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REPORT TO THE CONGRESS

Outlook For Federal Goals To Accelerate Leasing Of Oil And Gas Resources On The Outer Continental Shelf

Department of the Interior

Federal Energy Administration

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Offshore Drilling Pace Is Questioned

By Douglas Watson
Washington Post Staff Writer

The federal government's plan for accelerated leasing of offshore oil and gas resources is overly optimistic, a highly critical General Accounting Office report says.

It charges that the Interior Department's plan to lease 10 million acres of the outer continental shelf each year during this and the next four years was reached "without carefully analyzing and considering several factors and problems affecting the goal's soundness."

GAO added, however, that even if the goal of leasing 10 million offshore acres annually is reached, such a leasing pace won't meet the objectives of Project Independence toward making the nation self-sufficient in energy production.

"GAO's rough calculations show that from 15 to 28 million acres would have to be leased and drilled by 1985 to satisfy the Project Independence assumptions," according to the 40-page report.

For example, it says that Interior Department estimates "allow only a one-year time lag between exploratory drilling and production" of oil from the Atlantic continental shelf.

GAO, the investigatory arm of Congress, found oil industry experts saying that a more realistic time lag between the start of exploratory drilling and production is three to eight years. If the lag were only three years, GAO said, oil production from the Atlantic in 1985 "would be about 126 million barrels, or 53 million barrels a year less than the Project Independence estimate."

GAO's report calls on Interior Secretary Rogers C. B. Morton to "clearly define (offshore) leasing goals and specify how these goals will be met and how they relate to over all national energy goals."

It also urges the Interior Department to "reconsider the accelerated [offshore] leasing schedule in the light of government and industry capabilities and possible alternatives."

Rep. William S. Morehead (D-Pa.), chairman of a House Government Operations subcommittee on energy and natural resources, said yesterday his subcommittee will hold hearings on GAO's report, which Morehead said "seriously undermines the Interior Department's credibility."

"The government's tract selection and valuation practices are inadequate even at much slower leasing rates," GAO said. It claimed that in raising its offshore leasing goal from 1 million to 10 million acres annually, the government is proposing to lease almost as much of the continental shelf each year as it has over the past 20 years.

The report says that offshore oil and gas drilling will be slowed more than the government has anticipated by shortages of essential equipment, material, and manpower.

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

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U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

To the President of the Senate and the
Speaker of the House of Representatives

Our report concerns the outlook for accelerating Federal leasing of oil and gas resources on the Outer Continental Shelf.

We made our review pursuant to the Budgeting and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of the Interior; and the Administrator, Federal Energy Administration.

Elmer B. Staats
Comptroller General
of the United States

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ABBREVIATIONS

BLM	Bureau of Land Management
FEA	Federal Energy Administration
GAO	General Accounting Office
OMB	Office of Management and Budget
PI	Project Independence

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

OUTLOOK FOR FEDERAL GOALS TO ACCELERATE LEASING OF OIL AND GAS RESOURCES ON THE OUTER CONTINENTAL SHELF

Department of the Interior
Federal Energy Administration

D I G E S T

WHY THE REVIEW WAS MADE

Development of oil and gas resources on the Outer Continental Shelf is recognized as one way to lessen U.S. dependence on foreign energy supplies. However, there is considerable controversy over Department of the Interior plans for Shelf leasing.

This report, first of a series on Federal leasing policies and practices, focuses on how Interior determined its goal for accelerating leasing of oil and gas resources on the Shelf, how this goal is related to Project Independence, and constraints which may hinder its accomplishment.

FINDINGS AND CONCLUSIONS

Until 1971 there was little orderly planned development of the Shelf. The Shelf oil and gas leasing program was influenced heavily by industry interest and the desire to generate revenues for the Treasury. (See p. 6.)

Federal leasing goals had changed significantly in less than 4 years. The leasing goal increased from 1 million acres in 1971 to 10 million acres in 1974--only 0.8 million acres less than the total acreage leased in the 20-year period of the Federal Shelf leasing program. (See p. 6.)

Interior officials indicate a softening in their earlier firm position to lease 10 million acres. At a November 1974 conference of Coastal States Governors, the Secretary of the Interior said that the Administration was "not wedded" to leasing 10 million acres in 1975, but "was wedded" to the idea of beginning leasing in the frontier areas, in addition to the Gulf of Mexico.

The Secretary stated that Interior must proceed expeditiously with the preparatory steps for six proposed offers in 1975. It is unclear at this time what amount of acreage would make up the six offers. No new acreage goals were announced for 1975 or subsequent years. An Interior official told GAO in January 1975 that Interior program personnel were still working toward a 10 million acre leasing goal.

Unrealistic leasing goal

Interior established the accelerated leasing goal of 10 million acres without carefully analyzing and considering several factors and problems affecting the goal's soundness.

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GAO found that the goal was:

--hastily conceived by Interior under pressures exerted by the energy crisis and the newly formed Federal Energy Administration;

--developed with little input by the Interior operating levels and based on overly optimistic assumptions and inadequate data;

--adopted by Interior policy officials despite opposition from program personnel; and

--developed and adopted without adequate consideration of environmental impacts, national-regional supply-and-demand needs, or alternatives to large scale expansion of Shelf leasing. (See p. 4.)

Interior's analysis of production which could be expected from accelerated leasing was limited due to the tight response deadline set by Interior officials. At most, 2 weeks' time was spent drafting the accelerated leasing proposal which was announced by the President in January 1974. (See p. 8.)

Acreage leasing goals not related to Project Independence

Interior's decision to lease 10 million acres was reached before the Project Independence study was initiated in March 1974.

Although the study assumed that accelerated Shelf leasing would play a key role in providing future oil and gas supplies, the Project Independence production estimates were not tied to Interior's stated goal to lease 10 million acres in 1975 or to any other acreage goal. (See p. 12.)

Also, bases used in estimating production and the production estimates differ.

Interior's January 1974 estimates of production by 1985 were based on leasing 50 million acres during the 5-year period 1975-79, or an average of 10 million acres a year. The Project Independence production estimates were not based on acreage but on drilling estimates for each Shelf area.

GAO's rough calculations show that from 15 to 28 million acres would have to be leased and drilled by 1985 to satisfy the Project Independence assumptions. The total acreage leased would in all likelihood be higher than 15 to 28 million acres because a timelag generally exists between leasing and the start of drilling.

Interior estimated that oil production would reach 7 billion barrels a year by 1985. Compared with this projection, Project Independence crude oil production estimates were about five times lower.

Interior officials told GAO that revised production estimates given to the House Appropriations Subcommittee on Interior and Related Agencies in October 1974 were consistent

with Project Independence projections. These projections, however, were based on a 1-year leasing program of 10 million acres in 1975 and are not comparable to Project Independence estimates which covered a 12-year period and assumed that unlimited acreage would be available for accelerated leasing.

Although lower than Interior's estimates, the Project Independence production estimates are based on optimistic production conditions.

For example, the estimates allow only a 1-year timelag between exploratory drilling and production, compared to industry estimates of 3 to 8 years in the Atlantic.

By changing the leadtime variables alone, GAO estimated that the 1985 production from the Atlantic--under optimistic conditions of 3 years' delay--would be about 126 million barrels, or 53 million barrels a year less than the Project Independence estimate. (See p. 13.)

Under the less optimistic estimate of 8 years' delay, 1985 production from the Atlantic would be 14 million barrels, or 165 million barrels less than the Project Independence estimate.

GAO believes that the Secretary of the Interior should clearly define Shelf leasing goals and specify how these goals will be met and how they relate to national energy goals and plans. (See p. 16.)

GAO believes that the real issue in defining leasing goals concerns the magnitude of a leasing program and not necessarily the number of acres, although traditionally this has been the principal indicator of magnitude. Without clear guidance as to the magnitude of a leasing program, GAO questions whether Government or industry planning can be effectively accomplished. (See p. 16.)

Constraints to expanded production

A number of studies have been made of availability of materials, equipment, manpower, capital, and other related services needed for accelerated exploration of the Shelf. The predicted importance and impact of reported shortages remain questionable.

However, GAO found agreement that existing and predicted shortages will to some degree limit the ability of industry to expand exploration and development of the Shelf. (See p.30.)

Industry representatives told GAO that actions must be taken in several broad policy areas to minimize constraints to production, including:

--Implementation of a national energy policy which will be a focal point and provide guidance for an overall planning approach to leasing oil and gas and other energy resources.

--Removal of leasing uncertainties so that industry

resources (manpower, equipment, materials, and capital) can be planned for and managed properly.

--A decision at an early date regarding the depletion allowance and price controls of oil and natural gas.

--Development of timely, efficient, and effective methods for environmental assessment and realistic assessment of tradeoff between energy needs and environmental hazards.

--Accelerated research to improve technology for exploration and production in deep water and more hostile environments of Alaska and other frontier areas. (See p. 25.)

Quality of Government's valuation program jeopardized by accelerated leasing goal

If projected leasing schedules are maintained, the Government's lease valuation program will be jeopardized.

The lower quality and/or lack of evaluation made necessary by inadequate staffing will mean increased reliance on bid-competition as the only means to insure that fair market value is received for leased resources. The Government's tract selection and valuation practices are inadequate even at much slower leasing rates. (See p. 25.)

Survey officials told GAO that there will be major problems trying to evaluate all the acreage tentatively planned for offer in May 1975 and indicated that their approach probably will be to first evaluate what appears to be the best prospective acreage and, if time is available, to evaluate the lower quality acreage. (See p. 26.)

In December 1974 Survey was experiencing delays in filling the authorized positions necessary for carrying out evaluation aspects for the lease offers. (See p. 25.)

The main alternative to hiring is to contract for assistance to supplement the Government's valuation work. But, according to Survey, qualified contractors are straining to keep up with demand placed on them by industry and their assistance may not be available for some time. (See p. 26.)

Survey has already experienced delays in receiving some data interpretations from contractors for recent offers. Further, by contracting out such interpretive work to companies doing business with industry on a day-to-day basis, objectivity of the results is seriously open to question. (See p. 26.)

The Secretary of the Interior should reconsider the accelerated Shelf leasing schedule in the light of Government and industry capabilities and possible alternatives to leasing in new Shelf areas as addressed in the Project Independence analysis and the President's subsequent national energy and economic proposals. (See p. 31.)

Prospects for industry response to accelerated leasing program

A common view of industry is that new or "virgin" Shelf areas should be leased as soon as possible because of their resource potential.

The prospects that a planned Gulf of Mexico lease offer scheduled for May 1975 will be sought vigorously by industry and contribute significantly to the success of the accelerated lease program are not encouraging because:

--Industry interest in tracts for these offers has been disappointing, according to Interior, and will continue the downward trend.

--The trend in bids per tract by industry for recent offers has also been downward.

--Interior and industry consider the potential resources which are considered to be primarily gas to be marginal. Industry argues this is due partially to the low price of federally controlled gas. (See p. 27.)

Glutting the market with large acreage offerings in the Gulf likely will continue to lower the average bid price an acre. However, these offerings are being scheduled at the present time, apparently because there are no other Shelf areas available for immediate leasing. (See p. 27.)

Industry interest for the initial offerings in the new frontier Shelf areas cannot be projected on the basis of recent trends in the Gulf of Mexico. (See p. 27.)

The relatively low level of industry interest in the Gulf is the result of over 20 years' exploration during which areas with best potential have been offered and leased. The same trends could develop for the other Shelf areas over a comparable period of time. (See p. 27.)

Regardless of the general quality of tracts offered, industry has shown in recent offers that the most promising prospects will continue to attract high bids. (See p. 28.)

The eight largest petroleum companies are expected to secure a substantial share of the acreage to be leased in the initial offers of frontier acreage of the Atlantic and Alaska.

The smaller petroleum companies are not expected to be major competitors for the frontier Shelf areas because of high risks and costs associated with their exploration and development. (See p. 30.)

RECOMMENDATIONS

The Secretary of the Interior should:

--clearly define Shelf leasing goals and specify how these goals will be met and how they relate to overall national energy goals and plans and

--reconsider the accelerated

Shelf leasing schedule in the light of Government and industry capabilities and possible alternatives to leasing in new Shelf areas as addressed in the Project Independence analysis and the President's subsequent national energy and economic proposals.

AGENCY ACTIONS AND UNRESOLVED ISSUES

GAO reviewed Interior's draft comments and considered them in preparing this report. The Federal Energy Administration did not make their draft comments available for GAO's review. Final agency comments on this report were not received in time to be considered.

MATTERS FOR CONSIDERATION BY THE CONGRESS

This report contains information on a critical Federal policy decision regarding leasing of the Outer Continental Shelf, which has far reaching implications on the direction of future energy resources development. Early attention and resolution of the issues discussed in this report is important for the success of any program which may be established for increasing domestic oil and gas production. The Congress now has before it for consideration several major energy proposals related to these issues.

CHAPTER 1

INTRODUCTION

The United States is the largest energy-consuming Nation in the world. With only 6 percent of the world's population, the United States consumes about one-third of the energy used. Since the mid 1960's energy consumption in the United States grew at an annual rate of over 4 percent according to available information. Domestic production of the two primary energy sources, oil and natural gas, was not able to meet demand.

United States measured reserves 1/ of oil have been declining since 1966. In 1974 the measured reserves had declined to 35 billion barrels. Natural gas reserves peaked in 1967 at 293 trillion cubic feet and declined by 1973 to 250 trillion cubic feet.

Increased exploration and development of oil and gas resources on Federal lands can be one way of increasing the Nation's reserves of these fuels. Interior statistics show that in 1973 63 percent of the oil production and 74 percent of the natural gas production from Federal land came from the Outer Continental Shelf. Production from the Shelf totaled 361 million barrels of oil and 3.2 trillion cubic feet of gas.

The Department of the Interior and the Federal Energy Administration (FEA) both indicate that much of the increase in future U.S. domestic oil and gas production will have to come from the Shelf. The Secretary of the Interior has stated that the Shelf lands offer the best prospects of providing the Nation with major new oil and gas reserves in the next 10 years, with less environmental impact, than any available alternative energy source. Interior estimates that 76 percent of the Federal measured oil and natural gas liquids reserves and over 70 percent of the Federal measured natural gas reserves are on the Shelf. A November 1974 FEA report on the Project Independence (PI) study stated that the accelerated development of the Shelf could add 5.1 million barrels of oil and natural gas liquids a day, or about 25 percent of the total U.S. production by 1985.

1/ Identified reserves from which an energy commodity can be economically extracted with existing technology and whose location, quality, and quantity are known from geologic evidence supported by engineering evidence.

The Outer Continental Shelf Lands Act (43 U.S.C. 1332) provides for U.S. jurisdiction over Shelf submerged lands--all submerged lands seaward and outside State waters. Federal jurisdiction of Shelf lands generally begins about 3 miles from the coastline of each State. No seaward limit to the Federal jurisdiction of the Shelf has been defined. (See app. I for maps of the Shelf areas.)

The act authorizes Interior to lease such lands for certain purposes--including the production of oil and gas--and to regulate Shelf oil and gas operations to prevent waste and to conserve natural resources. The act requires that oil and gas leases be issued only on a competitive-bidding basis. Leases are awarded through sealed bids on the basis of the highest (1) cash bonus bid with a fixed royalty or (2) percentage royalty bid with a fixed cash basis. Interior has conducted only one offer where 10 leases were offered on the basis of a royalty bid.

The Interior's Bureau of Land Management (BLM) executes the leases of Shelf lands. The BLM leasing and management goals in leasing the Shelf are (1) orderly and timely resource development, (2) protection of the environment, and (3) receipt of a fair market value return for leased resources.

The Interior's Geological Survey assists BLM in its leasing objectives by providing technical and administrative assistance and services for managing and disposing of Shelf areas. Of particular importance is Survey's responsibility to value tracts before leasing on the basis of engineering and other technical evidence and economic analysis. Survey is also responsible for supervising and regulating exploration, development, and production activities on the leases once they are leased to private industry.

Through 1974, about 10.8 million acres have been leased in the 20 years of the program through competitive lease offers. Cumulatively, this acreage has produced revenues for the Federal Government of over $18 billion.

The Arab oil embargo imposed in October 1973 called vivid attention to the Nation's growing dependence on foreign oil imports. The economic, political, and national security impact of the embargo set in motion a series of events which led to a decision to more than triple the acreage annually leased on the Shelf. However, long before the embargo, President Nixon, in his April 1973 message to the Congress, directed the Secretary of the Interior to triple (from 1 million acres a year to 3 million a year) Shelf acreage leased.

In January 1974 President Nixon instructed Interior to accelerate the Shelf leasing program from 3 million acres to 10 million acres in 1975, another tripling of the goal in less than 1 year. Under this Presidential mandate, Interior proceeded with plans to lease 10 million acres in 1975, although this was almost as much acreage as Interior leased in the 20-year history of Shelf leasing.

At a November 1974 conference of Coastal States Governors, the Secretary of the Interior said that the Administration was not wedded to leasing 10 million acres in 1975 but was wedded to the idea of beginning leasing in the frontier areas, in addition to the Gulf of Mexico. The Secretary believed that Interior must proceed expeditiously with the preparatory steps for the six proposed offers in 1975. The Secretary noted that while there were advantages to setting an acre figure to facilitate planning the real objective was finding and producing oil and gas safely. No new acreage goals were announced for 1975 or subsequent years. However, as discussed on page , Interior's estimates of production through 1985 assumed that 10 million acres would be leased each calendar year from 1975 through 1979.

In the following chapters we discuss the circumstances under which the 10-million-acre goal was developed, its relationship to PI, and constraints which can be expected to hinder accomplishing an accelerated leasing program. This is the first in a series of reports on Federal mineral-leasing subjects which we expect to issue during calendar year 1975. Closely related Shelf reports will concern the Interior's program for deciding where to lease and at what dollar value and will consider the environmental consequences of Shelf oil and gas development. The scope of the review is discussed on page 32.

CHAPTER 2

FEDERAL OFFSHORE LEASING GOALS FOR OIL AND GAS PRODUCTION

The far-reaching implications of Interior's 10-million-acre leasing goal with respect to the direction of future energy resources development and potential environmental impact on coastal lands and waterway makes it the most critical policy decision in the 20-year history of Federal Shelf leasing; one which deserved careful analysis and considerations. Yet we found that the proposal was

--hastily conceived by Interior under pressures exerted by the presence of the energy crisis and fears that the newly formed FEA would assume responsibility for the Shelf leasing program;

--developed with little input by the operating levels of BLM and Survey and based on overly optimistic assumptions and inadequate data;

--adopted by Interior policy officials despite opposition from program personnel in BLM and Survey; and

--developed and adopted without considering environmental impacts, national-regional supply-and-demand needs, or alternatives to large-scale expansion of Shelf leasing.

Interior officials now say that Interior no longer has an acreage leasing goal, but that emphasis is on production and opening up frontier areas as quickly as possible by proceeding expeditiously with the preparatory steps for the six proposed offers in 1975. It is unclear at this time what amount of acreage would make up the six offers, although one Interior official told us in January 1975 that program personnel were still working toward a 10-million-acre leasing goal. Even the rationale for holding six offers rather than some other number of offers is unclear.

The decision to lease 10 million acres was made before FEA's PI study was begun. Although FEA's PI study group considered Shelf oil and gas development to be a critical source of domestic energy supplies, the production forecasts were not tied to acreage figures or to a leasing schedule.

This chapter details the circumstances under which the expanded leasing goal was conceived and adopted by Interior officials and how it related to PI.

ACCELERATED LEASING SCHEDULE

President Nixon in his energy message to the Congress on January 23, 1974, directed the Secretary of the Interior to lease 10 million acres in 1975. As discussed earlier, in November 1974 Interior shifted the emphasis of the leasing program from a specified acreage goal to one of accelerated production through rapid exploration of frontier areas. The leasing schedule announced at the Governors' Conference on November 13, 1974, called for six offers a year for calendar years 1975-78; however, no acreage estimates were announced. The chart below shows areas expected to be leased in each of these years.

Interior officials caution that the leasing schedule is very tentative and note that opposition to leasing, both by Coastal States and by environmental groups, may effectively limit leasing to the Gulf of Mexico and Southern California.

Area to be leased	1975 leasing (note a)	Acreage to be offered in 1975 (note b)	1976 leasing	1977 leasing	1978 leasing
		(millions)			
South Texas	X	3.0			
Central Gulf of Mexico (East Texas)	X	2.9			
Southern California	X	1.5	X	X	X
Cook Inlet (State and Federal)	X	1.7			
Gulf of Alaska	X	3.5	X		X
Mid-Atlantic	X	3.5		X	
Mississippi-Alabama-Florida (MAFLA and Gulf of Mexico deep)			X	X	
North Atlantic			X	X	
South Atlantic			X		X
Bering Sea			X		X
Beaufort Sea				X	
Outer Bristol Basin				X	
Northern California, Washington, and Oregon					X
Chukchi Sea (Hope Basin)					X

a/ Two 1975 contingency offers were also included: 2.5 million acres in the Bering Sea and 2.5 million acres in the MAFLA area.

b/ 1975 acreage offered figures are tentative and were taken from the Department supplemental budget requests. No estimates were provided for other years.

Historical perspective of the Shelf leasing policy

Federal leasing of the Shelf began in October 1954. Through 1974, 10.8 million acres had been leased of over 20 million acres offered for sale. Revenues paid the Federal Government during this period totaled about $18 billion. (See app. II.)

The Federal leasing goals have changed significantly in less than 4 years. Since 1971 the leasing goal has increased from 1 to 10 million acres--only 0.8 million acres less than the total acreage leased in the 20-year history of the Federal Shelf leasing program.

Until 1971 there was little orderly planned development of the Shelf. Industry interest and the needs of the Bureau of Budget (now the Office of Management and Budget) dictated when and where to lease. The Shelf oil- and gas-leasing program was heavily influenced by the desire to generate revenues for the Treasury. A National Science Foundation funded report 1/ points out that Interior pursued a policy of pacing the development of the Shelf at a low rate designed to keep demand for Shelf leases high and therefore keeping bonuses high.

In 1968 BLM contracted with a management consulting firm to study ways for determining the optimum Shelf lease offer size and timing and to determine how BLM could play a more effective role in developing Shelf oil and gas resources. BLM used this study 2/ to help develop a tentative 5-year leasing schedule based on supply-and-demand requirements by regions for the United States. BLM attempted to identify crude oil and natural gas production needs by region so that it would be possible to plan Shelf development to meet the demand in these areas.

This schedule, issued in June 1971, provided for leasing 1 million acres a year in two offers. The size of the offers was administratively set at 300,000 to 600,000 acres an offer. Interior believed that the 1-million-acre goal could be reached with offers within this range, without

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1/ "Energy Under the Oceans," The Technology Assessment Group Science and Public Policy Program, University of Oklahoma, June 1973.

2/ "The Timing and Size of OCS Petroleum Lease Sales," Arthur D. Little, Inc., June 1970 (unpublished).

imposing undue administrative burdens on the Interior staff or risking loss of industry competition on bids.

The 5-year schedule was never really implemented as planned, partly because of litigation by an environmental group brought against Interior. The scheduled offer in December 1971 was delayed until September 1972.

During the 1971-72 period, awareness was growing as to national energy supply needs. In June 1971 the President sent a message to the Congress calling for, among other things, increaased domestic production of conventional fuels to meet projected energy needs. In April 1972 the Office of Management and Budget (OMB) requested Interior to make a thorough review of the Shelf leasing system according to an Interior official. A task force staffed by representatives of Interior, OMB, and the White House was established to develop Shelf policy including, among other things, whether the Shelf program could be accelerated and still insure return of fair market value.

The task force study report issued in January 1973 did not recommend changes in the Shelf leasing program but did discuss alternatives. The report included an environmental overview of Shelf frontier areas and discussed options available regarding Shelf leasing, such as (1) changing the June 1971 Shelf leasing schedule, (2) requiring diligent effort to accelerate exploration, development, and production, and (3) establishing alternative leasing methods.

According to an Interior official, in March 1973 Interior provided input to a second energy message under preparation at the White House, and worked directly with the White House staff in developing parts of the energy message based on the January 1973 task force study. The official told us that the White House staff decided to adopt one of the options--to accelerate Shelf leasing to 3 million acres a year--discussed in the task force study. On April 18, 1973, President Nixon in his energy message to the Congress directed the Secretary of the Interior to take steps to triple the annual acreage leased on the Shelf beginning in 1974.

On July 10, 1973, Interior announced a tentative 5-year leasing schedule which called for three 1-million-acre lease offers each year beginning December 1973. Offers were scheduled primarily in the Gulf of Mexico, but offers were also planned for Alaska and Southern California Shelf areas.

The events leading to the President's announcement to lease 10 million acres and the assumptions made by Interior in drafting the proposals are detailed in the following paragraphs.

Events leading to accelerated leasing goal of 10 million acres

Before the first lease offer could be held under the July 1973 leasing schedule, the October 1973 Arab oil embargo focused the Nation's attention on the energy crisis. Interior was asked to provide input into another Presidential energy message. Interior, as well as other Federal agencies, was asked to suggest alternatives to alleviate the immediate energy crisis and lessen dependency on foreign oil.

Interior at this time was under pressure from the newly established FEA to speed up Shelf leasing. According to Interior officials, there was a power struggle between FEA and Interior as to who would administer the Shelf leasing program. Interior reacted by proposing an accelerated Shelf leasing program of 10 million acres each year for 5 years--1975 through 1979.

On January 23, 1974, President Nixon in his energy message to the Congress announced that he was directing the Secretary of the Interior to increase the acreage leased on the Shelf to 10 million acres in 1975. A decision to lease the same number of acres in subsequent years as Interior originally proposed was deferred, pending an evaluation of the 1975 leasing experience.

It is important to note that only 27 calendar days elapsed between the time a Deputy Under Secretary of the Interior requested Interior personnel to develop an accelerated leasing proposal and the date of the President's announcement. At most, 2 weeks was spent drafting the proposal before it was submitted to the Under Secretary. The key events in the proposal development are detailed below.

On December 28, 1973, the Deputy Under Secretary requested that Interior personnel develop a comprehensive program proposal to meet the objective of rapid development of new oil and gas production on the Shelf. The memorandum requested that the proposal be geared to four offers a year covering at least 1.5 million acres an offer. The proposal was to be submitted by January 11, 1974.

In response to the memorandum, BLM prepared a proposal dated January 10, 1974, which favored publishing a 5-year schedule by January 1975 for leasing six million acres each year (four offers a year). The schedule was to include three offers for a total of five million acres in the Gulf of Mexico each year and one offer of one million acres each year in new areas until desirable acreage in the Gulf of Mexico was exhausted, after which all leasing would be in new Shelf areas.

The Acting Deputy Assistant Secretary, Program Development and Budget, also prepared a response dated January 11, 1974, calling for an accelerated leasing program of 10 million acres a year beginning in 1975. The period of the leasing program was not stated. According to Interior officials, both proposals were discussed in a meeting with the Under Secretary on January 11, 1974.

Although we were unable to locate or obtain documentation on this meeting, it is apparent from comments by attendees and subsequent events that the 10-million-acre figure was favored as Interior's leasing policy.

One Survey official told us that Survey vigorously opposed the concept of 10 million acres a year but was unsuccessful in reducing the goal. In commenting on the 10-million-acre proposal, the Director of Survey expressed concern about the management problem created by a 10-million-acre level and said Survey believed it would be better to aim at a leasing rate of 5 to 6 million acres a year.

Another official indicated that the working levels in Survey and BLM, as well as industry itself, were unanimously opposed to the 10-million-acre proposal, but nobody listened. This attitude was especially evident from one high-level BLM official who cautioned us against relying on BLM field personnel views which differed from BLM's official position because he believed they had a limited understanding and parochial view of the leasing goal.

There were differences of understanding among those attending the January 11, 1974, meeting as to what the 10-million-acre goal really meant. BLM officials told us that they came away from the meeting with the understanding that 10 million acres would be offered for lease in 1975 but not necessarily leased. One BLM official told us that it was several weeks before he knew that the goal was to lease 10 million acres. In fact this apparent confusion continued as late as September 18, 1974, when the Deputy Under Secretary, in a memorandum to the Director of BLM, stated that the policy was to actually lease, rather than offer for lease, 10 million acres.

An Interior official who had been involved in preparing the 10-million-acre policy paper told us that it was intended all along to lease 10 million acres in 1975 and not just offer them. There was no consensus as to how much acreage would have to be offered to lease 10 million acres. Interior officials' estimates have ranged from about 16 to 26 million acres offered in order to lease 10 million acres.

On January 19, 1974, a meeting was held among the Secretary of the Interior, the Director of OMB, and the Administrator of FEA. At that meeting Interior's proposal to lease 10 million acres was presented and apparently accepted as the leasing goal. It was included in the President's energy message only 4 days later.

Analysis made and assumptions used in proposal

The January 11, 1974, proposal was based on an analysis of what production could be expected from accelerating leasing by levels of 4, 5, and 10 million acres for each year from 1975 through 1979. An Interior official told us that other levels of leasing between 5 and 10 million would have been considered but a tight response deadline did not allow enough time. The official told us that the 10-million-acre-a-year figure was considered by those preparing the proposal to be the maximum acreage Interior could administer. However, he was not able to document this judgment.

The analysis made two basic assumptions, both of which were considered to be optimistic by those preparing the proposals. These tended to inflate the production estimates.

--Drilling equipment and personnel were assumed to be available, and only customary or normal delays were assumed between lease offer and production.

--The additional acreage leased in each province was assumed to be as productive as the land scheduled to be leased in that province under the July 1973 schedule.

Interior has continued to use these assumptions in supporting its position to accelerate Shelf leasing.

Production estimates assumed leasing of 50 million acres between 1975 and 1979, or 10 million acres each year. On the basis of the production history (production to acreage leased), future Shelf production resulting from the 5-year 50-million-acre program was estimated to be 7 billion barrels of oil a year by 1985. The production history primarily involved experience in the Gulf of Mexico.

The Director of Survey told Interior officials that the charts used in the analysis were too simplistic in their basic assumption regarding the relationship between acreage and production. Also the price of oil and gas were assumed to be constant; an unrealistic and critical assumption, in our opinion, since price levels have a major effect on the oil

and gas production. The analysis acknowledged that the basic assumption might be too high but agreed that, if the expected returns were cut in half, it could still lead to a 4.8-billion-barrel-a-year increase over the expected production of the existing Shelf leases by 1986. According to the analysis, this would be enough for self-sufficiency in oil.

Also, the full implications of the leasing goal was not adequately addressed. Little consideration was given in the analysis to industrial constraints (such as shortages of equipment and manpower), environmental impacts of a 10-million-acre program, or how the accelerated program related to national or regional supply-and-demand needs.

On September 18, 1974, BLM and Survey were asked to prepare a leasing schedule to include (1) 10 million acres actually leased rather than offered in 1975, (2) a sale in 1975 in both Alaska and the Atlantic, and (3) an alternative if number 2 fails to insure leasing of 10 million acres. Survey and BLM both began developing tentative lease schedules to meet these goals.

Survey submitted a leasing schedule to BLM and commented that it felt the only way to meet the 10-million-acre goal was to offer all remaining Shelf areas for lease, require little or no minimum bid, and permit no bid rejections when there was an adequate expression of competitive interest.

A Survey official told us that, although a joint schedule was worked out and signed by Survey and BLM on October 17, 1974, Survey opposed including the Beaufort Sea (Alaska) offer scheduled for 1977 in the proposed lease schedule. They raised objections because, in their opinion, adequate environmental and reserve data was not now available and could not be expected by 1977 and development of the area would not be technologically feasible by 1977. He said that Survey included a comment on the schedule forwarded to the Under Secretary for final approval stating that the Beaufort Sea offer was included over the objections of Survey. The schedule which was approved and released by the Secretary on November 13, 1974, included the Beaufort Sea offer in 1977.

Relationship of leasing goal to Project Independence

The goal of the PI study was to present an action plan to the President containing legislative, administrative, economic, and budget recommendations to reach energy independence. The report issued in November 1974 clearly stated that the report was not an action document and made no

recommendations. The report included analyses of future supply-and-demand alternatives under a variety of assumptions.

The report emphasized the Nation's dependence on oil as the major energy supply. Although other sources are discussed, the report indicated that any significant impact from alternative energy sources would not be possible within the next 10 to 15 years. Increased domestic oil production will have to come from Alaska and increased Shelf leasing, according to the report.

Interior's decision to lease 10 million acres in 1975 was reached before the PI study was initiated in March 1974. There is no apparent relationship between PI's production estimates and Interior's accelerated Shelf leasing program. Also, the bases used in estimating production differ. As previously indicated, Interior estimates of production resulting from Shelf leasing were based on the assumption that 50 million acres would be leased between calendar years 1975 and 1979 (or 10 million for each of these years) and that the historical ratio of acres leased to oil produced would hold true for future leasing.

PI projected possible levels of future oil production on the relationship between exploratory footage drilled and the amount of oil discovered. Target drilling levels were estimated for each Shelf area. It was assumed that the Shelf acreage needed to meet projected exploratory-drilling levels would be available. PI made no estimates of how much acreage would have to be leased to achieve its goals.

It should be recognized that PI's assumptions and calculations, like those of Interior, are very tenuous. For example, the PI report stated that its production calculations could be higher or lower by as much as 55 percent if changes were made in the values and assumptions made in its analysis--such as finding rates, financial cost, discount rates, drilling costs, and effective depletion rates.

To relate the PI production estimates to acreage-leasing requirements, we estimated how much acreage would have to be leased and drilled to sustain the PI drilling rate. This estimate, although admittedly rough, provides a gage of acreage needed to meet PI projections. It showed that about 15 to 28 million acres would have to be leased and drilled by 1985 in the Shelf. The total acreage leased would in all likelihood be higher than 15 to 28 million acres because a time lag generally exists between leasing and the start of drilling. Even if Interior leased 50 million acres, development potential by 1985 would be limited to acreages around 15 to

28 million given PI's assumptions and our drilling/acreage conversion factors.

Our estimate was based on the following factors.

--Number of exploratory wells which would have to be drilled to meet PI targets (PI exploratory footage for each region divided by average depth of well).

--Number of wells drilled per tract (according to a Survey official between two and four exploratory wells are drilled per tract).

--Average 5,000 acres per tract.

PI projected that by 1985 accelerated Shelf development would provide the following crude oil production.

Area	Estimated yearly production (note a)
	(millions of barrels)
Alaska	285
Atlantic	179
Gulf of Mexico	652
Pacific	412
Total	1,528

a/ GAO calculation based on PI daily production projections.

Compared with Interior's January 1974 estimates of 1985 oil production, PI's estimates are about five times lower. Although lower than Interior's estimates, the PI production estimates are based on optimistic production conditions. For example, estimates allow only a 1-year timelag between exploratory drilling and production, compared with industry estimates of 3 to 8 years in the Atlantic.

By changing the leadtime variables alone, GAO estimated on the basis of oil production figures that the 1985 production from the Atlantic under optimistic conditions of 3 years would be about 126 million barrels, or 53 million barrels a year less than PI's estimate. Under the less optimistic estimate of 8 years' delay, 1985 production from the Atlantic would be 14 million barrels, or 165 million barrels less than PI's estimate.

PI also estimated that natural gas produced from these Shelf and Alaskan onshore areas would reach about 11.5 trillion cubic feet a year by 1985--assuming decontrol accelerated development and a direct relationship between the amount of natural gas discovered and the amount of oil exploration. The ratio of oil to gas discovered assumed for each Shelf area is an uncertain figure since the ratio cannot be accurately determined until actual exploratory and development drilling take place in each of the areas. Because gas production estimates for Alaskan Shelf areas alone were not detailed in PI's analysis, we were not able to compare these estimates with those of Interior.

Interior officials told GAO that revised production estimates given to the House Appropriations Subcommittee on Interior and Related Agencies in October 1974 were consistent with Project Independence projects. These projections, however, were based on a 1-year leasing program of 10 million acres in 1975 and are not comparable to Project Independence estimates which covered a 12-year period and assumed that unlimited acreage would be available for accelerated leasing.

Conclusions

Decisions regarding the Shelf leasing have historically been closely associated with industry interest and the need to generate revenues for the Treasury. Changes in the leasing program have occurred in recent years in reaction to a growing concern about the decline of domestic oil production. The Arab oil embargo highlighted the energy crisis and helped bring about Interior's goal to lease 10 million acres. This goal was hurriedly conceived in reaction to the Arab embargo and pressure exerted on Interior by a newly emerging FEA. The goal was based on inadequate information, unrealistic assumptions, and little input from program personnel. Once the goal was established, Interior policymakers appear to have been locked into the goal, although strong opposition exists within Interior and outside groups because of the goal's apparent impracticality.

Since November 1974, Interior officials have publically indicated a softening of their earlier firm position to lease 10 million acres. Interior officials now stress that the principal leasing objective is to increase production of oil and gas and to proceed expeditiously with exploration in the frontier areas. But they are vague as to how this objective will be met except to say that six offers will be held in 1975. Even the rationale for holding six offers rather than some other number is unclear.

Without any clear guidance as to the magnitude of a leasing program, we do not see how Government or industry planning can be effectively accomplished. As indicated in the following chapter (see p. 25), industry representatives we talked with suggested that, to minimize the constraints to accelerated production, leasing uncertainties must be removed so that industry resources (manpower, equipment, materials, and capital) can be properly planned for and managed.

PI evolved after Interior's decision to pursue a 10-million-acre goal. No relationship exists between PI's and Interior's plans. Our rough calculations show that from about 15 to 28 million acres would have to be leased and drilled by 1985 to satisfy PI's assumptions. Interior's production estimates were based on leasing 50 million acres during a 5-year period (1975-79). However, no estimates are available as to how much of this acreage would be drilled by 1985.

The President, by Executive Order 11814 dated October 11, 1974, activated the Energy Resources Council and designated the Secretary of the Interior as its Chairman. The Council is charged with performing such functions as are assigned to it by section 108 of the Energy Reorganization Act of 1974 (Public Law 93-438), developing a single national energy policy and program, and performing such other functions as may be assigned to it, from time to time, by the President.

President Ford in his January 15, 1975, State of the Union message outlined the Nation's energy outlook and set forth national energy objectives. The goal of the President's energy program for the 1975-85 period is to eliminate vulnerability to oil embargo by achieving full energy independence by 1985. A number of legislative and administrative actions were announced which would reduce energy demand, reduce oil imports, increase domestic production, and increase conversion to coal. The proposed actions would

--increase import fees on crude oil and petroleum products to reduce consumption and imports;

--encourage conservation measures to help reduce oil consumption by 1 million barrels a day;

--decontrol oil and gas prices;

--continue aggressive Shelf leasing programs, including offers in the Atlantic, Pacific, and Gulf of Alaska;

--allow exploration, development, and production of Naval Petroleum Reserves Number 1 and 4;

--amend the Clean Air Act and the Energy Supply and Environmental Coordination Act of 1974 to permit a vigorous program to make greater use of domestic coal;

--increase coal production by passage of a surface-mining bill;

--require diligent development of existing coal leases; and

--accelerate growth of nuclear power.

We believe that, in developing a single national energy policy proposal and program, it is important that the Secretary of the Interior clearly define Shelf leasing goals and specify how these goals will be met and how they relate to overall national energy goals and plans.

The real issue in defining leasing goals concerns the magnitude of a leasing program, and not necessarily the number of acres, although traditionally this has been the principal indicator of magnitude. without clear guidance as to the magnitude of a leasing program GAO questions whether Government or industry planning can be effectively accomplished.

Recommendation

We recommend that the Secretary of the Interior clearly define Shelf leasing goals and specify how these goals will be met and how they relate to overall national energy goals and plans.

CHAPTER 3

CONSTRAINTS TO AND LIKELY IMPLICATIONS OF FEDERAL GOALS FOR OFFSHORE OIL AND GAS DEVELOPMENT

We examined, from the standpoint of the following three broad questions, some likely constraints to and implications of an expanded Shelf leasing program as best we could from available data.

--What constraints can be expected to impede industries' ability to respond to a large-scale Shelf leasing program?

--What impact could an accelerated leasing goal have on the Government's tract selection and valuation program?

--What prospects for industry response is indicated by trends of past sales?

A fourth major issue area having serious implications for accelerated Shelf leasing involves the environmental impact on marine and coastal areas. This issue is addressed in a separate GAO report to follow.

These are hard questions which must be answered before success can become a reality. In the final analysis the timely and successful development of the Shelf will depend mainly on Interior's major policy decisions and the oil and gas industry's capability to do the task asked of them.

CONSTRAINTS TO EXPANDED PRODUCTION

Government and industry officials made various studies and expressed their opinions concerning the impact of shortages of equipment, material, manpower, and capital on industry's capability to expand Shelf drilling. Studies and opinions do not clearly identify the impact of accelerated Shelf leasing. Although there was little agreement on the severity and impact of anticipated shortages, there was some agreement that predictions were made difficult by the uncertainties and complexities inherent in oil and gas exploration and development and the influences of worldwide conditions.

Despite some optimistic outlooks that existing and predicted shortages could be overcome, other studies indicated that shortages warranted concern and could have a major impact on or could delay accelerated Shelf development.

A specific indication of constraints to accelerated Shelf leasing in 1975 was expressed by 25 oil companies' responses to a BLM request. As illustrated in appendix III, industry identified many constraints. There is common agreement that the constraints involve potential short- and long-range shortages of the resources--equipment, material, manpower, and capital--necessary to the expansion of oil and gas production.

Offshore mobile drilling rigs

According to the PI report, the domestic demand for fixed and mobile offshore drilling rigs is predicted to exceed the most optimistic current forecasts of domestic availability under an accelerated exploration and development program. Even with optimistic assumptions on mobile rigs production and world fleet movement to U.S. waters, requirements are expected to exceed projected availability.

Offshore mobile drilling rigs are used for exploration and development drilling. There are various types (including jackup, semisubmersible, and drillship) designed for different depths and offshore conditions. The world output for offshore mobile drilling rigs is estimated to be 50 a year. During April 1974 there were 134 offshore rigs under construction, worldwide, and scheduled for delivery through 1976 and later.

Most offshore mobile rigs capable of operating in deep water are in foreign offshore areas--over 70 percent are predicted to operate in foreign areas over the next 2 years. It is anticipated, however, that, given the proper incentives, some rigs would be returned to domestic areas.

However, a general consensus among rig owners and oil companies is that tax laws (U.S. Internal Revenue Code Section 956--Upstream Dividend Provision--passed in 1962) are not favorable for moving foreign-registered drilling units now located overseas back to the United States. Under the current tax law, U.S. owners of foreign-registered rigs could be taxed at the rate of 48 percent of the adjusted value of the equipment. Costs of equipment range from $25 to about $60 million. Possibly 75 to 85 drilling rigs would be affected by the above tax disadvantage. Some companies indicate that, if Shelf leasing is expanded, they will attempt to hold new rigs built in the United States for drilling on the Shelf rather than return overseas rigs. However, currently 50 to 60 percent of the rigs being built domestically are believed destined for foreign areas.

Also, drilling operators indicated that they could move their U.S.-registered rigs now working overseas to the Shelf if the oil companies to whom the rigs are contracted so desire. It could be reasonably estimated that 10 percent of U.S.-registered rigs would return from overseas in response to an accelerated leasing schedule, according to a May 1974 BLM report. A most optimistic case would be to divert 25 percent of the rigs to U.S. operations.

If 10 percent of the rigs projected for foreign service were made available for U.S. drilling, the U.S. rig count would increase by 26, a projected total of 126 by the end of 1975. If 25 percent were diverted from foreign service, 65 units would be added, bringing the projected total to 165 rigs.

Despite the estimated increase in available rigs, the number of rigs is predicted to fall short of the number needed under an accelerated Shelf leasing program. Even the expansion of manufacturing capacity and the return of foreign-registered rigs (not likely due to tax disadvantages) would not be enough to meet needs, according to the PI report.

Interior officials indicated that, based on an Interior study, compulsory unitization in all frontier areas hold some promise for increasing drilling rig productivity. Unitization of untested tracts located on large geological structures reportedly would greatly reduce the number of wells required to evaluate effectively the prospects for hydrocarbon accumulation.

Tubular goods

Tubular goods, such as drillpipe, casing, and tubing used in exploration and production drilling, are expected to be potentially severe constraints upon an accelerated Shelf development program. Current shortages of these products exist.

The National Petroleum Council estimated that the supply of tubular goods would approach demand by the end of 1975; however, spot shortages are expected particularly in high strength casing needed in deep drilling. The November 1974 PI report indicated that the domestic supply should be in balance with demand by 1976, provided tubular goods manufacturers have access to sufficient quantities of steel, steel pipe, and tubing.

There is some controversy on the causes of the tubular goods shortage. Some oil companies believe that it is not a

true shortage but resulted from hoarding by the major oil companies. Other companies believe that it was due to price controls on steel products. The shortage of tubular steel products is most commonly attributed to

--the large increase in domestic drilling since the Arab oil embargo,

--a drop in U.S. imports of tubular goods as international demand diverted supplies from the U.S. market, and

--a change in the inventory and distribution system by tubular goods manufacturers and supply houses from one of centralized inventories to one held by oil producers.

In December 1973 a joint survey team from the Department of Commerce, the Cost of Living Council, and the Federal Energy Office (now FEA) made a preliminary investigation into the reported shortages. The December 1973 survey revealed that shortages were real to independent operators, in particular, and to some major oil companies as a result of higher-than-normal inventories of tubular goods by certain of the major oil companies. According to the Energy Office, eight of these companies held 74 percent of the inventory.

In April 1974 Commerce updated the December 1973 survey by obtaining information from all major producers of tubular goods, 20 major oil companies, and 24 major distributors. The April survey concluded that the tubular goods inventories of the major oil companies indicated further stockpiling since the December 1973 survey. Inventories on March 30, 1974, were up 70 percent above the November 30, 1973, level; from 163,200 tons to 277,800 tons.

Three major oil company officials told us in October 1974 that they were experiencing delays in obtaining tubular goods. They expected that tubular goods might become a critical constraint if major oil and gas strikes were found in the proposed 10-million-acre lease offer. One official said that drillpipe and casing shortages were a problem because his company did not have a stockpile of those items. Another major oil company official said that over 300 onshore wells would not be drilled by his firm in 1974 due to the shortage of drilling rigs and pipe. A fourth industry official (of a major oil company) we interviewed felt that pipe shortages were causing delays in exploratory activities but that those shortages would work themselves out and should not become a major problem to the expanded lease offer.

Six drilling operators contacted by Interior said that the casing shortage was a severe problem, and several mentioned that they had not been able to obtain the amount necessary to maintain an adequate inventory. To meet the problem, most of these operators adopted economizing procedures and priorities. Offshore drilling is being given priority over onshore drilling, and exploratory drilling is being given priority over developmental drilling.

Manpower

Although specific limitations cannot be readily quantified, experts within the oil and gas industry and Government generally agree that potential shortages of professional and skilled manpower are anticipated in the extraction, drilling, and production of oil and gas in the near future.

A September 1974 National Petroleum Council report on the availability of resources stated that the most critical shortage identified at that time was in personnel for interpretation of geophysical data. These comments were consistent with those of industry officials we interviewed who stated that critical shortages of geophysicists and other professionals cannot be met.

The PI oil task force commented that the accelerated expansion of Shelf operations could further intensify the shortage of manpower. The move to deep water and hostile environments and the accompanying increased complexity of technology could have a major impact in the future on the plans to expand drilling on the Shelf and on requirements for engineers, scientists, geophysicists, and other professionals.

The gap between engineering-manpower demand and supply is wide, according to an article in the September 16, 1974, Oil and Gas Journal. It stated that the continuing engineer shortage is a major factor limiting the oil industry's ability to meet the energy challenges of the future. The article stated further that:

> "The supply of technical people is running thin under competition from other industries. And a study by one big engineering firm projects a 3-million-engineer deficit in the U.S., Germany, United Kingdom, France, Belgium, the Netherlands, Italy, Switzerland, and Japan by 1980 - an average of 300,000 engineers per country.
> The decline in enrollments at engineering schools indicates a continuation of the shortage in the U.S., at least for the short term. * * *"

Industry response to a survey, published in the September 16, 1974, Oil and Gas Journal, ranked the following disciplines as the most difficult to obtain.

1. Chemical engineers
2. Petroleum engineers
3. Mechanical engineers
4. Geophysicists
5. Geologists
6. Electrical engineers
7. Accountants
8. Petroleum landmen

Oil industry officials we interviewed emphasized the critical shortages of manpower which will be magnified by accelerating exploration on the Shelf. Since most of the exploratory drilling has occurred in foreign countries during recent years, our universities have not been educating the professionals needed by industry for expanded domestic exploration operations. This is especially important because of the long leadtime required for the necessary training in many occupations. Industry officials stated that college enrollments had been low in recent years for engineers, geologists, and geophysicists in particular.

Capital

Projections by industry, financial institutions, and Interior support the contention that needed capital can be obtained to meet accelerated expansion of Shelf leasing activities. Officials of one of the largest banks in the United States told us that capital resources would be available but that certain obstructions to the capital formation process must be eliminated before long-range capital requirements could be met.

One major oil company official we interviewed said that capital would not be a problem; however, three other majors were not as optimistic about the availability of capital.

Financial institution estimates of capital requirements for increased domestic onshore and offshore activity varied. One estimate--for the cost of exploring, developing, manufacturing, transporting, and distributing new domestic production--was as high as $250 billion for the period between 1975 and 1985.

According to officials of one of the largest banks, obstructions to the capital formation must be eliminated before industry can raise this much capital.

They pointed to obstructions to capital formation including "unenlightened" regulation of the price of interstate natural gas, past administrations' unawareness of the capital formation process, and the tax reform of 1969 which cost the

industry between $600 and $700 million in profits which could have been reinvested.

Backup industries

The success of expanded Shelf exploration and development hinges on a large number of widely ranging industries. Segments of these industries which could experience shortages that might affect, and be a constraint to, expanded Shelf operations include, among others, the steel industry (raw materials), shipyard drilling rig construction, and service and supply industries (support drilling and oil production activities). Predicted shortages in the backup industries range from "none anticipated" to "potentially critical shortages."

Rig equipment

A segment of the industry of concern to drilling rig manufacturers are primarily assemblers of subcomponents, such as masts, derricks, drilling bits, and bearings. Rig manufacturers are reported to be experiencing assembly postponements because of delays by the subcontractors and suppliers. Delays for delivery of bearings are 12 to 16 months and delays for mast and derricks are 18 to 24 months. These subcomponent manufacturers, however, depend on steel which has also been in short supply. For rigs to be available to meet the demands of operating companies, supplies must be available to the manufacturer at each step of the construction process.

Steel industry

Steel supplies could be a serious constraint for such primary uses as plate for platform construction and surface handling facilities, as well as secondary steel requirements of manufacturers and subsuppliers. Although the petroleum industry uses only 6 percent of the domestic output of basic steel, most manufacturers of oilfield equipment are highly dependent on adequate steel supplies. Oil equipment manufacturers expressed concern over their ability to continue to obtain currently required supplies and, particularly, the additional steel supplies required for indicated increases in output. Any shortfall of total steel supply would cause a net reduction in the indicated capacities of the various manufactured equipment segments. The steel shortage could become critical if strikes cause a disruption of steel production.

Shipyards

The basic problem is that shipyards, worldwide, are working at or near capacity. They have experienced problems in obtaning the steel for contract orders. In addition to rig construction, there is a demand for merchant ships, particularly oil tankers, and the additional impact of heavy naval construction. According to the Shipbuilders Council of America, the estimated backlog in the United States is $6.5 billion worth of orders which some shipyards estimate will keep them busy until 1977.

Well servicing equipment and service

The U.S. well servicing industry consists of more than 50 separate functions and supports drilling and producing activities from the time drilling starts until final well abandonment. Well servicing companies perform engineering, manufacturing, and installation services. The rapid increase in demand late in 1973 for services related to new well drilling was in addition to existing strong demand for production maintenance service. The industry is said to have the capacity to expand 25 percent in 1975. Further expansion in 1976 will require major investment decisions before the end of 1974, and critical shortages could result.

Federal price control of interstate gas

According to the petroleum company officials we interviewed, the Federal Power Commission's price control of the sale of interstate gas is a major factor impeding exploration and production. One company official noted that his company had 40 shut-in wells because it was not economical to produce at the present controlled gas price. Another company official said a lease with about 3 billion cubic feet of gas was not being developed because of the controlled price. According to industry officials, removal of price controls is necessary for accelerated development.

Industry's position on the merits of decontrolling gas prices is hotly contested by others, particularly consumer groups, who argue that decontrol of natural gas pricing either will not greatly increase gas supplies or will amount to windfall profits for the companies at the consumers' expense.

INDUSTRY COMMENTS ON ACTIONS NEEDED TO MINIMIZE CONSTRAINTS

Industry representatives we talked with suggested that, to minimize the constraints, the Congress and the Executive Branch must act on several broad policy issues, as follows:

--Implementation of a national energy policy which will be a focal point and provide guidance for an overall planning approach to leasing oil and gas and other energy resources.

--Removal of leasing uncertainties so that industry resources (manpower, equipment, materials, and capital) can be properly planned for and managed.

--A decision at an early date regarding the depletion allowance and price controls of oil and natural gas.

--Development of timely, efficient, and effective methods for environmental assessment and realistic assessment of tradeoff between energy needs and environment hazards.

--Accelerated research to improve the technology for exploration and production in deep water and more hostile environments of Alaska and other frontier areas.

IMPACT ON GOVERNMENT'S PROGRAM

One of the goals of Interior's Shelf leasing program is to insure a fair return to the public from the distribution of minerals from public lands. Before leasing Shelf acreage, Survey evaluates the oil and gas potential of tracts to establish a value for each tract offered. We found that inadequacies in the Government's tract selection and evaluation practices existed even at a 3-million-acre leasing rate. This subject will be covered in detail in a separate GAO report which will be issued early in 1975. To proceed with the projected leasing schedule will mean that the Government's role of protecting the public interest in Shelf lease offers will potentially be jeopardized. Lower quality and/or the lack of evaluation caused by an accelerated leasing program will mean increased reliance on bid competition as the only means to insure that a fair return is received for leased resources.

As of December 1974, Survey was experiencing delays in filling authorized positions necessary for carrying out the evaluation aspects for lease offers. The major reason for this difficult situation is that the Government is competing with industry for quality personnel at the same time both are staffing for the prospective accelerated leasing program. The demand for petroleum specialists, particularly engineers and geophysicists, greatly exceed the supply; industry is offering these scarce professionals salaries above those offered by the Government.

One Survey official estimated that industry offers college graduates in such fields about $2,700 more annually than does the Government.

Survey is having a difficult time recruiting new college graduates and an even more difficult time hiring experienced personnel. Survey recognizes that the difficulty in recruiting professionals is a serious problem and that the prospects for obtaining needed personnel are not very promising. In a 10-week period ended December 2, 1974, Survey's Gulf of Mexico office was able to fill only 6 of 62 vacant professional positions--1 geophysicist, 3 geologists, and 2 petroleum engineers. In addition, about 1 year is required before a new inexperienced staff member can make an effective contribution to the program.

The apparent inability to obtain staff for an accelerated program of 10 million acres can only compound already existing problems and reduce the quality of the overall evaluation program.

Survey estimates that it would require twice as many geophysicists as it now has to maintain the 1974 level of tract evaluation work. Shortcuts in evaluation procedures had already been taken for the sale in October 1974. Survey said that there would be major problems in trying to evaluate all the acreage tentatively planned for offer in May 1975. Survey field personnel have indicated that their approach probably will be to first evaluate the best acreage and, if time is available, to evaluate the lower quality acreage.

The main alternative to hiring to supplement the Government's preoffer evaluation is to contract for assistance in interpretating geological data.

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

Also, the effectiveness of contractor work would be limited because some data now used by Survey could not be incorporated into the work being done by a contractor since Survey considers some data obtained from oil companies to be proprietary. Further, by contracting out such work to companies doing business with the industry on a day-to-day basis, the objectivity of the results is seriously open to question.

PROSPECTS FOR INDUSTRY RESPONSE

Interior's leasing plans for 1975 included offering about 6 million acres--about 2.8 in February 1975 and about 2.9 million in May 1975--in the Gulf of Mexico. These offers were to represent a major part of the Government's accelerated leasing program to offer under the projected schedule 16.1 millions acres in 1975. The Government expected these two offers to contribute greatly to the success of increasing the acres under lease and providing increased production of energy supplies.

Judging from the results of the February 1975 offering and other indicators, the prospects that Gulf of Mexico lease offers will be pursued vigorously by industry and will contributed greatly to the success of the accelerated program are not encouraging. Specifically:

--Industries' response to the call for nominations 1/ for these offers has been, according to BLM, disappointing, and continues the downward trend noted for recent sales.

--The average number of bids per tract by industry for recent offers has also been trending downward from 5.3 in 1972 to 2.9 in 1974.

--Government and industry consider the potential resources to be marginal. Industry believes the resources will be primarily gas and economically marginal because of the controlled gas prices.

Glutting the market with large acreage offerings will likely continue to lower the average bid price an acre. Apparently these offers are being scheduled because at the present time there are no other Shelf areas available for immediate leasing.

Prospective industry interest in the new frontier Shelf areas is difficult to assess. The recent Gulf of Mexico experience does not provide an accurate analogy as to what might happen in new areas.

The recent Gulf of Mexico trends which suggest a low level of industry interest are the result of over 20 years

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1/ An official notice to industry published in the Federal Register to nominate tracts for inclusion in the proposed lease offers.

of exploration in which time most of the structures 1/ with the best potential have been offered and leased. The same trends could develop for the other Shelf areas over a comparable period of time. Industry interest in terms of nominations and bidding trends for the initial offerings in the new frontier Shelf areas cannot be projected on the basis of recent trends in the Gulf of Mexico.

Regardless of the general quality of tracts offered, industry has shown in recent offers that the most promising prospects offered will continue to attract high bids. This attitude may possibly continue under the accelerated leasing program if major structures are offered in new areas. Bids may be high in new areas because the petroleum companies want to insure that their company is represented in the opening of new areas.

A common view of industry is that frontier Shelf areas should be leased as soon as possible because they have the best potential. The representatives of three major companies told us they would agree to a test drilling program to identify the Shelf areas having the best geologic characteristics for petroleum accumulation and followup with a leasing program for the most promising areas. However, officials of another major company said that a test drilling program is not necessary and would delay leasing.

Gulf of Mexico future

Survey and industry concede that few major prospective structures remain unleased in the Gulf of Mexico. According to Survey, after the May 1975 offer all major prospective structures will have been offered/leased except a portion of the Destin Dome. This area was not leased because oil and gas activities would conflict with Department of Defense area operations which include target practice ranges.

According to Survey, most of the prospects which remain in the Gulf of Mexico have high risks and less reserve potential.

For any future offers in the Gulf of Mexico, lower quality acreage will be the rule rather than the exception. The percentage bid on can be expected to fall along with the level of bids. An analysis of acres offered and bid for the past 3 years (1972-74) shows a marked decline in percent of

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1/ Structures are underground traps which may contain oil and gas.

offered acres receiving bids and in leased and number of bids per tract.

	1972	1973	1974
Percent of offered acres receiving bids	92	70	52
Percent of offered acres leased	85	68	45
Average number of bids per tract	5.3	4.8	2.9

This trend was continued in the February 1975 offer. Of the total 2.8 million acres offered, only about 800,000 acres acres, or 29 percent, received bids which totaled $300 mil-million. Of the 800,000 acres, about 625,000 acres were leased. According to Interior, the principal reason for the low bids and the low percentage of acreage receiving bids in the February 1975 offer are the results of two deep tests wells which industry drilled before the offer. The tests indicated that much of the acreage was not promising.

In an October 29, 1974, memorandum, an Interior official said that low bid levels signal marginal acreage and a possible decline in competition. He said that at some higher leasing rate there would presumably be a drop in the proportion of tracts receiving bids because the higher expected rate of development would lead to forecasts of lower oil and gas prices, higher development costs, or both. The decrease in competition from glutting the market would obviously reduce the dollar value of the bids as well.

An analysis of nomination trends for the 1974 offers and 1975 planned offers in the Gulf of Mexico shows a significant declining trend which buttresses the point of declining interest.

	1973	1974	1975
Average number of nominations per tract	9.4	5.0	3.1
Highest number of nominations per tract	17	17	12

Shelf prospects for smaller petroleum companies

The prospects for independent oil companies participating in the future Shelf development is not known, but judging from past Shelf experience very little participation can be expected. A 1972 Interior study showed that Federal

offshore areas have been explored, developed, and produced primarily by major oil companies. Survey statistics show that in fiscal year 1974, 17 companies accounted for over 90 percent of the oil and 75 percent of the gas production on the Shelf.

According to a Survey official, the eight largest petroleum companies are expected to secure the most promising acreage to be leased in the initial offers of the Atlantic and Alaska frontier areas under the bonus bidding system.

The capital required to win and develop Shelf leases tends to favor the major petroleum companies. Shelf activities require large financial commitments made with a relatively high degree of risk. The risks and costs of Shelf operations are expected to become even greater as development and production activities move into deeper water and more hostile frontier environments.

To enhance the competitive climate in Shelf leasing, Interior has proposed new bidding and data disclosure regulations and is undertaking a review of alternative bidding systems.

Conclusions

A number of studies have been made of the shortages of materials, equipment, manpower, capital, and other related services needed for accelerated exploration of the Shelf. The predicted importance and impact of these reported shortages remain questionable. Nevertheless, there is common agreement that the existing and predicted shortages will to some degree be a constraint on the ability of industry to expand exploration and development of the Shelf, particularly in the short term. The impact of these shortages cannot be ignored if timely accelerated expansion of the Shelf is to be achieved.

How can these predicted shortages be dealt with so that, if and when they do occur, they will have only a minimal impact on the ability of industry to accelerate production?

In the opinion of industry officials, the exploration and development of the Shelf will be achieved. But if it is to be achieved in a more timely, efficient, and effective manner, then major actions will be required by both the Federal Government and industry. According to officials of one major oil company, the oil industry needs a cooperative posture with the Federal Government rather than a wholesale offer of tracts. Timely and effective exploration and

development of the Shelf will require specific policy decisions by Interior and cooperation with the oil industry to use its capabilities.

Industry representatives believe that to minimize constraints to production, the Congress and the Executive Branch must act on several broad policy issues, including:

--Implementation of an overall national energy policy which will be a focal point and provide guidance for overall planning an approach to leasing oil and gas and other energy resources.

--Removal of leasing uncertainties so that industry resources (manpower, equipment, materials, and capital) can be properly planned for and managed.

--A decision at an early date regarding the depletion allowance and price controls of natural gas and oil.

--Development of timely, efficient, and effective methods for environmental assessment and realistic assessment of tradeoff between energy needs and environmental hazards.

--Accelerated research to improve the technology for exploration and production in deep water and more hostile environments of Alaska and other frontier areas.

Interior is proceeding with Shelf leasing at a pace which far exceeds its administrative capacity to insure proper evaluation of leased areas and fair value on the disposition of oil and gas resources. The argument that gains in earlier oil and gas production will occur proportionate to acreages leased is highly questionable because of the constraints industry will face in responding to the greatly accelerated program. In light of the information discussed in this report, we believe that the Secretary of the Interior should reconsider the accelerated Shelf leasing schedule.

RECOMMENDATION

We recommend that the Secretary of the Interior reconsider the accelerated Shelf leasing schedule in the light of Government and industry capabilities and possible alternatives to leasing in new Shelf areas as addressed in the PI analysis and the President's subsequently announced national energy and economic proposals.

CHAPTER 4

SCOPE OF REVIEW

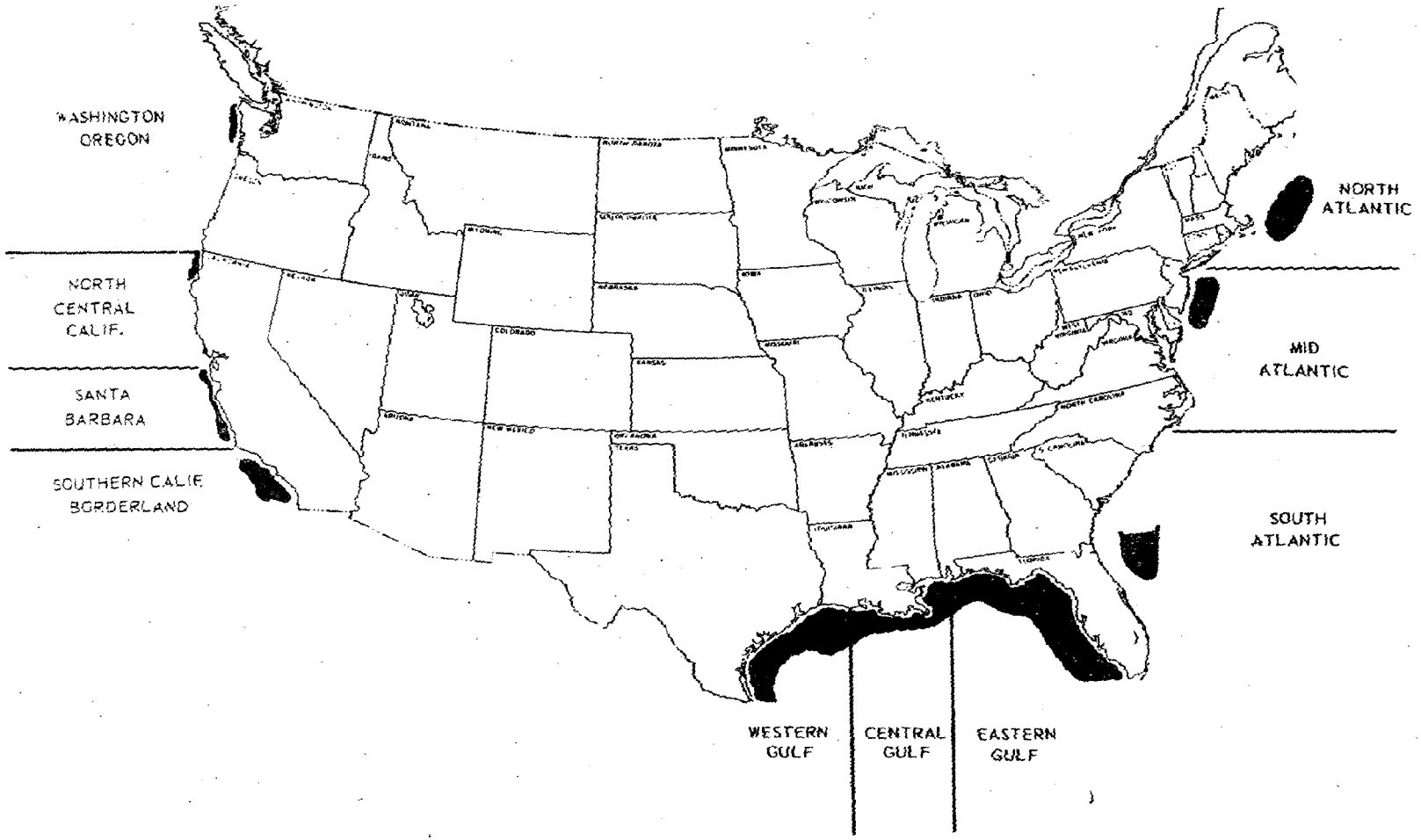
We made our review at Geological Survey's headquarters in Reston, Virginia; the area office in New Orleans, Louisiana; BLM headquarters in Washington, D.C.; and BLM's area office in New Orleans, Louisiana.

We reviewed legislation, regulations, policies, procedures, and practices pertaining to Federal leasing of the Shelf. We interviewed Survey and BLM officials at headquarters, regional, and area offices.

We obtained comments from petroleum industry officials (both major oil companies and independent oil operators) dealing with Federal Shelf leasing and implications of Federal goals for oil and gas development.

We also obtained comments from a major financial institution regarding the availability of capital for the expanded Federal leasing goals.

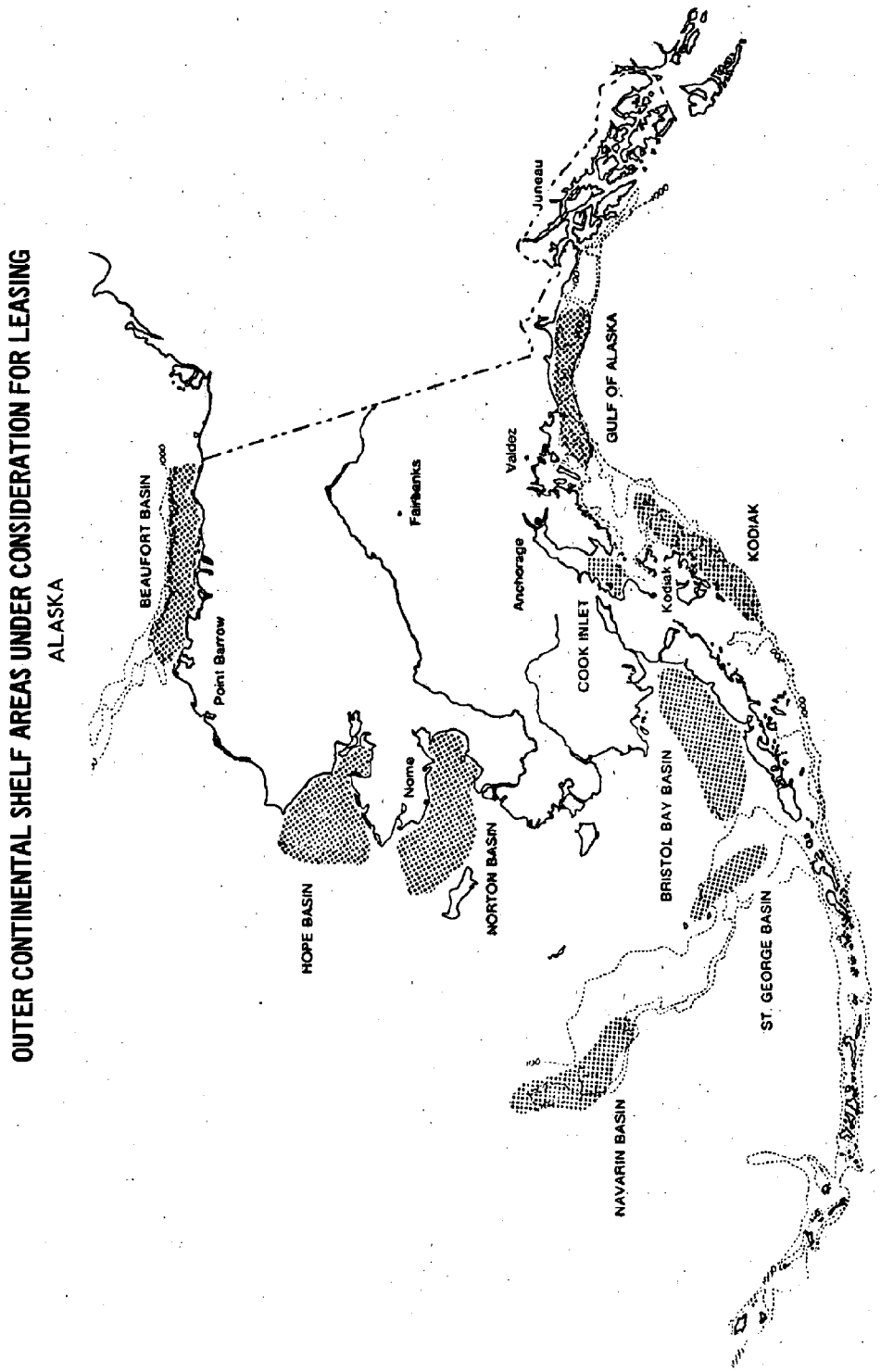
OUTER CONTINENTAL SHELF AREAS UNDER CONSIDERATION FOR LEASING



Source: Department of Interior, Bureau of Land Management.

APPENDIX I

APPENDIX I



Source: Department of Interior, Bureau of Land Management.

SUMMARY OF SHELF LEASING 1954-74

Calendar years	Number of tracts leased	Acreage offered	Acreage leased	Total bonuses paid (000,000 omitted)	Average tract value
1954-55	230	1,534,000	865,000	$ 249	$ 1,082,000
1956-58	-	(a)	(a)	-	-
1959-60	189	2,151,000	876,000	382	2,021,000
1961	-	(a)	(a)	-	-
1962-64	601	5,507,000	2,852,000	598	995,000
1965	-	(a)	(a)	-	-
1966-70	569	3,410,000	2,520,000	3,120	5,483,000
1971	11	56,000	37,000	96	8,727,000
1972	178	971,000	826,000	2,251	12,646,000
1973	187	1,515,000	1,033,000	3,082	16,481,000
1974	356	5,007,000	1,762,000	5,038	14,152,000
Total	2,321	20,150,000	10,771,000	$14,816	

a/ No leasing.

APPENDIX III

LIST OF THE 17 SHELF AREAS, TIME TO PRODUCTION

AND CONSTRAINTS AS NOTED BY INDUSTRY

Shelf Area	Years to initial production	Years to peak production	Constraints
North Atlantic	3 to 8	5 to 10 (25)	Drilling equipment, tubular goods, personnel, capital, logistics, platform fabrications, litigation, heavy shipping area, and fog.
Mid-Atlantic	3 to 8	5 to 10 (18 to 25)	Rigs, steel, personnel, capital, platform fabrications, logistics, and litigation.
South Atlantic	3 to 8	5 to 10 (15 to 25)	Rigs, tubular goods, platforms, labor, capital, deepwater technology, and hurricane storms.
Eastern Gulf of Mexico	3 to 4 (5/8)	6 to 8 (4 to 6 min., 15 max.)	Rigs, platforms, labor, capital, DOD warning areas, and possible subsea completion requirements.
Central Gulf of Mexico	2 to 4	4 to 8	General material and possible subsea completion requirements.
Western Gulf of Mexico	2 to 4	5 to 8 (10)	Rigs, platforms, DOD warning areas, labor, and possible subsea completion requirements.
Southern Californian Borderland	3	8 (10 to 15)	Rigs, tubular goods, platforms, seismic activity, and deepwater technology.
Santa Barbara Channel	2 to 4	5 to 8 (12)	Seismic activity, tubular goods, steel, subsea completion testing, and deepwater technology.

Shelf Area	Years to initial production	Years to peak production	Constraints
Northern and Central California	3 to 4	5 to 7 (10 to 20	Tubular goods, rigs, and seismic activity.
Washington-Oregon	3 to 4 (6)	6 to 9 (12 to 20)	Deepwater technology, logistics, tubular goods, weather, and seismic activity.
Cook Inlet	2 to 7	4 to 8 (15 to 20)	Remote supply sources, limited gas mkt., pipelines, shore facilities, litigations, tidal activity, rigs, platforms, steel, personnel, capital, and earthquake/ice.
Southern Aleutian Shelf	3 to 8	6 to 12 (20 to 25)	Rigs, platforms, capital, weather, limited gas mkt., remote supply sources, weather, and earthquakes.
Gulf of Alaska	3 to 8	10.5 (20)	Rigs, platforms, steel, labor, capital, limited gas mkt., weather, sea/sesimic, litigation, and remote supply sources.
Bristol Bay	3 to 8	10.5 (23)	Equipment, manpower, capital, remote mkt./supply sources, drilling time, ice, tidal activity, and fog.
Bering Sea	3 to 10	10.7 (25)	Construction season, equipment, labor, remote supply sources, limited gas mkt., weather, ice, winds, and technology.
Beaufort Sea	3 to 10	11.7 (30)	Ice, weather, limited passage, construction season, labor, equipment, remote mkts., transportation costs, and litigation.

APPENDIX III

Shelf Area	Years to initial production	Years to peak production	Constraints
Chukchi Sea	3 to 9	7 to 15 (5 to 25)	Labor, equipment, ice, weather, remote supply sources, and construction season.

Source: Department of the Interior, Bureau of Land Management.

PRINCIPAL OFFICIALS

RESPONSIBLE FOR THE ADMINISTRATION OF

ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office			
	From		To	
DEPARTMENT OF THE INTERIOR				
SECRETARY OF THE INTERIOR:				
Rogers C. B. Morton	Jan.	1971	Present	
Fred J. Russell (acting)	Dec.	1970	Jan.	1971
Walter J. Hickel	Jan.	1969	Nov.	1970
ASSISTANT SECRETARY OF THE INTERIOR--ENERGY AND MINERALS:				
Jack W. Carlson	Aug.	1974	Present	
King Mallory (acting)	May	1974	July	1974
Stephen A. Wakefield	Mar.	1973	Apr.	1974
John B. Rigg (note a)	Jan.	1973	Mar.	1973
Hollis M. Dole	Mar.	1969	Jan.	1973
ASSISTANT SECRETARY OF THE INTERIOR--LAND AND WATER RESOURCES:				
Jack O. Horton	Mar.	1973	Present	
ASSISTANT SECRETARY OF THE INTERIOR--PUBLIC LAND MANAGEMENT (note b)				
Harrison B. Loesch	Apr.	1969	Jan.	1973
DIRECTOR GEOLOGICAL SURVEY:				
Vincent E. McKelvey	Dec.	1971	Present	
William A. Radlinski (acting)	May	1971	Dec.	1971
William Pecora	Sept.	1965	May	1971
DIRECTOR BUREAU OF LAND MANAGEMENT:				
Curt Berklund	July	1973	Present	
Burton W. Silcock	June	1971	July	1973
Boyd S. Rusmussen	Apr.	1966	June	1971

APPENDIX IV

	Tenure of office			
	From		To	

FEDERAL ENERGY ADMINISTRATION (note c)

ADMINISTRATOR OF FEDERAL ENERGY ADMINISTRATION:				
Frank G. Zarb	Dec.	1974	Present	
John C. Sawhill	May	1974	Nov.	1974
William E. Simon	Dec.	1973	May	1974

a/ Deputy Assistant Secretary in charge.

b/ Became office of Assistant Secretary--Land and Water Resources in March 1973 reorganization.

c/ Federal Energy Office from December 1973 to May 1974.

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