shall be revised annually upon the basis of the shut-in pressures of the individual wells as of March 1 of each year.

"The revision data to be effective March 1, 1955, as presented by the Standard Oil Company of California, have been reviewed by the staff and found to be computed correctly. This revision would result in a State percentage participation in the Kirby Hill gas field production under Compensatory Royalty Agreement P.R.C. 255.1 in the percentage of 5.426, as against 5.219 which was effective from March 1, 1954 to March 1, 1955."

UPON MOTION DULY MADE AND UNANIMOUSLY CARRIED, IT WAS RESOLVED AS FOLLOWS:

THE EXECUTIVE OFFICER IS AUTHORIZED TO APPROVE THE ANNUAL MODIFICATION OF THE STATE PARTICIPATION PERCENTAGE UNDER COMPENSATORY ROYALTY AGREEMENT 255.1, TO BE 5.426 PER CENT FOR THE PERIOD MARCH 1, 1955 TO MARCH 1, 1956.

17. (PROPOSED OIL AND GAS LEASE, TIDE AND SUBMERGED LANDS, HUNTINGTON BEACH, ORANGE COUNTY - W.O. 1809.) The following report was presented to the Commission:

"On March 10, 1955 (Minute Item 3, pages 2275-2280) the Commission directed a study by a special Board of Consultants on the bases for lease offer of approximately 2,640 acres of tide and submerged land adjoining the Huntington Beach State Beach Park and the westerly limits of the City of Newport Beach, which had been recommended for lease offer January 21, 1955 (Minute Item 6, pages 2244-2246). The aforesaid recommendation of January 21, 1955 has been reviewed after consideration of the reports submitted June 30, 1955 by Consultants Bennett, Homan and Stanley, with the following conclusions as to the applicability of the Consultants' recommendations to the subject lease offer. (Copies of these reports are attached as Exhibits 'A', 'B' and 'C' respectively.)

"Engineering (E. R. Stanley)

1. While no planning specification has been recommended by Mr. Bennett as to minimum distance for the location of offshore drillsites from the shore, the suggestion has been offered by Mr. Stanley that 'if not inconsistent with the findings of' the 'planning consultant', . . . 'we suggest consideration be given to altering the current "not less than one mile seaward' restriction of the lease form." However, it would appear desirable that the original specification of not less than one mile from shore for the placement of filled land drillsites should be maintained in this instance, in view of the location of the proposed operations in front of the Huntington Beach State Beach Park, and in consideration of no foreseeable construction difficulties.

2. Technical amendment of the definition of an oil and gas zone as specified in Exhibit 'A' of the proposed lease form is recommended by Mr. Stanley and is concurred in by the staff.

3. It is the opinion of Mr. Stanley that 'we concur in the opinion that the production of oil and gas in the City of Newport Beach Tideland Lease constitutes a direct threat of drainage to State lands, specifically the area contained in Project W.O. 1809 lying westerly of the above lease . . . Alleviation of this serious drainage and pressure depletion is desirable, and we recommend that the parcel(s) previously designated as Leasing Project(s)...W.O. 1809 be offered for lease at an early date.

"Economics (Dr. P. T. Homan)

1. The proposed lease offer falls within the category recommended for specification of a '. . . combination of prescribed sliding-scale royalty curve and bonus bidding . . .' and '. . . a maximum royalty rate is recommended consistent with the principle of adequate continuing incentives.' 'Concerning the shape of the prescribed curve, no recommendation is offered. A primary condition has already been stated: namely, that in the judgment of the Commission the prescribed royalties will have no deterrent effect upon adequate use and development of productive capacity. Assuming this condition to be satisfied, the shape of the curve will be determined by the relative weight given to the desirability of present bonus revenue as compared to future royalty revenue.' These criteria are completely compatible with the royalty and bid bases suggested December 17, 1954 (Minute Item 4, pages 2195-2196) for lease under W.O. 1809.

   The sliding-scale royalty curve recommended herewith incorporates the combination of 16-2/3% minimum royalty, increasing royalty with increased production based on actual lease production experience in the closest adjoining operating areas at Huntington Beach and a maximum rate of 60% based on estimated maximum production rates to permit 'adequate continuing incentives.'

"Planning (C. B. Bennett)

1. 'Wherever drilling is proposed on an on-shore site in the vicinity of a publicly owned beach, such site, if feasible, should be situated at least five hundred (500) feet from the beach, and all of the six (following) conditions made applicable:

   a. The operator shall remove the derrick from each well within sixty (60) days after the drilling of said well has been completed, and thereafter, when necessary, such completed wells shall be serviced by portable derricks.

b. The drill site shall be landscaped with shrubbery, or fenced, so as to screen from public view as far as possible, the tanks, pumps or other permanent equipment. Such landscaping and shrubbery, or fencing, to be kept in good condition.

c. All oil drilling and production operations shall be conducted in such a manner as to eliminate, as far as practicable, dust, noise, vibration or noxious odors.

d. All waste substances such as drilling muds, oil, brine or acids produced or used in connection with oil drilling operations or oil production shall be retained in watertight receptors from which they may be piped or hauled for terminal disposal in a dumping area specifically approved for such disposal by local authorities.

e. No sign shall be constructed or erected, maintained or placed on the premises except those required by law or ordinance to be displayed in connection with the drilling or maintenance of the well.

f. Suitable and adequate sanitary toilet and washing facilities shall be installed and maintained in a clean and sanitary condition at all times.'

"An informal opinion has been received from the Office of the Attorney General indicating that legally it would be more advantageous to issue the currently proposed oil and gas lease under existing law in preference to waiting for the effective date of A.B. 3402. (A copy of this opinion is attached as Exhibit 'D'.)"

J. M. Wootan suggested leasing should await operating procedures potentially available under A.B. 3402, and protested that application of the 500-foot setback provision would restrict State's lessees without accomplishing aesthetic improvement in upland drilling area.

R. F. Lauer also suggested that leasing should be considered only under flexibility of A.B. 3402 when approved, particularly because of an alleged bid advantage if platforms can be planned in lieu of filled islands. This presentation was supported by P. Lower and J. Leovy who contended that discussion in the Legislature indicated that any leasing should await revised statutes.

R. Barrows recommended consideration of elimination of requirement for any bidder for an offshore lease to show advance possession of onshore storage and operating sites other than drillsites.

J. Bridges commented that consideration should be given to limitation of reasons for rejection of any future lease bids to conditions of connivance or collusion.

UPON MOTION DULY MADE AND UNANIMOUSLY CARRIED, IT WAS RESOLVED AS FOLLOWS:

THE EXECUTIVE OFFICER IS AUTHORIZED TO PREPARE A FORM OF OIL AND GAS LEASE AND PUBLISH A NOTICE OF INTENTION TO RECEIVE BIDS IN ACCORDANCE WITH THE PUBLIC RESOURCES CODE, FOR TWO PARCELS OF TIDE AND SUBMERGED LANDS IN ORANGE COUNTY EXTENDING WESTERLY FOR TWO MILES FROM THE WESTERLY NEWPORT BEACH CITY LIMITS COVERING THE AREAS PARALLEL WITH THE ORDINARY HIGH WATER MARK EXTENDING FROM THE LANDWARD LIMIT OF THE HUNTINGTON BEACH STATE BEACH PARK TO ONE MILE SEAWARD OF THE ORDINARY HIGH WATER MARK, AND FROM ONE MILE SEAWARD TO TWO MILES SEAWARD OF THE ORDINARY HIGH WATER MARK, AS AUTHORIZED PREVIOUSLY APRIL 27, 1954 (MINUTE ITEM 5, PAGES 2057-2058) AND AMENDED JANUARY 21, 1955 (MINUTE ITEM 6, PAGES 2244-2246), SUBJECT TO THE FOLLOWING:

1. THE LEASE OPERATING TERMS AND CONDITIONS SHALL CONFORM TO THE CONDITIONS AUTHORIZED PREVIOUSLY AND APPROVED AS TO FORM BY THE OFFICE OF THE ATTORNEY GENERAL FOR OIL AND GAS LEASE P.R.C. 1524.1.

2. SPECIFICATION OF LEASE OIL ROYALTY RATE TO BE IN ACCORDANCE WITH THE FOLLOWING FORMULA:

$$R = \frac{S}{3 + 0.01S}$$

WHERE R = ROYALTY RATE IN PER CENT

S = AVERAGE DAILY LEASE SHIPMENTS DURING CALENDAR MONTH

MINIMUM ROYALTY RATE = 16-2/3%

MAXIMUM ROYALTY RATE = 60%

3. SECTION 4, EXHIBIT A, OF THE PROPOSED LEASE FORM TO BE AMENDED TO CONFORM TO THE DEFINITION OF AN OIL AND GAS ZONE AS RECOMMENDED BY CONSULTANT E. R. STANLEY.

4. THE LEASE OFFER SHALL PROVIDE FOR BIDDING ON A BONUS BASIS.

5. CURRENT REQUIREMENTS FOR A BIDDER TO SHOW EVIDENCE OF CONTROL OF SITES FOR STORAGE AND OTHER PROCESSING FACILITIES ARE TO BE ELIMINATED.

6. THE LEASE SHALL REQUIRE:

   (a) THAT NO OPERATIONS REQUIRED UNDER THE LEASE SHALL BE CONDUCTED ON THE SURFACE WITHIN ONE HUNDRED (100) FEET OF THE LANDWARD SIDE OF U. S. HIGHWAY 101 EASTERLY OF STATE HIGHWAY 39.

(b) THE OPERATOR SHALL REMOVE THE DERRICK FROM EACH WELL WITHIN SIXTY (60) DAYS AFTER THE DRILLING OF SAID WELL HAS BEEN COMPLETED, AND THEREAFTER, WHEN NECESSARY, SUCH COMPLETED WELLS SHALL BE SERVICED BY PORTABLE DERRICKS.

(c) THE DRILL SITE SHALL BE LANDSCAPED WITH SHRUBBERY, OR FENCED, SO AS TO SCREEN FROM PUBLIC VIEW AS FAR AS POSSIBLE, THE TANKS, PUMPS OR OTHER PERMANENT EQUIPMENT. SUCH LANDSCAPING AND SHRUBBERY, OR FENCING, TO BE KEPT IN GOOD CONDITION.

(d) ALL OIL DRILLING AND PRODUCTION OPERATIONS SHALL BE CONDUCTED IN SUCH A MANNER AS TO ELIMINATE, AS FAR AS PRACTICABLE, DUST, NOISE, VIBRATION OR NOXIOUS ODORS.

(e) ALL WASTE SUBSTANCES SUCH AS DRILLING MUDS, OIL, BRINE OR ACIDS PRODUCED OR USED IN CONNECTION WITH OIL DRILLING OPERATIONS OR OIL PRODUCTION SHALL BE RETAINED IN WATERTIGHT RECEPTORS FROM WHICH THEY MAY BE PIPED OR HAULED FOR TERMINAL DISPOSAL IN A DUMPING AREA SPECIFICALLY APPROVED FOR SUCH DISPOSAL BY LOCAL AUTHORITIES.

(f) NO SIGN SHALL BE CONSTRUCTED OR ERECTED, MAINTAINED OR PLACED ON THE PREMISES EXCEPT THOSE REQUIRED BY LAW OR ORDINANCE TO BE DISPLAYED IN CONNECTION WITH THE DRILLING OR MAINTENANCE OF THE WELL.

(g) SUITABLE AND ADEQUATE SANITARY TOILET AND WASHING FACILITIES SHALL BE INSTALLED AND MAINTAINED IN A CLEAN AND SANITARY CONDITION AT ALL TIMES.

Attachments: Exhibits "A", "B", "C" and "D"

EXHIBIT "A"

REPORT TO THE
STATE LANDS COMMISSION
CALIFORNIA

The responsibility of managing certain State owned lands has been assigned to the State Lands Commission by the State Legislature. Among these lands are tidelands and submerged lands under some of which oil deposits are known to exist. The rights to this oil belong to all of the people of the State and it is the duty of the Commission to see that these rights are protected and preserved. Chapter Three, Part 2, Division 6, of the Public Resources Code, relating to oil, gas and mineral leases, sets forth the procedures to be followed when, in the findings of the Commission, it is necessary to protect the State's rights by offering to lease tidelands containing oil and gas for the extraction of same upon a specified royalty formula. The Code likewise sets forth cautionary measures to be contained in lease forms, in order that the general public interest be protected.

For example: "Pollution and contamination of the ocean and tidelands and all impairment of and interference with bathing, fishing or navigation in the waters of the ocean or any bay or inlet thereof, is prohibited and no oil, tar, residuary product of oil or any refuse of any kind, from any well or works, shall be permitted to be deposited on or pass into the waters of the ocean or any bay or inlet thereof." . . . . . "Impairment of or interference with developed shore line recreational areas or residential areas is prohibited."

It is apparent that the Legislature intended that this public trust be not indifferently or capriciously administered and established "ground rules", as it were, to clarify such intention.

Further, the statutes provide that proceeds from oil and gas leases on State owned lands, other than school lands, be allocated, after subtraction of certain operating expenses as follows:- Thirty percent to the General Fund; Twenty-three and one-third percent to the State Beach Fund; and Forty-six and two-thirds percent to the State Park Fund.

This division of the profits also compliments the foresight of the Legislature when it provided the financial means whereby the State's great recreational potential might be enhanced through the expansion of park and beach facilities to meet the tremendous population growth that has taken place in the past two decades — a growth destined to continue for some time to come.

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Under the terms of the Contract between the Commission and the undersigned Consultant, the Consultant has made a study of the Huntington Beach area in Orange County, as described in Exhibit "A" of his Contract, in relation to the prescription of judgments to be rendered thereon.

After viewing and visiting the existing island constructed by the Monterey Oil Company, one and one-half miles off-shore at Seal Beach, it is his opinion that the extraction of oil and gas from the tidelands in this manner will prove to be a better method of operation than the present one of slant drilling from on-shore sites, so far as conflict with recreational and residential interests are concerned.

Off-shore drilling, situated one mile from the shore line and surrounded by open water on all sides could not, in the Consultant's opinion, seriously affect on-shore development, including public beach facilities. Aesthetically, the view of the off-shore drilling island would be less of a psychological hazard than an oil drilling on-shore operation located in the near vicinity of the beach.

The only other possible hazard of a serious nature is that of a well blow-out or oil line break which would pollute beach waters. It is the Consultant's understanding that devices for reducing this hazard to the barest minimum are available to the operator and would be installed.

The appearance of the Monterey Oil Company off-shore island could be improved by the construction of siding, about six feet in height, above the main deck of the island. This would obscure from vision the stock pile of pipe and most of the equipment necessary in the operation of the facility. Where islands are to be but one mile from shore, as proposed in W.O. 1864(A) lease, this would seem to be especially desirable.

For economic reasons, important to the operator, it may be impossible, in every instance, for the State to lease tidelands for oil exploration from off-shore islands only. This type of facility is expensive to construct and maintain along with submarine pipe lines. Whenever possible, however, the off-shore method of drilling should be favored.

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Upland drilling for oil in the Los Angeles and Orange County urban areas has been a continuing source of conflict between the oil operators and residential property owners. Drilling, pumping and storage of oil is essentially an industrial operation incompatible with residential uses. Living amenities and residential values are bound to be detrimentally affected where they mix.

Huntington Beach is a good example of the effect of on-shore drilling on surrounding development. Venice is another.

In some jurisdictions, local public officials have enacted stringent regulations governing the drilling of oil in an effort to mitigate the friction, but only in instances where residential owners share in the royalties, has reconciliation relieved the political stress on public authorities.

RECOMMENDATION:

Where a lease is let for slant drilling into State owned tidelands from an on-shore site under the jurisdiction of the State, or otherwise owned or leased by the successful bidder, said lease should contain conditions governing methods of operation which are necessary to reduce to a minimum the depreciating effect oil drilling, pumping and storage usually has on surrounding property.

Following are conditions which should be considered for inclusion in the lease:-

1. The operator shall remove the derrick from each well within sixty (60) days after the drilling of said well has been completed, and thereafter, when necessary, such completed wells shall be serviced by portable derricks.

2. The drill site shall be landscaped with shrubbery, or fenced, so as to screen from public view as far as possible, the tanks, pumps or other permanent equipment. Such landscaping and shrubbery, or fencing, to be kept in good condition.

3. All oil drilling and production operations shall be conducted in such a manner as to eliminate, as far as practicable, dust, noise, vibration or noxious odors.

4. All waste substances such as drilling muds, oil, brine or acids produced or used in connection with oil drilling operations or oil production shall be retained in watertight receptors from which they may be piped or hauled for terminal disposal in a dumping area specifically approved for such disposal by local authorities.

5. No sign shall be constructed or erected, maintained or placed on the premises except those required by law or ordinance to be displayed in connection with the drilling or maintenance of the well.

6. Suitable and adequate sanitary toilet and washing facilities shall be installed and maintained in a clean and sanitary condition at all times.

It is not recommended that the aforementioned six conditions be arbitrarily incorporated in every on-shore drill site lease. Circumstances may vary in each case to such extent that one, or all, or even additional conditions are warranted. Also, where a drill site is situated in a local zone district where oil drilling is permitted as a matter of right, it may be advisable to not require any performance standards.

Where a drill site is not State owned and the oil drilling operation is governed by local regulations, conditions in the lease may be eliminated if, in the opinion of the Commission, the local regulations are adequate to protect the public interest.

However, whenever drilling is proposed on an on-shore site in the vicinity of a publicly owned beach, such site, if feasible, should be situated at least five hundred (500) feet from the beach, and all of the six conditions made applicable.

A good example of an inoffensive operation is that in Newport Beach where the operator has his pumping facilities set back to the North of Highway 101 and completely fenced off and landscaped.

It should be within the province of the Executive Officer of the Commission to grant minor variations in the terms of the conditions where same appear

advisable because of exceptional circumstances. The Commission might give consideration to seeking the cooperation of local public officials, in whose jurisdiction on-shore drill sites are situated, in establishing reasonable controls over appearance of the sites. The City of Los Angeles has had in effect for the past several years a set of regulations governing the drilling for oil, both in urbanized and non-urbanized districts. Oil operators have cooperated splendidly in conforming to these requirements and, as a consequence, have materially overcome much of the antagonism property owners feel toward the oil companies.

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No specific recommendations for regulating the size, shape, type of construction and appearance of off-shore island drill sites is made since this method of operation is still in an embryonic stage and will undergo change with experience.

Bidders for off-shore drilling rights should be required to submit plans of the type of island facilities they propose to construct with the understanding that the Commission reserves the right to impose reasonable conditions necessary, in their opinion, to enhance the aesthetic appearance of the installation.

No judgment is rendered in respect to leasing under the current provisions of the Public Resources Code or to wait until Assembly Bill 3402 becomes law, because the amendments contained in A.B. 3402 appear to affect the economics rather than the a esthetics of leasing procedures.

Respectfully submitted,

/s/ CHAS. B. BENNETT
Charles B. Bennett
Planning Consultant
Los Angeles, California

June 30, 1955

EXHIBIT "B"

July 1, 1955

REPORT TO THE CALIFORNIA STATE LANDS COMMISSION

Bid Bases and Royalty Terms under Oil Leases in Tide and Submerged Lands

by
Paul T. Homan

I. Basis of the Report

The author of this report was engaged by the California State Lands Commission on a consulting contract to prepare an impartial analysis of bid bases and royalty terms applicable to oil production under leases of state-owned tide and submerged lands and to make recommendations with special reference to contemplated leases at Huntington Beach. The author is solely responsible for the analysis and recommendations in the report, which is based on evidence and opinions gained from the State Lands Division, representatives of the petroleum industry and other sources.

II. General Conclusions and Recommendations

A. General Conclusions

The following general conclusions are presented in summary form without supporting argument.

1. The sole certain advantage to the state of the low flat rate and bonus plan, sponsored by much of the industry, is that it would provide some assured revenue to the state, as compared with the uncertain prospect of higher royalties at later dates. Beyond this, its advantage to the industry is clear enough, but its advantage to the state is not obvious. There is no evidence that the plan would necessarily be more effective than some other, potentially more remunerative to the state, in providing the necessary profit incentive to adequate productive operations.

2. There is no reason in principle why the state should settle for the maximum in cash bonuses, as against seeking larger potential revenue through royalties, when informed judgment presents the probability that the larger revenues will be forthcoming. There is, however, no clear principle as to what exact compromise should be struck between maximising assured as against potential revenue. The decision is necessarily arbitrary. If not made by legislative action, as it has not been, the making of policy on this point becomes an inescapable responsibility of the Commission. Assuming it to give adequate attention to continuing incentives to high production and full recovery, the main question for the Commission to decide is what weight to give to present bonus cash as against uncertain future royalties.

3. Achieving the largest revenue for the state should not be the sole objective of a royalty and bidding plan. Relatively full recovery

of oil is equally important. Even at some loss of revenue, rates which would promote fuller development would be economically justified. The wealth created and the incomes earned in producing more oil would be economic offsets to loss of direct revenue to the state. The "public interest" in oil leases is not precisely the same as the state's direct financial interest.

4. The plan heretofore followed by the Commission appears to be defective on two counts:

(a) Where bidding is essentially monopolistic, as has been the usual case in the past, it probably gives the state less revenue than would be attainable by some other alternative.

(b) Where competition is actively present, as in the two most recent leases, the royalty rates are likely to be so high as to preclude the most advantageous rate of production and adequate development.

The sliding-scale plan heretofore followed has probably provided the state with more revenue than would have been forthcoming under a 16 2/3 per cent and bonus plan. There is, however, no evidence that it is the most remunerative plan which could have been devised, consistent with adequate incentives to full and efficient production.

5. A bidding and royalty plan for Huntington Beach need give no special consideration to the interests of small bidders - an item in the Commission's earlier thinking. Under the probable conditions at Huntington Beach, involving the building of expensive islands, the question would have no particular importance. Only fairly large financial interests are likely to take an interest in the bidding. Apart from this, however, there is no persuasive evidence that the encouragement to small bidders, through absence of bonus bidding, has ever had any importance to the state's financial interest - with the doubtful exception of the most recent lease.

6. In the field of compromise (and any decision will be a compromise between opposing principles) a combination of the sliding-scale and bonus plans appears to offer the greatest advantage on two counts:

(a) If monopoly bidding is anticipated, the Commission can prescribe a royalty curve which will somewhat protect the state's interest.

(b) If active competition is anticipated, the Commission can establish a royalty curve and maximum rate which in its judgment will provide adequate incentives, making the curve higher or lower according to its view of the desirability of large immediate revenue from bonuses as against the chances of future royalties.

7. In summary, economic considerations center around maximising the revenues with due regard to (a) a desired time distribution of such revenues, (b) a desired degree of assurance of revenues, and (c) adequate productive use and development of the leased property.

B. Recommendations

On the basis of the above general conclusions, the following recommendations are made with reference to the prospective leases at Huntington Beach:

1. Competitive bidding on the prior basis of sliding-scale royalties and bid factor is not recommended.

2. Combination of prescribed sliding-scale royalty curve and bonus bidding is recommended.

3. Concerning the shape of the prescribed curve, no recommendation is offered. A primary condition has already been stated: namely, that in the judgement of the Commission the prescribed royalties will have no deterrent effect upon adequate use and development of productive capacity. Assuming this condition to be satisfied, the shape of the curve will be determined by the relative weight given to the desirability of present bonus revenue as compared to future royalty revenue.

4. A maximum royalty rate is recommended consistent with the principle of adequate continuing incentives. A reasonable maximum is obviously relative to the shape of the prescribed royalty curve - higher for a relatively flat curve, lower for a relatively steep one.

These recommendations are equally capable of fulfillment under the old law or under the new legislation. Therefore, they imply nothing concerning the timing of new leases - whether they should be issued soon or deferred until after the new law comes into effect in September, 1955. Timing can be determined according to convenience as affected by the threat of loss through drainage.

In making the recommendations, one must recognize that there is no precise economic answer as to exactly what plan would be to the state's greatest economic advantage. Too many unknowns, intangibles and questions of fiscal policy are involved. The recommendations express, however, a reasonable approach to a revised bidding and royalty system. The proposed plan is in principle the same as that tentatively authorized by the Commission for Leasing Project W.O. 1809 at Huntington Beach at its meeting on January 21, 1955, upon the recommendation of its Executive Officer. The actual terms there proposed should, however, be reviewed in the light of the considerations raised by this report.

III. Past Experience

Under the law of 1938, the State Lands Commission has had full discretion over the bid basis of leases and the type of royalty terms therein. The Commission could issue leases only where wells were found to be draining or threatening to drain oil from state-owned lands. Thus, only proven or semi-proven fields were involved.

Under its discretionary powers, the Commission set up a system of sliding scale royalties so that the royalty rate depended solely upon

average daily production (or shipments) per well. Under this system a basic scale, or curve, was established, with a flat rate of 16 2/3 per cent up to 109 bbls. per day average per well, then rising by degrees to 28 per cent at 200 bbls., 42.77 per cent at 500 bbls., and 50.26 per cent at 1000 bbls. This scale was originally based on evidence from various sources as to what might be considered a reasonable level of royalties at different levels of average production per well.

This basic scale was reduced to a mathematical formula. Competitive bidding for leases consisted of multiplying this formula by a so-called "bid factor". A bid factor of 1.0 would give the original basic curve. A bid factor of 1.1 would be 10 per cent higher along the whole curve, except for a level area at the lower end. A bid factor of 2.0 would double the basic rates, and so on.

The original expectation appears to have been that bidding would cluster about a bid factor of 1.0, expressing an average of prior and independent judgements of a reasonable level of sliding-scale rates. This expectation was borne out by experience up to 1954. Of five prior leases at Huntington Beach since 1938, for example, four were at a bid factor of 1.1 and one was at 1.63, the highest of any bids in the Commission's experience up to the past year. The last two leases, however, have been at much higher figures.

The Huntingtom Beach area has been the predominant source of royalty revenue to the state. From 1933 through 1954, it had provided more than 81 per cent of oil production under state leases. In 1954 the precentage was 83. Through December, 1954, the state had drawn $70.3 million in oil royalties from this area[1], or an average of about 24 per cent on the value of oil produced. The highest average rate in any one year from any single lease was 53.85 per cent, the lowest 18.4 per cent.

Based on such experience, the Commission appears to have been on the whole well satisfied with the operating results from its royalty system. At any rate, until the past year no steps were taken to review or modify it. How well justified such an attitude might be, no one can accurately assess, since there is no way of comparing actual revenues with what might have been received under some alternative system. There is, nevertheless, a fairly clear presumption that revenues were larger than they would have been under a system widely sponsored by the industry - a 16 2/3 flat royalty rate plus cash bonus bidding for the lease. Through 1953, a flat 16 2/3 per cent would have yielded $44.2 million on Huntington Beach leases as against $63.6 million actually received.[2] To bring an equivalent

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1. Not including about $7 million from gas and gasoline royalties.
2. A slight inaccuracy is involved in this statement as a small amount of revenue was received outside the terms of the leases.

total revenue to the state, bonus payments applicable to the same period of years would have had to amount to $19.4 million. Since the leased area amounted to only 3,539 acres, this would give a bonus value of nearly $5,500 per acre[1], a sum greatly in excess of any actual bonus payments on tide and submerged land leases anywhere in the United States, so far as I have been able to ascertain.

Even so, it is not clear that the state has secured revenues as large as might have accrued if the bidding had been on the competitive basis contemplated by the law of 1938. In each of five leases at Huntington Beach, prior to 1955, only one bid qualified as conforming to the rule laid down by the Commission that bidders must possess rights to upland drill sites and access to tide and submerged lands. The lease went in each case to a bidder who, by reason of prior control over sites and littoral access, was able to disqualify other actual or potential bidders. The bidding was in effect monopoly bidding.

The Commission did not find itself free to use the two methods which might have served to break up this monopoly bidding situation: (1) the use of the power of eminent domain, which the law gave it, in order to provide upland sites and access for other bidders; (2) the authorization of filled land and artificial island sites offshore. As to condemnation, until legal entanglements with the federal government were resolved in 1953, use of this power was debarred. As to offshore sites, the authority was only established in 1947 by a finding of the State Attorney General. What royalty rates and revenues might have been under true competitive bidding, one cannot attempt to say. Whether it would now be feasible to use condemnation proceedings effectively appears to be subject to doubt, due to the fact that the attempt might lead to extended litigation, meanwhile permitting oil to be drained away. If feasible, it would be desirable.

The two latest leases issued by the Commission -- at Rincon in 1954 and at Huntington Beach in 1955 -- departed radically from past experience. The bidding on these leases was highly competitive -- for the first time. At Rincon, the winning bid factor was 5.2375. At Huntington Beach it was 7.07, with nine other bids above 3.00. The Rincon lease had the astonishing feature that the royalty reached 100 per cent when average daily production was only about 120bbls. per well. The company's "take" from production actually started to decline when production averaged only about 55 bbls. per day. This fact has led to some very interesting speculation about what motives lay behind such a bid and what the operating results might be.

As to motive, the most obvious and presumably correct idea was that

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1. This is not a calculation of the bonus that would have had to be bid in order to equate with royalties received on a sliding scale during the life of the relevant leases. That cannot be calculated at present since the leases have years to run. If calculated, the bonus would have to be calculated on a compound interest basis for the full life of the lease.

an integrated company might be so intent on maintaining its supply of crude oil that it was willing to produce it at little if any profit, or even at a loss, depending on its refining and marketing activities as the source of profit. If bidding does in fact develop on this basis, it will exclude all but integrated companies -- a fact obviously distasteful to many members of the industry, but not in itself necessarily disadvantageous to the state's financial interest.

As to results, the question is whether such high bid factors may not lead to a low rate of production. If a direct profit incentive disappears at a low rate of production, will not production be held down to a low rate? Also, will it not prevent the amount of investment necessary to secure the fullest possible recovery of oil? Both these factors, if they appeared, would hold down the amount of royalties accruing to the state. On these grounds, it has been reasonably alleged that a lower bid factor might provide the state in the end with larger revenues, based on a larger production of oil.

No one knows the answer to this. It would depend on circumstances. If, for example, a company began to get a declining gross yield at 60 bbls. per day, it might want to limit production to that rate. On the other hand, if it were an integrated company seriously needing to supplement its supply of crude oil, it might be willing to carry production up into the range where the royalty rate was 100 per cent. This would amount to paying the current market price for crude plus a premium equal to operating costs and amortization charges on capital investment. Such a premium might in some cases be regarded as justified by an integrated company to ensure availability. Even so, a very high royalty on a low production rate could be expected to have some influence on the production rate and amount of capital investment a company was willing to make.

Very high royalty rates at low production rates might also raise administrative problems for the Commission. The Commission has certain untested powers to enforce a principle of maximum efficient recovery against lessees, but no one knows how this would work out in the case of a recalcitrant lessee under an unprofitable lease. Moreover, the Commission has no power to require additional investment needed for full recovery. Also, unremunerative operations might lead a lessee to exercise his right to quit-claim under present leasing terms.

Considerations of these various sorts, arising out of the Rincon lease, probably provided the reason why, in the latest lease at Huntington Beach, the Commission set a maximum of 75 per cent royalty. On this basis, however steeply the rate rises, the lessee can never receive less than 25 per cent of production (minus any over-riding royalties). The profit incentive is not completely nipped off.

The two latest leases -- at Rincon and Huntington Beach -- demonstrated that the state can now secure much higher royalty rates on proven fields than formerly if competitive bidding conditions are present. This is probably due to two reasons: (1) the deficit in oil production which has overtaken California; (2) the effect of truly competitive bidding conditions.

These two leases have carried the Commission into entirely new and strange territory. No one knows the possible consequences of very high bid factors. There is great difference of opinion on this point. That is one reason why an inquiry by the Commission into royalty terms is most timely. The other reason is that, under new legislation passed by the legislature (yet to be signed by the Governor), the past system of bidding and royalty payments would be discarded and the discretion left to the Commission would be more limited.

IV. New Legislation

Under the new legislation, the Commission could choose between two alternative plans in the case of proven or semi-proven fields ("lands within the known geologic structure, as determined by the Commission, of a producing oil or gas field"):

(1) a fixed royalty of not less than 16 2/3 per cent.

(2) a sliding scale of royalties commencing at not less than 16 2/3 per cent.

In either case, the lease is to be awarded to the qualified bidder who undertakes to pay the highest cash bonus. The "bid factor" which provided the competitive element in earlier leases is no longer permissible.

STANDARD B&P "NOTEAR"

This new legislation, if signed by the Governor, will not take effect until September, 1955. Consequently, if it wishes to move on contemplated leases at Huntington Beach prior to that time, the Commission has at its disposal the complete discretion as to bidding and royalty terms provided by earlier legislation.

Even under the new legislation, it will be seen, the Commission retains a considerable measure of discretion. Under (1) it can determine the flat rate, thereby determining whether the bonus will be relatively large or small. Under (2) it can determine the slope of the sliding scale, again affecting the size of the bonus. In both cases, in fact, it could conceivably fix the royalty rates so high that little if any bonus would be bid.

V. Alternative Royalty System

Discussion of alternative systems has centered mainly around two plans: (a) the sliding-scale plan heretofore used by the Commission and (b) the 16 2/3 per cent flat rate with bonus sponsored by much of the industry. There are, however, four basic alternatives, each capable of various modifications. These are:

1. A specified flat rate, with lease going to the bidder of the highest bonus. The specified rate could be relatively low or high.

2. An unspecified flat rate, the lease going to the bidder of the highest rate. A specified down-payment or bonus could be required.

3. A specified sliding-scale, with lease going to bidder of the highest bonus. The scale could be relatively flat or steep, and a maximum rate specified.

4. An unspecified sliding-scale, with lease going to the highest bid factor applied to a basic curve - the system heretofore in use. A maximum rate could be specified.

The second and fourth of these alternatives provide the state with no assurance of any revenue, since revenue depends solely upon whether oil is produced or not. On the other hand, these plans present the chance that the state may receive a very high revenue if highly productive wells are brought into operation. The Commission, in following the fourth, has followed the principle of seeking the highest uncertain revenue, because of the relatively good chance of a high revenue return.

The first and third would provide assurance of revenue to the state through bonuses, greater or less according to the level or curve specified. The industry on the whole has urged that, with a low rate under the first alternative, the state seek a maximum of certainty of revenue.

Between the two extremes of certainty[1] and uncertainty, there lie any number of possible compromise positions. The choice between these positions cannot be reduced to a simple calculation of greatest economic benefit to the state. A part of the answer lies in the realm of political and fiscal philosophy -- whether the state should seek the maximum of assurance of revenue at the earliest possible date or whether it should share with the industry some of the uncertainties of revenue which are inevitably connected with the exploitation of oil resources. On this point the new legislation is by no means explicit. While it takes away from the Commission its present discretion to forego any assured revenue (alternatives 2 and 4), it leaves a wide range of discretion as to the terms of the compromise.

While the question thus puts part of the problem in the field of fiscal philosophy and policy, there are two economic aspects to which attention is required. They may be stated negatively as follows:

(1) A lease should not contain royalty terms likely to give a lessee the incentive to hold down the rate of production unduly.

(2) A lease should not contain royalty terms likely to limit unduly the ultimate investment necessary to relatively full recovery of oil from a producing field.

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1. The extreme of certainty would be a plan under which no royalties would be paid, the lease going to the highest bonus bidder. I have never heard this proposed, but it carries to the end some of the logic used to support a low flat rate with bonus.

An economic discussion of the state's interest in royalty terms must face these points squarely. We may approach them by a roundabout route through certain views found within the industry.

VI. Industry Views

1. Two basic attitudes.

Among the larger members of the industry, there is a fairly universal opinion in favor of low flat royalty rates, with leases going to the highest bonus bidder This plan would limit the competitive field by excluding smaller bidders who lack the cash resources for high bonus bidding.

The smaller interests, for the opposite reason, tend to favor the past policy of the Commission in maintaining a system which requires no cash bonus.

The Commission appears to have regarded it as one of the merits of its past system that it has kept the competitive field open to smaller bidders. This is illustrated by the following excerpt from the Minutes of the Commission, February 3, 1955 in connection with Leasing Project W. O. 1864 (A) at Huntington Beach:

> "Under existing circumstances, the lands to be offered can be developed from upland drill sites without the necessity for large capital investment in offshore filled lands. Therefore, determination of the lease royalty rate by rate of production, with a subsequent award to the highest qualified bidder on that basis, appears to offer bidding opportunities to small as well as large operators alike which an award solely upon size of a bonus does not."

It is not, however, to be regarded as necessarily to the state's advantage in all cases to base its bidding policy on this principle.

2. The profit incentive in bonus bidding.

Looking at the preference of the larger companies for low flat rate and bonus, it is reasonable to assume that they anticipate a larger profit from this system. This anticipation appears to rest on the following points:

(a) Given some estimate of a range of production probabilities in proven or semi-proven fields, they may expect that bids will go for bonuses (advance royalties) the value of which will be less than the value of total royalties which would be paid under a sliding scale. This assumes that, on the same underlying technical data and economic calculations, the value of bonuses will not equate with the value of royalties above 16 2/3 per cent on a sliding scale.[1]

1. Comparing the value of a bonus with the value of a stream of royalties involves somewhat complicated compound interest calculations on both sides.

(b) An additional, and more calculable, advantage of bonus bidding lies in the tax aspects of amortization and depletion. The capital investment represented by a bonus can be written off during the life of a lease. Under the corporation profits tax the bonus will then in fact be only a fraction of its nominal amount. Moreover, the formulas for computing depletion for tax purposes have the quality that, if sliding-scale rates averaged above 16 2/3 per cent, depletion allowances may be less than at a flat 16 2/3 per cent rate.

(c) Within the range of its calculated chances of production, revenue and production costs, a company must measure its willingness to make investment outlays. The flat rate and bonus system, it is contended, simplifies the calculations upon which investment decisions must be made and reduces the degree of uncertainty as to profitability. This is no doubt in a degree true. It is doubtful, however, that companies would complain of this aspect of bidding if it were not associated with a system under which, for other reasons, their profit expectations were less. Also, it is not clear that the matter has any bearing upon the merits of alternative royalty systems from the state's point of view.

In deciding what royalty system to impose, the Commission has a very minor interest in whether the bidding process is more or less troublesome to bidders. It could, however, have an interest if the more uncertain basis of investment decisions appeared likely to reduce the state's revenues on the recovery of oil.

(d) Profitability depends only in part on royalty rates and/or bonuses. It depends also on production. A royalty system which is likely to induce higher rates of production and larger investment for full recovery of oil may add to the profit prospect. This point has a very direct bearing on the state's interest and must be further examined.

3. Productivity

If one thinks of total production as a pie to be cut between lessee and state, the idea at once occurs that a system which gives more to the company will give less to the state. The larger companies do not agree to this for what appear to be valid reasons. Their position is that the terms of the lease may greatly affect the size of the pie. The following points are quoted from industry sources:

(a) High royalty rates may establish cut-off points on the level of current production far short of possible production.

(b) High royalty rates lead to earlier abandonment of wells, thus resulting in lower ultimate recovery and a loss of oil and gas with a consequent loss of royalty revenue to the state as well as profit to the company.

(c) Secondary recovery, pressure maintenance, water flooding, and other such costly measures, which may greatly increase the oil recovered, are discouraged or prohibited by high sliding-scale

royalties.

In principle, these are valid points representing real possibilities. The question is whether, under the royalty terms of any particular lease, or as a probable result of a bidding system, any or all of these consequences will result. It appears to be a general view of the larger companies that high royalty bidding without bonuses opens the way for smaller lessees to make a smaller investment for a quick profit in ways which will not promote full recovery from a field.

These possibilities as to the effect of royalty terms upon productivity represent one of the most critical questions facing the Commission.

4. Bidding by integrated companies.

Some interests within the industry charge that high royalty bidding without bonus limits effective bidding to integrated companies. To quote from an industry source: "The integrated companies which can look to the marketing of their products for their profits can afford to bid high royalties, being content merely to break even on the producing operation. This would tend to preclude the independent non-integrated operator from being a successful bidder." This might, indeed, be the result. It is far from clear, however, that such a result by itself need have any interest for the Commission. It would appear to be a valid objection only if it also involved a smaller productive result and lower ultimate revenue. Moreover, if the larger integrated companies were intent on assuring their supply of crude oil, they could dominate the bidding under a bonus system as well as under a non-bonus system.

5. Political philosophy

One finds within the industry a fairly general philosophy that the state should conduct its affairs with a minimum of risk-taking, leaving the hazards of the oil industry to private enterprise. A bonus is cash-in-hand to the state.

It is notable that the Commission has operated at the opposite extreme of seeking no assured revenue from bonuses. The justification for operating at this end would presumably be that, since all leases were within known producing fields, the hazards of no revenue were slight and the prospects of relatively high revenues good.

As a matter of political philosophy, one can pay his money and take his choice. There is, however, no obvious reason why a state agency should in all circumstances act on the principle that a bird in the hand is worth two in the bush, especially when this runs counter to its own assessment of the probabilities of the case. Carried to its extreme, this philosophy would entail the conclusion that the state should always base its royalty terms on minimum risk, or absence of risk, even when the probabilities lay strongly on the other side. This would be a very arbitrary position. The end of this logic would be no royalties at all and the largest possible bonus. There appears to be no authoritative reason why a state agency should not exercise

a degree of informed judgment as to where the state's economic interest lies.

VII. General Conclusions

The following general conclusions are presented in summary form without supporting argument.

1. The sole certain advantage to the state of the low flat rate and bonus plan, sponsored by much of the industry, is that it would provide some assured revenue to the state, as compared with the uncertain prospect of higher royalties at later dates. Beyond this, its advantage to the industry is clear enough, but its advantage to the state is not obvious. There is no evidence that the plan would necessarily be more effective than some other, potentially more remunerative to the state, in providing the necessary profit incentive to adequate productive operations.

2. There is no reason in principle why the state should settle for the maximum in cash bonuses, as against seeking larger potential revenue through royalties, when informed judgment presents the probability that the larger revenues will be forthcoming. There is, however, no clear principle as to what exact compromise should be struck between maximizing assured as against potential revenue. The decision is necessarily arbitrary. If not made by legislative action, as it has not been, the making of policy on this point becomes an inescapable responsibility of the Commission. Assuming it to give adequate attention to continuing incentives to high production and full recovery the main question for the Commission to decide is what weight to give to present bonus cash as against uncertain future royalties.

3. Achieving the largest revenue for the state should not be the sole objective of a royalty and bidding plan. Relatively full recovery of oil is equally important. Even at some loss of revenue, rates which would promote fuller development would be economically justified. The wealth created and the incomes earned in producing more oil would be economic offsets to loss of direct revenue to the state. The "public interest" in oil leases is not precisely the same as the state's direct financial interest.

4. The plan heretofore followed by the Commission appears to be defective on two counts:

(a) Where bidding is essentially monopolistic, as has been the usual case in the past, it probably gives the state less revenue than would be attainable by some other alternative.

(b) Where competition is actively present, as in the two most recent leases, the royalty rates are likely to be so high as to preclude the most advantageous rate of production and adequate development.

The sliding-scale plan heretofore followed has probably provided the

state with more revenue than would have been forthcoming under a 16 2/3 per cent and bonus plan. There is, however, no evidence that it is the most remunerative plan which could have been devised, consistent with adequate incentives to full and efficient production.

5. A bidding and royalty plan for Huntington Beach need give no special consideration to the interests of small bidders - an item in the Commission's earlier thinking. Under the probable conditions at Huntington Beach, involving the building of expensive islands, the question would have no particular importance. Only fairly large financial interests are likely to take an interest in the bidding. Apart from this, however, there is no persuasive evidence that the encouragement to small bidders, through absence of bonus bidding, has ever had any importance to the state's financial interest - with the doubtful exception of the most recent lease.

6. In the field of compromise (and any decision will be a compromise between opposing principles) a combination of the sliding-scale and bonus plans appears to offer the greatest advantage on two counts:

(a) If monopoly bidding is anticipated, the Commission can prescribe a royalty curve which will somewhat protect the state's interest.

(b) If active competition is anticipated, the Commission can establish a royalty curve and maximum rate which in its judgment will provide adequate incentives, making the curve higher or lower according to its view of the desirability of large immediate revenue from bonuses as against the chances of future royalties.

7. In summary, economic considerations center around maximizing the revenues with due regard to (a) a desired time distribution of such revenues, (b) a desired degree of assurance of revenues, and (c) adequate productive use and development of the leased property.

VIII. Recommendations

On the basis of the above general conclusions, the following recommendations are made with reference to the prospective leases at Huntington Beach:

1. Competitive bidding on the prior basis of sliding scale royalties and bid factor is not recommended.

2. A combination of prescribed sliding-scale royalty curve and bonus bidding is recommended.

3. Concerning the shape of the prescribed curve, no recommendation is offered. A primary condition has already been stated: namely, that in the judgment of the Commission the prescribed royalties will have no deterrent effect upon adequate use and development of productive capacity. Assuming this condition to be satisfied, the shape of the curve will be determined by the relative weight given to the

desirability of present bonus revenue as compared to future royalty revenue.

4. A maximum royalty rate is recommended consistent with the principle of adequate continuing incentives. A reasonable maximum is obviously relative to the shape of the prescribed royalty curve - higher for a relatively flat curve, lower for a relatively steep one.

These recommendations are equally capable of fulfillment under the old law or under the new legislation. Therefore, they imply nothing concerning the timing of new leases - whether they should be issued soon or deferred until after the new law comes into effect in September, 1955. Timing can be determined according to convenience, as affected by the threat of loss through drainage.

In making the recommendations, one must recognize that there is no precise economic answer as to exactly what plan would be to the state's greatest economic advantage. Too many unknowns, intangibles and questions of fiscal policy are involved. The recommendations express, however, a reasonable approach to a revised bidding and royalty system. The proposed plan is in principle the same as that tentatively authorized by the Commission for Leasing Project W.O. 1809 at Huntington Beach at its meeting on January 21, 1955, upon the recommendation of its Executive Officer. The actual terms there proposed should, however, be reviewed in the light of the considerations raised by this report. It would be presumptuous of me to specify precise terms. That requires a basis of knowledge, experience, and judgment which is more likely to found within the Commission and its technical staff than elsewhere.

STANDARD B & P "NOEAR"

Addendum on the Competitive Field

The precise terms upon which the proposed royalty system should be applied to any given lease might vary according to the competitive situation. The upland sites and littoral rights on the subject properties at Huntington Beach are closely held. There is no assurance that upland sites and access rights would be available to other bidders. If for this reason the Commission anticipated essentially monopolistic bidding, it might be disposed to specify a curve of royalty rates substantially higher than if there were a free competitive field.

The handicap of controlled upland and littoral rights could, on the other hand, be modified by widening the competitive field through authorizing island drill sites. This solution is consistent with the consultant's report by Mr. Bennett dealing with recreational and other beach interests.

Whether the competitive field could be effectively widened by condemnation proceedings is, as indicated earlier, subject to considerable doubt.

Addendum on Areas to be Offered for Leases

My terms of reference included consideration of "size of area or areas to be leased". What can usefully be said on this subject appears to me to

lie mainly within the province of another consultant's report by Mr. Stanley, dealing with geological data. I defer to his technical views on the subject, which appear in no way to run counter to economic considerations. On the economic side, it appears important that the areas be of substantial size - not less than a square mile or more,- for two reasons: (1) the character of the geological formations, including the degree of doubt about their structure; and (2) the desirability of areas of sufficient size to justify offshore island sites both to improve development and to widen the competitive field.

EXHIBIT "C"

State Lands Commission
Division of State Lands
State Building
Los Angeles, California

Attention: Rufus W. Putnam
Executive Officer

Gentlemen:

This report has been prepared pursuant to the assignment received from Rufus W. Putnam, Executive Officer of the State Lands Commission.

The purpose is to review geological and engineering data pertinent to correlating the structural relationship of the currently producing oil and gas pools and the State tide and submerged lands, in the area between Huntington Beach and Newport Beach, Orange County, California and to determine the most effective bases for exploration, development and production of oil and gas in the State owned lands.

In the preparation of this report we have examined available records of drilling and development in the adjacent offshore and upland areas for the purpose of studying the known subsurface structural features and their relationship to the unleased subject lands. Production records were evaluated in an attempt to determine the potentialities of the known producing horizons. The uplands offsetting the subject lands have been the scene of extensive exploration and where commercial accumulations of oil and gas were discovered, intensive exploitation has followed. Structural interpretations and controls indicate that in many instances the upland producing areas would not extend into the State tidelands. We have confined our study to the portions that were expected to provide the greater amount of data pertinent to the tidelands evaluation.

For the most part the very excellent records and structural interpretations of the Division of State Lands' engineering and geological staff were used. Independent studies were made for the purpose of checking and extending these interpretations into the areas considered particularly significant to the current problem.

Interpretations and pertinent data obtained from offshore seismic surveys covering a considerable portion of the subject lands, the results of a submarine mapping project depicting the configuration and attitude of formations on the ocean floor, and certain records of the City of Newport Beach tideland wells were made available for our review and study.

Regional Geology and Stratigraphy

The area under discussion is located near the easterly boundary of the sedimentary and physiographic region known as the Los Angeles Basin, and contains lithological and structural features characteristic of such a location. The subject lands are southwest of upland oil producing areas lying along the southeasterly extremity of the Beverly-Newport uplift. A thick sedimentary section occurs throughout the area, and consists predominantly of soft sands and shales. Formations ranging in age from Recent to Lower Middle Miocene are found in the stratigraphic section; oil production is obtained from the Lower

Pliocene "Repetto" beds and the Upper Miocene Delmontian and Mohnian stage formations.

Equivalent geological time units occur at Huntington Beach and at West Newport, but the lithological characteristics of the beds vary considerably over the extent of the uplands. It appears that the sediments in the Huntington Beach area, due to a more favorable depositional location, are generally better sorted, and the sands have better porosity and permeability than those in the West Newport section. Progressing in a southeasterly direction from Huntington Beach toward West Newport, sand members show increasing tendencies toward lenticularity and decreasing sand content, with many beds almost completely shaling out in the facies change. This stratigraphic variation results in poorer productive performance of the sands in the West Newport field as well as fewer favorable productive measures. There are indications that the depositional and sand characteristics of the subject area will correlate more closely with the Huntington Beach section, and it is our opinion that reservoir conditions will be better than those found in the West Newport field.

The following depicts certain correlative formations in the Huntington Beach-West Newport region and indicates the geological age of each unit.

Age	Huntington Beach	West Newport
Pliocene	Tar Zone "Repetto"	"Repetto"
Miocene		
Delmontian	Upper "Jones" Sand	"A" Shale and Sand
	"Jones" Sand	"B" Shale and Sand
Upper Mohnian	"AM-L" Shale and Stringers	"C" Shale and Stringers
Middle Mohnian	"Main" Zone	"C" Sand

Structure and Productive Formations

The regional structure features a heavily faulted high with oil production being derived from a variety of traps. Closure for the productive areas has been effected by anticlinal and domal structures, by lateral faulting truncating the up-structure extremities of fault blocks, and by warping and up-dip accumulations against fault barriers.

Progressing in a southeasterly direction from the Old Huntington Beach Field, the following structural features and productive formations are present.

The "Jones", "Stringer", and "Main" zones are productive in the developed portion of the tidelands from a northwesterly trending anticline. The southeasterly productive limits of this structure appear to be approximately at the seaward projection of 17th Street with "Jones" and "Main" zone production extending approximately one mile and two miles seaward, respectively, along a southwesterly trending anticlinal nose. The developed portion of this offshore structure lies within Leases P.R.C. No. 91, 163, 425 and 426, and Easement No. 392.

Production in the Townsite Area has been developed from the "Tar", "Jones" and "Main" zones with the "Jones" sand being the principal productive measure in the recently intensively developed area southeasterly of 8th Street. Structural features accounting for hydrocarbon entrapment are a series of small fault blocks with closure effected by a large displacement thrust, termed the "Tidelands" Fault in this report. The trace of this thrust on the top of the "Jones"

sand is well recognized in the developed tidelands, and at the projection of 17th Street this trace is located approximately 600 feet from the mean high water line, and the strike is in a southeasterly direction gradually diverging from the shore line. Due to its magnitude, it appears reasonable that this thrust fault continues for some distance, and is a contributing factor in affording closure to a number of fault blocks in the recently developed Townsite area southeasterly of 8th Street and immediately adjacent to the State Tidelands; production in this area is derived primarily from the various members of the "Jones" sand.

The adjacent Atlanta Avenue development easterly of the Townsite indicates that production is being obtained from an upthrown fault block that dips in a northwesterly direction and rises toward the State lands, with the up-dip closure probably being provided by the Tidelands Thrust Fault. Production characteristics in the Townsite and Atlanta Avenue Areas differ, with the "Main" zone providing the principal source of oil in the Atlanta Avenue Pool.

The Surf Pool forms the next productive area and is separated from the Atlanta Avenue Pool by a northwesterly trending fault with a vertical displacement of at least 500 feet. Production is from the "Surf" Zone which is the equivalent of the "Upper Jones" sand of the Townsite and Tideland areas. Structural closure is formed by a northwesterly trending anticlinal fold with a northerly trending fault of small displacement confining the accumulation to the easterly portion of the fold.

Between the Surf Pool and the Banning area of the West Newport Field lies a heavily faulted region designated the Callens Area; here production has been derived from warping and up-dip accumulations against a pronounced northwesterly-southeasterly trending fault system. This series consists of at least five parallel faults having an overall vertical displacement in excess of 2300 feet. The most westerly of these is termed the Surf Fault which separates the Surf High from the Callens Area proper. The remainder of the group directly east from the Surf Fault are identified as the Aldrich Fault Zone, and, by virtue of the large displacement across the zone, it is probable that it extends longitudinally some distance into the submerged lands. Production in the Callens Area is predominantly from sand bodies in the "C" shale interval, a measure equivalent to the shale member separating the "Jones" and "Main" Zones in the Huntington Beach Area. Small amounts of production are obtained from both the "B" Zone and "C" Zone ("Jones" and "Main" Zone equivalents, respectively); however, the quantities of production from these zones are relatively small as compared to that from the "C" shale.

Near the southeasterly extremity of the productive uplands is the Banning Area of the West Newport Field. The northwesterly trending Inglewood Fault and northerly trending Banning Fault intersect to form a closure for the northwesterly dipping beds. Minor faulting occurs within the Banning Area, but is of secondary importance and has little effect upon accumulation. Production is principally from the "B" Zone ("Jones" sand equivalent) with some "C" Zone production in the southerly portion of the Banning Area. Although the "A" Zone contains small amounts of oil, it is predominantly wet throughout this area.

Summary of Upland Structure

There are a number of major structural features within the uplands which give indications of extending into the submerged lands. These features appear, in part at least, to bear direct relationship upon possible oil accumulation in the offshore area.

The "Tidelands" Fault appears to provide closure for many of the fault blocks in the recently developed Townsite Area. Its large displacement would indicate that it continues in a southeasterly direction, through at least a portion of the subject lands. Intersection of the "Tidelands" Thrust and the fault separating the Atlanta Avenue and Surf Pools should form an exceptionally favorable closure for hydrocarbon entrapment.

The large displacement across the Surf Fault and Aldrich Fault system indicates their probable extension into the submerged lands, with the resultant possibility of productive structures offshore similar to those in the uplands within the fault system. Projection of the "Tidelands" Fault in a southeasterly direction to intersect with the Surf Fault or Aldrich Fault zone would indicate another possible structure favorable for hydrocarbon accumulation.

Summary of Off Shore Structure

The interpretation of the seismic surveys reviewed by us indicates a structure of considerable magnitude in the offshore area of the City of Newport Beach and in the adjoining State lands. The submarine mapping of ocean floor formations further depicted this structural feature and the completion to date of nine producing oil wells in the Newport Beach tideland lease has proven that commercial accumulations of oil and gas are present.

Although the drilling of more wells will be necessary before the areal extent of this accumulation can be accurately delineated, presently available data are sufficient to make it reasonably certain that the productive area of the field will include portions of the subject lands.

Other features derived from the seismic survey interpretations lead us to believe that adjacent structural traps favorable to the accumulation of oil, in addition to the one currently being developed by Monterey and Humble are located within the area.

Examination of the electric logs from wells in the City of Newport Beach offshore area indicates that a thick sedimentary section occurs below the "C" shale and appears to be comparable to the "Main" Zone at Huntington Beach. This section consists predominantly of sands and interbedded shale members with the electric logs and micro-logs indicating generally good permeability. The sand bodies in the upper portion of the section appear to be lenticular and show evidence of faulting.

A number of these sand bodies have proven to be oil saturated and have a total productive thickness ranging from 300 feet to 850 feet in the individual wells. The net oil sand is estimated to vary from 200 feet to 600 feet, and the overall sand section tends to increase in thickness in a seaward direction.

Drainage

From Upland Wells

Our study indicates that drainage or the threat of drainage is present in the unleased State lands.

Subsurface controls derived from upland exploration and development show that the tilted fault blocks that form the traps for oil and gas accumulations in the Townsite and Atlanta Avenue areas extend into the tidelands. Although a

major portion of the recent intensively exploited Townsite area will be offset by the parcel leased under Project W.O. 1864(A), it is our opinion that Parcel W.O. 1864(B) is being subjected to drainage by the extraction of oil and gas from the Townsite and Atlanta Avenue Pools. This condition was anticipated by your staff when the request was made for authority "to offer the area for lease bid subject to future presentation of a staff recommendation relative to a finding that oil or gas deposits are known or believed to be contained in the tide and submerged lands offered, and that such lands may be or are being drained by means of wells on adjacent lands."

Subsequent to the above recommendation, drilling and exploration of the uplands have provided additional data from which subsurface structural interpretations and controls have been extended; it now appears reasonable to project portions of the producing structures into the area contained in Project W.O. 1864(B). This phase of our study was conducted in cooperation with your staff and is the basis for the statement that drainage is believed to exist in this portion of the State lands.

Latest available records list 146 producing wells in the Townsite Area between 1st and 8th Streets, and 63 of these wells are in a fault block that is considered to be a structural offset to the parcel of tidelands designated as Project W.O. 1864(B). In the Atlanta Avenue Pool, there are currently 15 wells producing approximately 1100 barrels per day. All of these are believed to be threats to the subject lands either through the actual drainage of oil and gas or through pressure depletion.

Drainage

From Tideland Wells

A summary report dated 27 April 1955 and signed by F. J. Hortig, Mineral Resources Engineer, contained the following:

1. "A new productive reservoir has been discovered under tide and submerged lands separate from any structural units developed previously on the upland."

2. "The new structure and the producing horizons developed in wells 'Newport Beach' 1 and 2 extend westerly to include ungranted tide and submerged lands adjoining the Huntington Beach State Beach Park."

3. "Pressure depletion and drainage of oil and gas from State owned lands will result from production operations in the Monterey Oil Company wells under the Newport Beach City Lease."

We concur in the opinion that the production of oil and gas in the City of Newport Beach Tideland lease constitutes a direct threat of drainage to State lands, specifically the area contained in Project W.O. 1809 lying westerly of the above lease.

As outlined in this report our review of the available structural interpretations, well records and other pertinent data indicates beyond any reasonable doubt, that the productive pool in which the above wells are located extends a considerable distance into the State lands.

At present nine wells with a reported current daily production of 850± barrels of oil have been completed in the City of Newport Beach lease. The bottom hole

locations of these wells are some distance from the State lands boundary, however development is expected to move in a westerly direction, with the result that the drainage problem will become progressively more acute.

Summary and Recommendations

It is our considered opinion that large portions of the unleased tide and submerged lands in the area between Huntington Beach and the City of Newport Beach Tidelands contain structural features favorable to the accumulation of oil and gas in commercial quantities. Subsurface structural controls indicate that currently producing oil pools situated in both the uplands and in the tidelands extend into the subject land, and pressure depletion and adverse drainage conditions are believed to exist. This condition can be expected to become progressively worse as exploitation of offset lands continues.

Alleviation of this serious drainage and pressure depletion is desirable, and we recommend that the parcels previously designated as Leasing Projects W.O. 1864(B) and W.O. 1809 be offered for lease at an early date.

Exploitation of parts of the subject areas can be accomplished by wells drilled from upland drillsites, however large portions probably can be more efficiently exploited by wells located on filled lands within the boundaries of the proposed leases. It is therefore important that any offering for lease be submitted on the basis that development is to be accomplished by wells drilled from on-shore and or, off-shore drillsites.

The information presently available is not sufficient to definitely determine the most strategic location for off-shore drillsites, however it is quite possible that more efficient and economical development could be obtained by placing these structures closer to shore than one mile. If not inconsistent with the findings and recommendations of your planning consultant, Mr. Chas. B. Bennett, we suggest consideration be given to altering the current "not less than one mile seaward" restriction of the lease form.

Excepting for the one mile restriction placed on offshore drillsite locations and the provision referred to below, it is our opinion that the lease form currently in use gives adequate protection and provides for proper development of the State oil and gas lands. In the definition of an oil and gas zone contained in Exhibit "A", Page 1, Paragraph 4, we recommend the deletion of the fifty foot provision and suggest the following; an oil or gas zone is hereby defined to mean any sequence of strata containing oil, gas or other hydrocarbon substances, wherein the reservoir characteristics, such as pressure, temperature, specific gravity, viscosity, permeability, and porosity are similar and whenever such sequence of strata is separated from dissimilar producing strata by a competent layer of shale, or other impervious rock.

It is believed that a material saving of time in leasing and the consequent commencement of development can be effected by proceeding under current provisions of the Public Resources Code. We believe the bests interests of the State will be served by following this course rather than by waiting to proceed under A.B. 3402 should this amendment to the Resources Code become law.

Respectfully submitted,
STANLEY AND STOLZ
/s/ E. R. Stanley

Los Angeles, Calif.
June 30, 1955

E. R. Stanley