REPORT TO THE LEGISLATURE

ON

PROPOSED OIL AND GAS LEASE SALE PROGRAM

PT. CONCEPTION - PT. ARGUELLO, SANTA BARBARA COUNTY

DECEMBER, 1981

CALIFORNIA STATE LANDS COMMISSION

KENNETH CORY, STATE CONTROLLER (CHAIRMAN)

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INTRODUCTION

PURPOSE OF THE PROJECT AND THIS REPORT

After a hiatus of over a decade, the State Lands Commission has developed a program which will enable the State to lease, by competitive bid, approximately 40,000 acres of State tidelands and submerged lands for oil and gas development. Subsequent to the 1969 blowout and oil spill on a Union platform on a Federal Outer Continental Shelf (OCS) lease in the Santa Barbara Channel, the Commission issued a moratorium on additional leasing of and drilling on State lands. Since 1973, the Commission has considered and authorized additional drilling on existing leases, but has not, until this time, considered the issuance of new leases.

The proposed lease area extends from Point Conception, Santa Barbara County, north to Point Arguello, Santa Barbara County. (See Figure 1) At present, the Commission's active leases extend from an area south of Point Conception, leased in April 1962, southward through Santa Barbara, Ventura, Los Angeles and Orange Counties. (See Appendix A)

During the legislative hearings of the Commission's 1981-82 Fiscal Year Budget, control language was proposed by the Office of the Legislative Analyst and accepted by the Legislature and the State Lands Commission.

> "The State Lands Commission (SLC) shall report to the Legislature by 11/1/81, on the advantages, disadvantages, costs and benefits of engaging in exploratory drilling or other pre-leasing strategies for offshore oil and gas development. Any needed changes in law should also be presented."

This report is submitted in conformance with such language.

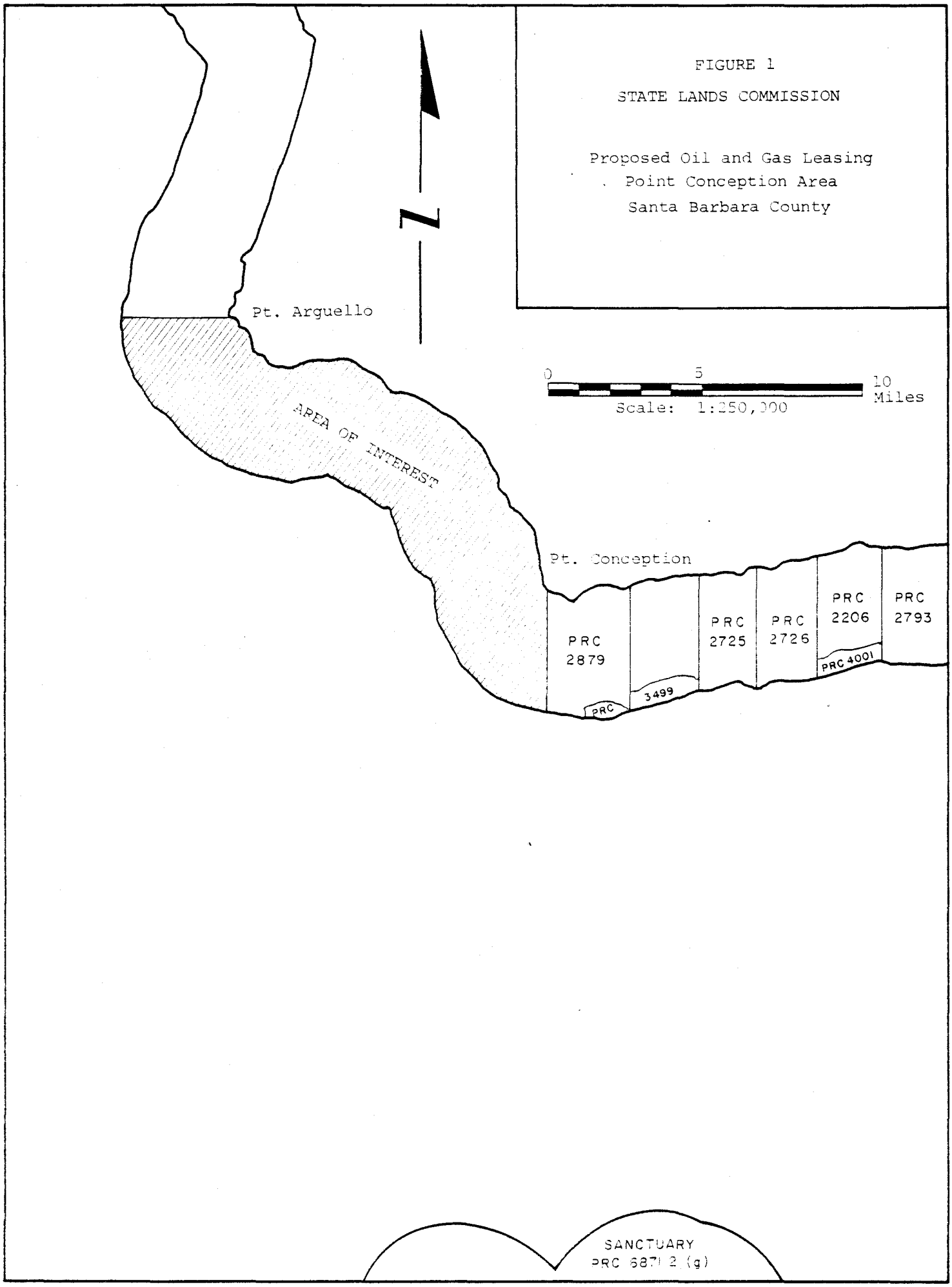


FIGURE 1
STATE LANDS COMMISSION
Proposed Oil and Gas Leasing
Point Conception Area
Santa Barbara County
N
Pt. Arguello
0
5
10
Miles
Scale: 1:250,000
AREA OF INTEREST
Pt. Conception
PRC 2879
PRC
3499
PRC 2725
PRC 2726
PRC 2206
PRC 4001
PRC 2793
SANCTUARY
PRC 6871.2 (g)

EXECUTIVE SUMMARY

After a hiatus of over a decade, the State Lands Commission has developed a program which will enable the State to lease, by competitive bid, approximately 40,000 acres of State tidelands and submerged lands for oil and gas development. Subsequent to the 1969 blowout and oil spill on a Union platform on a Federal Outer Continental Shelf (OCS) lease in the Santa Barbara Channel, the Commission issued a moratorium on additional leasing of and drilling on State lands. Since 1973, the Commission has considered and authorized additional drilling on existing leases, but has not, until this time, considered the issuance of new leases.

The proposed lease area extends from Point Conception, Santa Barbara County, north to Point Arguello, Santa Barbara County. (See Figure 1) At present, the Commission's active leases extend from an area south of Point Conception, leased in April 1962, southward through Santa Barbara, Ventura, Los Angeles and Orange Counties. (See Appendix A)

In paraphrase of the Conference Report issued by the U.S. Congress subsequent to the passage of the OCS Lands Act Amendments of 1978, the goals of the leasing program proposed by the Commission are to:

1) provide a fair return to the State for the use of its public resources;

2) increase and foster competition;

3) assure competent and safe operations;

4) avoid undue speculation;

5) avoid unnecessary delays in exploration, development and production;

6) discover and recover oil and gas resources in an efficient manner;

7) limit administrative burdens on government and industry; and

8) protect and enhance the natural environment.

We will discuss, subsequently in this report, how these goals

influence and are consequently influenced by the design and selection of oil and gas leasing systems.

The pre-lease program activities specified in Chapter 1 can be apportioned to two major management requirements: (1) geophysical testing and geologic evaluations of resources within the lease sale area; and (2) environmental analysis of the lease sale area and the activities anticipated to occur therein.

The proposed lease sale area was delineated based on: (1) expressed industry interest in the area; (2) data and information acquired or reviewed as a result of OCS Lease Sale 48; (3) proprietary data and information held by the State Lands Commission as a result of its involvement in adjacent and related projects; (4) data and resource projects developed by USGS in preparation for Lease Sale 53 (Point Conception to the California-Oregon border) of which the Santa Maria Basin, north of Point Conception, is regarded as having the highest potential for economically feasible oil and gas development; (5) new exploration and production activities on State leases within a geologic zone which is also evident in the lease sale area; and (6) onshore geologic information and technical extensions of that geology into the State tidelands and submerged lands.

Knowledge of defensible reserve figures, by industry and government, can have a major impact on the leasing process.

Such knowledge: (1) reduces uncertainty and risk (2) increases competition; (3) facilitates the receipt of fair market value (economic rent); (4) assists in the selection of an "appropriate" bidding system; and (5) assists in evaluations of the bids received.

U.S. General Accounting Office reports to Congress in 1977 (Lease Sale 35, Southern California), 1978 (Lease Sale CI (Cook Inlet), Alaska), 1979 (Lease Sale 40, Southeast Georgia), and 1980 (Lease Sale 48, Southern California), in conjunction with "program" evaluation reports of 1975, contain a number of conclusions and express concerns relevant to the justification for and design of the State pre-lease activities. For example, the reports of 197554 state that the Federal evaluation of OCS resources: (1) is hindered by inadequate data and analysis; and (2) does not reasonably asure that a fair market value return is received on lease offers of OCS oil and gas reserves.

Major themes developed in each of the lease sale reports concentrated on the acquisition and analysis of adequate geological and environmental data to: (1) assist in the selection of the most relevant tracts for lease (in conjunction with indications of industry interest rather than sole reliance on such recommendations); (2) increase competition as a means of securing fair market value for public resources; and (3) assist in the evaluation of industry bids subsequent to the sale.

We believe that the information contained in this report supports the Commission's position that pre-lease activity costs, prudently incurred by the State for studies (resource, environmental, etc.) which would, if not for the State's decision to do so, be conducted by prospective bidders, will benefit the public and industry (in excess of their cost) by: (1) reducing uncertainty and sharing risk; (2) increasing competition; (3) internalizing externalities (environmental and technical); and (4) assisting in the determination of the bidding system which promotes the optimum extraction of minerals and the optimum capture of economic rent (fair market value) by the public.

More precise determinations of "risk factors" which will assist: (1) industry in capital and bidding decisions; and (2) government in further pre-lease program decisions, are dependent on more precise resource and environmental information which will be available to Commission staff during the 1982/83, and 1983/84 Fiscal Years. Such information will also enable the Commission to recommend, if necessary, to the Legislature, amendments to the Public Resources Code to: (1) enable the Commission, within specific parameters, to lease State lands in tracts in excess of 5,760 acres; and (2) specifically authorize the Commission to contract for the drilling of exploratory wells on State lands.

CHAPTER 1

PROPOSED POINT CONCEPTION-POINT ARGUELLO LEASE SALE

In paraphrase of the Conference Report issued by the U.S. Congress subsequent to the passage of the OCS Lands Act Amendments of 1978, the goals of the leasing program proposed by the Commission are to:

1) provide a fair return to the State for the use of its public resources;

2) increase and foster competition;

3) assure competent and safe operations;

4) avoid undue speculation;

5) avoid unnecessary delays in exploration, development and production;

6) discover and recover oil and gas resources in an efficient manner;

7) limit administrative burdens on government and industry; and

8) protect and enhance the natural environment.

We will discuss, subsequently in this report, how these goals influence and are consequently influenced by the design and selection of oil and gas leasing systems.

The leasing program, as developed by the State Lands Commission, is separated into two major segments: pre-lease and post lease. In summary, the pre-lease activities include: (1) geologic and geophysical surveys; (2) cultural resource surveys; (3) acquisition and analyses of oil and gas resource data; (4) designation of sites for and conduct of exploratory drilling; (5) the preparation of a Program Enivornmental Impact Report (EIR) under the provisions of the California Environmental Quality Act (CEQA) for the Lease Sale and site specific EIRs for each exploratory well; and (6) the development of the lease system to authorize and govern the development of the State's oil and gas resources, e.g. number and size of tract offerings, bidding system(s), lease stipulations, etc. Following the sale and any consequential lease awards, the Commission's program would be of a more administrative nature, i.e. ensuring

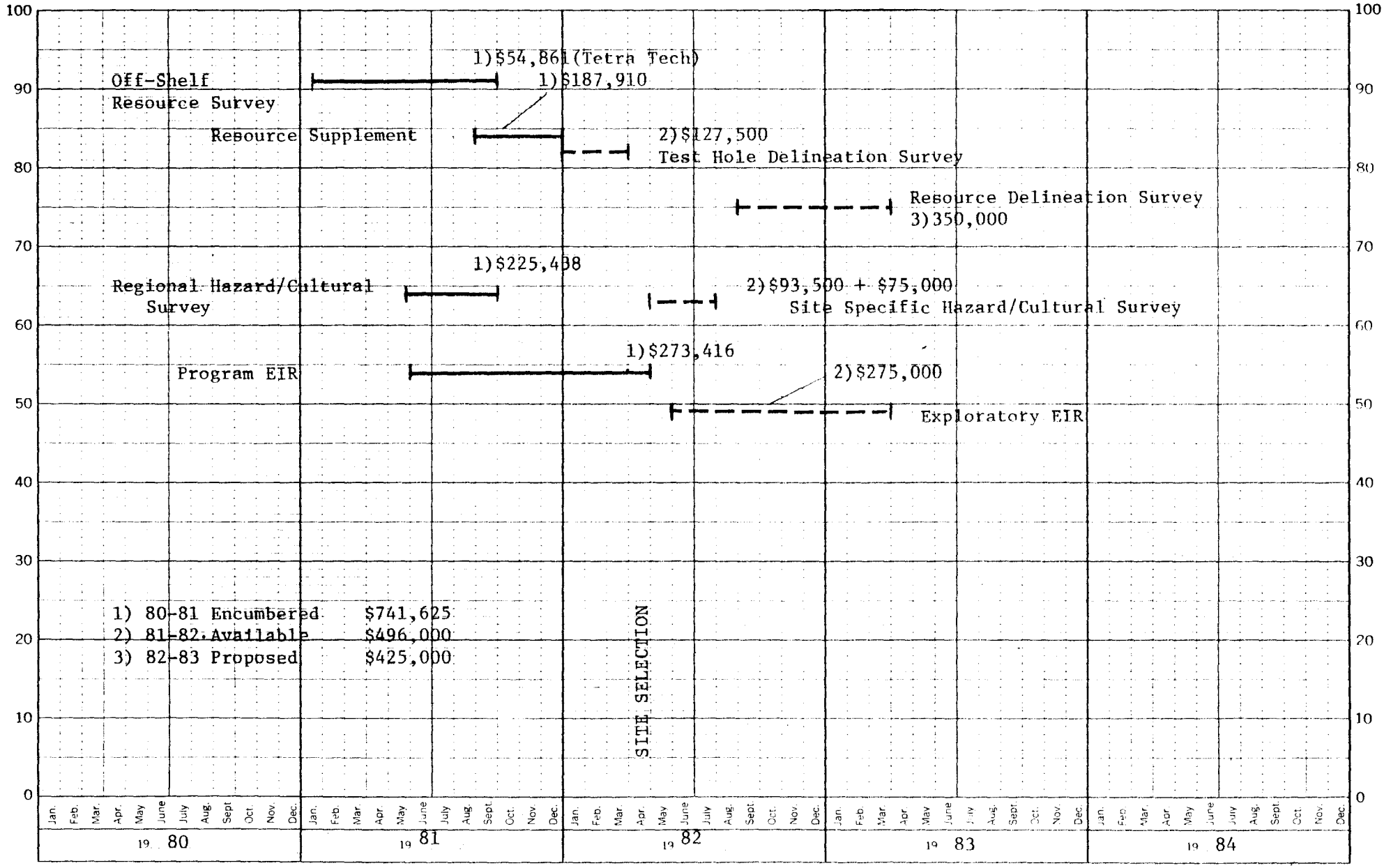
compliance with lease requirements and operating rules and regulations.

As proposed by the Commission, all pre-lease activities enumerated above would be financed by and implemented under the aegis of the State by and through the State Lands Commission. Monies allocated to such activities would be reimbursed to the State by the recipients of oil and gas leases awarded as a result of the competitive lease sale.

Pre-lease activities, as proposed, span a period of four (4) years, beginning in 1981. The completion of such activities according to the proposed schedule would allow the lease sale to occur in 1985. (See Figure 2) With this discussion in mind, let us now turn, in greater detail, to a further discussion of the pre-lease program - its nature and scope, purpose and justification, costs, etc.

FIGURE 2

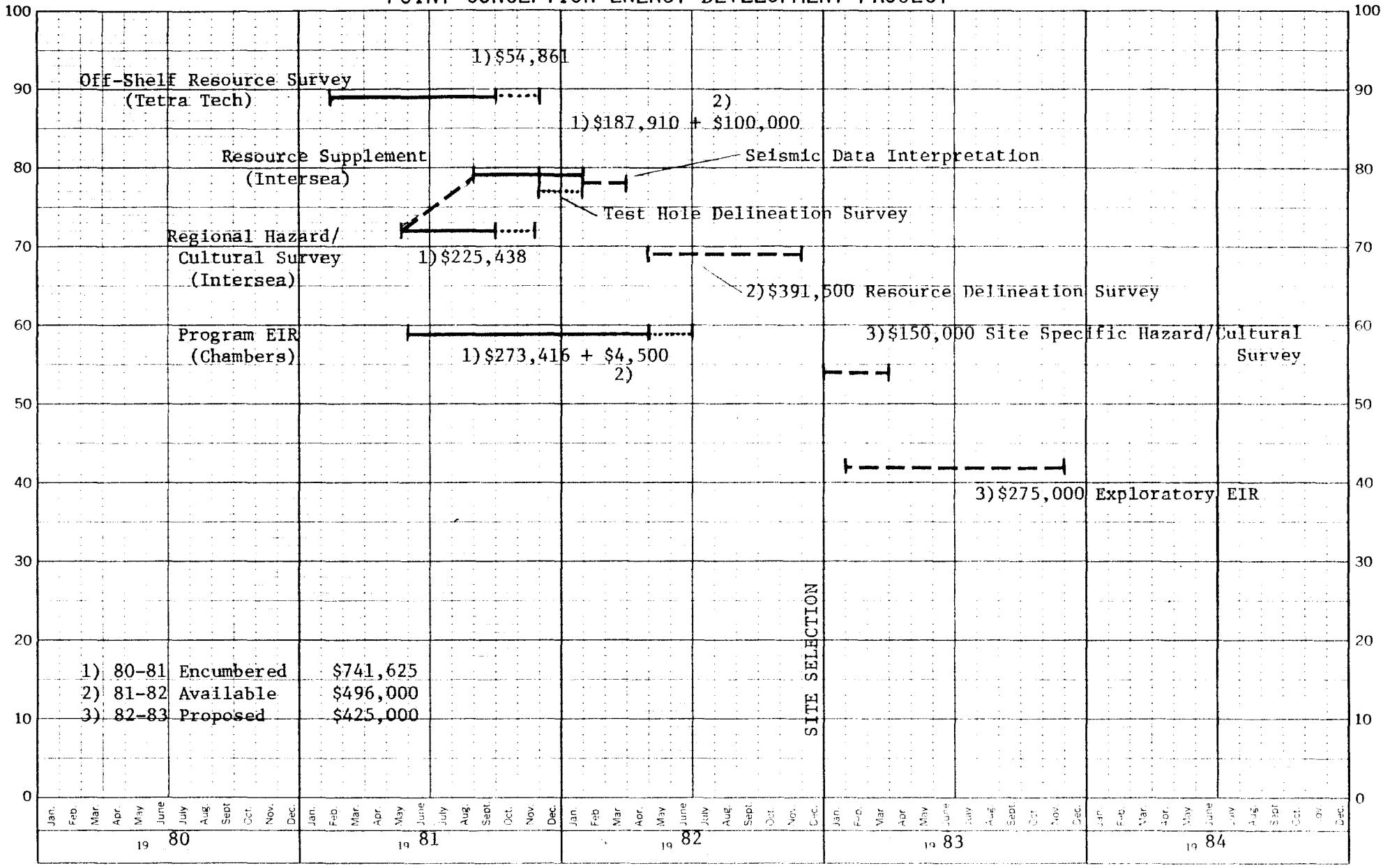
POINT CONCEPTION ENERGY DEVELOPMENT PROJECT



(AS BUDGETED)

FIGURE 2

POINT CONCEPTION ENERGY DEVELOPMENT PROJECT



(PROPOSED)

CHAPTER 2

PRE-LEASE PROGRAM ACTIVITIES

NATURE AND SCOPE

The pre-lease program activities specified in Chapter 1 can be apportioned to two major management requirements: (1) geophysical testing and geologic evaluations of resources within the lease sale area; and (2) environmental analysis of the lease sale area and the activities anticipated to occur therein. Each of these requirements are now discussed in greater detail.

GEOPHYSICAL TESTING AND GEOLOGIC EVALUATIONS

The search for oil and gas resources is a technical and sophisticated game of hide and seek which attempts, sequentially, to: (1) locate and define geologic structures and horizons which may have a potential to contain oil and gas; and (2) focus additional analyses on major structures which could be most productive. Surveys and analyses attempt to narrow resource probabilities from the general to the specific.

Except for a few shallow sample holes drilled near Point Conception during the 1950's and 1960's, there is little subsurface geologic information, specifically from the tentative lease sale area, from which one could determine the quantity or quality of oil and gas resources. During the initial considerations of the pre-lease program, it was necessary to compile subsurface well data from offshore areas adjoining the State's proposed lease area and surface geologic information from adjoining uplands and "project" extensions of such information into the lease area. However, any accurate representation of the area's geologic configurations was dependent on the conduct of additional geophysical surveys and/or the analysis of data already existent from relevant geophysical surveys.

> "The amount of geological and geophysical data necessary for tract evaluation varies from tract to tract depending upon technical parameters, such as: (1) structure placement on the tract; (2) the complexity of the structure; and (3) variation of the structure with depth."[1]

During the 1980-81 Fiscal Year, the Commission requested and was authorized General Fund monies to: (1) purchase and analyze resource data from geophysical survey lines previously run within the lease area; and (2) contract for the conduct and analysis of (a) additional geophysical surveys as a complement to the information available from (1) above; and (b)

a cultural resource survey to identify any sea floor anomalies which might signify the existence of cultural or historic resources. Funds in the amount of $741,695 were encumbered in the 1980-81 Fiscal Year for the above specified tasks ($468,209) and the required program environmental analysis ($273,416), see page 24. The subject geotechnical and geophysical studies are detailed as follows by contractor, contract amount and study purpose and product.

TETRA TECH - $54,861

This firm was selected, via competitive bid, to research seismic data held by private geophysical and oil companies and determine, in conjunction with Commission staff, that data which was most relevant to resource assessment goals of the Point Conception-Point Arguello leasing program. A total of two hundred forty-eight point sixty-four (248.64) line miles of data were summarily purchased and analyzed. Figure 3 indicates the location of the data runs. Of the total mileage, the data is divided into one hundred eighty-six point fifty-three (186.53) line miles of seismic recordings extending to a depth of 19,000± feet depth and sixty-two point eleven (62.11) line miles of recordings extending to a depth of 6,000± feet.

In addition to data acquisition, as described above, Tetra Tech is to provide Commission staff with a report, which including the raw data, identifies, via a series of geologic

maps, three known oil-bearing horizons. These horizons (top middle Miocene Monterey chert, top lower Miocene Vaqueros sandstone, top of upper Eocene Cozy Dell shale) were primarily identified by extrapolations of seismic interpretations from onshore well data. Another goal of the Tetra Tech report is the identification of data gaps or areas where the quality of the acquired data was such as to render interpretation technically unreliable. This analysis resulted in the recommendation that ninety-one point two (91.2) additional line miles of deep seismic (10 - 15,000+ feet) data should be acquired to: (1) supplement the data required by Tetra Tech by crossing existing lines resulting in a grid pattern; and (2) cross hatch a relatively complex geographic and geologic area to the southern portion of the proposed lease sale area. See Figure 4 on page 14B and discussion on page 17.

> "Seismic surveys measure the speed of shock waves through various rock formations, providing information about the depth of various rock layers and the location and existence of structures which may contain hydrocarbons. Based on these data, 'horizon maps' of each tract are made which detail the geology of the tract and any structures on it."

> "...These maps, when completed, provide information about the presence of a structure - a highly favorable factor associated with oil and gas resources. Structures act as a trapping mechanism and could contain oil and gas as in a reservoir...."

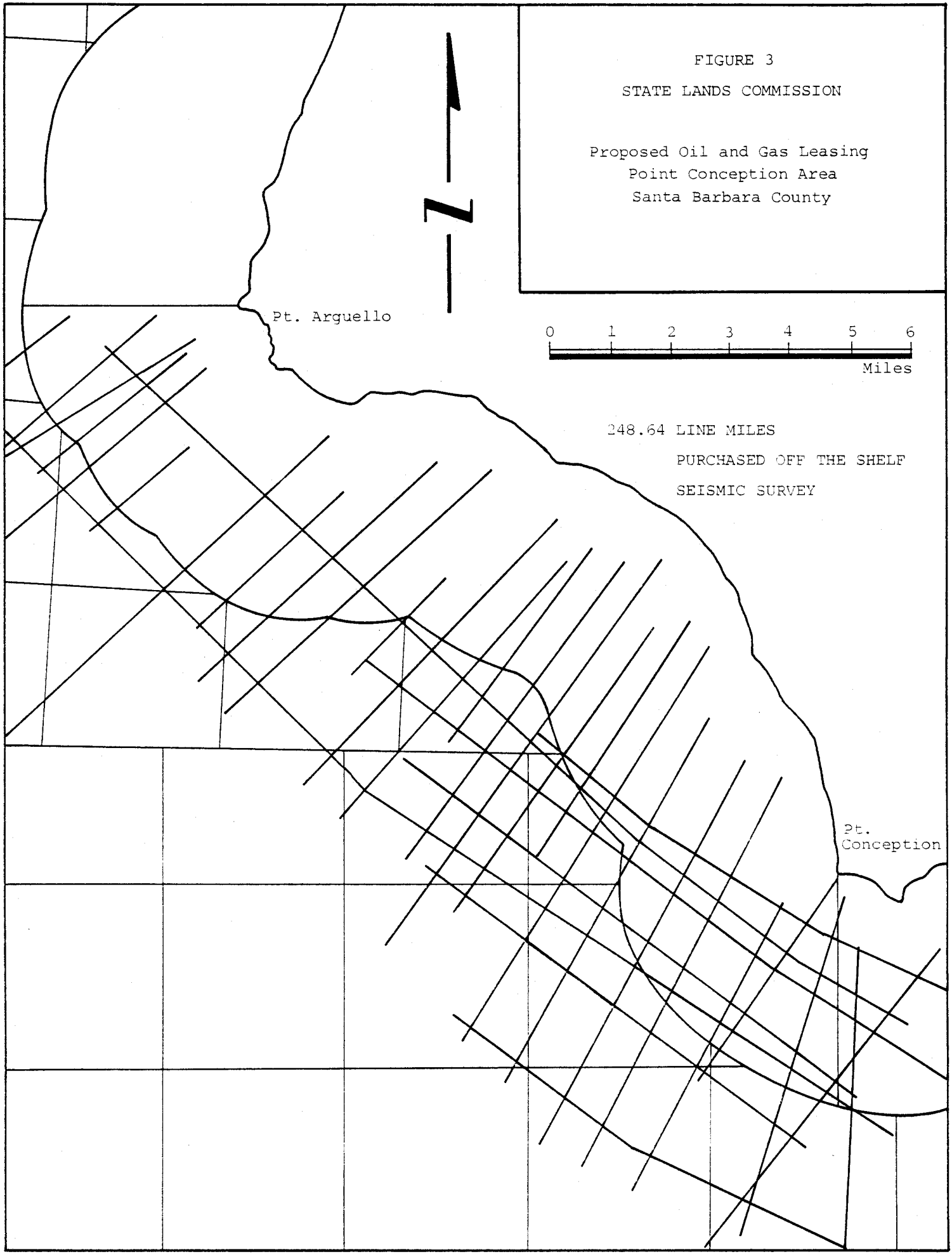


FIGURE 3
STATE LANDS COMMISSION
Proposed Oil and Gas Leasing
Point Conception Area
Santa Barbara County
N
Pt. Arguello
0 1 2 3 4 5 6
Miles
248.64 LINE MILES
PURCHASED OFF THE SHELF
SEISMIC SURVEY
Pt.
Conception

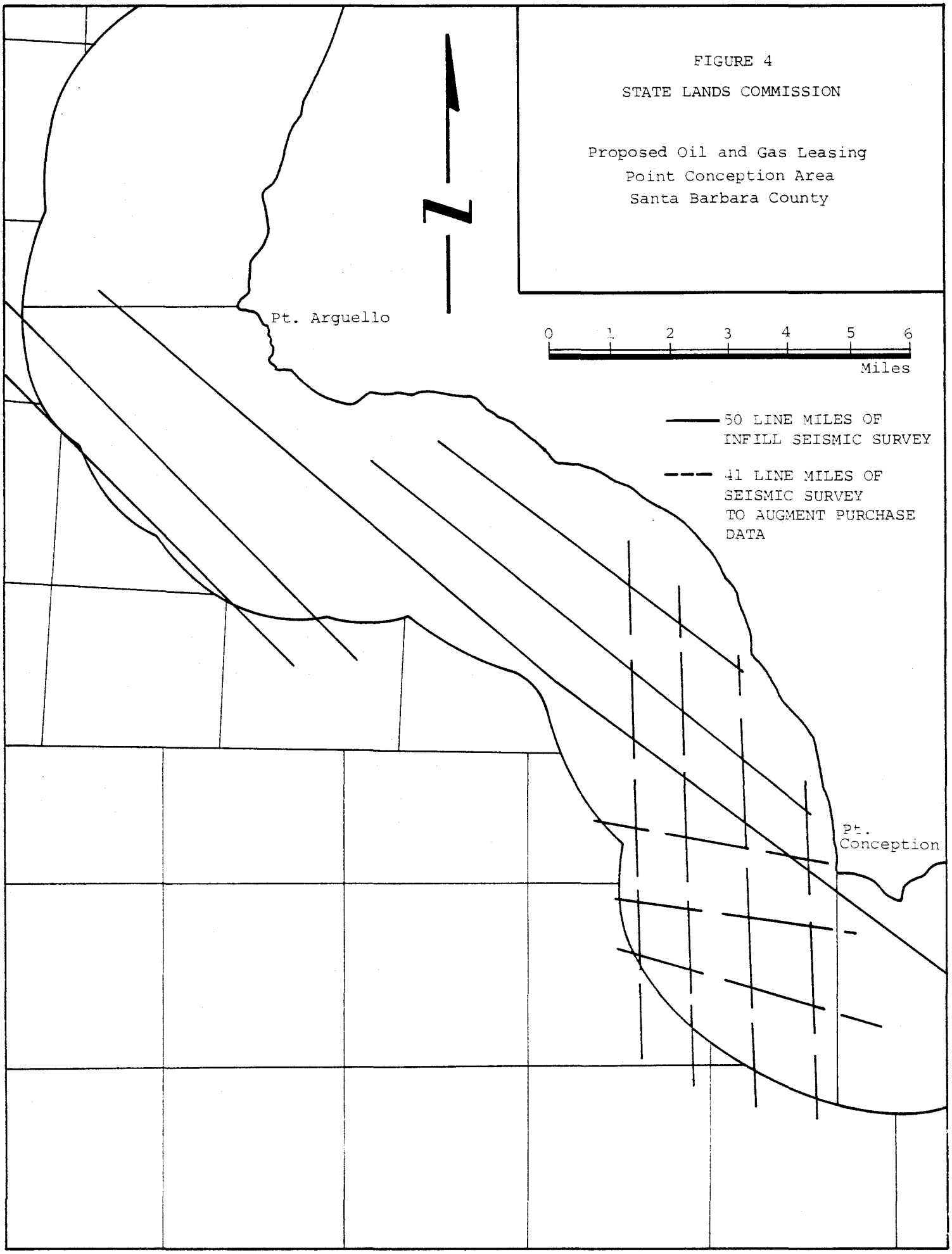


FIGURE 4
STATE LANDS COMMISSION
Proposed Oil and Gas Leasing
Point Conception Area
Santa Barbara County
Pt. Arguello
0 1 2 3 4 5 6
Miles
50 LINE MILES OF INFILL SEISMIC SURVEY
41 LINE MILES OF SEISMIC SURVEY TO AUGMENT PURCHASE DATA
Pt. Conception

> "Survey told us that seismic data provides reliable information about the presence or lack of structure...."[2]

INTERSEA - $225,438

The resource assessment goals of the above contract are complemented by the products of the geologic hazards and cultural resource surveys completed by the Intersea Research Corporation on December 1, 1981. This firm was selected by the same process as previously described. Its contract called for the gathering and interpretation of two hundred (200) line miles of seismic, sonic and bathymetric data. These data lines were run in a one-mile grid pattern over the proposed lease sale area and subsurface penetration extended to approximately 1,650 feet.

Information provided for the designated area by this survey includes: (1) a horizontal profile of the sea floor; (2) water depths; (3) data and interpretations relative to the potential existence of geologic hazards (shallow, pressurized pockets of natural gas, mud slide areas, slump areas, etc.) which could affect subsequent exploratory and/or development and production drilling; and (4) initial indications of the existence of sea floor anomalies which could signify the existence of cultural or historic resources, such as ship wrecks, etc. Much of this information is represented on a series of "regional" maps produced by the contractor utilizing the raw data procured from the "grid" survey.

Although all of this information is necessary to the lease of the State's lands, of contemporary necessity and application is the geologic hazard and cultural resource material. This material has been utilized in the preparation of the Program EIR (see discussion beginning on page 24 for description of the lease sale EIR process). The companion information (bottom profiling, water depths, etc.), which are more efficiently and economically obtained as parts of a larger study, will assume ever increasing importance in: (1) the design and conduct of exploratory drilling programs; (2) specifications relative to the lease of tracts within the sale area; and (3) the design and conduct of further development and production programs.

The Commission's Budget for the 1981-82 Fiscal Year allocates $496,000 for the Point Conception-Point Arguello Lease Sale Program. As originally proposed, these funds were to finance: (1) additional seismic test runs over the potential oil and gas structures identified through the work provided under the Tetra Tech contract. These runs were designed on a tighter grid pattern, i.e. lines closer together, and deeper (10 -15,000 feet), than previous information and over selected sub-areas within the designated sale area; and (2) EIRS for each of these designated sub-areas to discuss the conduct of exploratory drilling activities within them (see discussion on page 25). The contracts, their amounts and products are as follows.

INTERSEA/WESTERN GEOPHYSICAL - $287,662

The 1980-81 contract with Intersea provided for the acquisition, in November-December 1981, of approximately fifty (50) line miles of deep seismic runs to provide data on a sub-area of the lease sale area which was not covered by the material purchased and analyzed pursuant to the Tetra Tech contract. The original contract with Intersea was in the amount of $187,662 and called for data acquisition by Intersea and processing and interpretation by Western Geophysical.

As a consequence of the analysis of seismic data by Tetra Tech, it was recommended to the staff of the Commission that an additional forty-one point two (41.2) miles of deep seismic data should be acquired for the lease sale area just north and west of Point Conception. The data acquired for this sub-area by Tetra Tech has, upon formal analysis, indicated that the geology of this area is more complex than originally believed and that interpretation of the existing data would be inconclusive insofar as the sub-area's resource potential. The original contract was therefore augmented by $100,000 from the 1981-82 Fiscal Year Budget to enable Intersea to gather, concurrent with the fifty (50) line miles described above, the additional forty-one point two (41.2) line miles recommended by Tetra Tech.

Successful completion of this contract will provide

the Commission with: (1) seismic "coverage" of the proposed lease sale which is more complete and more up to date (technologically) than was possible under the Tetra Tech contract and the initial Intersea/Western Geophysical contracts; and (2) an integrated interpretation of three hundred thirty-nine point eighty-four (339.84) line miles of "deep" seismic data (see Figure 5). This integration by Western Geophysical will provide Commission staff with a "second opinion" of the interpretations originally performed by Tetra Tech and additional bases for separate interpretations of all data by the staff of the Commission. Specific products of this contract are comparable to those of the Tetra Tech contract, i.e. three structure contour maps on or near the top middle Miocene Monterey chert, the top lower Miocene Vaqueros sandstone and the top of upper Eocene Cozy Dell shale, data sections indicating faults and unconformities and a report which discusses the significance of important geologic features and explains any weak points of the interpretation of the "data". As indicated by Figure 5, there are numerous intersections of line data used by Tetra Tech and that gathered by Intersea, at which data interpretations by Tetra Tech and Western Geophysical must be integrated. The report and related material prepared pursuant to this contract is scheduled for delivery to the Commission no later than January 30, 1982.

Under the lease program, budget requests presented to

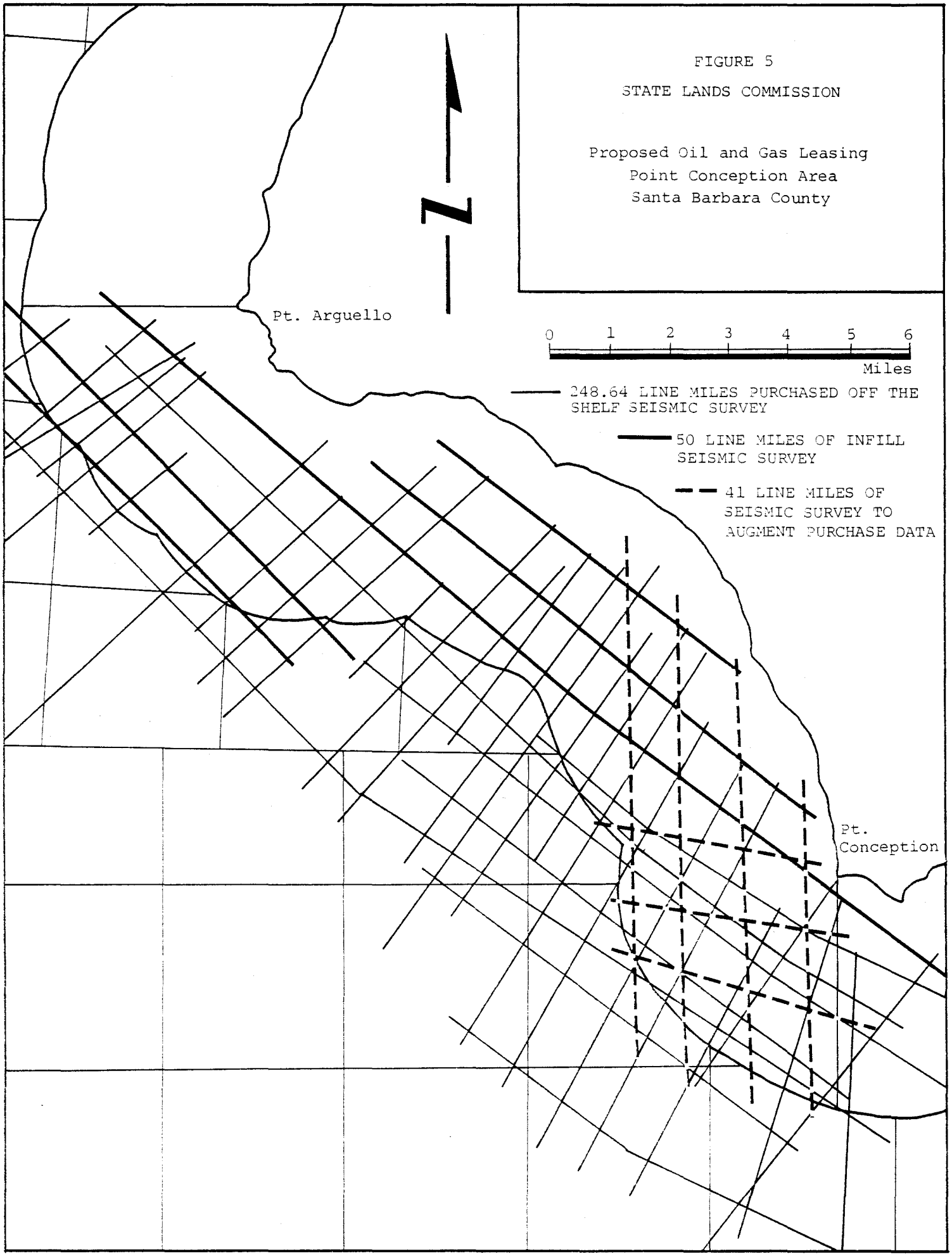


FIGURE 5
STATE LANDS COMMISSION
Proposed Oil and Gas Leasing
Point Conception Area
Santa Barbara County
N
Pt. Arguello
0 1 2 3 4 5 6
Miles
248.64 LINE MILES PURCHASED OFF THE SHELF SEISMIC SURVEY
50 LINE MILES OF INFILL SEISMIC SURVEY
41 LINE MILES OF SEISMIC SURVEY TO AUGMENT PURCHASE DATA
Pt. Conception

the Legislature for Fiscal Years 1980-81 and 1981-82, specific sites were to be designated within the lease sale area for additional, detailed geohazard, resource survey and environmental analysis preparatory to the designation of exploratory drilling sites. Funds in the amount of $425,000 are presently requested for the 1982-83 Fiscal Year to finance a more detailed (closer grid) resource delineation seismic survey at each of the proposed drill sites prior to the drilling of such wells. It was anticipated that funds for the drilling of such wells, under the sponsorship of the State, would be requested for the 1983-84 Fiscal Year.

As of December 18, 1981, the Commission submitted a request, purusant to Section 28 of the State Budget, to amend the sequence of activities within the Point Conception-Point Arguello Leasing Program. Specifically, the staff of the Commission propose to advance the detailed resource delineation surveys to the current year (1981-82) and delay the site specific geohazard, cultural surveys and exploratory drilling environmental analyses to the 1982-83 Fiscal Year Budget request.

Several factors have been considered in the development of this recommendation. First, as indicated by the previous narrative, the State's contractor, Tetra Tech, has indicated a sub-area of the proposed lease sale for which the

geologic information is deficient vis-a-vis adequate resource interpretation. The seismic runs and resultant report for this area (roughly west of Point Conception) and the north, south deep seismic runs over the entire area will be delivered to the staff not later than January 30, 1982. The areas which have been established, based on information thus far received, for further "close grid" seismic testing measure approximately 1.5 by 2.5 miles (3.75 square miles) and are indicated in Figure 6 on page 20A. Although this and information already delivered to the Commission will enable technical staff to narrow the "seismic search" to four major geologic structures in the program area, it is <u>not</u> sufficient to designate probable locations for the proposed exploratory wells. This being the case, staff of the Commission believe that it is more prudent to acquire additional data now rather than during the coming fiscal year (1982-83).

The seismic runs for each of the designated areas would be in a grid configuration whose spacing would be one half mile or less. This concentrates, by a factor of two at a minimum, the detail of geologic dta previously acquired in the general area surveys. Such a concentration will result in data which will be used to ascertain, within each geologic structure covered, vertical closure, horizontal limitations, possible barriers to fluid migration and density. Each of these factors are necessary components for the calculation, by standard

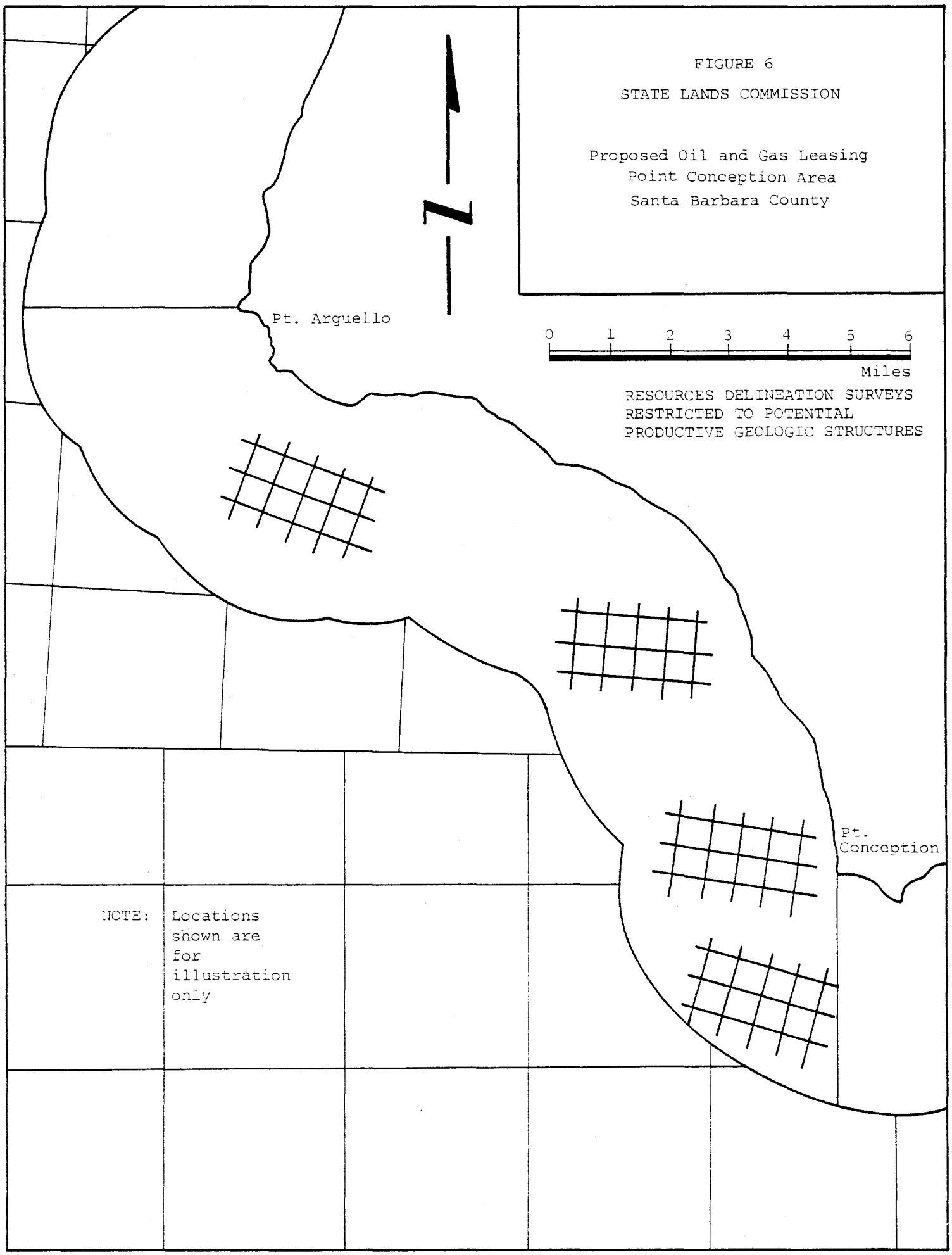


FIGURE 6
STATE LANDS COMMISSION
Proposed Oil and Gas Leasing
Point Conception Area
Santa Barbara County
Pt. Arguello
0 1 2 3 4 5 6
Miles
RESOURCES DELINEATION SURVEYS
RESTRICTED TO POTENTIAL
PRODUCTIVE GEOLOGIC STRUCTURES
Pt.
Conception
NOTE: Locations shown are for illustration only

engineering formulae, of probable reserves. The acquired data will also facilitate the determination of test well locations and parameters (depth, casing requirements, etc.). A minimum of sixty (60) additional line miles are proposed in the resource delineation phase of geophysical testing.

Second, the costs associated with geophysical testing activities, the "time availability" of the limited number of firms capable of providing such services, and the complexity of the information necessary for program decisions have contributed to the referenced program sequence change. Any break in the data acquisition activities of geophysical contactors will result in increased costs per line mile (which may reduce the number of miles acquired for monies budgeted), unnecessary repetions of start-up and shut down expenses related to the vessels used and potential scheduling delays resulting from consultant commitments to other potential customers and their resultant unavailability to the State. These factors are also relevant considerations with regard to firms capable of processing and interpreting the raw data acquired. To incur such additional costs and place the State's leasing schedule in further jeopardy by delaying the resource delineation surveys until the next fiscal year is an inefficiency which can be avoided with the recommended program amendments. In addition, the change would afford the Commission staff additional time to interpret the incoming complex geologic data and information

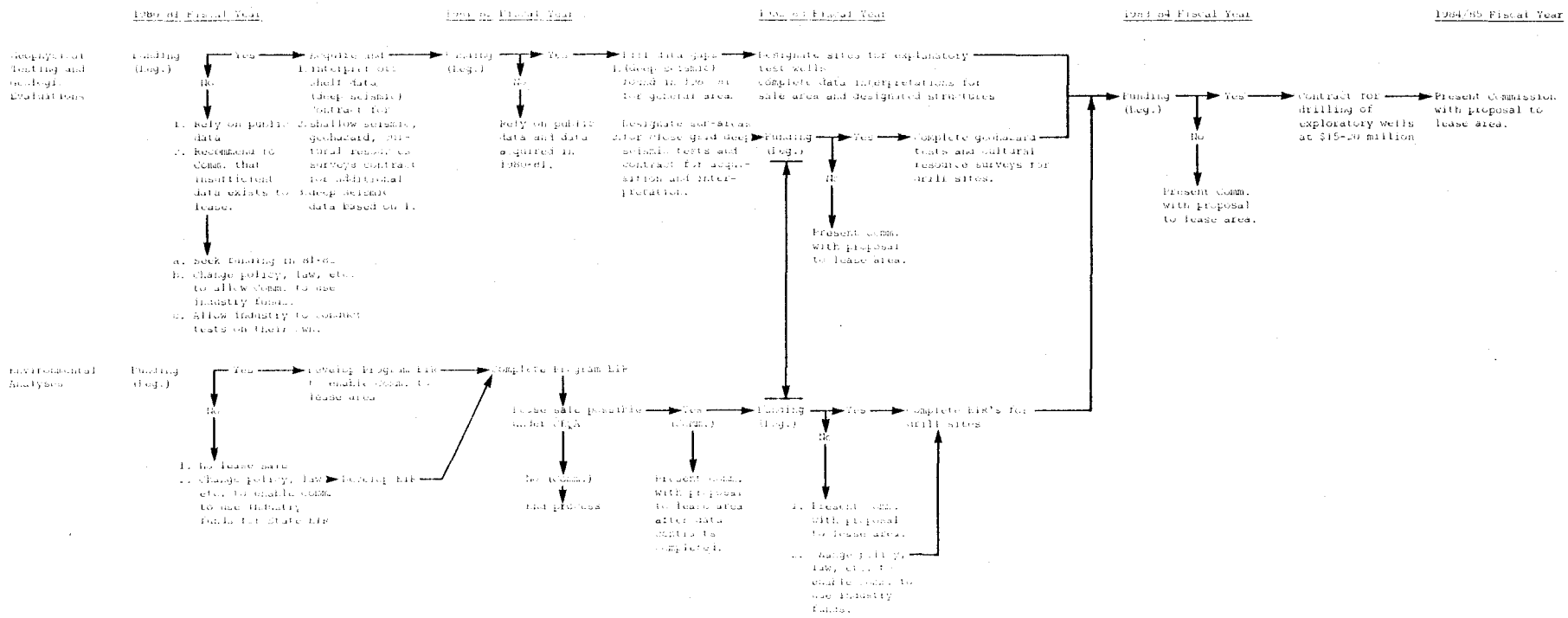
before the anticipated designation of exploratory drill sites. The potential also exists for the acquisition of more line miles of data if such work is performed in the current fiscal year due to cost avoidance of delay and the availability of approximately $70,000 over the program level proposed for the 1982-83 Fiscal Year. Paradoxically, such additional data would exacerbate the length of time necessary for its interpretation.

Third, the recommended change would guarantee the Commission's ability to acquire resource information since the funds proposed for expenditure are within its existing budget. Although it is apparent that the State would, upon lease of the subject area, be fully reimbursed for all funds thus far appropriated and proposed for expenditure, staff recognizes the increasing competition for monies from the General Fund. The recommended sequence amendment will preserve future options for program considerations by the Commission and the Legislature. Figure 7 on page 22A is a graphic depiction of the decisions associated with the Point Conception-Point Arguello Lease Program as proposed in the Section 28 submission.

The approval of the revised leasing program sequence does not substantially amend the timing or sequence of the last two phases of the leasing program - exploratory drilling in designated sub-areas and ultimate competitive lease of State lands. The fact remains that, in spite of the magnitude of

FIGURE 7

Ft. Chadron-Ft. Argyle Lease Program
Decision Alternatives
(Commission staff unless otherwise stated)



geotechnical data and information available to the State and potential bidders, the material obtained from an on-structure well or wells could provide the first physical evidence of the presence of oil and gas in the lease sale area.

> "Although structures that may contain oil and gas can be identified from seismic data, the specific potential for oil and gas is not known until after wells have been drilled."[3]

A relevant example is found in Federal Lease Sale 48 (1979) which included OCS tracts within the general area of the State lease sale. Prior to the sale, various companies combined resources to drill a test well in an effort to generate additional subsurface information. Deep Stratigraphic Test Well OCS-CAL 78-164 Number 1 was drilled in December 1978 about 10 miles southwest of Point Arguello. Although this well was intentionally drilled off-structure, significant shows of oil and gas at intervals in the well were announced by the Secretary of the Interior. As stated by the U.S. Geological Survey (USGS).

> "It is important to keep in mind that a stratigraphic test provides regional stratigraphic information that is useful in projecting and correlating subsurface information over a wide area, not just information about the tract on which it is drilled."[4]

ENVIRONMENTAL ANALYSES

The Commission's decision to lease the proposed area must also be guided by its knowledge of the environment of the area and the nature and extent of the possible or probable adverse impacts to that environment which may evolve as a result of the lease. With funds budgeted during the 1980-81 Fiscal Year, the Commission is preparing an Environmental Impact Report (EIR) under the provisions of the California Environment Quality Act (CEQA).

As there is no specific "project", e.g. a structure to be built in a specific location, this program EIR will address the environmental impacts which could be expected in the event of a lease sale. This practice is also followed by the Federal government for each of their lease offerings. The document under preparation will, for example, analyze a number of developmental scenarios (numbers of platforms, subsea completions, pipelines, etc.) which could occur based on the levels of estimated resources and their locations in the lease area. The environmental effects of each of the scenarios will be presented and mitigation measures suggested to counteract known adverse impacts which could follow from the lease sale.

While the geophysical and geologic evaluations have been discussed in a separate section, they and the program EIR are interrelated and complementary. For example, the geologic information provided by the geophysical surveys will be used in

the evaluation of the seismicity of the lease area and in the discussion relative to geologic hazards. Correspondingly, the information gathered in the cultural resources survey will be used as the foundation for the historical and cultural analysis of the area. Information relative to the location, size and depths of geologic structures will form the bases of facility location and production scenarios upon which air quality impact analyses depend, and so on. Thus, greater accuracy of environmental analyses is assured since fewer extrapolations of related, but not specific, data are necessary.

The program EIR is presently scheduled to be completed in May 1982. The document will serve as the base for additional "site specific" EIRs which must be done for each of the proposed test wells. Subsequent EIRs will be "tiered" on the program EIR and will be, in effect, as site specific "satellites" of the extensive lease area EIR. Under the amended program sequence, funds for the test well EIRs are included within the budget request for the 1982-83 Fiscal Year.

CHAPTER 3

PURPOSE AND JUSTIFICATION

The pre-lease activities underway and proposed by the Commission have one common thread - information. The major purposes of these activities are to gather, process and analyze existing and acquired data relative to the physical characteristics of the proposed lease sale area. As with the adjacent Federal OCS lands, the proposed lease area must be regarded as a "frontier" area about which relatively little is known in comparison to the lands south of Point Conception.

As has been alluded to previously, relevancy of data will become an issue in the preparation and public evaluation of the program EIR. As such, timely information produced about the lease area specifically, rather than related, extrapolated data, will be of better use to the Commission in its decision-making process and will be more legally and technically defensible.

With respect to resource data, it is not so much a

question of whether or not such data must be acquired as one of quantity and quality of data which must be acquired. A corollary question concerns itself with who should gather such information. The dicussion which follows will have several major topics: (1) uses and advantages to industry and government of information; (2) the liabilities associated with such information; (3) costs; (4) the Federal experience - evaluations and recommendations; and (5) who should conduct which pre-lease activities pertaining to a pre-lease resource data acquisition - industry and/or government?

USES AND ADVANTAGES OF INFORMATION

DETERMINATION OF LEASE AREA AND TRACTS WITHIN

The proposed lease sale area was delineated based on: (1) expressed industry interest in the area; (2) data and information acquired or reviewed as a result of OCS Lease Sale 48; (3) proprietary data and information held by the State Lands Commission as a result of its involvement in adjacent and related projects; (4) data and resource projects developed by USGS in preparation for Lease Sale 53 (Point Conception to the California-Oregon border) of which the Santa Maria Basin, north of Point Conception, is regarded as having the highest potential for economically feasible oil and gas development; (5) new exploration and production activities on State leases within a geologic zone which is also evident in the lease sale area; and

(6) onshore geologic information and technical extensions of that geology into the State tidelands and submerged lands.

Although the probable external boundaries of the lease sale area have been set, the number of tracts into which the area is to be divided has not been determined. Pursuant to the provisions of Section 6871.4 of the State Public Resources Code, the Commission may not offer any lease tract in excess of 5,760 acres. Under this limitation, the proposed lease area could be divided into a minimum of seven (7) equally sized lease tracts. Whether such a simplistic division would result in the most efficient development of the publics' resources, and thereby result in the best monetary return, is a decision which must be made with the benefit of the best possible resource information.

Specifically, leasing and subsequent development would be more efficient if the tract designations preserve the integrity of identified geologic structures, i.e. that structures are not "split" between two separate tracts. For instance:

> "Competition among leases of adjoining tracts can be inefficient when the tracts cover a single geological structure. In such a situation there can be an incentive for each one of several operators tapping the same reservoir to extract reserves hurriedly and inefficiently in an attempt to avoid depletion of the reservoir by his competitors. Similarly, competition can

> destroy incentives to adopt efficient methods of secondary and tertiary recovery, which generally require cooperative efforts among all the lessees to sustain or increase recovery pressures in the reservoir."[5]

This matter was further addressed in The Use of Federal Lands for Energy Development by the U.S. Department of Energy:

> "...If surface ownership of the area overlying a reservoir is divided among two or more operators, the legal doctrine known as the 'rule of capture' gives the well owner rights to whatever resource is 'captured' by his well, regardless of its origin within the reservoir. Since fluids tend to migrate toward areas of lowest pressure, each operator will attempt to reduce the pressure near his well by producing at a higher rate, thus increasing his own recovery at the expense of his neighbor. The problem arising out of such behavior is twofold. First, the extraction pattern for the field will be faster than that which maximizes present value (the current value that an individual places on a claim to a cost, payment or benefit accruing at some future date), even if total reservoir recovery is unaffected. However, the second problem is that such behavior is likely to result in reservoir damage, reducing the total amount of resource recoverable."[6] (Clarification added from same source at page 19.)

Although this circumstance could be addressed by the concept of "unitization", i.e. a cooperative agreement between leases which would provide for common procedures for joint field development, such an inefficient, artificial division of

resources by lease boundaries should be avoided if possible.

Without sufficient resource data, the Commission would neither be able to designate efficient tract boundaries nor determine the need for legislative amendment of Section 6871.4 of the State Public Resources Code to allow for lease sizes in excess of 5,760 acres.

DETERMINATION OF RESERVES

In a recent newspaper article, Donald Ziegler, Chief Geologist for Chevron's western region, stated, "An oil field needs four things...the presence of hydrocarbons - residue of compressed and decayed vegetable matter - the conditions within permeable rock to allow them to flow, a reservoir to catch them and a geological 'cap' structure to hold them."[7]

Oil in place is commonly referred to in terms of "reserves". Such reserves are further classified as producing and nonproducing. "The former encompass all zones open to production while the latter include all other zones that will probably produce. Producing reserves are more positive because there are inherently more production and test data available to confirm the data. Nonproducing reserves may be further classified as 'possible' or 'probable', depending on the amount of data available."[8]

To underscore the importance of reserve information:

> "Value must also depend on the amount of reserves available for collateral. This phase of the valuation, together with rate of production, embodies the largest amount of true engineering effort. Inasmuch as there is no positive way truly to measure them, the findings must stem from the rigorous application of established and proven engineering methods. This involves not only choice of method or methods among several available ones, but also checking the results to see that they are consistent with other data. For these reasons the accuracy of reserve figures is in direct proportion to the amount of data available."[9] (emphasis added)

> "The accuracy of reservoir size estimations obviously depends on the amount of hard data available. In the early stages when only geophysical-geological data are available, unconfirmed by sampling, the risk in any estimate is large. But the decision at this point involves only the expenditure necessary to confirm early implementations."[10]

The regional geophysical data purchased and interpreted in the 1980-81 and 1981-82 Fiscal Years were designed to locate potential peteroleum-productive geologic structures. The next objective in the sequence is delineation of the structures for shape and size because areal information is necessary for volumetric resource calculations.

Knowledge of defensible reserve figures, by industry and government, can have a major impact on the leasing process.

Such knowledge: (1) reduces uncertainty and risk; (2) increases competition; (3) facilitates the receipt of fair market value (economic rent); (4) assists in the selection of an "appropriate" bidding system; and (5) assists in evaluations of the bids received.

1. Uncertainty and Risk

A major component in any decision to allocate available capital is the consideration of uncertainty. Among the uncertainties associated with oil and gas developments in an offshore environment are the nature, location and extent of the resource, geologic hazards, environmental constraints, etc. Uncertainty(ies) ultimately translate into risk(s) which industry must recognize and evaluate in capital distribution and allocation decisions. It then follows that any reduction of risk could have corresponding impacts on such allocations of capital for the development of, in this instance, oil and gas resources from the State's tidelands and submerged lands. Any reduction in risk to industry is brought about by a "transfer or sharing" of that risk to or by another party; in this proposed lease sale program, this other party is the State Lands Commission, i.e. the State.

The relationship of information to risk should not be underestimated. Consider the following discussion:

> "The crux of the matter is the role of risk. One can see this by contemplating the extreme case in which there is no risk at all. Suppose that reserves are precisely known - amount, quality, location, depth, strata, pressures, etc. - and that recovery costs and sale prices are also precisely known. In such a situation, the government could easily dispense with royalties, since there would be no advantage to having the government share the risk by sharing the revenues. This would avert the possibilities of inefficiencies due to nondevelopment or early shutdown. The consequent increase in the value of a lease, and in the cash-bonus bids, would not deter even the small firms from bidding, because capital funds would be available at the riskless interest rate. Similarly, the tract could be large enough to cover the entire reservoir, and still any one bidder would be able and willing to bid for the entire share of the lease. Pre-sale information acquisition would, of course, disappear in the presence of already complete information. Finally, when the lease is riskless, the government could be assured of capturing the full economic rent in the cash bonus with as few as two bidders. The consideration of this extreme case of perfect information, in which the lease is riskless, indicates that the origin of the inefficiencies in the present leasing system lies chiefly in the role of risk due to incomplete information."[11]

While this passage alludes to a number of issues which will be discussed subsequently, i.e. the effects of information on competition, bidding behavior, etc., its major consequence is the establishing of the inverse relationship between the availability of information and the perception of risk level by industry. For example, in the report by the U.S. General Accounting Office evaluating Lease Sale 35 (Southern California), it was stated, "Industry officials also told us

that the bids for this sale were low because the lack of information made this a high-risk investment. Industry capital flows to investments of the greatest return and the least risk."[12]

The source of capital is also relevant. According to Campbell, et al., "As a practical matter about 40% of mineral exploitation capital investments are externally financed. The reserve is the collateral supporting said financing."[13] Thus, resource information is paramount to industry in its acquisition of capital as the lending of such capital is directly influenced by the perceived risks.

2. Competition

In light of the foregoing, this discussion illustrates the impacts of resource and related lease sale information, or the lack thereof, on competition:

> "The high risk nature of OCS investments under the current leasing system appears to reduce competition in two ways. First, the great uncertainty about the actual amounts of oil and gas that will be found may make it difficult if not impossible for small firms to obtain the large amounts of capital needed to bid on and explore OCS tracts. In contrast, identification and evaluation of hydrocarbon deposits prior to leasing should make financing much easier to obtain even for small firms, since the relatively well-defined value of the resource in the ground would provide substantial security for the investment. This would increase the

> number of firms participating in the bidding and would thus increase the competitive pressure on each bidder to offer as a bid all of the expected present value of a tract beyond a normal return to capital.
>
> "The second way in which the high risk of the current leasing system tends to reduce competition is the pressure it places on even the largest oil companies to participate in joint bidding ventures in order to spread their total investment over a large number of tracts and thereby reduce the aggregate risk. Since one of the traditional requirements for competitive bidding is that there be no prebid communication among bidders, the communication that is necessary to arrive at joint bids may have some negative effect on the level of competition. Reduction of risk through exploration prior to leasing would reduce or eliminate the need for joint bidding as a means of spreading risk, which should in turn reduce prebid communication.."[14]

The inability of small firms to compete equally in the capital market because of risk associated with uncertainty has also been referenced by other authors, such as Wilson, previously cited. Thus, the greater availability of resource and related information should reduce risk and uncertainty in the lease sale and thereby, under the arguments stated above, increase competition by: (1) providing the opportunity for greater numbers of firms to participate in the proposed bidding process; and (2) lessening the need for larger firms to join together in the bidding process. In descriptions of economic principles, increased competition is regarded as a required component to assure the receipt of "fair market value".

The relationship of the number of bidders (one measure of competition) to government revenue has, in fact, been empirically determined:

> "Analytical studies indicate that the government's expected percentage of loss in revenue from small numbers of bidders is roughly proportional to 1/n, where n is the number of bidders (Wilson, 1977; Milgrom, 1977)."[15]

The discussion thus far has maintained and illustrated how the availability of information functions in encouraging competition. An argument can also be supported that such information protects the leasing agency in the event, for reasons other than scarcity of information, competition has not occurred to the desired level. The following statements by the U.G.G.A.O. for three separate lease sales are illustrative of this point:

> "...In situations where there is little competition among bidders, it is important for Survay to have the best possible geological and geophysical information to protect the public interest...."[16]
>
> "As stated in our prior reports, a competitive leasing program is based on the premise that competition will provide a fair market return. When competitive conditions do not exist, however, it becomes increasingly important to have reliable tract values to use as the basis for accepting or rejecting bids. When large percentages of the total tracts in sale receive one or two bids per tract and are minimally valued based on poor information,

> there can be no assurance that the public received a fair market value return for the potential resources leased."[17]
>
> "Since market conditions were not perfectly competitive the only way to assure the public receives the fair market value for the sale of national resources is to improve the reliability of the valuations by obtaining and using better information."[18]

We will discuss the role of information in the evaluation of bids subsequently in this report. The major point made by the above discussion is that the State will require resource, etc., information in self defense if the primary goal of fostering competition by acquiring and publishing such information is not achieved to the desired level.

3. Receipt of Fair Market Value

According to Campbell et al., "The most commonly accepted definition of fair market value is the price that a knowledgeable and willing buyer is willing to pay, and the price that a knowledgeable seller is willing to accept."[19] A number of inferences might be drawn from this definition: (1) that the value of the resource (in this circumstance oil and gas) is not constant in relationship to time and may not be constant, within one time period, with similar firms seeking the resource; (2) that the value of a resource to one firm may vary from value as seen by another firm due to their respective reactions to externalities, i.e. market imperfections which prevent the

"perfect" (examples in the oil and gas industry include technical and environmental factors); and (3) that "knowledge", i.e. information, is of prime importance to each party and that the bona fide determination of fair market value relates proportionately to the amount and validity of such information. Illustrative of this point are two rules for bidding as stated in the Journal of Petroleum Technology: "(1) The less information one has compared with what his opponents have, the lower he ought to bid; and (2) The more uncertain one is about his value estimate, the lower he should bid...."[20]

The relationship between information and risk as perceived by industry and lenders of capital has been documented earlier in this paper. We must now turn to the relationship between perceived risk and the receipt of a fair return on the publics' resources.

> "If bidders were indifferent to risk and their value estimates were unbiased, improved information would have no effect on total receipts. Gains in receipts on good tracts due to better information would be exactly balanced by losses in receipts on bad tracts. However, bidders are likely to be averse to risk[21] and therefore the gains from better information are likely to exceed the losses."[22]

Previous studies have, in fact, indicated that bidders on OCS tracts have discounted their bids twice. The first

discounting occurs when "potential bidders incorporate into their bid evaluation analysis all the uncertainty factors they feel are associated with geological characteristics of the lease; the costs of exploration, development and production; and the general economic and regulatory environment. Then bidders may discount the resulting residual economic value a second time.... This 'second discounting' reflects the risk averse nature of bidders, i.e. their inherent unwillingness to accept risk beyond certain levels and their general uncertainty with the evaluation process itself. It can result in reduced bid levels and a proportionate loss of government revenue...."[23]

The impacts of aversion to risk were also discussed in a 1975 study by the U.S. Congress, Office of Technology Assessment (OTA):

> "...Under conditions of certainty, high competition would tend to force a bidder to offer the entire present value of the economic rent calculated for a tract as a bid, leaving the firm with nothing in excess of the normal return to capital. Similarly, under conditions of uncertainty, a firm that is completely neutral about risk would tend to bid the entire expected present value of the economic rent. However, if the firm is averse to risk, it would be willing to bid only some smaller amount, since uncertainty reduces the value to the firm of the expected income stream."[24]

As discussed by Porter:

"On revenue grounds, the risk averse bidder will reduce his bid to an amount less than what he regards as the expected value will reflect a 'risk premium', or a share of the expected rents which the bidder will demand in return for bearing the risks of development."[25]

Consider the following example:

"...a lease sold for a $50 milion cash bonus can be construed from the viewpoint of the firm as a management contract for a fee of perhaps $10 milion, plus the purchase of a lottery for a premium of $60 million. The cash bonus of $50 million is the difference between the premium of $60 million and the management fee of $10 million. The premium itself might further be divided into the difference between a $300 million price for the expected value of the lease if it were assured that reserves would be found, and an additional fee of $240 million for bearing the risk that the tract is devoid of oil and gas. Looked at in this way, the lease is a sale of the expected net profits for $300 million in the case that there is oil and gas offset by a management fee of $10 million and a risk-bearing fee of $240 million, yielding a net cash bonus of $50 million."[26]

The OTA study concludes that: "The effect of reduction of uncertainty by exploration prior to leasing would simply be to reduce this divergence between the value of a tract to a risk-averse bidder and its value to the public."[27]

An economic term key to this discussion appears for the first time in the cite from the OTA study -"economic rent". This term, of extreme relevance to this discussion, is defined in the literature as follows:

1) "Economic rent refers to the difference between price received and cost incurred by the producer of a good. For an extractable resource, it is simply the difference between price and extraction cost. As such, it represents a surplus value, in that it is an income to the producer beyond that required to bring the last amount of the resource into production."[28]

2) "...the value of the lease--the economic rent--is the difference between the value of production from a lease and the associated resource extraction costs."[29] "...economic rent is net of all long-run costs, which by definition include (adequate) provisions for return on capital investment that is consistent with risks of offshore activity vis-a-vis alternative investment alternatives. Economic rent represents the amount that government should capture as the social value of the resource."[30]

3) "This term is simply the difference between the total revenue available from the use of resources less all necessary costs of production, including a normal rate of return on an investment."[31]

A slightly modified concept of the term is contained in the OTA study and is cited from a report by J. W. Devanney, III, The OCS Petroleum Pie (Report Number MIT SG 7510, February 28, 1975). Economic rent is regarded as national (OCS) income which:

> "...will be split between the public and the investors in the development. The former will see lease payments, royalties and income taxes which would not occur if the resource were not developed. The latter will see profits in excess of what he would have achieved without the development. Notice that here we are using the word profits in a very restricted sense to imply profits above and beyond the normal return to capital which the investor could earn elsewhere, for this normal return to capital has been included in the unit resource cost by the present valuing process...."[32]

This definition extends that in number three above by equating economic rent with the term "excess profits", i.e. that profit beyond a rate of return on investment which in and of itself could vary between components of the industry.

From these definitions and supporting literature, we believe, with regard to the development of public land resources, that the concepts of receipt of "fair market value" and the capture of "economic rent" are indeed synonymous. Therefore, in order to receive fair market value for the resources in the lease sale area, the leasing program of the Commission should capture the maximum economic rent. (See Figure 8)

As has been indicated in the previous material, information (resource and area) availability affects the receipt of fair market value (economic rent) via its role in the

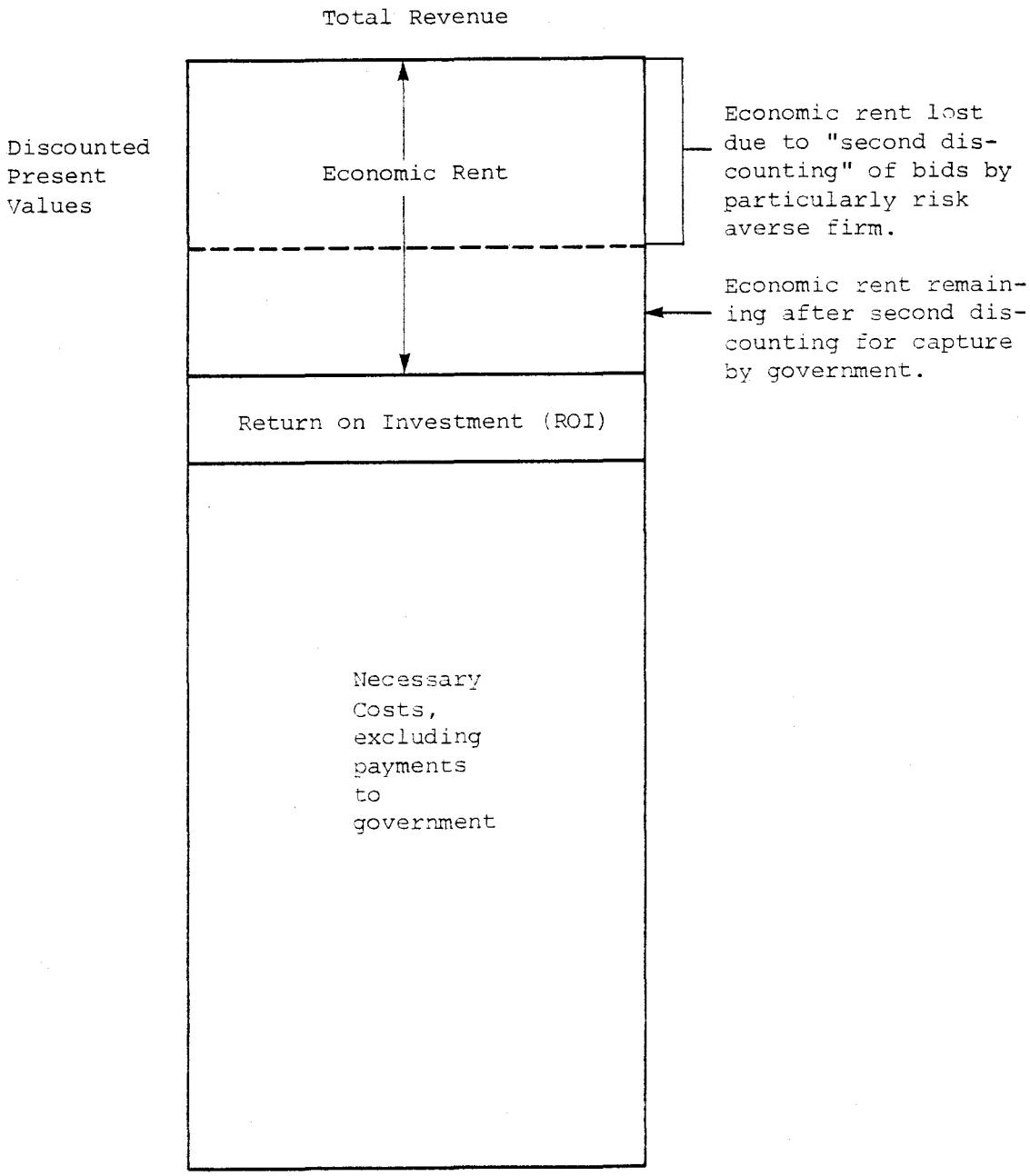


Figure 8 Model of Economic Rent Estimation

determinations of risk which affects competition, etc. In a discussion by Kalter, Stevens and Bloom, a more direct effect of information on economic rent is established:

> "...the economic rent is directly related to the expected level of resources. This factor is in turn a function of the schedule and location of lease sales...."[34]

Our discussion will now turn to an evaluation of leasing systems, i.e. the role information plays in the lease system selections, the advantages/disadvantages of each with regard to the capture of economic rent, production of the resource, goals of the lease program (see page 47), etc.

4. Determination of "Proper" Bidding System

Simply put, the proposed lease sale is a means to transfer a public resource, within yet to be defined limits, to private control. Porter states it concisely:

> "The government will wish to encourage exploration and production decisions which maximize the expected present value of the publicly owned resource, but it will attempt to secure for itself a maximum share of the rents which accrue from such a development program."[35]

While government may receive a portion of such economic rent at the time of the sale, such rents are not actually earned until actual production of the lease. Thus, at

the time of sale, "...any value attributed to a lease is the discounted sum of these expected future rents."[36] Rents which are "captured" at the time of sale are in the form of cash bonuses while those received late, at the time of actual resource production, may be in the form of royalties (a percentage of the gross value of production) or profit share (payment expressed as a net value of production) systems. These latter payments are commonly referred to as contingency payments as they are "contingent" on the advent and amount of production.

As stated by Edwards:

> "When the mechanism of contingency payments is employed to the government, these transfer payments appear to the potential bidder as an additional cost that reduces the economic rent he can retain in each production period. The remaining value of the lease at bid evaluation time becomes the former total expected economic rent less the discounted sum of these transfer payments. Consequently, the higher the contingency payments (i.e. higher royalty or profits share rates and payments), the lower the cash bonus that a potential bidder is willing to offer to acquire the lease."[37]

Other "fees", such as taxes and "nominal" land rental payments, in addition to bonuses and contingency payments, divert economic rent from lessee/producer to the government. Again, from Edwards:

> "...Assuming competitive market conditions, a potential bidder should be willing to increase his cash bonus bid to an amount where the sum of all transfer payments exhausts, ex ante, the economic rents associated with lease development rights. To go beyond this limit means bidding away normal profits and returns on capital."[38]

Common among all bidding systems, bonus and alternative, is their bifurcation into a bid factor which is variable and one which is fixed. Prior to the Federal OCS Lands Act Amendments of 1978, cash bonus or royalty bidding were the only authorized systems for OCS leasing. Upon adoption of the required regulations, systems listed in Table 1 (page 43) could be used on the OCS.

Table 2 contains a brief summary analysis of the "bid variables" which form the heart of the systems, in Table 1, and lists their advantages, disadvantages and related consequences.

As might be deduced from Table 2:

> "Several leasing systems provide greater benefits than fixed cash bonus or royalty leasing strategies.... In all cases the main cost is shifting risk accepted by drillers to the owners of the mineral--the public in this example. The public trade-off is between a cash bonus that is known with certainty, which is smaller in value than revenues from alternative leasing systems, but is uncertain. In return for uncertain cash flows the public also gains extra production. The choice--more revenues and more production at a cost of greater uncertainty. In other words, some of the risk is shifted to the public."[39]

TABLE 1

ALTERNATIVE BIDDING SYSTEMS

	BID VARIABLE	FIXED ITEM(S)
1.	Cash bonus	Fixed royalty of at least 12%
2.	Cash bonus	Sliding scale royalty of at least 12 1/2% at beginning of lease period
3.	Cash bonus	Fixed share of net profit of at least 30%
4.	Cash bonus	Both (a) fixed royalty of at least 12 1/2%, and (b) fixed share of net profit of at least 30%
5.	Royalty	Either (a) specified work commitment based on dollar amount for exploration, or (b) fixed cash bonus, or (c) both
6.	Net profit share	Fixed cash bonus
7.	Work commitment based on dollar amount for exploration	Both (a) fixed cash bonus, and (b) sliding scale royalty of at least 12 1/2%
8.	Work commitment based on dollar amount exploration	Both (a) fixed cash bonus, and (b) fixed royalty
9.	Any other combination of alternatives listed in points 1-8 above	
10.	Any other system of bid variables, terms, and conditions as determined by the secretary of interior, except that no such bidding system shall have amore than one bid variable. Subject to veto by either the Senate or House of Representatives.	

The pre-lease program proposed by the Commission is intended to reduce the burden of this risk on the public while providing for increased, long-term revenues, efficient use of

TABLE 2

	ADVANTAGES	CONSEQUENCES	DISADVANTAGES	CONSEQUENCES
1) Cash Bonus	Most of resource risk on industry.	1) Less risk for government.	Most of resource risk on industry.	1) Bids discounted proportionately to risk averse nature of firm-unsure of receipt fair market value. 2) Risk may make capital hard to get or unavailable to "small" firms and eliminate or restrict their participation process.
	Low contingency payment. Yields approximately 30% of total income immediately and remainder over productive life of resource.	1) Less risk for government.	Low contingency payment.	1) Prevents capture of larger than expected economic rents from larger than anticipated resource.
			Large "up front" cost.	1) Requires joint bidding by even major firms - competition questions. 2) May result in resource production in excess of "MER" to capture return on investments

TABLE 2

CONTINGENCY PAYMENTS	ADVANTAGES	CONSEQUENCES	DISADVANTAGES	CONSEQUENCES
A) Royalty	Less resource risk on industry.	1) Some risk transferred to government (reserve and price risk).	Greater risk carried by government.	1) Expenditure of public funds in pre-lease activities.
	Reduced bonuses.	1) Less risk capital required by small firms which may increase participation in sale.	Less "up front" money to government in form of bonuses.	1) Less income to government at sale. Yields approximately 3% of total revenues immediately and over 96% over productive life of resource.
		2) Less absolute economic loss to government since contingency payments are not discounted.		
		3) Greater tendency to over bid/or speculate for later sale or lease.	Resources must be be larger to provide returns to developer/ producer. May result in early termination of development production or smaller yearly production over longer period.	"Marginal" fields undeveloped.. Lost resource (increase of royalty from 1/16-1/2 = recovery loss of 10%) or less annual rental but over longer time frame.

TABLE 2

	ADVANTAGES	CONSEQUENCES	DISADVANTAGES	CONSEQUENCES
B) Net Profit Share	Less resources risk on industry	1) Some risk transferred to government (all risks in deference to limited risks under royalty system)	Greater risk carried by government.	Expenditure of public funds in pre-lease activities.
	Reduced bonuses.	1) Less risk capital required by small firms which may increase participation in sale.	Less "up front" money to government in form of bonuses.	Less income to government at sale. Yields approximately 3% of total revenue immediately and over 96% over productive life of resource.
		2) Amount of discounted monies smaller		
		3) Greater tendency to over bid/ or speculate for later sale or lease.	Administration of program has inherent difficulties in defining and measuring profits.	
	Greater potential capture of economic rent.	More revenues to government (related to additional amount of economic rent captured.		More administrative burdens and costs for government and industry which may result in discounted bids.

the resource and environmental protection.

One of the more recent analyses of alternate leasing systems for offshore oil and gas resources has been done by the State of Alaska, Department of Natural Resources, Division of Minerals and Energy Management. The report, dated October 9, 1979, is entitled "An Economic Evaluation of Alternative Leasing Systems" and contains the results of computer simulations (oil industry cash flow model) on four specific leasing systems: (1) cash bonus (bid factor) plus minimum royalty; (2) cash bonus and royalty (bid factor); (3) cash bonus (bid factor) and sliding scale royalty; and (4) cash bonus and net profits share (bid factor). Of the four systems, numbers (1), (2) and (4) are directly compared for their abilities to: (1) transfer economic rent to the State (timing of potential revenues); (2) encourage economically efficient resource use; (3) distribute income from the leasing process between the lessee and lessor; and (4) "share" risk (lessee vs. lessor).

The major assumptions with which the model was concerned were: (1) field size (500 MM bbl, 750 MM bbl, 1.5 billion bbl, 4.5 billion bbl); (2) oil prices (1979 dollars, $14 at wellhead plus 2%/year and constant); (3) production costs (average operating $1.90 bbl, capital $2.53 bbl of recoverable reserves); and (4) risk assumptions (50% and 10% probabilities

of success). Under each set of parameters, the model ranked the leasing systems, as follows, in increasing order of compliance with the factors specified above: (1) traditional (cash bonus plus minimum royalty); (2) royalty bid; and (3) net profits. As these systems were compared to that of the cash bonus (bid variable) with sliding scale royalty on the basis of "present value", the net profits system remained more beneficial until the applied discount rate exceeds ten percent (10%).

Two major points should be recognized from the discussion within this section:

1) "...bidding levels are very sensitive to the quantity of information available before the auction. Policies which increase the amount of presale information available to prospective bidders significantly enhance the rent capturing capabilities of all leasing methods."[40]; and

2) The selection of the most advantageous leasing system should occur as close as possible to the proposed lease sale and will be based on numerous factors, such as specified above, i.e. ability to transfer economic rent to the State (including considerations of cash flow; efficient resource recovery; distribution of income between lessor-lessee; and risk burden). Other factors which would influence such determinations include current monetary discount rates, Federal and State tax policies, etc.

5. Evaluation of Bids Received

A common tool used by the Federal government to estimate the value of respective tracts within a lease sale is a Monte Carlo mathematical model. According to a recent U.S.G.A.O. report:

> "This estimated value is a primary factor, along with competition, in determining the acceptability of industry bids and in assuring that the Government receives a fair market value return when it leases public lands. The Survey's evaluation is based upon geological, geophysical, and engineering inputs obtained through analysis of data submitted by industry and of purchased seismic data. Certain economic inputs, such as estimates of oil and gas prices, discount rates, and taxes, are also considered."[41]

Under current practices, the model used includes over thirty (30) input variables, a number of which are uncertainties which require subjective judgments based on agency experience and knowledge. "Thus, <u>the quantity and quality of data</u> on which these judgments are based <u>affect the reliability of the final value assigned to each tract</u>."[42] (emphasis added)

The information required for such evaluations must, of necessity, come from pre-lease activities of the nature and

extent proposed by the Commission. Such information (resource, environmental, hazard, etc.) is necessary to evaluate the reasonableness of industry's bids for the proposed lease sale area regardless of the type of bidding system specified. The availability of such information could also serve to narrow the documented, vis-a-vis past lease sale analyses, disparity between company to company and/or industry to government estimations of value for the same area.

ENVIRONMENTAL PROTECTION

As described earlier in this report, a component of the pre-lease sale program is the preparation of a program EIR to facilitate the decision to lease and subsequent site specified EIRs for each of the sites selected for exploratory drilling. As emphasized previously, the proposed lease sale area is, for information purposes, classified as a frontier area. A number of environmental studies, never done before, will contribute much to the knowledge of the present status of the area (habitat conditions and locations, endangered species, water quality, etc.) and the probable effects of any subsequent oil and gas activities.

Environmental conditions within a lease area are one of two major externalties - technical and environmental - which affect "discounting" determinations within the bidding process:

"By offering unknown offshore areas in competitive sale, the government can expect to lose revenues by maximizing the risk associated with the bonus."[43] Conversely, by identifying major environmental considerations and providing feasible (economic, etc.) mitigation measures, revenues to the government should increase in far greater proportion than the costs associated with the EIR.

Furthermore, the provision of environmental information prior to the sale can benefit the development plans subsequent to the sale. For example, facilities (platforms, pipelines, etc.) can be sited and designed, within parameters of resource location, etc., to avoid or to be benign to sensitive habitats, wildlife populations, adverse geologic conditions, etc. Such information will also prove useful to the Commission in the development, if necessary, of lease stipulations which should be specified within the notice of the area being opened for lease bidding. This information will also defend proposed stipulations and/or regulations should legal challenge arise.

ASSISTANCE TO STATE AND LOCAL PLANNING

While the proposed lease sale is confined to approximately 40,000 acres offshore Santa Barbara County, its impacts will be of a regional and statewide nature. The onshore area adjacent to the proposed sale area shares the "frontier" characteristics of the offshore. At present, there are no

processing or transportation facilities to which potential production from the area could go. In addition, the 1985 California Oil Transportation Study, published by the Commission earlier this year, has illustrated the interrelationships of additonal oil and gas production from the offshore and valley regions of California regarding available (and necessary) onshore processing, transportation, and processing facilities. On the basis of defensible resource information and resulting developmental scenarios currently under development, State and local planning agencies could begin to anticipate and provide for the offshore and onshore facilities which could result from lease sale development and production activities.

There are also other financial implications resulting from the proposed sale, i.e. the anticipated revenues from oil and gas production. At present, the petroleum related revenues from State lands' activities is approximately $40,000,000 per month. These revenues have assumed a greater importance of late in the State's revenue projections, planning and spending programs because of their increasing magnitude and corresponding revenue losses to the State from other sources. Although such projections are speculative at best, it is still to the advantage of State and local decision-makers to be able to look to sources and magnitudes of future revenues.

The validity of revenue projections is closely tied to the validity of the resource data used. As stated in a U.S.G.A.O. report on Lease Sale 35 (Southern California, December 1975):

> "The Department's (Interior) method for estimating OCS sale revenues is not adequate. Estimates are made far in advance of the sale and are based on inadequate data and insufficient information about the proposed tracts to be leased, often times, resulting in over-estimations of revenues actually received."[44] (clarification added)

Further stated:

> "According to the Director, Office of Policy Analysis, the Department's estimate of resources substantially overstates the estimates used by the oil companies. In addition, these volumetric estimates, as opposed by tract by tract estimates, were supplied to the Department by Survey personnel. According to the Director, 'this appears to be a case where volumetric (broad brush) estimates badly overstate the possibilities compared to what you see when you actually look, tract by tract, for resources, reservoirs, and traps'."[45]

An finally:

> "...revenue estimate would have been greatly enhanced if the tract by tract resource estimates had been based on more solid data which provided more information on rock porosity, and potential for hydrocarbons."[46]

CHAPTER 4

LIABILITIES OF RESOURCE INFORMATION

LESSER RESOURCE THAN ANTICIPATED

Inherent in the transfer of "risk" from industry to the State as a result of more intensive pre-lease exploratory activities, whether seismic or drilling, is the danger of indicating lesser rather than greater resource, i.e. "...the reduction of the uncertainty about both discoverable resources and the costs of exploration that would result from exploratory drilling prior to leasing should move the bidders' estimates of the expected present value toward the true resource value."[47]

As discussed further in the O.T.A. report, the telling point is subsequent to exploratory drilling:

> "On individual tracts, the change could be in either direction. If the exploration reveals the presence of hydrocarbons, the

> calculated expected value would go up significantly; if all of the exploratory holes were dry, it would drop significantly. However, while exploration prior to leasing would clearly have a major impact on the amount bid on individual tracts, reducing it on some and raising it on others, it is not clear what the net effect would be when these changes are aggregated over the total area offered for lease. If the industry has, on the average, been conservative in its estimates of expected present value of economic rent, as could be the case if firms make conservative probability estimates as a means of hedging against risk, then reduction of uncertainty by exploration prior to leasing should on the average increase the bidders' estimates of tract values. If competition for tracts is high, this should in turn lead to an increase in the average level of bids, other things being equal. On the other hand, if bidders have on the average been over-optimistic in their expectations, a reduction in uncertainty would by the same token lead to a downward shift in the average level of bids toward the true resource value of the tracts being offered."[48]

These circumstances do not, however, form a strong argument against the acquisition and use of information by government. The result could be the same should factors within the industry gain the same perspective of the area. Furthermore, if the State, in this instance, receives fair market value and the resulting revenues are greater than the investment in the information, then the goals of the sale have been met and the public's interests have been served.

INTERPRETATIONS OF DATA AND INFORMATION MAY VARY

While the pre-lease geophysical surveys proposed by the Commission are "standard" in the industry, the interpretation of survey results may vary among technical personnel. Interpretations of such data and information are influenced by subjective judgments and experience of those involved. It could be again argued, however, that any "variation" of interpretation can and will occur no matter the source of the information and that such variation will occur throughout industry and government and thus tend to balance out. This "disadvantage" may, in fact, be a reason for the greater exposure of geophysical data and information through government and the industry. In such manner, the collective experience of reviewers would again serve to bring resource estimates nearer their "true" levels. Furthermore, acquisition and circulation of such data and information by the State could better facilitate the "evening" of interpretive disparities.

COSTS OF PRE-LEASE ACTIVITIES

Just as there are differences of opinions as to interpretations of geophysical data, so too will debates occur as to "how much" data should be collected:

> "...exploration decisions are primarily investments in information as to the

> quantity and characteristics of potential new resources. Because exploration is costly and because as consequences are uncertain, it is itself a risky investment. It will consist typically of what amounts to a sequential sampling procedure.
>
> "An efficient procedure would sample first the areas of highest expected value (after discounting for true social risk) and continue sampling until its expected value of the incremental sample (an exploratory well, for instance) just equalled the incremental cost of such sample."[49]

The Commission's pre-lease program, up to the exploratory drilling phase, will result in the expenditure of $1,661,000 for geophysical and environmental data acquisition and analysis over three (3) fiscal years. Considering the size of the area (40,000 acres) and its classification as a frontier area, the program results in a nominal expenditure per acre of $42.

The costs of drilling a number of exploratory wells would, of course, increase this cost many times over. Although the costs of the proposed pre-lease wells have not yet been determined, the figures presented in Table 3 are indicative of the probable magnitudes. However, drillings costs are presently escalating approximately twenty percent (20%) per year.

TABLE 3

REPRESENTIVE DRILLING COSTS

SOUTHERN CALIFORNIA-EXPLORATORY

	ESTIMATE SOURCE	YEAR	AMOUNT (MM)	PARTICULARS
1)	U.S. Congress, O.T.A. 50	1975	$ 3.5	$.50/bbl Exploration Costs
2)	U.S.G.S.[51]	1978	$ 4.5	"COST" Well - Point Arguello
3)	U.S.D.O.E.[52]	1979 (1978 $)	$ 7.3	200 Ft Depth (Water)
			$ 7.8	300 Ft Depth (Water)
			$ 8.2	400 Ft Depth (Water)
			$ 8.6	500 Ft Depth (Water)
			$ 9.0	600 Ft Depth (Water)
			$ 9.4	700 Ft Depth (Water)
4)	ARCO[53]	1981	$12.6	$140,000/Day, 90 Days Drilling and Testing to 10,000± Feet

These costs must be, however, considered in relationship to bids which have been received by the U.S. Department of the Interior in two lease sales adjacent to the proposed Point Conception - Point Arguello lease sale area. Figure 9 illustrates total bid (and per acre cost) for relevant tracts in Lease Sale 48 and Lease Sale 53.

The table below contains other information relative to the size and lessee(s) of a number of the Federal OCS parcels surrounding the proposed lease area. Also included are State lessees located east of Point Conception.

TABLE 4

LEASE NUMBER	ACRES	LEASE HOLDERS	OPERATOR
P-0444	4,354	Atlantic Richfield Company	
P-0447	5,629	Chevron U.S.A., Inc. Phillips Petroleum Company	
P-0448	1,826	Chevron Phillips	
P-0450	5,132	Chevron Phillips	
P-0451	4,846	Chevron Phillips	
P-0452	4,018	Chevron Phillips	
P-0453	2,184	Chevron Phillips	
P-0315	4,269	TEXACO, Inc. Pennzoil Oil and Gas Co. Sun Oil Company (Delaware) KOCH Industries, Inc.	TEXACO
P-0316	4,178	Chevron Phillips Champlin Petroleum Co. Impkemix Inc.	Chevron
P-0317	4,087	Same as above	Chevron

LEASE NUMBER	ACRES	LEASE HOLDERS	OPERATOR
P-0318	1,430	Same as above	Chevron
P-0319	5,760	EXXON Corporation	
P-0320	5,760	CONOCO Inc. American Petrofina Co. (Texas) OGLE Petroleum Inc. McMoran-Freeport Petroleum Co. Weeks Exploration Co.	CONOCO
P-0321	5,760	Union Oil Company (California) Mobil Oil Corporation Hamilton Brothers Oil Co. Amerada Hess Corporation Sun Oil Co. (Delaware)	Mobil
P-0322	5,760	Same as P-0320	CONOCO
P-0323	5,760	Mobil Oil Corporation Hamilton Brothers Oil Co. Amerada Hess Corporation Sun Oil Co. (Delaware)	Mobil
P-0324	5,760	Same as P-0316	Chevron
P-0325	5,760	CONOCO Inc. Texas Eastern Exploration Co.	CONOCO
P-0197	4,893	EXXON Corporation Chevron	EXXON
P-0196	4,735	Same as above	EXXON
P-0195	5,695	Same as above	EXXON
P-0194	2,880	Same as above	EXXON
P-0193	3,316	Same as above	EXXON
P-0192	3,351	Same as above	EXXON
P-0326	1,440	Phillips Petroleum Co.	
PRC 2879		Union Oil Company	
PRC 3399 PRC 2725 PRC 2726		Phillips TEXACO Atlantic Richfield Co.	

LEASE NUMBER	ACRES	LEASE HOLDERS	OPERATOR
PRC 2206		TEXACO	
PRC 4001		Chevron	
PRC 2793		Mobil Oil Corporation	

From this table, a number of inferences might be drawn regarding those companies which could bid on the tracts to be offered in the proposed lese sale area. In particular, it should be noted that Chevron U.S.A., Inc. and Phillips Petroleum Company hold interests in all OCS tracts which are contiguous to the State lease sale area.

Any additional inferences from the bonus bids paid on relevant OCS tracts as to what the State might receive should bonus bidding be selected by the Commission, are more tenuous. However, the importance and effect of resource information on even bonus bidding can readily be seen be comparing the bonuses paid by Chevron/Phillips for Leases P-0316 ($35 million), P-0317 ($37 million) and P-0318 ($53 million) where relatively little information existed and the amount paid by these same companies for P-0450 ($333 million) based solely on the resource information gathered on their previous leases from exploratory drilling activities subsequent to their acquisition. The importance of resource information cannot be underestimated.

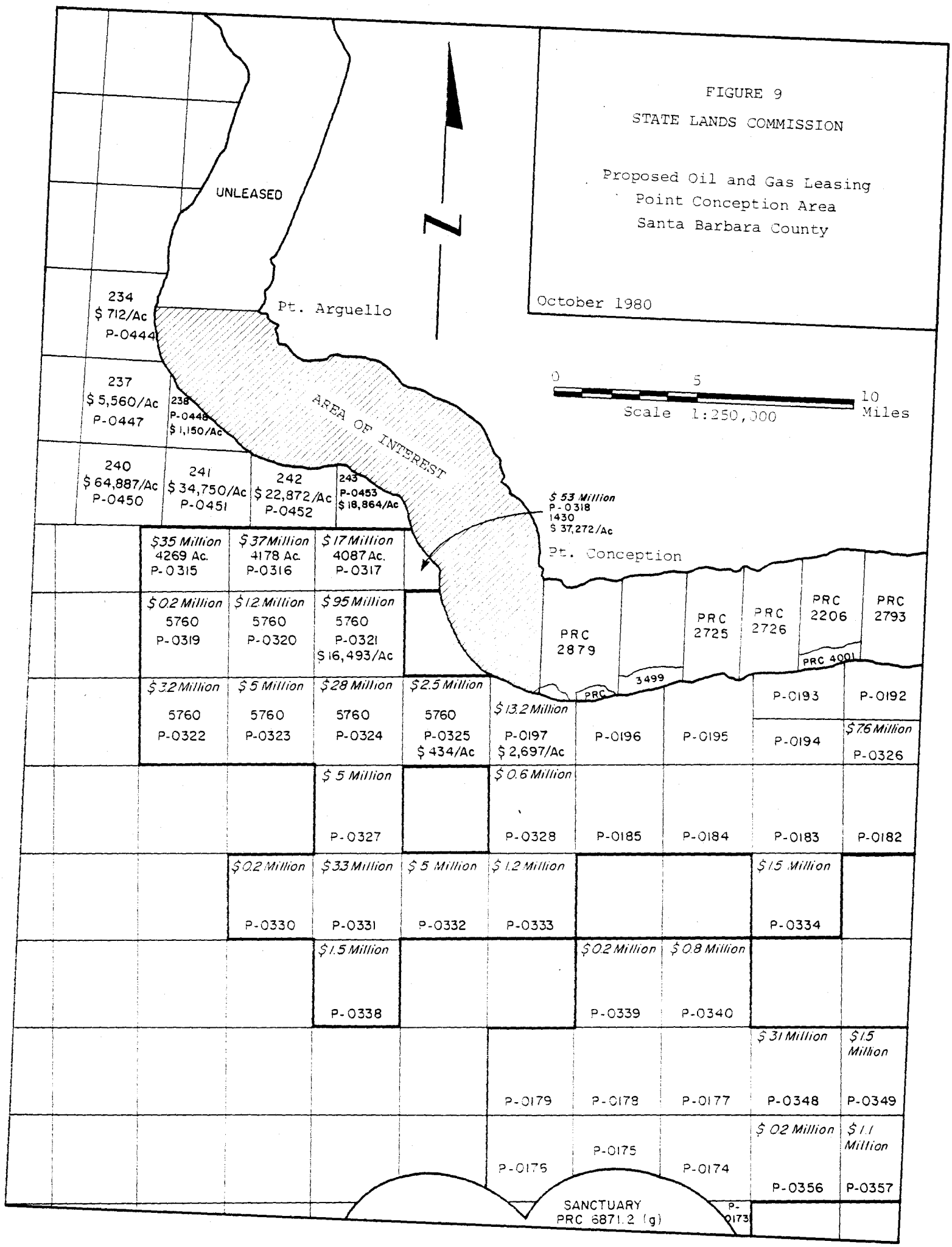


FIGURE 9
STATE LANDS COMMISSION
Proposed Oil and Gas Leasing
Point Conception Area
Santa Barbara County
October 1980
N
UNLEASED
Pt. Arguello
AREA OF INTEREST
0
5
10 Miles
Scale 1:250,000
234 $ 712/Ac P-0444
237 $ 5,560/Ac P-0447
238 P-0448 $ 1,150/Ac
240 $ 64,887/Ac P-0450
241 $ 34,750/Ac P-0451
242 $ 22,872/Ac P-0452
243 P-0453 $ 18,864/Ac
$ 53 Million P-0318 1430 $ 37,272/Ac
Pt. Conception
$35 Million 4269 Ac. P-0315
$ 37 Million 4178 Ac. P-0316
$ 17 Million 4087 Ac. P-0317
$ 0.2 Million 5760 P-0319
$ 1.2 Million 5760 P-0320
$ 95 Million 5760 P-0321 $ 16,493/Ac
PRC 2879
PRC 2725
PRC 2726
PRC 2206
PRC 2793
PRC 4001
PRC 3499
PRC
$ 3.2 Million 5760 P-0322
$ 5 Million 5760 P-0323
$ 28 Million 5760 P-0324
$ 2.5 Million 5760 P-0325 $ 434/Ac
$ 13.2 Million P-0197 $ 2,697/Ac
P-0196
P-0195
P-0193
P-0192
P-0194
$ 7.6 Million P-0326
$ 5 Million P-0327
$ 0.6 Million P-0328
P-0185
P-0184
P-0183
P-0182
$ 0.2 Million P-0330
$ 3.3 Million P-0331
$ 5 Million P-0332
$ 1.2 Million P-0333
$ 1.5 Million P-0334
$ 1.5 Million P-0338
$ 0.2 Million P-0339
$ 0.8 Million P-0340
$ 31 Million P-0348
$ 1.5 Million P-0349
P-0179
P-0178
P-0177
$ 0.2 Million P-0356
$ 1.1 Million P-0357
P-0175
P-0176
P-0174
SANCTUARY PRC 6871.2 (g)
P-0173

CHAPTER 5

THE FEDERAL LEASING EXPERIENCE-EVALUATIONS AND RECOMMENDATIONS

U.S. General Accounting Office reports to Congress in 1977 (Lease Sale 35, Southern California), 1978 (Lease Sale CI (Cook Inlet), Alaska), 1979 (Lease Sale 40, Southeast Georgia), and 1980 (Lease Sale 48, Southern California), in conjunction with "program" evaluation reports of 1975, contain a number of conclusions and express concerns relevant to the justification for and design of the State pre-lease activities. For example, the reports of 1975[54] state that the Federal evaluation of OCS resources: (1) is hindered by inadequate data and analysis; and (2) does not reasonably asure that a fair market value return is received on lease offers of OCS oil and gas reserves.

Major themes developed in each of the lease sale reports concentrated on the acquisition and analysis of adequate geological and environmental data to: (1) assist in the

selection of the most relevant tracts for lease (in conjunction with indications of industry interest rather than sole reliance on such recommendations); (2) increase competition as a means of securing fair market value for public resources; and (3) assist in the evaluation of industry bids subsequent to the sale.

Recommendations made by G.A.O. in the reports cited can be summarized as follows:

> "The Secretary of the Interior should direct a geological exploration program which has a systematic plan for appraising Outer Continental Shelf oil and gas resources, including selected stratographic test drilling. The plan should identify the level of stratographic drilling necessary to provide a minimal level of data on frontier shelf areas.
>
> "The Secretary should then encourage private industry to explore areas identified in the plan and confidentially share with Interior the information developed. Exploration permits issued by the Department for private drilling should provide the opportunity for any bona fide potential bidders to 'buy in' on the exploration by equally sharing the cost of the drilling.
>
> "If any data is still needed, Interior should take necessary actions, including public financing of stratographic drilling, to obtain it.

> "In addition, after the tracts have been selected, the process outlined above should be repeated to obtain more reliable data for pre-lease evaluation purposes if deemed necessary.
>
> "Interior's Geologic Survey and Bureau of Land Management should be required to obtain the necessary information to make reliable tract values before lease. The Department should offer for lease only those areas for which it has collected and analyzed sufficient information to adequately identify where the resources are, their estimated value, and potential for development in the near future."[55]

A perhaps more radical proposal for improving the Federal leasing system has been discussed in several publications.[56] The policy suggested has been termed "contract exploration" and:

> "...would separate the leasing procedure into a two stage process. Under the first stage, firms would bid for rights to explore the area and share in the bonuses from a subsequent production lease sale. The lessened risk in the production lease would increase both competition and revenues."[57]

Under such a system, the government and drilling contractor share the proceeds of the ultimate sale as well as exploration costs. Table 5 illustrates both advantages and disadvantages of contract exploration.

TABLE 5

CONTRACT EXPLORATION

ADVANTAGES	DISADVANTAGES
1. Requires little front money by exploration firm and risk shared with government.	1. Requires effective method of cost accounting.
2. Risk lessened substantially prior to lease sale which should increase competition and receipt of fair market value.	2. Contract explorers may not have the same profit motivation as private industry so government program may be less efficient.
3. Government pre-lease investments could be lessened as exploratory firm could defer a portion of their payment until time of sale.	3. Exploration drilling by "government" is generally opposed by industry and as a result, business confidenced in results obtained.
4. Environmental data collection could be incorporated into the exploration phase more easily under this system in comparison.	4. May require specific legal authorization for government to share "lease sale" revenues" with contract explorer.
5. Government could better direct overall exploration in consideration of policy and planning requirements.	5. Difficult for government and prospective contractor to anticipate full costs, needs and extent of drilling programs. Contract costs could expand beyond original economies.

PRE-LEASE ACTIVITIES - INDUSTRY/GOVERNMENT?

While there is debate as to the amount of geologic, resource, and environmental data that is required prior to a

lease sale to accomplish the goals, etc., herein discussed, there is even greater debate as to whether government or industry should take the dominant role in pre-lease activities up to and including the drilling of exploratory wells, on structure, within the proposed sale area. The ensuing discussion focuses on a number of issues within this debate.

ACQUISITION AND ANALYSIS OF RESOURCE INFORMATION

Seismic data can be acquired "off the shelf" from geophysical firms who have conducted "speculation" runs in anticipation of a lease sale or hold data from industry contracts which is, by agreement, saleable to others at the end of a specified period or by contracting with geophysical firms for new "runs" within the proposed area. Once gathered, such data must be interpreted.

In any of the above activities, government becomes a competitor, with industry, for such technical services. A consequence of the position may be that the government's program would suffer delays due to scheduling problems of the more desirable firms or that, in order to maintain a preferred schedule, government may elect to retain a firm that, although competent, was not their primary choice. These circumstances are, however, similar to those faced by components within the industry even if government were not also in the market for such

services. The issue of work delay has been recognized and cited by the G.A.O.:

> "According to Survey officials, limited numbers of contractors with geophysical interpretation capability to assist in the evaluation process are available and are straining to keep up with the present demand industry is placing on them. Therefore, the interpretation assistance may not be available for some time to come. Delays in receiving some data from contractors had already been experienced by Survey for recent offers."[58]

Government may also be restricted in its quest for public resource information by policy and/or budgetary factors. Although industry recognizes the necessity of sound geologic information prior to either bidding in a lease sale or conducting an exploratory drilling program and secures funding accordingly, governmental programs in this regard are subject to greater scrutiny. While government is theoretically able to accommodate risk because its survival would not (financially) be threatened by a run of bad luck, its "public" funds are subject to a greater variety of demands and are allocated by a process largely unfamiliar with resource analysis. As such, funds may not be appropriated in sufficient amounts or in sufficient time to compete in the above described process.

AVAILABILITY OF INFORMATION TO ALL POTENTIAL BIDDERS

One of the major goals of the "information" program discussed in this report is to provide greater access to

information by more companies within the oil and gas industry. The degree of access to credible resource information correlates directly to the level of competition in the related sale. Information supplied in such manner will also be broadbrush, i.e. covering, in this instance, the entire proposed lease sale and not only those areas which may be of interest to one or more individual firms. Government is not in a competitive relationship for the development of the resource and can thereby afford to provide wide circulation within the industry which is competing for a limited number of resource opportunities. The provision of valid resource data to all should also lessen or eliminate the inefficient duplications of efforts by individual companies or by a consortium to gather such information in order to enhance their own competitive stature.

The following is one of the chief criticisms voiced about public agency generated material:

> "There is, however, a major uncertainty associated with government determination of oil and gas reserves, stemming from the fact that the exploration process is more of an art than a science. It is generally agreed, as well, that the experts in this art are now concentrated within industry, not within government. The government alternative thus tends to offer a lower probability of success in determining the extent of a resource."[59]

The Commission's program does not fall under this criticism as all data relative to the lease sale area will initially be interpreted by the same types of firms utilized by the oil and

gas industry for the same purposes. In addition, both "raw" data and its interpretation will be made available to all potential bidders.

EFFICIENCY OF EXPLORATION PROGRAM

An evaluation of this question by the O.T.A. came to the conclusion that governmental administration of a pre-lease program was not appreciably more inefficient than industry. Although it was estimated that an "inefficiently" run government program could result in a delay of a sale up to two years in comparison to a comparable industry performance, it was also determined that any monetary differences would be adjusted in the bidding process.

Wilson's depreciation of governmental abilities in pre-lease activities comes at the point decisions must be made about exploratory wells:

> "...the government has depended on the initiative of private parties acting in their own interest to assess the merits of an exploratory well. But if the government were to conduct an exploration program at its own expense, it would have not such help, or at least firms would not have an incentive to advise the government on an efficient plan. The government would incur ultimately the task of deciding how many, if any, exploratory wells were called for and of choosing their location and depth.

> This is a task for which it has neither the technology nor the managerial skills without adding appreciably to its technical staff in the G.S."[60]

When considering the above viewpoint, certain "economies of scale" must be recognized. With as little data as has been documented and the size of Federal lease offerings (one million plus acres), one can sympathize with Wilson. In contrast, the Commission intends to develop data and information of greater volume and detail for an area of 40,000 acres. Further, the Commission's technical staff has had greater opportunities to gain experience (see Appendix A) in the potential of California's tidelands and submerged lands to produce oil and gas.

CHAPTER 6

CONCLUSION

Throughout this report, we have maintained that information about the nature and extent of probable oil and gas resources and the environment is a vital product of the pre-lease program formulated by the State Lands Commission in preparation for the competitive lease of State lands lying between Point Conception to Point Arguello, Santa Barbara County. A discussion by the Federal Office of Management and Budget (OMB), in response to the urgings of G.A.O. for the Federal government to acquire comparable information, is relevant to the Commission's program also:

> "Whether or not the government will be better off for having accepted this risk and the costs of producing the information, depends on the following:
>
> > How much, if any, the 'cost' of risk is lower to the government than to the bidders, and

> how (sic) much, if any, the information produced by the goverment replaces investments in informatino that would have would have been made by the bidders.

> If the bidders put a higher value on the risk than the government's valuation of the same risk, there will be a net gain in bonus receipts to set against the costs of producing the information. The risk evaluation of a major oil company is not likely to be much different from that of the government. For smaller bidders, on the other hand, the risk may have great significance. For this reason, transferring risk to the government by improving pre-lease information might simply increase the competitiveness of small bidders without significantly increasing the winning bids.
>
> If the information produced by the government replaces information investments that would have been made by the bidders, costs of those investments should be credited against the costs of the government's pre-leasing information collection..."[61]

There is a singularity to this viewpoint which is also reflected in a similar argument by Wilson: "...the government may be ready and willing to reduce the riskiness of a lease to benefit the prospective bidders, who are its customers in selling the lease, but it has no easy means of measuring the customers' benefits to see whether they exceed the costs."[62]

Each of these cites neglects to consider the costs to the government if such information is not available and/or

the benefits to the government if it is. These statements also belie the fact that government's primary responsibility is to provide benefits to its primary customers - the public. Instead of the emphasis indicated by O.M.B. and Wilson, we suggest that costs of pre-lease activities be also measured in terms of the benefits enjoyed by the public as result of such costs.

We believe that the information contained in this report supports the Commission's position that pre-lease activity costs, prudently incurred by the State for studies (resource, environmental, etc.) which would, if not for the State's decision to do so, be conducted by prospective bidders, will benefit the public and industry (in excess of their cost) by: (1) reducing uncertainty and sharing risk; (2) increasing competition; (3) internalizing externalities (environmental and technical); and (4) assisting in the determination of the bidding system which promotes the optimum extraction of minerals and the optimum capture of economic rent (fair market value) by the public.

More precise determinations of "risk factors" which will assist: (1) industry in capital and bidding decisions; and (2) government in further pre-lease program decisions, are dependent on more precise resource and environmental information which will be available to Commission staff during the 1982/83, and 1983/84 Fiscal Years. Such information will also enable the

Commission to recommend, if necessary, to the Legislature, amendments to the Public Resources Code to: (1) enable the Commission, within specific parameters, to lease State lands in tracts in excess of 5,760 acres; and (2) specifically authorize the Commission to contract for the drilling of exploratory wells on State lands.

FOOTNOTES

1. U.S. General Accounting Office (G.A.O.) Georgia Embayment - Illustrating Again the Need for More Data Before Selecting and Leasing Outer Continental Shelf Lands (EMD-79-22, March 19, 1979), p. 24.

2. U.S. G.A.O., Lower Cook Inlet -Another Example of More Data Needed for Appaising Outer Continental Shelf Oil and Gas Resources (EMD-78-48, June 8, 1978), p. 14.

3. G.A.O., Georgia Embayment - Illustrating Again the Need for More Data Before Selecting and Leasing Outer Continental Shelf Lands, p. 7.

4. Ibid, p. 24.

5. Robert B. Wilson, "Management and Financing of Exploration for Offshore Oil and Gas", Public Policy, 26 (Fall 1978), 640.

6. Edward Porter, U.S. Department of Energy, The Use of Federal Lands for Energy Development (Energy Policy Study, Volume 8, April 7, 1980), p. 27-28.

7. Don Shoecraft, "Chevron says test wells justify contested drill plan", Progress - Peninsula Edition, July 17, 1981.

8. John Sr., John Jr., Robert and Charles Campbell, Mineral Property Economics, Volume I: Economics Principles and Strategies (Campbell Petroleum Series, Norman, Oklahoma, July 1978), p. 9.

9. Ibid.

10. Ibid, p. 330.

11. Robert B. Wilson, "Management and Financing of Exploration for Offshore Oil and Gas", 642.

12. U.S. G.A.O., Outer Continental Shelf Lease Sale 35 -Problems Selecting and Evaluating Land to Lease (EMD-77-19, March 7, 1977), p. 11.

13. John Sr., John Jr., Robert and Charles Campbell, Mineral Property Economics, Volume I: Economics Principles and Strategies, p. 330.

14. U.S. Congress, Office of Technology Assessment (O.T.A.), An Analysis of the Feasibility of Separating Exploration From Production of Oil and Gas on the Outer Continental Shelf (May 1975), p. 44-45.

15. Robert B. Wilson, "Management and Financing of Exploration for Offshore Oil and Gas", p. 635.

16. U.S. G.A.O., Lower Cook Inlet - Another Example of More Data Needed for Appraising Outer Continental Shelf Oil and Gas Resources, p. 8.

17. U.S. G.A.O., Georgia Embayment - Illustrating Again the Need for More Data Before Selecting and Leasing Outer Continental Shelf Lands, p. 10.

18. U.S. G.A.O., Outer Continental Shelf Lease Sale 35 -Problems Selecting and Evaluating Land to Lease, p. 31.

19. John Sr., John Jr., Robert and Charles Campbell, Mineral Property Economics, Volume I: Economics Principles and Strategies, p. 103.

20. E. C. Capen, R.V. Clapp, W. M. Campbell, "Competitive Bidding on High-Risk Situations", Journal of Petroleum Technology,
XXIII (June 1971), p. 644.

21. Leland summarizes the type behavior one expects from risk firms: (a) they tend to explore less, (b) they tend to extract discovered resources to rapidly (due to price uncertainty), and (c) they tend to bid less for leases. Hayne E. Leland, "Cash Bonus Bidding for Mineral Resources: Comment", in Michael Crommeling and Andrew R. Thompson, eds., Mineral Leasing as an Instrument of Public Policy, (Vancouver: University of British Columbia Press, 1977), p. 57-58, as footnoted in S. W. Edwards, Evaluation of Profit Share Leasing Systems (Leasing Policy Development Office, March 1979 - Draft), p. 13.

22. U.S. G.A.O., Outer Continental Shelf Lease Sale 35 - Problems Selecting and Evaluating Land to Lease, p. 57.

23. S. W. Edwards, Evaluation of Profit Share Leasing Systems, p.16-17.

24. U.S. Congress, O.T.A., An Analysis of the Feasibility of Separating Exploration From Production of Oil and Gas on the Outer Continental Shelf, p. 44.

25. Edward Porter, U.S. Department of Energy, The Use of Federal Lands for Energy Development, p. 32.

26. Robert B. Wilson, "Management and Financing of Exploration for Offshore Oil and Gas", p. 636.

27. U.S. Congress, O.T.A., An Analysis of the Feasibility of Separating Exploration From Production of Oil and Gas on the Outer Continental Shelf, p. 44.

28. Stephen L. McDonald, The Leasing of Federal Lands for Fossil Fuels Production (Johns Hopkins University Press, Baltimore and London, 1979), Chapter 3 as cited in Edward Porter, U.S. D.O.E., The Use of Federal Lands for Energy Development, p. 20.

29. S. W. Edwards, Evaluation of Profit Share Leasing Systems, p. 9.

30. Ibid, p. 10.

31. Walter J. Mead, "An Efficient Policy for OCS Oil and Gas Leasing", League for the Advancement of the States' Equal Rights, Agenda for the 80's: A New Federal Land Policy, Proceedings of the National Conference on States' Rights, the Sagebrush Rebellion, and Federal Land Policy (Salt Lake City, Utah, November 20-24, 1980), p. 60.

32. U. S. Congress, O.T.A., An Analysis of the Feasibility of Separating Exploration From Production of Oil and Gas on the Outer Continental Shelf, p. 93-94.

33. Adopted from Walter J. Mead, "An Efficient Policy for OCS Oil and Gas Leasing", p. 61.

34. Robert J. Kalter, Thomas H. Stevens, and Oren A. Bloom, "The Economics of Outer Continental Shelf Leasing", American Journal of Agricultural Economics, 57, Number 2 (May 1975), 254.

35. Edward Porter, U.S. Department of Energy, The Use of Federal Lands for Energy Development, p. 23.

36. S. W. Edwards, Evaluation of Profit Share Leasing Systems, p. 10.

37. Ibid, p. 11.

38. Ibid, p. 12.

39. John Sr., John Jr., Robert and Charles Campbell, Mineral Property Economics, Volume I: Economics Principles and Strategies, p. 323.

40. Douglas K. Reese, University of California, Berkeley, "Leasing Offshore Oil" Ph.D. Thesis as referenced in Edward L. Phillips, State of Alaska, Department of Natural Resources, Division of Minerals and Energy Manaement, An Economic Evaluation of Alternative Leasing Systems," A Report to the State of Alaska, Jay S. Hammond, Governor, and to the Department of Natural Resources, Robert E. Leresche, Commissioner (October 9, 1979), p. 41.

41. U.S. G.A.O., Georgia Embayment - Illustrating Again the Need for More Data Before Selecting and Leasing Outer Continental Shelf Lands, p. 9.

42. Ibid.

43. Edward Porter, U.S. Department of Energy, The Use of Federal Lands for Energy Development, p. 62.

44. U.S. G.A.O., Outer Continental Shelf Lease Sale 35 -Problems Selecting and Evaluating Land to Lease, p. 6.

45. Ibid, p. 11.

46. Ibid.

47. U.S. Congress, O.T.A., An Analysis of the Feasibility of Separating Exploration From Production of Oil and Gas on the Outer Continental Shelf, p. 42.

48. Ibid, p. 42-43.

49. Edward Porter, U.S. Department of Energy, The Use of Federal Lands for Energy Development, p. 33.

50. U.S. Congress, O.T.A., An Analysis of the Feasibility of Separating Exploration From Production of Oil and Gas on the Outer Continental Shelf, p. 27.

51. This cost must be viewed in perspective, i.e. no testing is performed on a stratigraphic well and such testing of a well (exploratory) can account for 30% of total well cost.

52. U.S. Department of Energy, Leasing Policy Development Office, Federal Leasing and Outer Continental Shelf Energy Production Goals (February 1979. Draft Report), p. 96.

53. Conversation with Mr. Doug Ruckel, ARCO Drilling Supervisor, October 19, 1981. Costs specified are also contingent on exploratory vessel availability on the West Coast.

54. U.S. G.A.O., Outlook for Federal Goals to Accelerate Leasing of Oil and Gas Reserves on the Outer Continental Shelf (RED-75-343, March 19, 1975) and Outer Continental Shelf Oil and Gas Development -- Improvements Needed in Determining Where to Lease and at What Dollar Value (RED-75-349, June 30, 1975).

55. U.S. G.A.O., Lower Cook Inlet - Another Example of More Data Needed for Appraising Outer Continental Shelf Oil and Gas Resources, p. ii-iii.

56. Federal Trade Commission Staff Report on Federal Energy Land Policy U. S. Department of Commerce, Springfield, 1975; U.S. Congress, O.T.A. Feasibility of Separating Exploration From Production of Oil and Gas on the Outer Continental Shelf, U.S. Government Printing Office, Washington, D.C., May 1975; Wilson, Robert B. "Management and Financing of Exploration for Offshore Oil and Gas", Public Policy, XXVI, Number 4 (Fall 1978), 629; McDonald, Stephen L., The Leasing of Federal Lands for Fossil Fuels Production, The Johns Hopkins University Press, Baltimore and London, 1979.

57. U.S. Department of Energy, The Use of Federal Lands for Energy Development, p. 62.

58. U.S. G.A.O., Outlook For Federal Goals To Accelerate Leasing of Oil and Gas Resources On The Outer Continental Shelf (RED-75-343, March 19, 1975), p. 26.

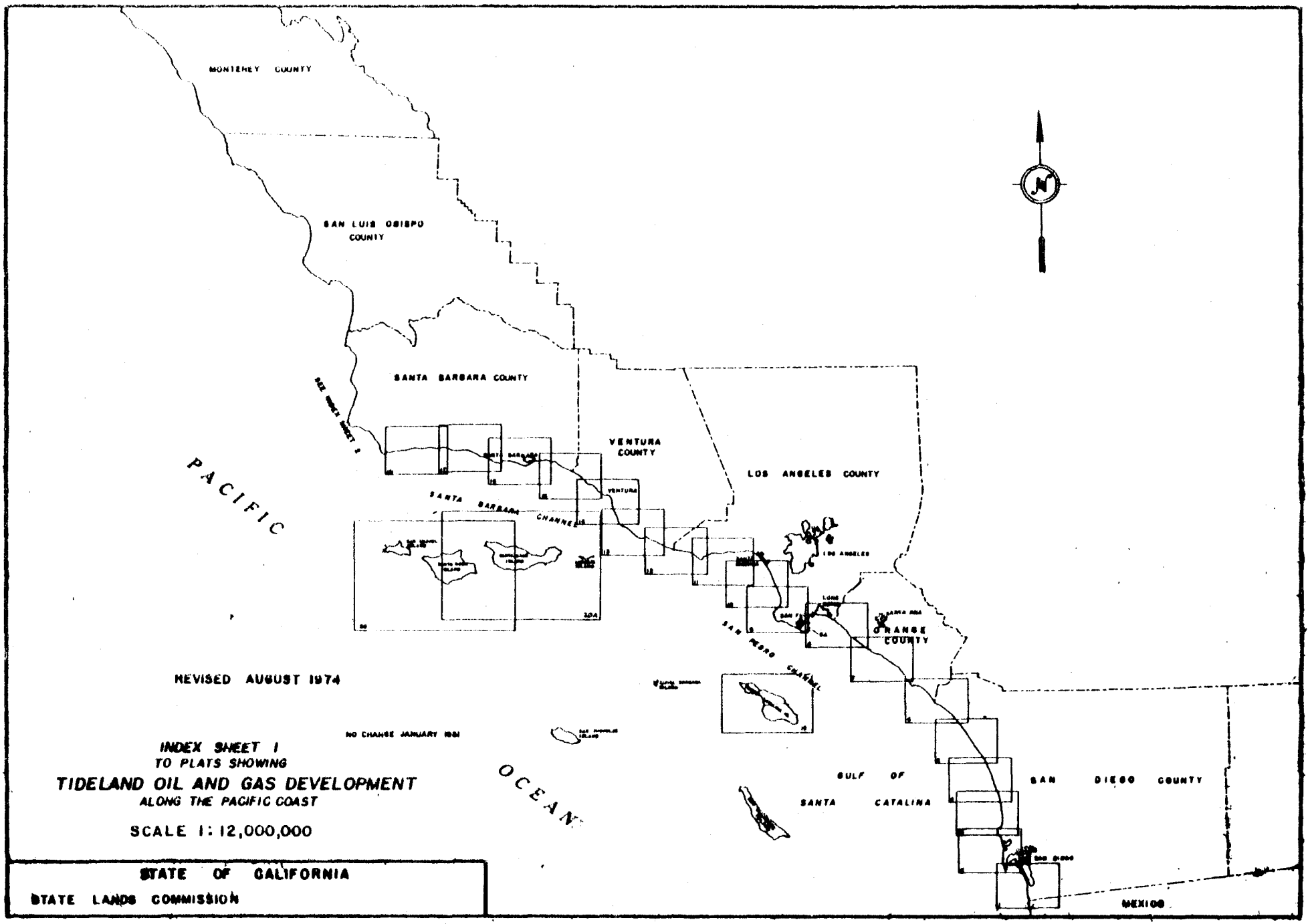
59. U.S. Congress, O.T.A., An Analysis of the Feasibility of Separating Exploration From Production of Oil and Gas on the Outer Continental Shelf, p. 38.

60. Robert B. Wilson, "Management and Financing of Exploration for Offshore Oil and Gas", p. 645.

61. U.S. G.A.O., Outer Continental Shelf Lease Sale 35 -Problems Selecting and Evaluating Land to Lease, p. 57.

62. Robert B. Wilson, "Management and Financing of Exploration for Offshore Oil and Gas", p. 646.

APPENDIX A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ORANGE COUNTY
SAN DIEGO COUNTY
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OCEAN
SANTA BARBARA CHANNEL
SAN PEDRO CHANNEL
GULF OF SANTA CATALINA
MEXICO
REVISED AUGUST 1974
NO CHANGE JANUARY 1951
INDEX SHEET 1
TO PLATS SHOWING
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ALONG THE PACIFIC COAST
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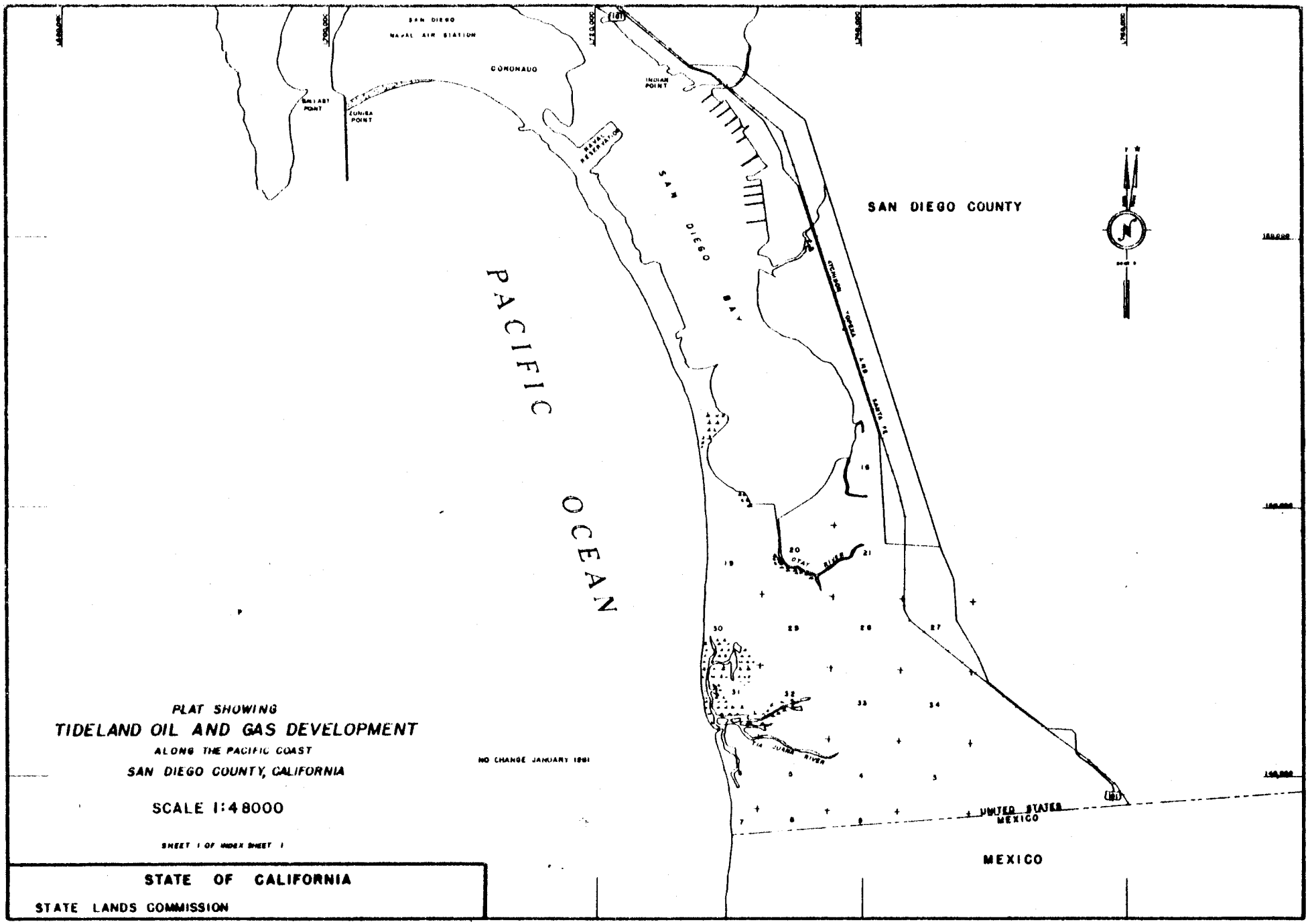
STATE LANDS COMMISSION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CORONADO
BALLAST POINT
LUNIGA POINT
INDIAN POINT
NAVAL RESERVATION
SAN DIEGO BAY
PACIFIC OCEAN
SAN DIEGO COUNTY
ATCHISON TOPEKA AND SANTA FE
OTAY RIVER
TIA JUANA RIVER
UNITED STATES
MEXICO
MEXICO
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
SAN DIEGO COUNTY, CALIFORNIA
SCALE 1:48000
SHEET 1 OF INDEX SHEET 1
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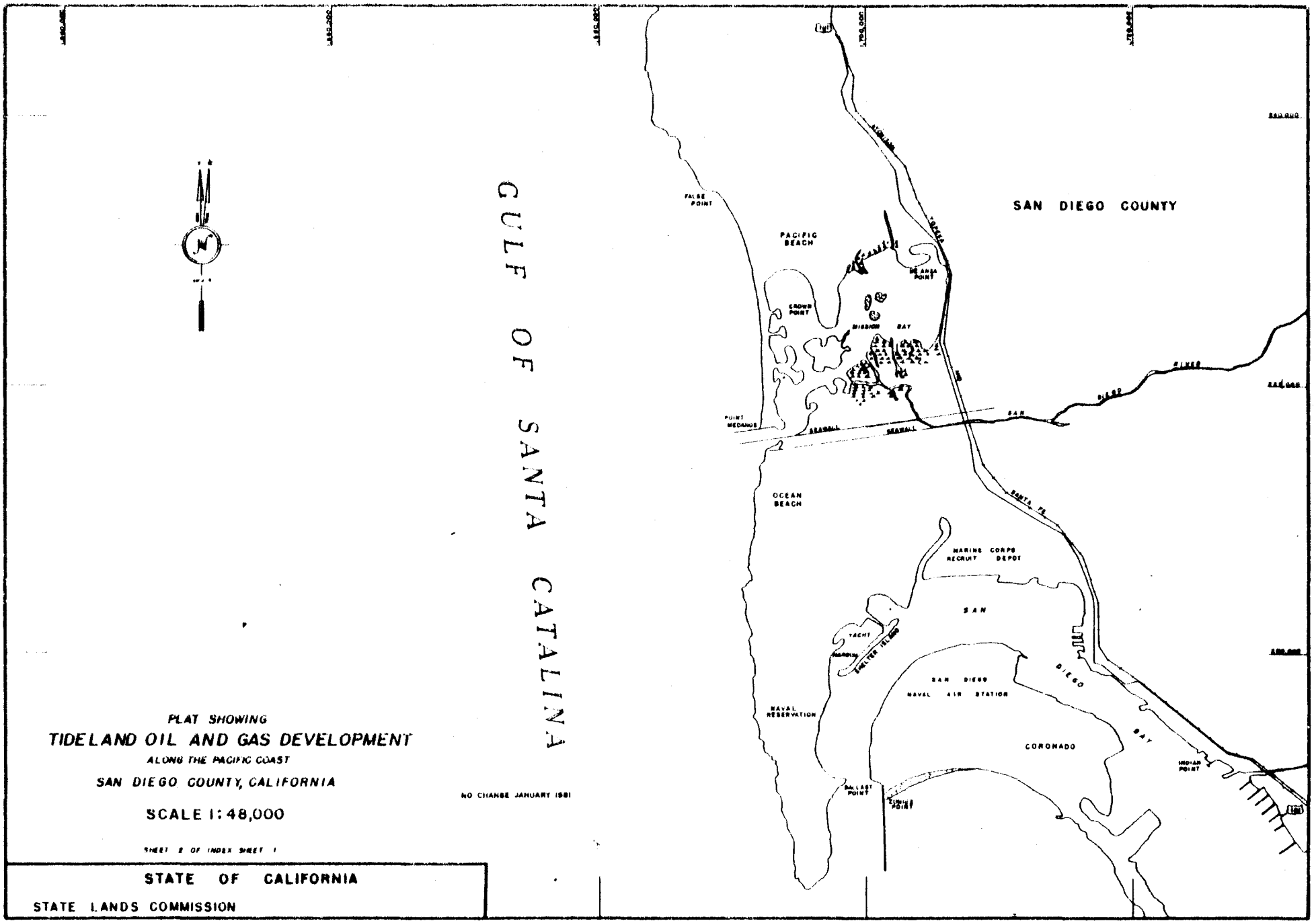

PLAT SHOWING

TIDELAND OIL AND GAS DEVELOPMENT

ALONG THE PACIFIC COAST

SAN DIEGO COUNTY, CALIFORNIA

SCALE 1:48,000

SHEET 2 OF INDEX SHEET 1

NO CHANGE JANUARY 1981

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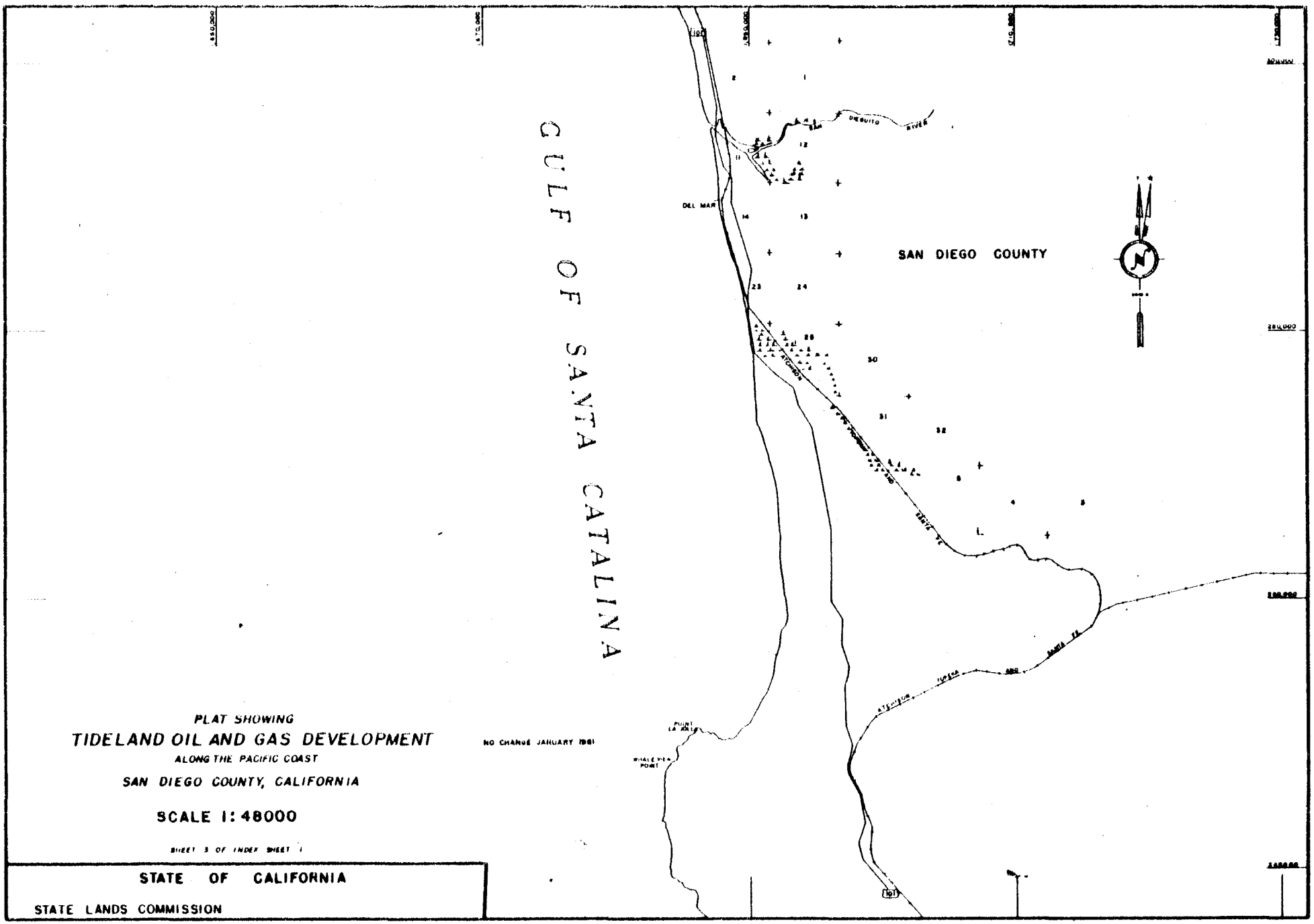
STATE LANDS COMMISSION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DESCANSO
ATCHISON
TOPEKA
AND
SANTA FE
WHALEY'S POINT
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
SAN DIEGO COUNTY, CALIFORNIA
SCALE 1:48000
SHEET 3 OF INDEX SHEET 1
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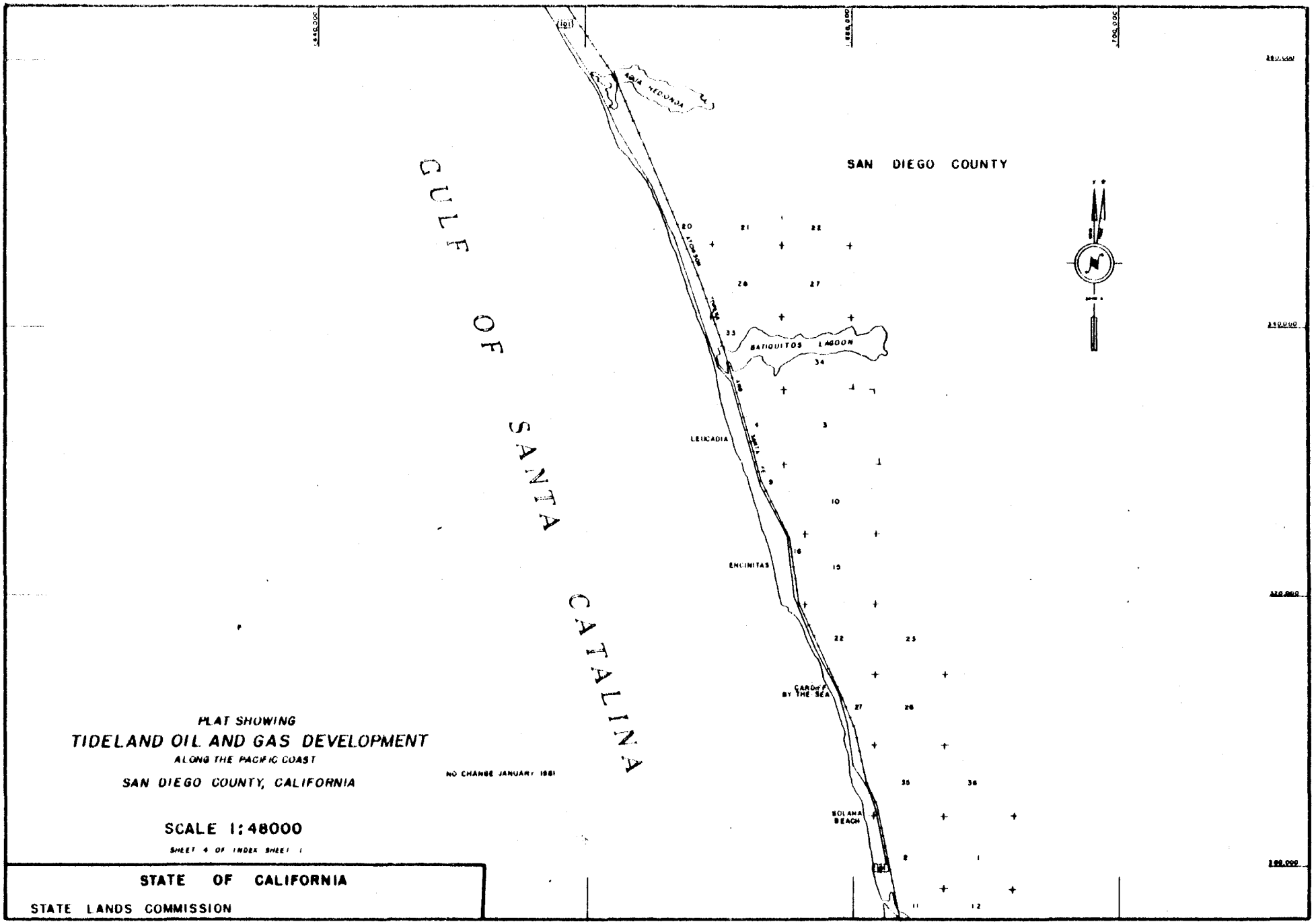
STATE LANDS COMMISSION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LEUCADIA
ENCINITAS
CARDIFF BY THE SEA
SOLANA BEACH
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
SAN DIEGO COUNTY, CALIFORNIA
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SCALE 1:48000
SHEET 4 OF INDEX SHEET 1
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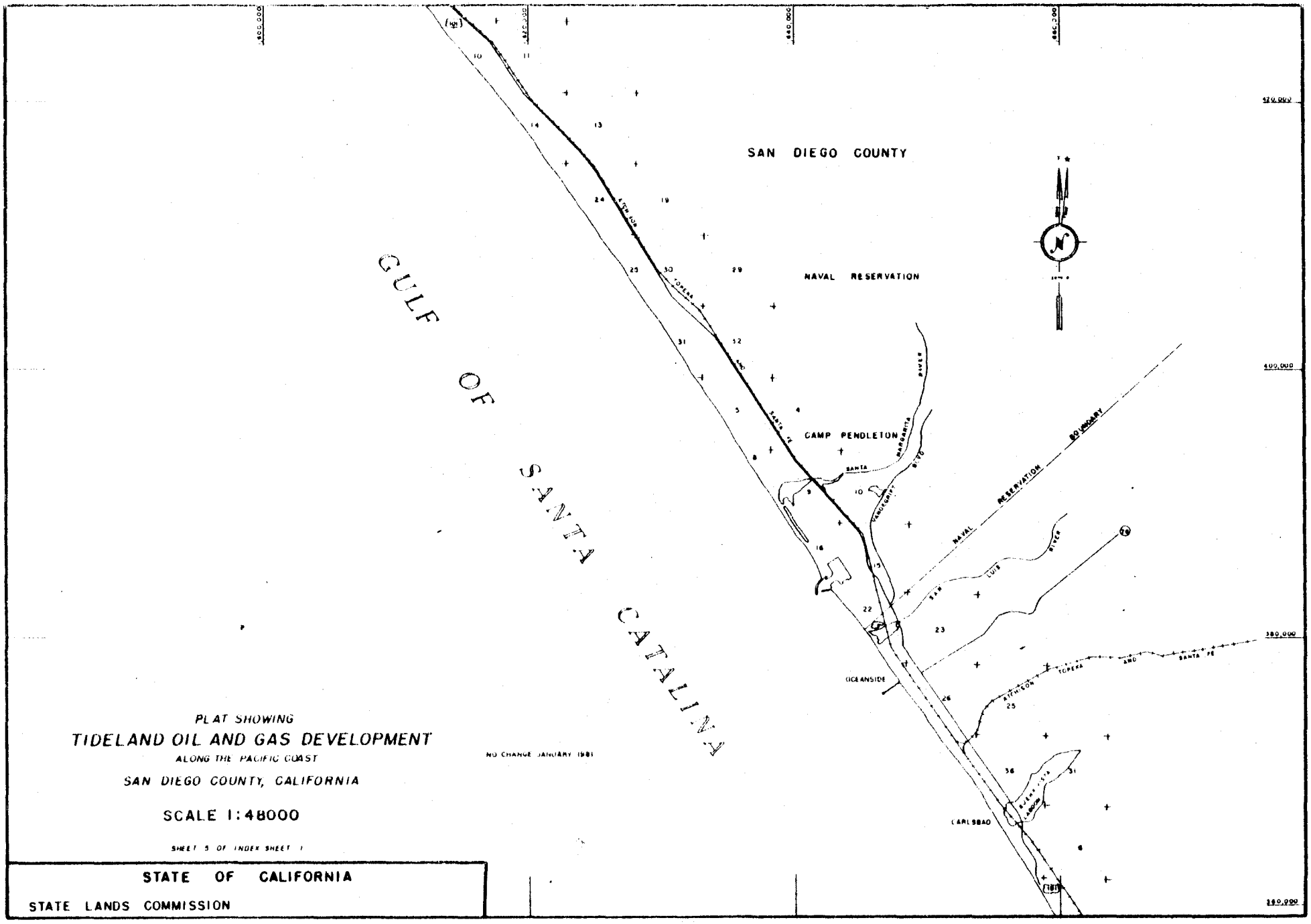
STATE LANDS COMMISSION



PLAT SHOWING

TIDELAND OIL AND GAS DEVELOPMENT

ALONG THE PACIFIC COAST

SAN DIEGO COUNTY, CALIFORNIA

SCALE 1:48000

SHEET 5 OF INDEX SHEET 1

STATE OF CALIFORNIA

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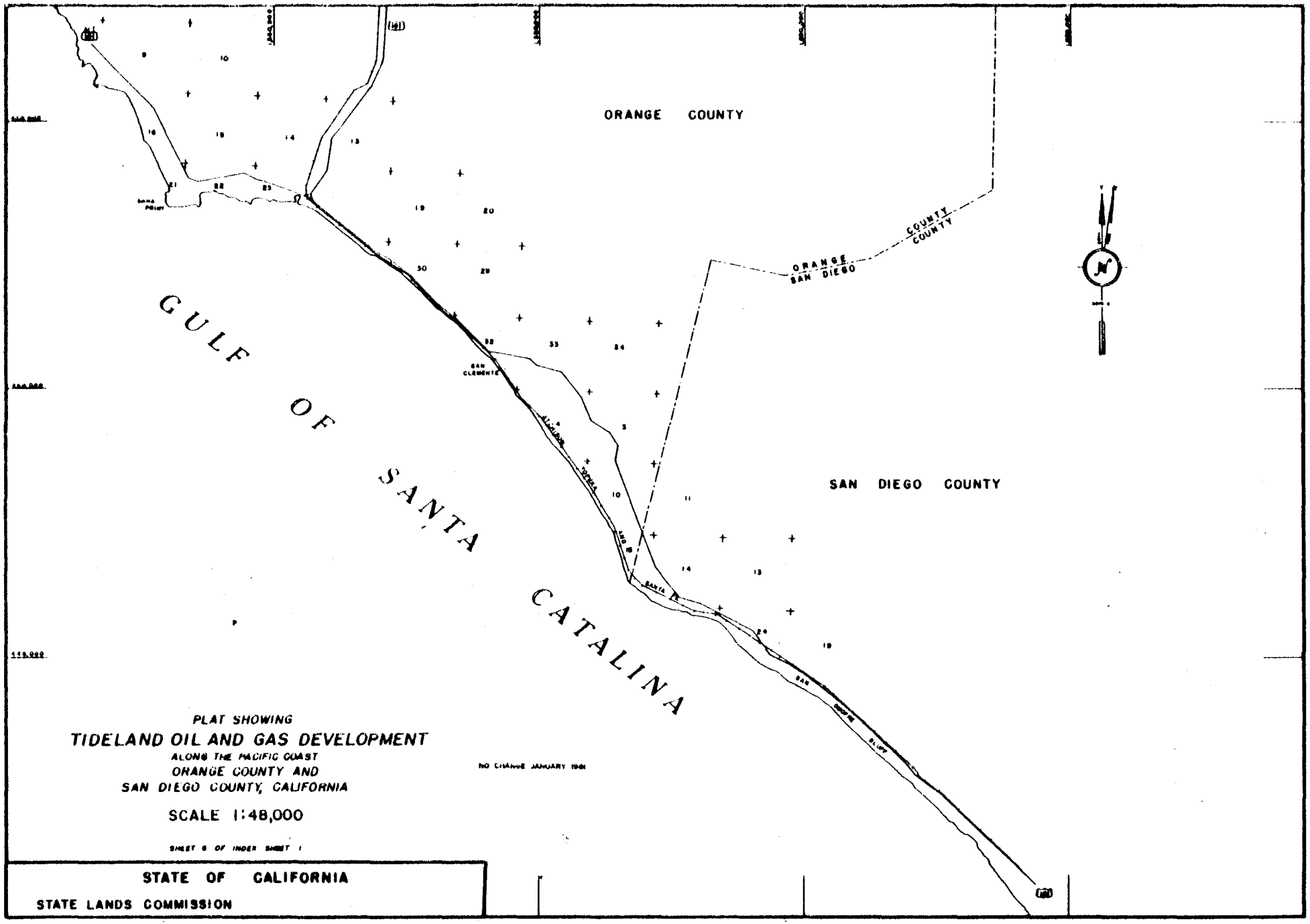
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ORANGE COUNTY
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SANTA POINT
SAN CLEMENTE
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TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
ORANGE COUNTY AND
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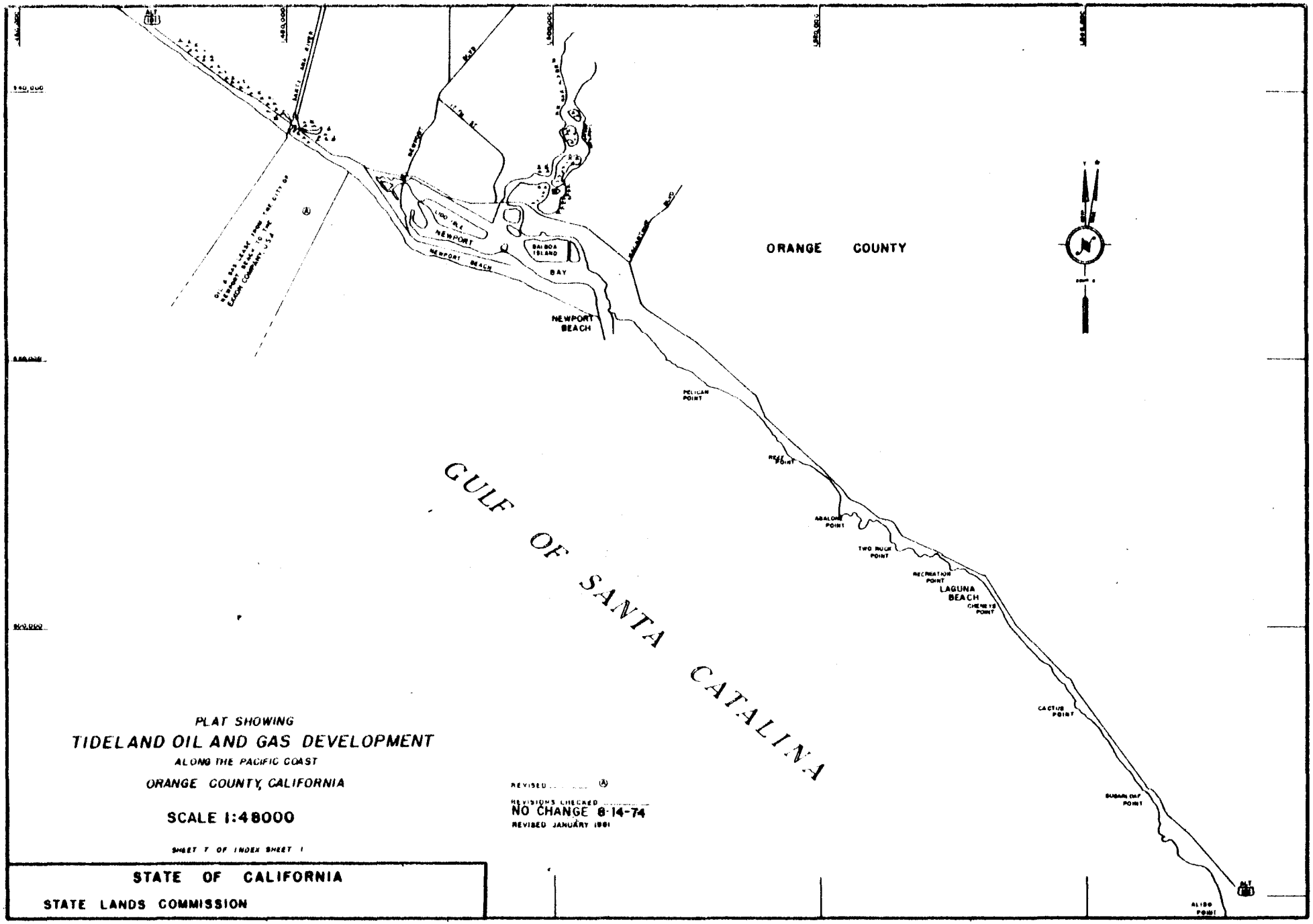
STATE LANDS COMMISSION



PLAT SHOWING

TIDELAND OIL AND GAS DEVELOPMENT

ALONG THE PACIFIC COAST

ORANGE COUNTY, CALIFORNIA

SCALE 1:48000

SHEET 7 OF INDEX SHEET 1

REVISED ..... Ⓐ

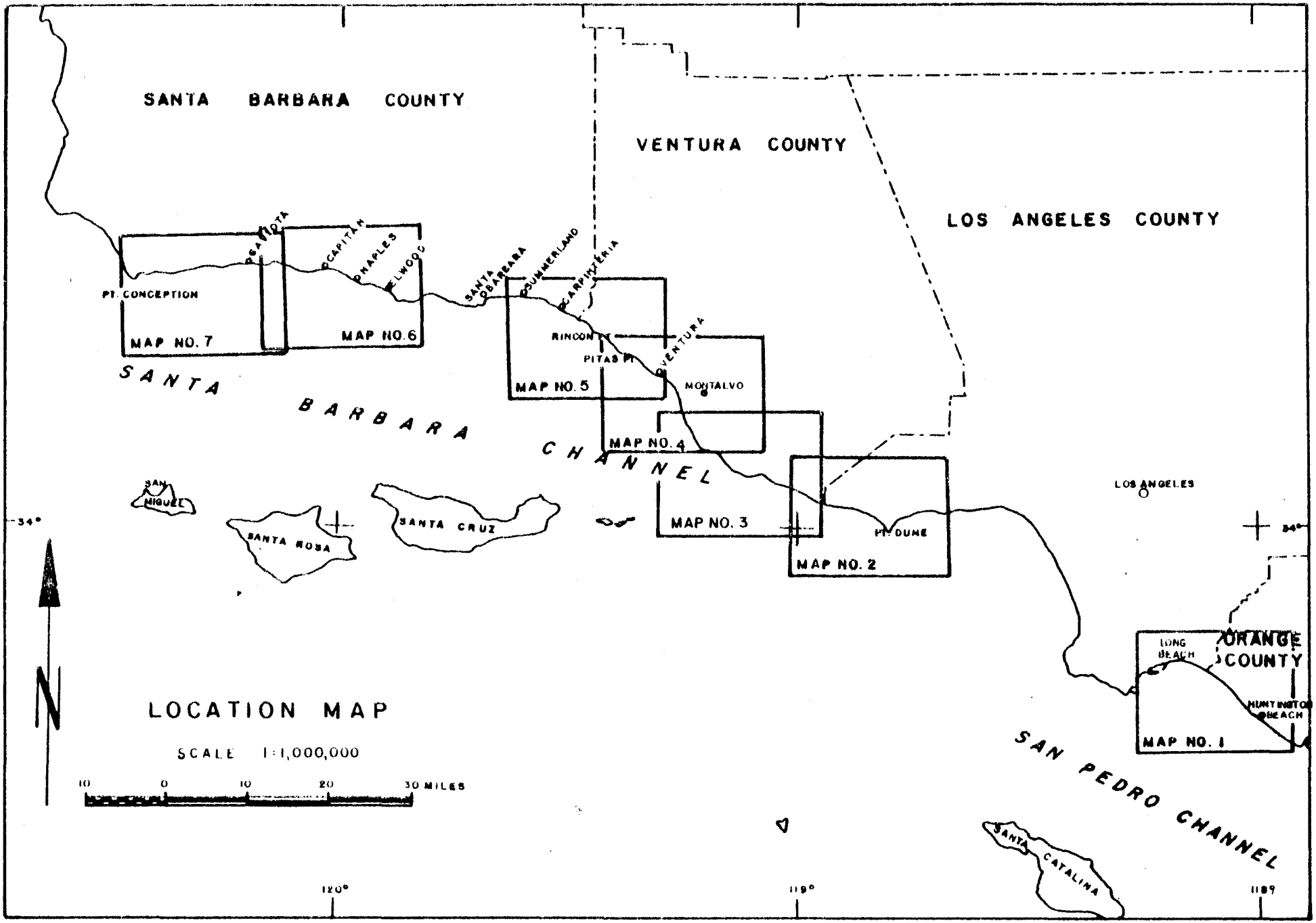
REVISIONS CHECKED .....

NO CHANGE 8-14-74

REVISED JANUARY 1981

STATE OF CALIFORNIA

STATE LANDS COMMISSION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CAPITAN
NAPLES
ELWOOD
SANTA BARBARA
SUMMERLAND
CARPINTERIA
RINCON PT.
PITAS PT.
VENTURA
MONTALVO
MAP NO. 7
MAP NO. 6
MAP NO. 5
MAP NO. 4
MAP NO. 3
MAP NO. 2
MAP NO. 1
SANTA BARBARA CHANNEL
SAN MIGUEL
SANTA ROSA
SANTA CRUZ
PT. DUME
LOS ANGELES
LONG BEACH
ORANGE COUNTY
HUNTINGTON BEACH
SAN PEDRO CHANNEL
SANTA CATALINA
34°
120°
119°
118°
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LOCATION MAP
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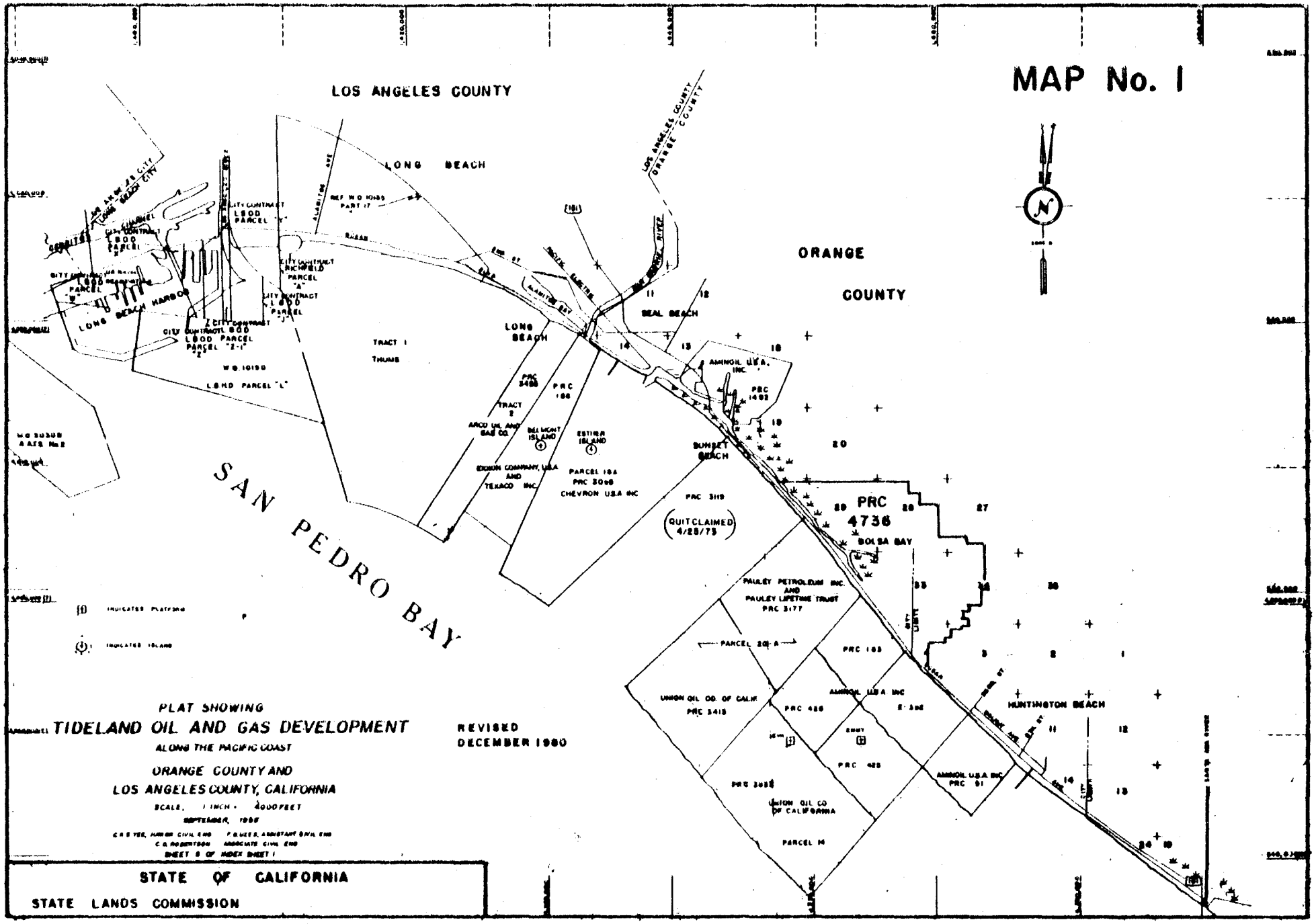
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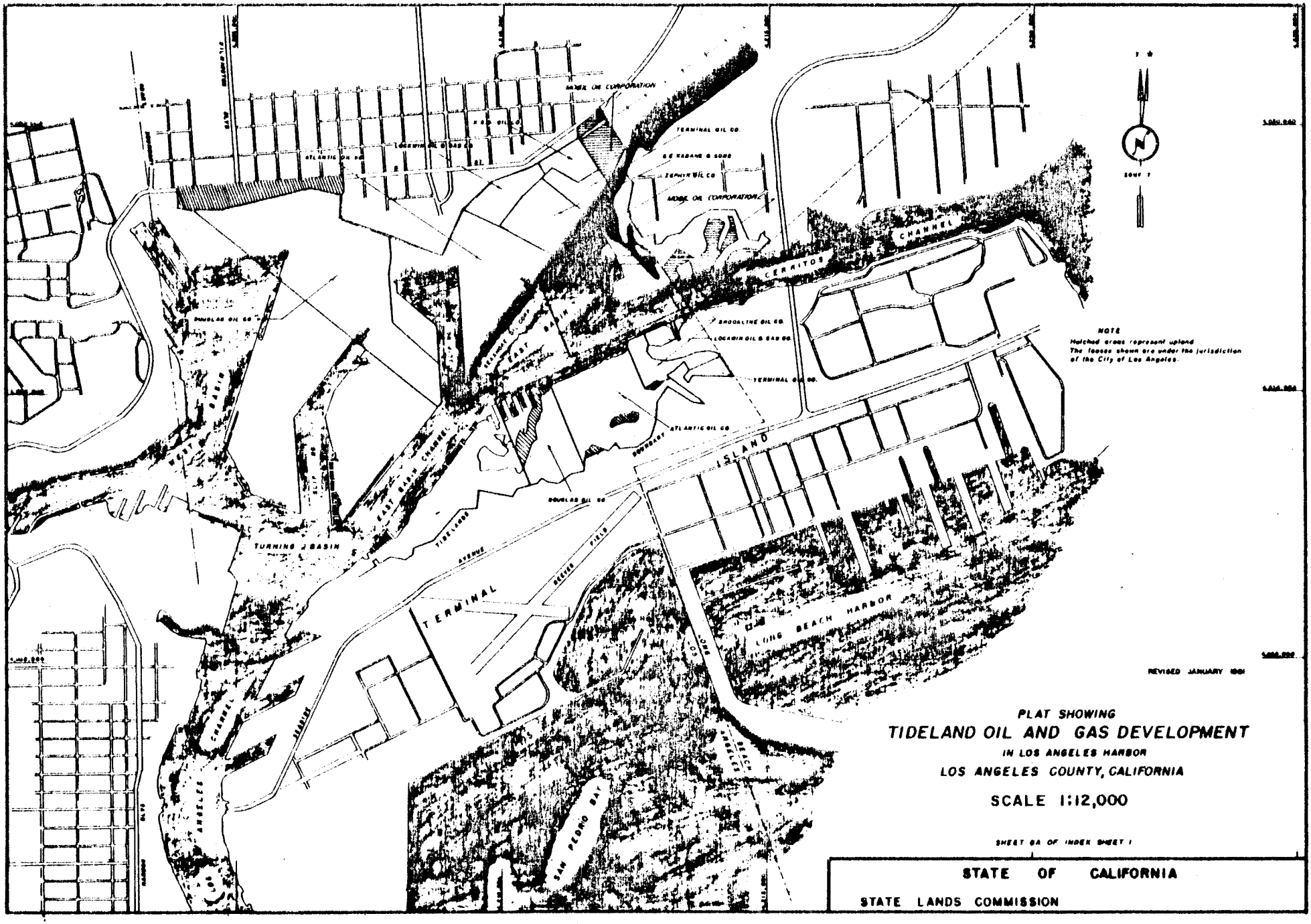
SEAL BEACH
SUNSET BEACH
BOLSA BAY
HUNTINGTON BEACH
SAN PEDRO BAY
TRACT 1
THUMB
TRACT 2
ARCO OIL AND GAS CO.
EXXON COMPANY, U.S.A. AND TEXACO INC.
BELMONT ISLAND
ESTHER ISLAND
PARCEL 19A
PRC 3068
CHEVRON U.S.A. INC.
PRC 3119
(QUITCLAIMED 4/28/75)
PRC 4736
AMINOIL U.S.A. INC.
PAULEY PETROLEUM INC. AND PAULEY LIFETIME TRUST
PRC 3177
PARCEL 20-A
UNION OIL CO. OF CALIF.
PRC 3415
PARCEL 14
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
ORANGE COUNTY AND
LOS ANGELES COUNTY, CALIFORNIA
REVISED
DECEMBER 1980
STATE OF CALIFORNIA
STATE LANDS COMMISSION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ZEPHYR OIL CO.
MOBIL OIL CORPORATION
ATLANTIC OIL CO.
LOCKWIN OIL & GAS CO.
CHANNEL
CERRITOS
BROOKLINE OIL CO.
LOCKWIN OIL & GAS CO.
TERMINAL OIL CO.
ATLANTIC OIL CO.
DOUGLAS OIL CO.
WEST BASIN
EAST BASIN
EAST BASIN CHANNEL
TURNING BASIN
TIDELANDS
AVENUE
TERMINAL
ISLAND
LONG BEACH HARBOR
SAN PEDRO BAY
LOS ANGELES CHANNEL
HARBOR
BLVD.
NOTE
Hatched areas represent upland
The leases shown are under the jurisdiction of the City of Los Angeles.
REVISED JANUARY 1961
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
IN LOS ANGELES HARBOR
LOS ANGELES COUNTY, CALIFORNIA
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STATE OF CALIFORNIA
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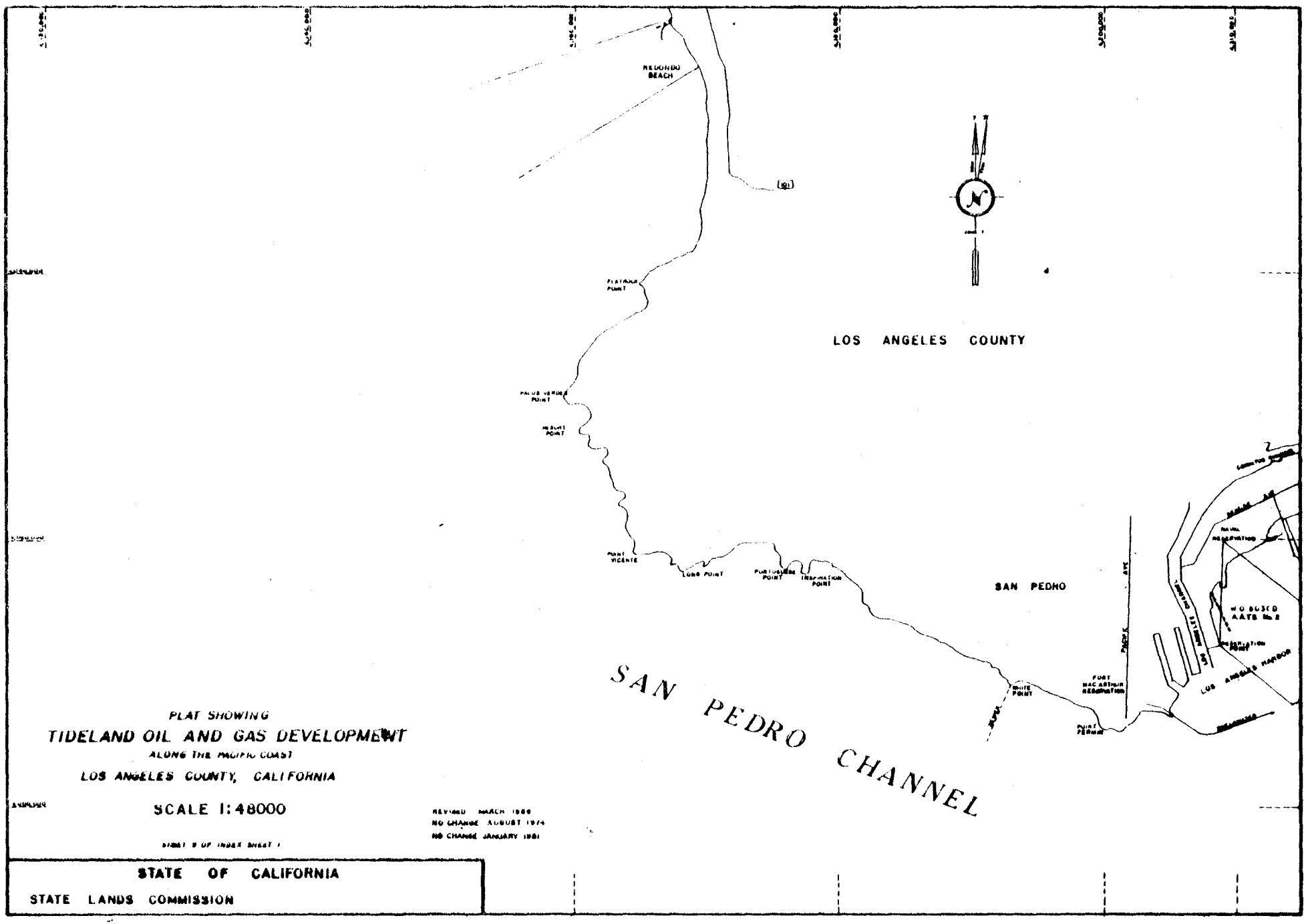

PLAT SHOWING

TIDELAND OIL AND GAS DEVELOPMENT

ALONG THE PACIFIC COAST

LOS ANGELES COUNTY, CALIFORNIA

SCALE 1:48000

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NO CHANGE JANUARY 1981

STATE OF CALIFORNIA

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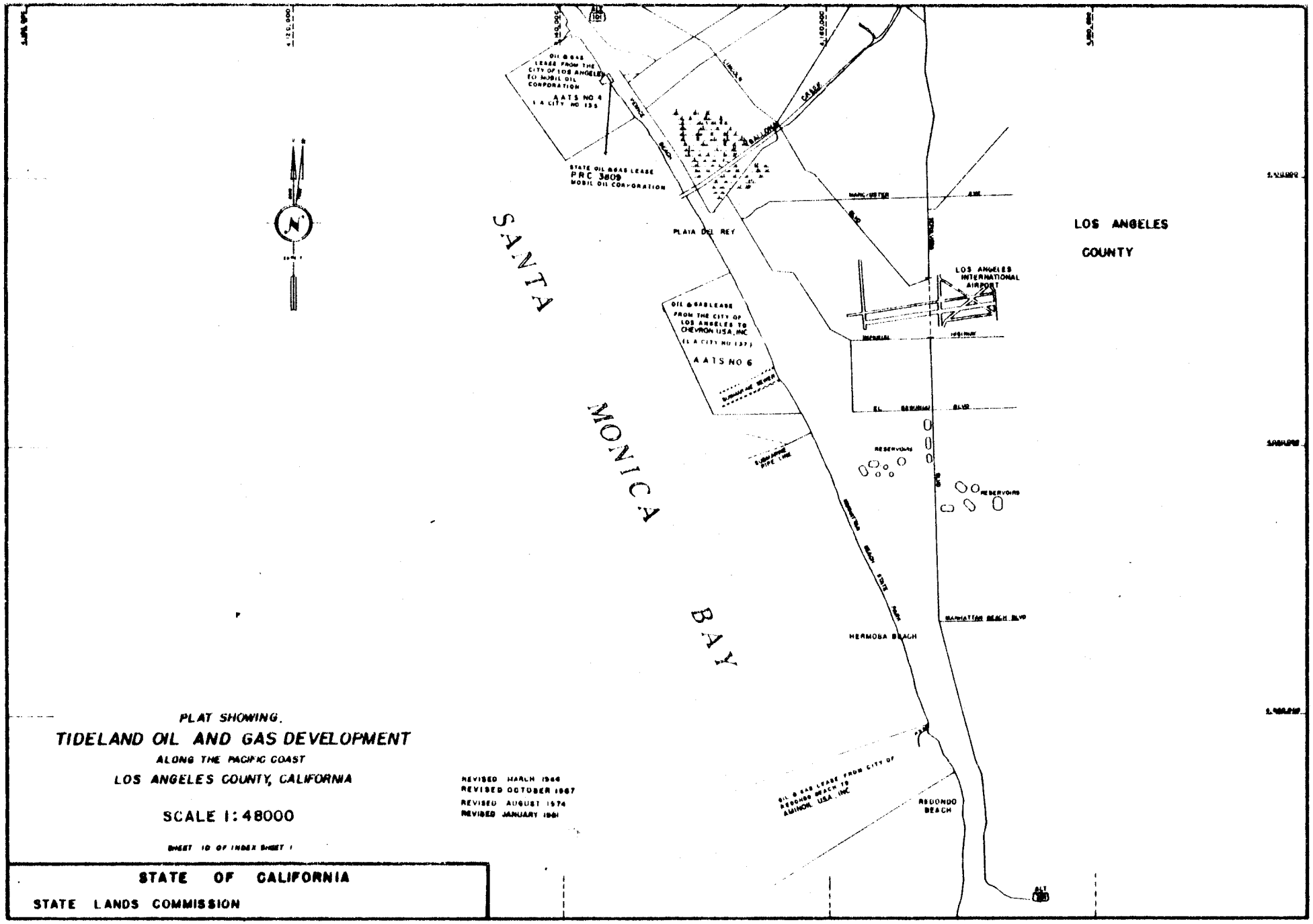

PLAT SHOWING.

TIDELAND OIL AND GAS DEVELOPMENT

ALONG THE PACIFIC COAST

LOS ANGELES COUNTY, CALIFORNIA

SCALE 1:48000

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REVISED AUGUST 1974
REVISED JANUARY 1981

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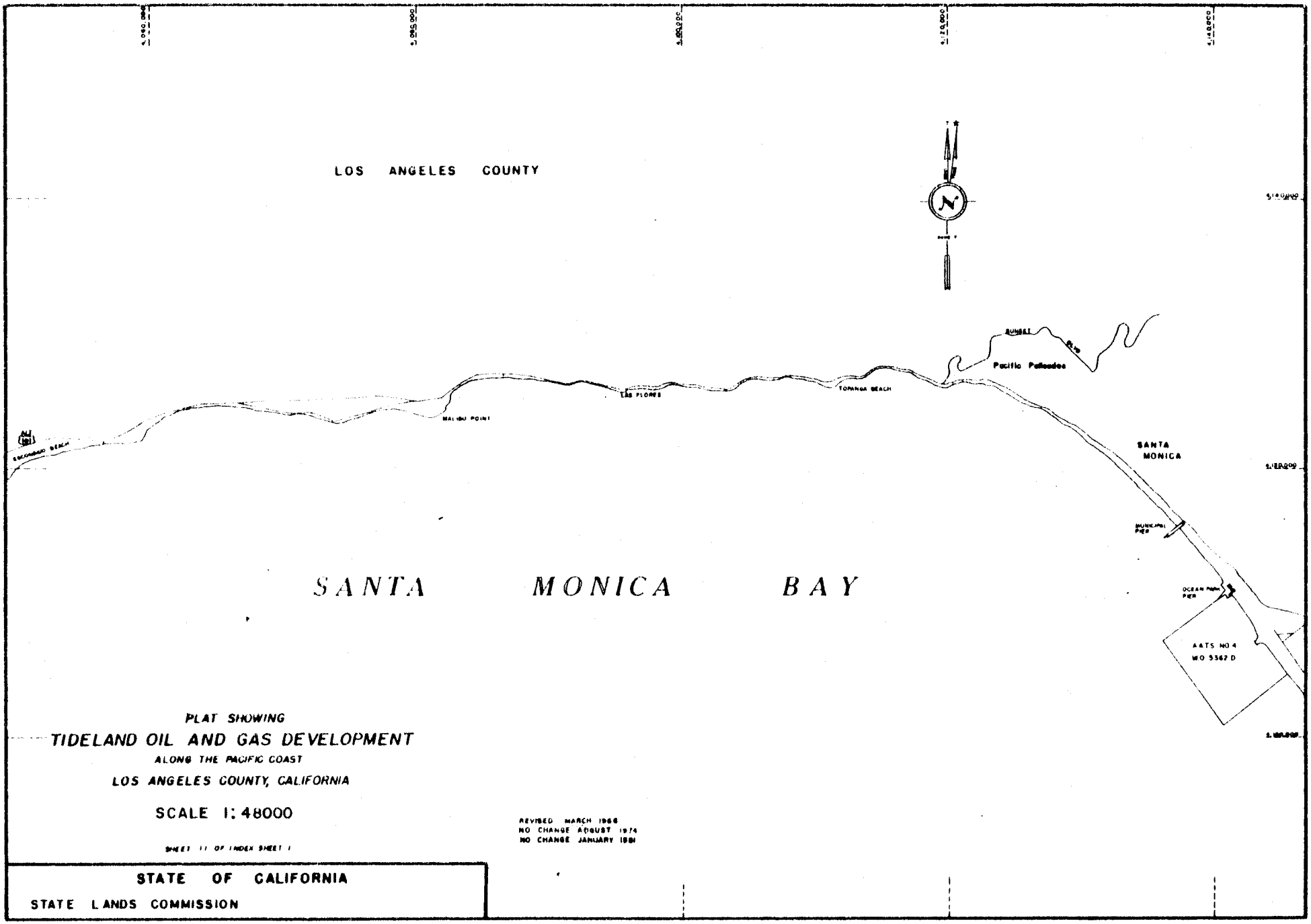
STATE LANDS COMMISSION



PLAT SHOWING

TIDELAND OIL AND GAS DEVELOPMENT

ALONG THE PACIFIC COAST

LOS ANGELES COUNTY, CALIFORNIA

SCALE 1:48000

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STATE OF CALIFORNIA

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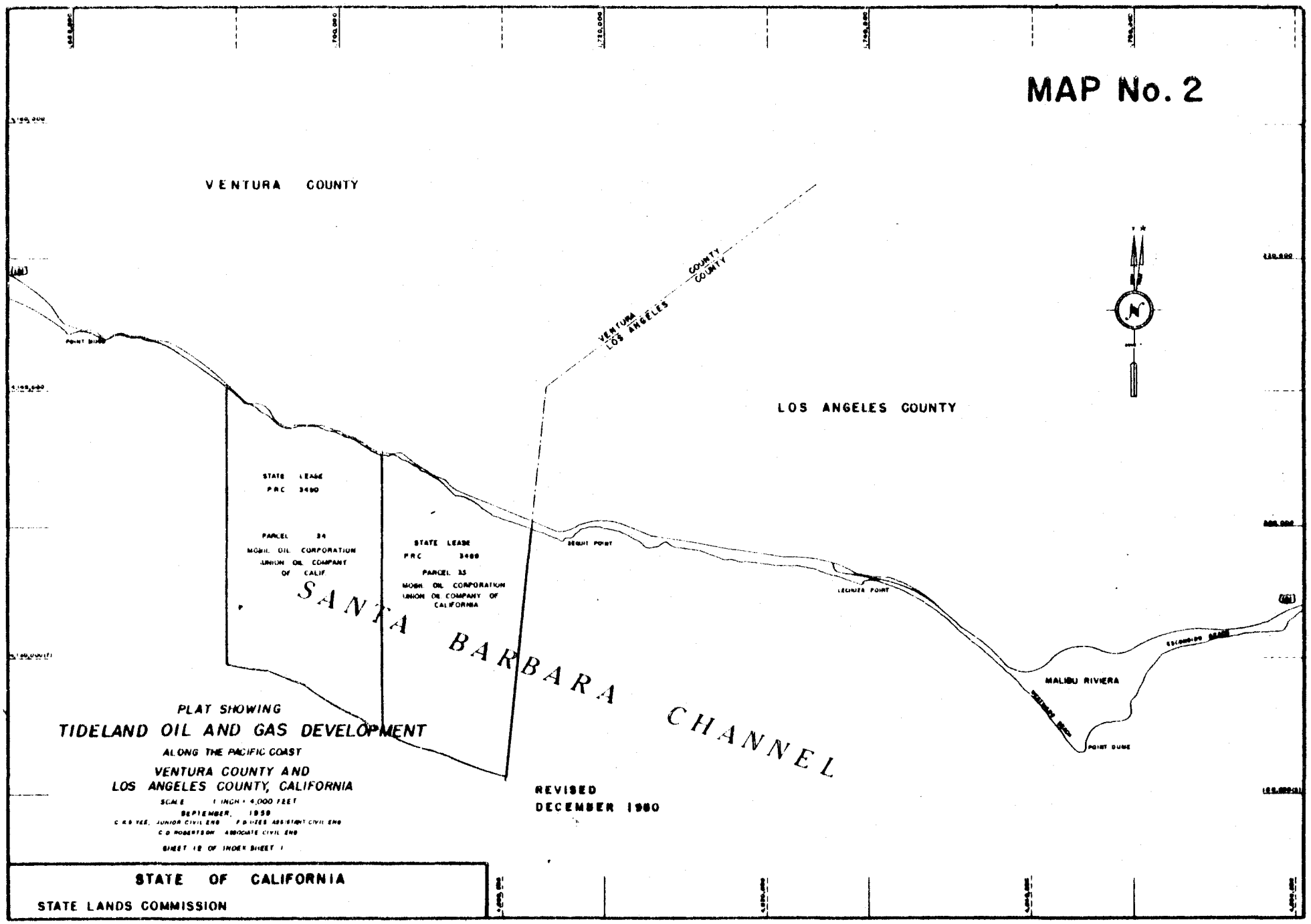
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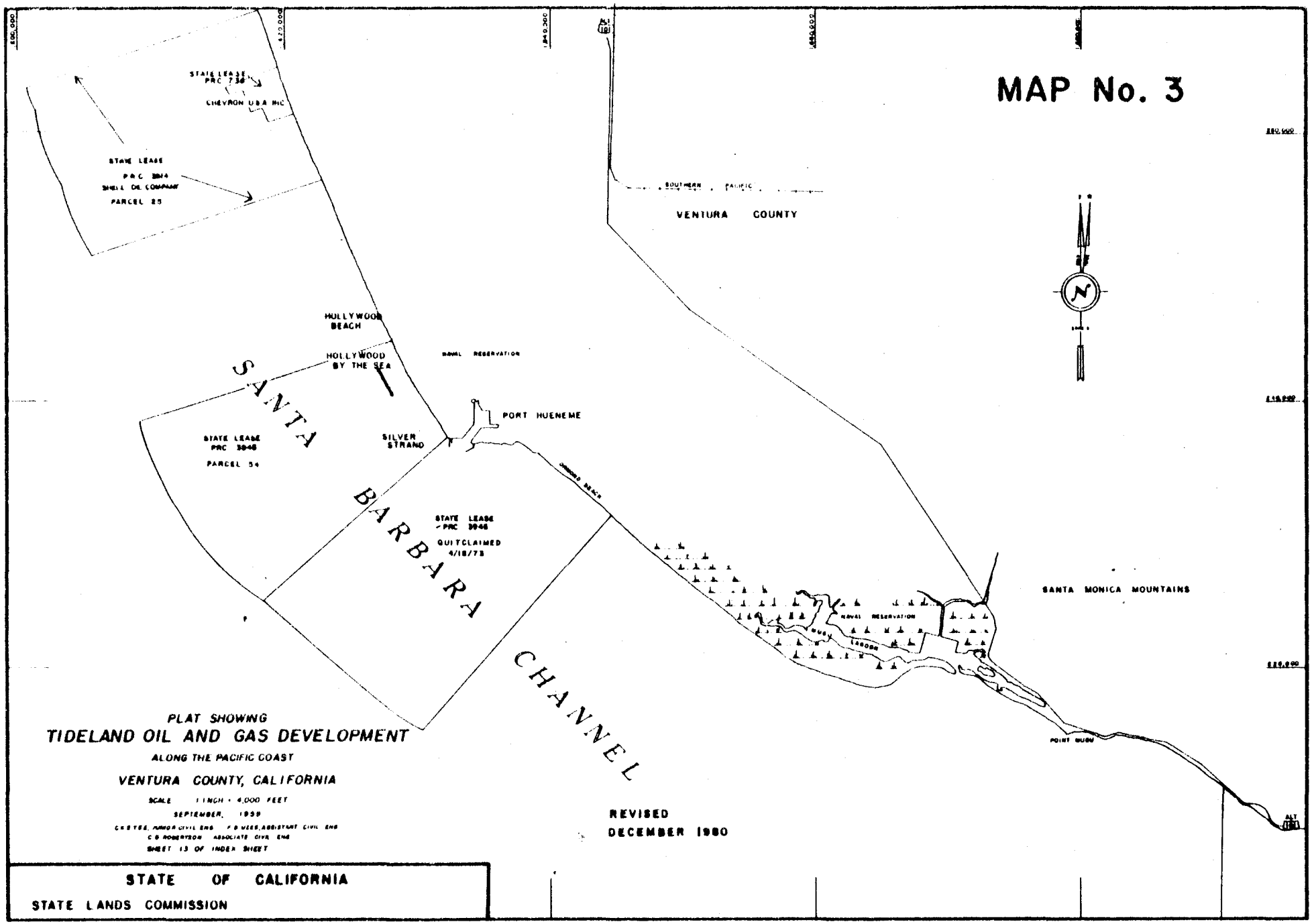
PARCEL 34
MOBIL OIL CORPORATION
UNION OIL COMPANY OF CALIF
STATE LEASE
PRC 3480
PARCEL 35
MOBIL OIL CORPORATION
UNION OIL COMPANY OF CALIFORNIA
SANTA BARBARA CHANNEL
MEDIT POINT
LEDUZA POINT
MALIBU RIVIERA
POINT DUME
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
VENTURA COUNTY AND
LOS ANGELES COUNTY, CALIFORNIA
SCALE 1 INCH = 4,000 FEET
SEPTEMBER, 1959
C.K.S. YEE, JUNIOR CIVIL ENG
F.D. VIZES ASSISTANT CIVIL ENG
C.D. ROBERTSON ASSOCIATE CIVIL ENG
SHEET 12 OF INDEX SHEET 1
REVISED
DECEMBER 1960
STATE OF CALIFORNIA
STATE LANDS COMMISSION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STATE LEASE
PRC 3014
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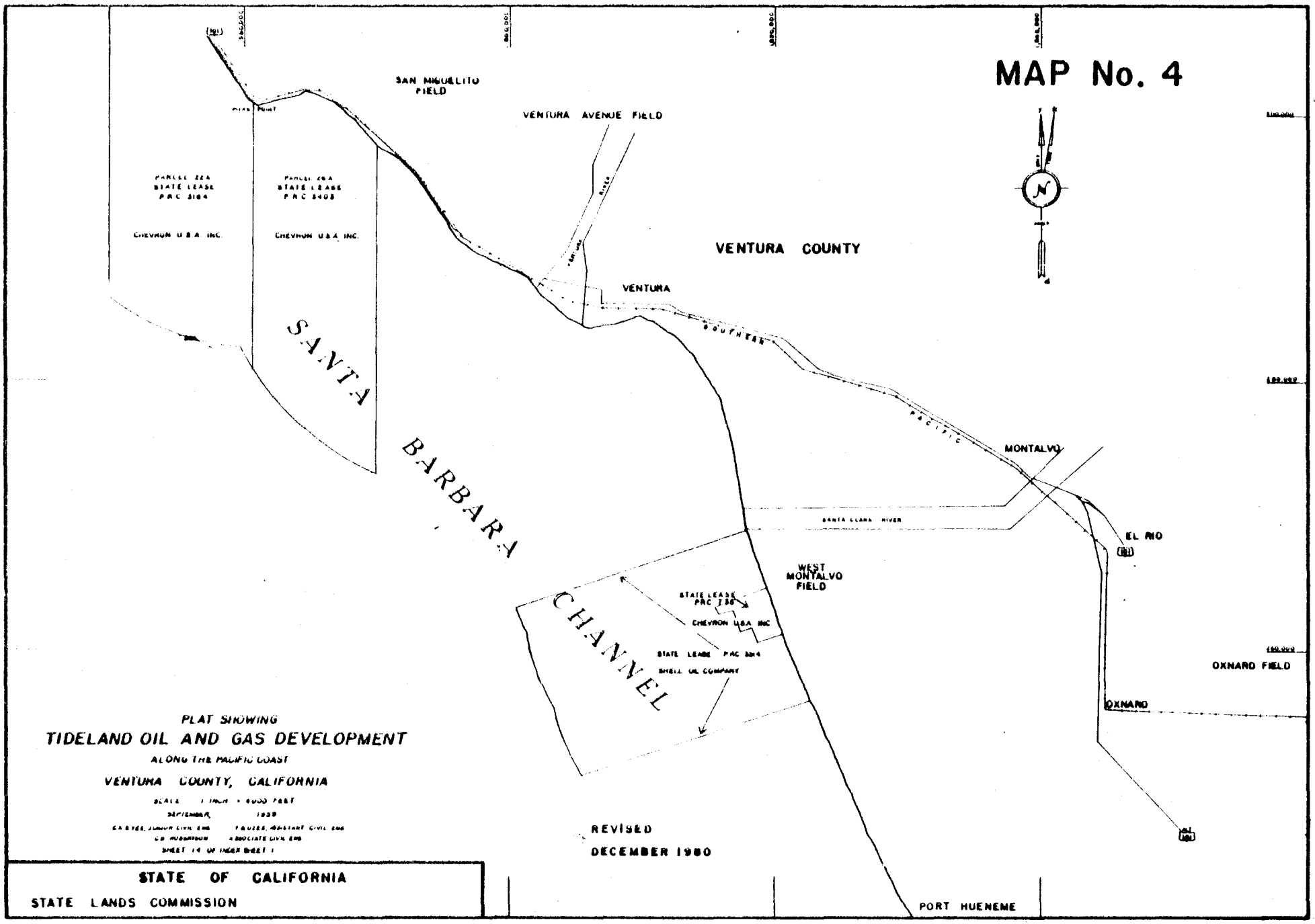
VENTURA COUNTY
HOLLYWOOD BEACH
HOLLYWOOD BY THE SEA
NAVAL RESERVATION
SANTA BARBARA
PORT HUENEME
STATE LEASE
PRC 3046
PARCEL 54
SILVER STRAND
STATE LEASE
PRC 3046
QUITCLAIMED
4/18/73
CHANNEL
SANTA MONICA MOUNTAINS
NAVAL RESERVATION
POINT MUGU
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
VENTURA COUNTY, CALIFORNIA
SCALE 1 INCH = 4,000 FEET
SEPTEMBER, 1959
SHEET 13 OF INDEX SHEET
REVISED
DECEMBER 1980
STATE OF CALIFORNIA
STATE LANDS COMMISSION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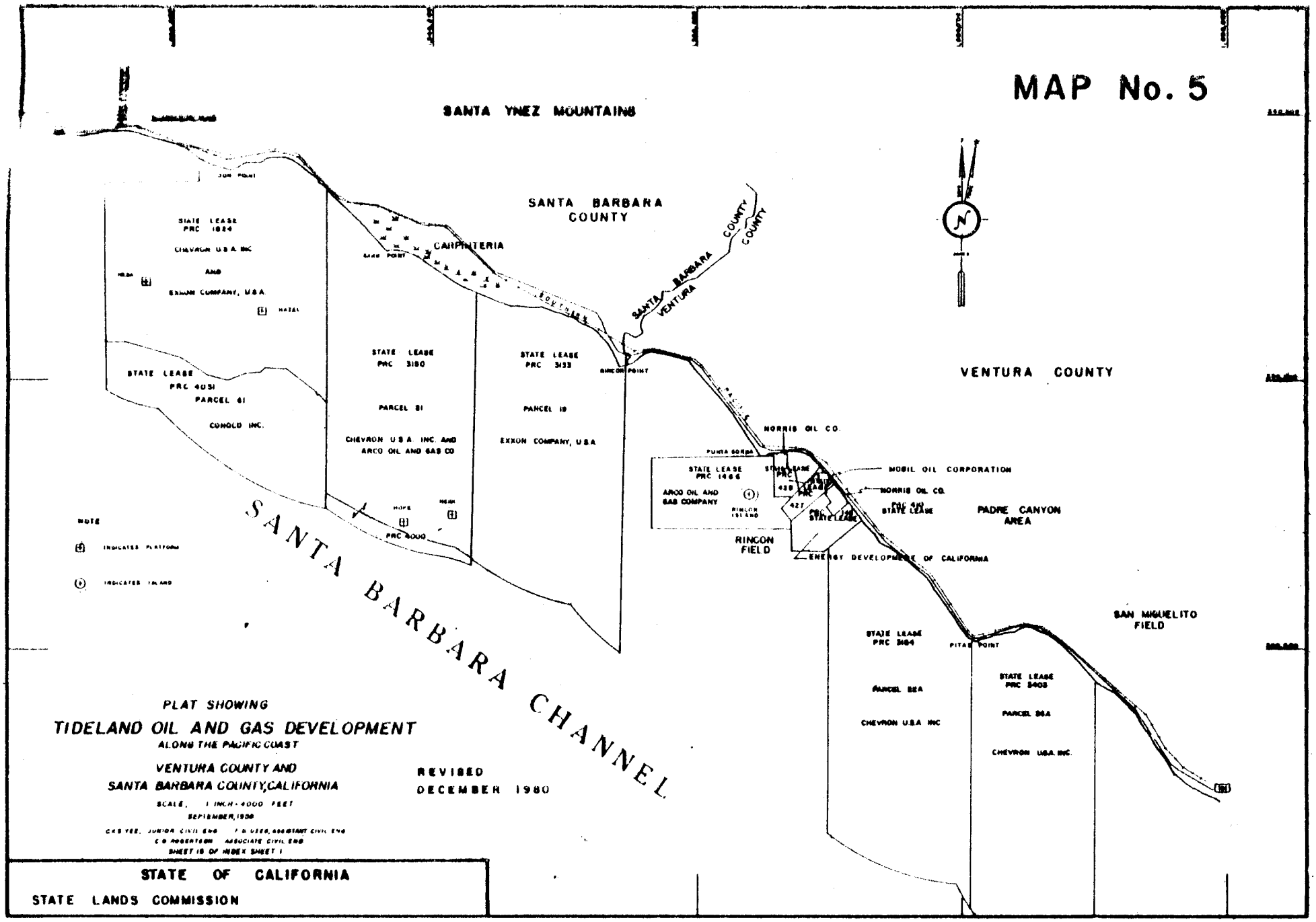
VENTURA COUNTY
VENTURA
SOUTHERN
PACIFIC
MONTALVO
EL RIO
OXNARD FIELD
OXNARD
PORT HUENEME
SANTA BARBARA CHANNEL
WEST MONTALVO FIELD
PARCEL 22A STATE LEASE PRC 3184
CHEVRON U.S.A. INC.
PARCEL 26A STATE LEASE PRC 3408
CHEVRON U.S.A. INC.
STATE LEASE PRC 186
CHEVRON U.S.A. INC.
STATE LEASE PRC 3814
SHELL OIL COMPANY
SANTA CLARA RIVER
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
VENTURA COUNTY, CALIFORNIA
SCALE 1 INCH = 6000 FEET
SEPTEMBER, 1959
SHEET 14 OF INDEX SHEET 1
REVISED
DECEMBER 1960
STATE OF CALIFORNIA
STATE LANDS COMMISSION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VENTURA COUNTY
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AND
EXXON COMPANY, U.S.A.
STATE LEASE PRC 4031
PARCEL 61
CONOCO INC.
STATE LEASE PRC 3180
PARCEL 81
CHEVRON U.S.A. INC AND ARCO OIL AND GAS CO
STATE LEASE PRC 3133
PARCEL 19
EXXON COMPANY, U.S.A.
RINCON POINT
NORRIS OIL CO.
PUNTA GORDA
STATE LEASE PRC 1466
ARCO OIL AND GAS COMPANY
RINCON ISLAND
RINCON FIELD
MOBIL OIL CORPORATION
NORRIS OIL CO.
STATE LEASE
PADRE CANYON AREA
ENERGY DEVELOPMENTS OF CALIFORNIA
SANTA BARBARA CHANNEL
STATE LEASE PRC 3184
PARCEL 86A
CHEVRON U.S.A. INC
PITAS POINT
STATE LEASE PRC 3408
PARCEL 96A
CHEVRON U.S.A. INC.
SAN MIGUELITO FIELD
NOTE
INDICATES PLATFORM
INDICATES INLAND
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
VENTURA COUNTY AND
SANTA BARBARA COUNTY, CALIFORNIA
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SEPTEMBER, 1950
REVISED
DECEMBER 1980
SHEET 18 OF INDEX SHEET 1
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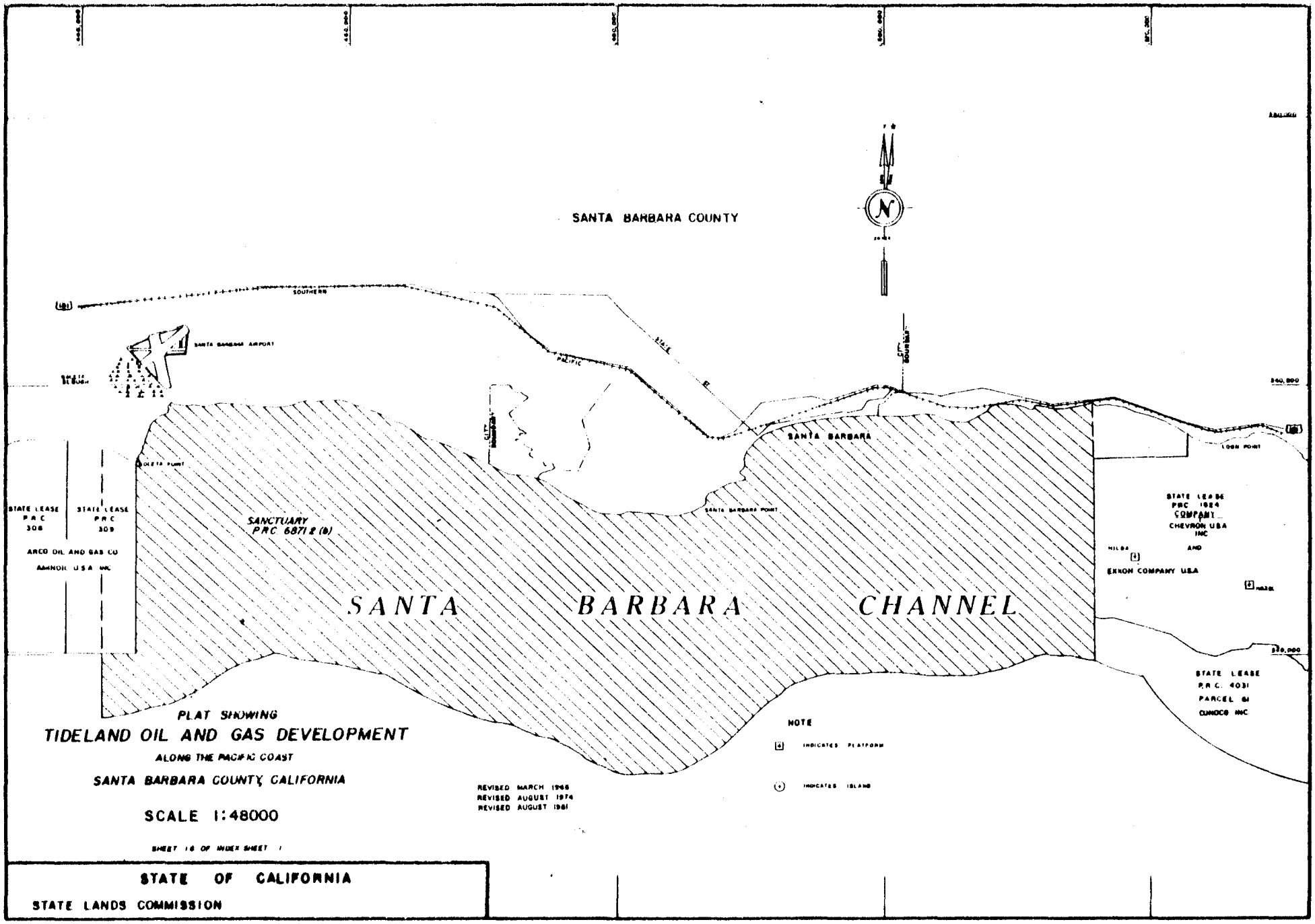
STATE LANDS COMMISSION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SOUTHERN
PACIFIC
SANTA BARBARA AIRPORT
GOLETA POINT
STATE LEASE
P R C
308
STATE LEASE
P R C
309
ARCO OIL AND GAS CO
AMINOIL U S A INC
SANCTUARY
P R C 6871.2 (b)
SANTA BARBARA
SANTA BARBARA POINT
SANTA BARBARA CHANNEL
LOON POINT
STATE LEASE
PRC 1984
COMPANY
CHEVRON U.S.A
INC
AND
EXXON COMPANY U.S.A
HILDA
HIDEE
STATE LEASE
P.R.C. 4031
PARCEL 61
CONOCO INC
NOTE
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INDICATES ISLAND
REVISED MARCH 1966
REVISED AUGUST 1974
REVISED AUGUST 1981
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
SANTA BARBARA COUNTY, CALIFORNIA
SCALE 1:48000
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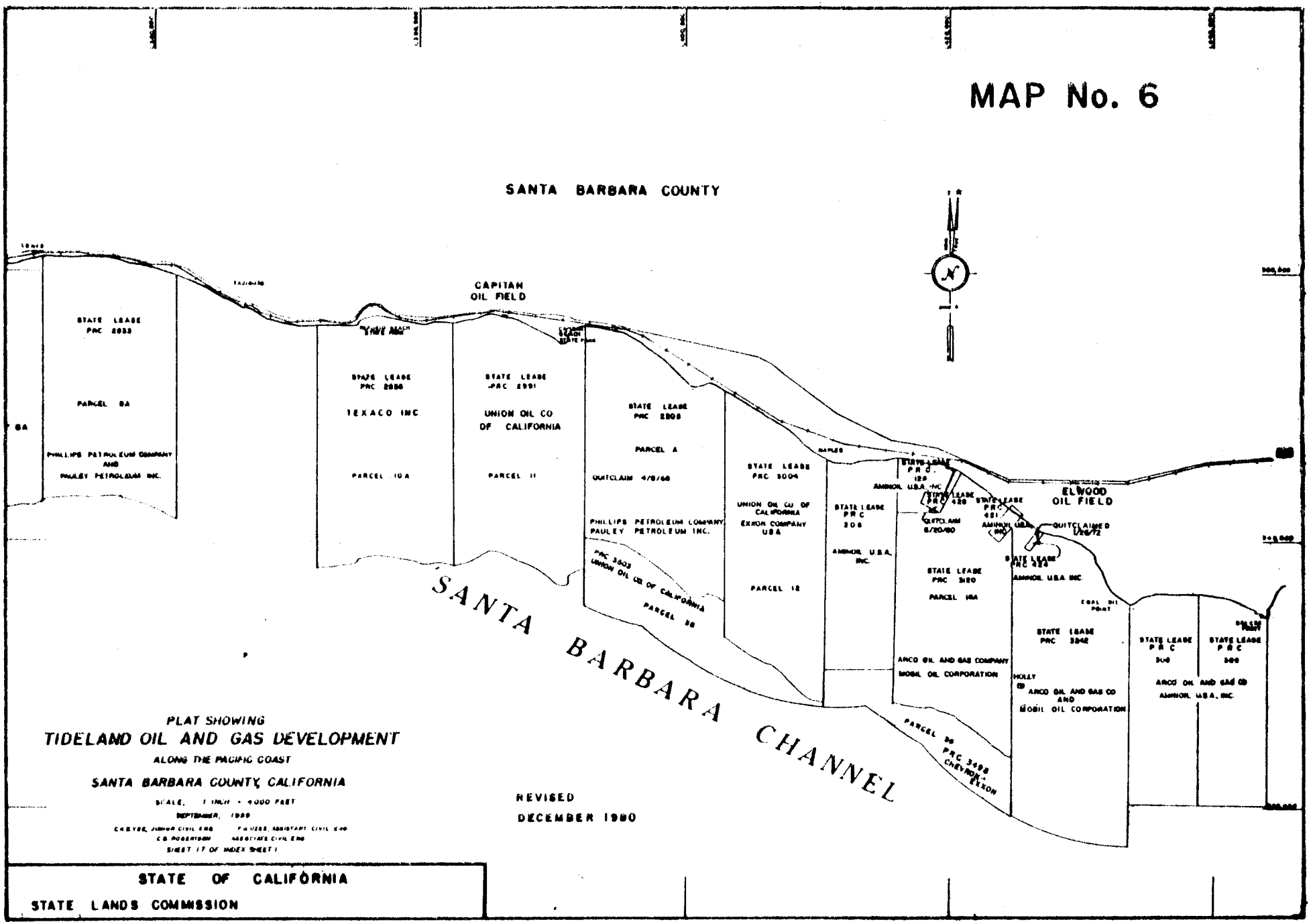
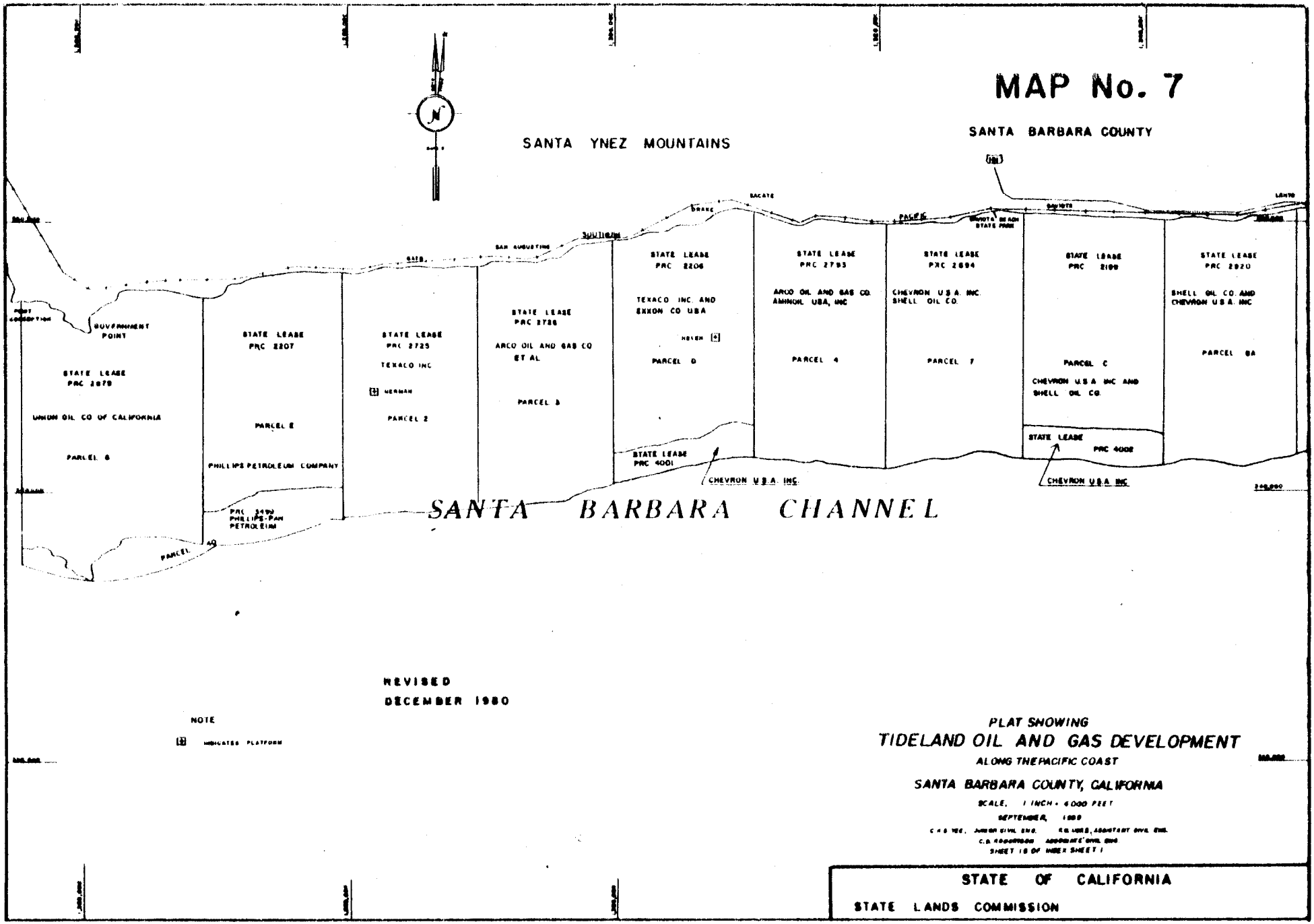
STATE OF CALIFORNIA
STATE LANDS COMMISSION

MAP No. 6


SANTA BARBARA COUNTY
CAPITAN OIL FIELD
ELWOOD OIL FIELD
STATE LEASE PRC 2033
PARCEL 9A
PHILLIPS PETROLEUM COMPANY AND PAULEY PETROLEUM INC.
STATE LEASE PRC 2030
TEXACO INC.
PARCEL 10A
STATE LEASE PRC 2991
UNION OIL CO OF CALIFORNIA
PARCEL 11
STATE LEASE PRC 2808
PARCEL A
QUITCLAIM 4/8/68
PHILLIPS PETROLEUM COMPANY
PAULEY PETROLEUM INC.
PRC 3503
UNION OIL CO OF CALIFORNIA
PARCEL 9B
STATE LEASE PRC 3004
UNION OIL CO OF CALIFORNIA
EXXON COMPANY USA
PARCEL 12
STATE LEASE PRC 206
AMINOIL U.S.A. INC.
STATE LEASE PRC 129
AMINOIL U.S.A. INC.
STATE LEASE PRC 420
QUITCLAIM 6/20/80
STATE LEASE PRC 421
AMINOIL U.S.A. INC.
QUITCLAIMED 1/26/72
STATE LEASE PRC 424
AMINOIL U.S.A. INC.
STATE LEASE PRC 3120
PARCEL 10A
ARCO OIL AND GAS COMPANY
MOBIL OIL CORPORATION
PARCEL 9B
PRC 3498
CHEVRON-EXXON
COAL OIL POINT
STATE LEASE PRC 3042
HOLLY
ARCO OIL AND GAS CO AND MOBIL OIL CORPORATION
STATE LEASE PRC 340
STATE LEASE PRC 500
ARCO OIL AND GAS CO
AMINOIL U.S.A. INC.
SANTA BARBARA CHANNEL
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
SANTA BARBARA COUNTY, CALIFORNIA
SCALE, 1 INCH = 4000 FEET
SEPTEMBER, 1969
REVISED
DECEMBER 1980
STATE OF CALIFORNIA
STATE LANDS COMMISSION


MAP No. 7
SANTA BARBARA COUNTY
SANTA YNEZ MOUNTAINS
SANTA BARBARA CHANNEL
GOVERNMENT POINT
STATE LEASE PRC 2879
UNION OIL CO OF CALIFORNIA
PARCEL 6
STATE LEASE PRC 2207
PARCEL E
PHILLIPS PETROLEUM COMPANY
PRC 3490 PHILLIPS-PAN PETROLEIM
PARCEL 49
STATE LEASE PRC 2725
TEXACO INC
HERMAN
PARCEL 2
STATE LEASE PRC 2726
ARCO OIL AND GAS CO ET AL
PARCEL 3
STATE LEASE PRC 2206
TEXACO INC AND EXXON CO USA
HELEN
PARCEL D
STATE LEASE PRC 4001
CHEVRON U.S.A. INC.
STATE LEASE PRC 2793
ARCO OIL AND GAS CO. AMINOIL USA, INC
PARCEL 4
STATE LEASE PRC 2694
CHEVRON U.S.A. INC. SHELL OIL CO.
PARCEL 7
STATE LEASE PRC 2199
PARCEL C
CHEVRON U.S.A INC AND SHELL OIL CO.
STATE LEASE PRC 4002
CHEVRON U.S.A INC
STATE LEASE PRC 2920
SHELL OIL CO. AND CHEVRON U.S.A. INC
PARCEL 8A
REVISED
DECEMBER 1980
NOTE
INDICATES PLATFORM
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
ALONG THE PACIFIC COAST
SANTA BARBARA COUNTY, CALIFORNIA
SCALE, 1 INCH = 6000 FEET
SEPTEMBER,
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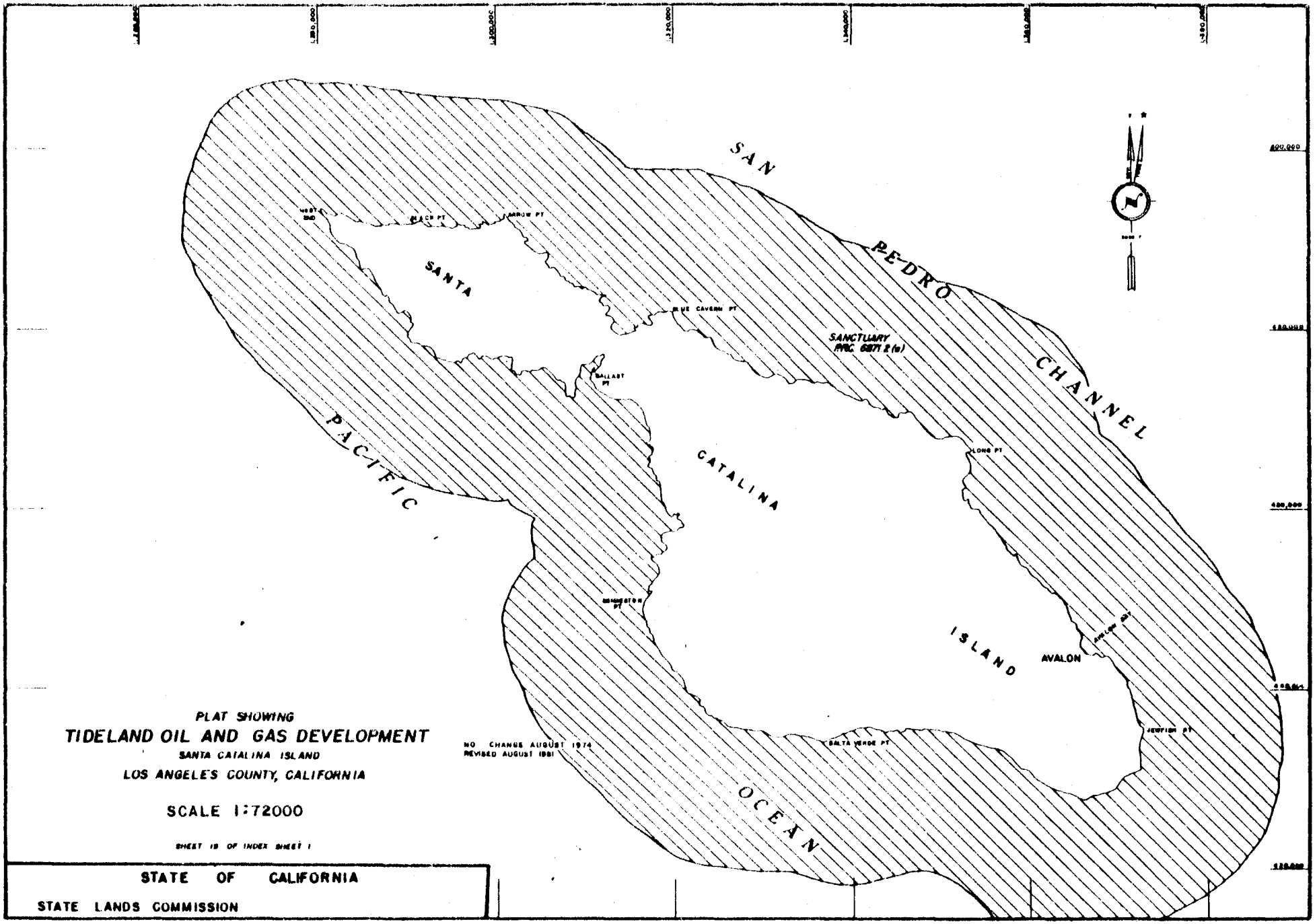
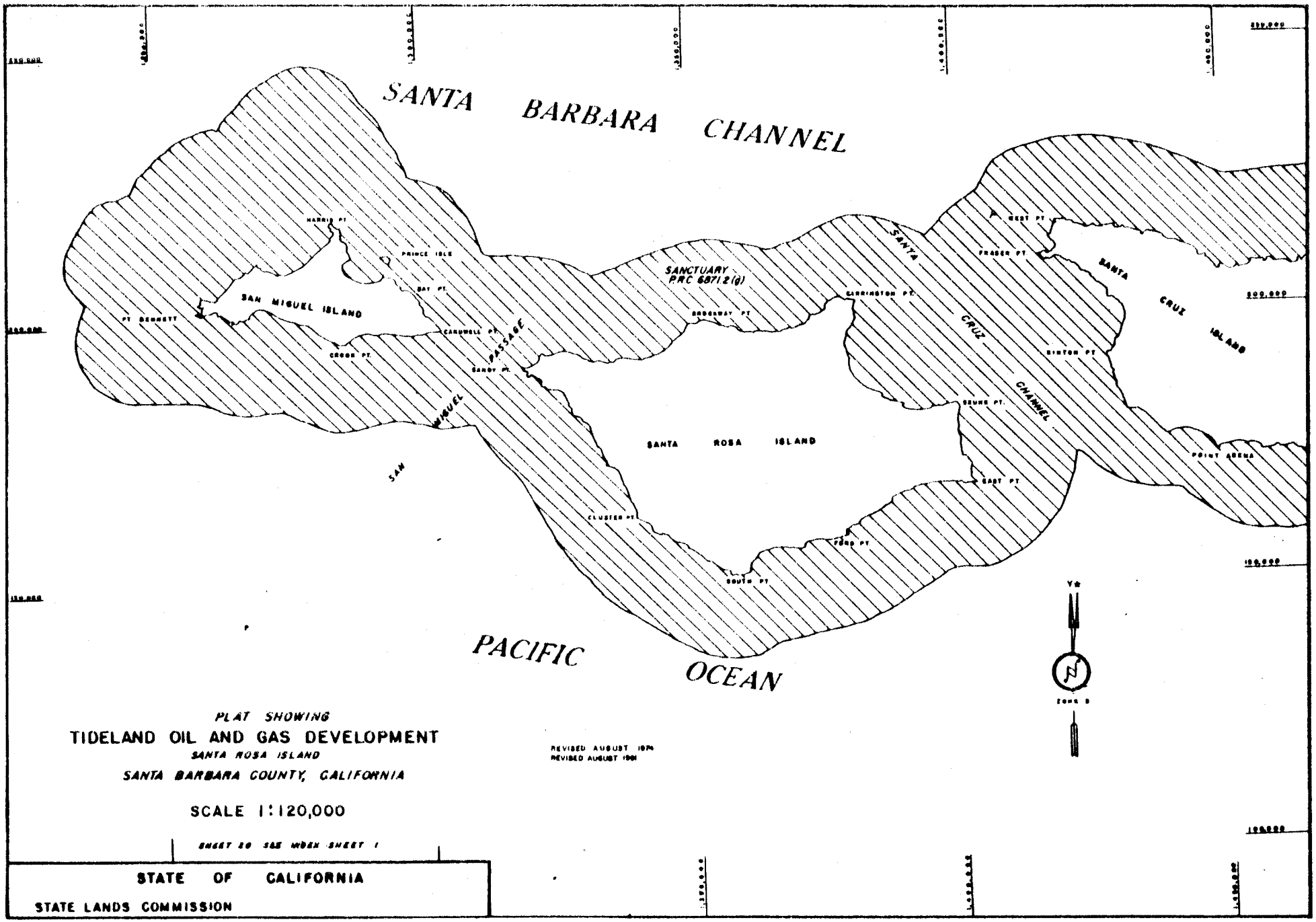
STATE OF CALIFORNIA
STATE LANDS COMMISSION


SAN
PEDRO
CHANNEL
SANTA
PACIFIC
CATALINA
ISLAND
OCEAN
AVALON
SANCTUARY
PUBLIC LAND
BLACK PT
ARROW PT
BLUE CAVERN PT
BALLAST PT
LONG PT
SANTA MONICA PT
SANTA MONICA PT
JEFFERSON PT
NO CHANGE AUGUST 1974
REVISED AUGUST 1981
PLAT SHOWING
TIDELAND OIL AND GAS DEVELOPMENT
SANTA CATALINA ISLAND
LOS ANGELES COUNTY, CALIFORNIA
SCALE 1:72000
SHEET 18 OF INDEX SHEET 1
STATE OF CALIFORNIA
STATE LANDS COMMISSION



PLAT SHOWING

TIDELAND OIL AND GAS DEVELOPMENT

SANTA ROSA ISLAND

SANTA BARBARA COUNTY, CALIFORNIA

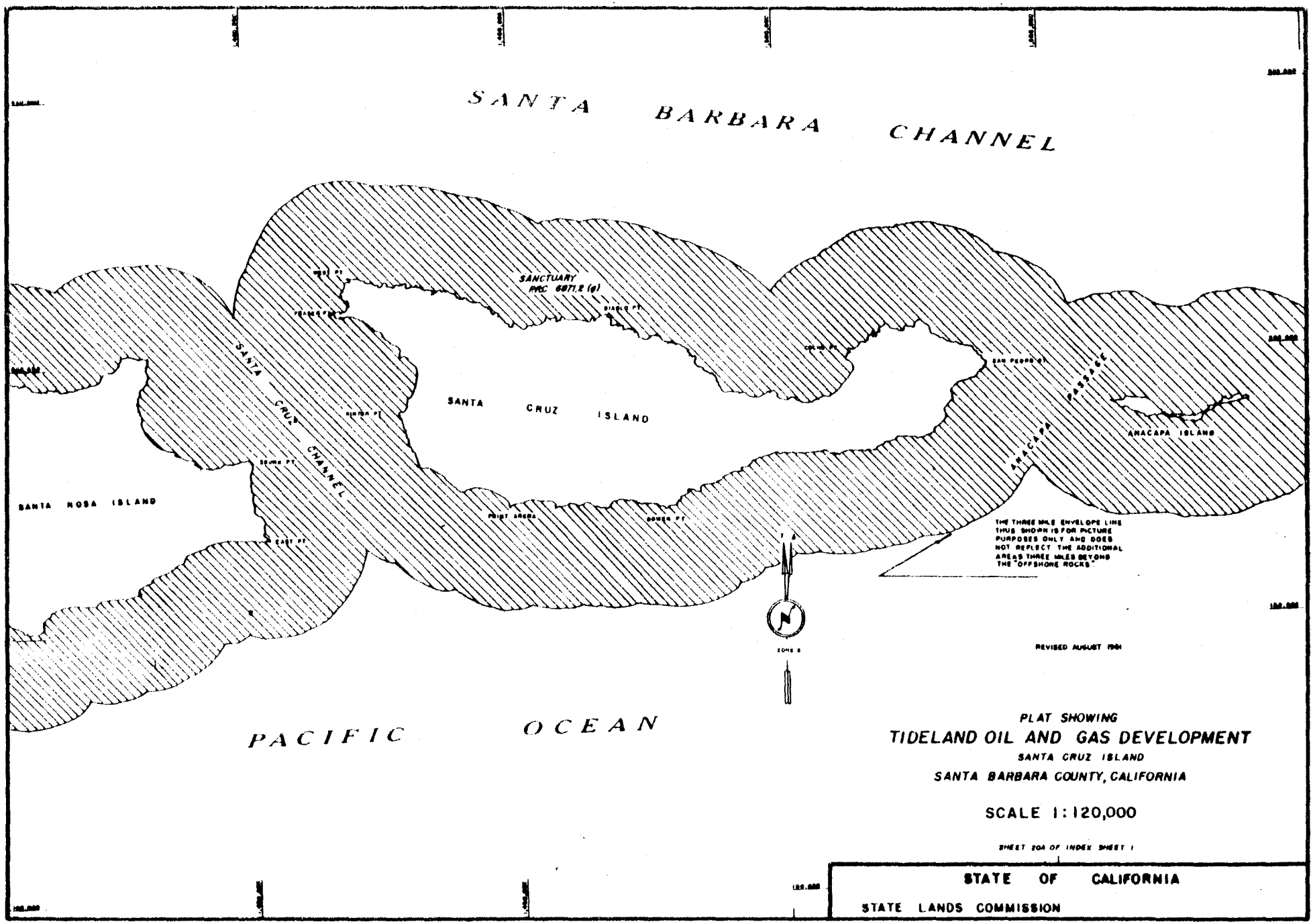
SCALE 1:120,000

SHEET 20 SEE INDEX SHEET 1

REVISED AUGUST 1974
REVISED AUGUST 1981

STATE OF CALIFORNIA

STATE LANDS COMMISSION



PLAT SHOWING

TIDELAND OIL AND GAS DEVELOPMENT

SANTA CRUZ ISLAND

SANTA BARBARA COUNTY, CALIFORNIA

SCALE 1:120,000

SHEET 20A OF INDEX SHEET 1

STATE OF CALIFORNIA

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