OCS Report
MMS 91-0051

Estimates of Undiscovered, Economically Recoverable Oil & Gas Resources

for the Outer Continental Shelf
Revised as of January 1990

MMS U. S. Department of the Interior
Minerals Management Service
Offshore Resource Evaluation Division

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By: Larry W. Cooke

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INTRODUCTION

The Minerals Management Service (MMS) has revised its estimates of the undiscovered, economically recoverable oil and gas resources for the Federal Outer Continental Shelf (OCS) prepared for the 1987 National Oil and Gas Resource Assessment. New geological and geophysical data warranted such an update. The results of this update are presented in a set of tables included in this report. This reassessment increased the entire OCS undiscovered risked mean resource estimate by 10 percent.

BACKGROUND

The MMS is the bureau within the U.S. Department of the Interior (DOI) that is responsible for administering the minerals leasing program for the Federal OCS. The Outer Continental Shelf Lands Act and its amendments provide the legislative guidelines for administering the leasing program. One of the primary purposes of the Act is to:

> . . . preserve, protect, and develop oil and natural gas resources in the Outer Continental Shelf in a manner which is consistent with the need (a) to make such resources available to meet the Nation's energy needs as rapidly as possible, (b) to balance orderly energy resource development with the protection of the human, marine, and coastal environments, (c) to insure the public a fair and equitable return on the resources of the Outer Continental Shelf, and (d) to preserve and maintain free enterprise competition . . . . (P.L. 95-372, Sec. 102 (2)).

To accomplish these goals, the Secretary of the Interior is directed to prepare and maintain an oil and gas leasing program. The program consists of a schedule of proposed lease sales indicating the size, timing, and location of leasing activities that will best meet national energy needs for the 5-year period following the schedule's approval (43 U.S.C. 1344 (a)). This schedule is approved by the Secretary after review by the Congress and the President. One of the primary items of information needed by the Secretary to formulate a draft 5-year offshore leasing program is an estimate of the undiscovered, economically recoverable oil and gas resources that could be available for lease, by planning area.

In August 1989, the U.S. Geological Survey (USGS) and the MMS, two agencies of the DOI, released a publication (Mast, et al., 1989) which reported the results of their joint assessment of the undiscovered, conventionally recoverable oil and gas resources for the entire Nation. This National Assessment was conducted over a period of more than 2 years and reflects data and information available as of January 1, 1987. The resource estimates

are reported as ranges of possible values and are given by geologic province. Individual provinces are large regions or areas, based on natural geologic entities and may include a single dominant structural element or a number of contiguous elements.

The 26 current OCS planning areas are administrative regions defined and used by the DOI to specify the size and location of areas being considered for proposed lease sales. These planning area boundaries are not necessarily defined by geologic province limits. Therefore, the OCS results of the National Assessment by geologic province had to be reconfigured in terms of the 26 OCS planning areas for use in the leasing program. The total OCS and regional results did not change. The planning area resource estimates were released in May 1989 (Cooke, 1989). An in-depth report on the MMS portion of the National Assessment, by planning area, is presented in Estimates of Undiscovered Oil and Gas Resources for the Outer Continental Shelf as of January 1987 (Cooke and Dellagiarino, in press). The publication provides information on the complex technical aspects of probabilistic resource estimates, their derivation, the geologic and economic basis for the numbers, and the implications for resource potential.

Originally, the OCS resource estimates developed for the National Assessment were expected to be the initial input in terms of resource potential for the development of the 1992 to 1997 5-year leasing program. In late 1989, the MMS regional offices were asked to review the estimates they developed for the National Assessment to determine whether they were still valid or if significant new information had become available which would warrant an update. Subsequently, five of the OCS planning areas were determined to have new information as well as additional prospect mapping and analyses which would significantly change the National Assessment resource estimates.

This report presents the revised estimates for those five OCS planning areas. The resource assessment methodology used for the current assessment remains the same as that described in Cooke and Dellagiarino (in press). This publication is an update and companion to that report. The economic assumptions used for the National Assessment remain valid and have been retained. The changes to the resource estimates for the five planning areas are a result of incorporating new information, more detailed mapping, and new interpretations of existing data.

RESULTS

Using data available as of January 1990, the five OCS planning areas with revised estimates are the Beaufort Sea, Chukchi Sea, Hope Basin (all in Arctic Alaska), Eastern Gulf of Mexico, and Northern California, as shown on figure 1. Estimates for the Eastern Gulf of Mexico were updated earlier, using data available as of July 1989, and these estimates are still applicable to the January 1990 assessment. Although new geological and geophysical information was available in other OCS planning areas, significant changes to the 1987 resource estimates were not apparent.The revised resource

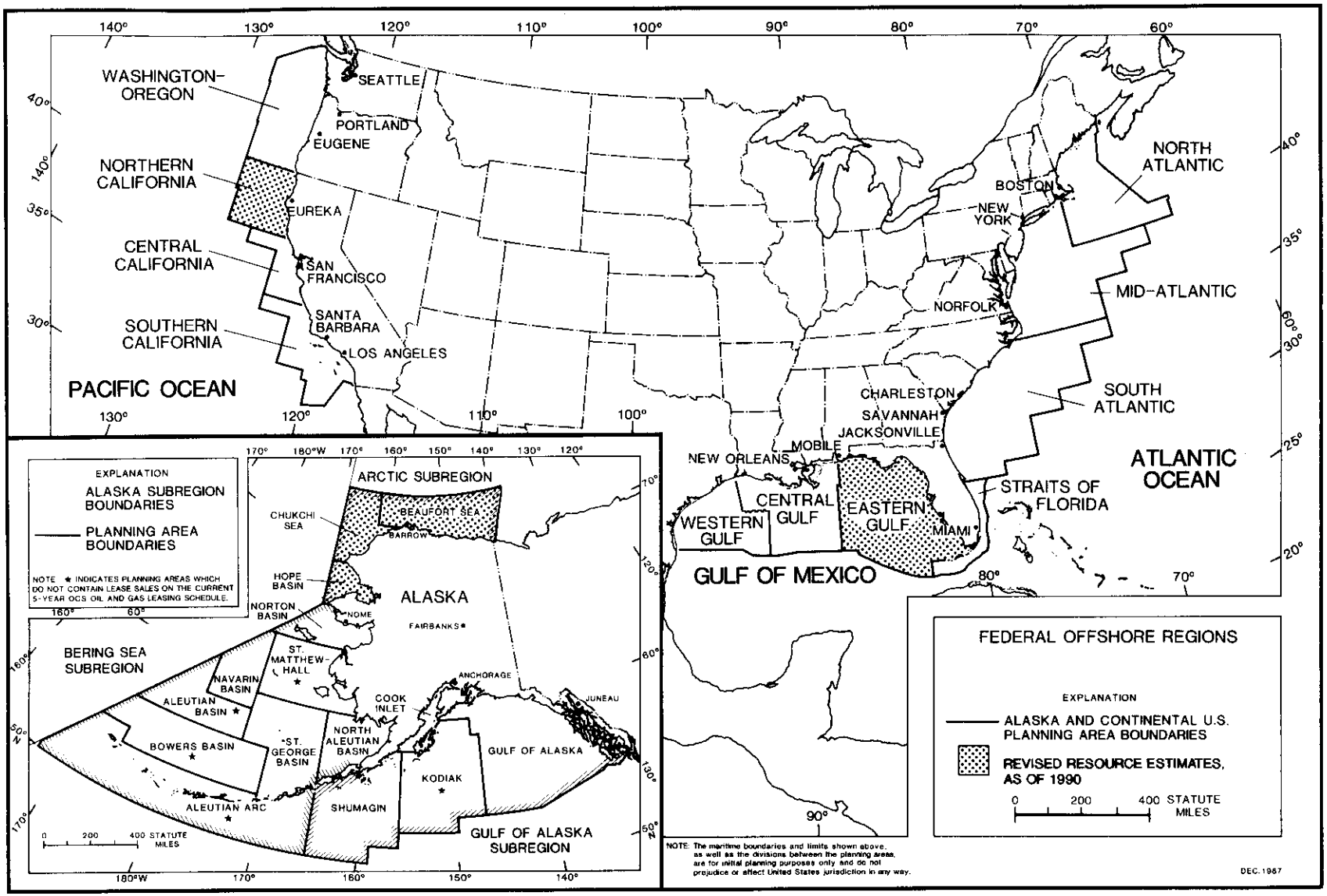

Figure 1. The 1990 assessment revises resource estimates in the Eastern Gulf of Mexico, Northern California, Hope Basin, Chukchi Sea, and Beaufort Sea Planning Areas.

estimates for the five planning areas as of January 1990 are summarized in Tables 1 and 3. For comparison, the January 1987 National Assessment estimates are listed on Tables 2 and 4. Complete tables of undiscovered oil and gas resource estimates for all planning areas as of January 1, 1990, are in the appendix.

Conditional and risked estimates are both shown on the tables. Conditional estimates are based on the assumption (or condition) that commercially recoverable oil and gas resources exist in the area. As such, they are the best indicators of resource potential in an area. If oil and gas are discovered in an area, the conditional estimate reflects the anticipated amount. The risked estimates incorporate the chance or risk that an area will be devoid of commercially recoverable oil and gas resources. They do not represent actual volumes which could be discovered, but have been discounted through the risking process. Risked estimates are useful for aggregation purposes.

Tables 1 and 2 report results for the primary case economic scenario for the 1990 and 1987 assessments, respectively. This scenario assumes starting prices of $18 per barrel for oil and $1.80 per thousand cubic feet for natural gas, with a range of real price growth rates, encompassing numerous possible oil and gas price paths. These economic assumptions are described in more detail by Mast and others (1989), and by Cooke and Dellagiarino (in press). Under the primary case gas prices, Alaskan natural gas is not estimated to be economically recoverable.

Tables 3 and 4 for the 1990 and 1987 assessments, respectively, show the undiscovered, economically recoverable resources estimated under an alternative case economic scenario of higher prices and growth rates. This scenario assumes starting prices of $30 per barrel for oil and $3.00 per thousand cubic feet for natural gas (Cooke and Dellagiarino, in press).

Comparing the primary case estimates on a risked mean barrels of oil equivalent (BOE) basis for the five OCS planning areas (Tables 1 and 2), Chukchi Sea has the greatest percentage increase of the Arctic areas. Resource estimates more than doubled. Chukchi Sea is now the fourth highest ranked OCS planning area (on a risked mean BOE basis), following the three producing areas of the Central Gulf of Mexico, Western Gulf of Mexico, and Southern California. Consequently, Chukchi Sea is now the highest ranked frontier exploration area in terms of resource potential. Much of the change in the Chukchi Sea Planning Area estimates is the result of identifying and mapping additional geologic prospects. Although Beaufort Sea Planning Area estimates increased over 80 percent, this is not as great a change as the Chukchi Sea, because many of the large prospects in the Beaufort Sea have already been drilled. Changes in the Hope Basin Planning Area estimates are significant when compared with the 1987 assessment, but the contribution to the overall offshore resource estimates is negligible.

Eastern Gulf of Mexico Planning Area estimates tripled, with the marginal probability increasing to 1.00, indicating a certainty of at least one economic

accumulation. Roughly 20 percent of the estimated undiscovered resources in the Eastern Gulf of Mexico are on leased lands. The overall ranking of the Eastern Gulf of Mexico rose from eighth to fifth under the primary case economic assumptions.

Northern California Planning Area estimates doubled, partly as a result of an increase in the marginal probability. The change in marginal probability indicates a more favorable chance of commercial accumulations of hydrocarbons existing in the area. Northern California is the sixth highest ranked planning area.

Changes to the estimates reflect a detailed reassessment that incorporates the results of recent exploration, new mapping, and a reevaluation of the potential geologic plays and their analogs. The next sections will focus on the reasons for the changes in each area.

CHANGES IN ESTIMATES

Alaska OCS Region

The Chukchi Sea Planning Area has the largest amount of potentially productive acreage of all Alaskan OCS planning areas. The undiscovered economically recoverable resource estimates more than doubled when compared with the 1987 assessment, with a number of significant factors contributing to this change.

Since the 1987 National Assessment, an intensive mapping effort for Chukchi Sea Lease Sale 109 resulted in the identification of many additional prospects. The 1987 assessment had 170 prospects, of which approximately 90 were mapped and the rest were speculative prospects or leads. The latest mapping effort initially yielded 400 closures (areas identified by seismic data where hydrocarbons could accumulate). These were reduced to 243 mapped prospects for the 1990 assessment, by using limiting criteria such as reservoir depths shallower than 3,000 feet (which would require excessive development costs), and reservoir depths exceeding 20,000 feet (which would be expensive and gas prone). No unmapped or unidentified prospects are carried in the current data base. Plays were further differentiated in the current data base. A play is defined as a group of geologically related known accumulations or prospects having similar hydrocarbon sources, reservoirs, traps, and geologic histories (Mast, et al., 1989). The 1987 assessment had five plays in two sequences. The 1990 assessment includes 10 plays in 4 sequences. The sequences are the Lower Ellesmerian, the Upper Ellesmerian, the Lower Brookian, and the Upper Brookian. More information on the geology of the Chukchi Sea can be found in Geologic Report for the Chukchi Sea Planning Area, Alaska (Thurston and Theiss, 1987).

Sparse data coverage caused some very large prospects to be sized more conservatively or fragmented in the 1987 assessment. Several of the high quality prospects are now modeled as being larger single features based on the new mapping. The number of line miles of seismic data acquired by MMS for the Chukchi Sea Planning Area increased 120 percent between the 1987 and 1990 assessment.

Conditional mean estimates increased for the Beaufort Sea Planning Area from 1.44 billion barrels of oil (BBO) in the 1987 primary case economic assessment to 1.66 BBO in the current assessment. A significant factor contributing to the change in the risked estimates is the marginal probability, which increased from 0.14 to 0.23.

Four sequences were modeled in the Beaufort Sea Planning Area, with the Brookian sequence containing 44 percent of the risked mean resources and 58 percent of the prospects; the Rift sequence contains 7 percent of the resources and 12 percent of the prospects; the Ellesmerian sequence contains 18 percent of the resources and 23 percent of the prospects; and the Northeast Chukchi sequence contains 30 percent of the resources and only 6 percent of the prospects. When only the unleased potential is considered, the Brookian sequence contains 33 percent of the risked mean resources, and the Northeast Chukchi sequence contains 49 percent.

Changes to the Beaufort Sea estimates cannot be pinned down to a few, specific blanket changes to key variables. Instead, changes occurred to different variables for each play. To some extent, the changes were compensating, so that the change to the overall area estimates is relatively minor (on a conditional basis).

Hope Basin does not contribute significantly to the overall OCS undiscovered resources. The 1987 assessment included nine prospects. The current assessment includes 14 additional prospects, for a total of 23. Many of these are small in closure area, and the average net pay has been reduced based on a reassessment of well data and regional geologic models. The conditional mean for the 1990 update decreased 24 percent relative to the 1987 assessment. This area is thought to be gas prone, and the marginal probability of a commercial accumulation is only 0.01.

Gulf of Mexico OCS Region

In preparation for the proposed Lease Sale 137 in the Eastern Gulf of Mexico (EGOM) Planning Area, an extensive reinterpretation and mapping effort was begun. Based on the acquisition and interpretation of new geologic and geophysical data available as of July 1989, and the reassessment of plays and their analogs, the revised undiscovered, economically recoverable resource estimate for this area increased from a risked mean of 0.41 billion barrels of oil equivalent (BBOE) (January 1987) to 1.25 BBOE. The marginal probability also increased from 0.90 to 1.00.

One result of this intensive reassessment of the Eastern Gulf of Mexico was a dramatic increase in the number of potential geologic prospects that were mapped and included in the data base. The EGOM Planning Area resource estimates developed for the 1987 National Assessment were based on 121 mapped prospects in 5 geologic plays. The new assessment includes over 700 mapped prospects in 8 plays, and includes additional "unidentified" prospects. The MMS resource assessment computer program includes an unidentified prospect option which can be used to assess resources contributed by either

speculative plays or stratigraphic prospects, where it would be difficult to determine the possible areal extent of a prospect (Cooke and Dellagiarino, in press). This unidentified prospect option was used to model potential stratigraphic traps in the EGOM. It was also used to model structural traps where data or mapping was incomplete.

The economically recoverable resource potential for the EGOM is principally in gas prone clastic sediments in the northwestern portion of the planning area and in oil prone carbonates in the southern portion. The northwest section has two gas plays. The Norphlet-Smackover Play contains approximately 70 percent of the undiscovered gas resources in the planning area and 4 percent of the oil (on a risked mean basis). The Miocene Bright Spot Play contains 21 percent of the gas. The Cretaceous and Older High Potential Play is located in the north central portion of the planning area, but does not contribute economically recoverable resources. Although prospects and information are included in the data base for noneconomic plays, the estimated resources are not sufficient to warrant commercial development. The Cretaceous and Older Low Potential Play is also located in the north central EGOM, but only contains 1 percent of the total gas resource. In general, the natural gas plays are significantly impacted by economic constraints. Risked mean gas estimates increase over 20 percent when the 1990 primary economic case is compared with the alternative case.

Four plays were modeled in the South Florida Basin, which lies in the southern portion of the planning area. The Lower Cretaceous Shelf Edge Reef Play is a northwest trending reef complex extending into the Central Gulf of Mexico Planning Area and onshore into Louisiana and Texas. It is not estimated to contain economic resources at prevailing and projected prices. The Lower Cretaceous Structural Play has a large number of mapped prospects, and contains 75 percent of the oil and 8 percent of the gas in the EGOM. Reservoir attributes are analogous to the onshore Sunniland Formation, in which 14 fields have been discovered. Production from these fields is largely oil with only minor amounts of gas. The Lower Cretaceous Stratigraphic Play contains 21 percent of the oil, and the Cenozoic Deepwater Play is not economically recoverable.

With discoveries in the Norphlet-Smackover and Shallow Miocene Bright Spot Plays and the 14 discoveries in the Sunniland Formation, the overall EGOM Planning Area risk is zero. In other words, the chance of at least one commercial hydrocarbon accumulation existing in the area is a virtual certainty, and the marginal probability is, therefore, 1.00.

Pacific OCS Region

Resource estimates for the Northern California Planning Area were revised to incorporate new seismic data, some of which was of much higher quality than previous data. Subsequent to the completion of the National Assessment, the MMS Pacific Region interpreted about 3,500 line miles of newly acquired seismic data gathered by industry in anticipation of proposed Lease Sale 91.

The new geophysical data permitted more detailed interpretation and mapping of the area. The primary case estimate on a risked mean BOE basis for the planning area was 0.52 billion barrels with a marginal probability of 0.60 in the 1987 assessment. In the current assessment, this estimate doubled to 1.03 billion barrels with a marginal probability of 0.78.

The Northern California Planning Area includes the Eel River Basin to the north and the Point Arena Basin to the south. Eel River Basin estimates decreased slightly compared with the National Assessment estimates, primarily as a result of better prospect definition. Eel River contributed about 29 percent of the risked mean gas for the total planning area and a small percentage of the oil. The assessment also includes a Miocene-Pliocene clastic play having 95 mapped prospects. Speculative plays were not included for this basin. Geologic characteristics of the basin are similar to those with the adjacent Washington-Oregon Planning Area.

Point Arena Basin estimates increased significantly, owing to the identification of additional prospects. The updated Point Arena assessment includes 169 mapped prospects in three plays (pre-Monterey, Monterey, and post-Monterey), and one speculative high risk play. Point Arena Basin contributed 94 percent of the oil and 71 percent of the gas compared with the risked means for the total planning area. The basin shows favorable geologic conditions for source rocks, reservoir rocks, and trapping mechanisms. The probability that the Point Arena Basin contains at least one commercial accumulation is a relatively high 73 percent. The marginal probability for the planning area is 0.78.

CONCLUSIONS

What do these revised resource estimates tell us about the resource potential of these areas? Before making specific comments by area, some general observations are in order. The reader should bear in mind that these are frontier exploration areas for the most part and frequent assessment updates are desirable to inventory resources in the earliest stages of planning and leasing. Initial assessments of frontier areas tend to identify the large prospects that often contain a high percentage of the undiscovered resources. The initially mapped, outer boundaries of these prospects may become more limited or constrained as additional seismic data are collected. However, in the case of the Chukchi Sea reassessment, additional seismic data supported extending the areal limits on some previously mapped large prospects. Additional seismic data also enhances the ability of the interpreters to identify and map progressively smaller prospects.

As more geologic information is acquired, estimates of reservoir variables can be refined or narrowed in range. A significant factor on the resource estimates, particularly for basins in the early exploratory stages, is the risk that the area will be devoid of hydrocarbons. Estimates of geologic risk can change as new information becomes available. Even when exploratory drilling yields a dry hole, the geologist gains valuable information concerning the potential

reservoir rocks, possible source rocks, presence of adequate seals, etc. A change of the area risk may not drastically change the conditional resource estimates (since they are based on the condition or assumption that the area does contain hydrocarbons), but it could result in a significant change in the risked estimates. The conditional estimates are not appropriate for comparisons, since each area has a different probability of the condition occurring, as represented by the marginal probability. Risking the estimates removes the condition and allows the estimates for different areas to be compared on an equal basis. Although the risked estimates are appropriate for comparisons, they can understate the potential of high risk areas.

A review of the revised estimates permits more specific conclusions to be drawn by planning area. Of all the U.S. frontier exploration areas, the Chukchi Sea Planning Area has the greatest potential in terms of the possible magnitude of undiscovered resources. The area contains many large, undrilled structures, and the petroleum industry has indicated a high interest in the area as demonstrated by their aggressive bidding in the Chukchi Sea Lease Sale 109, held in May 1988. Geologic risk is relatively high for this area, and the results from drilling during the next several years could have a large effect on this variable, and consequently on the risked estimates. A major concern for this area is the high cost associated with exploration and development. Estimates of economically recoverable resources in the Arctic Region are highly dependent on prevailing and projected economic conditions. Many of the comments regarding the Chukchi Sea Planning Area are also applicable to the Beaufort Sea Planning Area. The Beaufort Sea is a more mature exploration area, with many large prospects already drilled. However, large, undrilled prospects are present, and the proximity of the existing oil pipeline serves to lessen the economic risk. Unfortunately, the Beaufort Sea becomes less prospective as the distance from shore increases.

Hope Basin Planning Area is adversely effected by the small number of prospects and the high economic costs. It has had little impact on the potential U.S. energy supply but remains a frontier exploration area which has not yet been offered for leasing.

The EGOM shows a large increase in estimates of undiscovered resources, and has a number of highly favorable features. The area includes a large number of prospects. Geologic conditions are favorable, as indicated by existing discoveries and the presence of known source rocks, reservoir rocks, and suitable trapping mechanisms. The South Florida Basin is considered to be oil prone, which enhances the economic attractiveness of the planning area. The EGOM has the greatest potential in terms of the probability of a commercial discovery.

Resource estimates for the Northern California Planning Area also show a substantial increase when compared to the earlier assessment. The changes to Point Arena Basin account for most of the increase. The higher marginal probability is another factor in the improved resource outlook for this area.

SUMMARY

Undiscovered, economically recoverable resource estimates for the entire OCS increased from 22.08 BBOE in the 1987 National Assessment to 24.36 BBOE in the current assessment if the risked means are summed for all areas. This is an overall increase of 10 percent.

This report focuses solely on the resource potential of those five planning areas where new data and mapping have resulted in revisions to the estimates in the 1987 National Assessment. The updated resource estimates provide a starting point in the development and analysis of a proposed 5-year leasing program. If areas are reduced or deferred from consideration in the proposed program, these estimates will be adjusted downward. These resource estimates provide only one piece of information considered in the complex balancing of National energy needs with socio-environmental concerns.

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$18 case

Table 1

Undiscovered, Economically Recoverable Oil and Gas Resources
as of January 1990
Primary Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Beaufort Sea														
Leased and Unleased	0.58	4.69	1.66	0	0	0	0.23	0	2.63	0.38	0	0	0	0.38
Unleased	0.43	4.19	1.45	0	0	0	0.16	0	2.00	0.24	0	0	0	0.24
Leased	0.54	1.82	0.94	0	0	0	0.15	0	1.10	0.14	0	0	0	0.14
Chukchi Sea														
Leased and Unleased	1.19	13.10	5.96	0	0	0	0.23	0	8.76	1.36	0	0	0	1.36
Unleased	1.11	9.14	4.16	0	0	0	0.21	0	5.72	0.88	0	0	0	0.88
Leased	0.96	5.53	2.65	0	0	0	0.17	0	3.26	0.46	0	0	0	0.46
Hope Basin														
Leased and Unleased	0.20	1.44	0.50	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Unleased	0.20	1.44	0.50	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Northern California														
Leased and Unleased	0.21	1.54	0.89	1.25	4.18	2.45	0.78	0	1.49	0.69	0	4.05	1.91	1.03
Unleased	0.21	1.54	0.89	1.25	4.18	2.45	0.78	0	1.49	0.69	0	4.05	1.91	1.03
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Eastern Gulf of Mexico														
Leased and Unleased	0.44	1.72	0.95	1.27	1.94	1.68	1.00	0.44	1.72	0.95	1.27	1.94	1.68	1.25
Unleased	0.31	1.54	0.80	0.85	1.35	1.11	1.00	0.31	1.54	0.80	0.85	1.35	1.11	1.00
Leased	0.03	0.35	0.15	0.23	0.81	0.56	1.00**	0.02	0.35	0.15	0.22	0.80	0.56	0.25

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5 percent estimate.

** Rounding of the marginal probability will not necessarily be evident in the risked estimates.

Table 2

Undiscovered, Economically Recoverable Oil and Gas Resources
as of January 1987
Primary Case Economic Scenario

$18/bbl case

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Beaufort Sea														
Leased and Unleased	0.55	4.02	1.44	0	0	0	0.14	0	1.74	0.21	0	0	0	0.21
Unleased	0.31	3.39	0.87	0	0	0	0.14	0	1.02	0.12	0	0	0	0.12
Leased	0.32	1.87	0.79	0	0	0	0.12	0	0.85	0.09	0	0	0	0.09
Chukchi Sea														
Leased and Unleased	1.03	5.41	2.73	0	0	0	0.22	0	3.59	0.59	0	0	0	0.59
Unleased	1.03	5.41	2.73	0	0	0	0.22	0	3.59	0.59	0	0	0	0.59
Leased	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hope Basin														
Leased and Unleased	0.20	1.96	0.66	0	0	0	0.01	0	0*	Negl.	0	0	0	Negl.
Unleased	0.20	1.96	0.66	0	0	0	0.01	0	0*	Negl.	0	0	0	Negl.
Leased	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern California														
Leased and Unleased	0.19	1.02	0.57	0.22	3.05	1.69	0.60	0	0.95	0.34	0	2.87	1.01	0.52
Unleased	0.19	1.02	0.57	0.22	3.05	1.69	0.60	0	0.95	0.34	0	2.87	1.01	0.52
Leased	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Gulf of Mexico														
Leased and Unleased	0.07	0.51	0.24	0.01	3.41	1.21	0.90	0	0.49	0.22	0	3.34	1.09	0.41
Unleased	0.06	0.38	0.19	0.01	2.72	0.80	0.89	0	0.37	0.17	0	2.60	0.71	0.30
Leased	0.01	0.28	0.09	Negl.	1.69	0.69	0.59	0	0.24	0.05	0	1.51	0.41	0.12

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5 percent estimate.

Table 3

Undiscovered, Economically Recoverable Oil and Gas Resources
as of January 1990
Alternative Case Economic Scenario

$30 oil

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Beaufort Sea														
Leased and Unleased	0.37	4.66	1.57	0.57	10.67	5.70	0.43	0	3.33	0.67	0	10.17	2.45	1.11
Unleased	0.26	3.91	1.05	0.46	7.00	3.35	0.37	0	2.43	0.39	0	6.78	1.25	0.62
Leased	0.32	1.82	0.80	0.58	5.50	2.97	0.36	0	1.35	0.29	0	4.90	1.08	0.48
Chukchi Sea														
Leased and Unleased	0.92	14.40	6.98	2.77	36.86	18.41	0.24	0	10.65	1.69	0	27.55	4.46	2.48
Unleased	0.77	10.07	4.69	2.27	30.47	13.36	0.24	0	6.97	1.13	0	19.23	3.21	1.70
Leased	0.54	5.26	2.47	1.42	11.80	5.87	0.22	0	3.66	0.55	0	7.98	1.31	0.78
Hope Basin														
Leased and Unleased	0.18	0.67	0.22	0.28	5.20	2.58	0.02	0	0*	<0.01	0	0*	0.05	0.01
Unleased	0.18	0.67	0.22	0.28	5.20	2.58	0.02	0	0*	<0.01	0	0*	0.05	0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Northern California														
Leased and Unleased	0.31	1.64	0.99	1.57	5.05	2.93	0.78	0	1.60	0.77	0	4.90	2.29	1.18
Unleased	0.31	1.64	0.99	1.57	5.05	2.93	0.78	0	1.60	0.77	0	4.90	2.29	1.18
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Eastern Gulf of Mexico														
Leased and Unleased	0.54	1.80	1.07	1.64	2.35	2.05	1.00	0.54	1.80	1.07	1.64	2.35	2.05	1.43
Unleased	0.41	1.61	0.92	1.11	1.58	1.36	1.00	0.41	1.61	0.92	1.11	1.58	1.36	1.16
Leased	0.03	0.35	0.15	0.35	0.94	0.68	1.00**	0.03	0.35	0.15	0.34	0.94	0.68	0.27

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5 percent estimate.

** Rounding of the marginal probability will not necessarily be evident in the risked estimates.

Table 4

Undiscovered, Economically Recoverable Oil and Gas Resources
as of January 1987
Alternative Case Economic Scenario $30 oil

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Beaufort Sea														
Leased and Unleased	0.30	2.56	0.91	1.09	13.92	5.61	0.42	0	1.84	0.38	0	11.48	2.38	0.81
Unleased	0.18	1.67	0.58	0.73	9.19	3.32	0.42	0	1.20	0.24	0	6.83	1.40	0.49
Leased	0.18	1.48	0.51	0.55	8.39	3.47	0.28	0	0.91	0.14	0	6.03	0.98	0.32
Chukchi Sea														
Leased and Unleased	1.14	7.63	4.15	2.86	18.09	10.11	0.25	0	5.79	1.03	0	13.92	2.52	1.48
Unleased	1.14	7.63	4.15	2.86	18.09	10.11	0.25	0	5.79	1.03	0	13.92	2.52	1.48
Leased	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hope Basin														
Leased and Unleased	0.15	0.84	0.25	0.55	7.73	3.50	0.02	0	0*	0.01	0	0*	0.08	0.02
Unleased	0.15	0.84	0.25	0.55	7.73	3.50	0.02	0	0*	0.01	0	0*	0.08	0.02
Leased	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern California														
Leased and Unleased	0.26	1.17	0.69	0.31	3.97	2.23	0.60	0	1.09	0.41	0	3.81	1.34	0.65
Unleased	0.26	1.17	0.69	0.31	3.97	2.23	0.60	0	1.09	0.41	0	3.81	1.34	0.65
Leased	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Gulf of Mexico														
Leased and Unleased	0.07	0.52	0.25	0.01	3.43	1.22	0.91	0	0.50	0.22	0	3.35	1.11	0.42
Unleased	0.05	0.38	0.19	0.02	2.71	0.81	0.90	0	0.37	0.17	0	2.63	0.72	0.30
Leased	0.01	0.28	0.08	Negl.	1.69	0.67	0.62	0	0.24	0.05	0	1.51	0.41	0.12

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5 percent estimate.

Appendix

TABLE 1

Alaska Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Primary Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Cook Inlet														
Leased and Unleased	0.14	0.26	0.17	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Unleased	0.14	0.26	0.17	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Gulf of Alaska														
Leased and Unleased	0.18	2.32	0.98	0	0	0	0.04	0	0.01*	0.04	0	0	0	0.04
Unleased	0.18	2.32	0.98	0	0	0	0.04	0	0.01*	0.04	0	0	0	0.04
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Kodiak														
Leased and Unleased	0.11	0.95	0.43	0	0	0	0.03	0	0*	0.01	0	0	0	0.01
Unleased	0.11	0.95	0.43	0	0	0	0.03	0	0*	0.01	0	0	0	0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Shumagin														
Leased and Unleased	0.12	0.57	0.28	0	0	0	0.01	0	0*	<0.01	0	0	0	<0.01
Unleased	0.12	0.57	0.28	0	0	0	0.01	0	0*	<0.01	0	0	0	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Total Gulf of Alaska Subregion														
Leased and Unleased	0.18	4.28	1.39	0	0	0	0.05	0	0*	0.07	0	0	0	0.07
Unleased	0.18	4.28	1.39	0	0	0	0.05	0	0*	0.07	0	0	0	0.07
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5% estimate.

TABLE 1

Alaska Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990
Primary Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Aleutian Basin														
Leased and Unleased	<0.01	<0.01	<0.01	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Unleased	<0.01	<0.01	<0.01	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Navarin Basin														
Leased and Unleased	0.17	4.95	1.14	0	0	0	0.03	0	0*	0.03	0	0	0	0.03
Unleased	0.12	4.32	0.90	0	0	0	0.03	0	0*	0.03	0	0	0	0.03
Leased	0.05	1.03	0.33	0	0	0	0.03	0	0*	0.01	0	0	0	0.01
St. Matthew-Hall														
Leased and Unleased	<0.01	<0.01	<0.01	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Unleased	<0.01	<0.01	<0.01	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Norton Basin														
Leased and Unleased	N/A	N/A	0.58	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Unleased	N/A	N/A	0.51	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Leased	N/A	N/A	0.17	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01

N/A = Not Available

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5% estimate.

TABLE 1

Alaska Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990
Primary Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Aleutian Arc														
Leased and Unleased	<0.01	<0.01	<0.01	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Unleased	<0.01	<0.01	<0.01	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Bowers Basin														
Leased and Unleased	<0.01	<0.01	<0.01	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Unleased	<0.01	<0.01	<0.01	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
St. George Basin														
Leased and Unleased	0.17	0.91	0.39	0	0	0	0.02	0	0*	0.01	0	0	0	0.01
Unleased	0.15	0.91	0.38	0	0	0	0.02	0	0*	0.01	0	0	0	0.01
Leased	N/A	N/A	0.11	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
North Aleutian														
Leased and Unleased	0.17	2.08	0.61	0	0	0	0.02	0	0*	0.01	0	0	0	0.01
Unleased	0.17	2.08	0.61	0	0	0	0.02	0	0*	0.01	0	0	0	0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Total Bering Sea Subregion														
Leased and Unleased	0.14	5.87	1.72	0	0	0	0.03	0	0*	0.06	0	0	0	0.06
Unleased	0.09	5.25	1.49	0	0	0	0.03	0	0*	0.05	0	0	0	0.05
Leased	0.02	1.24	0.34	0	0	0	0.02	0	0*	0.01	0	0	0	0.01

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5% estimate.

TABLE 1

Alaska Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Primary Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Hope Basin														
Leased and Unleased	0.20	1.44	0.50	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Unleased	0.20	1.44	0.50	0	0	0	<0.01	0	0*	<0.01	0	0	0	<0.01
Leased	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chukchi Sea														
Leased and Unleased	1.19	13.10	5.96	0	0	0	0.23	0	8.76	1.36	0	0	0	1.36
Unleased	1.11	9.14	4.16	0	0	0	0.21	0	5.72	0.88	0	0	0	0.88
Leased	0.96	5.53	2.65	0	0	0	0.17	0	3.26	0.46	0	0	0	0.46
Beaufort Sea														
Leased and Unleased	0.58	4.69	1.66	0	0	0	0.23	0	2.63	0.38	0	0	0	0.38
Unleased	0.43	4.19	1.45	0	0	0	0.16	0	2.00	0.24	0	0	0	0.24
Leased	0.54	1.82	0.94	0	0	0	0.15	0	1.10	0.14	0	0	0	0.14
Total Arctic Subregion														
Leased and Unleased	4.29	6.87	5.48	0	0	0	0.32	0	6.54	1.74	0	0	0	1.74
Unleased	2.54	6.00	4.04	0	0	0	0.28	0	4.96	1.12	0	0	0	1.12
Leased	1.58	3.82	2.55	0	0	0	0.24	0	3.05	0.61	0	0	0	0.61
Total Alaska Region														
Leased and Unleased	2.51	8.69	5.01	0	0	0	0.37	0	7.16	1.87	0	0	0	1.87
Unleased	1.55	7.09	3.69	0	0	0	0.33	0	5.36	1.23	0	0	0	1.23
Leased	1.21	4.11	2.39	0	0	0	0.26	0	3.07	0.63	0	0	0	0.63

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5% estimate.

TABLE 2

Atlantic Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Primary Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
North Atlantic														
Leased and Unleased	0.05	0.27	0.11	1.12	6.06	2.54	0.39	0	0.18	0.04	0	4.17	1.00	0.22
Unleased	0.05	0.27	0.11	1.12	6.06	2.54	0.39	0	0.18	0.04	0	4.17	1.00	0.22
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Mid-Atlantic														
Leased and Unleased	0.08	0.47	0.22	2.36	11.46	5.35	0.44	0	0.40	0.10	0	9.44	2.36	0.52
Unleased	0.04	0.38	0.17	2.08	9.05	4.40	0.44	0	0.31	0.08	0	7.39	1.95	0.43
Leased	0.02	0.22	0.08	0.29	4.16	1.61	0.32	0	0.15	0.03	0	2.90	0.51	0.12
South Atlantic														
Leased and Unleased	0.07	0.52	0.21	1.69	10.38	4.60	0.23	0	0.32	0.05	0	6.67	1.06	0.24
Unleased	0.07	0.49	0.20	1.69	9.68	4.39	0.23	0	0.30	0.05	0	6.17	1.01	0.23
Leased	<0.01	0.02	0.01	0.15	0.52	0.26	0.09	0	0.01	<0.01	0	0.23	0.02	<0.01
Florida Straits														
Leased and Unleased	0.18	0.63	0.34	0.24	1.47	0.57	0.19	0	0.42	0.06	0	0.66	0.11	0.08
Unleased	0.18	0.63	0.34	0.24	1.47	0.57	0.19	0	0.42	0.06	0	0.66	0.11	0.08
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Total Atlantic Region														
Leased and Unleased	0.02	1.17	0.32	2.63	10.22	5.65	0.80	0	1.01	0.25	0	9.77	4.51	1.05
Unleased	0.01	1.32	0.34	2.62	11.36	6.03	0.67	0	1.00	0.23	0	10.40	3.99	0.95
Leased	0.01	0.29	0.08	0.34	3.75	1.47	0.36	0	0.11	0.02	0	2.49	0.52	0.10

TABLE 3

Gulf of Mexico Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Primary Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Eastern Gulf of Mexico														
Leased and Unleased	0.44	1.72	0.95	1.27	1.94	1.68	1.00	0.44	1.72	0.95	1.27	1.94	1.68	1.25
Unleased	0.31	1.54	0.80	0.85	1.35	1.11	1.00	0.31	1.54	0.80	0.85	1.35	1.11	1.00
Leased	0.03	0.35	0.15	0.23	0.81	0.56	1.00**	0.02	0.35	0.15	0.22	0.80	0.56	0.25
Central Gulf of Mexico														
Leased and Unleased	1.63	6.70	3.82	17.61	63.40	37.66	1.00	1.63	6.70	3.82	17.61	63.40	37.66	10.52
Unleased	0.30	4.05	1.87	3.34	38.57	18.36	1.00	0.30	4.05	1.87	3.34	38.57	18.36	5.14
Leased	0.78	3.29	1.94	7.99	32.29	19.29	1.00	0.78	3.29	1.94	7.99	32.29	19.29	5.37
Western Gulf of Mexico														
Leased and Unleased	0.33	3.41	1.58	7.26	51.31	25.40	1.00	0.33	3.41	1.58	7.26	51.31	25.40	6.10
Unleased	0.09	3.13	1.22	1.73	44.98	17.95	1.00**	0.09	3.10	1.22	1.66	44.63	17.91	4.41
Leased	0.09	0.77	0.35	2.17	15.90	7.53	1.00	0.09	0.77	0.35	2.17	15.90	7.53	1.69
Total Gulf of Mexico Region														
Leased and Unleased	1.24	17.16	6.34	27.90	122.68	64.74	1.00	1.24	17.16	6.34	27.90	122.68	64.74	17.86
Unleased	0.49	11.99	3.89	10.88	86.38	37.38	1.00	0.49	11.99	3.89	10.88	86.38	37.38	10.54
Leased	0.28	7.71	2.44	10.98	53.99	27.35	1.00	0.28	7.71	2.44	10.98	53.99	27.35	7.31

** Rounding of the marginal probability will not necessarily be evident in the risked estimates.

TABLE 4

Pacific Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Primary Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Southern California														
Leased and Unleased	0.61	2.23	1.31	1.10	6.24	3.01	1.00	0.61	2.23	1.31	1.10	6.24	3.01	1.84
Unleased	0.35	1.73	0.97	0.62	4.81	2.21	1.00	0.35	1.73	0.97	0.62	4.81	2.21	1.36
Leased	0.12	0.73	0.32	0.28	2.88	0.86	1.00	0.12	0.73	0.32	0.28	2.88	0.86	0.47
Central California														
Leased and Unleased	0.15	0.94	0.50	0.31	1.40	0.82	0.90	0	0.93	0.45	0	1.40	0.74	0.58
Unleased	0.15	0.94	0.50	0.31	1.40	0.82	0.90	0	0.93	0.45	0	1.40	0.74	0.58
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Northern California														
Leased and Unleased	0.21	1.54	0.89	1.25	4.18	2.45	0.78	0	1.49	0.69	0	4.05	1.91	1.03
Unleased	0.21	1.54	0.89	1.25	4.18	2.45	0.78	0	1.49	0.69	0	4.05	1.91	1.03
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Oregon-Washington														
Leased and Unleased	0.07	0.30	0.19	0.80	3.11	1.97	0.25	0	0.25	0.05	0	2.56	0.49	0.14
Unleased	0.07	0.30	0.19	0.80	3.11	1.97	0.25	0	0.25	0.05	0	2.56	0.49	0.14
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Total Pacific Region														
Leased and Unleased	0.63	6.12	2.49	2.46	12.14	6.15	1.00	0.63	6.12	2.49	2.46	12.14	6.15	3.58
Unleased	0.50	5.48	2.16	2.05	10.81	5.35	1.00	0.50	5.48	2.16	2.05	10.81	5.35	3.11
Leased	0.12	0.73	0.32	0.28	2.88	0.86	1.00	0.12	0.73	0.32	0.28	2.88	0.86	0.47
Total Federal Offshore														
Leased and Unleased	3.56	23.93	10.94	36.44	133.68	75.40	1.00	3.56	23.93	10.94	36.44	133.68	75.40	24.36
Unleased	2.00	18.03	7.51	17.18	97.03	46.89	1.00	2.00	18.03	7.51	17.18	97.03	46.89	15.84
Leased	0.66	9.67	3.43	14.10	55.55	28.50	1.00	0.66	9.67	3.43	14.10	55.55	28.50	8.51

TABLE 5

Alaska Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Alternative Case Economic Scenario $30 CASE

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Cook Inlet														
Leased and Unleased	0.06	0.35	0.17	0.09	0.49	0.25	0.02	0	0*	<0.01	0	0*	<0.01	<0.01
Unleased	0.06	0.35	0.17	0.09	0.49	0.25	0.02	0	0*	<0.01	0	0*	<0.01	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Gulf of Alaska														
Leased and Unleased	0.19	2.57	1.17	0.98	12.56	5.95	0.05	0	N/A*	0.06	0	N/A*	0.29	0.11
Unleased	0.19	2.57	1.17	0.98	12.56	5.95	0.05	0	N/A*	0.06	0	N/A*	0.29	0.11
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Kodiak														
Leased and Unleased	0.16	0.92	0.48	0.73	3.69	2.17	0.03	0	0*	0.01	0	0*	0.07	0.03
Unleased	0.16	0.92	0.48	0.73	3.69	2.17	0.03	0	0*	0.01	0	0*	0.07	0.03
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Shumagin														
Leased and Unleased	0.10	0.60	0.29	0.21	1.66	0.91	0.02	0	0*	0.01	0	0*	0.02	0.01
Unleased	0.10	0.60	0.29	0.21	1.66	0.91	0.02	0	0*	0.01	0	0*	0.02	0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Total Gulf of Alaska Subregion														
Leased and Unleased	0.13	5.65	1.66	0.88	16.00	7.82	0.05	0	N/A*	0.08	0	N/A*	0.38	0.15
Unleased	0.13	5.65	1.66	0.88	16.00	7.82	0.05	0	N/A*	0.08	0	N/A*	0.38	0.15
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0

N/A = Not Available due to insufficient number of data points.

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5% estimate.

TABLE 5

Alaska Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Alternative Case Economic Scenario $30 CASE

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Aleutian Basin														
Leased and Unleased	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Unleased	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Navarin Basin														
Leased and Unleased	0.13	4.84	1.19	0.31	7.34	3.50	0.04	0	0*	0.05	0	0*	0.16	0.08
Unleased	0.12	4.43	1.03	0.15	6.98	3.15	0.04	0	0*	0.04	0	0*	0.14	0.07
Leased	0.04	0.88	0.27	0.08	1.64	0.61	0.04**	0	0*	0.01	0	0*	0.02	0.01
St. Matthew-Hall														
Leased and Unleased	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Unleased	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Norton Basin														
Leased and Unleased	0.11	0.56	0.15	0.11	2.63	1.51	0.01	0	0*	<0.01	0	0*	0.02	0.01
Unleased	0.06	0.46	0.13	0.14	2.60	1.20	0.01	0	0*	<0.01	0	0*	0.02	0.01
Leased	0.04	0.10	0.04	0.02	0.71	0.48	0.01**	0	0*	<0.01	0	0*	<0.01	<0.01

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5% estimate.

** Rounding of the marginal probability will not necessarily be evident in the risked estimates.

TABLE 5

Alaska Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Alternative Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Aleutian Arc														
Leased and Unleased	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Unleased	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Bowers Basin														
Leased and Unleased	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Unleased	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
St. George Basin														
Leased and Unleased	0.11	0.79	0.41	1.02	9.08	4.55	0.05	0	0.08	0.02	0	0.30	0.22	0.06
Unleased	0.11	0.82	0.40	1.10	8.98	4.56	0.05	0	0.03	0.02	0	0.29	0.22	0.06
Leased	0.03	0.11	0.05	0.08	1.24	0.44	0.01	0	0*	<0.01	0	0*	<0.01	<0.01
North Aleutian														
Leased and Unleased	0.09	1.34	0.41	0.28	4.18	2.24	0.04	0	0*	0.02	0	0*	0.09	0.03
Unleased	0.09	1.34	0.41	0.28	4.18	2.24	0.04	0	0*	0.02	0	0*	0.09	0.03
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Total Bering Sea Subregion														
Leased and Unleased	0.10	6.89	1.90	5.17	17.37	10.14	0.05	0	0	0.09	0	0	0.49	0.18
Unleased	0.08	6.33	1.71	4.75	16.99	9.68	0.05	0	0	0.08	0	0	0.47	0.16
Leased	0.01	1.14	0.29	0.05	3.06	0.85	0.04	0	0	0.01	0	0	0.03	0.02

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5% estimate.

TABLE 5

Alaska Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990
Alternative Case Economic Scenario

$30 CASE

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Hope Basin														
Leased and Unleased	0.18	0.67	0.22	0.28	5.20	2.58	0.02	0	0*	0.01	0	0*	0.05	0.01
Unleased	0.18	0.67	0.22	0.28	5.20	2.58	0.02	0	0*	0.01	0	0*	0.05	0.01
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Chukchi Sea														
Leased and Unleased	0.92	14.40	6.98	2.77	36.86	18.41	0.24	0	10.65	1.69	0	27.55	4.46	2.48
Unleased	0.77	10.07	4.69	2.27	30.47	13.36	0.24	0	6.97	1.13	0	19.23	3.21	1.70
Leased	0.54	5.26	2.47	1.42	11.80	5.87	0.22	0	3.66	0.55	0	7.98	1.31	0.78
Beaufort Sea														
Leased and Unleased	0.37	4.66	1.57	0.57	10.67	5.70	0.43	0	3.33	0.67	0	10.17	2.45	1.11
Unleased	0.26	3.91	1.05	0.46	7.00	3.35	0.37	0	2.43	0.39	0	6.78	1.25	0.62
Leased	0.32	1.82	0.80	0.58	5.50	2.97	0.36	0	1.35	0.29	0	4.90	1.08	0.48
Total Arctic Subregion														
Leased and Unleased	1.07	12.09	4.72	5.77	26.74	13.85	0.50	0	9.27	2.37	0	22.61	6.95	3.61
Unleased	0.62	9.26	3.36	3.37	21.38	9.94	0.45	0	6.58	1.53	0	16.91	4.51	2.33
Leased	0.30	5.63	1.93	2.21	10.83	5.49	0.43	0	3.79	0.84	0	8.73	2.39	1.27
Total Alaska Region														
Leased and Unleased	0.95	12.28	4.63	5.75	27.96	14.24	0.55	0	9.66	2.54	0	24.11	7.82	3.93
Unleased	0.56	9.53	3.34	3.64	22.62	10.59	0.51	0	7.00	1.69	0	18.56	5.35	2.64
Leased	0.28	5.53	1.87	1.97	10.93	5.31	0.46	0	3.79	0.85	0	8.80	2.42	1.28

* In these cases, the low marginal probability causes the risked mean to be located at a percentile below the 5th percentile, resulting in the risked mean being greater than the risked 5% estimate.

TABLE 6

Atlantic Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Alternative Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
North Atlantic														
Leased and Unleased	0.05	0.35	0.15	1.16	7.37	3.16	0.42	0	0.28	0.06	0	5.85	1.33	0.30
Unleased	0.05	0.35	0.15	1.16	7.37	3.16	0.42	0	0.28	0.06	0	5.85	1.33	0.30
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Mid-Atlantic														
Leased and Unleased	0.08	0.93	0.34	2.39	17.77	7.44	0.52	0	0.76	0.18	0	15.41	3.85	0.86
Unleased	0.05	0.79	0.27	2.10	15.67	6.16	0.52	0	0.63	0.14	0	13.10	3.23	0.72
Leased	0.02	0.25	0.10	0.33	4.56	1.76	0.44	0	0.20	0.04	0	3.70	0.76	0.18
South Atlantic														
Leased and Unleased	0.08	0.62	0.25	1.81	12.15	5.24	0.30	0	0.42	0.07	0	8.36	1.55	0.35
Unleased	0.08	0.60	0.25	1.75	11.56	5.14	0.29	0	0.40	0.07	0	8.15	1.48	0.34
Leased	<0.01	0.03	0.01	0.10	0.59	0.26	0.22	0	0.02	<0.01	0	0.35	0.06	0.01
Florida Straits														
Leased and Unleased	0.18	0.66	0.36	0.19	1.42	0.54	0.21	0	0.45	0.07	0	0.67	0.11	0.09
Unleased	0.18	0.66	0.36	0.19	1.42	0.54	0.21	0	0.45	0.07	0	0.67	0.11	0.09
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Total Atlantic Region														
Leased and Unleased	0.03	1.67	0.46	3.35	15.74	8.11	0.85	0	1.52	0.40	0	15.19	6.92	1.63
Unleased	0.02	1.51	0.41	2.88	14.50	7.29	0.84	0	1.36	0.35	0	13.93	6.16	1.44
Leased	0	0.21	0.06	0.30	3.92	1.47	0.56	0	0.18	0.04	0	3.10	0.82	0.19

TABLE 7

Gulf of Mexico Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Alternative Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Eastern Gulf of Mexico														
Leased and Unleased	0.54	1.80	1.07	1.64	2.35	2.05	1.00	0.54	1.80	1.07	1.64	2.35	2.05	1.43
Unleased	0.41	1.61	0.92	1.11	1.58	1.36	1.00	0.41	1.61	0.92	1.11	1.58	1.36	1.16
Leased	0.03	0.35	0.15	0.35	0.94	0.68	1.00**	0.03	0.35	0.15	0.34	0.94	0.68	0.27
Central Gulf of Mexico														
Leased and Unleased	1.88	8.28	4.88	20.12	78.62	47.27	1.00	1.88	8.28	4.88	20.12	78.62	47.27	13.29
Unleased	0.35	5.42	2.64	4.13	51.43	25.37	1.00	0.35	5.42	2.64	4.13	51.43	25.37	7.16
Leased	1.04	3.57	2.24	10.48	35.29	21.91	1.00	1.04	3.57	2.24	10.48	35.29	21.91	6.13
Western Gulf of Mexico														
Leased and Unleased	0.41	4.01	1.90	8.48	59.54	30.02	1.00	0.41	4.01	1.90	8.48	59.54	30.02	7.24
Unleased	0.14	3.66	1.52	2.68	52.37	22.14	1.00**	0.13	3.63	1.52	2.58	51.98	22.10	5.45
Leased	0.11	0.82	0.38	2.55	16.50	7.92	1.00	0.11	0.82	0.38	2.55	16.50	7.92	1.79
Total Gulf of Mexico Region														
Leased and Unleased	1.76	20.24	7.86	35.49	147.14	79.32	1.00	1.76	20.24	7.86	35.49	147.14	79.32	21.97
Unleased	0.78	14.85	5.08	15.55	108.25	48.82	1.00	0.78	14.85	5.08	15.55	108.25	48.82	13.77
Leased	0.38	8.40	2.77	13.21	57.68	30.51	1.00	0.38	8.40	2.77	13.21	57.68	30.51	8.20

** Rounding of the marginal probability will not necessarily be evident in the risked estimates.

TABLE 8

Pacific Region, Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources by Planning Area as of January 1990 Alternative Case Economic Scenario

Planning Area	Conditional Oil - BBO			Conditional Gas - TCF			MPhc	Risked Oil - BBO			Risked Gas - TCF			Risked Mean BOE (BBOE)
	95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case		95% Case	5% Case	Mean Case	95% Case	5% Case	Mean Case	
Southern California														
Leased and Unleased	0.67	2.37	1.42	1.19	6.17	3.30	1.00	0.67	2.37	1.42	1.19	6.17	3.30	2.01
Unleased	0.42	1.79	1.08	0.69	4.85	2.51	1.00	0.42	1.79	1.08	0.69	4.85	2.51	1.52
Leased	0.12	0.70	0.31	0.30	2.70	0.85	1.00	0.12	0.70	0.31	0.30	2.70	0.85	0.46
Central California														
Leased and Unleased	0.18	0.98	0.53	0.36	1.54	0.92	0.90	0	0.97	0.48	0	1.52	0.83	0.63
Unleased	0.18	0.98	0.53	0.36	1.54	0.92	0.90	0	0.97	0.48	0	1.52	0.83	0.63
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Northern California														
Leased and Unleased	0.31	1.64	0.99	1.57	5.05	2.93	0.78	0	1.60	0.77	0	4.90	2.29	1.18
Unleased	0.31	1.64	0.99	1.57	5.05	2.93	0.78	0	1.60	0.77	0	4.90	2.29	1.18
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Oregon-Washington														
Leased and Unleased	0.18	0.31	0.25	1.93	3.24	2.57	0.25	0	0.28	0.06	0	2.90	0.64	0.18
Unleased	0.18	0.31	0.25	1.93	3.24	2.57	0.25	0	0.28	0.06	0	2.90	0.64	0.18
Leased	0	0	0	0	0	0		0	0	0	0	0	0	0
Total Pacific Region														
Leased and Unleased	0.55	7.35	2.73	2.44	15.04	7.06	1.00	0.55	7.35	2.73	2.44	15.04	7.06	3.99
Unleased	0.43	6.63	2.39	2.06	13.67	6.26	1.00	0.43	6.63	2.39	2.06	13.67	6.26	3.50
Leased	0.12	0.70	0.31	0.30	2.70	0.85	1.00	0.12	0.70	0.31	0.30	2.70	0.85	0.46
Total Federal Offshore														
Leased and Unleased	4.67	28.83	13.52	52.39	171.24	101.05	1.00	4.67	28.83	13.52	52.39	171.24	101.05	31.50
Unleased	2.70	22.23	9.51	27.76	128.56	66.59	1.00	2.70	22.23	9.51	27.76	128.56	66.59	21.36
Leased	0.76	10.85	3.98	16.15	62.57	34.60	1.00	0.76	10.85	3.98	16.15	62.57	34.60	10.14

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.