MINUTE ITEM

This Calendar Item No. 30 was approved as Minute Item No. 30 by the State Lands Commission by a vote of 2 to 0 at its 2/9/82 meeting.

CALENDAR ITEM

30

1/28/82
W 9016.3
PRC 3242
Willard

APPROVAL OF OFFSHORE NATURAL OIL AND GAS SEEP CONTAINMENT PROJECT AND MEMORANDUM OF AGREEMENT, COAL OIL POINT, SANTA BARBARA COUNTY

APPLICANT: ARCO Oil and Gas Company
P. O. Box 147
Bakersfield, California 93302

AREA: Offshore Coal Oil Point Natural Oil and Gas Seep.

COUNTY: Santa Barbara.

PROPOSAL: The purpose of the proposed action is two-fold: 1) to approve the installation of a seep containment device on PRC 3242.1 for the purpose of capturing and containing hydrocarbon emissions to be used by ARCO for emission tradeoffs for future drilling operations, and 2) to approve a Memorandum of Agreement (MOA) between the County of Santa Barbara, Santa Barbara County Air Pollution Control District (APCD), ARCO and the State Lands Commission.

PERTINENT INFORMATION:

On September 24, 1980, the Commission authorized the resumption of exploratory drilling operations on State Oil and Gas Leases PRC 308.1 and PRC 309.1 offshore Coal Oil Point, Santa Barbara County. Further authorization for exploratory drilling is anticipated for PRC 208.1, 3120.1 and 3242.1, pending final EIR certification for these leases. Such leases, except 208.1 (Aminoil) are currently operated by ARCO Oil and Gas Company (ARCO).

The final EIR certified by the Commission for PRC 308.1 and PRC 309.1 on September 24, 1980, identified certain elements of the existing environment which could be significantly impacted by the project. These elements included the effects on air quality,

A 35

S 18

and proposed mitigation measures providing for tradeoffs based on the containment and delivery to shore of hydrocarbons from a natural oil and gas seep located on State Oil and Gas Lease PRC 3242.1, approximately one mile east from Platform "Holly". Under this procedure there would be a potential reduction in atmospheric emissions of hydrocarbons and other contaminants from the seep. The recovered reactive hydrocarbons would be used as air tradeoffs for any oxides of nitrogen or hydrocarbon air emissions produced by any temporary projects(s) related to exploration, development, processing and oil terminal operations. A procedure has been developed whereby the captured reactive hydrocarbons will be "banked" for use as tradeoffs including the use of a certain volume as advanced air emission tradeoffs (credit before installation of containment equipment). ARCO has recently contracted for a drillship to commence its exploratory drilling under PRC 308 and PRC 309 in early 1982. The advanced air emissions tradeoffs will be used for this project.

A Memorandum of Agreement for the Seep Containment Project between Atlantic Richfield Company (ARCO), Santa Barbara County Air Pollution Control District, County of Santa Barbara, and the State Lands Commission, has been prepared which details air emission credits and installation and operation of seep containment equipment.

ARCO has applied to the Commission for a permit to install a seep containment device over the natural oil and gas seep located on PRC 3242.1 and located approximately one mile east of Platform "Holly". The containment device will be installed pursuant to the terms and conditions of the Seep Containment Memorandum of Agreement (MOA) which has been executed by the Santa Barbara County and the Santa Barbara County Air Pollution Control District (APCD), and ARCO. The MOA is a four-party (ARCO, Santa Barbara County, Santa Barbara County APCD,

and the State Lands Commission) two-part agreement in which the first part involves agreement between ARCO and the Santa Barbara County APCD on the various principles of air emission credits and tradeoffs and the second part involves the agreement between SLC and ARCO concerning the liability for environmental impacts and provisions for SLC, if it chooses, to take over the seep containment project should ARCO desire to abandon the project.

The second part of this Agreement, between the State Lands Commission and ARCO, is proposed to be amended to:

1. Change paragraph II.B.2 to specify that Arco may assign its interest in the project to Mobil or Aminoil or their subsidaries or successors.

2. Change paragraph II.B.6.b to read "released as a result of the negligence of any participant in the project."

ENVIRONMENTAL IMPACT CONSIDERATIONS:

Subsequent to ARCO's submission of a written request for approval of the seep containment device and auxillary equipment including pipelines and prior to any SLC grant, permit license or approval, consideration of the environmental effects was necessary. The Commission staff, in accordance with State Guidelines for implementation of the CEQA of 1970 as amended, has prepared an Initial Study for the proposed action and concluded that the proposed activity will not result in a significant effect on the environment. Therefore, the preparation of an EIR is not required.

In compliance with Section 2905(c) of the California Administrative Code, a Negative Declaration was prepared and filed with the State Clearinghouse. The Negative Declaration was circulated to responsible agencies and agencies having jurisdiction by law and to the public. No significant adverse comments were received during the circulation period.

AB 884: 9/2/82.

EXHIBITS: A. Location Map.
B. Negative Declaration.

IT IS RECOMMENDED THAT THE COMMISSION:

1. CERTIFY THAT A NEGATIVE DECLARATION EIR ND 296 HAS BEEN COMPLETED IN COMPLIANCE WITH CEQA, THE STATE EIR GUIDELINES AND THE COMMISSION ADMINISTATIVE REGULATIONS, AND THAT THE COMMISSION HAS REVIEWED AND CONSIDERED THE INFORMATION CONTAINED THEREIN PRIOR TO THE APPROVAL OF THE PROJECT.

2. DETERMINE THAT THE PROJECT WILL NOT HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT.

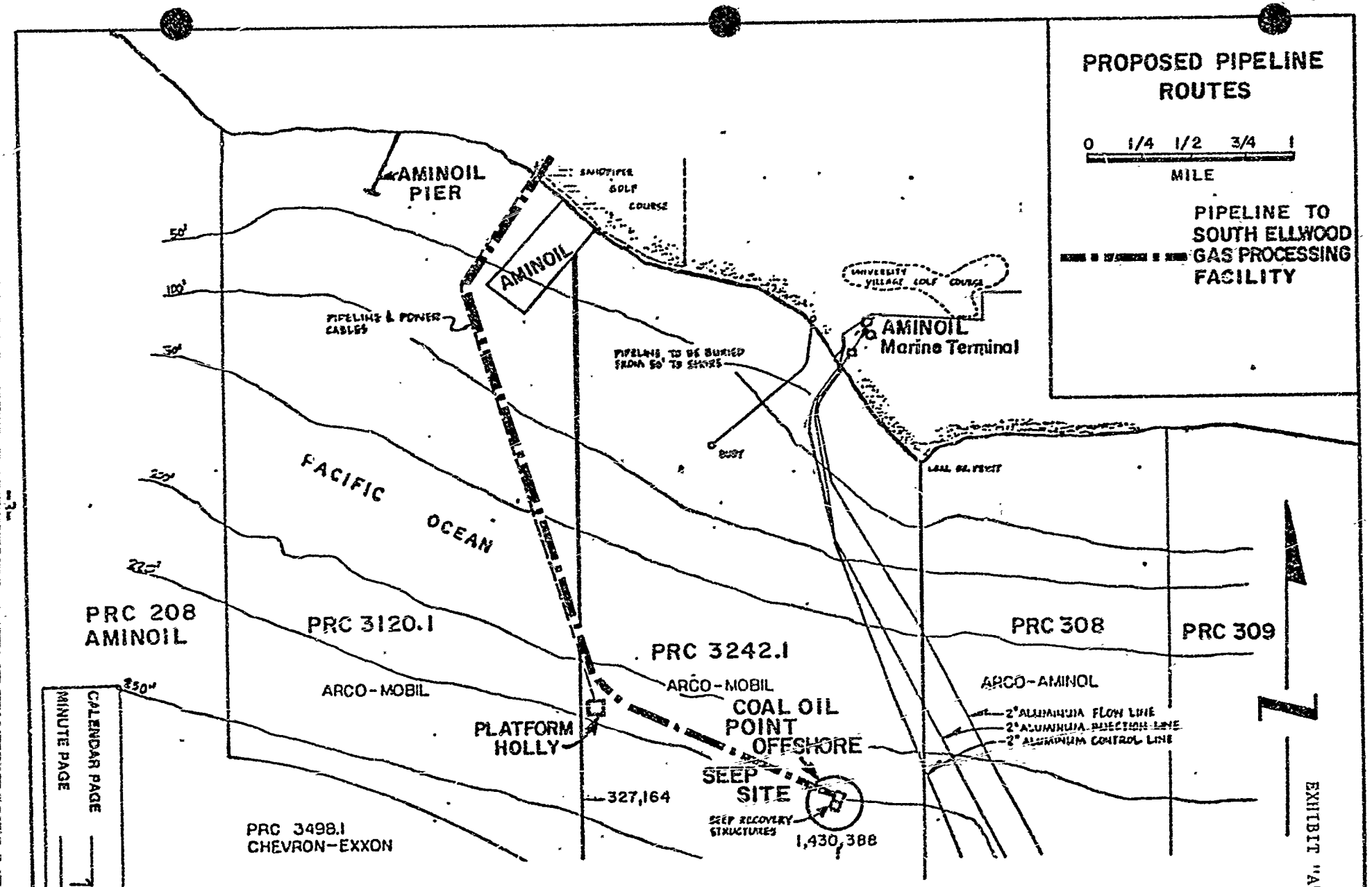
3. FIND THAT GRANTING OF THIS AUTHORIZATION WILL HAVE NO SIGNIFICANT EFFECT PURSUANT TO SEC. 6370.1 OF THE PUBLIC RESOURCES CODE.

4. APPROVAL OF THE PROJECT WILL BE CONTINGENT UPON APPROVAL BY ALL PERTINENT STATE, FEDERAL AND LOCAL AGENCIES.

5. APPROVE ARCO'S APPLICATION FOR PERMIT TO INSTALL A SEEP CONTAINMENT DEVICE OVER THE OFFSHORE COAL OIL POINT NATURAL OIL AND GAS SEEP LOCATED ON PRC 3242.1 APPROXIMATELY ONE MILE EAST OF PLATFORM "HOLLY".

6. AUTHORIZE EXECUTION OF THE MEMORANDUM OF AGREEMENT BETWEEN THE ARCO OIL AND GAS COMPANY, THE SANTA BARBARA COUNTY AIR POLLUTION CONTROL DISTRICT, THE COUNTY OF SANTA BARBARA, AND THE STATE LANDS COMMISSION COVERING THE DISPOSITION OF AIR EMISSIONS CREDITS FOR THE NATURAL OIL AND GAS SEEP CONTAINMENT PROJECT LOCATED ON STATE OIL AND GAS LEASE PRC 3242.1, COAL OIL POINT, SANTA BARBARA COUNTY.

7. AUTHORIZE AMENDMENT OF ARTICLE 2 OF THE MEMORANDUM OF AGREEMENT TO PROVIDE FOR THE AMENDMENT PROPOSED HEREIN BY STAFF AND WHICH IS ON FILE IN THE OFFICE OF THE COMMISSION.



CALENDAR PAGE 98
MINUTE PAGE 130

MAP OF THE COAL OIL POINT OFFSHORE CONTAINMENT AREA, OFFSHORE SANTA BARBARA COUNTY, CALIFORNIA

FIGURE 1

(SOURCE: ARCO, 1981)

STATE OF CALIFORNIA—STATE LANDS COMMISSION

EDMUND G. BROWN JR., Governor

STATE LANDS COMMISSION
1807 13TH STREET
SACRAMENTO, CALIFORNIA 95814

EXHIBIT "B"

/x/ Draft

/ / Final

NEGATIVE DECLARATION

EIR ND 296

File Ref.: W 9016.3

SCH#: 81092905

Project Title: Proposed Coal Oil Point Offshore Seep Containment Project.

Project Location: Approximately 2 miles south of Coal Oil Point, Santa Barbara County, California.

Project Description: To install an underwater seep collection device to trap and recover the emitted hydrocarbons at the source which would involve the emplacement of a seep containment device which is a gravity structure and the laying of a pipeline to an existing onshore gas processing plant at the ARCO Ellwood facility or the Coal Oil Point processing plant.

This NEGATIVE DECLARATION is prepared pursuant to the requirements of the California Environmental Quality Act (Section 21000 et seq of the Public Resources Code), the State EIR Guidelines (Section 15000 et seq, Title 14, of the California Administrative Code), and the State Lands Commission regulations (Section 2901 et seq, Title 2, of the California Administrative Code).

Based upon the attached Initial Studies, it has been found that:

/x/ the project will not have a significant effect on the environment.

/ / the attached mitigation measures will avoid potentially significant effects.

Contact Person: Ted T. Fukushima
1807-13th Street
Sacramento, CA 95814
(916) 322-7813

CALENDAR PAGE	99
MINUTE PAGE	131

R. A. P. CAAL

EDMUND G. BROWN JR., Governor

STATE OF CALIFORNIA STATE LANDS COMMISSION

STATE LANDS COMMISSION
20 OCEANGATE – SUITE 300
BEACH, CALIFORNIA 90802
TELEPHONE: (213) 590-5201

File Ref.: W 9016.3

December 21, 1981

The Resource Management Department
Santa Barbara County
123 East Anapamu Street
Santa Barbara, CA 93101

Attention: Albert J. McCurdy, Deputy Director
Division of Environmental Review

Gentlemen:

This is to acknowledge receipt of your comments concerning the Coal Oil Point Offshore Seep Containment Project Initial Study. Responses to your conditions and comments are listed below in the order that you submitted them:

In regards to your three (3) suggested conditions to the Negative Declaration:

(1) The onshore portion of the pipeline will be confined to the existing roadway, leading from the beach to the ARCO Ellwood facility.

ARCO will construct the pipeline through the surf zone in accordance with State Lands Commission, U.S. Corps. of Engineers, U.S. Coast Guard and County regulations. There are no coastal bluffs to be concerned with and the pipeline route will follow the existing easement through the mean high tide line to its intersection with an existing road on Sandpiper Golf Course property and thereafter follow the course of that road into the ARCO Ellwood facility which will be used instead of the proposed Coal Oil Point site.

(2) Disturbance of the kelp bed will be minimized and will be confined to a 30 foot wide corridor on the sea floor.

ARCO will confine its pipeline to a 30 foot wide corridor on seafloor with a minimum disturbance to the kelp along that corridor.

CALENDAR PAGE 100
MINUTE PAGE 132

(3) Any section of the pipeline route not previously surveyed for submarine cultural resources will be surveyed prior to construction activities. If any cultural resources are located, they will be avoided or a State approved recovery and documentation program will be implemented.

ARCO has completed additional survey in November, 1981 along the pipeline route which in conjunction with existing survey data affords sufficient information for a geologic hazards and cultural resources analysis. No cultural resources where identified in this survey. Any cultural resources found would of course be avoided. A recent Marine Cultural Resources Survey Report has been completed by Dames and Moore (1981) for Leases PRC 3120, 3242, and 208.

In response to what you suggested the Negative Declarations should discuss, such as "The extent to which the proposed seep containment project will facilitate future offshore oil and gas development by providing required air emission offsets." The answer is that although this project represents a potential growth inducing impact, future drilling or other projects could proceed by using other offsets and more significantly these projects will be required to go through the EIR process as required by CEQA. Furthermore, it is believed that at present the seep is more deleterious as is than the potential impacts from the proposed project.

The comment "If the proposed eight inch pipeline was used at some future date, for transporting large quantities of high pressure gas, the added throughput to the Ellwood facility could result in adverse air quality impacts," is possible if ARCO were to use it for that purpose; however, ARCO reportedly does not plan to use the eight inch pipeline for high pressure gas transmission at a future time.

Responses to your additional comments which the Negative Declaration should discuss regarding potential adverse environmental impacts and potential mitigation measures are included in the order you submitted them:

(1) The spill of 350 barrels of captured oil may result in greater impacts than the continual oil discharge from the seep, especially if the spill impacts a more sensitive location. The document should present spill containment and cleanup procedures.

ARCO's Oil Spill Contingency Place for California State Leases 308-309, 3120 and 3242 dated November, 1981 will be activated should a spill occur at the seep containment site, along the pipeline or during transport or transfer of the oil. Furthermore, ARCO's oil spill contingency equipment on Platform Holly, approximately one mile from the site, would be committed to respond to any spill together with the combined resources of Clean Seas, Inc.

(2) Natural seeps in the area support an unusual group of organisms. In that the containment site represents the largest seep in the area, a brief study of the organisms associated with this seep should be performed prior to installation of the containment device. This will document any unusual characteristics of the biological community and will increase overall knowledge of the seep sites.

In October and November, 1981 both the State Lands Commission and ARCO made manned submersible surveys of the seep containment site documenting the area as well as a control site with video tapes, stereophotographs, and collecting biological samples for study. A report on the biology of the sites is in preparation and any future surveys of the area to assess potential changes in the marine resources of the site will be made after consultation with the California Division of Fish and Game.

(3) A program should be implemented to assess the success of the seep containment device in capturing oil and gas, and to determine if any seepage has migrated to a location outside the containment device. Components of this program should include a provision for ARCO reports to the APCD stating any pressure or volume changes in gas or oil flow, and a periodic inspection program of the seep containment device and surrounding area.

An assessment of the success of the seep containment device is inherent in the Seep Containment Agreement in that before ARCO receives any credit for banked emissions, it must quantify those emissions both for oil and gas and report such findings to the Santa Barbara County APCD. The report will contain all pertinent information relative to the gas and oil such as volume and pressure changes. ARCO will make periodic inspections of the seep device (quarterly the first year and twice a year thereafter) and pipeline as is standard procedure on State Lands.

(4) Clear marking of the containment site, using surface buoys will reduce the likelihood of commercial fishermen damaging the containment device or their fishing equipment.

In accordance with U.S. Coast Guard regulations, ARCO will contact the 11th U.S. Coast Guard District Aids to Navigation Branch prior to installation of the containment device and buoy. A surface buoy attached to the marine loading hose will be identified by Lambert Coordinates. Proper buoy markings will be installed in conformance with U.S. Coast Guard requirements. Furthermore, the location of the containment device will be posted in Notice to Mariners indicating that the device is located "X" number of feet from the buoy shown on the surface of the water.

(5) Avoiding the use of explosives during implantation of the pipeline in the surf zone will reduce the potential for adverse impacts to marine organisms.

It is not anticipated that explosives will be used during the pipeline installation. Jetting and other methods are presently being considered for implantation of the pipeline in the surf zone.

(6) Disturbance of the sea floor during installation of the pipeline should be minimized to reduce turbidity, disruption of benthic organisms and interference with commercial trawl fishing.

Disturbance of the seafloor will be minimized as much as possible during the installation of the pipeline since it is not ARCO's intention to disturb the marine resources along the pipeline route any more than is necessary to lay the lines.

(7) The period during which the pipeline is installed across the beach should be minimized to reduce interference with beach use.

Installation of the pipeline across the beach will only take a few days. ARCO has recently (1980) installed a four inch replacement line across the beach without any undue interference with the use of the beach.

(8) The required permits for the proposed project should be identified in the environmental document, including those which must be obtained from Santa Barbara County.

The required permits will be from the California Coastal Commission, State Lands Commission, Santa Barbara County APCD, and the U.S. Army Corps. of Engineers. In addition, notification of the U.S. Coast Guard and pertinent fisheries associations will be made.

Yours very truly,

R. A. P. GAAL
Senior Marine Geologist

RAPG:cb

CALENDAR PAGE	103
MINUTE PAGE	135

State of California

State Lands Commission

Memorandum

To : California Coastal Commission
631 Howard Street, 4th Floor
San Francisco, CA 94105

Attention: L. Thomas Tobin

Date : December 17, 1981

File No.: W 9016.3

From : R. A. P. Gaal
STATE LANDS COMMISSION
100 Oceangate, Suite 300 – Long Beach, CA 90802

Telephone: ATSS
(635)-5233

Subject : The Coal Oil Point Offshore Seep Containment Project Initial Study SCH #81092905

This is to acknowledge receipt of your comments on the proposed Offshore Coal Oil Point Seep Containment Project. Responses to your comments are listed below:

Comment:

Navigational Safety. There is no analysis of the potential navigation conflicts with the floating oil storage tank. The study does not address how the tank will be lighted for navigation safety at night, or what other measures will be taken to avoid vessel traffic problems. The analysis does not describe how the tank will be offloaded or where the offloading vessel will come from.

Response:

A floating surface storage barge will not be used. Instead, ARCO will use a work boat with a vacuum truck (100 barrel capacity) at periodic intervals to remove oil from the seep containment device on a when-needed basis. Once loaded, the work boat will proceed to Platform "Holly" where ARCO will pressurize the vacuum tank and transfer the oil to surge tanks on the Platform. The oil will then enter the oil processing system of Platform "Holly" and be pumped along an existing pipeline to the Ellwood Facility. A buoy and line will be connected to the loading hose at the site. Proper buoy markings will be installed in conformance with U.S. Coast Guard requirements and the buoy description and location will be posted in Notice to Mariners. Furthermore, the commercial and sport fishing groups in the Santa Barbara area will be informed about the containment system and the location of the buoy. ARCO's Oil Spill Contingency Plan for California State Lands 308-309, 3120 and 3242, dated November 1981 will be activated should a spill occur at the seep containment device, along the pipeline, or during transport or transfer of the oil by the vacuum truck.

Comment:

Pipeline Landfall. The study does not address the methods that will be used to construct the pipeline through the surf zone and the coastal bluffs. Will existing routes be used or will new routes be necessary?

Response:

The pipeline will be constructed through the surf zone in accordance with State Lands Commission, U.S. Coast Guard, and County regulations and permits. The pipeline will be protected using standard ocean engineering pipeline practices and buried in the surf zone as required by the aforementioned permits. There are no coastal bluffs along the route and the pipeline will follow the existing easement through the mean high tide line to its intersection with an existing road on the Sandpiper Golf Course property and thereafter follow that road in the ARCO Ellwood Facility. Installation of the pipeline across the beach will only take a few days without any interference to use of the beach as evidenced from ARCO's installation of a 4 inch replacement line in 1980.

Comment:

Commercial Fishing. There is no discussion of potential conflicts with commercial fishing in this area. Have commercial fishermen and the Department of Fish and Game been consulted?

Response:

Appropriate agencies, California Department of Fish and Game, U.S. Fish and Wildlife Service, and local fishing groups have been informed and will be up-dated as to the progress of the project so that potential space-use conflicts will be minimized. To date, there has been no known fishery problems in the area. Since fishing is a competive business, precise fishery locations in the area are unavailable; however, very little bottom trawling is reported from the area and little to no conflicts are anticipated as a result of the project.

Comment:

Documentation. What kind of program does ARCO propose to document the success/failure of the containment device?

Response:

The success or failure of the containment device is self-monitored and will be reflected in the quantification that is required under

Response: (cont'd)

the Memorandum of Agreement with State Lands, ARCO, and the Santa Barbara County APCD. Quantification will be on a quarterly basis and ARCO will not be given any credit for anything not contained. In addition, ARCO will make seafloor inspections of the seep containment device and pipelines as required by the State Lands Commission permitting process.

Very truly yours,

R. A. P. GAAL
Senior Marine Geologist

RAPG:11

CALENDAR PAGE 106
MINUTE PAGE 138

File Ref.: W 9016.3
SCH #81092905

October 30, 1981

INITIAL STUDY FOR THE COAL OIL POINT OFFSHORE SEEP CONTAINMENT PROJECT

INTRODUCTION

Numerous offshore oil and gas seeps have been identified along the Santa Barbara coastline which cause atmospheric and oceanic pollution. One of these, an exceptionally large hydrocarbon gas seep, the Coal Oil Point Offshore Seep, hereinafter called the Seep, near Goleta has been documented since 1970, and under constant surveillance since 1973 by the State Lands Commission (SLC). The ARCO Oil and Gas Company (ARCO) currently contemplates implementing a seep containment project designed to capture and contain this large natural oil and gas seep. The project's potential reduction in atmospheric emissions of noxious hydrocarbons and other contaminants emanating from the seep would be used for air emission tradeoffs for future ARCO projects.

PURPOSE

ARCO proposes to install an underwater seep collection device to trap and recover the emitted hydrocarbons at the source as a means of obtaining emission tradeoffs. The crude oil collected would be stored at the site and periodically removed by barge, while the gas would be sent to shore via pipeline and processed at an existing onshore facility. Implementation of this proposed containment device would provide an additional energy source and result in the eliminations of substantial waterborne pollution and air emissions in the Santa Barbara Channel. The tradeoff scheme would allow ARCO to use a certain percentage of the emission captured and eliminated as offsets to emissions caused by their subsequent development. In return for captured hydrocarbons, ARCO will receive air emission credits to be used for tradeoffs in other projects requiring such tradeoffs. The credits are transferable to other parties. Aminoil and Mobil who are ARCO's partners, may at their election become participants in the seep containment agreement. The seep containment device must be installed by July 1, 1982.

A Memorandum of Agreement (MOA) already approved by Santa Barbara County and the Santa Barbara County Air Pollution

CALENDAR PAGE 107
MINUTE PAGE 139

Control District (APCD), regarding the containment of the natural oil and gas seep is presently being considered by ARCO and SLC for approval and execution. The MOA is a four-party (ARCO Oil and Gas Company, Santa Barbara County, Santa Barbara Air Pollution Control District, and the State Lands Commission) two-part agreement in which the first part involves agreement between ARCO and the Santa Barbara County Air Pollution Control District on the various principles of air emission credits and tradeoffs and the second part involves the agreement between SLC and ARCO concerning the liability for environmental impacts and provisions for SLC, if it chooses, to take over the seep containment project should ARCO desire to abandon the project.

LOCATION

The site under consideration lies a few miles off the south coast of Santa Barbara County, near Goleta, California on State Lease PRC 3242.1 in the South Ellwood Offshore Field (see Figure 1). The Coal Oil Point Offshore Seep is located 5570 feet ESE along a bearing 112° true from ARCO's Platform "Holly" and about 2 miles south of Coal Oil Point in 220 feet of water. It's Lambert Grid Zone is 5; X coordinate = 1,430,388 and Y coordinate = 327,164.

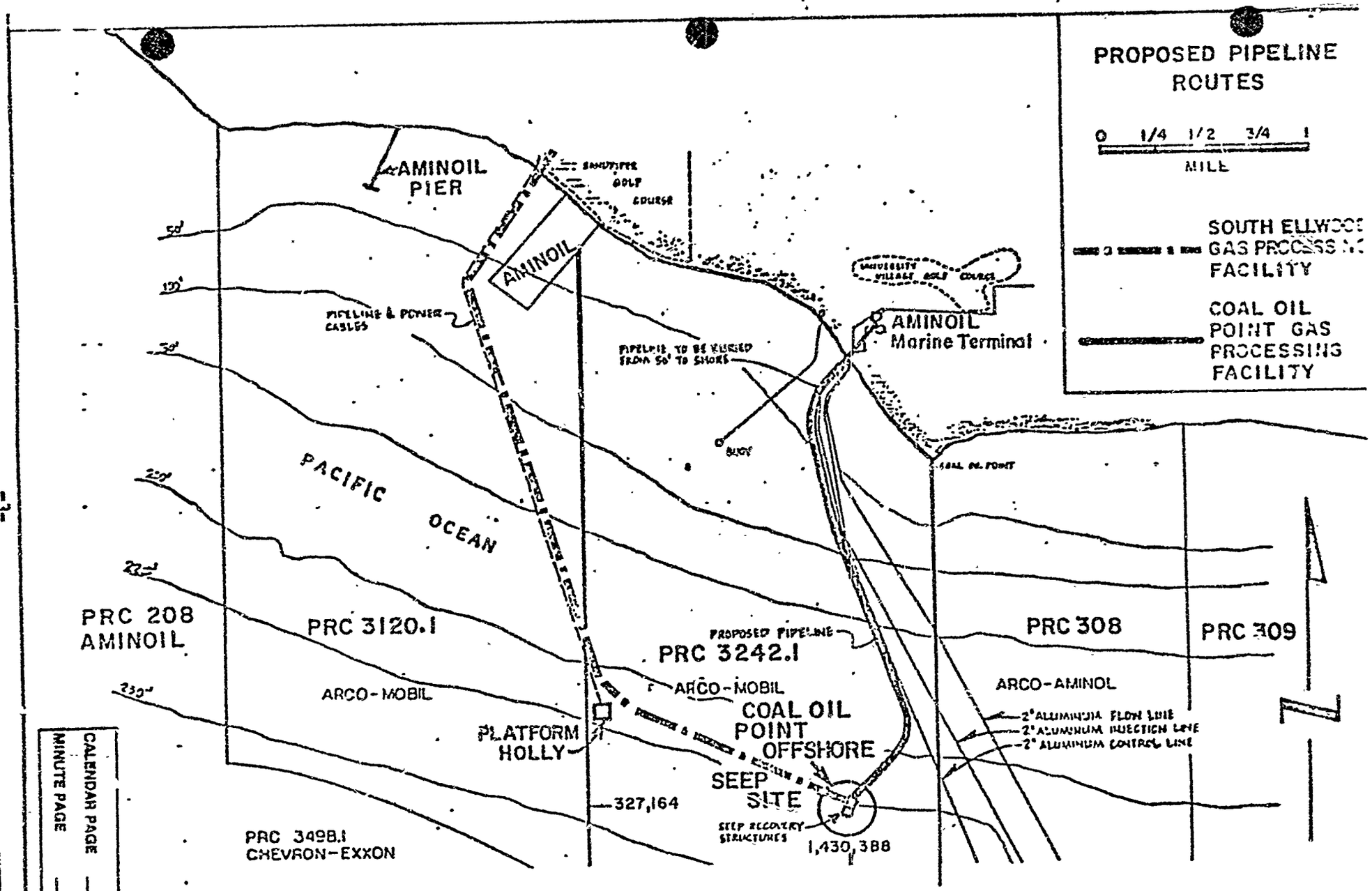
DESCRIPTION OF PROPOSED ACTION

ARCO has requested a permit from the State Lands Commission to install a seep containment device over the Offshore Coal Oil Point natural oil and gas seep located on PRC 3242.1 located approximately one mile east of ARCO's Platform Holly.

It is proposed to allow the offshore entrapment, recovery, and transmission of oil and gas emanating from natural oil and gas seeps on the existing State oil and gas lease identified above. This action will require the emplacement of a seep containment device which is a gravity structure and the laying of a pipeline to an existing onshore gas processing plant at the ARCO Ellwood facility or the Coal Oil Point processing plant.

The containment device will be installed pursuant to the terms and conditions of the Seep Containment Agreement which has heretofore been executed by Santa Barbara County and approved by the Santa Barbara APCD and Santa Barbara County.

It has been estimated that the seep emits from 1,200,000 to 2,000,000 SCFD of gas and 50 BBL/Day of oil which represents 6 to 12 tons of reactive hydrocarbons per day. This is approximately 25% of Santa Barbara County's hydrocarbon air emission inventory.



CALENDAR PAGE 109
MINUTE PAGE 141

MAP OF THE COAL OIL POINT OFFSHORE CONTAINMENT AREA, OFFSHORE SANTA BARBARA COUNTY, CALIFORNIA

FIGURE 1

(SOURCE: ARCO, 1981)

SEEP CONTAINMENT SYSTEM DESIGN AND CONCEPT

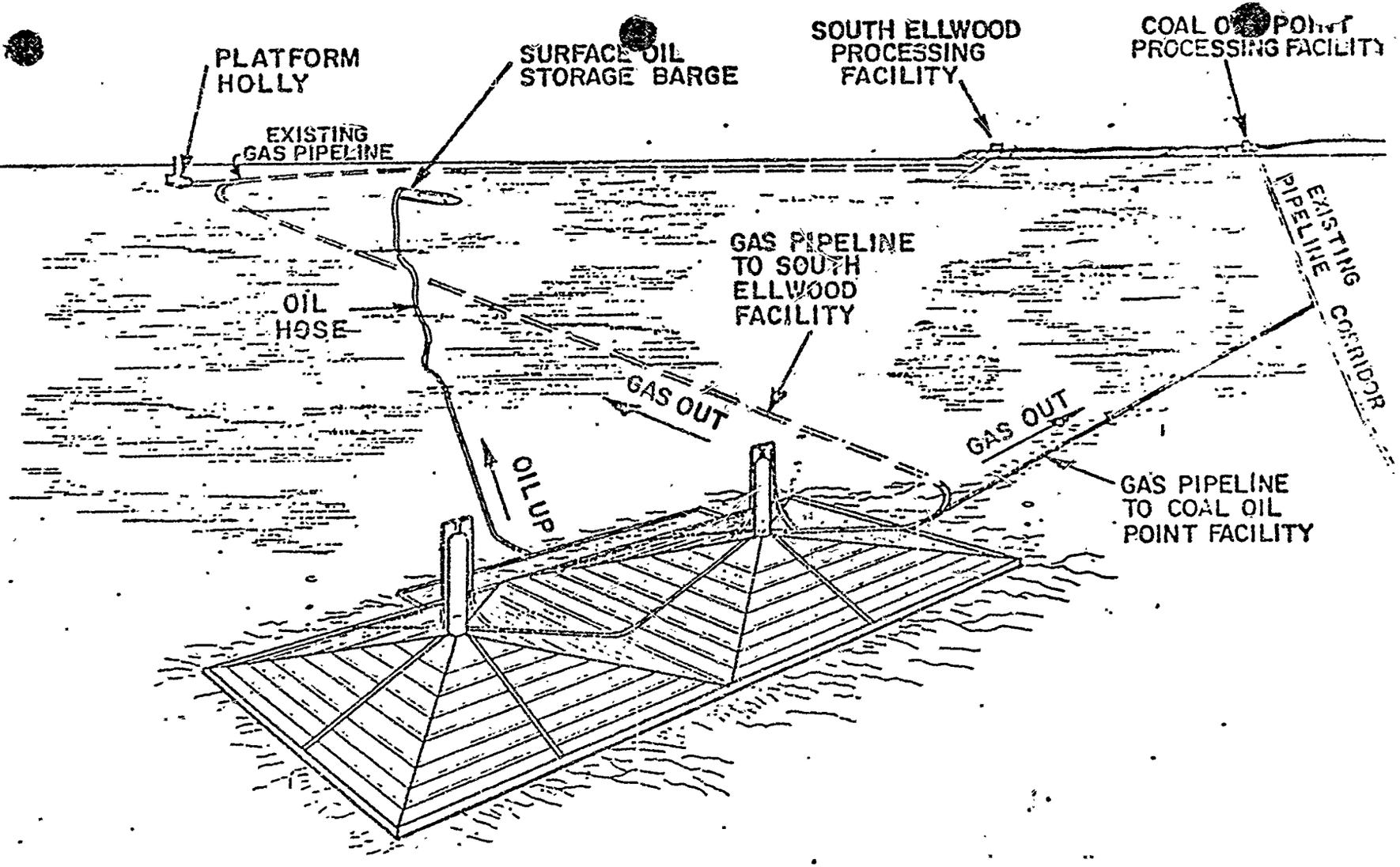
The containment device will consist of two pyramid-shaped 20 ft. high, 100 ft. square at the base structures that will be set side by side over the peanut-shaped, seep area on the ocean floor in 220 feet of water about 2 miles from shore (see Figure 2).

The containment device will be fabricated at a site, from which it can be loaded onto a cargo barge(s) and towed to a nearby shallow water location near the seep site. The structure will then be submerged in the shallow water and later towed to the seep site. The dead weight (load) of the structure will be increased through the placement of large concrete blocks (4 ft. x 6 ft. x 13 ft.) at the initial shallow water site prior to towing to the seep location for the final sinking and installation on the seafloor.

The two pyramidal structures are to be constructed of a 30 inch and 36 inch diameter steel pipe frame work covered with 3/8 inch thick steel plate. Both pyramids will contain a 60 inch diameter, 50 foot high cylindrical steel separator/-storage tank projecting through the center of the pyramid to collect the oil and gas from the seep (See Figure 3). This subsea system has cathodic protection and will be relatively maintenance free. Minimum design service life is 20 years.

ARCO proposes to use one of its existing onshore petroleum facilities to process the gas captured from the Seep. Presently, the Ellwood onshore facility is considered the primary choice for the project since it is already set-up to process additional sour gas. The ARCO Ellwood petroleum treating facility is located near the mouth of Bell Canyon in the Ellwood area of Santa Barbara County. This facility meets all governmental requirements for air pollution and safety. A Stretford unit is used to remove H_2S from gas that it processes to meet existing standards for sale. This alternative doesn't require any modification to the existing plant facility and only the laying of a pipeline from the seep containment site to the existing pipelines from Platform Holly and thence along this existing pipeline corridor to the same landfall at the Ellwood Facility. The alternate site at Coal Oil Point would require minor modifications to process the seep gas as well as the laying of a pipeline from the seep site to and along an existing pipeline corridor to a Coal Oil Point landfall and thence to the processing plant.

The oil and gas will be separated in the combination separator/storage tank by gravity with the gas being taken

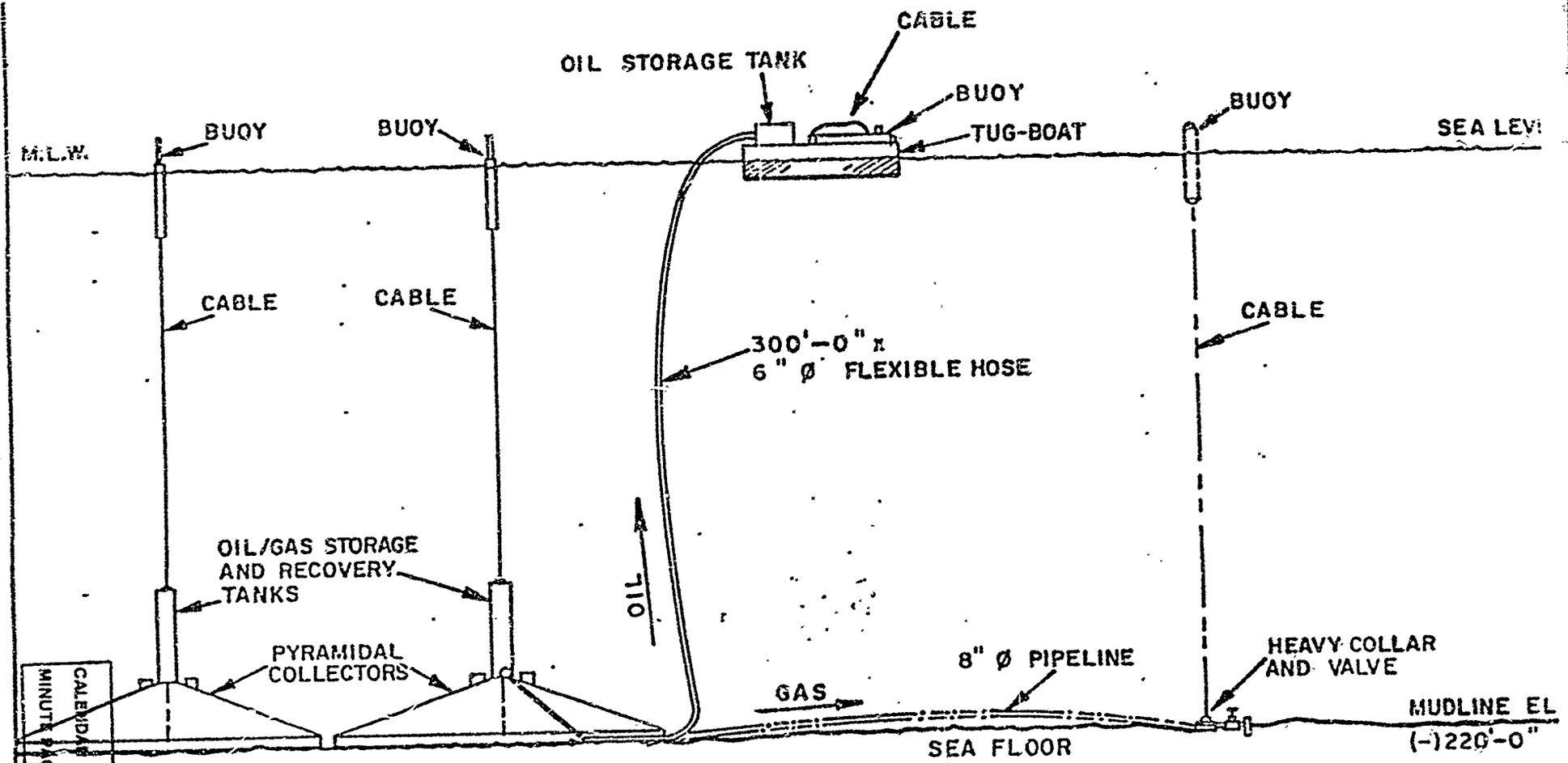


PERSPECTIVE VIEW OF SUBSEA EMPLACED SEEP RECOVERY STRUCTURE

(SOURCE: ARCO, 1981)

FIGURE 2

CALENDAR PAGE 111
MINUTE PAGE 143



CONCEPTUAL DIAGRAM OF SEEP RECOVERY STRUCTURE AND OIL LOADING AND GAS TRANSMISSION SYSTEMS

(SOURCE: ARCO, 1981)

FIGURE 3

CALENDAR PAGE 112
MINUTE PAGE 144
XXXX, 81

off the top of the tank continuously and sent to shore under its own energy through a 8 inch diameter pipeline. The single phase flow pipeline will have pigging capability. The storage tanks are large enough to contain 350 barrels or about one week's storage for the separated oil. The oil is to be collected as needed by a barge through a 6 inch diameter hose connected to the tanks utilizing the hydrostatic head of the seawater as the driving force (See Figure 3). Flow will cease when all of the oil stored in the tank has been transferred to the barge. When not in use the hose with a shutoff valve on the end will lie on the ocean floor and will be tied to a buoy for recovery when oil transfer is required. The containment device and the concrete weight blocks are heavy enough to resist the combined wave uplift, overturning moment and buoyancy forces and yet light enough not to sink into the sediment under the combined dead load and downward component of the wave load.

If the Coal Oil Point facility is used the seep gas first enters a water knock-out drum which will remove any free liquids that may be traveling in the gas. Then the gas will be passed through iron sponge (Fe_2S_3) units to remove any hydrogen sulfide. The gas will then be filtered on its way to the suction side of the gas compressor units where it is compressed to 410 psig by parallel compressors. The gas then will be cooled, dried, filtered, metered and sold into a nearby commercial gas pipeline. Prior to start up, all equipment in the system will have been set, bolted, tested, and drained. The system will then be purged and put into the normal operating mode.

SAFETY FEATURES

Pressure relief valves are furnished on all pressure vessels and equipment which could be over pressured by fire or other malfunctions. The separator-storage vessels on the pyramid collectors have a check-float to prevent entry of liquid into the gas pipeline to shore. The pyramid collectors have breathing holes at 205 ft. sub-sea level elevation to allow gas to escape if pressure in the storage vessel exceeds 91.1 psig.

The design wave height used for structural analysis is 45 feet which is greater than the estimated 100 year maximum storm wave heights (25 feet).

Each of the onshore gas compressors has approved shut down systems to protect it. When all compressors are shut down in case of emergency, an alarm will automatically be sent to the Ellwood Production Office Facility over a telephone line.

If ARCO uses the alternate Ellwood Facility, the plant alarm system currently approved by Santa Barbara County will monitor the additional seep gas.

ENVIRONMENTAL SETTING/GENERAL

The area under consideration is within State owned tide and submerged lands in the Santa Barbara Channel between Coal Oil Point and Ellwood. The Santa Barbara Channel region lies within the westernmost part of the Tranverse Ranges province of southern California where the major physiographic and structural features trend east-west. The Channel region is the partially submerged extension of the Ventura Basin, a topographic and structural depression that locally contains more than 50,000 feet of Cretaceous and Tertiary strata. A marine terrace slopes gently southward from the foothills of the Santa Ynez Mountains to the north shore of the Santa Barbara Channel. The terrace and coastal plain terminates at a sea cliff; 50 to 100 feet high. Long, straight, sandy or rocky beaches, occasionally interrupted by rocky headlands, stretch for miles along the base of the sea cliff. The southern boundary of the Santa Barbara Channel is formed by the Northern Channel Islands (Anacapa, Santa Cruz, Santa Rosa, and San Miguel). The area east of the Channel is dominated by the Santa Clara River Valley and western area is open to the Pacific Ocean. A submarine shelf extends beneath the surface of the Santa Barbara Channel from shore to water depths of about 280 feet and varies in width from 3½ to 5 miles in the northwest portion of the Channel. Beyond the shelf, water depths increase to about 2,000 feet in the west-central part of the Channel.

The local offshore bathymetry of the proposed site is shown on the contoured bathymetric chart (Figure 1). The topography of the seafloor is characterized by a relatively smooth south-dipping slope, with an average gradient of one and one-half to three percent. There are no prominent topographic features in the local offshore area.

The physical environment in the vicinity of the Seep is submerged land lying in water depths of about 220 feet. The seafloor in this area is covered with fine-grained sediments (mud) and is below the zone of appreciable wave wave motion. The seep containment site is exposed to waves approaching from the west and southwest sectors and is swept by variable currents that move in the Santa Barbara Channel. The surrounding shoreline is composed of local sandy beaches separated by cliffs cut in bedrock and by a local slough. The offshore area is used for recreation, sport and commercial fishing.

CALENDAR PAGE	114
MINUTE PAGE	146

Much of the information and data presented in this study are based on and directly abstracted from existing literature which are listed in the references.

SITE PHYSIOGRAPHY AND BATHYMETRY

The proposed seep containment site and auxiliary onshore facilities are within the Transverse Ranges physiographic province. This province deviates from the normal northwest-southeast trend of mountains, ranges and Continental Borderland in southern California by its "transverse" or east-west orientation. The site lies within the western portion of the Transverse Ranges which extend from the easternmost end of the Mojave Desert to the region offshore from the Point Conception-Point Arguello area. This area is predominately sedimentary rock terrain overlying a metamorphic basement.

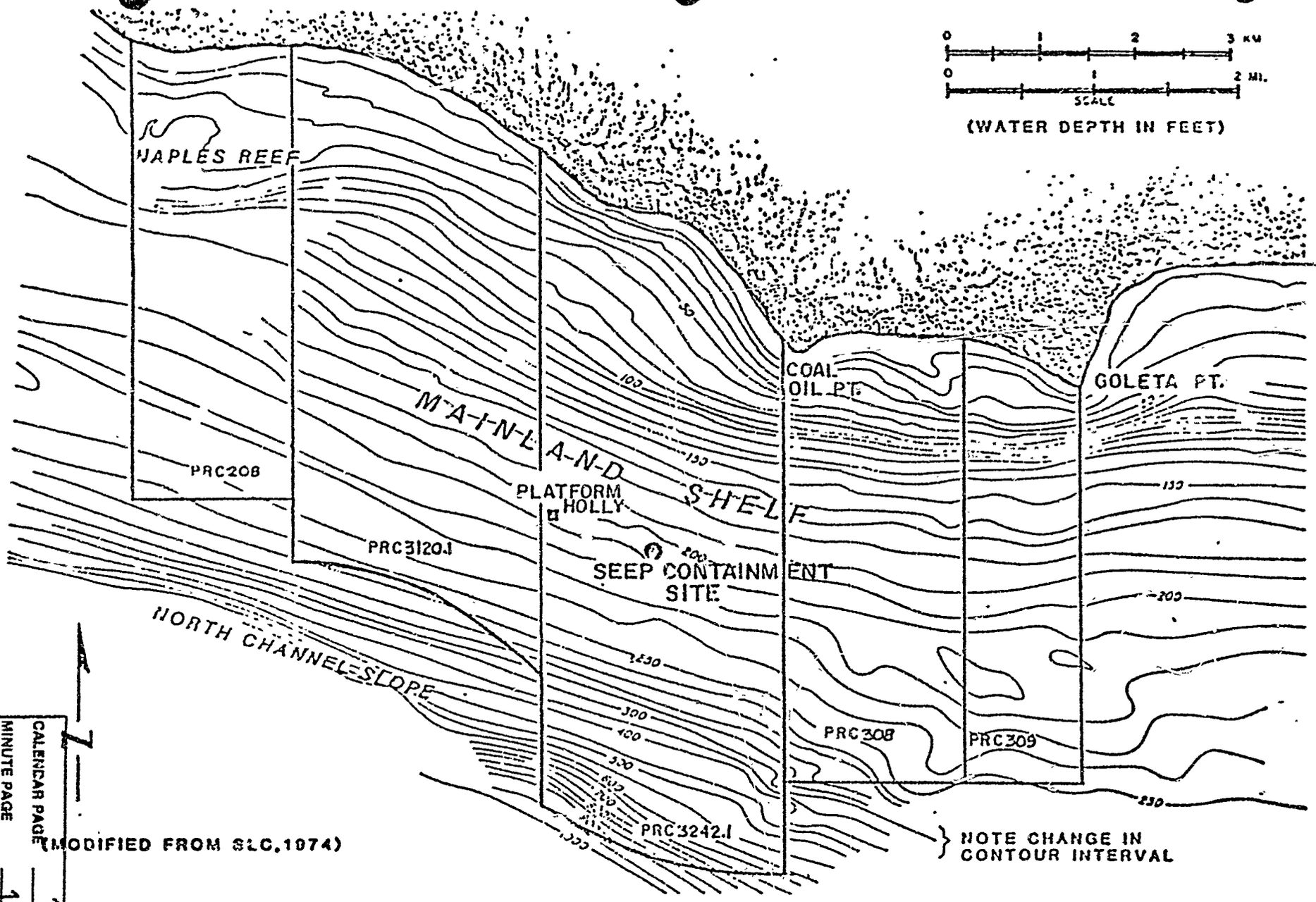
The site area lies near the northern edge of the Santa Barbara Basin which is an offshore extension of the Ventura Basin and forms a major part of the Western Transverse Ranges Province. The Santa Barbara Basin is rimmed on the northern part by the mainland shelf which lies between sea level and about the 100 metre isobath. A generalized bathymetric map of the area is shown on Figure A.

The mainland shelf is approximately 6 km. wide near the site area and broadens to the east and narrows to the west. The shelf is typically a smooth, featureless seafloor which slopes to the south at an average gradient of about 10 metres per km (1 percent slope). At the shelf-slope bathymetric break, there is a change in gradient where the bottom slopes southward into the Santa Barbara Basin with an average gradient of about 60 metres per km. (about 6 percent slope). Onshore from the site, the area is bounded by the Santa Ynez Mountains which is comprised mainly of southward dipping sedimentary and igneous rocks. Near the coastline, these strata have been beveled and covered with alluvium to form a broad, flat terrace about 15 to 20 metres above sea level. The terrace is terminated abruptly at the coastline forming a seacliff. The coastline is a rocky seacliff composed of siliceous shales bordered by thin strands of intermittent sandy beach interrupted locally by rocky headlands where the shales are more resistant to erosion.

GEOLOGY

A knowledge of the geology of the region is important to the understanding of the seeps in the area. The geology of the northwest Santa Barbara Channel is relatively well documented. See SLC Draft EIR's, Dibblee (1950, 1966), Vedder, et al. (1966, 1974), Yerkes, et al. (1981) in the Reference section. The channel occupies the submerged lowland between the Santa Ynez Mountains and the Northern Channel Islands.

CALENDAR PAGE 115
MINUTE PAGE 147



(MODIFIED FROM SLC, 1974)

CALENDAR PAGE 116
MINUTE PAGE 148

GENERALIZED BATHYMETRIC MAP OF AREA

FIGURE

The Santa Barbara Channel region forms the westernmost part of the east-west trending Transverse Ranges province and includes the Santa Ynez Mountains to the north; the Northern channel Islands to the south; Point Conception near the western margin and Hueneme Canyon near the east edge of the channel.

The seep containment site is on PRC 3242.1 lying on the mainland shelf which is a submarine terrace that parallels the coastline. This terrace extends about 4 miles offshore and covers part of a complexly faulted and folded east-west trending structural belt that includes the South Ellwood and Coal Oil Point Offshore oil fields. The structural relief of the trend diminishes to the east and west of the site. This trend is bounded on the north by the Santa Ynez Mountains homocline and on the south by a regional syncline.

Since the geologic strata of the adjacent Santa Ynez Mountains shore area dips seaward and extends under the waters of the Santa Barbara Channel, the offshore stratigraphy is similar. A stratigraphic section is shown on Figure 4. Furthermore, the known onshore stratigraphic data combined with previously drilled offshore oilwells indicate that the stratigraphy of the offshore seep containment site is the same as that of the Western Santa Ynez Mountains. The sedimentary strata anticipated to be encountered under the seep containment site range from early Eocene to Recent with the Sisquoc Formation of late Miocene age believed to underlie the thin layer of Recent sediments at the site.

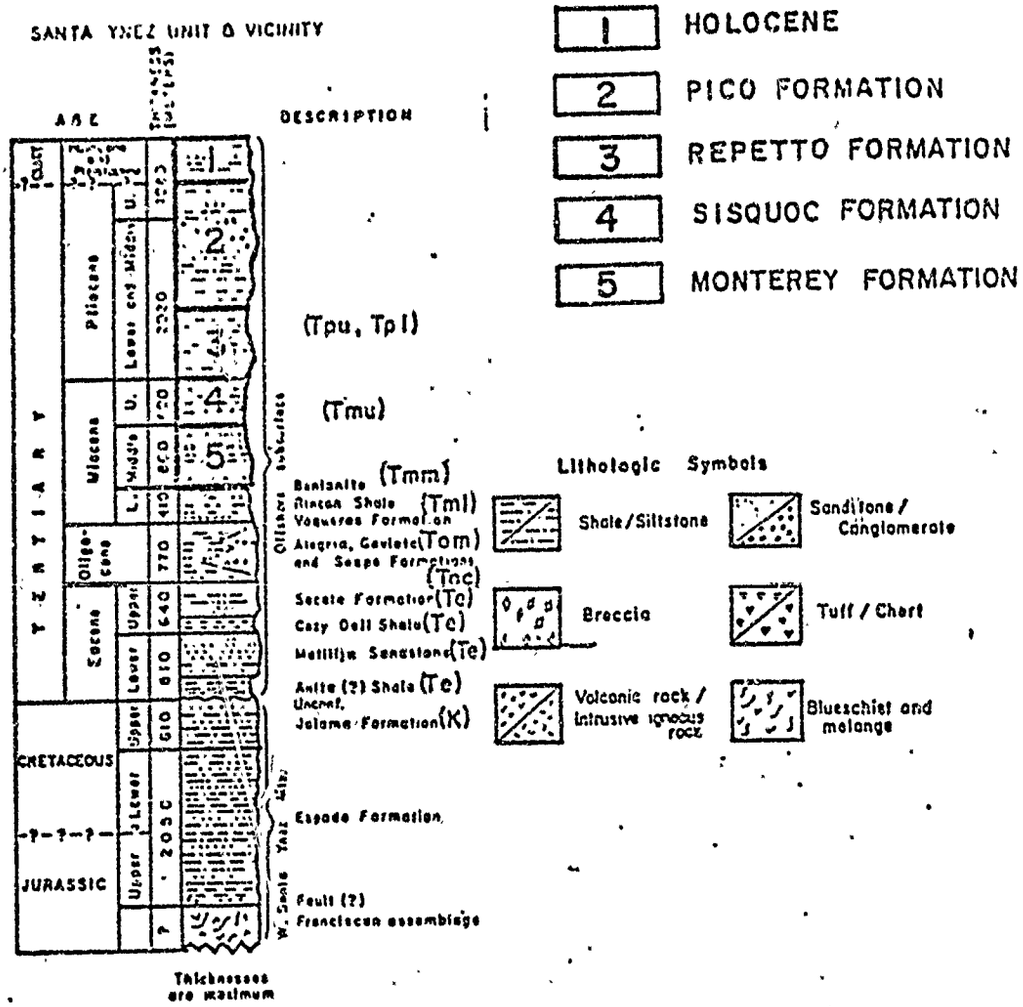
GEOLOGIC STRUCTURE

The geologic structure and strata of the Santa Barbara Channel region are continous with those of the Ventura Basin to the east. The structural trends of the faults and folds that deform the Neogene units in the region trend west-north-west as contrasted with the typical east-west tectonic grain of the western Transverse Ranges. Folding may have begun in late Oligocene time and may be continuous into the present time. Fault trends are predominantly east-west along the northern shelf or subparallel to the folds. Transverse faults occur locally. The east-west faults appear to be high angle with normal separation in which the southern blocks are down-dropped relative to the northern blocks. Lateral components of movement of the east-west faults may exist and movement on some of the faults has persisted into the present time.

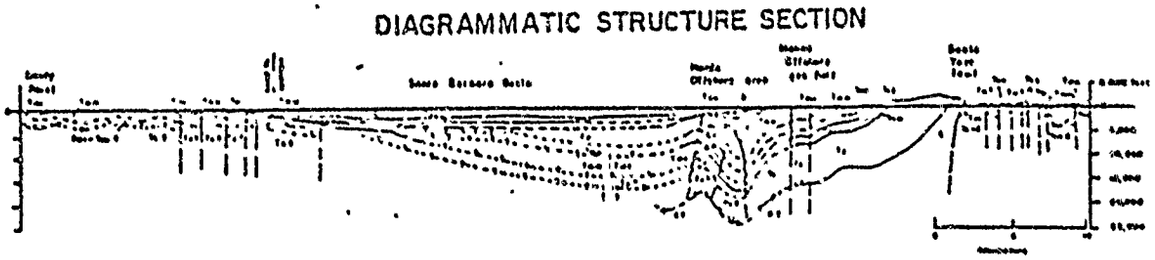
The major structural features of the area are indicated in Figure 5. The Santa Ynez Mountains, a faulted anticlinal fold is the major structural feature onshore. The structure of the Santa Ynez Mountains between the Santa Ynez fault and the offshore area is homoclinal in nature ~~incorporating~~ Cretaceous to Miocene age rocks dipping steeply southward.

CALENDAR PAGE 117
MINUTE PAGE 149

FIGURE 4



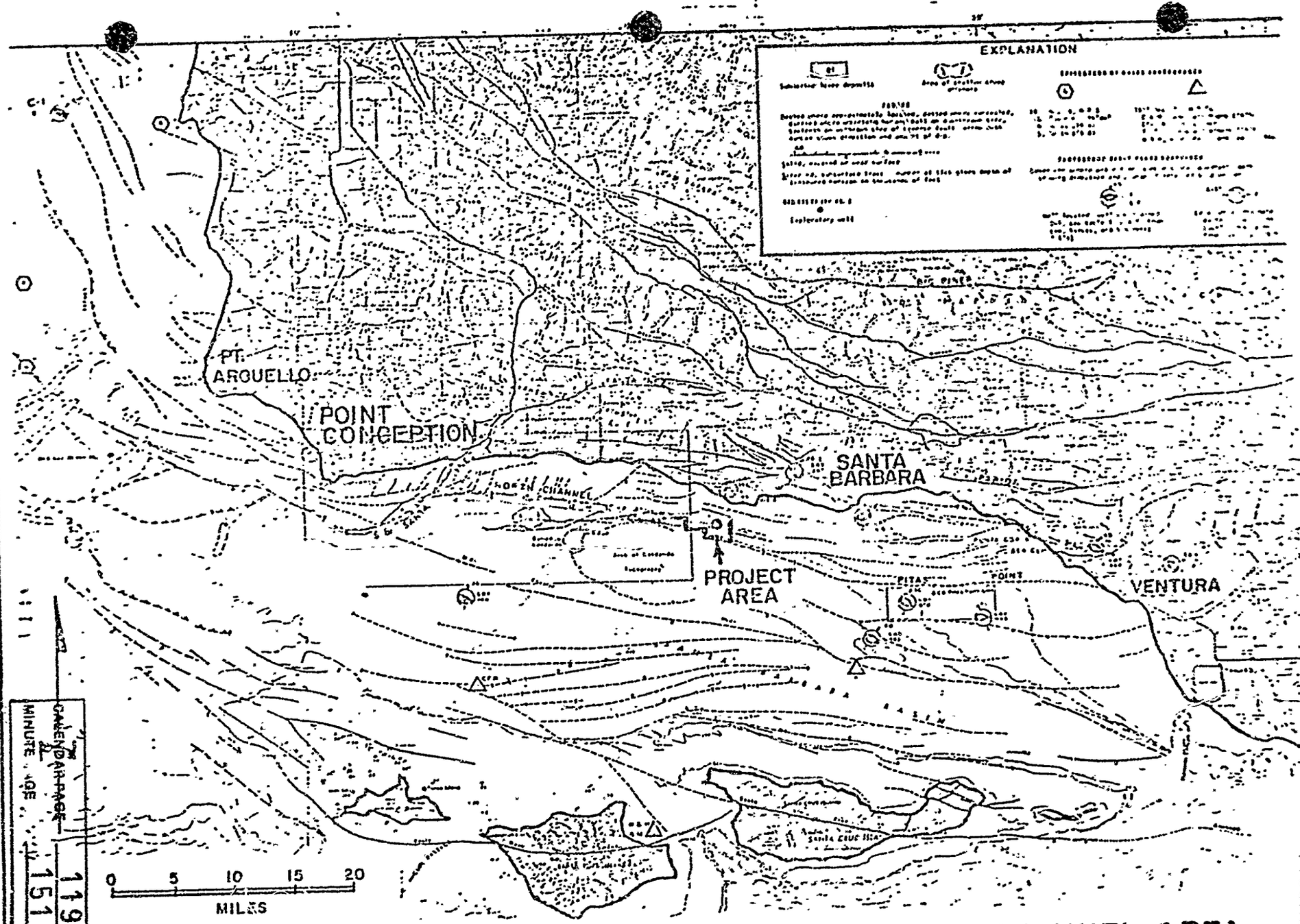
DIAGRAMMATIC STRUCTURE SECTION



GENERALIZED STRATIGRAPHIC COLUMN AND STRUCTURE SECTION, SANTA BARBARA CHANNEL REGION

(After Howell and others, 1978)

CALENDAR PAGE	118
MINUTE PAGE	150



SEISMOTECTONIC FEATURES OF THE SANTA BARBARA CHANNEL AREA

(AFTER JERKES, ET AL. 1981)

FIGURE 2

CALENDAR PAGE 119
MINUTE PAGE 151

Along the mainland coast the less competent and younger Tertiary rocks are cut by many faults that generally trend parallel to the range front and includes strata that have been folded into complex anticlines and synclines of varying size. The Santa Ynez Fault generally dips steeply to the south, and the south side apparently has been raised up to 10,000 feet relative to the northside. Offshore a series of east-west trending anticlines, separated by intervening faults and synclines, have formed in response to regional stress. The major offshore fault is the west-northwest trending North Channel Slope-Pitas Point system. The principal anticlinal fold in the region is the Rincon trend.

SITE GEOLOGIC STRUCTURE

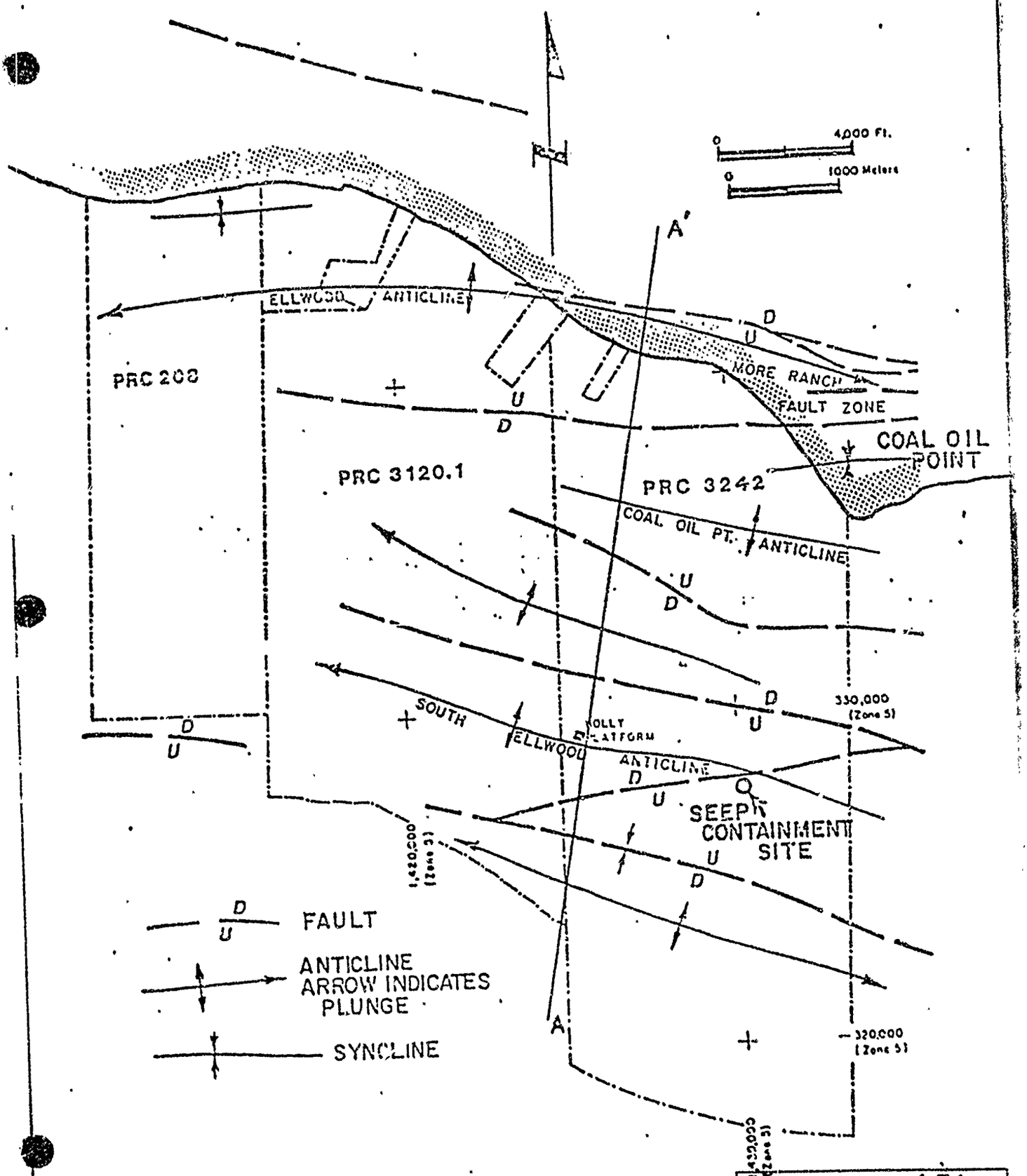
The structure of the offshore seep site area is characterized by two dominant folds along the western extension of the Rincon Trend. These folds are the east plunging Coal Oil Point anticline and farther offshore, the doubly plunging South Ellwood anticline, which is the primary oil-producing structure in this area (See Figure 6). Between these two folds, two east-west trending, steeply dipping, reverse faults and one faulted synclinal fold occurs. It is believed that moderate to intense fracturing of the offshore sedimentary rocks has occurred as a result of the folding and faulting, especially along the axes of the folds and planes of the faults. These faults and fractures are the pathways for the migration of hydrocarbons.

The most recent movement of the faults offshore cannot be accurately determined. However, they apparently cut late Pliocene age rocks. Onshore, the More Ranch fault is reported to be tectonically active with an estimated vertical movement rate of 4-13 millimetres per year (SLC, 1974 and 1981).

STRATIGRAPHY

The rocks of the Santa Barbara Channel region record the geologic history of more than 100 million years and indicate changing periods of relative quiescence and tectonic activity. It is the combination of certain rocks, time and tectonism which has led to the formation of the seeps. The Santa Barbara Channel region is the submerged extension of the Ventura Basin, which contains over 40,000 feet of Cretaceous and Tertiary sedimentary rocks. The surrounding Santa Ynez Mountains in the northern part of the region and offshore Channel Islands consist of complexly folded and faulted sedimentary and igneous rocks ranging in age from Early Cretaceous to Holocene (See Figure 4). These rocks unconformably overlie, or are faulted against the basement complex that is Cretaceous in age and older.

FIGURE 6



CALENDAR PAGE	121
MINUTE PAGE	153

GENERALIZED STRUCTURE MAP OF SEEP CONTAINMENT

(SOURCES: ARCO, 198 DINGLEE, 1966; SLC, 1974; SLC, 1981)

SITE STRATIGRAPHY

The geology of the local onshore and offshore area surrounding the seep containment site is shown on the structure map (Figure 6) and in geologic cross sections (Figure 7). The rocks and unconsolidated deposits exposed in the area are primarily of Cenozoic age. The bedrock in the northern shelf of the Santa Barbara Basin is predominately middle to late Miocene age. The Miocene rocks include siliceous and diatomaceous shales and siltstones of the Monterey and Sisquoc Formations. Shales and siltstones of the early Pliocene "Repetto" and late Pliocene-early Pleistocene "Pico" formations reportedly overlie the Miocene units near the seaward edge of the shelf.

Onshore, Tertiary rocks at the Coal Oil Point area consist of marine Miocene Sisquoc Formation and Monterey Shale overlain locally by Quaternary Santa Barbara Formation and unconsolidated Pleistocene terrace and Holocene deposits.

Offshore, a broad, relatively flat wavecut bench consisting of beveled Miocene bedrock is overlain by a thin veneer of nearly horizontally bedded Holocene and Pleistocene (?) unconsolidated marine sediments. The contact between the unconsolidated sediments and bedrock is an angular unconformity. The unconsolidated unit varies in thickness from zero to 400 feet in the region and is approximately six metres (20 feet) thick near the center of the site. Hydrocarbons have been measured in bottom sediments near the project site and ranged from 0.1 to 1.0 weight percent (SLC 1981). The underlying bedrock in the seep area is believed to be part of the Sisquoc Formation consisting of interbedded shales and silt-claystones.

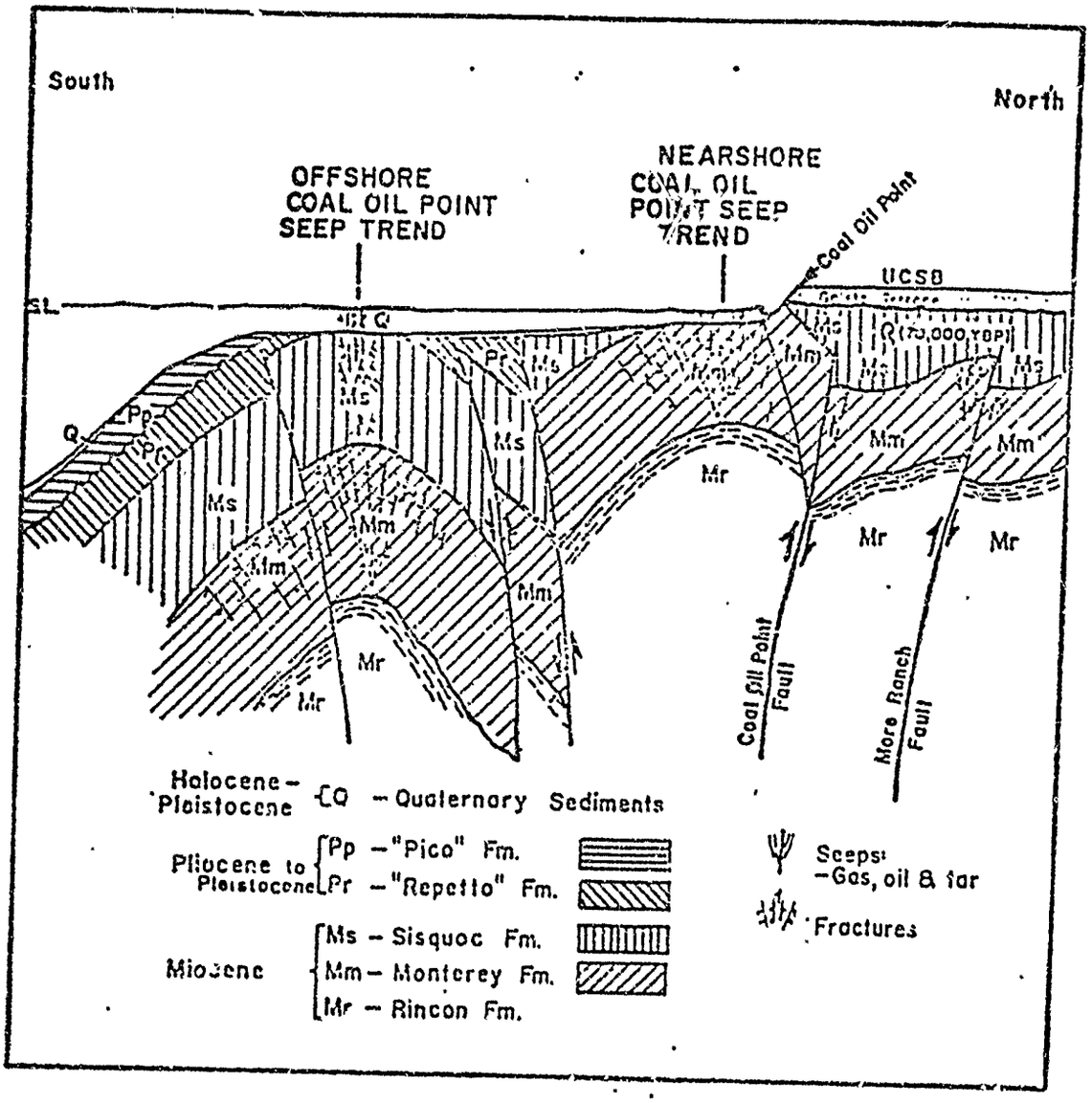
SEISMICITY

The Santa Barbara Channel region is part of the Circum-Pacific seismic belt that has been seismically active throughout much of Cenozoic time. Activity appears to have reached a maximum in Quaternary time and is continuing today. Earthquakes and structural deformation such as folding and faulting are obvious manifestations of this ongoing seismic activity.

Three large earthquakes of 6 magnitude or better on the Richter Scale have occurred in the Santa Barbara Channel region in historic time, one of these earthquakes reportedly caused a tsunami but this has not been verified. The most recent earthquake in the area occurred in 1978 about 2 km. south of Santa Barbara. Since there is difficulty in correlating specific earthquakes to specific faults, the 1978 earthquake has been postulated to be associated with a zone between the Mid-Channel fault system and the Rincon Point fault with the active Pitas Point fault speculated as being the causative fault.

CALENDAR PAGE 122
MINUTE PAGE 154

FIGURE 7



DIAGRAMMATIC CROSS SECTION THROUGH COAL OIL POINT AREA

(SOURCE: SLC, 1980; ARCO, 1981)

CALENDAR PAGE	123
MINUTE PAGE	155