau of Land Management, Los Angeles

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

MODIFICATIONS OF ISSUED NPDES PERMITS FOR GLOBAL MARINE, INC.

Name of Vessel	NPDES Permit No.
Glomar Atlantic	CA0110401
Glomar Pacific	CA0110389
Glomar II	CA0110142
Glomar Grand Isle	CA0110125
Glomar Grand Banks	CA0110109
Glomar Conception	CA0110117
Glomar Coral Sea	CA0110087
Glomar Java Sea	CA0110133

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, the Regional Administrator has made the following modification:

Each of the above permits is modified to include as authorized discharge sites the fifty-four (54) Outer Continental Shelf (OCS) parcels which were awarded in 1979 as a result of the Department of Interior's Lease Sale No. 48. These additional parcels are (by OCS lease parcel No.):

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

This permit modification is effective 30 days from the date of issuance, provided, this permit modification shall not become effective with respect to any drilling within 1000 meters of waters of the State of California until the discharger provides EPA with a certification, concurred in by the California Coastal Commission, that the drilling is consistent with the approved State Coastal Zone Management Plan.

Signed this 21 day of March, 1980

For the Regional Administrator

Acting Director, Enforcement Division

STATEMENT OF BASIS

Modification of Exploratory
Drilling Permits for
Lease Sale #48 Parcels

Background

The Environmental Protection Agency (EPA), Region IX, has issued a series of 14 National Pollutant Discharge Elimination System (NPDES) permits for offshore exploratory drilling operations in OCS lease sale #35. The permittees, date of permit issuance and vessels concerned are listed as follows:

Discharger	Name of Vessel	Date of Issuance	NPDES No.
Global Marine, Inc.	Glomar Atlantic	June 26, 1978	CA0110401
Global Marine House	Glomar Pacific	Sep. 30, 1977	CA0110389
811 West Seventh St.	Glomar II	Jan. 20, 1977	CA0110142
Los Angeles, CA 90017	Glomar Grand Isle	Dec. 8, 1976	CA0110125
	Glomar Grand Banks	Dec. 8, 1976	CA0110109
	Glomar Conception	Dec. 8, 1976	CA0110117
	Glomar Coral Sea	Dec. 8, 1976	CA0110087
	Glomar Java Sea	Dec. 8, 1976	CA0110133
Diamond M Company P.O. Box 22738 Houston, TX 77027	Diamond M General	Jan. 20, 1977	CA0110330
Dolphin International 2525 One Allen Center Houston, TX 77002	Borgsten Dolphin	Jan. 20, 1977	CA0110338
Keydril Company One Allen Center Houston, TX 77002	Aleutian Key	Jan. 20, 1977	CA0110282
Zapata Offshore Co. Zapata Tower P.O. Box 4240 Houston, TX 77001	Zapata Trader	June 30, 1977	CA0110346
Exxon Corporation P.O. Box 2180 Houston, TX 77001	Alaskan Star	Mar. 3, 1978	CA0110206
ODECO (U.K.), Inc. P.O. Box 61780 New Orleans, LA 70161	Ocean Prospector	Nov. 24, 1978	CA0110176

On August 14, 1979, the Diamond M Company requested that NPDES Permit No. CA0110330, issued to the vessel DIAMOND M GENERAL, be modified to authorize exploratory drilling operations on certain parcels within the recently opened Lease Sale Area 48 on the outercontinental shelf (OCS Lease #48) In accordance with established policy of EPA, Region IX, the Regional Administrator, on October 18, 1979, gave public notice of his intent to modify all existing NPDES permits, as identified above, to permit exploratory drilling in fifty-four (54) lease parcels contained in Sale 48 as follows:

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 Chanel 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

In response to numerous requests received by EPA during the public comment period, for the initial modification determination, a public hearing was held in Santa Barbara on January 17, 1980. The purpose of this meeting was to receive comment from interested parties regarding the proposed modifications. After consideration of oral and written comments and the record developed in this proceeding, I have determined to approve the proposed permit modifications to allow exploratory drilling on parcels within Lease Sale 48. I believe that this action is in the public interest and, that it is warranted on the basis of the record before me.

II. Summary of Decision

In the public notice of the proposed modifications, EPA stated that it intended to modify all existing NPDES permits which have been issued for exploratory drilling to further authorize permittees identified herein to conduct exploratory drilling on any tract within Lease Sale No. 48. This office has reviewed available field data, bioassay data, and opinion testimony contained in the record for these permit modifications. This review has been conducted in accordance with the factors contained in Section 403(c)(2) of the Clean Water Act (the Act) and in consideration of the public interest test applicable under Section 403(c)(1). It is acknowledged that here, as always, the depth and state of knowledge concerning the effect of man's activities upon the environment is imperfect; however, adequate data exists to allow me to conclude that these permit modifications should be approved. This action is subject to reopening if substantial new information is developed which suggests that the environmental effects of exploratory oil and gas drilling operations are more serious than anticipated.

Existing field and bioassay studies do not show significant long-term effects on fish, shellfish, or recreational values resulting from exploratory drilling in the Santa Barbara area. The short-term impacts that have been identified, such as increased turbidity in the area of discharge, are localized and the record supports a conclusion that fairly rapid and complete recovery occurs shortly after drilling activity is ceased.

The record shows concern over the aggregate impact of drilling a number of exploratory holes in a concentrated area. While it is possible more than one hole would be drilled in any given parcel, generally this has not been the case. There is the possibility that exploration would be conducted on adjacent parcels; however, the normal separation both temporal and spatial are sufficient to minimize the potential for cumulative or combined adverse impact.

III. Summary of Legal Requirements

A. Section 403(c)

EPA is required by Section 403(c) of the Act to issue guidelines for the discharge of pollutants into the ocean. After the guidelines are issued, no permit for an ocean discharge may be issued except in compliance with them; however, no guidelines are now in effect. Prior to promulgation of the guidelines, a permit may be issued if issuance is in the "public interest" under Section 403(a)(1).

On November 15, 1979, EPA published a Federal Register notice explaining its policy under Section 403. In pertinent part, that notice requires that:

> "*** pending promulgation of final ocean discharge guidelines, the criteria set forth in section 403(c) of the Act are to be considered and applied in the issuance, reissuance, or review of all NPDES permits for ocean dischargers. In addition, except where circumstances make it inappropriate to do so, the ocean dumping criteria in 40 CFR Part 227 are to be applied to the fullest extent possible before issuing, re-issuing, or reviewing any such NPDES permits." [44 Fed. Reg. 65752]

On February 12, 1980, EPA proposed Ocean Discharge Criteria at 45 FR 9548. These proposed regulations, consistent with the provisions of the NPDES regulations at 40 CFR 12248, permit the issuance of general permits to minor dischargers which involve

(1) the same or substantially similar types of operations

(2) discharges of the same types of waste

(3) would require the same or similar types of effluent limitations or operating conditions

(4) would required the same or similar monitoring conditions and;

(5) In the opinion of the Director or Regional Administrator would be more appropriately controlled under a general permit than under individual NPDES permits.
(proposed 40 CFR 125.129)

I have been guided in this decision by the November 15 notice; the similarity of this action to the "General Permit" concept of the proposed OCEAN DUMPING CRITERIA and implementaion of the "public interest" requirement of the statute in determining to issue these modifications.

B. Other Legal Requirements

NPDES permits for ocean discharges must comply not only with provisions of Section 403(c), but also with other sections of the Act, including Section 301(b). This section requires that any permit issued under the provisions of Section 402 must require compliance with any applicable effluent limitations guidelines, water quality standards, or both. EPA promulgated Effluent Limitation Guidelines applicable to the Offshore Oil and Gas Extraction Subcategory at 40 CFR Part 435 on September 15, 1975. The modified permits contain conditions implementing all applicable requirements of these guidelines. EPA's application of Section 301(b) requirements was not questioned during the public comment/hearing process.

IV. Application of Section 403(c) to this Permit

A. Application of Part 227 Requirements

As stated in the above summary of legal requirements, this permit action is subject to the requirements of Section 403 of the Act. In implementing Section 403, EPA's policy, as indicated in the November 15, 1979 Federal Register notice, is to apply the requirements of 40 CFR Part 227 (Ocean Dumping Criteria) to ocean discharges "except where circumstances make it inappropriate to do so." Part 227 requires, in pertinent part, a three-phase bioassay of materials which are proposed for ocean dumping on a representative range of local species. This requirement assumes that little is known about the environmental effects of materials proposed for dumping. In many cases, including cases of proposed ocean discharge from a point source, this may be a reasonable assumption. The three-phase bioassay is required to produce some information about effects of material of essentially unknown composition and toxicity.

The most significant discharge from the exploratory drilling operations has been assumed to be the release of washed drill cuttings and spent drilling mud. Drill cuttings consist of sand and rock chips resulting from the hole penetration and are relatively non-toxic. Drilling muds exhibit some variation in composition, however they all tend to conform to a few basic well defined formulations. A variety of these fluids have been subjected to bioassay testing procedures. The results of these studies have repeatedly shown low levels of toxicity to marine organisms. Field data collected from a number of areas support a finding of minimal environmental impact from exploratory drilling and the associated discharges. Therefore, I have concluded that sufficient study has been completed to make it inappropriate for me to require additional bioassay data prior to issuance of these modifications.

B. Statutory Factors

The November 15, 1979 Federal Register notice also requires EPA permit writers to consider the criteria of Section 403(c)(2) of the Act which requires ocean discharge guidelines to include:

> (A) the effect of disposal of pollutants on human health or welfare, including but not limited to plankton, fish, shellfish, wildlife, shorelines, and beaches;
> (B) the effect of disposal of pollutants on marine life including the transfer, concentration, and dispersal of pollutants or their byproducts through biological, physical, and chemical processes; changes in marine ecosystem diversity, productivity, and stability; and species and community population changes;
> (C) the effect of disposal, of pollutants on esthetic, recreation, and economic values;
> (D) the persistence and permanence of the effects of disposal of pollutants;
> (E) the effect of the disposal at varying rates, of particular volumes and concentrations of pollutants;
> (F) other possible locations and methods of disposal or recycling of pollutants including land-based alternatives; and
> (G) the effect on alternate uses of the oceans, such as mineral exploitation and scientific study.

The record contains extensive discussion of each of these statutory factors. In particular, the Final Environmental

Impact Statement prepared by the Department of Interior in conjunction with Lease Sale No. 48 (FEIS) discusses in detail the expected impacts on fish, shellfish, recreation, wildlife, beaches, and other values. The other statutory factors are reflected in the analysis of the available evidence on the environmental effects of off-shore drilling which is discussed in the following section of this document.

On February 12, 1980 EPA proposed regulations (45 FR 9548) to establish ocean dischare criteria under Section 403(c) of the Act, which the Agency will apply in issuing and reviewing NPDES permits under Section 402 of the Act for discharges into the territorial seas, the contiguous zone and the oceans. While this proposal is not strictly applicable to this permit action it does provide significant guidance on the Agency's current approach and policy in reviewing, issuing or denying NPDES permits for ocean discharges. Of particular significance is proposed Section 125.129 "Requirements of general permits," which provides for consideration a class or category of point sources having the same or similar discharges and limitations. (Also 40 CFR §122.48) I have concluded that issuance of these permit modifications is not disimilar from the General Permit approach of 40 CFR §122.48 and the evaluation contemplated under the proposed regulations at 40 CFR §122.48 and is, therefore, an appropriate action, as opposed to individual site specific requirements.

V. Discussion of Available Evidence of Environmental Effects of Authorized Discharges

I have reviewed the administrative record from the Santa Barbara hearings. This review leads me to conclude that the environmental effects associated with the exploratory drilling on Lease Sale 48 parcels are likely to be temporary and of a minor localized nature. Considering the short term of the actual drilling, the relatively small quantities of material discharged and the separation of potential sites. I believe that the exploratory drilling will not result in an unacceptable cumulative effect on the environment of the area encompassed by Lease Sale 48. The discharges which would be permitted are 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 blowout preventer control fluid.

The primary concerns expressed by commenters center around the discharge of drill cuttings and drilling muds. The Final Environmental Impact Statement of OCS Lease Sale No. 48 provides an in-depth review of these discharges including the impact on plankton, benthos and nekton. The general conclusion is that the impact will be localized and insignificant. Some longer-term impacts of developmental drilling actions are not well-defined at this time. However, these permits allow only exploratory drilling activity. Some smothering and burial of the benthic organisms will occur but again the impact is highly localized. The Tanner Bank Mud and Cuttings Study (Exhibit 13) investigated the effects of these discharges from an exploratory drilling operation in a particularly sensitive area and did not identify any significant environmental effects as a result of the discharges. Data from the study show a very rapid dilution which occurs when drilling mud is discharged into the marine environment (Table 1).

TABLE I

EFFECT OF DRILLING FLUID DISCHARGE ON WATER QUALITY

Run	Distance From Source Meters	Suspended Solids mg/l	Barium* mg/l	Chromium mg/l	Lead mg/l
	—	250,000	14,000	302	26.5
A	<1	499	23.6	0.824	0.038
Vol = 5 bbl Rate = 10 bbl/hr	105	5.2	0.103	0.004	0.0004
	155	2.03	0.047	0.008	0.004
	450	1.79	0.038	0.008	0.005
	Control	1.54	0.013	0.004	0.004
G	<1	328	12.7	0.917	0.04
Vol = 125 bbl Rate = 750 bbl/hr	74	25.2	0.575	0.013	0.003
	500	4.04	0.146	0.016	0.0009
	625	1.10	0.047	0.0005	0.0005
	800	4.73	0.111	0.0007	0.0044
	1000	0.563	0.026	0.0009	0.0001
	Control	0.814	0.022	0.0005	0.0002

* Present as $BaSO_4$

With respect to benthos, measurable amounts of discharged material were found to have settled on the ocean floor up to 120 m from the source, but no evidence of sedimentation was apparent 915 m downcurrent from the source. These results again illustrate the highly localized impact of the discharge.

VI. Response to Legal and Policy Comments

Pursuant to 40 CFR §124.63, EPA is required to address all significant comments received on the proposed permit action. For convenience, comments received are divided into two categories: (1) legal and policy comments, and (2) scientific comments. This section responds to category (1) comments while the following section responds to category (2) comments.

A. Comment: The November 15, 1979 Federal Register notice requires strict application of 40 CFR Part 227 in this case.

Response: The Federal Register notice explicitly recognizes that it is not appropriate to apply Part 227 to all ocean discharges. Based on the extensive record and wealth of information already available, I have determined that strict compliance with Part 227 is not likely to result in the development of meaningful new information and is, therefore, inappropriate.

B. Comment: Section 403(c)(2) requires denial of the permit because insufficient information exists as to the effects of the proposed activities.

Response: I have concluded that there is presently enough information available to make a "reasonable judgement" as to the effects of the proposed discharge as they relate to the criteria set forth in Section 403 of the statute.

This is not to say that the state of our knowledge is perfect with respect to this discharge. There are, admittedly, unknowns and uncertainties involved in off-shore drilling for oil despite the wealth of available experience and information. There is, however, enough information currently available to reasonably conclude that the environmental effects and risks of the proposed exploratory drilling operations are likely to be insignificant. The costs and delays associated with the site specific studies which would be necessary to perfect the state of our knowledge of the precise situation at each and every drill site would be unreasonable and contrary to the public interest.

If further information becomes available indicating that significant unanticipated adverse environmental effects result from the permitted activity, the permit can be modified or terminated.

C. Comment: EPA should not proceed with permitting until exploration plans become available.

Response: Permit conditions require EPA be notified at least 14 days in advance of a new drilling operation. Exploration plans are available and may be reviewed by the Agency within that time frame to determine the need for any special consideration on a project specific basis. Appropriate modification could then be made to incorporate these considerations.

D. Comment: EPA should defer permit action until NOAA makes its determination on the proposal to establish a marine sanctuary in the Santa Barbara Channel.

Response: There is no legal requirement to delay permit issuance during the pendency of a proposal to establish a marine sanctuary. Nonetheless, EPA has reviewed all of the alternatives presently under consideration by NOAA and concludes that issuance of the permit does not conflict with any of them. Moreover, each of the alternatives would allow drilling on parcels leased prior to establishment of the Sanctuary.

Subsequent to the close of the comment period on these permit modifications a law establishing CHANNEL ISLANDS NATIONAL PARK was enacted by Congress and signed into Law by the President on March 5, 1980 (PL 96-199). The boundary of the new park extends one (1) nautical mile around the perimeter of each of the following islands: San Miguel, Santa Rosa, Santa Cruz, Santa Barbara and Anacapa. The legislative history of this law makes it quite clear that Congress intended that establishment of the Park would not interfere with oil and gas production on the outer continental shelf (e.g., pp 1421-1423 <u>CONGRESSIONAL RECORD</u>, February 18 1980). This legislative history included, explicit discussion of the urgent need to increase domestic oil and gas production in light of the energy crisis and concludes that establishment of the National Park will not interfere with oil and gas activities.

I conclude that issuance of these permit modifications will not affect the CHANNEL ISLANDS NATIONAL PARK, in particular since the only permit drilling in Federal Waters beyond the 3 mile limit which allows an additional 2 mile buffer zone outside the Park boundary.

E. Comment: EPA should reopen and modify the underlying permit issued for Lease Sale No. 35.

Response: Modifications to the underlying permit were not within the scope of the public notice and are not properly a part of this proceeding. Nonetheless, a modification to the underlying permit is not appropriate unless new information is presented to the Agency constituting grounds for modification. In addition, the new information must be shown to have been unavailable at the time of original permit issuance. No new information of this nature has been submitted to the Agency.

VII. Response to Scientific Comments

Several specific concerns regarding the discharges were raised in the record which need to be addressed.

A. Comment: Drillings made are toxic in the water column.

Response: The toxicity of drilling mud varies widely with mud composition and with the organism tested. It is impractical to look at the effects of every drilling mud formulation on all the organisms present at the drill site. Therefore, in analyzing these effects EPA looked at a representative variety of species and mud formulations. A summary of available information is contained in the Western Oil and Gas Association (WOGA) Study, "The Environmental Impacts of Offshore Disposal of Drill Cuttings and Mud (Exhibit 12, pp. 19ff). This study reports acute toxicities for whole drilling mud in the range of 8,500 ppm to 560,000 ppm. A wide variety of species was studied in producing these results. As was mentioned, EPA has been directed, when appropriate, to utilize the ocean dumping criteria as outlined in 40 CFR Part 227 for the analysis of ocean discharges. Section 227.6(c)(1) prohibits discharges which, after allowance for initial dilution, will result in violations of marine water quality criteria, or in the event such criteria do not exist, the limit is 1% of the concentration shown to be acutely toxic to appropriate sensitive marine organisms. (Section 227.27(a)(1) and (2)). The most toxic mud reported in the WOGA's study would require a dilution of 12,000:1 for compliance with these regulations.

The record provides some direct dilution data as a function of time (Dames & Moore, 1978, "Drilling Fluid Dispersion and Biological Effects Study for the Lower Cook Inlet C.O.S.T. Well") and provides the means of calculating dilution as a function of time (Tanner Bank Study). Section 227.29 defines initial mixing as "that dispersion or diffusion of liquid, suspended particulate and solid phases of a waste which occurs within four hours after dumping."

The Dames & Moore study (p. 67) showed that for two bulk mud discharges (15 barrels and 40 barrels) dilution factors of 46,000 and 22,000 were achieved after only 18 and 17 minutes, respectively, far less than the four hours allowed by the ocean dumping regulations. After 187 minutes (still less than four hours), the dilution factor in the 40 barrel case was 2,000,000 or over 150 times the dilution required to satisfy the ocean dumping criteria. Data from the Tanner Bank Study provides similar insight into the mitigating impact of rapid dilution. For the high discharge rate case, Table 1 shows that at a distance of 1,000 m the suspended solids concentration had dropped from an initial 250,000 mg/l to .563 mg/l, a dilution of 440,000. To travel the 1,000 m (current of .5 knots) only about 65 minutes would have been required, less than the allowed four hours but nevertheless providing a dilution much greater than the necessary factor of 12,000. Moreover, most of the muds which have been studied require a substantially smaller dilution factor to be rendered harmless.

The toxic effects of drilling muds on a large sample of representative organisms have been tested and the test results lead me to conclude that the effects of this discharge will be minor.

B. Comment: Mud and cuttings will blanket the ocean bottom killing benthic organisms.

Response: These discharges may result in burial of some benthic organisms. However, the data in the record shows that this effect is highly localized. The Tanner Bank Study found that "measurable amounts of discharged materials settled to the ocean bottom up to 120 meters from the discharge source." However, "no evidence of elevated sedimentation was apparent at a distance of 915 meters downcurrent from the source." This study also reports that "submarine reconnaissance showed no visual accumulations." In order to locate evidence of the cuttings, mineralogical and microscopic analyses were required.

The problem of burial is of greater concern for the case of a fixed drilling and production platform where greater volumes of material are discharged. The record contains several studies in which accumulation of drill cuttings were observed around production platforms. The problem is still localized and recovery eventually occurs, although five years or more may be required. However, the permit modifications under consideration here are for exploratory drilling operations, and I conclude that the blanketing effects from such a limited volume of discharged material will not be significant.

C. Comment: Rare and endangered species may be threatened by the drilling.

Response: I find no evidence in the record, beyond some speculation, that any species listed by the Department of Interior would be threatened by issuance of these permit modifications. However, if evidence of significant harm should surface, the permits are subject to re-consideration/review under provision of 40 CFR §122.31(d)(3) or (e)(2). This will provide for further modification or revocation as might be appropriate.

Additionally, the Endangered Species Act of 1973 under Section 7 requires Federal agencies to consult with the United State Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to insure that actions they authorize, fund and carry out do not jeopardize the continued existence of any endangered or threatened species.

As part of the National Environmental Policy Act (NEPA) Environmental Impact Statement (EIS) development, consultation was held with USFWS and NMFS. As a result of this consultation a biolgical opinion, in accordance with the requirements of 50 CFR §402.04(e), was issued by NMFS on August 21, 1978. In this opinion, NMFS states "... the identified activites probably would not jeopardize the continued existence of species in question with the possible exception of the Pacific right whale should it come in contact with an oil spill."

It is my opinion, after review of the record, that any potential threat to rare and endangered species as a result of this permitting action is minimal.

D. Comment: Turbidity caused by the discharge will adversely effect photosynthesis by marine organisms.

Response: The EIS for Lease Sale No. 48 reviewed this problem and stated that:

> "The local increased turbidity caused by the plume could decrease phytoplankton photosynthesis by obstructing light penetration in the plume area. This effect would probably last only a few hours for a given water parcel passing by the discharge source. The residence time for phytoplankton within the water parcel and within this reduced euphotic zone would depend on the vertical and horizontal transport at the time. Unlike fish and other good swimmers, the phytoplankton in a given water parcel cannot avoid the turbidity plume, but would pass through it with the water parcel. The decreased photosynthetic effects could cause minor, short-term impacts on the phytoplankton populations that pass through a plume extending 200 m (600 feet) or at a maximum 2 or 3 km (1.2 to 1.9 miles) in the down-current direction from the 86 exploratory drilling wells for this proposed action. This effect would probably have a minor, and probably immeasurable, impact on the total phytoplankton productivity of the Southern California Bight although the chronic long-term effects are unknown at this time."

There is no evidence in the record which indicates that the FEIS assessment is incorrect. I, therefore, conclude that this is not a basis to deny a permit.

VIII. Conclusion

Generally, the thrust of the objections raised to the permitting of discharges associated with exploratory wells in Lease Sale No. 48 is that insufficient information is available to assess the environmental effects of these discharges. There are no serious allegations that major harm <u>will</u> occur from these drilling operations. EPA recognizes that more could be known about the ecological relationships in existence within the area of Lease Sale 48. However, the considerable body of information which is presently available is sufficient for me to conclude that serious environmental damage is highly unlikely.

Several commenters speaking in opposition to the permit modifications have urged EPA to conduct (or to have conducted) extensive, site by site studies to determine the exact ecological relationships existing within each parcel. It is not practicable to make such evaluations to determine all of the possible permutations of discharge, ecosystem and synergisms at each potential drilling site. It is my judgement that such studies would be too costly, unduly time consuming and are not warranted given the information available.

A major study contained in the record (Tanner Banks) was conducted in an area which is especially rich and sensitive. Neither this study, not any of the other evidence in the record suggests that discharge of drilling muds and cuttings from exploratory drilling will result in significant environmental degradation. There will, of course, be some destruction of marine biota and habitat. However, the record leads me to conclude that these effects are likely to be localized and short-term. Serious long-term effects are unlikely, and to the extent they might occur, they will also be highly localized.

Section 403 of the Clean Water Act is the basic statutory provision controlling in this case. Since guidelines under that section are not in effect, I have, in accordance with EPA's Statement of policy in its November 15, 1979 Federal Register notice considered the criteria of Section 403(c) and the application of 40 CFR Part 227. I find that strict application of Part 227 is not appropriate in the case, that the discharge is in the public interest and that it is consistent with the Section 403(c) criteria. Section 403 does not require zero impact but rather a public interest judgment which includes weighing the environmental effects of the proposed activity.

In reaching this decision to issue these permit modifications, I have additionally considered the alternative of requiring the use of barges to contain and transport spent drilling fluids and cuttings for land disposal. Since I have determined, on the basis of the administrative record, that there are no specifically identified unique or sensitive sites included in the potential drilling sites that would require such and since the record shows that barging is very costly and potentially dangerous, I have concluded that such a general requirement is unwarranted. In reaching these conclusions I am also aware of the public policy that requires me to give active attention to the energy needs of the United States in the national interest.

I believe there is sufficient information presently available to justify issuance of the foregoing permit modifications. They are however, subject to reopening and/or reconsideration if new information is developed which suggests more severe environmental impacts than have been anticipated.

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

TELEPHONE: 213-680-9550
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

Armo

Lil's [illegible] in your files

/ Williams
R.W. Armstrong
Shell
Hal-LaHaye
Rm 1856
575 Market

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).

789 513

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 134, 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, Glomar 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 8, 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				Monitoring Requirements*	
	kg/day (lbs/day)		Other Units (Specify)			
	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 WASTEWATER

130 Bbls. PERDAY

A. EFFLU[illegible] LIMITATIONS AND MONITORING REQUIREMENTS (B[illegible] on a daily maximum flow of .005 mil[illegible] ga[illegible] per day or .0002 cubic meters per [illegible]d)

2. Dur[illegible] 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

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)	-	-	-	-	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 15M

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. Ei UENT LIMITATIONS AND MONITORING REQUIR Nmq..

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)		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).

OIL WATER SEPARATOR SKIMMER

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)	-	-	-	-	Once/month	Composite
Oil and Grease	-	14.2(31.2)	-	52 mg/l	Once/month	Composite

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

4/CA 24HR

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

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)	-	-	-	-	Once/month	Discrete
Temperature	-	-	-	-	Once/month	Discrete
Oil and Grease***	-	250(550)	-	15 mg/l	Once/month	Discrete

1st 15th

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 APM

* 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. IMITATIONS 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				Monitoring Requirements *	
	kg/day (lbs/day)		Other Units (Specify)			
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency	Sample Type
Flow-m^3/Day (MGD)	-	-	-	-	Quarterly/yr.	Discrete
Oil and Grease	-	-	-	-	Quarterly/yr.	Discrete
Total Volumes (gallons)**	-	-	-	-	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 requirements 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} 60 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.

ONITORING 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.

B. ESPONSIBILITIES

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.

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*

otwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including ny 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.

arty 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.

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

R 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.

t 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.

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 6

FACILITY EMISSION CALCULATIONS

CALCULATION OF DRILLSHIP EMISSIONS

This appendix contains the basic data and calculations used to compute the total emissions, in tons, of each pollutant from each well in the accompanying Exploration Plan. These totals are tabulated in Table 9 of the text and their environmental consequences discussed in Section 4(b)(2).

All drilling, motive, and ancillary power on the drillship Glomar Coral Sea is provided by diesel-electric generators. These are powered by 6 Caterpiller D-399 diesel engines, each driving an 800 KW, 600V 3-phase, 60 cycle generator. In addition, the drillship carries a 175 KW emergency generator driven by one GMC 8V-71 diesel engine; this emergency generator does not figure in emissions calculations for normal operations.

Table 1 (a through i) of this appendix shows the equipment in use, load factors, and total power for each of the 10 discrete types of activity involved in exploratory drilling from a self-propelled vessel, as well as the factors assumed in calculating fuel consumption in each activity. These tables are from a report "Estimated Air Emissions Inventory for Glomar Coral Sea", prepared for Union Oil Company by Westec Services, Inc., 118 Brookhollow Drive, Santa Ana, CA 92705, dated July 1980.

Figure 1 of this appendix has been used to determine the fuel consumption rate for the engine efficiency factor applicable to each activity.

Table 2 of this appendix presents the EPA AP-42 factors used to convert fuel consumption, in gallons per hour, to emissions in pounds per hour for each pollutant.

Table 3 of this appendix lists the fuel consumption rates of Table 1, for each activity, followed by the estimated emissions rates which result from the application of Table 2's AP-42 factors to those fuel consumption rates.

Table 4 (a through h) of this appendix lists, for each well, the estimated operating hours for each type of activity, and tabulates the total quantity of pollutant generated by that activity. These are summed to give the estimated total amount of each pollutant emitted during the drilling of that well. These totals are tabulated (Table 9) and discussed in Section 4(b)(2) of the text - Environmental Consequences; Air Quality.

To illustrate the successive steps in calculating emissions, four examples are detailed below:

1) SO_2 generated during the Drilling Cycle for P-0205 #3

2) TSP generated during Standby and Fishing for P-0205 #3

3) NO_x generated during the Drilling Cycle for P-0205 #3

4) NO_x generated during Logging and Equipment Testing for P-0205 #3

Case 1: SO_2 generated during Drilling Cycle for P-0205 #3

Step a - Appendix Table 1b shows four items of equipment being used. The power requirement in kilowatts (kw) for each item is calculated by multiplying the horsepower requirement by:

load factor (0.30 to 1.00);
horsepower-to-kilowatt conversion factor (.746);
system efficiency factors (.95, .99 and .95) as listed on Appendix Table 1a.

The sum of all power requirements (1,525 kw) is used to determine the number of generator sets in operation (3) and the engine efficiency (.64) as percent of output capacity, for each generator. By referring to Figure 1 of the appendix, that output capacity (64%) is used to determine the diesel fuel consumption (10.5 kilowatt-hours per gallon) for that particular activity. Then, 1,525 kw/10.5 kw per gal. = 145.25 gal/hr. fuel consumption during Drilling Cycle (Appendix Table 3, column 1).

Step b - Appendix Table 2 (from EPA AP-42) shows that a diesel engine produces 31.2 lbs. of SOx for each 1000 gallons of fuel consumed, or 0.031 lb/gal, thus:

145.25 gal/hr x 0.031 lb/gal = 4.53 lb/hr of SOx produced during the Drilling Cycle (Appendix Table 3, Column 5).

Step c - Appendix Table 4a (column 1) estimates 849 hours of Drilling Cycle activity for these wells:

849 hours x 4.53 lbs/hr = 3846 lbs. (column 5). Emissions for each of the other activities are calculated in the same way and these are totalled for each pollutant; the estimated total SO_2 emissions for these wells are 9915 lbs. or 4.95 tons.

Step d - For each well, the estimated total pollutants are compared with an exemption limit which varies according to the distance offshore. Table 8 of the text shows, for each well, the exemption limits and the estimated total amount of each pollutant.

Case 2: TSP generated during Standby and Fishing for P-0205 #3

<u>Step a</u> - Appendix Table 1i shows one item of equipment being used. The power requirement in kilowatts (kw) for each item is calculated by multiplying the horsepower requirement by:

load factor (0.75);
horsepower-to-kilowatt conversion factor (.746);
system efficiency factors (.95, .99 and .95) as listed on Appendix Table 1a.

The sum of all power requirements (157 kw) is used to determine the number of generator sets in operation (1) and the engine efficiency (.20) as percent of output capacity, for each generator. By referring to Figure 1 of the appendix, that output capacity (20%) is used to determine the diesel fuel consumption (4.6 kilowatt-hours per gallon) for that particular activity. Then, 157 kw/4.6 kw per gal. = 34.1 gal/hr. fuel consumption during Standby and Fishing (Appendix Table 3, column 1).

<u>Step b</u> - Appendix Table 2 (from EPA AP-42) shows that a diesel engine produces 33.5 lbs. of TSP for each 1000 gallons of fuel consumed, or 0.034 lb/gal, thus:

34.1 gal/hr x 0.034 lb/gal = 1.16 lb/hr of TSP produced during the Standby and Fishing (Appendix Table 3, Column 6).

<u>Step c</u> - Appendix Table 4a (column 1) estimates 629 hours of Standby and Fishing activity for these wells:

629 hours x 1.16 lbs/hr = 730 lbs. (column 6). Emissions for each of the other activities are calculated in the same way and these are totaled for each pollutant; the estimated total TSP emissions for these wells are 10,633 lbs. or 5.31 tons.

<u>Step d</u> - For each well, the estimated total pollutants are compared with an exemption limit which varies according to the distance offshore. Table 8 of the text shows, for each well, the exemption limits and the estimated total amount of each pollutant.

Case 3: NOx generated during Drilling Cycle for P-0205 #3

Step a - Appendix Table 1b shows four items of equipment being used. The power requirement in kilowatts (kw) for each item is calculated by multiplying the horsepower requirement by:

load factor (0.30 to 1.00);
horsepower-to-kilowatt conversion factor (.746);
system efficiency factors (.95, .99 and .95) as listed on Appendix Table 1a.

The sum of all power requirements (1,525 kw) is used to determine the number of generator sets in operation (3) and the engine efficiency (.64) as percent of output capacity, for each generator. By referring to Figure 1 of the appendix, that output capacity (64%) is used to determine the diesel fuel consumption (10.5 kilowatt-hours per gallon) for that particular activity. Then, 1,525 kw/10.5 kw per gal. = 145.25 gal/hr. fuel consumption during Drilling Cycle (Appendix Table 3, column 1).

Step b - Appendix Table 2 (from EPA AP-42) shows that a diesel engine produces 469 lbs. of NOx for each 1000 gallons of fuel consumed, or 0.469 lb/gal, thus:

145.25 gal/hr x 0.469 lb/gal = 68.12 lb/hr of NOx produced during the Drilling Cycle (Appendix Table 3, Column 4).

Step c - Appendix Table 4b (column 1) estimates 849 hours of Drilling Cycle activity for these wells:

849 hours x 68.12 lbs/hr = 57,833 lbs. (column 4). Emissions for each of the other activities are calculated in the same way and these are totalled for each pollutant; the estimated total NOx emissions for these wells are 149,100 lbs. or 74.55 tons.

Step d - For each well, the estimated total pollutants are compared with an exemption limit which varies according to the distance offshore. Table 8 of the text shows, for each well, the exemption limits and the estimated total amount of each pollutant.

Case 4: NOx generated during Logging and Equipment Testing for P-0205 #3

Step a - Appendix Table 1g shows one item of equipment being used. The power requirement in kilowatts (kw) for each item is calculated by multiplying the horsepower requirement by:

load factor (1.0);
horsepower-to-kilowatt conversion factor (.746);
system efficiency factors (.95, .99 and .95) as listed on Appendix Table 1a.

The sum of all power requirements (209 kw) is used to determine the number of generator sets in operation (1) and the engine efficiency (.13) as percent of output capacity, for each generator. By referring to Figure 1 of the appendix, that output capacity (13%) is used to determine the diesel fuel consumption (3.5 kilowatt-hours per gallon) for that particular activity. Then, 209 kw/3.5 kw per gal. = 59.71 gal/hr. fuel consumption during Logging and Equipment Testing (Appendix Table 3, column 1).

Step b - Appendix Table 2 (from EPA AP-42) shows that a diesel engine produces 469 lbs. of NOx for each 1000 gallons of fuel consumed, or 0.469 lb/gal, thus:

59.71 gal/hr x 0.469 lb/gal = 28.00 lb/hr of NOx produced during the Logging and Equipment Testing (Appendix Table 3, Column 4).

Step c - Appendix Table 4b (column 1) estimates 621 hours of Logging and Equipment Testing activity for these wells:

621 hours x 28.00 lbs/hr = 17,388 lbs. (column 4). Emissions for each of the other activities are calculated in the same way and these are totalled for each pollutant; the estimated total NOx emissions for these wells are 149,100 lbs. or 74.55 tons.

Step d - For each well, the estimated total pollutants are compared with an exemption limit which varies according to the distance offshore. Table 8 of the text shows, for each well, the exemption limits and the estimated total amount of each pollutant.

CORAL SEA
DRILLSHIP MOVEMENT

Appendix Table 1a

Equipment	Horsepower	Load
Unit #1	2,250	.45
Unit #2	2,250	.45

1. Unit #1 = 2,250 hp x .45 x .746 = 755 kw
Power = 755 kw ÷ (.95 x .99 x .95)
= 845 kw at prime mover

2. Unit #2 = 2,250 hp x .45 x .746 = 755 kw
Power = 755 kw ÷ (.95 x .99 x .95)
= 845 kw at prime mover

TOTAL POWER = 845 kw + 845 kw
= 1,690 kw at prime mover

TOTAL POWER/DAY = 1,690 kw x 24 hr/day
= 40.550 kwhr/dav

Fuel Consumption:

(1) Assume three (3) balanced generator sets = 1,690 kw ÷ 3 = 563 kw/engine.

(2) Assume total available power of each generator set = 800 kw.

(3) Assume efficiency of engines = 563 kw ÷ 800 kw = .70.

(4) Assume fuel consumption rate of 10.75 kwhr/gal (Figure1)
40,560 kwh/day ÷ 11.0 kwhr/gal
= 3,687 gal/day = 153.6 gal/hr
= 87.8 barrels/day

Efficiency of system estimated as follows:

(1) Diesel engine to AC generator = .95.

(2) AC generator to SCR bus = .99.

(3) SCR bus to DC motor = .95.

CORAL SEA
DRILLING CYCLE

Appendix Table 1b

Equipment	Horsepower	Load
Mud Pump #1	1,500	0.50
Mud Pump #2	1,500	0.30
Rotary	750	0.50
Auxiliaries	250	1.00

---

1. Mud Pump #1 = 1,500 hp x .50 x .746 = 560kw
   Power = 560 kw ÷ (.95 x .99 x .95))
   = 627 kw at prime mover

2. Mud Pump #2 = 1,500 hp x .30 x .746 = 336 kw
   Power = 336 kw ÷ (.95 x .99 x .95)
   = 376 kw at prime mover

3. Rotary = 750 hp x .50 x .746 = 280 kw
   Power = 280 kw ÷ (.95 x .99 x .95)
   = 313 kw at prime mover

4. Auxiliaries = 250 hp x 1.0 x .746 = 187 kw
   Power = 187 kw ÷ (.95 x .99 x .95)
   = 209 kw at prime mover

TOTAL POWER = 627 kw + 376 kw + 313 kw + 209 kw
= 1,525 kw at prime mover

TOTAL POWER/DAY = 1,525 kw x 24 hr/day
= 36,600 kwhr/day

Fuel Consumption:

(1) Assume three (3) balanced generator sets = 1,525 kw ÷ 3 = 508 kw/engine.

(2) Assume total available power of each generator set = 800 kw.

(3) Assume efficiency of engines = 508 ÷ 800 = .64.

(4) Assume fuel consumption rate of 10.5 kwhr/gal
= 3,486 gal/day = 145.25 gal/hr
= 83.0 barrels/day.

CORAL SEA
TRIPPING CYCLE

Appendix Table 1c

Equipment	Horsepower	Load
Drawworks	1,500	0.30
Auxiliaries	250	1.00

1. Drawworks = 1,500 hp x .30 x .746 = 336 kw
   Power = 336 kw ÷ (.95 x .99 x .95)
   = 376 kw at prime mover

2. Auxiliaries = 250 hp x 1.0 x .746 = 187 kw
   Power = 187 kw ÷ (.95 x .99 x .95)
   = 209 kw at prime mover

TOTAL POWER = 376 kw + 209 kw
= 585 kw at prime mover

TOTAL POWER/DAY = 585 kw x 24 hr/day
= 14,040 kwhr/day

Fuel Consumption:

(1) Assume two (2) balanced generator sets = 585 kw ÷ 2 = 293 kw/engine.

(2) Assume total available power of each generator set = 800 kw.

(3) Assume efficiency of engines = 293 kw ÷ 800 kw = .37.

(4) Assume engine output rate of 7.7 kwhr/gal
= 1,823 gal/day = 75.96 gal/hr
= 43.4 barrels/day.

CORAL SEA
SETTING/CEMENTING CASING

Appendix Table 1d

Equipment	Horsepower	Load
Cement Plant	1,500	.15
Drawworks	1,500	.10
Auxiliaries	250	1.00

1. Cement Plant: = 1,500 hp x .15 x .746 = 168 kw
Power = 168 kw ÷ (.95 x .99 x .95)
= 188 kw at prime mover

2. Drawworks: = 1,500 hp x .10 x .746 = 112 kw
Power = 112 kw ÷ (.95 x .99 x .95)
= 125 kw at prime mover

3. Auxiliaries: = 250 hp x 1.0 x .746 = 187 kw
Power = 187 kw ÷ (.95 x .99 x .95)
= 209 kw at prime mover

TOTAL POWER = 188 kw + 125 kw + 209 kw
= 522 kw at prime mover

TOTAL POWER/DAY = 522 kw x 24 hr/day
= 12,528 kwhr/day

Fuel Consumption:

(1) Assume two (2) balanced generator sets = 522 kw ÷ 2 = 261 kw/engine.

(2) Assume total available power of each generator set = 800 kw.

(3) Assume efficiency of engines = 261 kw ÷ 800 kw = .33.

(4) Assume engine output rate of 7.5 kwhr/gal
= 1,670 gal/day = 69.58 gal/hr
= 39.8 barrels/day

CORAL SEA
CUT/RECOVER CASING

Appendix Table 1e

Equipment	Horsepower	Load
Drawworks	1,500	.25
Auxiliaries	250	1.00

1. Drawworks = 1,500 hp x .25 x .746 = 280 kw
   Power = 280 kw ÷ (.95 x .99 x .95)
   = 313 kw at prime mover

2. Auxiliaries = 250 hp x 1.00 x .746 = 187 kw
   Power = 187 kw ÷ (.95 x .99 x .95)
   = 209 kw at prime mover

TOTAL POWER = 313 kw + 209 kw
= 522 kw at prime mover

TOTAL POWER/DAY = 522 kw x 24 hr/day
= 12,528 kwhr/day

Fuel Consumption:

(1) Assume two (2) balanced generator sets = 522 kw ÷ 2 = 261 kw/engine.

(2) Assume total available power of each generator set = 800 kw.

(3) Assume efficiency of engines = 261 kw ÷ 800 kw = .33.

(4) Assume engine output rate of 7.5 kwhr/gal
= 1,670 gal/day = 69.58 gal/hr
= 39.8 barrels/day.

CORAL SEA
CEMENT/ABANDON HOLE

Appendix Table 1f

Equipment	Horsepower	Load
Cement Plant	1,500	.10
Auxiliaries	250	1.00

1. Drawworks = 1,500 hp x .10 x .746 = 112 kw
   Power = 112 kw ÷ (.95 x .99 x .95)
   = 125 kw at prime mover

2. Auxiliaries = 250 hp x 1.00 x .746 = 187 kw
   Power = 187 kw ÷ (.95 x .99 x .95)
   = 209 kw at prime mover

TOTAL POWER = 125 kw + 209 kw
= 334 kw at prime mover

TOTAL POWER/DAY = 334 kw x 24 hr/day
= 8,016 kwhr/day

Fuel Consumption:

(1) Assume two (2) balanced generator sets = 334 kw ÷ 2 = 167 kw/engine.

(2) Assume total available power of each generator set = 800 kw.

(3) Assume efficiency of engines = 167 kw ÷ 800 kw = .21.

(4) Assume engine output rate of 4.7 kwhr/gal
= 1,706 gal/day = 71.08 gal/hr
= 40.6 barrels/day.

CORAL SEA
LOGGING, EQUIPMENT TESTING

Appendix Table 1g

Equipment	Horsepower	Load
Auxiliaries	250	1.0

2. Auxiliaries = 250 hp x 1.0 x .746 = 187 kw
Power = 187 kw ÷ (.95 x .99 x .95)
= 209 kw at prime mover

TOTAL POWER = 209 kw at prime mover

TOTAL POWER/DAY = 209 kw x 24 hr/day
= 5,016 kwhr/day

Fuel Consumption:

(1) Assume two (2) balanced generator sets = 209 ÷ 2 = 105 kw/engine.

(2) Assume total available power of each generator set = 800 kw.

(3) Assume efficiency of engine = 105 kw ÷ 800 kw = .13.

(4) Assume fuel consumption rate of 3.5 kwhr/gal
= 1,433 gal/day = 59.71 gal/hr
= 34.1 barrels/day.

CORAL SEA
DRILL STEM TESTING

Appendix Table 1h

Equipment	Horsepower	Load
Drawworks	1,500	.05
Auxiliaries	250	.50

1. Drawworks = 1,500 hp x .05 x .746 = 56 kw
   Power = 56 kw ÷ (.95 x .99 x .95)
   = 63 kw at prime mover

2. Auxiliaries = 250 hp x .50 x .746 = 93 kw
   Power = 93 kw ÷ (.95 x .99 x .95)
   = 104 kw at prime mover

TOTAL POWER = 63 kw + 104 kw
= 167 kw at prime mover

TOTAL POWER/DAY = 167 kw x 24 hr/day
= 4,008 kwhr/day

Fuel Consumption:

(1) Assume two (2) balanced generator sets = 167 kw ÷ 2 = 84 kw/engine.

(2) Assume total available power of each generator set = 800 kw.

(3) Assume efficiency of engines = 84 kw ÷ 800 kw = .11.

(4) Assume engine output rate of 3.0 kwhr/gal
= 1,336 gal/day = 55.66 gal/hr
= 31.8 barrels/day.

CORAL SEA
SITE PREPARATION/STANDBY/FISHING

Equipment	Horsepower	Load
Auxiliaries	250	.75

1. Auxiliaries = 250 hp x .75 x .746 = 140 kw
   Power = 140 kw ÷ (.95 x .99 x .95)
   = 157 kw at prime mover

TOTAL POWER = 157 kw at prime mover

TOTAL POWER/DAY = 157 kw x 24 hr/day
= 3.768 kwhr/day

Fuel Consumption:

(1) Assume one (1) generator set = 157 kw/engine.

(2) Assume total available power of generator set = 800 kw.

(3) Assume efficiency of engine = 157 kw ÷ 800 kw = .20.

(4) Assume engine output rate of 4.6 kwhr/gal
= 819 gal/day = 34.1 gal/hr
= 19.5 barrels/day.

3.3.3 Gasoline and Diesel Industrial Engines

by David S. Kircher

3.3.3-1 General – This engine category covers a wide variety of industrial applications of both gasoline and diesel internal combustion power plants, such as fork lift trucks, mobile refrigeration units, generators, pumps, and portable well-drilling equipment. The rated power of these engines covers a rather substantial range–from less than 15 kW to 186 kW (20 to 250 hp) for gasoline engines and from 34 kW to 447 kW (45 to 600 hp) for diesel engines. Understandably, substantial differences in both annual usage (hours per year) and engine duty cycles also exist. It was necessary, therefore, to make reasonable assumptions concerning usage in order to formulate emission factors.[1]

3.3.3-2 Emissions – Once reasonable usage and duty cycles for this category were ascertained, emission values from each of the test engines [1] were aggregated (on the basis of nationwide engine population statistics) to arrive at the factors presented in Table 3.3.3-1. Because of their aggregate nature, data contained in this table must be applied to a population of industrial engines rather than to an individual power plant.

The best method for calculating emissions is on the basis of "brake specific" emission factors (g/kWh or lb/hphr). Emissions are calculated by taking the product of the brake specific emission factor, the usage in hours (that is, hours per year or hours per day), the power available (rated power), and the load factor (the power actually used divided by the power available).

Table 2

Table 3.3.3-1. EMISSION FACTORS FOR GASOLINE- AND DIESEL-POWERED INDUSTRIAL EQUIPMENT
EMISSION FACTOR RATING: C

Pollutant[a]	Engine category[b] Gasoline	Diesel
Carbon monoxide (CO)		
g/hr	5700.	197.
lb/hr	12.6	0.434
g/kWh	267.	4.06
g/hphr	199.	3.03
kg/10^3 liter	472.	12.2
lb/10^3 gal	3940.	102.
Exhaust hydrocarbons (VOC+)		
g/hr	191.	72.8
lb/hr	0.421	0.160
g/kWh	8.95	1.50
g/hphr	6.68	1.12
kg/10^3 liter	15.8	4.49
lb/10^3 gal	132.	37.5
Evaporative hydrocarbons		
g/hr	62.0	–
lb/hr	0.137	–
Crankcase hydrocarbons		
g/hr	38.3	–
lb/hr	0.084	–

Table 2

Table 3.3.3-1. (continued). EMISSION FACTORS FOR GASOLINE- AND DIESEL-POWERED INDUSTRIAL EQUIPMENT
EMISSION FACTOR RATING: C

Pollutant[a]		Engine category[b] Gasoline	Diesel
Nitrogen oxides			
g/hr	NO_x	148.	910.
lb/hr		0.326	2.01
g/kWh		6.92	18.8
g/hphr		5.16	14.0
kg/10^3 liter		12.2	56.2
lb/10^3 gal		102.	469.
Aldehydes			
g/hr		6.33	13.7
lb/hr		0.014	0.030
g/kWh		0.30	0.28
g/hphr		0.22	0.21
kg/10^3 liter		0.522	0.84
lb/10^3 gal		4.36	7.04
Sulfur oxides			
g/hr	SO_2	7.67	60.5
lb/hr		0.017	0.133
g/kWh		0.359	1.25
g/hphr		0.268	0.931
kg/10^3 liter		0.636	3.74
lb/10^3 gal		5.31	31.2
Particulate			
g/hr	TSP	9.33	65.0
lb/hr		0.021	0.143
g/kWh		0.439	1.34
g/hphr		0.327	1.00
kg/10^3 liter		0.775	4.01
lb/10^3 gal		6.47	33.5

[a]References 1 and 2.

[b]As discussed in the text, the engines used to determine the results in this table cover a wide range of uses and power. The listed values do not, however, necessarily apply to some very large stationary diesel engines.

References for Section 3.3.3

1. Hare, C. T. and K. J. Springer. Exhaust Emissions from Uncontrolled Vehicles and Related Equipment Using Internal Combustion Engines. Final Report. Part 5: Heavy-Duty Farm, Construction, and Industrial Engines. Southwest Research Institute. San Antonio, Texas. Prepared for Environmental Protection Agency, Research Triangle Park, N.C., under Contract No. EHS 70-108. October 1973. 105 p.

2. Hare, C. T. Letter to C. C. Masser of the Environmental Protection Agency concerning fuel-based emission rates for farm, construction, and industrial engines. San Antonio, Tex. January 14, 1974.

APPENDIX TABLE 3

ESTIMATED RATES OF GASEOUS EMISSIONS (Note 1)
DRILLSHIP CORAL SEA

Activity	Fuel Consumption gal/hr	CO lb/hr	VOC lb/hr (Note 2)	NOx lb/hr	SO_2 lb/hr	TSP lb/hr
Drillship Movement	153.6	15.67	5.76	72.04	4.79	5.14
Site Preparation	34.1	3.57	1.31	16.41	1.09	1.16
Drilling Cycle	145.25	14.81	5.45	68.12	4.53	4.86
Tripping Cycle	75.96	7.75	2.85	35.63	2.37	2.54
Setting/Cementing Casing	69.58	7.10	2.61	32.63	2.17	2.33
Cut/Recover Casing	69.58	7.10	2.61	32.63	2.17	2.33
Cement/Abandon Hole	71.08	7.25	2.66	33.34	2.22	2.38
Logging, Equipment Testing	59.71	6.09	2.24	28.00	1.86	2.00
Drillstem Testing	55.66	5.68	2.09	26.10	1.74	1.86
Standby, Fishing	34.1	3.57	1.31	16.41	1.09	1.16
Natural Gas Flaring		480.	33.0	neg	neg	neg

(1) Using fuel consumption with AP-42 emission factors, Section 3.3.3-1, Table 3.3.3-1. (See Appendix 6 for derivation.)

(2) VOC cannot be calculated from factors and/or test data now available. The quantities listed are <u>total</u> unburned hydrocarbons; in all instances, VOC is substantially <u>less</u> than this quantity.

,0326(...)

APPENDIX TABLE 4a
SUMMARY OF ESTIMATED GASEOUS EMISSIONS (Note 1)
P-0205 #3 (8,000 Feet D.D., 80 Days)

Activity	Total Operating Hours (Note 2)	CO lbs	VOC lbs (Note 3)	NOx lbs	SO2 lbs	TSP lbs
Drillship Movement	18	282	104	1,297	86	93
Site Preparation	54	193	71	886	59	63
Drilling Cycle	358	5,302	1,951	24,387	1,622	1,740
Tripping Cycle	138	1,069	393	4,917	327	351
Setting/Cementing Casing	318	2,258	830	10,376	690	741
Cut/Recover Casing	48	341	125	1,566	104	112
Cement/Abandon Hole	72	522	192	2,400	160	171
Logging, Equipment Testing	350	2,131	784	9,800	651	700
Drillstem Testing	360	2,045	752	9,396	626	670
Standby, Fishing	295	1,053	386	4,841	322	342
Natural Gas Flaring	5	2,400	165			
TOTAL PER WELL	(lbs)	17,596	5,753	69,866	4,647	4,983
	(tons)	8.79	2.87	34.93	2.32	2.49

(1) Emission rates from Appendix Table 3 have been multiplied by operating hours for each activity.

(2) Based on maximum probable drilling days which includes an abnormal amount of testing and fishing.

(3) VOC cannot be calculated from factors and/or test data now available. The quantities listed are total unburned hydrocarbons; in all instances, VOC is substantially less than this quantity.

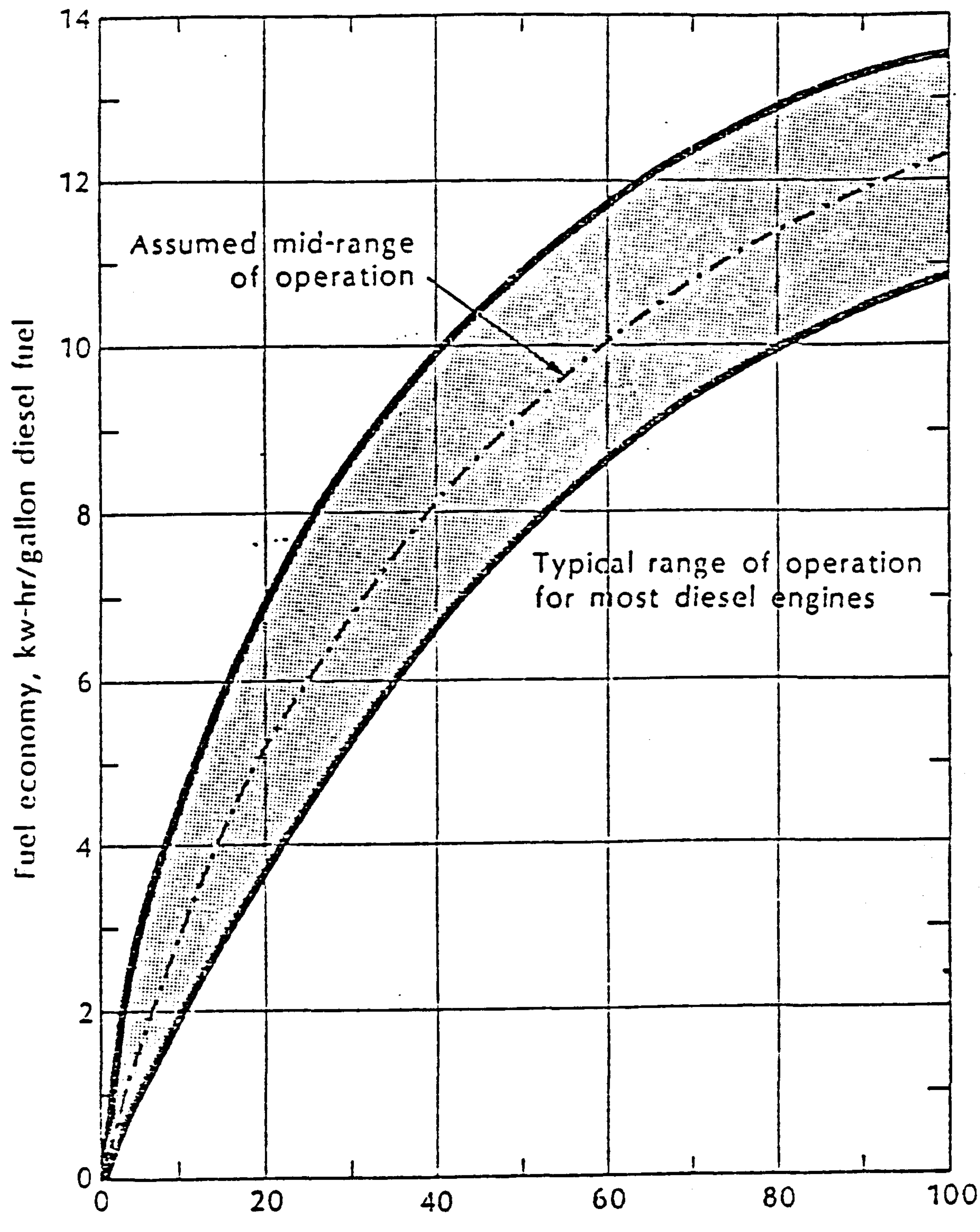
APPENDIX TABLE 4b
SUMMARY OF ESTIMATED GASEOUS EMISSIONS (Note 1)
P-0205 #4 (8,500 Feet (D.D.), 90 Days)

Activity		Total Operating Hours (Note 2)	CO lbs	VOC lbs (Note 3)	NOx lbs	SO2 lbs	TSP lbs
Drillship Movement		18	282	104	1,297	86	93
Site Preparation		54	193	71	886	59	63
Drilling Cycle		491	7,272	2,676	33,447	2,224	2,386
Tripping Cycle		201	1,558	573	7,162	476	511
Setting/Cementing Casing		326	2,315	851	10,637	707	760
Cut/Recover Casing		48	341	125	1,566	104	112
Cement/Abandon Hole		72	522	192	2,400	160	171
Logging, Equipment Testing		271	1,650	607	7,588	504	542
Drillstem Testing		336	1,908	702	8,770	584	625
Standby, Fishing		334	1,192	438	5,481	364	387
Natural Gas Flaring		5	2,400	165			
TOTAL PER WELL	(lbs)		19,633	6,504	79,234	5,268	5,650
	(tons)		9.81	3.25	39.61	2.63	2.82

(1) Emission rates from Appendix Table 3 have been multiplied by operating hours for each activity.

(2) Based on maximum probable drilling days which includes an abnormal amount of testing and fishing.

(3) VOC cannot be calculated from factors and/or test data now available. The quantities listed are total unburned hydrocarbons; in all instances, VOC is substantially less than this quantity.



Typical diesel engine efficiency curve showing effect of loading and range of economy.

(Note: Range of operation includes 2 and 4 stroke engines, natural and forced injections units, at sea level.)

Source: Oil and Gas Journal, April 7, 198[illegible]

Diesel Engine Efficiency

1

FIGURE

APPENDIX 7

TEXT TABLES

TABLE 1 - DETAILS OF PROPOSED WELLS

WELL P-0205	COORDINATES (ZONE 6) X	Y	(N)	(W)	PROPOSED TOTAL DEPTH (FEET)	WATER DEPTH (FEET)	ESTIMATED TIME (DAYS) DRILLING	TOTAL
#3	1,046,660	728,490	37°7.0'45"	119°24'2"	8,000 (DD)	719	40-50	50-80
#4	1,046,600	728,490	34°7.0'45"	119°24'2"	8,500 (DD)	719	50-60	60-90

TABLE 2

DIRECTLY DETERMINED ROCK ACCELERATIONS (a)

Fault	Magnitude	Minimum Distance to the Site in Miles	(Km.)	Site Rock Acceleration
Santa Cruz Island/ Santa Monica Bay	7.0	9	(14)	0.39
Santa Ynez	7.5	25	(40)	0.22
Oakridge (b)	6.5	7	(11)	0.38
Red Mountain	6.5	14.5	(23)	0.23
Pitas Point	6.5	11.5	(19)	0.27
More Ranch	7.0	19.5	(31)	0.22
San Andreas	8.25	52	(84)	0.13
Random Event (b) (directly beneath the site)	6.0	6	(10)	0.31

(a) Calculated according to Schnabel and Seed (Ref. 19).

(b) Hypocentral distance.

TABLE 3

ANNUAL CATCH (LBS) IN FISH BLOCK 684
AVERAGE OVER FIVE YEARS (1971-1975)

Species	Catch in lbs
Northern anchovy	2,862,761
Rockfish (lumped)	197,806
Sea urchin	129,657
English sole	64,120
Pacific bonita	53,841
Trash fish (lumped)	43,431
Bluefin tuna	39,770
Boccaccio	36,430
Jack mackerel	12,420
California halibut	9,547

Source: California Dept. of Fish and Game,
Fish Block Data (Ref. 50)

TABLE 4

QUARTERLY CHLOROPHYLL a CONCENTRATIONS

AT THE SURFACE (mg/m^3) AND INTEGRATED

OVER 150 m. (mg/m^2) AT ANACAPA ISLAND IN 1969

	Surface	150 m.
January-March	1.0-1.5	30-50
April-June	0.3-0.4	50-70
July-September	0.5-1.0	50-70
October-December	0.2-0.3	20-25

Source: Owen, 1974 (Ref. 34).

TABLE 5

ZOOKPLANKTON COMPOSITION OF THE SANTA BARBARA BASIN

Taxon	Species
COELENTERATES	Tiaropsidium kelseyi Aegina citrea Colobonema sericeum Atolla wyvellei Vogtia sp.
CRUSTACEANS	
Amphipods	Hyperia sp. Paracallisoma coesus Paraphronema crassipes Primno macropa Phronema sedentaria Scina spp.
Decapods	Pasiphaea pacifica Pasiphaea emarginata Sergestes similis Pasiphaea chacei Sergestes phorcus Lepidopa mupos (larvae) "porcelain crab" (larvae) Blepharaopoda occidentalis (larvae) Emerita analoga (larvae)
Euphausiids	Nyctiphases simplex Thysanoessa spinifera Nematoscelis difficilis Euphausia pacifica
CTENOPHORES	Pleurobrachia bacheii

Source: Ebeling et al., 1970 (Ref. 35).

TABLE 6

FAUNAL COMPOSITION OF STATION 878
(288 m., LATITUDE 34°8.31, LONGITUDE 119°38.95)

Taxon	Species	Number
Polychaetes	*Paraprionospio pinnata*	1
	Tauberia gracilis	3
	Nephtys punctata	1
	Harmothoe scriptora	1
	Nothria iridescens	1
Mollusks	*Cyclocardia ventricosa*	1
Crustaceans	*Ampelisca*, near *macrocephala*	1
	Eudorella pacifica	1
	Erichthonius, near *hunteri*	19
	Maera, near *danae*	13
	Janiridae unid.	11
Echinoderms	*Allocentrotum fragilis*	2

Source: Fauchald and Jones, 1978, (Ref. 34).

TABLE 7

CETACEANS SIGHTED IN THE
SANTA BARBARA CHANNEL, 1975-1976

	April-June	July-Sept	Oct-Dec	Jan-March
Toothed Whales:				
Dall's porpoise	1	1	17	116
Common dolphin		2550		
Pacific white-sided dolphin		10	13	255
Risso's dolphin		71		13
Pilot whale			11	
Killer whale				21
Northern right whale dolphin				4
Baleen Whales:				
Gray whale*				41
Blue whale*		1		
Humpbacked whale*		1		
Minke whale		2		

Source: U.C. Santa Cruz (Ref. 41).

In addition to the species listed above, the sei whale*, fin whale*, sperm whale* and Pacific right whale* are listed (Ref. 1; p. 336-340) as occurring in the area.

*Endangered species

TABLE 8
BREEDING POPULATIONS OF MARINE
BIRDS ON ANACAPA ISLAND
1975-76

		Estimated Population 1975-76
Anacapa Island	Western Gull	200-6,000
	Brown Pelican	424
	Pigeon Guillemot	8
	Pelagic Cormutant	2
	Brandt's Cormurant	2
	Xanuts' Murrelet	2

Source: DEIS Channel Islands Proposed Marine Sanctuary (Ref. 3).

TABLE 9

AIR QUALITY IMPACT PER 30 CFR 250
OCS P-0205

Well	(Anacapa Is.) Distance from Shore (D) (Statute Miles)	Exemption Limit (E) (Note a) for SO2, TSP, NOx, VOC (tons/yr)	Drillship Emissions (Note b) SO_2 (tons/well)	TSP (tons/well)	NOx (tons/well)	VOC (tons/well)	Exemption Limit (E) (Note c) for CO (tons/yr)	Drillship Emissions (Note b) CO (tons/well)
#3	8.0	266.40	2.32	2.49	34.93	2.87	13,600	8.79
#4	8.0	266.40	2.63	2.82	39.61	3.25	13,600	9.81

Note a: E = 33.3 D, as stipulated in 30 CFR 250.57-1(d).

Note b: From Appendix 6, Table 1.

Note c: $E = 3400\ D^{2/3}$, as stipulated in 30 CFR 250.57-1(d).

Note d: VOC cannot be calculated from factors and/or test data now available. The quantities listed are total unburned hydrocarbons; in all instances, VOC is substantially less than this quantity.

Note e: Because drilling of these two wells will require substantially less than one year, a tons/year rate is not appropriate.

APPENDIX 6

Input from USGS Deputy Conservation Manager, Resource Evaluation

United States Department of the Interior

GEOLOGICAL SURVEY

1340 W. Sixth Street
Suite 100
Los Angeles, California 90017

October 21, 1981

Memorandum

To: Deputy Conservation Manager, Field Operations

From: Acting Deputy Conservation Manager, Resource Evaluation

Subject: Geologic Hazards Analyses--Santa Clara Unit, OCS P-0205 Nos. 3 and 4; Chevron U.S.A. Inc., Unit Operator

INTRODUCTION

Application has been received from Chevron U.S.A. Inc. for approval of a plan to drill two exploratory wells from the same surface location on OCS Lease P-0205. Lease P-0205, part of the Santa Clara Unit, is located at the south-eastern end of the Santa Barbara Channel about 10.5 km north of Anacapa Island and 19.3 km southwest of Ventura. The proposed site for wells P-0205 Nos. 3 and 4 is located adjacent to the north lease line at a water depth of 219 m. The site is in the buffer zone adjacent to the northbound sea lane.

The purpose of the wells is to test the southern limits of a possible commercial oil accumulation which underlies the northeastern portion of the lease. The proposed wells will be directionally drilled southward beneath the north-bound sea lane to evaluate the position and reservoir character of oil bearing zones on the south flank of the structure. Drilling of well P-0205 No. 4 is dependent on the results of well P-0205 No. 3.

GEOLOGIC HAZARDS ANALYSIS

Slope Stability

The sea floor in the northern part of lease P-0205 is generally smooth and regular, sloping about 1° SSW. Upslope from the site, in Leases P-0208 and P-0209, the sea floor is very irregular and hummocky, due to an underlying slide deposit. Sea-floor mounds on the surface of the slide show as much as 10 m of relief. A prominent head scarp occurs along the top of the slide (just below the Oxnard Shelf break) 1,676 m north-northeast of the drillsite. The toe of the slide is located 91 m north (upslope) of the drillsite. The slide deposit is as much as 15-20 m thick. The sea-floor slope across the slide deposit is 4.0°-5.5° SSW. Another slide deposit, buried about 25 m below the sea floor, is located about 450 m south of the site.

Unconsolidated surficial sediments, probably Holocene silt and clay, form a southward thickening wedge across Lease P-0205. Surficial sediments are about 8 m thick at the proposed drillsite.

Faulting

No evidence of shallow faulting was observed in the vicinity of the proposed drillsite. The operator does not anticipate encountering any faults at depth.

Shallow Gas Zones and Seeps

No shallow gas or hydrocarbon seeps were identified on high-resolution geophysical profiles collected in the vicinity of the proposed drillsite.

REMARKS

The slide north of the proposed drillsite is a recent event (lacks any sediment cover) and is probably stabilized at its present position at the base of the slope. Well P-0205 No. 1, located about 180 m west of the proposed drillsite, was completed without incident. The toe of the slide is about 130 m northeast of well P-0205 No. 1.

Cyril V. Bird

Cyril V. Bird

APPENDIX 7

Review Comments and Related Correspondence from Other Agencies and/or the Public

*National Marine Fisheries Service
National Park Service
†U. S. Bureau of Land Management
†U. S. Coast Guard
U. S. Environmental Protection Agency
*U. S. Fish and Wildlife Service
U. S. Office of Coastal Zone Management
State of California
  California Coastal Commission
  Governor's Office of Planning and Research

*written comments received prior to October 19, 1981
†written comments received by October 27, 1981

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

October 14, 1891 F/SWR31:DS
1503-06

NOTED-DUNAWAY

Mr. Gerald D. Rhodes
Acting Deputy Conservation Manager
U. S. Geological Survey
1340 W. Sixth Street, Room 160
Los Angeles, CA 90017

Dear Mr. Rhodes:

We have reviewed the Plan of Exploration--Santa Clara Unit, OCS-P 0205: Nos. 3 & 4; Chevron U.S.A. Inc., Unit Operator. We find that those fishery resources for which we have a responsibility will not be significantly affected. However, the plan could impact certain marine mammal species.

Our concerns are for those whale species identified in our September 25, 1979 biological opinion which was issued pursuant to an Endangered Species Act, Section 7 consultation between our respective agencies. The biological opinion addressed all U.S Geological Survey supervised activities ongoing and proposed at sites that were leased in either Lease Sale Number 48 or prior lease sales in the Southern California Bight.

The biological opinion contains the information necessary for the completion of your environmental analysis as well as our recommendations for reducing the impacts of mineral development in the Southern California Bight. We note that the list of endangered or threatened species within the plan of exploration is complete. No critical habitat has been established for any of the subject species within the area of the proposed action.

We note that the plan of exploration proposes the initiation of exploratory drilling for early 1982; drilling will last between 59-90 days per well. Because this lease is within the known migration pathway of the endangered gray whale and exploration will most likely occur during the gray whale migration periods, we believe an opportunity may exist to gather information concerning the interactions of drilling operations and the activities of migrating gray whales. We recommend you contact the Bureau of Land Management, Pacific Outer Continental Shelf Office, in Los Angeles to coordinate contracted research activities which might utilize such a platform of opportunity.

We also recommend that you inform the operator of the locations of harbor seal (Phoca vitulina) breeding sites along the Santa Barbara and Ventura County coastlines. The discussion on page 117 should be modified to include the following rookery sites: Pt. Arguello, Pt. Conception, Naples, More Mesa, Carpenteria, and Mugu Lagoon. The exact locations of these sites is described in a report by Bowland (1978); a copy was previously forwarded to your office.

If you have any questions, or we can be of further assistance, please feel free to contact Mr. Dana J. Seagars of my staff at FTS 796-2518.

Sincerely yours,

Alan W. Ford

Alan W. Ford
Regional Director

GEOLOGICAL SURVEY
PACIFIC OCS REGION
RECEIVED
OCT 22 1981
FIELD OPERATIONS
LOS ANGELES

UNITED STATES GOVERNMENT

memorandum

DATE: OCT 21 1981

REPLY TO ATTN OF: Manager, Pacific OCS Office

NOTED - [illegible] OCS-P 0205

SUBJECT: 655 DM 1 Review, Exploration Plan - Santa Clara Unit, OCS-P 0205 Nos. 3 and 4, Chevron U.S.A. Inc., Unit Operator

TO: Acting Deputy Conservation Manager, Field Operations, Pacific OCS Region, U.S. Geological Survey

This Office has reviewed Chevron's proposed Exploration Plan and Environmental Report for lease OCS-P 0205 wells nos. 3 and 4 and we recommend that USGS approve the Exploration Plan. Our comments on the Environmental Report are presented below.

Section 2: The location of proposed well nos. 3 and 4 are within the 500 meter buffer zone of the Santa Barbara Channel northbound traffic lane. Prior to drilling, the drilling rig, Glomar Coral Sea, needs to be placed in position by anchors, which could be placed within the northbound traffic lane. According to Lt. Jan Terveen, Eleventh Coast Guard District, the chains, cables and marker bouys (if used) for anchors should be at least 125 feet below the water surface to prevent interferences with vessels that are within the traffic lane. Consequently, Section 2 should include discussions of chains and cables for anchors that are placed within the traffic lane.

Page 85, para. 2: A summary discussion of potential oil spill trajectories during specific seasonal environmental extremes and how sensitive biological areas would be impacted/affected, should be provided.

We are returning the enclosed Amended Exploration Plan for Wells P-205 nos. 3 and 4, Santa Clara Unit Area. If there are any questions, please contact us.

William E. Grant

Enclosure

OPTIONAL FORM NO. 10
(REV. 1-80)
GSA FPMR (41 CFR) 101-11.6
5010-114

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
24000 Avila Road
Laguna Niguel, CA 92677

DUNAWAY

October 14, 1981

Memorandum

To: Acting Deputy Conservation Manager
Field Operations, Pacific OCS Region
U.S. Geological Survey, Los Angeles, CA

From: Field Supervisor (ES-LN), Laguna Niguel, CA

Subject: Chevron USA, Inc., OCS-P-0205, Santa Barbara Channel, Exploratory Wells Environmental Report

The Fish and Wildlife Service provides the following 655 DM 1 review comments on the modified version of the Environment Report (Exploration) for proposed wells 3 and 4 in OCS P-0205 in the eastern Santa Barbara Channel, 11 miles southwest of Ventura and adjacent to the northbound sea lane.

GENERAL COMMENTS

The limited information on potential oil spill trajectories, effects of open water drilling mud disposal, and an inventory of biological resources within the parcel lease point out the need for additional studies before actual production activities are allowed on this parcel. These additional informational needs should be scoped jointly by all interested parties.

SPECIFIC COMMENTS

Page 22. Proposed monitoring studies will also require coordination with the Fish and Wildlife Service.

Page 42. Carpinteria Marsh (El Estero) and Mugu Lagoon are two additional environmentally sensitive areas protected by various Federal and State laws.

Page 70. The correct scientific name for the light-footed clapper rail is Rallus longirostris levipes. The Federal and State endangered salt marsh bird's beak (Cordylanthus maritimus ssp. maritimus) and American peregrine falcon (Falco peregrinus anatus) should be discussed in the endangered species section of the environmental report. Likewise, some discussion should be provided for the State endangered Belding's savannah sparrow (Passerculus sandwichensis beldingi).

Pages 83-84. A better discussion is needed on the trajectory of an oil spill and potential impact if a spill comes ashore on the Ventura coast and Santa Cruz Island. The present information is too limited and relies primarily on the factor that any oil spill will be wind directed. We would appreciate the development of oil spill plans comparable to the work done on "Trans-Alaska SPCC plans at Valdez."

If you have any questions on the above, please contact John Wolfe or me at FTS 796-4270.