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FEDERAL LEASING OF PETROLEUM ON THE OUTER CONTINENTAL SHELF

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HENRY M. JACKSON, *Chairman*
COMMITTEE ON INTERIOR AND
INSULAR AFFAIRS
UNITED STATES SENATE

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MEMORANDUM OF THE CHAIRMAN

To Members of the Senate Committee on Interior and Insular Affairs:

On July 30, 1975, the Senate passed the Outer Continental Shelf Management Act of 1975 (S. 521). It makes many much needed changes in the Outer Continental Shelf Lands Act of 1953. The major changes would: (1) establish policy guidelines, (2) require a 5-year leasing program, (3) give the coastal States an increased role in Federal OCS decisions, (4) provide Federal compensation to coastal States adversely affected by OCS development, (5) improve safety requirements, (6) establish unlimited absolute liability for oil spill damage with payments from a liability fund, (7) provide for a two-step decision process to separate exploration from development and production, and (8) authorize new leasing systems and require their use on an experimental basis.

This study, by the Library of Congress, focuses on the issues presented by the various new leasing systems which have been included in S. 521 or have been proposed elsewhere. I believe that it will be helpful to the Committee as we continue our work on this vital legislation.

HENRY M. JACKSON, *Chairman.*

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FEDERAL LEASING OF PETROLEUM ON THE OUTER CONTINENTAL SHELF

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FEDERAL LEASING OF PETROLEUM ON THE OUTER CONTINENTAL SHELF

I. Introduction

In the 22 years that have elapsed since the first Federal lease of petroleum on the Outer Continental Shelf (OCS) was granted in 1954, this source of oil and gas has risen to a position of major importance in domestic energy production. It is likely that this trend will continue as onshore production declines and the demand for accelerated leasing of the OCS increases. Because of its importance, OCS leasing policy has become the subject of intense controversy in recent years. Involved in the leasing decisions are a wide range of issues which are beyond the scope of this report. These considerations include political and environmental factors that can figure significantly in the basic policy decision to lease or not to lease. The controversy does not end there, however, for the allocation of the leases remains as a difficult and complex problem. It is toward that aspect of leasing that this report is addressed.

The current leasing system reflects an earlier period when the United States was relatively independent of foreign oil and when the major leasing consideration was in maximizing the revenues to the Federal Government, regardless of the value of the resource to society. Under this system, which has not changed significantly since its inception, the resources are allocated on the basis of a single variable—the initial cash bonus. Within this framework, the present leasing system has proven to be both workable and effective.

In recent years, however, Federal OCS leasing policy has been seriously questioned. There has been considerable concern that to the Nation's detriment this policy may not be encouraging the maximum production of the resource, may not be distributing the leases in the most equitable manner, and may be limiting the financial ability of the operators to develop the leases. The advantages and disadvantages of alternative leasing arrangements, therefore, need to be considered in any attempt to correct the shortcomings of the present system.

This paper is intended to provide not a comprehensive analysis of all aspects of Federal leasing policy but a perspective on the subject of lease allocation. To deal effectively with the issue, it is necessary to understand both the evolution of the current policy and the alternatives that have been proposed for the future. There can be little doubt that the current system has deficiencies, but there is always the possibility that uninformed policy decisions might inadvertently produce something worse. The following description of the system, analysis of its strengths and weaknesses, and assessment of proposed alternatives may provide a useful context for future congressional deliberations on this issue.

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II. History of OCS Leasing

Geographically, the continental margin extends from the mean low-water line to the deep seabed and consists of three parts. Extending seaward they are (1) the continental shelf, (2) the continental slope, and (3) the continental rise. The continental shelf is that portion of the continental margin that lies between the mean low-water line and is the change in the inclination of the ocean floor that marks the beginning of the continental slope (see fig. 1). The Outer Continental Shelf (OCS), the area of concern here, is the portion of the continental shelf that is under the jurisdiction of the Federal Government.

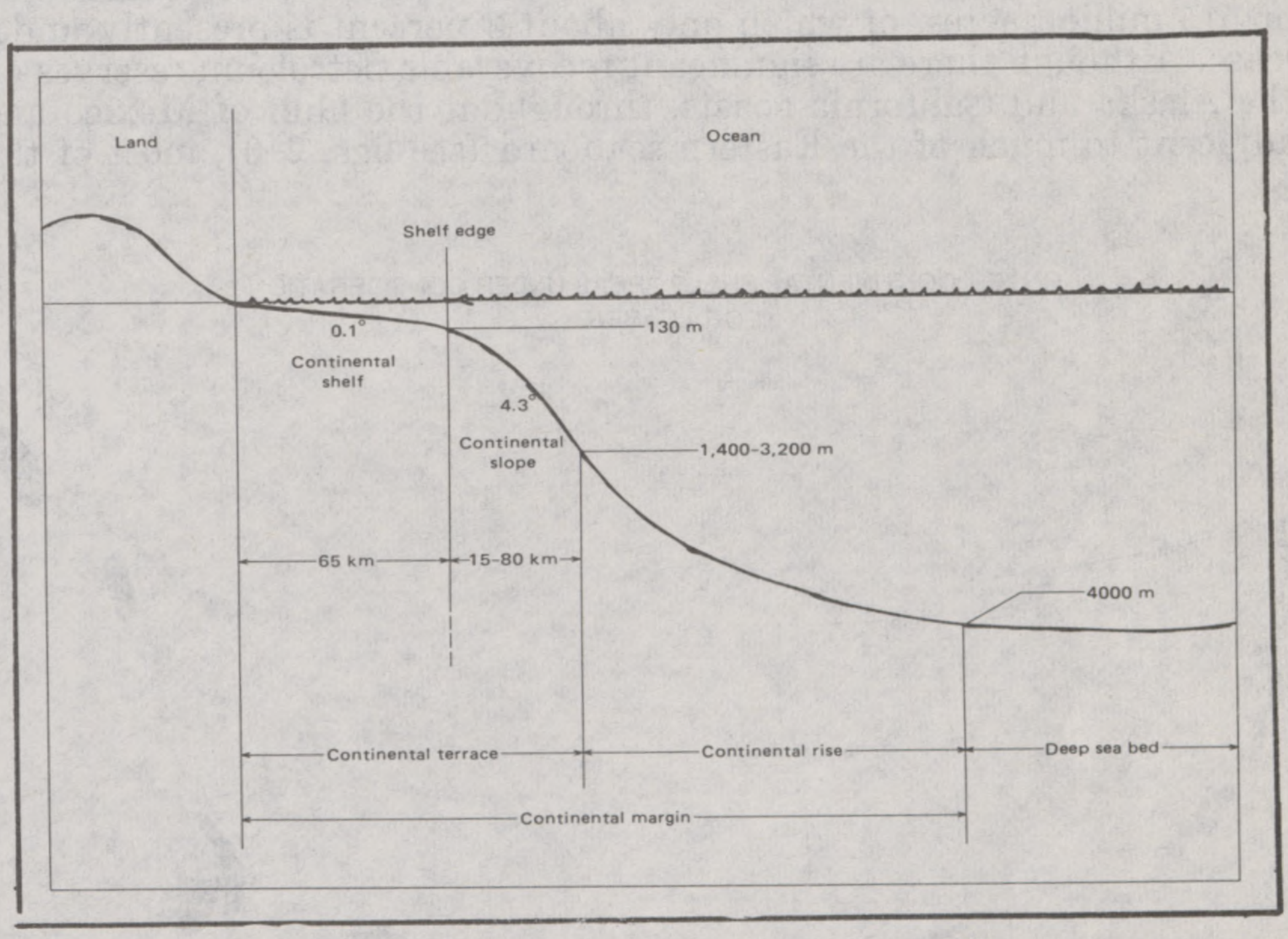


Figure 1.—Programmatic Profile of Continental Margin

Numbers shown (metres and kilometres) are world-wide averages. The world's continental terrace, which includes the continental shelf and the continental slope, covers an area of about 21,400,000 square miles. The 1,332,000 square miles adjacent to the United States amounts to 6.22 percent of the world total.

Source: Department of the Interior.

By legislation and subsequent Supreme Court decisions the shoreward boundary of the OCS is fixed at 3 nautical miles (3.5 statute miles) from shore, except along Texas and the Gulf Coast of Florida where, due to historical precedent, it is fixed at three leagues (10.5

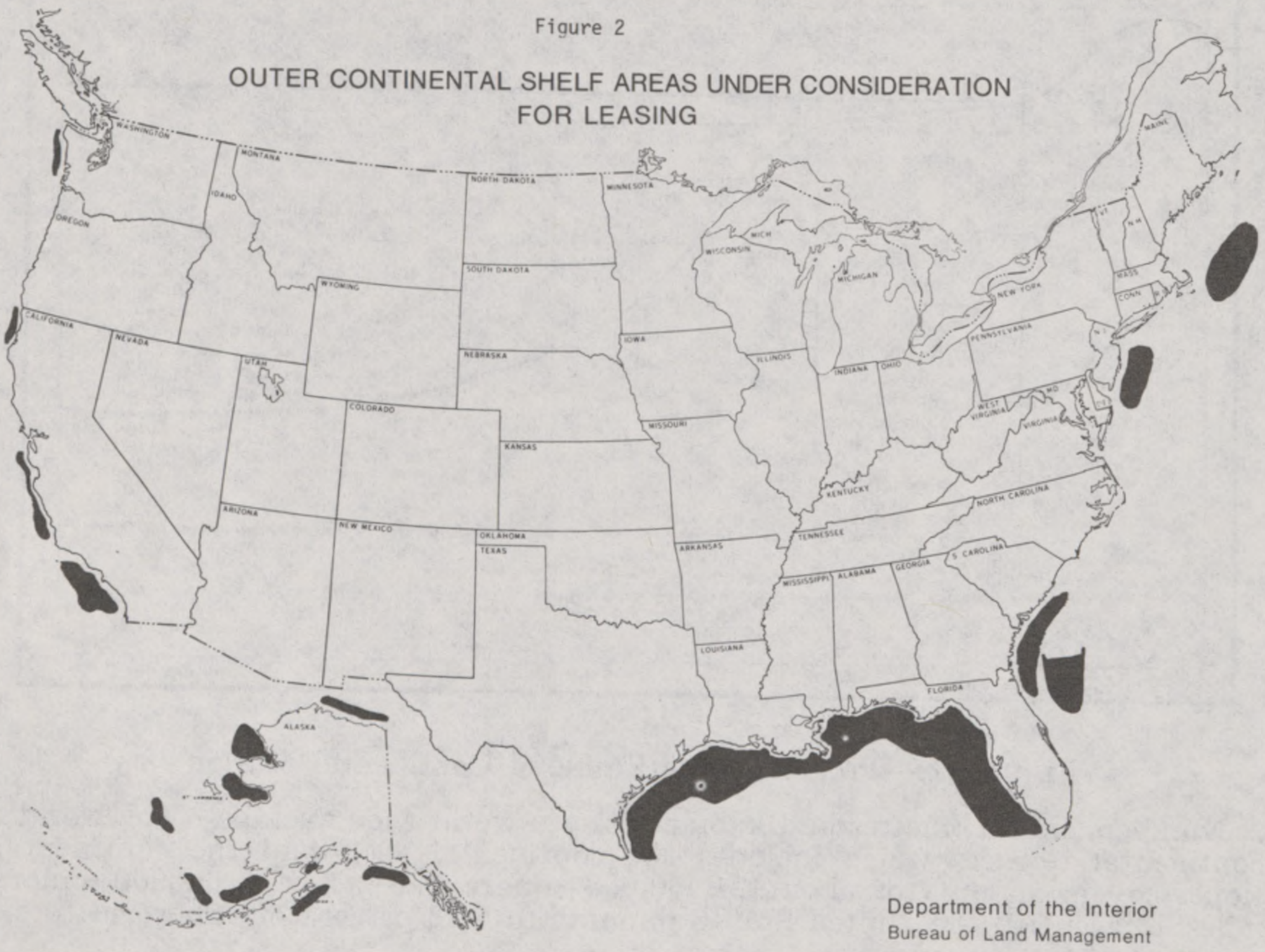
statute miles).[1] Article I of the 1958 Geneva Convention on the Continental Shelf attempted to establish the seaward limit of the Outer Continental Shelf. It defined the Outer Continental Shelf to refer:

> (a) to the seabed and submarine areas adjacent to the coast but outside the area of the territorial sea to a depth of 200 meters, or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas; and
>
> (b) to the seabed and subsoil of similar submarine areas adjacent to the coasts of islands.

Between the shoreward boundary and the 200-meter depth contour line, 560,000 square statute miles of OCS lie off the coast of Alaska, 107,500 off the Gulf Coast, 122,000 off the Atlantic Coast and 15,400 off the combined coasts of Washington, Oregon, and California.[2]

The OCS of the United States consists of about 805,000 square miles or 515 million acres, of which only about 3 percent is presently under lease. Although there are significant recoverable petroleum reserves off the Alaska and California coasts, throughout the Gulf of Mexico and adjacent to much of the Eastern seaboard (see figs. 2–6), most of the

Figure 2



[1] U.S. Congress. Senate. Committee on Interior and Insular Affairs. Outer Continental Shelf Policy Issues. Hearings, 92d Congress, 2d session. March 23, 24, and April 11, 18, 1972. Washington, U.S. Government Printing Office, 1972. p. 173.

[2] Ibid, p. 174.

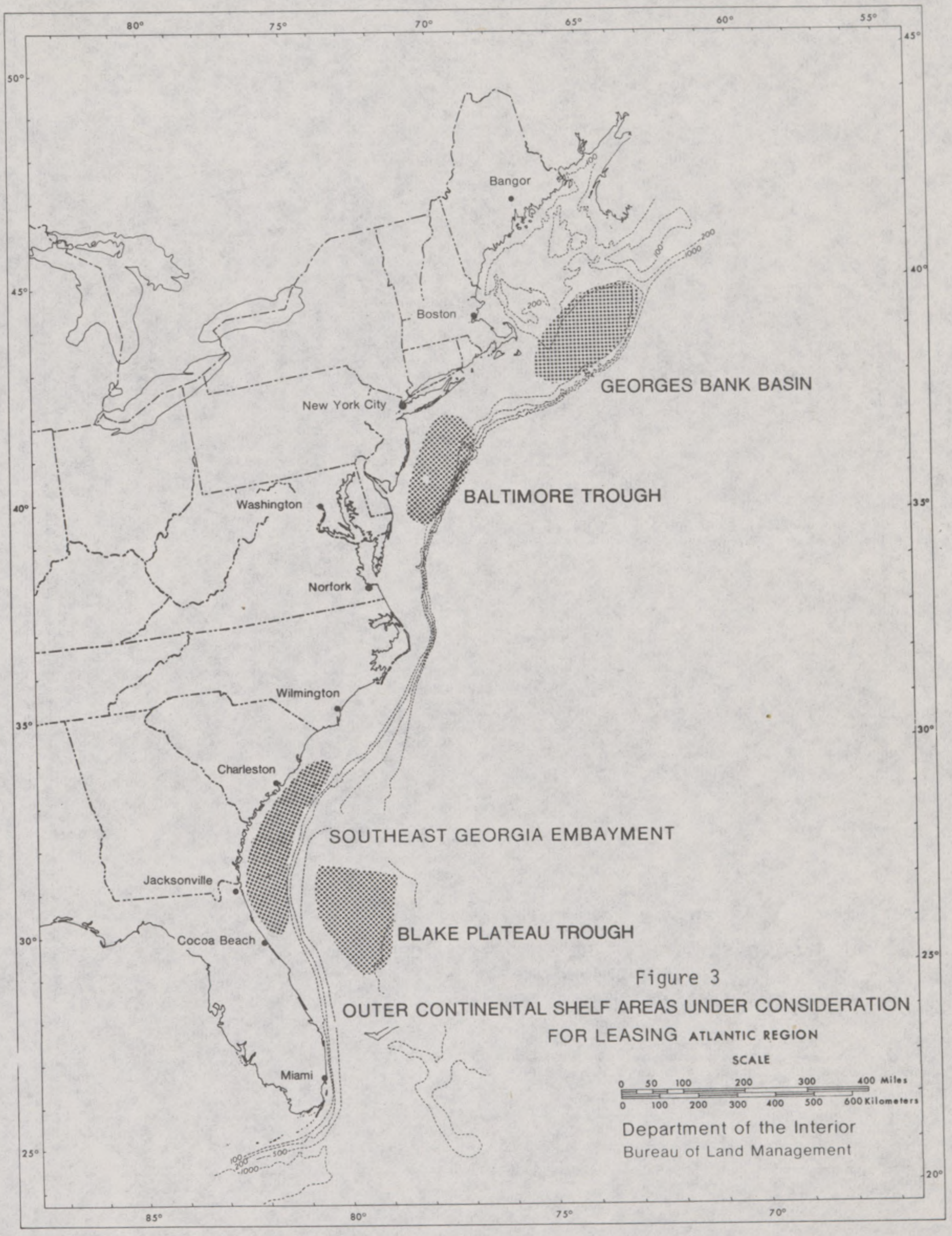


Figure 3

OUTER CONTINENTAL SHELF AREAS UNDER CONSIDERATION FOR LEASING ATLANTIC REGION

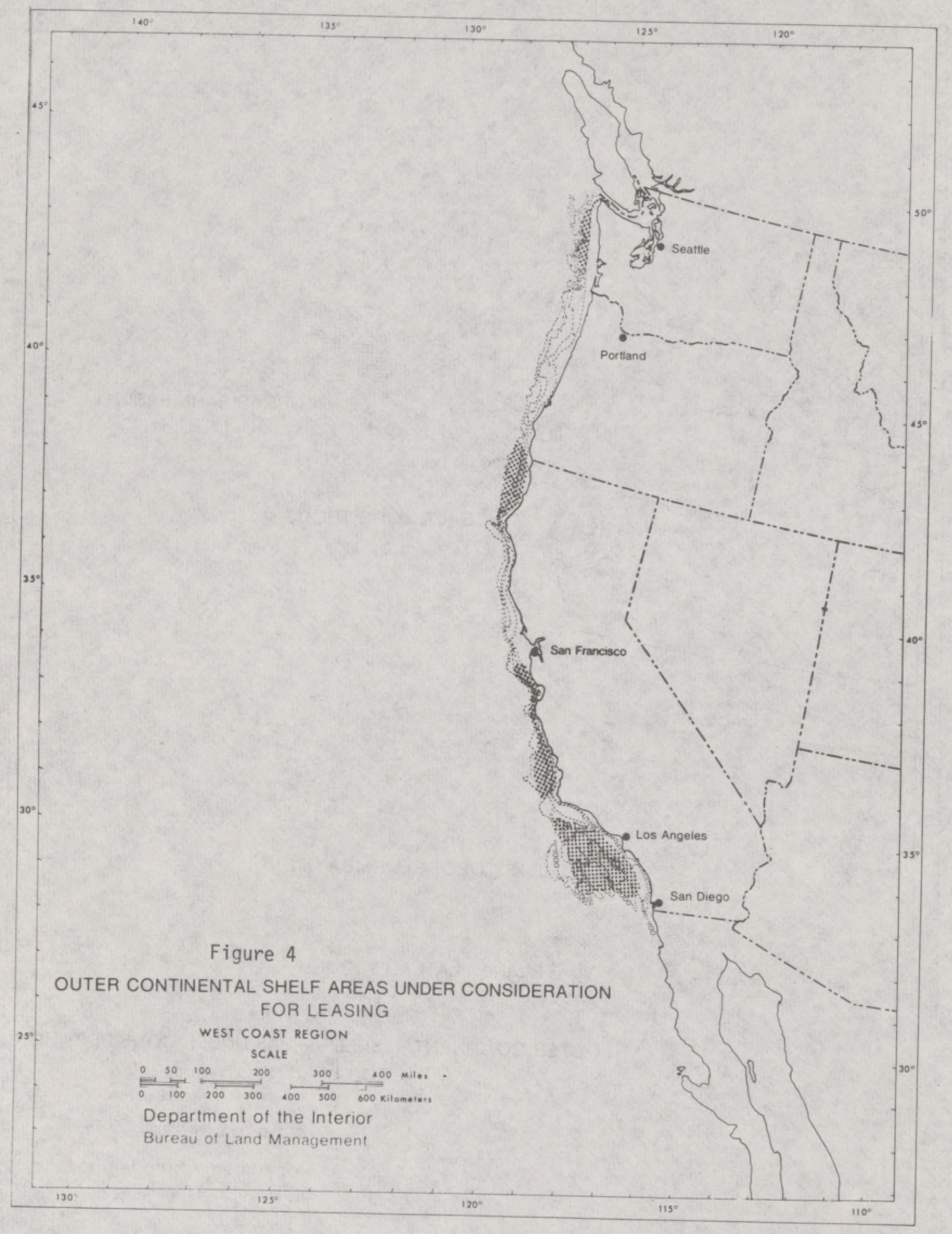
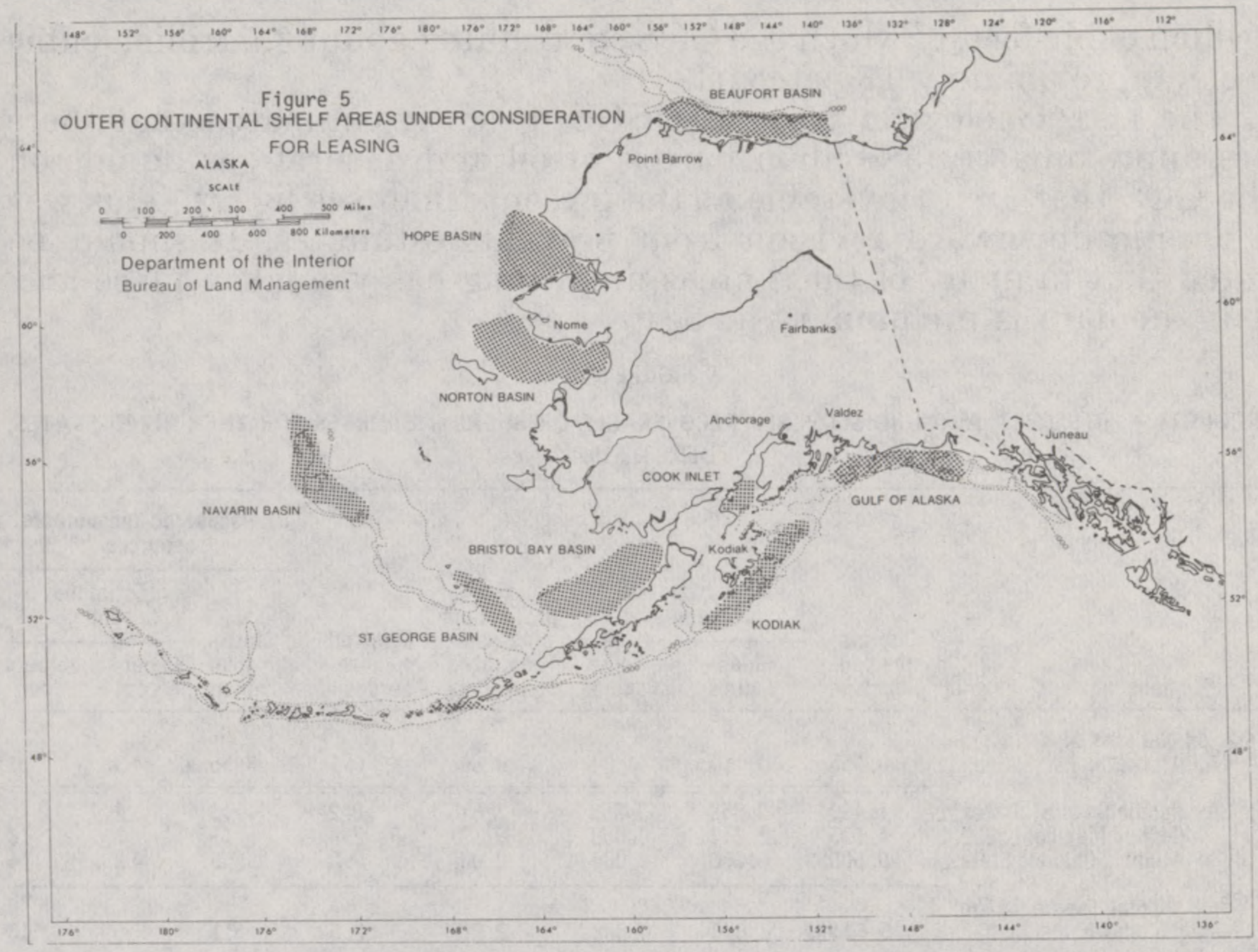
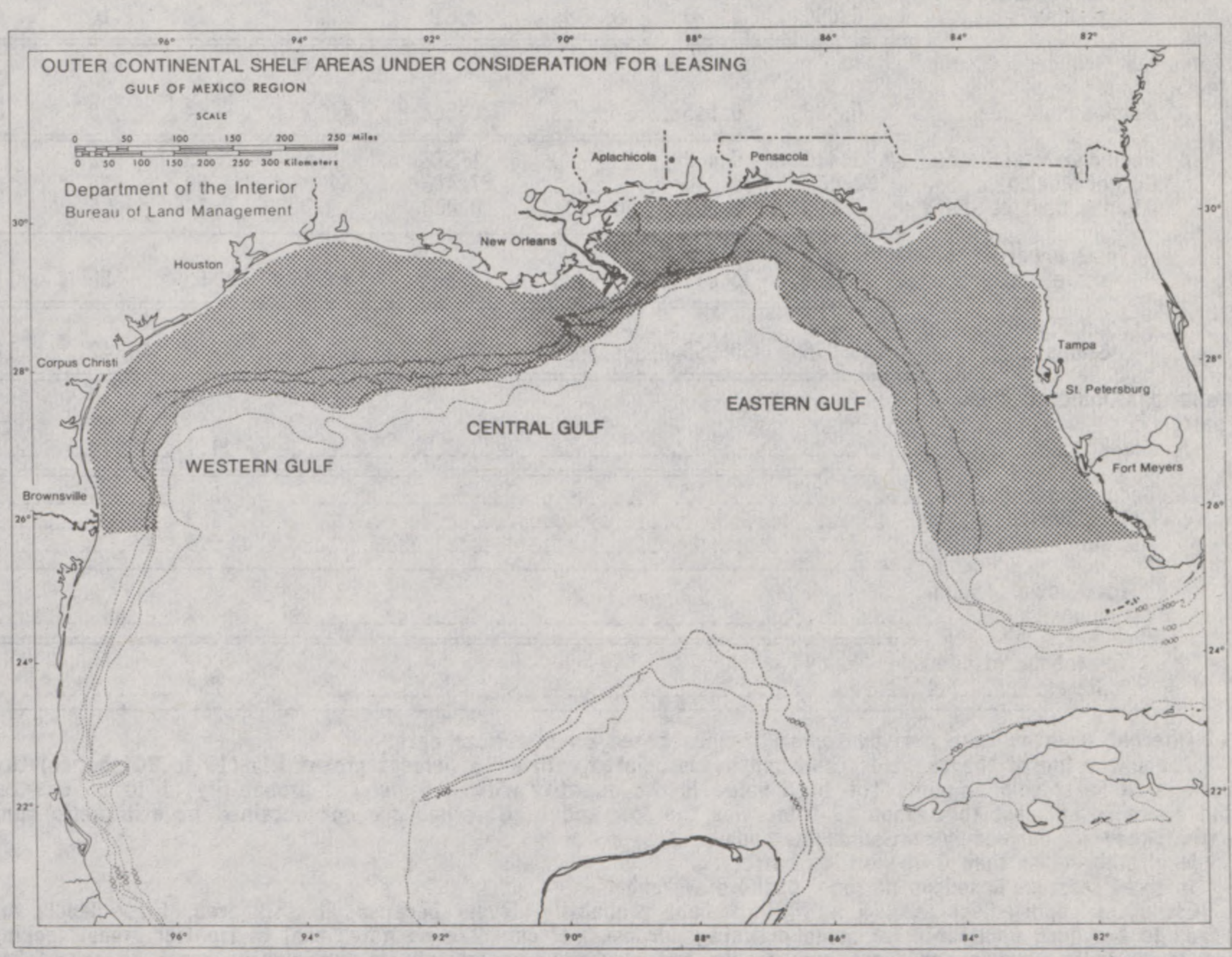


Figure 4

OUTER CONTINENTAL SHELF AREAS UNDER CONSIDERATION FOR LEASING

Figure 5
OUTER CONTINENTAL SHELF AREAS UNDER CONSIDERATION
FOR LEASING





current OCS petroleum production takes place off the Louisiana Coast. In 1975 the OCS provided 332 million (approximately 11 percent) of the 3. 1 billion barrels of oil that the United States produced. In 1975 U.S. domestic production of natural gas was approximately 20.1

trillion cubic feet, of which the OCS contributed about 3.5 trillion cubic feet (approximately 17 percent).

The U.S. Geological Survey (USGS) recently estimated that there are approximately 58 billion barrels of oil and natural gas liquids on the OCS that are recoverable at the present time (see fig. 7). This was a drastic downward revision from previous estimates. It should be noted that in many of these areas no drilling has yet taken place and that the data is preliminary at best.

FIGURE 7

PRODUCTION, RESERVES, AND UNDISCOVERED RECOVERABLE OFFSHORE RESOURCES FOR THE UNITED STATES, DEC. 31, 1974

Regions	Cumulative production	Demonstrated reserves		Total cumulative production plus demonstrated reserves	Inferred reserves [1]	Undiscovered recoverable resources		
		Measured	Indicated			Statistical mean	Estimated range [2] 95 percent	5 percen
Crude oil (billions of barrels):								
1A. Alaska	0.456	0.150	(3)	0.606	[4] 0.1	15	3	31
2A. Pacific Coastal States	1.499	0.858	0.258	2.616	0.2	3	2	5
Gulf of Mexico	4.135	2.212	0.050	6.397	2.4	5	3	8
Atlantic Coastal States	0.000	0.000	0.000	0.000	0.0	3	[5] 2	4
Total lower 48 offshore	5.634	3.070	0.308	9.012	2.6	11	5	18
Total offshore United States	6.090	3.220	0.308	9.618	2.7	26	10	49
Natural gas (trillions of cubic feet):								
1A. Alaska	0.423	0.145	----------	0.568	[6] 0.1	44	8	80
2A. Pacific Coastal States	1.415	0.463	----------	1.878	0.4	3	2	6
Gulf of Mexico	32.138	35.348	----------	67.486	67.0	50	18	91
Atlantic Coastal States	0.000	0.000	0.000	0.000	0.0	10	[7] 5	14
Total lower 48 offshore	33.553	35.811	----------	69.364	67.4	63	26	114
Total offshore United States	33.976	35.956	----------	69.932	67.5	107	42	181
Natural gas liquids (billions of barrels):								
1A. Alaska						1.1	----------	
2A. Pacific Coastal States						0.1	----------	
Gulf of Mexico						1.3	----------	
Atlantic Coastal States						0.3	----------	
Total lower 48 offshore						1.7	----------	
Total offshore United States						2.8	----------	

[1] Inferred reserves were derived for all regions based on historical data.

[2] The low value of the range is the quantity associated with a 95 percent probability (19 to 20 chance) that there is at least this amount. The high value is the quantity with a 5 percent probability (1 to 20 chance) that there is at least this amount. Totals for the low and high values are not obtained by arithmetic summation; they are derived by statistical methods.

[3] Negligible—less than 0.001 billion barrels.

[4] Inferred reserves based on national onshore average.

[5] Estimates reported at the 75 and 25 percent probability levels because, in this area, these levels are judged to be more applicable for some planning purposes. It can also be noted that in frontier areas, lacking discovered indigenous or adjacent recoverable hydrocarbons, uncertainty is sufficiently great as to weaken probability estimates at extreme ranges. For purposes of comparison with other recorded ranges, the 95–5 percent probability range in offshore Atlantic is 0–6 billion barrels of oil.

[6] Inferred reserves based on national onshore average.

[7] Estimates reported at the 75 and 25 percent probability levels because, in this area, these levels are judged to be more applicable for some planning purposes. It can also be noted that in frontier areas, lacking discovered indigenous or adjacent recoverable hydrocarbons, uncertainty is sufficiently great as to weaken probability estimates at extreme ranges. For purposes of comparison with other recorded ranges, the 95–5 percent probability range in offshore Atlantic is 0–22 trillion cubic feet of gas.

Source: U.S. Geological Survey, "Geological Estimates of Undiscovered Recoverable Oil and Gas Resources in the United States," circular 725, Department of the Interior, 1975.

By compiling responses to a recent survey, the Department of the Interior has ranked the economic value and order of industry preference of the various sections of the OCS.[3] In order of preference they were as follows: 1st—the Central Gulf of Mexico, 2nd—The Gulf of Alaska, 3rd—the West Gulf of Mexico, 4th—the Southern California borderland, 5th—the Mid-Atlantic, 6th—the East Gulf of Mexico, 7th—the North Atlantic, 8th—the Bristol Bay, 9th—the Beaufort Sea, 10th—Santa Barbara, 11th—the Cook Inlet, 12th—the Bering Sea, 13th—the South Atlantic, 14th—the Chukchi Sea, 15th—the Southern Aleutian Shelf, 16th—Northern-Central California, and 17th—Washington and Oregon.

During the early 1940's coastal States began leasing offshore lands to the oil industry. Texas had passed an offshore leasing act in 1913, Louisiana in 1915, and California in 1921. A jurisdictional dispute soon arose between the States and the Federal Government over leasing authority for these areas and the extent of State and Federal control.[4] The two Mineral Leasing Acts of 1920 and 1937 did not cover the issue and the States claimed the authority. A House Joint Resolution would have given these rights to the Federal Government, but the bill was vetoed by President Truman and the House did not have enough votes to override. The issue was forced when a suit was brought against the Pacific Western Oil Corporation by the Federal Government to recover submerged lands that had been leased by the State of California to the oil company. The question of submerged land ownership was settled when President Truman proclaimed on September 28, 1945 that the continental shelf belonged to the United States. The Supreme Court, in decisions against California, Texas and Louisiana, upheld the proclamation in ruling that the States did not own the three-mile marginal belts along their coasts.

The issue was not closed by those decisions, however, and clarifying legislation was sought in Congress. House Resolution 4198 was signed into law as the Submerged Lands Act on May 22, 1953.[5] This act gave the States title to the lands beneath navigable waters within their boundaries and permitted the coastal States to resume leasing. The boundary between State and Federal canals, therefore, was transferred from the "ordinary low-water mark and the seaward limits of inland waters" to "the seaward boundaries of the states." This was a minimum of three nautical miles (3.5 statute miles) for all States, although the act extended to each of the States bordering the Gulf of Mexico the opportunity to prove entitlement in judicial proceedings to a greater grant up to three marine leagues (approximately 10.5 statute miles) through proof that it had a boundary extending more than three nautical miles from its coast when it came into the Union, or if such an extended boundary had been approved by Congress prior to enactment of the Submerged Lands Act.

After enactment of the Submerged Lands Act, each of the States bordering on the Gulf of Mexico claimed historic boundaries extending three leagues into the Gulf of Mexico from its coastline. The Federal Government reached an interim agreement with the State of Louisiana

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[3] U.S. Department of the Interior, Bureau of Land Management. Report On The Responses Received In Reply To The Request For Comments On Potential Future Outer Continental Shelf Oil And Gas Leasing. June 5, 1974: p. 9.

[4] Bass, D. M., ed., State and Federal Regulations Pertaining to the Petroleum Industry, Quarterly of Colorado School of Mines, v. 65, n. 3, July 1970, p. 2.

[5] Public Law 31, Submerged Lands Act (67 Stat. 29, U.S.C. 1301 et seq.).

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under which mineral development in the contested area could proceed pending final determination of the controversy in the courts. Under the agreement, income from mineral leases in the disputed areas has been held in an escrow fund.

In litigation involving all five Gulf States, the Supreme Court in 1960 rendered decisions holding that under the Submerged Lands Act the States of Louisiana, Mississippi, and Alabama were entitled to juridical boundaries extending no more than three nautical miles from their coastline. The Court also concluded that the three-league boundary claimed by Texas when it entered the Union was entitled to recognition under the Submerged Lands Act. It also held that Florida's Gulf Coast boundary (but not its Atlantic Coast boundary) extends to three leagues because of Congressional approval of a boundary claimed in Florida's new constitution upon its readmission to the Union after the Civil War. These decisions, however, did not determine the location of the coastlines of the States involved.

In 1965, the Supreme Court adopted the definitions expressed in the Geneva Convention on the Territorial Sea and Contiguous Zone for the purpose of determining the location of the coastline of the coastal States under the Submerged Lands Act. This resulted in a substantial settlement of certain areas in dispute between the Federal Government and the State of California, and led to a stipulated supplementary decree adjudicating the respective rights of the United States and the State of Louisiana to a small part of the contested area in the Gulf of Mexico.

On March 3, 1969, the Supreme Court rendered another decision regarding the location of the Louisiana coastline. In this decision the Court rejected Louisiana's claim that the so-called "Coast Guard Line" was its "coastline" for the purposes of measuring its entitlement to submerged lands in the Gulf of Mexico under the Submerged Lands Act. Resolution of this issue in favor of the United States will ultimately entitle the Federal Government to most of the areas in dispute off the Louisiana Coast and to a large percentage of the lease revenues impounded under the 1956 Interim Agreement. The Court, however, referred the case to a Special Master for consideration of several other questions relating to the precise location of the coastline.

The litigation concerning the coastline of Texas was resolved in 1967 when the Court ruled that the 3-league belt of submerged lands in the Gulf of Mexico granted to Texas by the Submerged Lands Act was to be measured from its coastline as it existed in 1845 when Texas was admitted to the Union.

Recently some of the States along the East Coast have claimed submerged lands as far as 80 miles into the Atlantic Ocean, basing their claims on colonial charter grants from the English Crown. In April 1969, the United States filed an original action in the Supreme Court against each of the Atlantic Coast States to establish its right to the submerged areas of the Atlantic Ocean seaward of the three-mile line. On March 17, 1975 the U.S. Supreme Court, in *U.S.* vs *Maine, et al*, decided against the coastal States and continued to limit their jurisdiction to three miles. The International Boundaries between the United States and Canada, The Bahamas, Cuba and Mexico (in the Pacific Ocean) are not yet firmly established.

To cover leasing on the Continental Shelf beyond the State jurisdiction, a new leasing law was needed because the existing laws did not apply. On August 7, 1953, the Outer Continental Shelf Lands Act was passed.[6] It was to be not only the equivalent of the Mineral Leasing Act for the OCS, but also the legislative authority to acquire the subsoil and seabed of the OCS beyond the limits of the States. It set for the Federal Government, therefore, exclusive jurisdiction and control over this vast area of the Outer Continental Shelf and provided for the development of its mineral resources. The Outer Continental Shelf Lands Act gave to the Secretary of the Interior the authority to carry out the provisions of the Act. This authority has since been delegated to the Bureau of Land Management for leasing and to the United States Geological Survey for regulation of lease exploration, drilling, and development. This established the framework for Outer Continental Shelf mineral leasing on the basis of the following provisions:

SEC. 5(a)(1). The Secretary shall administer the provisions of this Act relating to the leasing of the Outer Continental Shelf, and shall prescribe such rules and regulations as may be necessary to carry out such provisions. The Secretary may at any time prescribe and amend such rules and regulations as he determines of waste and conservation of the natural resources of the Outer Continental Shelf, and the protection of correlative rights therein, and, notwithstanding any other provisions herein, such rules and regulations shall apply to all operations conducted under a lease issued or maintained under the provisions of this Act. In the enforcement of conservation laws, rules, and regulations the Secretary is authorized to cooperate with the conservation agencies of the adjacent States. Without limiting the generality of the foregoing provisions of this section, the rules and regulations prescribed by the Secretary thereunder may provide for the assignment or relinquishment of leases, for the sale of royalty oil and gas accruing or reserved to the United States at not less than market value, and, in the interest of conservation, for unitization, pooling, drilling agreements, suspension of operations or production, reduction of rentals or royalties, compensatory royalty agreements, subsurface storage of oil or gas in any said submerged lands, and drilling or other easements necessary for operations or production.

SEC. 8. LEASING OF OUTER CONTINENTAL SHELF.—(a) In order to meet the urgent need for further exploration and development of the oil and gas deposits of the submerged lands of the Outer Continental Shelf, the Secretary is authorized to grant to the highest responsible qualified bidder by competitive bidding under regulations promulgated in advance, oil and gas leases on submerged lands of the Outer Continental Shelf which are not covered by leases meeting the requirements of subsection (a) of section 6 of this Act. The bidding shall be (1) by sealed bids, and (2) at the discretion of the Secretary, on the basis of a cash bonus with a royalty fixed by the Secretary at not less than 12½ per centum in the amount or value of the production saved, removed or sold or on the basis of royalty, but at not less than the per centum above mentioned, with a cash bonus fixed by the Secretary

(b) An oil and gas lease issued by the Secretary pursuant to this section shall (1) cover a compact area not exceeding five thousand seven hundred and sixty acres, as the Secretary may determine, (2) be for a period of five years and as long thereafter as oil or gas may be produced from the area in paying quantities, or drilling or well reworking operations as approved by the Secretary are conducted thereon, (3) require the payment of a royalty of not less than 12½ per centum, on the amount of the production saved, removed, or sold from the lease, and (4) contain such rental provisions and such other terms and provisions as the Secretary may prescribe at the time of offering the area for lease.

SEC. 9. DISPOSITION OF REVENUES.—All rentals, royalties, and other sums paid to the Secretary or the Secretary of the Navy under any lease on the Outer Continental Shelf for the period from June 5, 1950, to date, and thereafter shall be deposited in the Treasury of the United States and credited to miscellaneous receipts.

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[6] Public Law 212, Outer Continental Shelf Lands Act (67 Stat. 462, 43 U.S.C. 1331 et seq.).

III. Current Procedure

BACKGROUND

Under the Mineral Leasing Act of 1920,[1] the Acquired Land Leasing Act of 1947, and the Outer Continental Shelf Lands Act of 1953, the Department of the Interior is charged with the responsibility of leasing public lands for oil and gas development to meet public needs. Congress directed the Department of the Interior to lease the OCS "in order to meet the urgent need for exploration," but little other guidance was offered.

The Department of the Interior has stated that its major goals and objectives with respect to the management of the publicly owned mineral resources are:[2]

(1) to assure orderly and timely resource development;

(2) to protect the environment;

(3) to insure the public a fair market value return on the disposition of its resources.

The Department claims that the three major goals and objectives as applied in its mineral programs are not mutually incompatible. Its stated goal is to achieve an optimum balance among the three with the objective of encouraging exploration, development, and production, while assuring the public a fair market value return for the resource.

Sections six and eight of the OCS Lands Act of 1953 prescribe the basic criteria and requirements of OCS petroleum leasing. The primary provisions include the following:

(1) the tracts must not exceed 5,760 acres;

(2) leases will be valid for five years or for as long as oil and gas is extracted in commercial quantities;

(3) bidding will be by sealed competitive bids and will be, at the discretion of the Secretary of the Interior, on the basis of one of the following methods:

(*a*) a competitively bid bonus with fixed royalty and rental rates;

(*b*) a competitively bid royalty with a fixed rental rate and a fixed bonus;

(4) the royalty rate is to be a minimum of 12½ percent of the market value of all petroleum saved, removed, or sold;

(5) a bonus and an annual rental is to be charged for each acre leased.

The act specifies a minimum royalty of 12½ percent, but by tradition a rate of 16⅔ percent (one-sixth) is levied. Even though no minimum is specified by law, in the past the yearly rental charged has been $3 per acre on OCS lands in "unproven" regions and $10 per acre in "proven" regions. All rents are now uniform at $3 per acre.

From the first OCS petroleum lease sale in October 1954 through

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[1] Public Law 146, Mineral Leasing Act of 1920 (41 Stat. 437, 30 U.S.C. 181 et seq.).

[2] U.S. Congress, Senate Committee on Interior and Insular Affairs, Federal Leasing and Disposal Policies Hearings, 92nd Congress, 2d Session, June 19, 1972. Washington, U.S. Govt. Print. Off., 1972 : p. 38–9.

May of 1975 a total of 5,249 tracts (oil and gas) were offered for lease. Of these 5,249 tracts, bids were received on 2,816, of which 2,522 received acceptable bids and were leased (see fig. 8). Through 1974 this had produced revenues of about $14.8 billion in bonuses, $3.2 billion in royalties, and $139.1 million in rentals. As shown in fig. 9, the total cumulative revenue through 1974 roughly totaled $18.2 billion. A bonus bid of $39,110 per acre in the October 1974 lease sale was the highest ever received, while in a 1959 sale the highest bid received was $16.17 per acre. It is evident from figures 8 and 10 that the average bid per-acre has risen erratically over time and has even declined in recent sales. Figure 11 shows that OCS lease sales have not been evenly scheduled. In 1956, 1957, 1958, 1961, and 1965 no OCS tracts were offered for lease but during 1974 more than 5 million acres were offered.[3] From October 1954 through May 1975, the average number of bids per tract was 1.8 while the average number of bids per tract on which bids were received was 3.3.

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[3] Until 1971 the Department of the Interior had no announced formal future leasing plan. It is reported by Kash, White, et al., in *Energy Under the Oceans* (Oklahoma: University of Oklahoma Press: 1973) that "Successive Secretaries of the Interior have pursued a policy of pacing the development of OCS oil and gas resources with leases being parcelled out at a rate that has kept the offshore industry hungry and bonuses high. Conservation and waste seem to have been treated as antonyms."

FIGURE 8

OUTER CONTINENTAL SHELF STATISTICAL SUMMARY

Date of sale	State	Number of tracts	Acres	Number of tracts bid on	Acres	Number of tracts leased	Acres	Total bonus	Average per acre	Total rentals [1]	Number of bids received	Total amount of all bids received	Highest per acre bid
Oct. 13, 1954	Louisiana	199	748,000	97	427,221	[1] 90	394,721	$116,378,476	$294.84	$1,184,175	327	$302,924,834	$1,220.00
Nov. 9, 1954	Texas	38	111,788	19	67,149	19	67,149	23,357,029	347.84	201,450	90	73,801,896	2,209.00
July 12, 1955	do	39	216,000	27	149,760	27	149,760	8,437,462	56.34	449,280	33	9,027,610	177.00
Do	Louisiana	171	458,095	94	252,807	94	252,807	100,091,264	395.92	758,442	351	314,212,441	2,076.80
May 26, 1959	Florida	80	458,000	23	132,480	23	132,480	1,711,872	12.92	397,440	23	1,711,872	16.17
Aug. 11, 1959	Louisiana	38	81,813	28	62,967	19	38,820	88,035,120	2,267.78	388,200	56	174,411,628	10,442.08
Feb 24, 1960	Texas	97	437,760	48	240,480	48	240,480	35,732,031	148.59	721,440	105	56,400,897	1,026.25
Do	Louisiana	288	1,173,223	125	710,718	99	464,046	246,909,784	532.07	1,392,159	339	518,774,752	2,501.51
Mar. 13, 1962	do	401	1,808,276	212	981,408	206	951,806	177,260,305	186.23	2,855,433	538	314,218,540	3,201.00
Mar. 16, 1962	Texas	30	90,720	10	28,800	10	28,800	557,720	19.37	86,400	10	557,720	26.25
Do	Louisiana	380	1,780,265	200	948,221	195	927,720	267,775,677	288.63	2,783,238	656	604,799,998	3,081.00
Oct. 9, 1962	do	19	33,855	14	24,858	9	16,178	43,887,359	2,712.79	161,780	26	66,265,290	8,480.00
May 14, 1963	California	129	669,777	58	312,976	57	312,945	12,807,587	40.93	938,838	70	13,989,953	454.80
Apr. 28, 1964	Louisiana	28	34,028	23	32,673	23	32,673	60,340,626	1,846.69	326,780	69	93,850,051	10,490.40
Oct. 1, 1964	Oregon	149	836,134	74	425,433	74	425,433	27,768,772	65.27	1,276,302	165	43,049,543	376.00
Do	Washington	47	253,940	27	155,420	27	155,420	7,764,928	49.96	466,260	57	10,530,210	310.05
Mar. 29, 1966	Louisiana	18	35,993	18	35,993	17	35,056	88,845,963	2,534.43	350,570	64	275,384,739	6,112.20
Oct. 18, 1966	do	52	227,898	32	134,717	24	104,717	99,164,930	946.98	523,600	79	185,214,816	3,128.00
Dec. 15, 1966	California	1	1,995	1	1,995	1	1,995	21,189,000	10,618.49	9,980	7	89,937,020	10,618.49
June 13, 1967	Louisiana	206	971,489	172	812,202	158	744,456	510,079,178	685.17	2,233,458	742	1,627,749,269	6,500.00
Feb. 6, 1968	California	110	540,609	75	383,341	71	363,181	602,719,262	1,659.56	1,089,543	164	1,293,601,113	11,373.70
May 21, 1968	Texas	169	728,551	141	666,631	110	541,304	593,899,046	1,097.16	1,623,915	556	1,620,393,212	7,602.00
Nov. 19, 1968	Louisiana	26	46,824	21	40,262	16	29,679	149,868,789	5,049.58	296,820	38	398,430,736	27,400.73
Jan. 14, 1969	do	38	96,389	26	61,628	20	48,504	44,037,339	907.90	485,050	40	71,036,938	2,161.00
Dec. 16, 1969	do	27	93,764	16	60,153	16	60,153	66,908,196	1,112,29	601,550	58	230,460,743	6,600.00
July 21, 1970	do	34	73,360	21	50,889	19	44,642	97,769,013	2,190.06	446,420	59	163,451,158	8,201.00
Dec. 15, 1970	do	127	593,485	127	593,485	118	551,398	846,784,660	1,535.70	1,654,194	1,043	2,877,429,559	12,875.00
Nov. 4, 1971	do	18	55,872	13	42,222	11	37,222	96,304,523	2,587.30	372,230	33	172,735,981	18,004.76
Sept. 12, 1972	do	78	366,682	74	346,693	62	290,321	585,827,925	2,017.86	870,996	324	1,599,155,464	21,870.04
Dec. 19 1972	do	132	604,029	119	548,374	116	535,874	1,665,519,631	3,108.04	1,607,661	690	6,191,018,227	21,630.00
June 19, 1973	Texas–Louisiana	129	697,643	104	566,573	100	547,173	1,591,397,380	2,908.40	1,641,519	551	6,248,160,989	13,490.97
Dec. 20 1973	Mississippi, Alabama, and Florida.	147	817,297	89	496,917	87	485,397	1,491,065,231	3,071.85	1,456,197	373	3,404,892,969	36,805.13
Mar. 28, 1974	Louisiana	206	930,918	114	522,397	91	421,218	2,092,510,854	4,967.76	1,263,675	402	6,474,003,574	33,772.20
May 29, 1974	Texas	245	1,355,678	123	680,335	102	565,112	1,471,851,831	2,604.53	1,695,348	352	3,354,292,556	13,371.85
July 30, 1974	Louisiana–Texas	258	1,298,739	49	249,704	19	100,241	30,236,800	301.64	300,729	57	88,799,354	1,563.40
Oct. 16, 1974	Louisiana	287	1,370,031	149	693,172	136	634,832	1,427,242,455	2,248.22	1,904,547	330	2,514,518,419	39,110.60
Do	do	10	51,515	8	40,755	8	40,755	1,018,875	25.00	122,265	57	7,238,500	25.00
Feb. 4, 1975	Texas	515	2,870,344	143	796,367	113	626,585	274,690,955	377.51	1,879,761	281	484,721,874	3,565.97
May 28, 1975	Louisiana–Texas	282	1,345,432	102	486,327	86	406,942	232,810,050	572.36	1,220,856	191	402,752,335	5,084.54
Total		5,249	24,336,211	2,816	13,264,503	2,522	12,010,495	15,272,293,001	----------	38,046,001	9,406	42,418,906,778	----------

[1] 1st-yr rentals only.

Source: U.S. Department of the Interior Bureau of Land Management, New Orleans Office, Outer Continental Shelf Statistical Summary.

FIGURE 9

OUTER CONTINENTAL SHELF REVENUE AND PRODUCTION VALUE PERCENTAGE CUMULATIVE REVENUE OF CUMULATIVE PRODUCTION VALUE CALENDAR YEARS 1953–74

Year	Bonuses	Minimum royalties	Rentals	Shut-in gas payments	Royalties	Total revenue	Total cumulative revenue	Total production value	Total cumulative production value	Percent
All States:										
1953			$1, 359, 630	$30, 650	$967, 892	$2, 358, 172	$2, 358, 172	$5, 036, 861	$5, 036, 861	47
1954	$140, 969, 005		3, 855, 333	86, 950	2, 748, 977	147, 660, 265	150, 018, 437	14, 370, 098	19, 406, 959	774
1955	108, 528, 725		3, 406, 351	122, 000	5, 140, 006	117, 197, 082	267, 215, 519	27, 060, 679	46, 467, 638	575
1956			4, 006, 193	79, 950	7, 629, 383	11, 715, 526	278, 931, 045	39, 497, 871	85, 965, 509	324
1957		$68, 581	3, 270, 122	110, 268	11, 391, 245	14, 840, 216	293, 771, 261	61, 072, 588	147, 038, 097	200
1958		184, 396	2, 420, 584	121, 218	17, 423, 878	20, 150, 076	313, 921, 337	96, 471, 136	243, 509, 233	129
1959	89, 746, 993	171, 036	2, 285, 725	84, 984	26, 539, 977	118, 828, 715	432, 750, 052	150, 472, 527	393, 981, 760	110
1960	282, 717, 065	316, 975	3, 603, 140	49, 350	37, 095, 301	323, 781, 831	756, 531, 883	200, 969, 615	594, 951, 375	127
1961		314, 121	3, 073, 861	37, 100	47, 920, 332	51, 345, 414	807, 877, 297	273, 636, 456	868, 587, 831	93
1962	489, 481, 111	517, 722	8, 412, 207	62, 200	66, 096, 334	564, 569, 574	1, 372, 446, 871	376, 675, 900	1, 245, 263, 731	102
1963	12, 807, 587	668, 339	8, 435, 184	52, 950	76, 999, 225	98, 963, 285	1, 471, 410, 156	450, 866, 484	1, 696, 130, 215	87
1964	95, 874, 326	820, 343	9, 798, 573	45, 800	88, 400, 230	194, 939, 272	1, 666, 349, 428	506, 783, 510	2, 202, 913, 725	76
1965	33, 740, 309	1, 072, 699	8, 731, 378	38, 450	102, 862, 540	146, 445, 376	1, 812, 794, 804	594, 222, 732	2, 797, 136, 457	65
1966	209, 199, 893	1, 367, 250	6, 869, 277	41, 700	136, 987, 537	354, 465, 657	2, 167, 260, 461	801, 724, 611	3, 598, 861, 068	60
1967	510, 109, 742	1, 891, 515	6, 208, 936	41, 400	15, 607, 609	675, 859, 202	2, 843, 119, 663	947, 214, 691	4, 546, 075, 759	63
1968	1, 346, 487, 097	2, 145, 178	8, 230, 787	52, 300	20, 136, 931	1, 558, 052, 293	4, 401, 171, 956	1, 179, 912, 209	5, 725, 987, 968	77
1969	111, 660, 685	1, 923, 632	8, 312, 607	41, 650	24, 090, 666	362, 029, 240	4, 763, 201, 196	1, 443, 870, 472	7, 169, 858, 440	66
1970	945, 064, 773	1, 745, 864	8, 607, 855	47, 700	283, 494, 568	1, 238, 960, 760	6, 002, 161, 956	1, 707, 593, 450	8, 877, 451, 890	68
1971	96, 304, 522	1, 891, 000	7, 741, 997	32, 300	350, 042, 488	456, 012, 307	6, 458, 174, 263	2, 135, 677, 078	11, 013, 128, 968	59
1972	2, 251, 347, 556	2, 019, 533	7, 984, 897	49, 550	363, 556, 339	2, 624, 957, 875	9, 083, 132, 138	2, 229, 179, 121	13, 242, 308, 089	69
1973	3, 082, 462, 611	2, 391, 249	8, 948, 816	52, 650	401, 126, 114	3, 494, 981, 440	12, 578, 113, 578	2, 486, 864, 855	15, 729, 172, 944	80
1974	5, 022, 860, 815	2, 048, 439	13, 532, 754	32, 550	560, 283, 889	5, 598, 758, 447	18, 176, 872, 025	3, 570, 053, 959	19, 299, 226, 903	94
Total all States	14, 829, 362, 815	21, 557, 872	139, 096, 207	1, 313, 670	3, 185, 541, 461	18, 176, 872, 025	18, 176, 872, 025	19, 299, 226, 903	19, 299, 226, 903	94

[1] Percentage accumulated revenue of accumulated production value.

Note: Revenue=charges and/or collection—bonuses and 1st-yr rentals adjusted from book transfer dates (years) to USGS from BLM, to actual sales dates. Distribution of escrow funds totaling $39,316,-545 to the State of Louisiana and lessees, pursuant to Supreme Court decree dated Dec. 31, 1965, was not deducted from calendar year 1966 revenue charges, nor was the production value of $157,000,000 deducted. 1970 bonuses increased $951,875 and rentals increased $22,500—leases on appeal validated.

Source: U.S. Department of the Interior, U.S. Geological Survey-Conservation Division. Outer Continental Shelf Statistics 1953 through 1974, June 1975, p. 49.

FIGURE 10

PERCENTAGE OF LEASES ACQUIRED

Sale date	Number of tracts leased	Majors (percent)	Groups of majors (percent)	Independents (percent)	Groups of majors/ independents (percent)	Average bid per acre
Oct. 13, 1954	90	70	16	10	4	$295
July 12, 1955	121	60	18	14	7	396
Feb. 24, 1960	147	75	12	7	5	532
Mar. 13, 1962	206	56	12	25	6	186
Mar. 16, 1962	216	69	15	10	6	288
June 13, 1967	158	46	34	11	8	685
May 21, 1968	110	24	21	12	43	1,097
Dec. 15, 1970	118	35	8	19	39	1,536
Sept. 12, 1972	62	31	19	5	45	2,018
Dec. 19, 1972	119	25	15	25	35	3,108
June 19, 1973	100	8	9	21	62	2,908

Source: U.S. Congress, Senate, Committee on Interior and Insular Affairs. Market performance and competition in the petroleum industry. Hearings, 93d Cong., 1st sess., Nov. 28, and 29, 1973. Washington, U.S. Government Printing Office, 1974, p. 106.

FIGURE 11

OCS ACRES OFFERED FOR PETROLEUM LEASE AND LEASED

	Acres offered	Acres leased	Percent leased of acres offered
1954	859,788	461,870	54
1955	674,095	402,567	60
1956	0	0	----------
1957	0	0	----------
1958	0	0	----------
1959	539,813	171,300	32
1960	1,610,983	704,526	44
1961	0	0	----------
1962	3,713,116	1,924,504	52
1963	669,777	312,945	47
1964	1,124,102	613,526	55
1965	0	0	----------
1966	265,886	141,768	53
1967	971,489	744,456	77
1968	1,315,984	934,164	71
1969	190,153	108,657	57
1970	666,845	596,040	89
1971	55,872	37,222	67
1972	970,711	826,195	85
1973	1,514,940	1,032,570	68
1974	5,005,881	2,186,363	44

Source: U.S. Department of the Interior, Bureau of Land Management, New Orleans Office, Outer Continental Shelf statistical summary.

The Bureau of Land Management (BLM) is charged with the Departmental responsibility to implement the leasing objectives of the Outer Continental Shelf Lands Act. The BLM has the responsibility of insuring (1) orderly and timely resource development, (2) protection of environment, and (3) receipt of fair market value.

BLM coordinates its efforts with the United States Geological Survey (USGS) which provides technical advice throughout several of the leasing procedures. The USGS is responsible for supervising and regulating exploration, development, and production activities on the leaseholds after leases are issued, including the maximum efficient rate (MER) of production (applicable to the entire reservoir) and the maximum production rate (MPR) (applicable to individual wells). The production rates, as well as drilling requirements, plugging, surface and subsurface safety, pollution, platform structure requirements, and inspections, are regulated by OCS orders issued by USGS.

Under section II of the OCS Lands Act, the USGS is authorized to grant preleasing geological and geophysical exploration permits on the OCS.

The leasing procedure on the OCS consists of eight major components: [4]

1. Proposed Schedule—Provisional OCS Leasing.
2. Call for Nominations.
3. Tract Selection.
4. Environmental Analyses.
5. Program Decision Option Document.
6. Pre-Sale Evaluations.
7. Sale.
8. Post-Sale Analyses.

PROPOSED SCHEDULE—PROVISIONAL OCS LEASING

The proposed schedule is the framework used to determine the timing and initiation of individual sale procedures, and it is continually updated and revised as new resource information becomes available and as national energy needs change. An analysis is made in broad terms of when, where, and how much oil and gas acreage to offer for lease. This is done through a review of the national energy situation and the identification of future supply-demand imbalances. Deficits are identified by matching projections of future non-OCS supplies of oil and gas and future OCS production from existing leases with future projected demand. Demand forecasts are made on a regional basis, using the regions of the Future Requirements Committee for gas and the Petroleum for Administration of Defense districts for oil. New OCS sales are proposed in order to meet rising deficits, and alternative schedules are tested with respect to the impact on demand.

The different options are also reviewed from the perspective of receipt of fair market value. The size and frequency of sales can induce or inhibit competition which in turn can reduce the Government's receipt of fair market value. In 1972, two general lease sales of 300,000–600,000 acres each were scheduled for each fiscal year. In response to the April 18, 1973, Presidential energy message, this schedule was increased to three sales per fiscal year of up to 1 million acres each. New schedules have proposed even larger sales, up to 10 million acres, but these are subject to regular revisions and modifications as the level of knowledge expands (see fig. 12). In a recent announcement, the Interior Department increased the offshore leasing schedule to six sales per year from 1976 through 1978, including at least one sale in each of the Atlantic, Pacific, and Alaskan offshore frontier areas.[5]

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[4] U.S. Department of the Interior, Bureau of Land Management press release, 1975.

[5] Department of the Interior, News Release "Interior Approves Accelerated Offshore Oil and Gas Leasing," October 2, 1975.

PROPOSED OCS PLANNING SCHEDULE

JUNE 1975
(REVISES NOVEMBER 1974 SCHEDULE)

SALE AREA		1974 J A S O N D	1975 J F M A M J J A S O N D	1976 J F M A M J J A S O N D	1977 J F M A M J J A S O N D	1978 J F M A M J J A S O N D
SOUTH TEXAS	37	DES PH BSI FES	N Sale S A L E H	E L D I N F E B R U A R Y 1 9 7 5		
CENTRAL GULF	38	ND T DES	PH FES N Sale S	A L E H E L D I N	M A Y 1 9 7 5	
CENTRAL GULF	38A	ND T DES	PH N Sale			
SOUTHERN CALIF.	35	T	DES PH BSI FES N Sale			
COOK INLET	1/	F E D E R A	L S T A T E	L E I D A T E U N C E R T A I N		
GULF OF ALASKA	39	BSI C ND	DES PH FES N Sale			
GULF OF MEXICO (GENERAL)	41	C ND	DES PH FES N Sale			
MID–ATLANTIC	40	C BSI ND	T PH FES N Sale			
NORTH ATLANTIC	42	C ND	BSI T DES PH FES N Sale			
GULF OF MEXICO (DRAINAGE)	44	T DES PH FES N Sale				
SOUTH ATLANTIC	43	C BSI ND	T DES PH FES N Sale			
GULF OF ALASKA (INCLUDING KODIAK)	46	BSI C ND	T DES PH FES N Sale			
BERING SEA (ST. GEORGE)	45	C ND BSI	T DES PH FES N Sale			
GULF OF MEXICO (DEEP)	47	C ND	T DES PH FES N Sale			
SO. CALIFORNIA	48	C ND	T DES PH FES N Sale			
MID–ATLANTIC	49	BSI C ND	T DES PH FES N Sale			
BEAUFORT SEA	50	BSI C ND	T DES PH FES N Sale			
OUTER BRISTOL BASIN	51	BSI C ND	T DES PH FES N Sale			
NORTH ATLANTIC	52	BSI C ND	T DES PH FES N Sale			
CALIFORNIA GENERAL INCL. WASH. & OREGON	53	BSI C ND	T DES PH FES N Sale			
SOUTH ATLANTIC (BLAKE PLATEAU)	54	BSI C ND	T DES PH FES N Sale			
BERING SEA (NORTON BASIN)	55	BSI C ND	T DES PH FES N Sale			
GULF OF ALASKA – ALEUTIAN SHELF	56	BSI C ND	T DES PH FES N Sale			
CHUKCHI SEA HOPE BASIN	57	BSI C ND	T DES PH FES N Sale			

BSI Baseline Studies Initiated
C Call for Nominations
ND Nominations Due
T Announcement of Tracts
DES Draft Environmental Statement
PH Public Hearing
FES Final Environmental Statement
N Notice of Sale
1/ State May Conduct Sale

Baseline studies scheduled are contingent upon scientific personnel and equipment being available to perform the studies.
Sales are contigent upon technology being available for exploration and development. A decision whether to hold any of the lease sales listed will not be made until completion of all necessary studies of the environmental impact and the holding of public hearings; as a result of the environmental, technical, and economic studies employed in the decision – making process, a decision, may, in fact, be made not to hold any sale on this schedule.

Curt Berklund
Director,
Bureau of Land Management

FIGURE 12

CALL FOR NOMINATIONS

The call for nominations is an official notice to the oil and gas industry published in the Federal Register to obtain an indication of industry interest in individual offshore tracts which may subsequently be offered for lease. Calls are issued for large contiguous areas after covering several million acres off the coast of a single state. Industry is normally allowed a period of 60–90 days to submit tract nominations.

TRACT SELECTION

After nominations have been received, specific tracts are selected for possible lease offering. This is a joint responsibility of the BLM and the USGS. In the tract selection process, the Interior Department gathers and reviews more detailed geophysical, geological, engineering and economic resource information and nominations on areas proposed for sale. The BLM's responsiblity involves an evaluation of (1) the number of weighted and non-weighted nominations per tract; (2) the need to initiate leasing in wildcat areas in terms of industry development capability, competition, and timely future availability of resources to consumers; (3) tract leasing history; (4) nomination patterns; (5) consideration of a mix of tracts by water depth, distance from shore; (6) and identification of tracts deleted from prior sales for environmental impact reasons or for which special environmental stipulations have been developed. The responsibility of the USGS involves a technical evaluation to ensure proper consideration of the development of geologic structures and trends and identification of

tracts in imminent danger of drainage, tracts which are most prospective for production, and tracts demonstrating a need for or susceptibility for prompt drilling and development. Based on these agency analyses, a joint BLM–USGS field office review is made to prepare final recommendations of tracts. The Washington offices of BLM and USGS, after a review of the joint field reports, make the final tract selection for the sale within existing policy guidelines. A list of the selected tracts is published in the Federal Register prior to the availability of the draft Environmental Impact Statement.

The USGS obtains its information from data that it purchases on the "open market" from geophysical exploration companies as well as from confidential industry submittals on OCS tracts already in production.[6] The USGS has several other sources and can, if necessary, produce its own data. Prior to submitting a bid on an OCS tract, petroleum firms obtain seismic survey data on the tract from the "open market." Though there is a limited amount of information trading among oil producers, most production data is not available to prospective bidders. As a consequence, the USGS tends to have an information edge over the bidders.[7]

"Open market" seismic survey data on the subterranean geological formations is gathered by trailing behind ships detection devices that receive the echoes which are sent out by an energy generating device and bounced off the floor of the ocean. This may cost anywhere from $65 to $1,200 per line-mile and on the average 20,000 line miles are needed per million OCS acres.[8] As a rule of thumb, OCS data costs about $350 per line-mile or about $40,000 per standard tract.

The Department of the Interior does not require each petroleum company exploring the OCS to submit exploratory data and analysis because, first, the USGS does not have the manpower and equipment to evaluate all of it, and second, it is argued by the Department of the Interior that this would be tantamount to forcing a company to testify against itself.[9] However, the Department of the Interior does have a mandatory reporting system of certain geological and engineering data obtained by the lessee in the development and production stages of a tract.

ENVIRONMENTAL ANALYSES

This component involves the preparation of environmental impact statements under Section 102 (2)(c) of the National Environmental Policy Act of 1969. A draft Environmental Impact Statement (EIS) is first prepared, a public hearing is held, and a final EIS is prepared for all OCS oil and gas lease sales. Consultation and coordination with interested Federal agencies is routinely undertaken in preparation of EIS concerning proposed OCS lease sales. The EIS analysis discusses

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[6] A large part of the data obtained by the USGS is seismic survey data that is purchased on the open market. There are several commercial survey companies who collect and sell such data. Often prospective petroleum lease purchasers will join together to hire an exploratory company in order to lower the cost of data. This can lower the company cost of data to as little as $10 per line mile. Due to legal considerations, the USGS does not join in these ventures but under the usual "new comers" clause the USGS can purchase the data at a later date.

[7] *In toto*, the petroleum industry has more information on any particular tract than does the USGS. However, because firms do not freely exchange their information, on the average each petroleum firm has less information on any particular tract than does the USGS.

[8] A line-mile is one ship traveling in a line for one mile.

[9] U.S. Congress. House. Committee on the Judiciary, Subcommittee on Immigration, Citizenship, and International Law. Outer Continental Shelf Oil and Gas. Hearings, 93rd Congress, 2d Session. January 24, 30, February 7, March 6 and 14, 1974. Washington, U.S. Govt. Print. Off., 1974: p. 404.

the impact of a proposed sale on a tract-by-tract basis, and it contains the following information:

1. Description of the proposed action.
2. Description of the environment.
3. Environmental impact of proposed action.
4. Mitigating measures included in the proposed action.
5. Any unavoidable adverse environmental effects.
6. The relation between local short-term use and maintenance and enhancement of long-term productivity.
7. Any irreversible or irretrievable commitment of resources.
8. Alternatives to the proposed action (including alternate sources or resources).
9. Coordination and consultation with others.

The draft EIS is made available to the public and is sent out for comment by Federal agencies with jurisdiction or expertise, by State and local agencies authorized to develop or enforce environmental standards, and by anyone else requesting a copy. Thirty days after the draft has been made available, a public hearing is held. Anyone who wishes to do so may comment on the proposed action at the hearing.

The Final EIS is then prepared after comments on the draft (solicited and unsolicited) and testimony from the hearing are analyzed. After the incorporation of any new relevant information, unresolved issues, or attitudes toward the proposed action, the necessary revisions are made on the draft and the final EIS is then submitted to the Council on Environmental Quality (CEQ).

PROGRAM DECISION OPTION DOCUMENT

At the time the final statement is being prepared, a Program Decision Option Document (PDOD) is also prepared. The PDOD brings to the decision-maker's attention the non-environmental factors associated with the proposed action. The non-environmental factors discussed in a PDOD include the economic, social, and political impact of the proposal and its effect on the Department's budget and programs. This document, in conjunction with the final environmental impact statement, provides the Secretary of the Interior with information necessary to evaluate the total impact of the proposed action.

PRESALE EVALATIONS

Prior to a lease sale, the USGS calculates pre-sale values of the OCS tracts offered for lease with BLM performing an audit and review function. USGS provides the geologic, geophysical and engineering inputs which are obtained through analysis of industry data submitted to the Government and through the purchase of seismic information. BLM provides certain economic inputs including estimates of capital and operating expenses, discount rates, and procedures to follow in calculating taxes.

A formal evaluation agreement, signed December 1971, between BLM and USGS, established the responsibilities of each organization in the evaluation process. Under this agreement the Geological Survey field office furnishes to the BLM Washington office, at least 3 weeks prior to the sale, detailed reliability categories for each tract indicating

the adequacy of avilable technical data. At the same time it also indicates other factors that will be used in the resource evaluation. Prior to the sale, the USGS field office gathers data on all the tracts in the sale and then places on each tract one or more potential value estimates, normally calculated using a discounted cash flow.

In estimating the fair market value of petroleum, USGS examines the data gathered on the tracts to be leased, as well as data from nearby areas already in production, before setting a minimum acceptable bid. The evaluation takes place in secrecy, and the value of the minimum acceptable bid may be released only after the leasing process is completed. Because of the imprecision in evaluating this type of data, and often due to the lack of "hard" production data, there is occasionally a great difference between the evaluation given by the USGS to a particular tract and the evaluation given by the petroleum companies. For example, in the December 1973 sale, tract number 032005 had a presale USGS evaluation of $3,625,432 but the winning bonus bid was $32,232,000 (the next highest bid was $8,067,600). In the same sale, tract number 032077 was valued at $144,000 but sold for $76,827,600.

At least 1 week prior to the sale, the USGS field office provides the BLM evaluation review team with the tract values that have been calculated. The review team receives the reserve estimates and all pertinent data used in the evaluation process. On the day before the sale, the review team submits to the responsible USGS and BLM officials a report indicating the team's findings with respect to its review of the USGS presale evaluation procedures and discusses any area of possible concern regarding selected evaluation inputs such as price, discount factors, and taxation methods.

Ninety days after a sale, BLM reviews and analyzes the manner in which the presale evaluation procedures were implemented. This analytical review identifies areas where research is needed and suggests changes in the presale evaluation process for use in succeeding lease sales. As needed, the Interior Department further reviews and analyzes its sales operations and procedures in order to improve the conduct of future sales.

SALE

The terms and conditions of each lease sale are published in the Federal Register at least 30 days prior to the sale date. Sales are conducted by the manager of the appropriate BLM leasing office pursuant to the detailed procedures that are issued by him prior to each sale. Following the opening of sealed bids each is checked for technical and legal adequacy, qualifications of bidders, sufficient advance bonus (20 percent at time of bidding), powers of attorney, compliance certificates, and bonds. Foreign companies are not permitted to buy OCS leases, although domestic subsidiaries of the companies are eligible.

POSTSALE ANALYSIS

Following a sale, the Bureau of Land Management conducts a procedural review of the high bids to assist the manager in his determination of whether particular leases should be granted. The primary emphasis in the post sale analysis is on the receipt of fair market value granted.

The factors considered in the analysis of the sale are:[10]

(1) the type of tract—whether the tract is drainage, development or wildcat;

(2) the total high bid;

(3) the Geological Survey's reliability rating—this refers to the quantity and quality of the USGS data;

(4) mean range of values (ROV)—the mean ROV is the Survey's undiscounted estimate of the value of the tract and is obtained by averaging the 500 tract values obtained from the computer run "Monte Carlo" simulation;

(5) the high bid as a percent of the mean ROV;

(6) discounted mean ROV—the mean ROV is discounted at 10 percent for two years;

(7) high bid as a percent of discounted mean ROV;

(8) average evaluation of tract—the sum of the bids on the tract plus the government's pre-sale value which is divided by the number of bids plus one;

(9) high bid as a percent of the average evaluation of tract;

(10) number of bids on the tract;

(11) average number of bids per tract by type of tract;

(12) the tract's deviation from the average/mean deviation by type of tract—indicates whether there is concensus on the tract value;

(13) bidding performances of high bidder by quartiles—shows how the high bidder bid on other tracts in the sale;

(14) average number of bids on tracts on which the high bidder bid;

(15) potential environmental hazard;

(16) geologic/bottom hazards;

(17) history of the tract—whether the tract has been leased, offered or nominated before;

(18) miles tract is from shore;

(19) miles tract is from pipeline;

(20) water depth;

(21) other considerations—any other factors which may have an impact on the decision (i.e. special stipulations to be imposed on tract if leased).

Analysis of each sale is necessary in order to provide the following information to the manager to aid in the determination of whether particular leases should be issued: (1) leasing history of the tract, such as information concerning the number of times a tract has been nominated and offered, including bids submitted and rejected and (2) status of production in the area. If some tracts are being drained or could be drained by production from adjoining tracts on the same structure, an analysis of the effect of not leasing a tract on the initial or ultimate development of the structure is required.

Protection of the environment is more heavily weighted in the earlier phases of an OCS leasing action. In the postsale analysis, however, new or additional environmental information is considered along with information developed in the environmental impat statement.

Following the review, recommendations to accept or reject high bids that were submitted at the sale are made by the BLM OCS field office manager. Normally this entire procedure, starting with a call for nominations, usually takes approximately 12 months.

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[10] U.S. Department of the Interior, Bureau of Land Management.

In order for the highest bid to be accepted as the winning bid it usually must be equal to, or greater than, the minimum acceptable bid set by the USGS as well as meeting certain other criteria. In the July 1974 Louisiana and Texas OCS lease sale, 49 tracts were bid on but only 19 received acceptable bids and were leased. Rejected bids are not always insubstantial. For example, in the July 1974 sale a per-acre bonus bid of $65.62 won the lease for tract number os1005 while the highest per-acre bonus bid on tract number os1039, $439.58, was rejected as being insufficient. The Department of the Interior reports that in no case has a bid been rejected on the grounds of increasing the market share of a firm or of being anticompetitive.

The minimum bid considered is $25.00 for each acre leased, but BLM is not required to accept such a bid. In addition to the cash bonus, the lessee must pay in advance an annual rental of $3.00 per acre to BLM. The rental is suspended at any time the royalty payment exceeds the equivalent of $3.00 per acre.

By law, any tract that is not in production five years after the actual date of leasing reverts to the Federal Government. If development progress can be shown, however, the production deadline can be extended up to an additional five years. The lease-reversion rate is substantial. Of the almost 1,600 leases sold prior to 1974, nearly 40 percent had been relinquished. On tracts that had been leased more than five years earlier, the reversion rate reached 60 percent. Although the bonus is not refundable if a lease proves unproductive, the tax laws do permit the bidder, once the tract is abandoned, to deduct the bonus for a tax savings of 48 percent of the amount of the bonus.

On the initial exploratory well, which can be drilled only after the lease is awarded, the chance of finding petroleum in economically recoverable quantities is about one out of six. In "wildcat" regions of the OCS the success ratio is even lower.[11] Exclusive of contracting and information costs, the estimated cost per exploratory well drilled on the OCS is $1,000,000. The cost of a single drilling rig or platform can range from $10 million to $40 million, depending on the type of rig and the depth of the water in which drilling is to take place.

COMPETITION

The OCS leasing system has inadvertently allowed the majority of leases to be captured by the larger oil companies, and some economists assert that this has led to increased market concentration and increased oligopolistic power. Until November 1, 1975, OCS leasing regulations did not prohibit joint bidding and, as a result, it was common practice for the major oil concerns to join together in order to capture a lease (see fig. 13). On that date, however, the Interior Department established new regulations that prohibit joint ventures between companies that produce more than 1.6 million b/d of crude oil, natural gas, or liquefied petroleum products worldwide between January 1 and June 30, 1975. This list will be reviewed every six months, at which time it will be updated and a new "bidding period" will begin. Initially, 9 of the 126 companies that have filed production statements will be barred from joint bidding in offshore oil and gas

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[11] The risk involved is well illustrated by the Washington-Oregon OCS experience. After investing nearly 100 million dollars and five years of drilling on 600,000 OCS acres, the oil companies were unable to locate any oil or gas.

lease sales, although they will be allowed to bid jointly with smaller companies that are not on the restricted list.[12]

JOINTLY OWNED LEASES (FEDERAL DOMAIN)

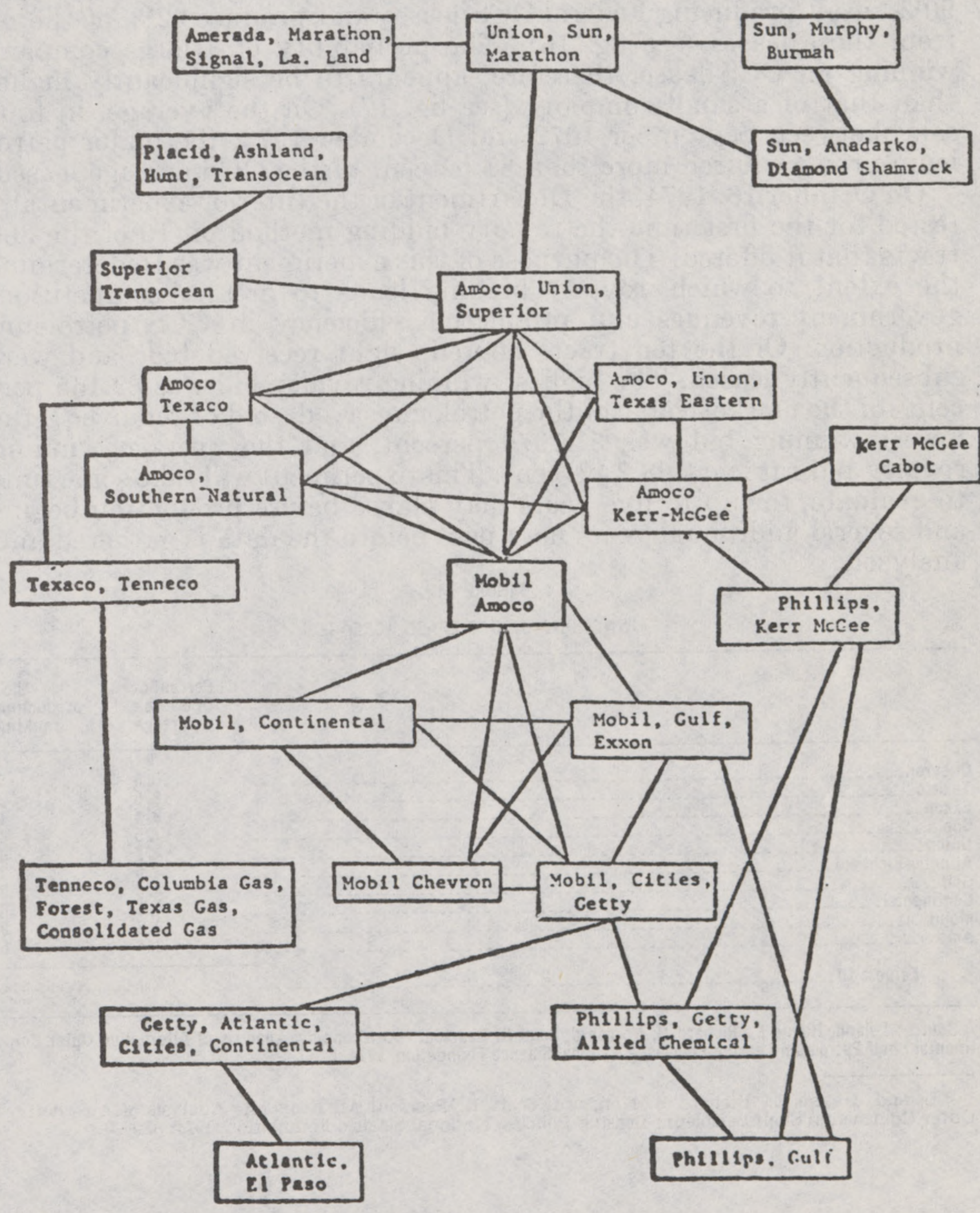

FIGURE 13

Source: U.S. Congress. Senate. Committee on the Judiciary. Subcommittee on Antitrust and Monopoly. The natural gas industry. Hearings, 93rd Congress, 1st session. June 26, 27 and 28, 1973. Washington, U.S. Govt. Print. Off., 1973. pt. 1, p. 489.

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[12] The 9 companies prohibited from joint bidding are the Amoco Production Company, BP Alaska Exploration, Inc., Chevron Oil Company, Exxon Corporation, Gulf Oil Corporation, Mobil Oil Corporation, Shell Oil Company, Standard Oil Company of California, and Texaco, Inc.

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This concentration of oil lease ownership is evidenced by the fact that nine of the largest oil producing firms in the United States are also among the ten largest OCS lease holders and that these ten firms hold 62 percent of the total OCS acres leased (see. fig. 14).[13] Shell, Texaco, Gulf, Exxon, Chevron, and Continental account for about 70 percent of the oil produced from all offshore oil wells (State and Federal lands) in the Gulf of Mexico (see fig. 15). The 17 largest operators own 90% of all producing Federal OCS leases and produce 92% of the oil from those leases (see fig. 16). The probability of a large company winning an OCS lease, therefore, appears to be significantly higher than that of a small company (see fig. 17). On the average, in four sales between September 1972 and December 1973, the major petroleum firms acquired more than 61 percent of the OCS acreage leased.

On October 16, 1974, the Department of the Interior experimentally tested for the first time the royalty bidding method on 10 of the 300 tracts that it offered. The purpose of this experiment was to determine the extent to which royalty bidding leads to greater competition, government revenues and production efficiency in OCS petroleum production. Of the ten tracts offered, eight received bids and were subsequently leased. The highest winning royalty bid was 82.165 percent (of the market value of the petroleum saved, sold or removed), the lowest winning bid was 51.7979 percent, and the average winning royalty bid rate was 68.2 percent. This experiment will take some time to evaluate, for up to five years may elapse before production begins and several additional years may pass before the data is gathered and analyzed.

FIGURE 14

OWNERSHIP OF OCS LEASE ACREAGE

	Percent of OCS lease acreage	U.S. production ranking
Chevron	10.6	5
Texaco	9.5	2
Exxon	9.4	1
Shell	7.5	4
Union	4.7	9
Atlantic-Richfield	4.6	7
Gulf	4.4	3
Continental	4.1	13
Mobil	3.8	8
Amoco	3.4	6
Largest 10	62.0	

Source: Leland, Hayne E., Richard B. Norgaard, Scott R. Pearson. "An Economic Analysis of Alternative Outer Continental Shelf Petroleum Leasing Policies," National Science Foundation, 1974. p. 17.

[13] Leland, Hayne E., Richard B. Norgaard, Scott R. Pearson. An Economic Analysis of Alternative Outer Continental Shelf Petroleum Leasing Policies, National Science Foundation, 1974: p. 9–20.

FIGURE 15

OFFSHORE AND OCS OIL PRODUCTION

[Dollar amounts in millions]

Producer	Gulf of Mexico production, State and Federal, 1971 [1]		Corporate income 1972 [2]		Production in Federal waters through 1968 cumulative [3]	
	Oil and condensate (thousands of barrels)	Percent of total production	Gross income	Net income	Oil and condensate (thousands of barrels)	Bonus paid
Shell Oil Co	105,496	17.1	$4,591	$245	221,500	$284
Texaco, Inc	96,959	15.7	7,529	904	16,800	407
Gulf Oil Corp	95,428	15.5	5,940	561	162,800	271
Exxon Co., U.S.A	73,719	11.9	18,700	1,466	244,900	519
Chevron Oil Co	72,698	11.8	5,143	511	275,400	198
Continental Oil Co	44,520	7.2	3,262	109	65,300	75
Signal Oil & Gas Co	16,646	2.7	1,315	29	(5)	22
Placid Oil Co	16,620	2.7	(4)	(4)	(5)	----------
Kerr-McGee Corp	15,131	2.5	603	51	7,108	----------
Union Oil Co. of California	14,367	2.3	1,873	115	50,000	81
Mobil Oil Corp	12,596	2.0	8,243	541	38,600	188
Tenneco Oil Co	10,902	1.8	2,841	184	23,400	105
Ocean Drilling & Exploration	9,907	1.6	61	11	4,800	120
Lake Washington, Inc	7,148	1.2	(4)	(4)	(5)	----------
Amoco Products, Co	5,444	.9	4,054	342	16,400	48
Atlantic Richfield Co	3,897	.6	3,658	199	40,000	85
Sun Oil Co	3,414	.6	1,939	152	(5)	16
Southern National Gas Co	1,515	.2	(4)	(4)	8,500	----------
Superior Oil Co	1,104	.2	135	4	3,200	16
Phillips Petroleum Co	1,086	.2	2,363	132	34,400	68
Skelly Oil Co	1,031	.2	555	38	(5)	24
Pennzoil Products Co	1,020	.2	731	33	(5)	----------

[1] Clean Gulf Associates Oil Spill Contingency Agreement; exhibit B, percentage participation of members (July, 1972).
[2] Moody's Industrial Manual—1972, Moody's Investors Service, Inc. New York, N.Y.
[3] Offshore petroleum studies, Bureau of Mines Information Circular—IC 8557.
[4] Not available.
[5] Not in top 20 producers; top 20 produced 97.7 percent of total.

Source: Kash, Don E. and Irvin L. White et. al. "Energy Under the Oceans," University of Oklahoma Press, 1973, p. 94.

FIGURE 16.—U.S. GEOLOGICAL SURVEY—CONSERVATION DIVISION, SUMMARY OF OIL AND GAS LEASE STATUS FOR 17 LARGEST OPERATORS AND/OR LESSEES, AS OF JULY 31, 1974

Operator and/or lessee	Federal OCS leases						Federal OCS production		
	Producing		Nonproducing		Total OCS		Oil thousands of barrels	Gas millions of cubic feet	Liquids thousands of barrels
	Number	Acres	Number	Acres	Number	Acres			
Atlantic Richfield	29	32, 620	35	180, 029	64	212, 649	11, 186	5, 230	70
Continental Oil	73	301, 154	59	249, 103	132	550, 257	45, 503	485, 290	7, 358
El Paso Natural Gas									
Exxon	49	223, 317	64	332, 358	113	555, 675	51, 541	185, 443	158
Gulf Oil	38	149, 978	40	207, 752	78	357, 730	30, 203	219, 417	3, 788
Kerr-McGee	19	76, 967	28	136, 724	47	213, 691	10, 598	104, 145	1, 859
Marathon Oil	6	19, 375	10	51, 520	16	70, 895	17, 722	49, 929	1, 949
Mobil Oil	44	140, 597	27	135, 138	71	275, 735	9, 949	250, 986	2, 893
Phillips Petroleum	5	16, 995	27	138, 230	32	155, 225	2, 231	51, 793	39
Placid Oil	8	40, 000	3	13, 974	11	53, 974	11, 692	112, 050	1, 891
Shell Oil	87	242, 236	43	204, 189	130	446, 425	70, 946	263, 528	6, 374
Standard Oil of California	70	237, 071	88	417, 730	158	654, 801	46, 440	171, 019	331
Standard Oil of Indiana	17	76, 848	42	194, 987	59	271, 835	8, 655	118, 570	1, 899
Sun Oil	4	21, 081	37	169, 264	41	190, 345	5, 935	5, 085	35
Tenneco Oil	22	81, 401	19	82, 008	41	163, 409	7, 775	233, 242	2, 103
Texaco	20	88, 761	42	197, 653	62	286, 414	8, 835	220, 572	3, 418
Union Oil of California	34	126, 385	27	145, 934	61	272, 319	22, 072	271, 094	4, 107
Total companies	525	1, 874, 786	591	2, 856, 593	1, 116	4, 731, 379	361, 283	2, 747, 393	38, 272
Percent of grand total	90	83	79	79	84	81	92	77	88
Grand total all companies	583	2, 256, 910	751	3, 615, 847	1, 334	5, 872, 757	391, 923	3, 548, 143	43, 359

Note: Oil includes condensate. Exxon includes Humble; Standard Oil of California includes Chevron; Standard Oil of Indiana includes Amoco and Pan American.

Source: ADP printouts—Operator and/or lessee production. Anchorage, Alaska; Casper, Wyoming; Los Angeles, California; Metairie, Louisiana; Roswell, New Mexico; Tulsa, Oklahoma; Washington, D.C. and FY Grand Total.

FIGURE 17

PERCENTAGE OF SUCCESS IN WINNING OCS TRACTS

[Based on acreage: percent participation considered for bidding combines]

Sale date	Majors	Others	Number of tracts
Sept. 12, 1972	73.8	26.2	62
Dec. 19, 1972	57.2	42.8	116
June 19, 1973	28.7	71.3	97
Dec. 20, 1973	85.0	15.0	87
Unweighted average	61.2	38.8	90.5

Source: U.S. Congress. House. Committee on the Judiciary. Subcommittee on Immigration, Citizenship, and International Law. Outer Continental Shelf Oil and Gas. Hearings, 93d Cong., 2d sess., Jan. 24, 30; Feb. 7; Mar. 6 and 14, 1974. Washington, U.S. Government Printing Office 1974. p. 437

On January 23, 1974, President Nixon announced in his energy message that the 1975 target for OCS leasing would be 10 million acres. This was a significant increase in the rate of OCS development and would have been comparable in size to the total of OCS acres leased as of July 1974 (10,101,000 acres). Based on previous lease-sale experience, this would have necessitated a total offering of 20 million of OCS acres. The Department of the Interior had tentative plans to offer a total of 16.1 million OCS acres for lease in 1975, including 3.0 million acres off of South Texas, 2.9 million acres in the Central Gulf, 1.5 million acres off of Southern California, 1.7 million acres in the Cook Inlet, 3.5 million acres in the Gulf of Alaska and 3.5 million acres in the Mid-Atlantic region. Critics charged, however, that such a large area could not be effectively developed and that the only result would be diluted bidding and reduced Federal revenue. In its revised schedule (fig. 12), the Interior Department now plans to offer considerably less than ten million acres.

DISADVANTAGES OF CURRENT SYSTEM

It has been stated that the Federal OCS leasing policy should be designed to maximize the present value of the natural resource to society. Under this concept, maximizing the net present social value of petroleum requires consideration of more factors than just the level of Government revenues.

In a paper prepared for the National Science Foundation on Federal Outer Continental Shelf leasing policies, it was pointed out that bonus bid leasing has been accompanied by the following five fundamental changes: [14]

1. *A Switch from Private to Public Lands.*—Initially large firms or groups of individuals leased oil land primarily from small landowners. Clearly, the lessees were more capable of bearing risk than were the lessors. In that situation leasing strategies which shifted risk to the firms were desirable. OCS leasing policy followed the historical precedent even though the situation with respect to risks has been reversed. As the lessor, the Government can bear risk more easily than potential lessees.

[14] Leland, op. cit., pp. 2-3.

2. *Greater Costs of Drilling.*—The OCS requires massive expenditures for drilling rigs which can be many times more expensive than onshore rigs. Together with the rising costs of leases mentioned below, "front-end" capital costs have risen to the point where only the largest firms can diversify their leasing activities. Yet, simultaneously, there is a rising policy interest in increasing competition in the petroleum industry.

3. *Rise in the Price of Oil.*—The "energy crisis" and uncertain supplies have led to a doubling in the price per barrel of crude. Consequently, bonus bids on desirable lease tracts have soared. Bonus payments have risen relative to royalties, creating an undesirable transfer of risk from the public lessor to the private lessee.

4. *Greater Market and Environmental Uncertainties.*—Concurrently with the increase in leasing outlays, the riskiness of return has increased. Fluctuations in oil prices have been magnified in changing profits. Market uncertainties have become perhaps the greatest source of risk because appropriate diversification is difficult. A further source of uncertainty is the environmental hazard associated with OCS drilling. Leaks and ruptures can lead to large clean-up or reparation costs, further increasing the riskiness of OCS operations.

5. *Greater Reliance on OCS Resources.*—Historically, petroleum from the OCS has been a small portion of U.S. production amounting to only 5 percent of total U.S. output two decades ago. Crude oil reserves on the OCS, however, amounted to about 21 percent of U.S. reserves. The percentage of OCS production and reserves will increase in the future simply because virtually all of the petroleum provinces in the continental U.S. have been explored and developed, whereas only about 10 million acres of the more than 500 million acres (200-meter contour) of the OCS have been leased and explored with the drill. The recent monopolistic behavior of the Organization of Petroleum Exporting Countries (OPEC) has increased the value and importance of domestic resources and greatly increased interest in accelerating production from our OCS.

IV. Alternative Leasing Methods

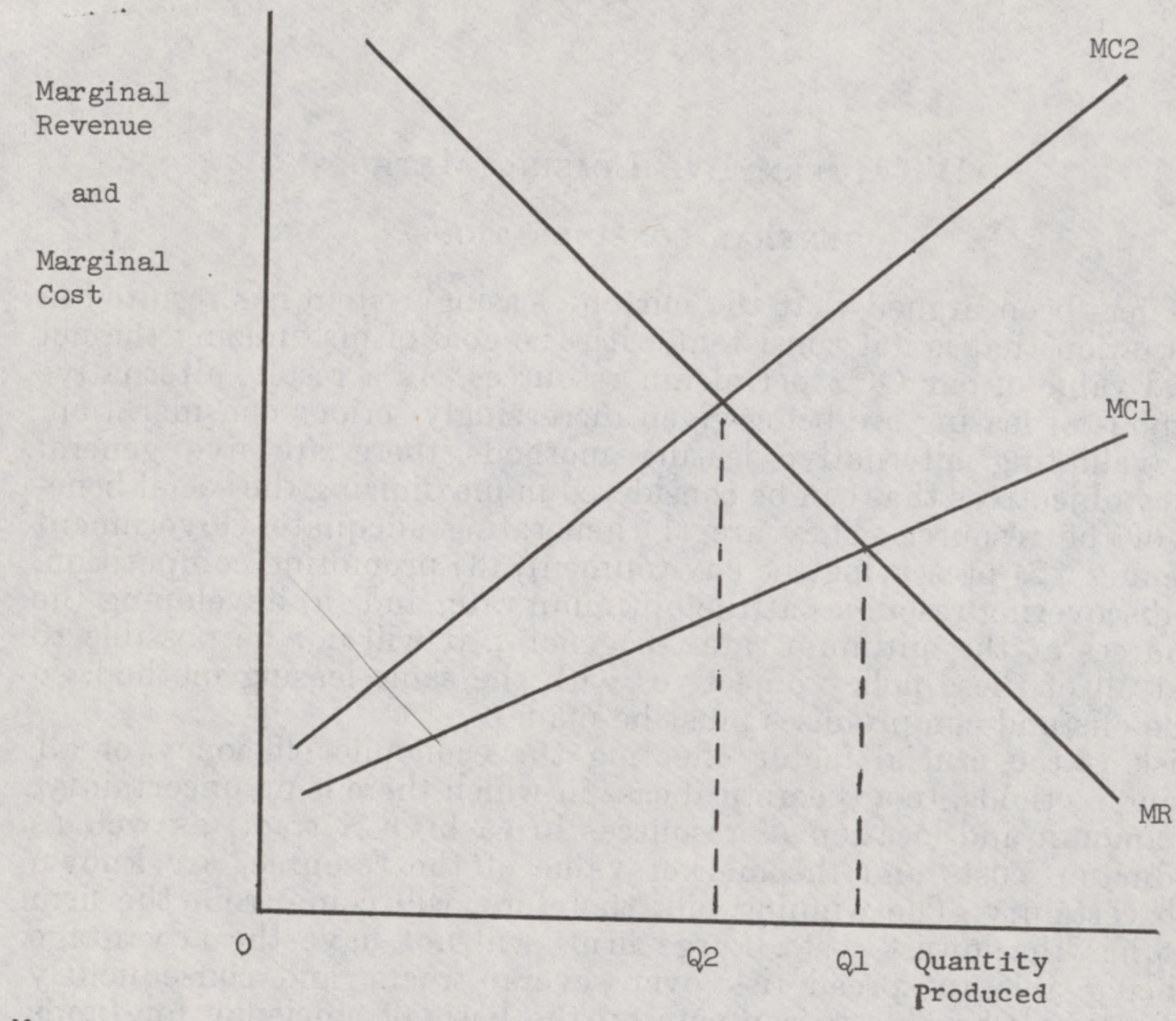
GENERAL CONSIDERATIONS

It has been argued that the current leasing system has resulted in a situation that is not consistent with the goal of maximizing the net social value of our OCS petroleum resources. As a result, alternative methods of leasing are being given increasingly serious consideration. In evaluating alternative leasing methods there are five general policy objectives that can be considered in maximizing the social benefits of the resource. They are (1) generating adequate Government revenues, (2) preserving the environment, (3) promoting competition, (4) discovering resources at the optimum rate, and (5) developing the resources at the optimum rate. In general, it will not be possible to meet all of these policy objectives with the same leasing method, so trade-offs and compromises must be made.

Risk is the crucial factor affecting the economic efficiency of all leasing methods. In a theoretical case in which there is no uncertainty, the amount and location of resources in each OCS tract, as well as production costs and the market value of the resource, are known with certainty. The winning bid, therefore, will come from the firm that has the lowest costs. Large firms will not have the advantage of being able to spread risk over several tracts, and consequently all firms will be able to compete on the basis of efficiency for funds in the capital market. The Government will obtain the maximum amount of revenues possible because all firms will be willing to pay the full amount of the value of the resources less the "normal" rate of return on investment. Consequently, no firms will receive "windfall" profits either because of lack of competition or because of "luck." Because conditions are known with certainty, resources will be discovered and developed at the socially optimal rate; there will be no rush to overdevelop nor any reason to underinvest in equipment or in exploration. Theoretically, with perfect knowledge the socially optimal level of environmental preservation will also be achieved.

Under the theoretical situation of no uncertainty, a royalty increases the per-unit costs and, therefore, it alters the production decision and leads to a sub-optimal utilization of the resource. A bonus, however, is extracted prior to production and consequently has no direct effect on the production decision. A firm will normally extract the resource until the cost of production equals or exceeds the value of the resource produced. Royalties increase the cost per unit of production, therefore, the royalty bidding method can lead to an earlier shutdown than would be likely with the bonus bid system. Instead of producing quantity OQ1 in figure 18 (as would be the case with the bonus bid lease), the firm will limit production to OQ2 with the royalty lease. Because the production cost per unit increases (or revenue per unit decreases) as the royalty percentage increases, the greater royalty rate the earlier the shutdown.

PRODUCTION DECISION GRAPH



Marginal Revenue -- The revenue from an additional barrel of petroleum

Marginal Cost -- The cost of producing an additional barrel of petroleum

MC 1 -- Marginal Cost with bonus bidding

MC 2 -- Marginal Cost with royalty bidding

FIGURE 18

It can be argued that in a world without uncertainty or risk, a royalty lease is economically less efficient than is a bonus lease. A royalty reduces the revenue from each additional barrel produced, which decreases the incentive to explore and to produce and will ultimately lead to lower Government revenues, to a smaller petroleum supply, and to higher costs to the consumer. Even though the U.S. Code of Federal Regulations does provide for reduction of royalties or rentals to promote development of leases which would otherwise be uneconomic, the provision has never been invoked.[1]

The "real world", however, is not risk-free. As noted earlier, the probability of finding petroleum in commercially recoverable quantities in an exploratory well is about one out of six. The four major

[1] U.S. Code of Federal Regulations, section 250. 12, title 30.

sources of risk involved in leasing on the OCS are (1) the amount of recoverable resources located in the tract, (2) the cost of exploration, (3) the cost of production, and (4) the future market value of the resources. The uncertain nature of the petroleum market has been recently illustrated by sharply rising prices, foreign production cutbacks and price increases, proposed new energy taxes, and the elimination of special tax provisions. In addition, companies operating on the OCS face unlimited liability for oil spills. These factors and others have contributed to making OCS petroleum and exploration and development a high-risk venture, while the lack of a significant futures market in petroleum has prevented firms from "insuring" against some of the inherent risk.

FIXED ROYALTY WITH BONUS BIDDING

This leasing method is provided for under the OCS Lands Act of 1953 and is to date the only method that has been employed to any significant degree in leasing the OCS.[2] Under this act the royalty is a stated percentage of the value of production and can be paid in cash or in kind. Although the OCS Lands Act stipulates a minimum rate of 12½ percent, the royalty rate is usually set at 16⅔ percent.

Each tract is usually awarded on the basis of the highest bonus bid; if the highest bid submitted meets or exceeds the pre-determined minimum acceptable level, as well as certain other criteria, then a lease is awarded. However, if the highest bid falls below the miuminm acceptable level, then the BLM institutes a reevaluation process in which all bids are reviewed in terms of geological information, data reliability, and other factors in order to determine which of the bids, if any, will be accepted.[3]

In the past, the royalty has been set at a rate such that the bonus tends to be a large component of total investment.[4] This poses particular hazards for the smaller firms because the bonus payment is contingent upon the award of the lease and not upon the presence of recoverable petroleum, and it is made long before the firm can be assured of any return on its investment. Because there is a low probability of finding a recoverable pool in any one area, a small firm investing a large portion of its resources in a few tracts will run a greater risk of bankruptcy than would a large company. Many economists argue, therefore, that the only way a firm can "buy insurance" under this leasing arrangement and current market conditions is to purchase a large number of tracts in order to spread the risk. These factors are indicative of the problems small firms have in competing with larger firms in the capital market and in absorbing the high interest rates that they must pay.

Since the royalty payment is based on the market value of the petroleum produced, a portion of the market risk is shifted from the firm to the Government (i.e., society). Thus the economic effect of any change in either the market value of petroleum or the quantity produced is borne by both parties. Theoretically, the higher the fixed

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[2] As noted earlier, an experimental royalty lease sale of 10 tracts took place on October 16, 1974.

[3] As reported by the Bureau of Land Management some of the "other" factors taken into consideration are: (1) bidding performance of high bidder; (2) average number of bids on tracts on which the high bidder bid; (3) potential environmental hazard; and (4) geologic and bottom hazards.

[4] According to Kash, White, et al. *Energy Under the Oceans*, prior to development the bonus payment accounts for almost 65 percent of the petroleum firms costs; after development it accounts for more than 14 percent of its costs.

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royalty rate, the lower will be the winning bonus bid and the greater will be the sharing of risk. Of the four types of risk—discovery, exploration cost, production cost and market price—royalty payments directly transfer only market-price risk.

There are, however, distinct disadvantages to having a royalty payment included in any lease. As noted earlier, the major problem is that of early shutdown; the higher the fixed royalty, the earlier the termination of production and the greater the amount of petroleum left in the OCS. Because of high start-up costs it is doubtful that under present conditions an abandoned field would ever be reopened. Further, because royalties affect per-unit output costs, they tend to decrease the firm's investment in exploration and total amount of tract development. Overall, this can result in lower Governmental revenues, smaller supplies, and higher costs to the consumer than would be expected without a royalty payment.

A fixed royalty will cause additional problems if it is set too high for firms to make a "normal" rate of return on their investment. This could result either in non-development of a field or in bankruptcy of the unwary firm.

FIXED BONUS WITH ROYALTY BIDDING

The fixed bonus with royalty bidding method is also permitted under the provisions of the OCS Lands Act. In this case, a fixed bonus (to be paid on award of the lease) is stipulated prior, to bidding, and competition is based on the royalty to be paid to the Government. Except for ten experimental leases offered in late 1974 this method has never been employed on the OCS.

Royalty bidding can cause some additional problems due to excessive speculation. If the fixed bonus is set too low, firms have little to lose by bidding high royalties, which could lead to early shutdowns and incomplete extraction of the petroleum. Theoretically, the lower the fixed bonus, the higher will be the winning royalty bid. Royalty bidding has the additional disadvantage that it may attract bidders who are not as well qualified to develop the lease because of inexperience in offshore oil development.

The primary advantage of a royalty is that it transfers a portion of the firm's risk to the Government and indirectly to society. If the lease tract turns out to be "dry", then both the petroleum firm and the Government share the loss. An increase in risk sharing could help enable small firms to enter the field and increase competition, increase Government revenues, and promote a more efficient allocation of resources.

Techniques such as a declining royalty schedule could be implemented in order to help alleviate the early shutdown problems. This would lower the cost of production over time and could be expected to result in greater extraction of the resource. Any royalty, however, will still lead to some early shutdown and could result in the non-development of some tracts (an extreme case of early shutdown).

FIXED BONUS WITH RENTAL BIDDING

Under the OCS Lands Act of 1953, rental bidding with a fixed bonus is not permitted (a minimum royalty of 12½ percent is

mandatory), and consequently an amendment to the law would be necessary to implement this method. This system calls for a fixed bonus with competitive bidding based on the size of the rental payments. If the firm that wins the lease fails to pay the rent, it loses the lease. This leasing method also tends to transfer some risk to the Government from the firms; if there are no recoverable resources, then the firm can drop the lease and lose its "sunk" costs (the drilling, bonus and rent costs that have already been paid). Theoretically, it can be expected that the lower the fixed bonus, the higher will be the winning rent bid. The higher the rental, the greater will be the risk-sharing.

The rental method does appear to share some risk, but not as much as with royalty payments. Rental payments are contingent upon continued production and not upon market conditions or production costs. If the lease is executed during periods of high profitability the rental would probably be high. If profitability declines, however, the size of the payment would remain the same and could lead to early shutdowns. Unlike a royalty scheme in which the shutdown decision is made on the basis of production, the rental shutdown decision is made on the basis of the rental period. Thus, the yearly marginal cost of production, rather than the per-barrel marginal cost of production, is the decision variable that is affected. Once the decision is made to pay the rent and proceed with production, the rental is viewed as a sunk cost not affecting marginal production costs. Since the rental payments are made at periodic intervals, however, firms would probably attempt to maximize the extraction of petroleum in between payments. This could lead to additional problems because the total amount of petroleum that can be recovered is diminished if attempts to extract it too quickly reduce reservoir pressures.

FIXED BONUS WITH PROFIT-SHARE BIDDING

As with rental bidding, profit-share bidding would necessitate a change in current law. Under this leasing arrangement, a fixed bonus would be stipulated and the petroleum firms would compete on the basis of the percentage of the profit to be shared with the Government.

This system, unlike any other, shares *all* of the risks associated with petroleum recovery. Pool-size risk, exploration-cost risk, production-cost risk, and market-value risk are shared in proportion to the profit share. The lower the fixed bonus, the higher will be the percent profit share of the Government. The higher the Government's profit-share, the less risk will be borne by the individual petroleum firms and the greater it will be borne by the government.

The sharing would be negative as well as positive; losses as well as profits would be shared between the industry and the Government, which would be a very effective means of reducing development risk. As a consequence, an increase in competition, government revenues, and an efficient allocation and utilization of resources could be expected.[5]

There are, however, several major difficulties associated with this system of leasing. For example, this system would necessitate the

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[5] For a mathematical analysis see: Kalter, Robert, Thomas H. Stevens and Oren A. Bloom. The Economics of Accelerated Outer Continental Shelf Leasing, Cornell Agricultural Economics Staff Paper, 74-18, August 1974.

institution of procedures for uniform accounting and profit determination. In order to establish uniform accounting procedures and insure proper reporting of profits, a Federal regulatory agency would probably be necessary. In addition, the definition of profits is a very difficult question both economically as well as politically, and if defined incorrectly incentives could result which might lead to inadequate production efforts.

DECLINING ROYALTY SCHEDULE

To discourage the early shutdowns which are inherent in a royalty leasing system, the Government could employ a declining royalty schedule. Initially the royalty rate would be high; with the passage of time the cost of extracting a barrel of oil would increase due to lower production rates, while the royalty rate would decline at a predetermined pace. Even though a declining royalty rate could alleviate some of the early shutdown problems, it could not completely prevent them. There would still be some small or marginal petroleum fields which would be abandoned early because of the royalty, even if the percentage is reduced. These early shutdowns would adversely affect petroleum production and Federal revenues.

Compared to the non-declining royalty lease, the declining royalty lease adds little to the sharing of risk. The firm would still be liable for all of the risks and costs inherent in the exploration, development, and production stages. Even though the royalty would apportion the market-price risk between the firm and the government, as the royalty declines the burden of the risk shifts back to the firm.

In addition to these drawbacks, a royalty system imposes additional administrative costs for the monitoring of production and the collection of royalties. Furthermore, as the royalty tends to lessen the capital requirements of operators, participation by unqualified, marginal or speculative operators may be encouraged.

PERFORMANCE SYSTEM

The performance system of leasing OCS lands for resource development has been employed by other countries, most notably Canada and Great Britain. The performance system substitutes administrative evaluations for the competitive market place. Under this system, the authorized leasing agent specifies the amount of work to be done on each tract, the rate at which the work is to be performed, the amount of capital expenditures, as well as other performance criteria.

The primary advantage of this system is that it provides the Government with tight control over the development and use of its resources. The government would have the authority to specify the exact rate and extent of resource development, and it could recall the lease if the firm fails to comply. In addition, this system could give smaller operators, at the discretion of the leasing authority, greater access to the resources.

FIXED BONUS WITH OIL PAYMENT BIDDING

In this leasing system, the fixed bonus (to be paid when the lease is awarded) is specified in dollars, while the oil payment bid is specified in barrels. The oil payment could be either on the basis of the number of barrels to be paid each year of the lease or on the basis of a per-

centage of production. The primary advantage of this system is that it helps to share the market price risk of petroleum between the firm and the Government; changes in the market price are felt by both parties.

If the oil payment is specified in terms of the number of barrels to be paid per year, then this system is, in effect, a rental system and has all of the associated problems. If, on the other hand, the payment is specified in terms of a percentage of production, then the system is a royalty system with all of its associated disadvantages. Thus, there are no clear advantages in having an oil-payment bidding system.

STAGGERED BONUS BIDDING

This system would require the bonus to be paid in several stages instead of all at once. This might be devised so that one-third of the bonus bid would be paid at the time of the sale, another one-third when petroleum is found in paying quantities, and the final one-third when production begins. Less capital would be tied up by this system thereby freeing more funds for exploration and development. If no petroleum were found, the cost to the company would be smaller and would therefore reduce the financial risk of OCS development. The disadvantage would be that it would reduce revenues to the Federal Government and might provide less incentive for thorough exploration of the tract.

SHARE BIDDING

This system, sometimes known as the "Phillips Plan" for the company that proposed it, recommends the leasing of entire structures regardless of their size instead of the arbitrary 5700-acre tract limit now in effect. Companies would enter bonus bids as they do now, only each bid would be for the entire field and not for a specific tract. Each company would then receive, based on its equity, a percentage of the profits (or losses) from the development of the field. There would be a maximum of 20 percent on the participation by any one company in the development. A corporation would be formed with each participating company exercising control relative to the size of his bid up to the maximum of 20 percent. One operator would be designated to develop the structure and the corporation would be billed by the developer, even if the operator were one of the participants in the corporation. This bill would be paid by drawing from a fund established for that purpose, possibly from bonus bids held in escrow for that purpose. In this way the bonus money would be used not as front-end money but as working capital. The major disadvantage of the plan is that its administrative complexity would require a very large Federal bureaucracy to oversee the operations of these corporations.

SUMMARY OF ALTERNATIVE LEASING METHODS

These leasing arrangements are, of course, only a few of the many possible alternatives. Because of the risk and uncertainty, the advantages of bonus bidding are inconsequential. Although the bonus bids are held "hostage" and are development incentives, firms facing high risks tend to be overly conservative about the future, and

consequently they tend to under-invest in exploration and development. Risk decreases the supply and increases the cost of capital funds. This is particularly true for small companies which are unable to diversify their operations and thereby decrease their risk. As a consequence, small firms are at a disadvantage in this respect when competing with large firms—a fact that is confirmed by statistics. The higher the risk and more uncertain the market, the greater will be the advantage to the larger firms under present leasing arrangements. A study by the Department of the Interior has shown that "Federal offshore areas have been explored, developed and produced primarily by major oil companies because the capital requirements . . . exceed the capabilities of most independents." [6] It can be argued that risk is not effectively shared between industry and Government under the present arrangements. On the assumption that operators tend to bear more than their share of risk, there is also a tendency for OCS resources to be underutilized.

In a world of risk, the bonus-bidding method currently employed has been criticized as being the least desirable of the alternatives discussed on the grounds that it leads to 1) inefficient use of resources, 2) industrial concentration, 3) reduced competition and 4) lower Government revenues. Royalty-bid leasing may encourage the sharing of some forms of risk between firms and the government and it may increase competition, but it also creates a problem of premature abandonment when production levels begin to decline and potentially significant production is shut-in because the cost of oil extraction is high relative to its value.

Profit-sharing appears to be the most economically efficient system available. Because it effectively shares *all* forms of risk, it will tend to promote competition, to increase Federal revenues, and to insure optimal development of the resources. The major drawbacks are technical in nature—problems such as defining profit, cost, and revenue, as well as difficulty in passing the necessary legislation over likely industry resistance.

A leasing arrangement is only one method of apportioning risk between the petroleum firm and the Government, and many other techniques are available. For example, the expensing of exploration and intangible drilling costs for tax purposes shifts an additional share of exploration and development risks to the Government. If it were to provide firms with additional data which would enable them to more accurately establish the tract's potential value, then another portion of the risk would be transferred away from the firm. The Government could contract with exploration companies to produce the data needed for tract evaluation, and then provide it (without any evaluation) to interested petroleum firms at a price just high enough to cover costs. The Government could also provide interested bidders with production data on nearby tracts; at present the Government does not release this information. Pre-bid exploration need not be limited to seismic surveying but could also include the drilling of exploratory wells.

The present method of setting a minimum acceptable bid in secrecy brings little discernible benefit, but it does contribute substantially to

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[6] Kash, Don E., Irvin L. White et al. Energy Under The Oceans. University of Oklahoma Press, 1973: p. 93.

a firm's risk. If the USGS evaluation of the value of the tract is above the value perceived by the oil companies, then none will submit an acceptable bid. If the minimum acceptable bid is known in advance, the industry could warn the Department of the Interior that they believe the USGS evaluation is excessive and should be reviewed. If, however, the minimum acceptable bid is below what the industry believes to be the market value of the resource, competition will assure that the maximum bid will be obtained. This, of course, presupposes that competition exists (whether actual or *potential*), and that anti-collusive antitrust laws are enforced. With the secret minimum acceptable bid, even the firm that bids the highest amount is not assured that it will win the bid. This is costly to the winning bidder because of large investments in acquiring and analyzing exploration data.

Other proposals to promote risk apportionment include 1) leasing of larger tracts, 2) exploration leases with the option to develop all or part of the tract, 3) checkerboard leasing, 4) additional tax provisions for exploration and development, and 5) contract exploration.[7]

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[7] Leland, op. cit., p. 60.

V. Alternatives to Leasing

The Federal Oil and Gas Corporation (as proposed in H.R. 12104, 93d Congress) has also been suggested as a possible alternative to some of the problems that exist under the current leasing system. As stated by the sponsor of the bill, the goals of the Corporation are: [1]

> First, the Corporation would develop publicly owned oil and gas resources in order to satisfy national energy rather than to maximize private sector profits. Second, the Corporation would develop oil and gas rights to stimulate maximum economic competition in various aspects of the petroleum business. Third, the Corporation would provide the public and the Government with knowledge of the actual cost of producing oil and gas, so that appropriate public policy can be set to best manage the Nation's energy resources. Fourth, the Corporation would provide the public and the Government with accurate indications of the extent of our energy reserves so that any future attempts to trigger public panic by under-reporting available supplies could be met with reliable information.

In addition to its charter, which would effectively grant it the power to operate as if it were a private firm, the Corporation would have some extraordinary privileges. On Federal lands the Corporation would have the power to explore to the extent necessary to carry out its authorized activities. It could request up to 50 percent of any tracts offered, and it would not be required to make any lease payments. The Corporation would receive annual appropriations from Congress for the first 10 years, after which it would be expected to be self-sufficient. Though the Corporation would be expected to pay State and local taxes, it would be free from any Federal income tax. The Corporation would also be exempted from State and local laws and court jurisdiction if the laws impeded its ability to operate as Congress directed. Critics of the proposal doubt that the Corporation could fulfill the goals set for it and that it would not be the least costly means of achieving these objectives. They also object to the Federal Government competing directly with private industry.

Private petroleum corporations, as all other economic units, attempt to maximize their profits as much as existing market conditions and Government regulations permit. By altering the market conditions or Government regulations, different output mixes may be obtained. Theoretically, it is possible for the Government to obtain any mix of products it desires by changing laws and regulations. If petroleum development in a certain region is desired (or not desired) then that area can be offered for lease (or withheld). If a certain product is desired (or nor desired) the Government could stimulate (or restrict) its production through appropriate tax laws and other regulations. If the Government feels that firms should make certain data public, then it need only pass legislation requiring such disclosure. Since it is not necessarily true that a Government corporation is more efficient than a private corporation, it is not necessarily true that the Government corporation can provide a product at a lower cost.

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[1] Harrington, Michael. The Federal Oil and Gas Corporation. Remarks in the House. Congressional Record (daily ed.), March 28, 1974: H 331-2332.

However, because of its preferential treatment (such as an exemption from the Federal corporate income tax) it may *appear* that the Government corporation is more efficient.

Advocates of the proposal claim that "public ownership aimed at increasing competition, together with vigorous antitrust action of the kind formally initiated against the oil companies by the Federal Trade Commission * * * would protect against the effects of monopoly altogether." [2]

It has been argued, therefore, that the proposed Corporation would be effective in fostering competition in the petroleum industry. However, serious problems might arise from this situation. If the Corporation were to be truly competitive then it can be expected that all of the private firms would be eliminated from OSC development. Assuming that the Corporation would be at least as efficient as is the most efficient petroleum company, because of its tax, legal, and financial advantages it would be able to produce petroleum at a lower cost than any other firm. Consequently, if the Corporation were competitive and offered petroleum at the lowest possible price that would still provide a normal rate of return on capital, then it would probably eliminate most or all of its competitors. Rather than fostering competition, therefore, it might well destroy it. It could, on the other hand, price its petroleum so that even the most inefficient firm could stay in business, but that action would not be consistent with the original purpose of the Corporation.

A Corporation is likely to be desirable only when the market system cannot, or will not, appropriately incorporate the desires of the society it serves. For example, this may occur when the production or distribution of a particular product is controlled by a single firm or by a few collusive firms (monopoly or oligopoly). It also may occur when the political or social desires of a society are not the same as those expressed by the consumers through the market. For example, it may be politically or strategically prudent to restrict or cut off petroleum imports but not economically desirable to do so.

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[2] M. Harrington, op. cit., p. H 2332.

VI. Conclusion

It is apparent that after nearly a quarter of a century, the policy of leasing Federal oil and gas on the OCS needs a thorough review. In the re-evaluation of national energy goals that has been precipitated by a series of "energy crises," this policy must be given priority consideration because OCS petroleum represents one of the few remaining domestic sources of energy for the United States. The present system has proven useful but has deficiencies that are considered by many to be counterproductive. There can be little doubt that the present system can be improved, even if the modifications are not as sweeping as some have suggested. The present system should be compared to the alternatives, as outlined in this report, and the best features taken from each to the extent that they are compatible and with the objective of encouraging exploration and development, improving competition, and reducing the associated environmental hazards. A revised leasing policy, incorporating these elements, would be a major contribution toward the establishment of a national energy policy.

APPENDIX

Offshore Oil: Selected References 1969–75

OFFSHORE OIL: SELECTED REFERENCES 1969–1975

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