

Originally Processed With FOIA(s):
2025-0647-S

FOIA Number:
2025-0647-S

FOIA MARKER

**This is not a textual record. This is used as an
administrative marker by the George Bush Presidential
Library Staff.**

Record Group/Collection: George H.W. Bush Presidential Records
Collection/Office of Origin: Chief of Staff, White House Office of
Series: Rogers, Ed, Files
Subseries: Subject Files

OA/ID Number: 04014
Folder ID Number: 04014-017b

Folder Title:
Outer Continental Shelf

Stack:	Row:	Section:	Shelf:	Position:
G	15	23	1	

V. BENEFITS OF OCS OIL AND GAS PRODUCTION

PUBLIC COMMENTS ABOUT OCS BENEFITS AND ENERGY POLICY

One of the concerns repeatedly expressed in the Task Force workshops was whether there was sufficient need for and benefit from the OCS oil and gas that might be produced in the three sale areas to warrant the risks of environmental damage that could result. Many people expressed the belief that a carefully worked out national energy policy, particularly one that called for greater energy conservation, could reduce the need for oil and thus eliminate the benefit from additional OCS leasing in the three sale areas. In addition, the NAS/NRC Report noted the concern that the objectives to be served by OCS leasing and development are not adequately defined or placed in context by national energy policy.

Many opponents of leasing stated that conservation should be treated as a substitute for additional OCS oil and gas production. Because conservation reduces the demand for oil, they reason, the production of oil can be reduced by a like amount. Alternatively, because oil conservation and domestic oil production can both reduce oil imports, some regard them as substitutes in pursuing energy security goals.

The Task Force also heard from representatives of the oil industry who emphasized the importance of OCS oil and gas as a source of domestic energy supplies and expressed concern about the dangers of growing dependence on oil imports.

The Task Force regarded this issue as one of the central issues that must be addressed in making decisions about the three lease sales. It asked the Department of Energy (DOE) to conduct a briefing on the process under way for developing the new National Energy Strategy, on the trends in energy consumption, production and oil imports, and on the potential for additional oil production and conservation. The Task Force analyzed the information provided by DOE and MMS on the benefits of OCS oil and gas production. This section summarizes the results of this analysis and presents the Task Force's findings and conclusions with regard to the benefits of the three lease sales and the potential for greater oil conservation.

BENEFITS OF OCS OIL AND GAS PRODUCTION

Based on the DOE briefing and a review of MMS documents, the Task Force identified two types of benefit from the oil and gas production that could result from the three lease sales:

1. energy security benefits and
2. economic benefits.

Energy security benefits arise through reduction of oil imports. Such benefits arise by reducing the potential losses in the U.S. economy from a disruption in the supply of oil from foreign sources or from sharp increases in world oil prices. The economic benefits are those that arise in the form of additional income to individuals, governments, or corporations in the United States. Such income is derived from ownership of the oil and gas rights, as is the case of the Federal Government, or from investments in exploration and development by lessees.

As will be discussed in more detail in this chapter, the Task Force learned that the amounts of oil and gas that might be discovered in the three sale areas are significant, perhaps as much as 2 billion barrels of oil and 3 trillion cubic feet of gas, if discoveries are made in all three areas. New reserves of this amount would make a significant addition to U.S. reserves, which have been declining and are currently about 30 billion barrels of oil and 207 trillion cubic feet of gas. The economic benefits from such discoveries could be as high as \$8 billion dollars.

Energy Security Benefits

The OCS of the United States is a major source of our country's oil and natural gas supplies, providing about one-fifth of total domestic production. As transportation and heating fuels, oil and natural gas are critical components of our economy. They account for more than two-thirds of our Nation's energy requirements, and they will continue to be our primary energy sources for years to come.

Although domestic supplies of natural gas are adequate to meet most of our demand, domestic production of oil falls far short of our needs. As a result, our Nation is dependent on large volumes of oil imports. The development of our domestic oil resources in new fields, including those that might be discovered in the three OCS sale areas, would reduce our need for oil imports and thus would help to ensure that our Nation does not become overly dependent on insecure supplies of foreign oil.

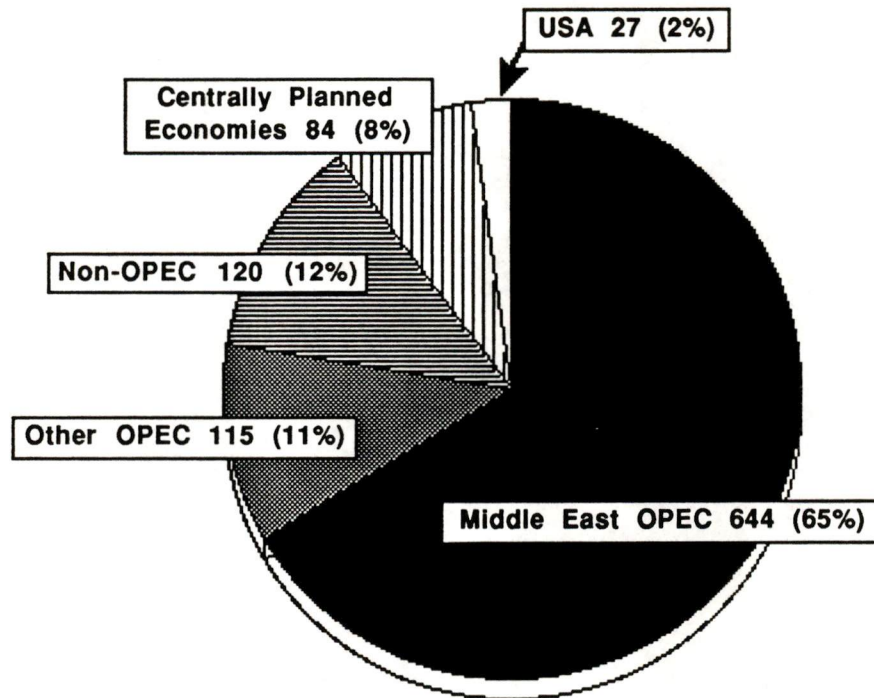
The energy security benefits of OCS oil and gas production arise because certain economic costs that result from imports are reduced by reducing oil imports. These economic costs of oil imports are losses to our economy that are not reflected in the price paid for imported oil. They include losses that result from the trade deficit as well as the losses in economic productivity that result when the economy is forced to adjust to rapid changes in oil prices or a disruption in import supplies. The oil price shocks of 1973-1974 and 1979-1980 provided many examples of these losses including recession, inflation, and widespread unemployment in industries whose business is sharply reduced when oil prices increase.

A threat to U.S. energy security, particularly the possibility of sharp oil price increases, results from concentration of the world's current oil reserves in the Persian Gulf area. Figure V-1 shows the distribution of the world's oil reserves (known oil that can be recovered economically with current technology at today's prices). Of all the world's oil reserves, over 63% are in the region surrounding the Persian Gulf. In that region, Saudi Arabia has the largest reserves, with over a quarter of the free world total. Other OPEC countries hold another 12%.

The remaining quarter of the world's reserves is spread among the non-OPEC producers. Although the United States is the largest consumer of oil and is still the second largest producer, it holds just 3% of the world reserves.

The DOE estimates that by the year 2000, OPEC's share of the world market will be between 50% and 60%, and supplies from the volatile Persian Gulf region could be between 35% and 40%.

Figure V-1: World Oil Reserves



TOTAL: 990 Billion Barrels

U.S. Vulnerability to Oil Supply Disruptions

The United States will grow increasingly more dependent on oil from OPEC producers, especially those in the Persian Gulf. As a result, the United States will become more vulnerable to oil supply disruptions and oil price increases. This results from the fact that OPEC production is generally controlled by governments that coordinate their oil production and pricing policies through a cartel. The more oil the United States acquires from the world market, the more the U.S. economy is subject to the risk of damage from sharp oil price increases or supply disruptions.

There are additional risks as well. Growth in OPEC's power to set high oil prices will increase the unpredictability of the world oil market. Increased volatility is likely to have an adverse effect on capital investment in further exploration and development of U.S. oil resources and alternative energy supplies.

In the short-term, to protect our economy from sudden increases in the price of oil due to a supply disruption, the United States has built a significant strategic stockpile of oil. The Strategic Petroleum Reserve now contains over 850 million barrels of oil that can be drawn down and distributed at a rate of 3.25 million barrels per day. Our allies also maintain substantial volumes of oil stocks. Worldwide stockdraw capabilities would be sufficient to respond effectively to supply disruptions of the duration and magnitude that occurred during the 1970's.

Economic Benefits

The Task Force learned that MMS has developed measures of the economic benefits of OCS oil and gas development which it has used in a variety of decisions and which have been upheld by several court rulings. The primary measure of benefit which the MMS uses is net economic value. The net economic value of the oil and gas produced from an OCS reserve is the total value of the revenues from sale of the oil and gas produced less the total costs of the exploration, development, production, and transportation incurred to bring the oil and gas to the point of sale. Oil and gas resources for which costs are greater than the revenues from sale of the resulting production yield no net economic value.

The Task Force learned that the process used in leasing OCS oil and gas assures that only those oil and gas resources that would yield economic benefits are leased and developed. The OCS leasing system, through competitive bidding for leases and competitive, profit-oriented operation of leases by private firms, assures that only those oil and gas fields that have net economic value get produced. Fields that have net economic value yield production revenues that exceed costs. Fields that are profitable for oil companies to lease, explore, and develop have production revenues that exceed costs by enough to cover bonuses, royalties, and taxes and still provide profits to the lessee. Thus, fields that are profitable enough to attract industry investment are fields that also hold benefit for the economy.

POTENTIAL BENEFITS FROM THE THREE SALE AREAS

In order to examine in detail the potential contribution of the three sale areas, the Task Force sought answers to the following questions:

1. What are the current trends in U.S. oil consumption, production, and imports?
2. Why are these trends occurring?
3. What is the effect of these trends on the benefits from the oil and gas that might be produced if the three lease sales were to proceed?

Overview of the Current Situation: Declining Production and Rising Imports

As Figure V-2 shows, U.S. oil production has been steadily declining for the last 4 years. The sharp decline in oil prices in 1986 and the subsequent period of relatively low prices have reduced drilling activity, accelerated the abandonment of low-volume wells, and discouraged the use of enhanced oil recovery techniques. Additions to U.S. oil reserves have dropped off sharply. The rate of decline in production accelerated in 1989, resulting in a September 1989 production level of 7.7 million barrels per day, the lowest in 25 years. Through the first 9 months of 1989, production fell an average of 480,000 barrels per day, or 6% compared to last year. This is due primarily to the fact that Alaska North Slope production has begun to fall.

While production has been declining during the past 4 years, U.S. consumption of oil has increased substantially. Total oil consumption for the first 9 months of 1989 averaged 17 million barrels per day compared to 15.6 million barrels per day during the same period in 1985. The growth in U.S. oil consumption has been caused by general economic growth and the effects of lower incentives for conservation, particularly in the transportation sector. The transportation sector accounts for over two thirds of U. S. oil use, more than 11 million barrels per day. Transportation alone uses more oil than we produce domestically.

The result of declining production and growing consumption has been reliance on growing volumes of imported oil, as shown in Figure V-3. Net imports now average over 7 million barrels per day, or 42% of consumption. This is the highest dependence on imports since 1979.

Impact of Price on U.S. Production and Consumption

One of the underlying causes of these trends is the response of producers and consumers to prices. Over the past two decades, three abrupt changes in world oil prices—two upward price "shocks" in the 1970's and one price "collapse" in the mid-1980's—have demonstrated the sensitivity to price of crude oil production and consumption in the United States.

Higher oil prices in the 1970's caused a strong upturn in U.S. oil industry activity. Increased investments resulted in further drilling of existing fields in the Lower 48, as well in new production capacity in Prudhoe Bay, Alaska. However, in the United States as a whole, the additional oil produced from the new drilling did not result in a major increase in overall domestic production. Rather, it merely halted a 10-year decline in production. Unfortunately, the reserves added as a result of this intense drilling activity were barely enough to replace the reserves depleted through production. Because the United States has

Figure V-2: U.S. Oil Consumption and Production: 1980-1989

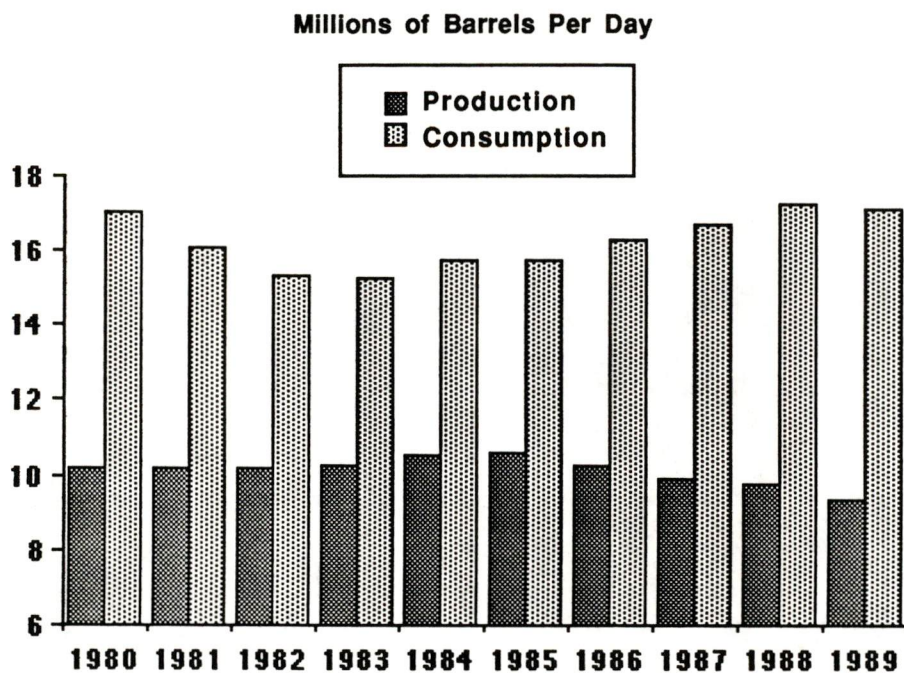
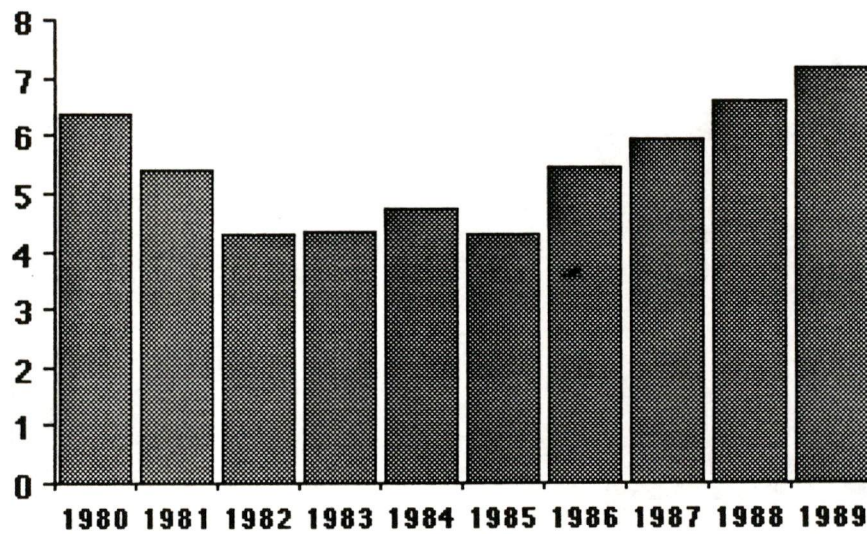
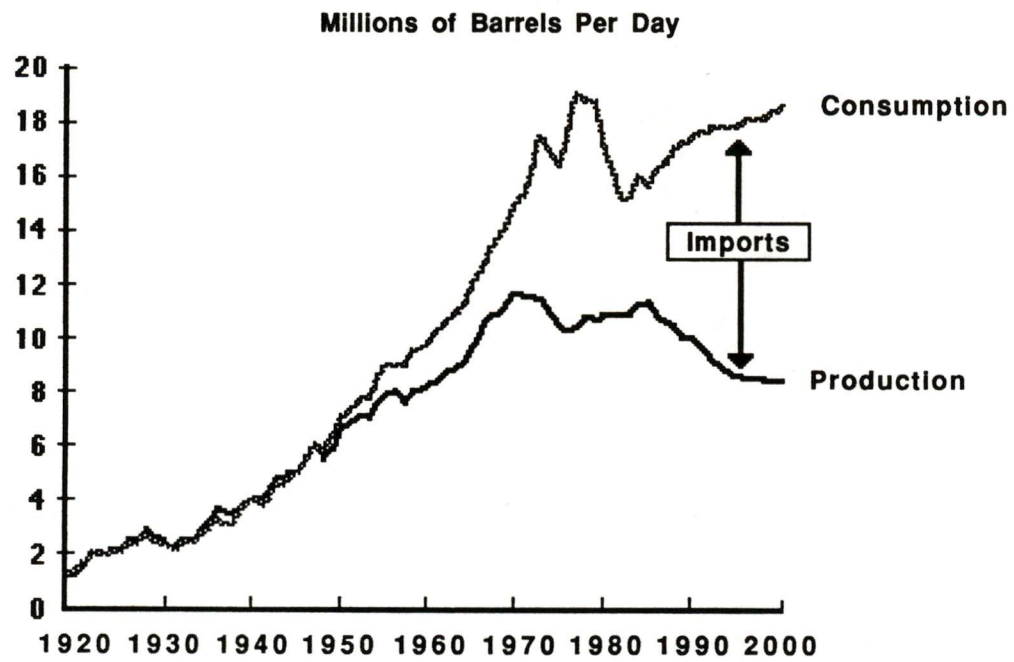


Figure V-3: U.S. Petroleum Net Imports: 1980-1989

Millions of Barrels Per Day



**Figure V-4: U.S. Oil Consumption,
Production, and Imports: 1920-2000**



been explored so extensively—over 80% of the oil and gas wells drilled world-wide have been drilled in this country—most of the very large oil fields have probably been discovered. The potential for massive additions to reserves is limited. This is especially true for the onshore areas of the Lower 48 where most of the drilling has occurred.

The 1986 price collapse and the subsequent price volatility were devastating to U.S. exploration and development investments, because most of the oil and gas resources remaining to be discovered in the United States are very costly. This makes the returns on such investments highly vulnerable to lower oil prices. The level of corporate capital investment in U.S. oil exploration and production has been steadily falling for the last 4 years, resulting in a drop in total number of wells drilled. The active drilling rig count for 1988 averaged 937, compared to 964 in 1987, and the 1981 peak of 4000. Total exploration and production wells decreased from a high in 1981 of 90,000 to a 1988 low of 30,000. This slowdown has affected exploratory drilling in new "frontier" areas, including Arctic regions and offshore areas, as well as drilling in known oil fields.

According to the DOE, the decline in drilling activity will have a serious impact on our ability to maintain domestic oil production at current levels. The number of skilled workers in the oil production and service sector—including petroleum engineers, geologists, geophysicists, jobbers, and drillers—has decreased by almost 50% since 1981. This decline limits the speed at which the industry could respond to an upturn in world oil prices.

Oil consumption is also affected by oil prices. In the 1970's, price increases motivated consumers to undertake major efforts to reduce energy consumption and to use energy more efficiently. Without the improvements in energy efficiency that have taken place since 1974, the United States would be using about 8 million barrels per day more oil than it does today.

However, lower oil prices during the past 4 years and strong economic growth in the latter part of the 1980's have once again increased our use of oil. Demand rebounded to 17.2 million barrels per day in 1988, a 3% increase over 1987 levels and the highest level of petroleum consumption since 1979.

Oil Supply and Demand Outlook for the Future

In order to determine the effects of recent trends on the benefits of the future oil and gas production that could result from the three lease sales, it is necessary to project oil production, consumption, imports, and prices for the period during which those resources would be produced. Production from the three lease sales is not likely to begin much before 2000 and will extend at least until 2030. It is difficult to project with confidence so far into the future. The DOE projections for the 1990's, however, indicate growing oil demand and continued falling production in the United States, leading inevitably to an increasing dependence on oil imports during this period.

The DOE projections are shown in Figure V-4. They are based on the assumption that world oil prices remain low, within the range of \$20 to \$28 by the year 2000. The DOE forecasts a fall in U.S. crude oil production of 2.7% per year through the next decade, resulting in an average daily production of 5.9 million barrels in the year 2000.

At these low oil prices, U.S. oil consumption is expected to reach 18.6 million barrels per day by the year 2000. Oil imports will increase from 7.2 million barrels per day in 1989 to about 9.3 million barrels per day in 1995. They could increase by another 1 million barrels per day by the year 2000.

Conventional recovery of the oil discovered to date in the United States has left about 340 billion barrels of oil remaining in the ground. Of this amount, about 17 billion barrels are currently estimated to be recoverable (using current enhanced oil recovery technology) at an oil price of \$30 per barrel in 1987 dollars. Enhanced oil recovery (EOR) techniques include more sophisticated methods of extraction, such as hot water flooding or injection of carbon dioxide or chemicals, to push the oil into the well. However, the decline in oil prices since 1986 has rendered most EOR techniques uneconomic.

An estimated 36 billion barrels of oil could be removed from known reservoirs using advanced EOR techniques. However, these advanced methods are the most expensive means of oil extraction and will only be used when the price of oil is higher than \$30 per barrel.

Low oil prices have caused the abandonment of many low-production domestic wells that are primary candidates for application of EOR techniques. The abandonment of these wells results in the loss of remaining oil resources that could have been produced. The DOE estimates that economic access to as much as 40% of the remaining resources from these low-production wells may have already been abandoned.

In the long term, the Nation must look to other energy sources that can provide an alternative to oil, particularly fuels for the transportation sector that are not based on oil. Although expected increases in automobile fuel efficiency and growing use of alternative fuels will dampen the growth rate of U.S. oil consumption, American consumers will remain heavily dependent on oil well into the next century. Consequently, economic and environmentally sound development of the Nation's remaining oil resources, including those that might be found in the three lease sale areas, will be needed.

Potential Contribution of OCS Resources to U.S. Oil Reserves

Domestic oil production plays an important role in the U.S. energy balance, providing about one-quarter of total energy consumption. There is little chance of finding a number of supergiant oil fields like the ones that have dominated U.S. oil production in the past. Thus, U.S. oil production in the future will be comprised of many smaller fields. Each increment, including the potential production from the three lease sale areas under consideration, represents an important addition to total U.S. production.

Until new oil and gas fields have been located by drilling, it is not possible to be sure that any new production will result from lease sales in the three areas. There is a chance that no oil and gas will be found. Using seismic data, the MMS is able, however, to identify possible reservoirs and estimate the amounts of oil and gas they could contain if, in fact, they contain any oil and gas at all.

The MMS has prepared estimates of undiscovered oil and gas resources for each of the three sale areas, based on the assumption that at least one developable field will be found in the area. Because of the uncertainty in the estimates, the Task Force concluded that it is

appropriate to recognize the range covered by the estimates instead of focusing on a single number. The low estimate in the range is the amount which is rated as having a 95% chance of being found or exceeded if there is oil or gas present. The high estimate is the amount rated as having only a 5% chance of being found or exceeded if there is oil or gas present.

The MMS estimates for the currently unleased acreage in three sale areas are as follows:

Lease Sale 116, Part II, off southwestern Florida:

- from 190 to 880 million barrels of oil,
- from 0.04 to 0.12 trillion cubic feet of natural gas.

Lease Sale 95, off southern California:

- from 200 to 960 million barrels of oil,
- from 0.37 to 2.10 trillion cubic feet of natural gas.

Lease Sale 91, off northern California:

- from 20 to 92 million barrels of oil
- from 0.49 to 1.67 trillion cubic feet of natural gas.

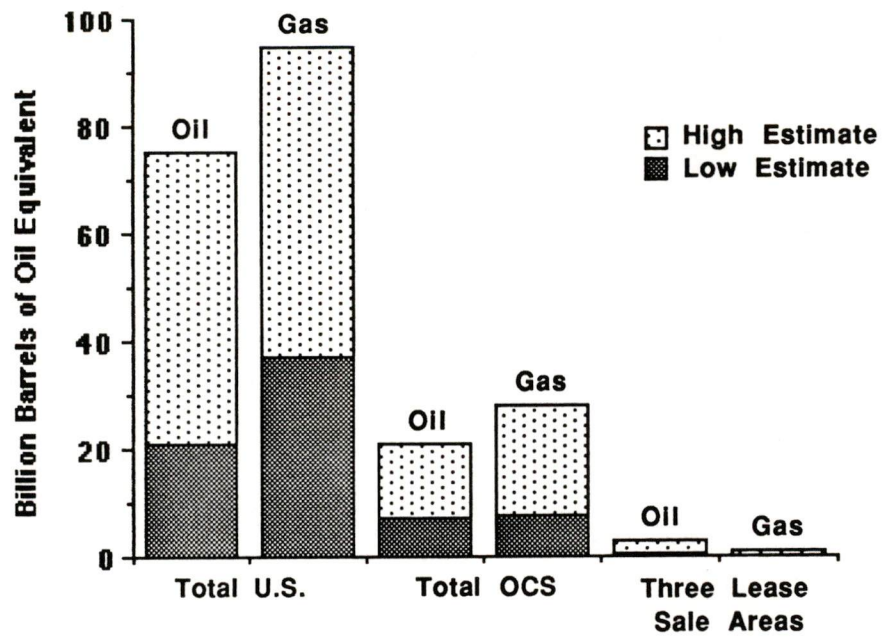
If all three areas contain developable oil and gas fields, they could contain over 2 billion barrels of oil and over 3 trillion cubic feet of natural gas. Total U.S. OCS undiscovered economically recoverable resources are estimated at about 4 to 14 billion barrels of oil and about 44 to 114 trillion cubic feet of gas. Thus, the resources that might be located in the three lease sale areas are significant, representing about 14% of total OCS oil resources and 3% of total OCS gas resources. Figure V-5 shows a comparison of the estimates of undiscovered economically recoverable oil and gas resources for the three sale areas, the entire OCS and the total for the United States.

Concerns About the Estimated Amounts of Oil and Gas

Local residents near each sale area told the Task Force that in their view, the amount of oil and gas estimated to be in the sale area was so small that it did not warrant taking the risks associated with exploration and development. Often, this point was made by citing the number of days that the estimated amount of oil would last at current consumption rates. The Task Force examined this concern in light of information from the MMS on the amounts of oil and gas that might be discovered in each sale area. It also reviewed the NAS/NRC assessment of the adequacy of the data and methods on which MMS based its assessment of the resource potential. The NAS/NRC concluded that the methods and data used by the MMS to estimate undiscovered oil and gas resources in the three areas were adequate. The NAS/NRC noted that the methods used by the MMS would tend to underestimate the amounts of undiscovered oil and gas resources in a sale area.

Based on its review of this information, the Task Force identified two problems that need to be addressed. The first problem arises from the estimating methods that are used to reflect the uncertainty inherent in all measures of undiscovered oil and gas resources. These methods yield estimates which can be misleading about the amounts of oil and gas that will be developed if exploration is successful. The second problem arises from the widespread practice of estimating the number of days of U.S. oil consumption that would

Figure V-5: Comparison of Estimates of Undiscovered Economically Recoverable Oil and Gas



be provided by the estimated amounts of oil and gas.

In reviewing the MMS and NAS/NRC materials on oil and gas resource estimates, the Task Force recognized that the fundamental problem is that only exploratory drilling can provide reliable information about the location and size of oil and gas fields in an area. Until drilling has been completed, estimating the amount of oil and gas that might be found and produced in an area is similar to estimating the amount of prize money that will be won from a handful of lottery tickets. All that can be known is that there might be a grand prize, a minor prize or two, or no prize at all.

Analysts have developed ways to estimate the value of a lottery ticket that reflect the chances of winning a prize. Using these methods, a lottery ticket with a 1 in 1 million chance of yielding a \$1 million prize is worth \$1. Both the prize and the chance of winning it are reflected in this estimate. The value is much smaller than the prize because of the small chance of winning. The actual outcome, however, is either zero or \$1 million.

Unfortunately, estimates made using similar methods to reflect all the possible outcomes of oil and gas exploration can be misleading to those trying to determine if exploration is worthwhile. The MMS and the NAS/NRC agree that the mathematically correct way to express the amount of oil and gas that might be found in an area uses the various amounts that are possible, including zero, and the chances for finding each amount. The statistics on oil and gas exploration show that the vast majority of prospects that are drilled are found to contain no oil or gas. Estimates for an area that reflect an 80% or 90% chance of finding no oil or gas in each prospect, in addition to the small chance of finding significant amounts, are smaller than the amounts that might actually be found. Such estimates are technically referred to as risked mean estimates.

For a sale area, there is only a small chance that the amount of oil and gas actually discovered will be equal to the risked mean estimate. Often, the most likely result of exploration is no discovery. If oil and gas are found, the amount is most likely to be greater than the risked estimate. The Task Force has concluded that the use of risked mean estimates, while mathematically correct, can be misleading to those not familiar with the methods used to compute such estimates.

The MMS also produces "unrisked" estimates of the amounts of oil and gas that might be found in an area. The technical term for such estimates is "conditional" estimates, because they are predicated on the condition that oil and gas deposits exist in the area. To illustrate, a conditional estimate for a lottery ticket that could pay \$1 million is \$1 million. Conditional estimates give a better sense of the gains that might result. Their primary limitation, however, is that the conditional estimates for a number of areas cannot be added together without allowing for the change in the probabilities. The chances of winning \$5 million from 5 tickets in 5 lotteries like the one above are much less than the chance of winning \$1 million in one lottery.

Both risked and conditional estimates need to be considered in assessing whether the resource potential of an area makes it worthwhile to lease. Risked estimates are useful for comparing the potential of areas with different chances of discovery. Conditional estimates, on the other hand, give a better sense of the amount of oil and gas that might be found in an area. The estimates provided earlier in this chapter are conditional estimates.

The second problem to be addressed is raised by those who compute the number of days that an estimated amount of oil would last at the current rate of oil consumption in order to judge the potential benefit of leasing an area. The Task Force heard such computations repeatedly in its workshops. Local residents most frequently concluded that because the estimated amount of oil was only a few days of consumption, it was not worth leasing.

The Task Force examined this issue by analyzing whether such an approach would give logically consistent results and whether the number of days of oil consumption is a good measure of the benefits of OCS oil production. In general, if such a comparison is logically consistent, then the greater the benefit from a given amount of oil, the more worthwhile it should appear from the computation. If providing oil for consumption is a primary benefit of OCS production, then the greater our rate of consumption, the more important it is to have production to meet that consumption.

Computing the number of days of consumption that could be provided by the estimated oil in a sale area gives the opposite result. The greater the rate of consumption, the fewer the number of days a given amount of oil could cover. Thus, if we were consuming relatively little oil as the result of very successful conservation efforts, such a comparison would make leasing in a sale area appear more beneficial than if we were consuming oil at a profligate rate. The number of days of consumption is clearly not a logically consistent indicator of the benefit of leasing in an area.

Furthermore, if all oil and gas discoveries yielding only a few days of U.S. consumption were forgone, the cumulative effect would be crippling to U.S. production because most individual discoveries are smaller than those expected in the three sale areas. There are only a few areas of similar size in the United States that hold the potential to contribute as much to future domestic oil and gas discoveries as these three areas.

As discussed in the previous section, the Task Force has concluded that the energy security benefits and the economic benefits are the best measures of the benefits of producing OCS oil and gas. Neither of these types of benefits is captured by computing the number of days of consumption covered by the estimate of the oil to be found.

In conclusion, the Task Force finds that the number of days of oil consumption from a given lease sale is not a useful way to judge whether that sale is worthwhile.

Contribution of OCS Oil and Gas to the Economy

The MMS has also helped the Task Force prepare estimates of the economic benefit that could result if the estimated amounts of oil and gas are found. These estimates are based upon the assumption that oil prices grow from about \$19 to about \$28 (in constant dollars) in 2030. These projected oil prices are generally consistent with DOE's projections. The Task Force recognizes the possibility that the economic benefits could be larger if oil prices grow more rapidly than assumed. The net economic value estimates for the three areas are as follows:

- Lease Sale 116, Part II, off southwestern Florida:
 - from \$0.4 to \$1.8 billion

Lease Sale 95, off southern California:
• from \$0.9 to \$4.3 billion

Lease Sale 91, off northern California:
• from \$0.4 to \$1.4 billion

The Task Force has examined the potential for realizing both the energy security and economic benefits from OCS production. **The Task Force finds that such benefits are important to the Nation. Therefore, the Task Force concludes that careful consideration should be given to leasing proposals for the three sales and their associated environmental issues. None of these leasing proposals can be rejected as having insufficient potential benefits to warrant consideration.**

ENERGY POLICY AND CONSERVATION

The Task Force examined the question of whether the development of a new National Energy Strategy could, by incorporating additional conservation measures, reduce or eliminate the need for the additional OCS production that may result from the three lease sales. To do this, it first analyzed the logical relationship between oil conservation measures and the benefits of OCS oil and gas production. Then, it reviewed the information provided by DOE on the potential for additional oil conservation.

Oil conservation measures are attractive because they have the added benefit of avoiding the environmental effects that can result from both the production and the consumption of oil. In this view, additional oil conservation measures should be considered as alternatives that would avoid the environmental effects of leasing oil and gas in each of the three sale areas. If conservation and OCS production are substitutes, then it follows that a national energy policy which calls for greater conservation should call for less OCS oil and gas production, perhaps eliminating the need for leasing in one or more of the three sale areas. Following this logic, decisions to move forward with leasing in the three sale areas should not be made until the new National Energy Strategy being developed by DOE has been completed.

The Task Force began with the principle that in order for two actions to be true logical substitutes for each other, the conduct of one must essentially eliminate the motive for undertaking the other. It then examined oil conservation to determine whether additional conservation could eliminate the benefits that could be realized from additional oil production.

Many conservation measures are worthwhile on their own merits; that is, they reduce oil imports, producing both energy security benefits and economic benefits. Oil conservation can produce energy security benefits by reducing the amount of oil imported by the United States. Conservation measures yield economic benefits in the same manner as oil production, by costing less than the cost of the oil they save. Oil conservation can also yield environmental benefits by avoiding the environmental damages that result from oil production and consumption.

While both OCS production and oil conservation can reduce oil imports, the key question is whether they are substitutes for each other in producing benefits. The Task Force found that they are not. Substitute measures must be able to replace each other; using one measure must eliminate the reason for using the other for such replacement to occur. If it does not, then the two actions can be taken together to produce greater benefits than each could produce separately or to help achieve the same objective more effectively than either one by itself. Two such actions are complements rather than substitutes.

The Task Force examined the question of whether oil conservation and OCS oil production are likely to be substitutes in achieving energy security benefits. For this to occur, oil imports would need to be low enough to permit the additional conservation measures in question to reduce imports to a level at which the economy would be much less severely damaged by oil supply disruptions or price shocks.

A substitute for OCS oil production in producing economic benefits must therefore leave essentially no benefits to be realized from the oil production in question. One way of posing the question then, is: can oil conservation make otherwise profitable oil fields unprofitable? For oil conservation measures to have such an effect, they must increase the costs of finding and producing OCS oil or decrease oil prices, or both, sufficiently to make costs exceed price. Otherwise, conservation would not reduce or eliminate the economic benefits of additional oil production. Oil conservation is not likely to affect the costs of oil and gas operations. A substantial reduction in U.S. oil demand might, however, reduce the world oil price. For this effect to be measurable, the conservation measures in question must substantially reduce the total demand for OPEC oil.

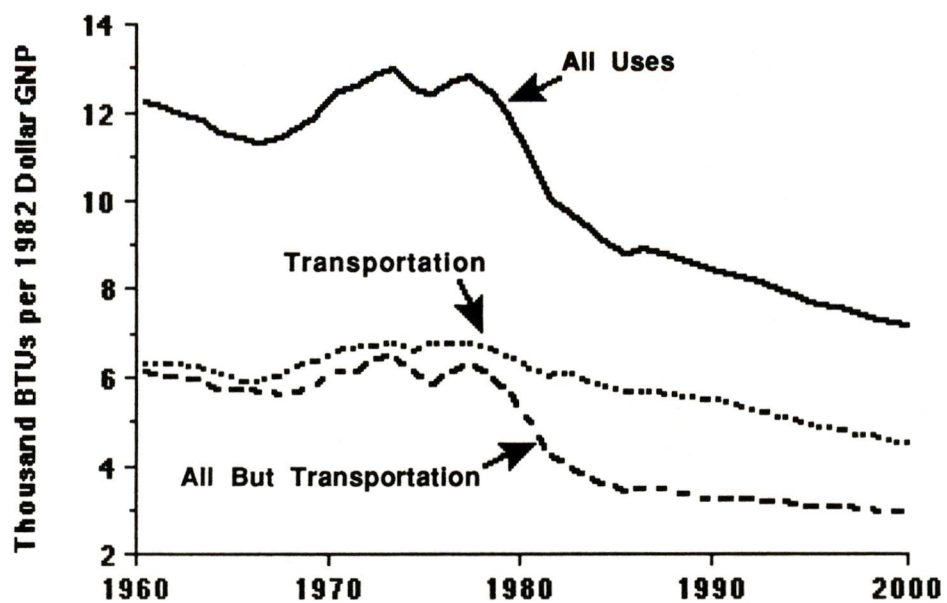
The Task Force reviewed materials provided by DOE on energy conservation in general and oil conservation in particular to determine whether it is likely that oil conservation in the United States could have these two effects. These materials and the Task Force analysis are summarized below.

The Potential for Increased Oil Conservation

As shown in Figure V-6, the concentration of oil use in the U.S. economy has fallen 31% since the late 1970's, from 12.2 thousand Btus per dollar of GNP in 1978, to 8.4 thousand Btus per dollar of GNP in 1988. This decline in oil use is due to a number of changes in our economy. Improvements in equipment design have increased efficiency. Fuel switching has played a major role in decreasing our dependence on oil. In many cases, residential, commercial, and industrial consumers have substituted natural gas, coal, and electricity for oil. Increased imports of oil-intensive goods, such as plastics and steel, have led to changes in the mix of domestically produced goods.

Changes in energy prices have strongly influenced energy conservation by causing a diverse set of consumption responses within all sectors of the economy. The high oil prices of the 1970's brought an energy awareness to industry, homeowners, and transportation operators. This stimulated the search for better ways of using energy. For example, consumers purchased more fuel-efficient vehicles and appliances, adjusted thermostats, and weatherized their homes. Businesses replaced heating and cooling equipment, installed energy-management systems, and built more efficient buildings. Manufacturers adopted more efficient processes and equipment. Concurrently, higher energy prices caused industrial growth to shift from energy-intensive industries, such as

Figure V-6: U.S. Oil Use Intensity



making steel, toward less intensive goods and services, further slowing the growth of energy use. Other important factors, including efficiency standards, technology development efforts, and information programs, facilitated this market response to the increased energy prices.

The most important part of this market response has been the adoption of new, more efficient technology. Improved efficiency in new cars, appliances, buildings, and industrial heat-recovery equipment are examples of technology development that provided products that used less energy but still delivered the same level of goods or services. These responses, which produced most of the 37 quad savings over the 15-year period from 1973 to 1988, were seen in all sectors of the economy.

Oil can be conserved in three ways: (1) by using it more efficiently, (2) by substituting other fuels, or (3) by curtailing the consumption of goods and services that use oil. Some efficiency improvements and fuel changes are economical under currently projected prices. These changes can be expected to be made through the normal operation of the economy and will produce direct economic gains. Other efficiency improvements and fuel changes are technically feasible but would not be economic unless oil prices grow more rapidly than projected. These changes could be made to occur, at least to some extent, by governmental action.

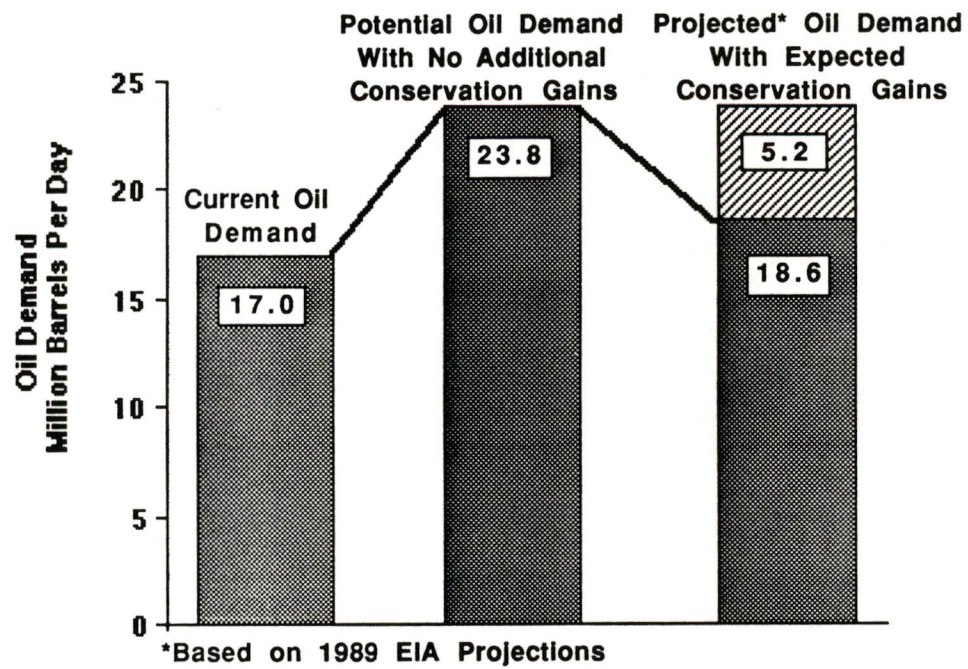
Although the potential for overall energy conservation is large, the potential for oil conservation without substantial curtailment is more limited for several reasons:

- Fewer economic retrofit opportunities exist, and, with current oil prices at relatively low levels, there is less price driven incentive to increase efficiency.
- Outside the transportation sector, only a limited amount of new boilers and processing equipment, is being purchased. This restricts the market penetration potential of more efficient equipment, and it discourages research and development of more efficient oil-using technology.
- A large amount of fuel switching already has taken place. The potential for more fuel switching depends on expanding gas availability in oil-dependent regions or developing more efficient electricity-using technology.

As shown in Figure V-6, a continuing decline in the oil intensity (oil use per dollar of GNP) is expected to result from normal operation of the economy under projected oil prices. Most of the decline is expected to come from continuing gains in transportation fuel efficiency. Only small gains are expected in the non-transportation sectors because of the lack of economic incentives and the limited opportunities for improved efficiency that remain. Even the larger gains projected for the transportation sector are speculative, given current forecasts of relatively low future oil prices and consumer indifference to auto fuel economy.

As Figure V-7 shows, the projected declines in oil use relative to our economic growth, if realized, will produce about 5 million barrels per day of oil additional conservation savings. Three-quarters of these savings will be in the transportation sector due to turnover in the

Figure V-7: Oil Conservation Potential to the Year 2000
In Millions of Barrels Per Day



Source: DOE, 1989

automotive and truck fleet and an expected increase in new vehicle efficiency. Aircraft efficiency will also rise as newer, more efficient aircraft are brought into the fleet.

Outside the transportation sector, the largest gain in oil conservation will likely come from the substitution of natural gas and coal for industrial residual and distillate oil. Also, trends indicate a continuing shift towards more electricity-intensive economic activity. The buildings sector of the economy will make a small contribution to oil savings as oil-heated homes make up a declining portion of total housing. However, even with these expected conservation gains, oil demand is projected to increase to over 18 million barrels per day by the year 2000.

Potential Additional Oil Conservation Beyond Expected Savings

The expected gains in oil conservation during the next 10 years do not include conservation potential that is technically feasible but not likely to be realized under current policies and market conditions. Additional conservation could be achieved through further, technically feasible, fuel switching and efficiency improvements. These potential additional savings primarily are in the transportation sector. Realizing oil conservation potential beyond expected savings would require major shifts in transportation modes and fuels under conditions that are unlikely to be either economically efficient or viable in the near term.

The greatest potential for reducing U.S. oil demand lies in the transportation sector. As Figure V-8 shows, transportation accounts for approximately two-thirds of total U.S. oil use. The technology to increase the fuel economy of cars, trucks, and aircraft is well developed and much is already in production. The potential impact of this technology is enhanced by the relatively high rates of additions to and turnover of the fleets of vehicles and aircraft. However, even with the technology that is now available, major changes in product design and consumer acceptance would be required to achieve additional, technically feasible conservation.

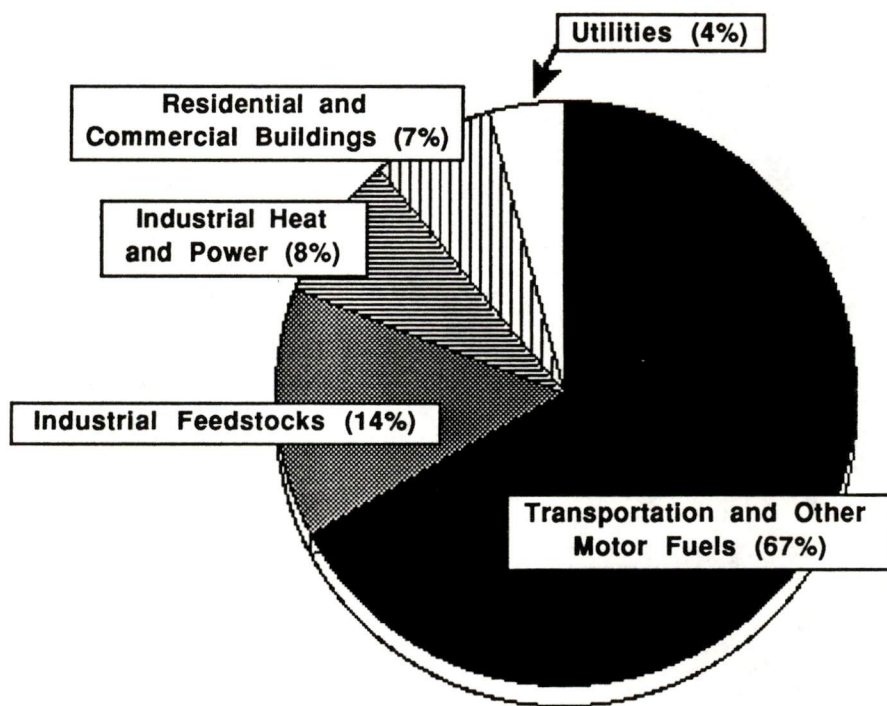
A large amount of fuel substitution may be technically feasible in the transportation sector. This would require extensive use of alcohol fuels, methanol or ethanol, compressed natural gas, propane, and gasoline additives. The prospects for increased use of these fuels would be enhanced by enactment of the President's Clean Fuels Program.

The technology needed to use alternative fuels, such as methanol or compressed natural gas, or even electricity, is currently in the demonstration stage. However, 30 to 40 million compatible vehicles and \$20 to \$30 billion in investments would be required to build a large alternative fuels infrastructure.

The residential and commercial buildings sectors combined account for a small portion of total U.S. oil consumption, all of which is used for space and water heating. Less than 20% of the total energy used in these sectors is provided by oil, and over one-half of that amount is used in the northeast where access to natural gas is limited.

The large fraction of buildings that have already been retrofitted limits the potential for further economically efficient improvements in existing buildings. Also, the ability to fully substitute fuels in these sectors is constrained by the nature of those buildings still using oil. The majority of these buildings and homes are old and in rural locations where access to other fuels is limited or expensive.

Figure V-8: Current U.S. Oil Use
1988 Demand - 17 Million Barrels Per Day



Oil conservation potential in the industrial sector is limited by the special-purpose nature of industrial oil use. While oil accounts for more than a third of the sector's energy use, only a quarter of this amount is used as fuel for heat and power and could thus be replaced. Oil uses such as feedstocks, asphalt, lubrication, and wax are technical dependencies that cannot be readily reduced through substitution or efficiency increases.

Non-feedstock or non-refinery fuel uses, such as building and water heating, crop drying, and steam raising/process heat, are the most promising for efficiency improvements in the industrial sector.

The primary opportunity for substitution in this sector would be the use of natural gas in lieu of residual fuel oil. No substitution of light oil products, such as distillate fuel oil, seems likely in the short- to mid-term, since over 80% of industrial distillate is used in remote locations where fuel substitution is technically difficult.

The electric utility sector is not a major consumer of oil. Therefore, it has limited ability to contribute to oil conservation potential. In 1988, oil-fired electric power generation accounted for only 6% of total generation and 4% of total oil consumption. Options for further reducing oil consumption in this sector are limited to switching from oil to gas, mainly in the northeast, and increasing electric power output from existing nuclear plants. Because of the fuel conversion that has already taken place and the limited remaining opportunities for conversion, oil conservation potential in the electric utility sector through the year 2000 is minimal.

Summary of Oil Conservation Potential

The potential for additional oil conservation in the United States, beyond the savings that are already expected to occur as the result of projected prices and normal economic processes, is summarized as follows:

- Much of the oil use that is embedded in all sectors of the economy has no readily available substitutes, and there are limited options for use of new conservation measures.
- Oil use is likely to grow as the U.S. economy grows, even if additional conservation potential is realized.
- The technical potential for oil conservation could, if fully realized, keep oil use at today's level or possibly marginally reduce it, but it would be uneconomic at currently projected oil prices.
- Major changes in the industrial infrastructure and transportation system would be required to achieve oil conservation beyond the savings that are expected to occur.
- Even with major infrastructure changes, such as expansion of the natural gas distribution system, most of the additional conservation measures would not be cost effective at current oil prices. Higher oil prices, or another strong economic or regulatory stimulus, in addition to infrastructure changes, would be required to achieve additional oil conservation beyond expected savings.

The DOE's analysis makes clear the fact that the United States does not have the potential to eliminate oil imports in the next decade or two by undertaking even the most technologically advanced conservation measures. The DOE's analysis also shows that it is not likely that the estimated savings from oil conservation will be sufficient to reduce world oil prices to the point that there would be no economic benefit from development of the oil and gas resources that might be found in the three sale areas.

The conservation estimates above cover oil savings that are likely to result from the incentives created by oil prices or the use of technically feasible though uneconomic oil efficiency and fuel switching improvements. These estimates do not deal with oil use curtailment, that is, the reduction of oil consumption that might be achieved if the Government instituted policies to require less consumption of goods and services that use oil than consumers would otherwise choose, given the prices that exist. Implementation of such policies would need to be based on widespread agreement that it is better for people as consumers to give up some part of the value which they associate with energy services than to suffer the losses that are expected to result from substantial dependence on oil imports in future decades.

A number of participants in Task Force workshops raised the possibility that oil conservation in the form of Government instituted curtailment could eliminate the need for the oil and gas production that could occur in the three sale areas. The Task Force examined the question of whether such curtailments, if added to the estimates of economically and technically feasible conservation, could eliminate the benefits of oil and gas production in the three areas.

Only by drastic curtailment, that is, widespread restriction of oil consumption which American consumers would otherwise enjoy, could imports be reduced below 5 million barrels per day as they were at their lowest level in the 1980's. Even if this were to happen, it is not likely to reduce the world oil price sufficiently to make development of the oil and gas resources in the three areas uneconomic. The Task Force recognized that it would take a substantial amount of oil use curtailment to achieve this result.

While some individuals believe that such curtailment is needed, it is unclear whether the majority of people in the United States would support extensive governmental restrictions on oil consumption. The Task Force concluded that there is little evidence at this point that the American public would support enactment of oil use curtailments substantial enough to eliminate the benefits of oil and gas production in the three areas.

Absent large scale curtailment of oil consumption in the United States, the total oil production from all economical possibilities, including the three OCS lease sales, leaves substantial levels of oil imports that could be reduced further by conservation. Furthermore, the total of all potential oil conservation measures, save drastic curtailment of oil use, leaves substantial oil imports that could be reduced by additional oil production. More importantly, the combination of all possible economic oil production and economic and technically feasible conservation measures still leaves oil imports that could be reduced by even further production and conservation should new opportunities for either or both emerge in the future.

The conclusion for the purposes of the Task Force's work is as follows: greater oil conservation, though a worthwhile component of a National Energy Strategy, would not eliminate the national benefits from, and is not a substitute for, the additional oil production that may be achieved from leasing and development in the three sales under review by the Task Force.

These sales should be considered on their own merits, that is, by evaluating the potential environmental effects which remain despite appropriate protection and mitigation measures and considering whether such effects are acceptable in light of the potential benefits. Oil conservation measures are an important part of our national energy policy and will be considered on their own merits.

VI. ASSESSMENT OF OPTIONS AND ENVIRONMENTAL PROTECTION MEASURES

SUMMARY OF OPTIONS DEVELOPED BY TASK FORCE

The Task Force has developed three options for each of the three sale areas, plus a set of additional environmental protection measures which should be developed for application, where appropriate, to leases issued in the future in all three sale areas.

All options provide for the collection of additional information in response to the findings of a report by the NAS/NRC which found some of the available information inadequate for leasing decisions.

All options provide for additional environmental protection measures. Some address environmental concerns specific to a sale area, others could be applied in all three areas.

The options differ primarily in the timing of the lease sales and in the limits placed on the location of leasing or drilling. Option C for each sale generally delays future leasing decisions longer than Options A and B.

In developing options, the Task Force recognized that OCS lease sales must be scheduled in a 5-year leasing program approved by the Secretary of the Interior. The three lease sales addressed by the Task Force, as well as follow on sales in the same OCS areas, are scheduled in the 1987-1992 5-Year Leasing Program. Additional sales could be scheduled in a new 5-year leasing program. The Secretary is tentatively planning to release a proposal for a new 5-year program for comment in March 1990. If gaps and overlaps between 5-year programs are avoided, the new program will cover the 1992-1997 period. It would be followed by a 1997-2002 program. The options for the three sale areas reflect the structure imposed by the 5-year program requirement.

The Task Force has also identified several measures which, if implemented, would provide substantially greater protection for environmental resources while still allowing exploration, development, and production programs to continue. Consideration of these measures responds to the Task Force's finding that OCS activities can in fact, have negative effects on important and valuable environmental resources, but that most instances of adverse effects are not so important as to warrant or justify delay or cancellation of leasing. Thus, where future exploration, development, and production occur in the three sale areas, the following control and mitigation measures should be considered:

- Require transport of OCS oil in pipelines where technically feasible and environmentally preferable;
- Improve OCS oil spill risk assessment, contingency planning, and response capability;
- Encourage consolidation of onshore facilities to reduce demand on existing public services, infrastructure, and land use changes;
- Establish processes to assist local communities to address onshore impacts associated with OCS development;
- Require no discharge of drilling muds/fluids in sensitive areas;
- Establish joint oil/fishing industry coordinating committees in areas where OCS activities are likely to conflict with commercial fishing; and
- Strengthen policies to protect environmentally sensitive areas.

These measures are discussed in greater detail beginning on page VI-16.

Sale 116, Part II - Off Southwestern Florida

SALE 116, PART II SUMMARY

Acreage	~ 14 million															
Number of Tracts	2500 whole or partial blocks															
Sale area status	FEIS completed October 1987; proposed Notice of Sale delayed															
Sale timing	At the time of the President's call for study, it was considered procedurally possible to hold a sale in 5-6 months															
Mean resource estimate	110 million barrels of oil are expected to be leased, developed, and produced															
Probability of commercially recoverable discovery	99%															
Net economic value	About \$218 million															
Cumulative oil spill risk	<table><tr><td></td><td colspan="2">PROBABILITY OF ONE OR MORE SPILLS</td></tr><tr><td></td><td>Without Sale</td><td>With Sale</td></tr><tr><td>SPILL SIZE</td><td></td><td></td></tr><tr><td>≥1,000 bbl</td><td>>99.5%</td><td>>99.5%</td></tr><tr><td>≥10,000 bbl</td><td>96%</td><td>97%</td></tr></table>		PROBABILITY OF ONE OR MORE SPILLS			Without Sale	With Sale	SPILL SIZE			≥1,000 bbl	>99.5%	>99.5%	≥10,000 bbl	96%	97%
	PROBABILITY OF ONE OR MORE SPILLS															
	Without Sale	With Sale														
SPILL SIZE																
≥1,000 bbl	>99.5%	>99.5%														
≥10,000 bbl	96%	97%														

Location of Sale Area and Estimated Hydrocarbon Resources

Proposed Lease Sale 116, Part II contains about 14 million acres in the 74 million acre Eastern Gulf of Mexico Planning Area.

The Eastern Gulf of Mexico Planning Area is the OCS region which lies offshore the entire coastline of western Florida from near Mobile, Alabama to the Florida Keys. The Sale 116, Part II area includes only the region offshore the southwestern Florida coast south of 26 degrees north latitude, from Naples to the Florida Keys. This area is known as the South Florida Basin. There are 73 existing leases in the sale area. Figure II-2 shows the location of Proposed Sale 116, Part II within the Eastern Gulf of Mexico Planning Area.

The MMS's mean estimates for the oil and gas resources in the Sale 116, Part II area are 610 million barrels of oil and 110 billion cubic feet of gas. The probability of at least one commercial accumulation is 100%. Of this total resource, 490 million barrels of oil and 80 billion cubic feet of gas are estimated to be unleased; 140 million barrels of oil and 30 billion cubic feet of gas are estimated to be within the 73 existing leases. The amount expected to be leased as a result of Sale 116, Part II is a portion of the total unleased resource estimate; 110 million barrels of oil (and no commercial quantities of gas) are estimated to be leased, developed, and produced as a result of Sale 116, Part II. The probability of at least one discovery of commercial quantities of hydrocarbons on leases issued in Sale 116, Part II is 99%.

The standard method for measuring the benefits of OCS activity is to estimate the net economic value of potential production. The national economic benefit from holding a lease sale in this area is estimated to be about \$218 million, assuming oil prices gradually increasing from \$19 per barrel.

Option A:

Cancel Sale 116, Part II, and defer subsequent leasing decisions until additional oceanographic, ecological, and socioeconomic data in response to the NAS/NRC Report have been collected.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness and develop improved means of assessing the risk of oil spill damage.

Existing Leases: Proceed with decisions about exploration and development on existing leases under normal OCS Lands Act and CZMA procedures.

The major feature of this option is that it would cancel the proposed sale and would make any future leasing decisions in the Part II area conditional upon collection of additional oceanographic, ecological, and socioeconomic data, in response to the NAS/NRC Report. All decisions on leasing would be deferred until additional data had been gathered and analyzed. The Secretary will use these data, as well as other information, as a basis for any future decisions on possible leasing in this area. Moreover, before leasing could proceed, the MMS would strengthen oil spill contingency planning requirements to improve their effectiveness. The MMS would also improve the methods it uses to assess the risk of oil spill damage.

Although this option would not permit any new leases to be offered until completion of further study, it would allow for the possibility of proceeding with exploration of the 73 existing leases in the Part II area. However, additional environmental controls would be required to protect the Everglades and Keys from oil spills.

This option would greatly reduce many of the most significant environmental risks and potential effects associated with the current proposal to offer 14 million acres for lease. The 73 existing leases in the area purchased in previous sales would remain open to the possibility of exploration and development. These 73 leases cover about 400,000 acres. The acreage that would likely be explored and developed is far less. To date, two plans of exploration have been filed for three leases. The MMS mean conditional resource estimate for the existing leases is 140 million barrels of oil.

Exploration of the existing leases without an additional lease sale would lead to more limited production. Therefore, the probability of an OCS oil spill in the area would be less than the risk associated with conducting the sale as originally planned. The probability of an oil spill greater than 1,000 barrels associated with production that could occur on the 73 existing leases is estimated to be 23%. The probability of such a spill associated with the recovery of resources from the existing leases plus leases issued in Sale 116, Part II is estimated to be 38%. Thus, the chance of damage to coastal resources which are especially sensitive to spilled oil (coral, sea grasses, and mangroves) would be somewhat less. Similarly, this option would reduce risks to the commercial and sport fisheries as well as marine mammals and other wildlife. Nevertheless, tanker traffic would remain the major source of an oil spill that could damage the coastal environment and protected lands of southwestern Florida and the Keys.

The onshore effects which may result from development of any of the 73 existing leases are uncertain, but they are likely to be minimal since neither pipeline construction nor onshore support services or processing would be expected on the Florida coast. Support bases would be located at one or two places onshore in Florida, relatively convenient to the offshore activities. These service bases involve low levels of activity at the site.

Under this option, the minimum time before a lease sale could occur would be extended from 6 months (from the time the current moratorium expires) to 5 or 6 years. Thus, the earliest that production from new leases could occur would be similarly delayed. About \$200 million in net economic benefits from this sale would be delayed, and as much as four times that amount in benefits from possible future sales would be delayed, because access to an estimated 490 million barrels of unleased oil and gas resources would also be postponed.

The estimated national benefits of this alternative are based on the possible production of 140 million barrels of oil estimated for the existing 73 leases. The estimated net economic value of these resources is about \$280 million.

Option B:

Cancel Sale 116, Part II.

Exclude the Part II area from consideration in formulating the new 1992-1997 5-Year Program.

Existing Leases: Proceed with decisions about exploration and development on existing leases under normal OCS Lands Act and CZMA procedures.

The DOI should undertake discussions with Florida and existing lessees to facilitate purchase of existing leases by the State, if the State so desires.

This option contains all the environmental safeguards of Option A, but differs from Option A in two important respects. First, this alternative would definite postponement of any consideration of leasing in this area until after 1997; whereas Option A would permit the possibility of a new sale under the 1992-1997 5-Year Leasing Program, provided that additional oceanographic, ecological, and socioeconomic studies were completed in time to allow a sale prior to 1997.

Second, this option could result in no exploration and development on the 73 existing leases if the State of Florida were willing and able to negotiate purchase of them in order to prevent activity. If successful, State purchase would be a faster and more certain way to prevent development than attempting to cancel the leases under section 5 of the OCS Lands Act. However, the purchase of existing leases would not assure a permanent ban on future development since these and other tracts might be offered in a later sale. The cost of buying back these leases is estimated to be about \$200 million. These factors could dampen Florida's interest in negotiating purchase of the leases.

The important feature of this option is that no significant environmental effects from a new lease sale are possible until some time after 1997. This delay would allow ample time for the MMS to schedule and conduct further studies of the ecology, physical oceanography, and socioeconomic effects of offshore leasing in southwestern Florida. Some adverse effects could occur if negotiation to purchase the existing leases failed and if applications to explore and develop them were approved. However, additional environmental controls to protect the Everglades and Florida Keys would have to be in effect.

With Option B, the minimum time before a lease sale could occur would be extended from 6 months (from the time the current moratorium expires) to 7 years. Thus, the earliest production could occur would be similarly extended. As with Option A, about \$200 million in net economic benefits from this sale would be delayed, and as much as four times that amount in benefits from future sales would be delayed, because access to 490 million barrels of unleased oil and gas resources would also be postponed. Moreover, in the event of State purchase of existing leases, national benefits associated with an estimated 140 million barrels of economically recoverable oil resources, estimated to be about \$280 million, would be lost.

The economic effect of this option would be to postpone any national benefit until after 1997, unless some or all of the estimated 140 million barrels of oil which may be discovered on the 73 existing leases is produced.

Option C:

Cancel Sale 116, Part II.

Exclude the Part II area from consideration in formulating the new 1992-1997 5-Year Program and the 1997-2002 5-Year Program.

Existing Leases: The DOI should undertake discussions with Florida and existing lessees to facilitate State purchase of existing leases. The Secretary should initiate procedures that could lead to cancellation of the existing leases pursuant to section 5 of the OCS Lands Act. If these leases are canceled, it would prevent drilling on existing leases. Selection of this option would reflect the view that the existing oil spill threat to environmental resources in this region is too great and that additional risk from any source, including OCS exploration and development, is not justified at this time.

This option contains all of the environmental safeguards of Options A and B and would further postpone consideration of a lease sale until the turn of the century, during formulation of a 5-year program for the 2002-2007 time period. Moreover, this alternative

would take a clear position against any exploration and development of the 73 existing leases in the area. Instead of placing the entire burden for buying back existing leases on the State of Florida as in Option B, this option calls for the Secretary of the Interior to begin lease cancellation procedures under section 5 of the OCS Lands Act and to initiate discussions with the State and lessees regarding the State's purchase of the existing leases. Under this approach, the State and the Federal Government might share the costs of cancellation.

As with Options A and B, additional oceanographic, ecological, and socioeconomic studies would be conducted to inform any future leasing decisions, and environmental controls to protect the Everglades and Keys from oil spills would be implemented.

Under Option C, the minimum time before a lease sale could occur would be extended from 6 months (from the time the current moratorium expires) to 12 years, and the earliest production would be likewise delayed. About \$200 million in net economic benefits from this sale would be delayed, and as much as four times that amount in benefits from possible future sales would be delayed, since access to an estimated 490 million barrels of unleased oil and gas resources would be postponed. In the event of cancellation of existing leases, net economic benefits of about \$280 million associated with an estimated 140 million barrels of economically recoverable oil resources would be lost. In addition, the cancellation of all 73 existing leases could cost the Federal Government about \$200 million.

Protecting the Everglades and Keys from Oil Spills

A key feature of all three options is the establishment of a program to provide greater protection from oil spills to the environmental resources of the Everglades and Keys ecosystem. The Task Force has found that even without OCS activity, the use, value, and unique environmental sensitivity of the Everglades and Keys resources are great enough to warrant increased protection from oil spills from existing sources (e.g., tanker transport). The Task Force suggests the development of a system for oil spill protection for the Everglades National Park and Florida Keys resources.

These efforts to improve protection of the Everglades and Keys should involve the DOI, the Department of Commerce, the U.S. Coast Guard, the EPA, and representatives from the oil and gas industry. In addition, the U.S. Coast Guard should study the feasibility of moving oil tanker routes further from the environmental resources in the Keys and Everglades.

Sale 95 - Off Southern California**SALE 95 SUMMARY**

Acreage	~ 6.7 million															
Number of Tracts	1280 whole or partial blocks in the DEIS analysis															
Sale area status	The initial Area Identification was completed October 1987; a supplemental Call was issued in November 1988; the second Area Identification was postponed; no DEIS has been prepared															
Sale timing	At the time of the President's call for study, it was considered procedurally possible to hold a sale in 16 months															
Mean resource estimate	312 million BOE (230 million bbl of oil and 460 billion cubic feet of gas) are expected to be leased, developed, and produced															
Probability of commercially recoverable discovery	100%															
Net economic value	About \$1 billion															
Estimated level of activity	2 platforms are likely with up to 40 development wells															
Cumulative oil spill risk	<table><tr><td></td><td colspan="2">PROBABILITY OF ONE OR MORE SPILLS</td></tr><tr><td></td><td>Without Sale</td><td>With Sale</td></tr><tr><td>SPILL SIZE</td><td></td><td></td></tr><tr><td>≥1,000 bbl</td><td>>99.5%</td><td>>99.5%</td></tr><tr><td>≥10,000 bbl</td><td>93%</td><td>94%</td></tr></table>		PROBABILITY OF ONE OR MORE SPILLS			Without Sale	With Sale	SPILL SIZE			≥1,000 bbl	>99.5%	>99.5%	≥10,000 bbl	93%	94%
	PROBABILITY OF ONE OR MORE SPILLS															
	Without Sale	With Sale														
SPILL SIZE																
≥1,000 bbl	>99.5%	>99.5%														
≥10,000 bbl	93%	94%														

Location of the Sale Area and Estimated Hydrocarbon Resources

Proposed Lease Sale 95 includes about 6.7 million acres of the 30 million acre Southern California Planning Area, the OCS region between the United States/Mexican border and the San Luis Obispo/Monterey County line. Figure II-3 outlines the offshore areas proposed for leasing under Sale 95.

Figure VI-1 illustrates the major oil bearing regions in the Southern California Planning Area. The major regions are the offshore Santa Maria Basin, the Santa Barbara Channel, the Inner Basin, and the Outer Basin. There are 123 active leases in the planning area, 44 of which have not yet been explored. The Inner Basin south of Newport Beach is the only nearshore area where there has been no leasing. Exploration and production are ongoing in

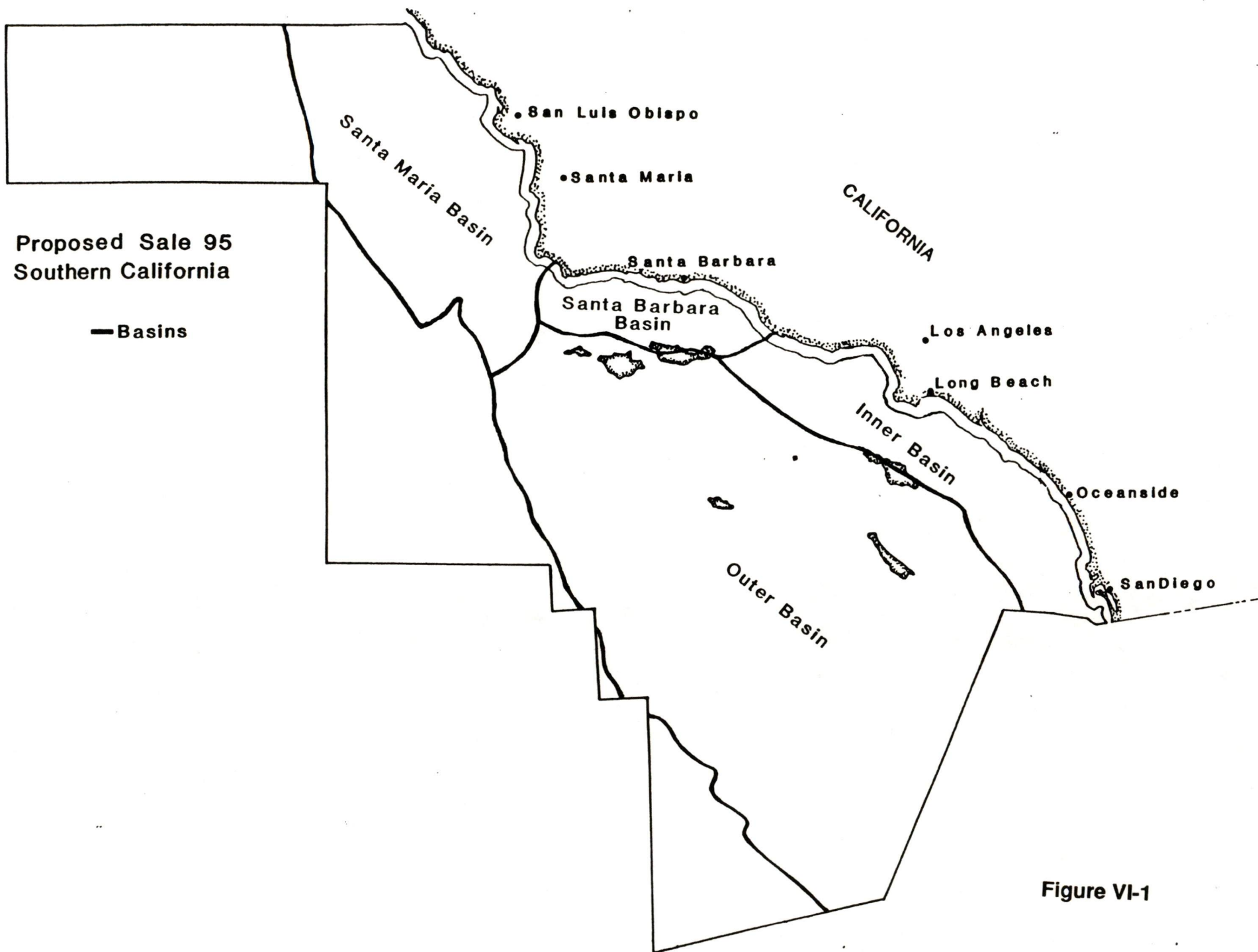


Figure VI-1

the Santa Barbara Channel and Santa Maria Basin; production is occurring from four leases offshore Long Beach in the northern portion of the Inner Basin; the five leases in the Outer Basin have yet to be explored. Current annual production of 33.6 million barrels of oil and 34.5 billion cubic feet of gas is concentrated in the Santa Barbara Channel.

The MMS's mean estimates for the oil and gas resources in the Southern California Planning Area are 1.31 billion barrels of oil and 3.01 trillion cubic feet of gas. The probability that commercial hydrocarbons exist in the area is 100%. Of this amount, 970 million barrels of oil and 2.21 trillion cubic feet of gas are estimated to be unleashed in the entire planning area.

Sale 95 contains about 22% of the acreage of the entire planning area. The amount of unleashed resources estimated in the Sale 95 area are 530 million barrels of oil and 1.07 trillion cubic feet of gas. Of these amounts, 230 million barrels of oil and 460 billion cubic feet of gas are estimated to be leased as a result of holding Sale 95. Current discovered resources (reserves) for this area include 1.3 billion barrels of oil and 2.0 trillion cubic feet of gas.

The standard method for measuring the benefits of OCS activity is to estimate the net economic value of potential production. Assuming oil prices gradually increasing from \$19, the national economic benefits realized would be about \$1 billion.

Option A:

A-1: Proceed with preparations for a lease sale but defer final leasing decisions until after additional oceanographic and socioeconomic data in response to the NAS/NRC report have been collected.

A-2: Cancel Sale 95, and defer subsequent leasing decisions until additional oceanographic and socioeconomic data in response to the NAS/NRC report have been collected.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness, and develop improved means of assessing the risk of oil spill damage.

Option A-1 would give the Secretary of the Interior the discretion to proceed with preparations for a lease sale when he determines that it is appropriate in light of the progress in collecting additional data. Option A-2 directs the Secretary to cancel Sale 95. Both would defer decisions on any leasing in the area until additional oceanographic and socioeconomic data have been gathered and analyzed in response to the NAS/NRC Report. The Secretary will have the benefit of these data and other relevant information in making decisions on whether to pursue leasing in this area. If a decision to lease is made, the new information would be used in determining which tracts to offer and what environmental controls to apply to the leases in order to resolve environmental concerns. The data will be especially helpful in further assessing the effects of a possible oil spill as well as in examining likely onshore impacts of offshore development. Further, the MMS would strengthen oil spill contingency planning requirements to improve their effectiveness. The

MMS would also improve the method it uses to assess the risk of oil spill damage.

This option, as well as the other two, address the problem of onshore air quality in southern California. The Task Force found that the most important environmental issue is the possible effect of oil and gas development on the region's air quality. Existing air quality is regarded as the worst in the Nation, particularly for ozone, and offshore development could exacerbate the problem. By requiring equitable air quality standards for OCS operations, this option would assure that no further degradation of air quality would occur as a result of OCS emissions.

With this option, the minimum time before a lease sale could occur would be extended from 2 years to 3 years and or longer, depending on the timing of oceanographic studies. The minimum time before production could occur would be similarly extended. About \$1 billion in net economic benefits from this sale and a similar amount of benefits from anticipated future sales in the area would be delayed, since access to 530 million barrels of oil and 1 trillion cubic feet of gas resources estimated for the unleased sale area would be postponed.

Option B:

Defer leasing decisions until the 1992-1997 5-Year Leasing Program.

Offer tracts only in Santa Maria Basin and San Diego Outer Basin in the next sale off southern California.

Conduct additional oceanographic and socioeconomic studies prior to making leasing decisions for any future sale.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness, and develop improved means of assessing the risk of oil spill damage.

This option would defer any leasing decisions in the area until sometime during the 1992-1997 5-Year Program. If additional oceanographic and socioeconomic studies could be completed, this option would allow for the possibility of a lease sale prior to 1997. The results of these studies, along with other information, would be used by the Secretary in making any leasing decisions. Although there would be no drilling on new leases, exploration and development could continue on existing leases. The MMS would continue to refine its assessment of the oil and gas resources in the area to provide a basis for these future decisions. Leasing would proceed only if new OCS air quality standards have proven substantially equivalent to standards onshore. Also, before leasing could proceed, the MMS would strengthen oil spill contingency planning requirements to improve their effectiveness and would improve the methods it uses to assess the risk of oil spill damage.

The principal difference from Option A is that if the Secretary decided that a lease sale should be offered in the 1992-1997 period, he would offer tracts only in the Santa Maria Basin and the San Diego Outer Basin.

The option for proceeding with leasing in the Santa Maria Basin needs to be considered in light of the likelihood that related onshore facilities would probably be located in Santa Barbara County, which has already experienced substantial development. Because there has been little drilling of the larger prospects in Santa Maria Basin, there may be a greater chance for large discoveries than remains in the Channel. The generally deep water, however, may make such resources less beneficial economically.

Leasing in the Outer Basin may be more acceptable environmentally than leasing closer to shore because the greater distance from shore reduces visual impacts and reduces the chance that an oil spill from operations on a lease would contact the coast. However, tanker transportation of oil from this basin to shore would partially offset the reduction in the risks to the coast. Because there may be large prospects that have not been drilled, there is a chance for large discoveries. However, as the geology and economics are less favorable in this area, the chance of finding commercial quantities of oil and gas is considerably lower.

This option would defer leasing in the Santa Barbara Channel in light of the intensity of current and planned oil and gas development on existing leases off Santa Barbara County. These developments have been slowed by concerns about the onshore impacts. Once such problems have been worked out, however, additional leasing and development should be possible without substantial increases in onshore facilities if activities are appropriately phased. Additional leasing in the Santa Barbara Channel holds a lower probability of discovering new large oil fields, because most of the larger prospects there have already been drilled.

This option also defers leasing in the Inner Basin in light of its proximity to highly valued, intensively used coastal resources in San Diego County, Orange County, and Los Angeles County. However, because the larger prospects in this area have not been drilled, deferring leasing would forgo a good chance for large discoveries.

The net economic benefits from a sale limited to the Santa Maria Basin and the Outer Basin would be reduced from about \$1 billion to less than \$400 million. The estimated unleased resources made available for leasing would be reduced from 530 million barrels of oil and 1 trillion cubic feet of gas to 240 million barrels of oil and 0.75 trillion cubic feet of gas. The benefits from unleased resources in the Inner Basin and the Santa Barbara Channel would be delayed at least 5 years.

Option C:

Cancel Sales 95 and 138.

Exclude the southern California area from consideration in formulating the new 1992-1997 5-Year Program.

Conduct additional oceanographic and socioeconomic studies prior to making leasing decisions for the next sale.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Revise requirements for OCS oil spill contingency plans to improve their

effectiveness, and develop improved means of assessing the risk of oil spill damage.

This option would delay any leasing in the southern California area until after 1997. As with Options A and B, no leasing decisions would be made by the Secretary until additional oceanographic and socioeconomic studies have been completed in response to the NAS/NRC Report. Also, air quality standards for the California OCS would be in effect which are substantially equivalent to those applied onshore. Further, before leasing could proceed the MMS would strengthen oil spill contingency planning requirements and would improve the methods it uses to assess the risk of oil spill damage.

Option C is similar to Option A in that it does not restrict the geographic scope of possible leasing, but it does provide for a definite delay of all new activity until after 1997, which Option A does not. Unlike Option B, this option imposes no geographic limits on areas which could be leased, but it would provide a definite deferral of leasing for at least 5 years longer than Option B.

Because Option C postpones any possible leasing for at least 7 years, it also defers any potential production for a similar period. With this option, about \$1 billion in net economic benefits from leasing would be delayed.

OCS Air Quality Regulations and Tanker Route Study

The Task Force has found that the air emission controls applied to OCS facilities should be substantially equivalent to those applied to onshore facilities, unless safety and technical considerations justify a less stringent standard. A component of all three of the options above is the promulgation of a rule making the standards for regulating air quality on the OCS substantially equivalent to regulatory standards onshore. The MMS has been drafting a new proposed rulemaking consistent with this finding.

Also included in all three options is the suggestion that a study be conducted to consider moving tanker routes away from existing OCS facilities in the Santa Barbara Channel. Such a study, to be conducted by the U.S. Coast Guard, should also include consideration of establishing a vessel traffic system in the Santa Barbara Channel and creating traffic separation zones south of the Channel Islands National Park and National Marine Sanctuary.

Concerns about oil spills from all sources in the southern California area are substantial. The Task Force has concluded that they could be addressed more effectively by focusing greater effort on the prevention and containment of oil spills from all sources of risk, especially tankers. Improvements in oil spill response capabilities in the area could limit potential damage to valuable coastal resources by more than the increased risk due to additional OCS leasing. Increased capabilities would also reduce the risk of damage from an OCS oil spill.

Sale 91 - Off Northern California**SALE 91 SUMMARY**

Acreage	~ 1.1 million															
Number of Tracts	223 whole or partial blocks: 167 in Point Arena Basin and 56 in the Eel River Basin															
Sale area status	Public hearing completed February 1988; final EIS delayed															
Sale timing	At the time of the President's call for study, it was considered procedurally possible to hold a sale in 10 months															
Mean resource estimate	546 million BOE (400 million bbl of oil and 820 billion cubic feet of gas) are expected to be leased developed and produced															
Probability of commercially recoverable discovery	51%															
Net economic value	About \$975 million															
Estimated level of activity	2 production platforms in the Eel River Basin and 10 production platforms in the Point Arena Basin. Production in the Point Arena Basin is expected to be concentrated in the southern portion of the basin.															
Cumulative oil spill risk	<table><tr><td></td><td colspan="2">PROBABILITY OF ONE OR MORE SPILLS</td></tr><tr><td></td><td>Without Sale</td><td>With Sale</td></tr><tr><td>SPILL SIZE</td><td></td><td></td></tr><tr><td>≥1,000 bbl</td><td>91%</td><td>96%</td></tr><tr><td>>10,000 bbl</td><td>77%</td><td>85%</td></tr></table>		PROBABILITY OF ONE OR MORE SPILLS			Without Sale	With Sale	SPILL SIZE			≥1,000 bbl	91%	96%	>10,000 bbl	77%	85%
	PROBABILITY OF ONE OR MORE SPILLS															
	Without Sale	With Sale														
SPILL SIZE																
≥1,000 bbl	91%	96%														
>10,000 bbl	77%	85%														

Location of the Sale Area and Estimated Hydrocarbon Resources

Proposed Lease Sale 91 includes 1.1 million acres of the 28.5 million acre Northern California Planning Area, which is the OCS region lying between the southern boundary of Mendocino County and the California/Oregon border. Figure II-4 shows the location of Proposed Sale 91 within the Northern California Planning Area.

There are two distinct areas within the planning area proposed for leasing in Sale 91. The Point Arena Basin, which includes about 800,000 acres and 167 tracts, is located offshore Mendocino County, near the coastal communities of Fort Bragg and Mendocino. There are about 300,000 acres and 56 tracts in the Eel River Basin, located offshore Humboldt County near the communities of Arcata and Eureka.

The MMS's mean estimates for the oil and gas resources in the Northern California Planning Area are 770 million barrels of oil and 1.69 trillion cubic feet of gas. The probability that commercial hydrocarbons exist in the planning area is 60%. All of the undiscovered resources in this area are unleased. The Sale 91 area is a subset of the entire planning area; the amounts of undiscovered resources in the Sale 91 area are 440 million barrels of oil and 980 billion cubic feet of gas. The probability that hydrocarbons exist in the sale area is 51%. Of the total undiscovered resources estimated to be in the sale area, 400 million barrels of oil and 820 billion cubic feet of gas are estimated to be leased as a result of Sale 91.

The principal differences between the Point Arena and Eel River Basins are:

- (1) the area proposed to be offered for leasing in the Point Arena Basin is about 800,000 acres versus 300,000 acres in Eel River;
- (2) the estimated resources are significantly greater in Point Arena;
- (3) Point Arena is primarily oil-prone, while Eel River is gas-prone;
- (4) if oil and gas is found, the level of offshore development would probably be much higher in Point Arena, 10 offshore platforms versus 2 in Eel River; and
- (5) the onshore effects would be greater from Point Arena offshore development, because the Mendocino County communities are very small and lack supporting infrastructure to accommodate large scale oil and gas development.

The standard method for measuring the benefits of OCS activity is to estimate the net economic value of potential production. According to MMS calculations, the national benefits from holding Sale 91 are estimated to be about \$975 million, assuming oil prices gradually increasing from \$19.

Option A:

A-1: Proceed with preparations for a lease sale but defer final leasing decisions until after additional socioeconomic data in response to the NAS/NRC report have been collected.

A-2: Cancel Sale 91, and defer subsequent leasing decisions until additional socioeconomic data in response to the NAS/NRC report have been collected.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness, and develop improved means of assessing the risk of oil spill damage.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Reevaluate the effects on fisheries and institute measures to reduce conflicts with commercial fishing.

Option A-1 would give the Secretary of the Interior the discretion to proceed with preparations for a lease sale when he determines that it is appropriate in light of the progress in collecting additional data. Option A-2 directs the Secretary to cancel Sale 91. Both would defer decisions on any leasing in the area until additional socioeconomic data have been collected in response to the NAS/NRC Report. This information will improve understanding of possible onshore impacts of offshore leasing and will help the Secretary in making decisions on whether to pursue leasing in this area. If a decision to lease is made, the new information would be used in determining which tracts to offer and what environmental controls to apply to the leases in order to reduce environmental concerns.

In addition, the MMS would strengthen oil spill contingency planning requirements to improve their effectiveness. The MMS would also improve the method it uses to assess the risk of oil spill damage.

Finally, in order to preserve the region's excellent air quality, the MMS would also promulgate OCS air quality standards substantially equivalent to those in effect onshore.

Under Option A, the minimum time before a lease sale could occur would be extended from about 1 year to 2 years or more. The minimum time before production could occur would be similarly extended. About \$975 million in net economic benefits from this sale and a similar amount from anticipated future sales would be delayed since access to the 440 million barrels of oil and the 1 trillion cubic feet of gas in the unleased sale area would be postponed.

Option B:

Defer leasing decisions until the 1992-1997 5-Year Leasing Program.

Offer tracts only in the Eel River Basin in the next sale off northern California.

Conduct additional socioeconomic studies prior to leasing decisions for the next sale.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Reevaluate the effects on fisheries and institute measures to reduce conflicts with commercial fishing.

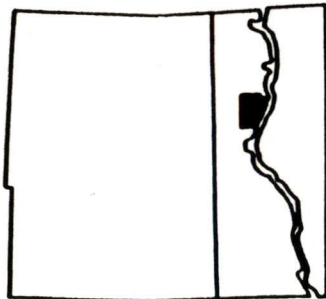
This option would defer any leasing decisions in the area until the 1992-1997 5-Year Program. Prior to deciding on any lease sale, additional socioeconomic studies would be performed. The Secretary would take these study results into account in making decisions on whether to lease in the area. If a sale is scheduled for the 1992-1997 period, only tracts in the Eel River Basin would be included. This option would reduce the area originally proposed for lease by 73%, from 1.1 million acres to about 300,000 acres. Figure VI-2 shows the area that might be offered in an Eel River Basin sale. Leasing in the gas-prone Eel River Basin would greatly diminish the likelihood of oil discovery and thus reduce oil spill risk.

**Proposed Sale 91
Northern California**

Option B

 **Available Acreage**

N. CALIFORNIA PLANNING AREA



SEE DETAIL MAP

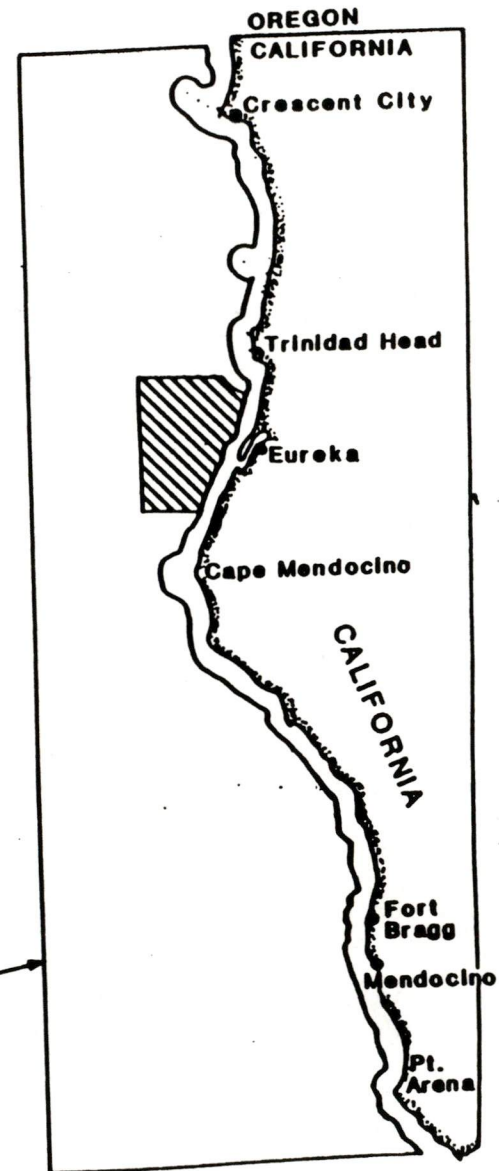


Figure VI-2

In addition, this option would preserve existing air quality by requiring offshore standards that area substantially equivalent to those in effect onshore.

Also, the MMS would reexamine the location of commercial fishery resources in the area and reassess potential impacts of offshore development on highly productive areas in the Eel River Basin. In light of such study, the Secretary would consider the desirability of eliminating some tracts.

Offering only the Eel River Basin would reduce the net economic benefits from \$975 million to less than \$100 million. This option reduces the sale area resources from 440 million barrels of oil and 1 trillion cubic feet of gas to 20 million barrels of oil and 0.4 trillion cubic feet of gas. The balance of the benefits and resources would be delayed by at least 5 years.

Option C:

Cancel Sale 91 and Sale 128.

Exclude the Northern California Planning Area from consideration in formulating the new 1992-1997 5-Year Program.

This option would cancel Sale 91 and the next sale scheduled, Sale 128. Further, no sales would be considered for this area in the 1992-1997 5-Year Program. The MMS would conduct socioeconomic studies prior to considering a sale under the 1997-2002 5-Year Program, and the Secretary would take the results of these studies into account in making decisions whether to lease in the area during the 1997-2002 period.

As in Option A and B, offshore air quality standards would be adopted which are substantially equivalent to those applied onshore. Moreover, the MMS would review the location of important commercial fishery resources in the area and reassess the possible impacts of offshore development on their productivity. This review could lead to the elimination of some tracts offered for lease.

With Option C, the minimum time before a lease sale could occur would be extended from about 1 year to 7 years, and the earliest production could occur would be similarly extended. About \$975 million or more in net economic benefits from this sale and a similar amount of benefits from anticipated future sales in the area would be delayed.

ADDITIONAL ENVIRONMENTAL PROTECTION AND MITIGATION MEASURES

The Task Force identified a number of additional measures which should be developed for consideration when future leasing decisions are made in the three areas. It also suggests that some of these measures be taken in the near future in order to reduce the environmental effects of exploration and development on existing leases or to protect environmental resources in one or more of the three areas from damages that could result from other existing activities.

Implementation of the control measures outlined in this section could often impose considerable costs on the lessee. The Task Force believes that these costs are the primary reason the measures are not already in use or practice everywhere on the OCS. The Task Force recognizes that requiring these control and mitigation measures in the three sale areas could increase the costs and substantially reduce the benefits of developing oil and gas resources and thus could discourage the industry from bidding on leases. It is likely, however, that future increases in the price of oil and gas commodities will increase lease values, so that protection measures which are uneconomic now may become feasible later.

The Task Force recognizes that environmental resources in the three sale areas vary considerably in breadth and value and that implementing all protection measures may not be appropriate in every leasing area. For each of the measures described, the Task Force suggests that criteria be established which determine the application of the control and mitigation measures. When OCS activity threatens to degrade an environmental resource, the value of which is sufficiently high, the criteria would specify the protective measure warranted. For example, the necessity of improving the existing poor air quality onshore in southern California justifies measures in the OCS which would not further degrade onshore air quality.

A description of control and mitigation measures and general criteria for their application follows:

- Require Transport of OCS Oil in Pipelines Where Feasible and Environmentally Preferable

The risk of oil spills from OCS pipelines is less than the spill risk for tankers. The MMS currently applies lease stipulations to encourage pipeline transport of oil produced on the OCS (e.g., Stipulation #5, Sale 91 EIS; all California sales on the 1987-1992 5-Year Program include such a stipulation). The MMS lease stipulations specify that pipeline transport is preferable, subject to the availability of pipeline rights-of-way, technological feasibility, environmental preference, and net social benefit. **The Task Force concludes that the lease stipulation should be strengthened by specifying that pipelines should be used to transport OCS oil ashore where feasible and environmentally preferable.**

- Improve OCS Oil Spill Risk Assessment, Contingency Planning, and Response Capability

Improve OCS Oil Spill Risk Assessment

Outer Continental Shelf oil spill risk modeling should continually be updated to reflect current operations and transportation of oil.

Risk assessments should include a description of the maximum credible spill and its potential effects.

Potential damages from oil spills should be assessed by incorporating equipment performance capabilities into oil spill trajectory models to assess the effectiveness of response personnel and equipment in reducing the extent of oil contacting sensitive environmental resources.

The MMS should determine which tracts in a proposed sale can be identified as having a higher likelihood of having any spilled oil contact sensitive resources.

Improve Prelease Information

Oil spill response effectiveness should be a part of presale evaluation of the possible damages of an oil spill. The basis for lease sale decisions should include information about the extent to which oil spill response would reduce the damage caused by an oil spill.

Response effectiveness should be analyzed for particular sale areas using development scenarios, oil spill statistics, equipment performance estimates from MMS studies, and the oil spill trajectory model which MMS currently employs.

The MMS should conduct a sale area-specific, comparative oil spill risk analysis to evaluate the spill risk:

- 1) with OCS development; and
- 2) without OCS development, but with increased tanker traffic needed to meet the current and (expected) increasing demand for oil.

Improve Oil Spill Contingency Planning on the OCS

Require that each OCS Oil Spill Contingency Plan

- 1) be revised annually to reflect changes including but not limited to personnel, response technologies, potential spill size, and oil spill risk;
- 2) clearly describe the current maximum credible spill;
- 3) document a realistic response for the current maximum credible spill scenario;
- 4) document a realistic response for a spill scenario that may be considered "more likely;"
- 5) address whether or not a local infrastructure can support a large scale emergency response, and if it cannot, describe what must be done so that it can;
- 6) list sources of oil spill response equipment and personnel, and note contact people and telephone numbers for each source;
- 7) list what equipment is available from each source;
- 8) describe how and when all offsite response resources listed in the contingency plan will be obtained, transported, and deployed;
- 9) address the changes required for an extended response which are necessary to meet changing characteristics of oil, location, etc.;
- 10) address waste removal from the spill site and waste disposal;
- 11) clarify organizational responsibilities; and
- 12) identify significant environmental features, and describe appropriate

responses to protect these resources.

Require the MMS to consider the performance of equipment and personnel when determining the amount and location of equipment, the minimum number of personnel required on-site and their specific duties, and the amount of training and drills required to maintain readiness of personnel and equipment.

Compile and regularly update a set of established regional guidelines for reviewing and approving oil spill contingency plans. This will facilitate thorough and efficient annual reviews of oil spill contingency plans.

Establish MMS regulations to specify the lessee's commitment to following those provisions of the oil spill contingency plans which detail adequate numbers of trained, ready response personnel and allow for effective MMS enforcement.

Implement an effective "oil spill inventory system" to identify location of response equipment in the United States and internationally.

Review port contingency plans by the National Response Team and U.S. Coast Guard Captain of the Port's needs to consider interrelationships with OCS oil spills.

Pre-approve the use of specified dispersants to control spills of specified types of oil under specified seasonal/climatic/location conditions. Decisions should be made by MMS, U.S. Coast Guard, EPA, and local/State environmental officials.

Improve planning and field coordination among various Federal and State agencies with responsibility for natural resources protection (parks, sanctuaries, wildlife).

OCS Oil Spill Drills

Regional guidelines for conducting unannounced oil spill response drills need to be developed and documented.

Hold more frequent, realistic training exercises for Government and industry personnel with emphasis on improving integration of activities of different levels of government in spill response and Government/industry activities.

Industry, Federal, State, and local plans must be coordinated and understanding of plans must include top officials (not just technical staff) who will be on the front line in a big spill.

Establish Minimum Standards for OCS Oil Spill Response

Standard test procedures should be developed for OCS oil spill response equipment, and the capability of existing oil spill response technology should be evaluated.

Minimum performance standards should be established for OCS oil spill response equipment.

Outer Continental Shelf oil spill response time requirements should be established; lessees should be required to demonstrate ability to meet these standards as a condition of exploration and development.

- **Encourage Consolidation of Onshore Facilities to Reduce Demand on Existing Onshore Public Services, Infrastructure, and Land Use Changes**

Development and production of OCS oil and gas requires onshore marine terminals, processing plants, and crew and supply support facilities which can change the existing land use and place additional loads on public services infrastructure such as electric utilities, water and sewer systems, and ports and harbors. Potential displacement of existing land uses and increased demands on local services and infrastructure as a result of OCS development and production were among the concerns most frequently raised by local government officials during the Task Force's workshops in the sale areas.

Building fewer onshore facilities through consolidation clearly has the potential to reduce lessee development and operating costs. Further, consolidation of facilities could reduce a number of demands on local governments including facility permitting, regulation and compliance, and service provision.

Planning larger facilities to handle future production from the same area could reduce the need for additional sites, construction, and demand on services. The local governments would also issue fewer permits to induce consolidated use of onshore facilities.

Facility consolidation could produce substantial savings for both industry and local governments.

In order to support local governments in their land use planning, the Task Force suggests that lease stipulations or notices to lessees incorporate local ordinances relevant to siting and consolidation of OCS onshore facilities.

- **Establish Processes to Assist Local Communities to Address Onshore Impacts Associated With OCS Development**

Representatives from the oil industry, State and local governments, and local industries should be convened to determine appropriate ways to reduce adverse affects of onshore facility development associated with OCS development. Voluntary subcommittees could be created to address specific onshore issues such as: (1) community services including schools, (2) ports and harbors, and (3) recreation and tourism. These committees could function in a manner similar to the joint oil/fisheries committee in the Santa Barbara County area, which is funded by the oil and gas industry. This would not entail great expense.

The Task Force finds that MMS and NOAA can play a mediating role between State and local governments and the oil industry in mitigating adverse onshore effects of OCS development.

- **Require No Discharge of Drilling Muds/Fluids in Sensitive Areas**

Discharge of drilling muds and cuttings is known to adversely affect some biota including plankton, coral, and fish larvae. A variety of alternatives to direct ocean discharge are required by lease stipulation, State regulation, and NPDES permits. The alternatives

include shunting to ocean bottom, barging to land disposal, incineration, injection, and barging to ocean dump site.

The Task Force finds that mitigation programs should be required for drilling in sensitive environments to reduce adverse effects.

Consistent with the recommendations of the NAS/NRC report, MMS should institute a research program to evaluate the chronic effects of muds, cuttings, and other discharges on the marine environment.

• Establish Joint Oil Industry/Fishing Industry Coordinating Committees in Areas Where OCS Activities Are Likely to Conflict With Commercial Fishing

- Joint committees should be funded by industry and operated jointly by the oil and commercial fishing industries.
- Joint committee should meet to resolve issues including, but not limited to:
 - (1) scheduling of geophysical surveys;
 - (2) oil industry activity in traditional fishing areas; and,
 - (3) compensation and mitigation programs.

The Task Force suggests the establishment of a joint oil industry/fisheries industry liaison committee wherever leasing is to occur. It should be similar to the Joint Oil/Fisheries Committee which focuses on potential conflicts offshore San Luis Obispo, Santa Barbara and Ventura Counties. The Task Force thinks that fishermen and seismic operators should be able to work out a schedule of seasons and locations as a means to avoid conflict. Seasonal discharge restrictions may also be appropriate.

With regard to heavy vessel traffic, there need to be mutually agreeable traffic corridors in order to minimize damage to fishing gear. In the event that there is damage to fishing gear as a result of heavy vessel traffic or seismic surveys, a set of mutually agreeable guidelines is needed for agreeing how to compensate or mitigate for potential impacts. The Task Force also suggests that guidelines are needed to establish the length of time between the date a claim is filed and the date the claimant receives compensation. This process needs to be as efficient as possible in order to permit timely gear replacement.

The Task Force recognizes that the majority of problems which occur between the fishing and the oil and gas industries are the result of space and scheduling conflicts. The Task Force finds that a joint oil industry/fisheries industry committee would be capable of handling many conflicts.

• Strengthen Policies to Protect Environmentally Sensitive Areas

The Secretary of the Interior could strengthen policies to protect National and State parks, marine sanctuaries, and wildlife areas that exist near leasing areas.

Means of special protection might include:

- (1) defer areas near designated parks, wildlife refuges, marine sanctuaries, and areas of special biological significance;

- (2) require resource management agencies, in conjunction with oil and oil transportation industries, to consider ways to respond to oil spills in order to protect significant resources; and
- (3) notify Federal, State, and private oil spill response officials of the presence of significant natural resources to assure that OCS oil spill contingency plans address what is necessary to protect natural resources in case of emergency.

The Secretary of the Interior should strengthen policies to protect significant biological features such as pinniped haul-out areas, coral reefs, hard bottoms, sea mounts, canyon heads, and seagrass beds that exist throughout the areas under consideration.

MMS should be required to include lease stipulations that would:

- (1) protect biologically sensitive resources to the maximum extent practicable; and
- (2) require mitigation of impact to sensitive biological resources wherever practical.

**The Adequacy of Environmental Information For
Outer Continental Shelf Oil and Gas Decisions:
Florida and California**

**Committee to Review the Outer Continental Shelf
Environmental Studies Program**

Board on Environmental Studies and Toxicology

**Commission on Physical Sciences,
Mathematics, and Resources**

National Research Council

**NATIONAL ACADEMY PRESS
Washington, D.C.
1989**

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

The National Academy of Sciences is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Frank Press is president of the National Academy of Sciences.

The National Academy of Engineering was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Robert M. White is president of the National Academy of Engineering.

The Institute of Medicine was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Samuel O. Thier is president of the Institute of Medicine.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Frank Press and Dr. Robert M. White are chairman and vice chairman, respectively, of the National Research Council.

The project was supported by the President's Outer Continental Shelf Leasing and Development Task Force through Department of the Interior Contract No. 1435000130495.

A limited number of copies of this report are available from the Board on Environmental Studies and Toxicology, 2101 Constitution Avenue, N.W., Washington, D.C. 20418

Executive Summary

The environmental impacts of oil and gas production on the U.S. outer continental shelf (OCS) have been studied and debated for many years. The issues derive from the complexity of coastal and offshore marine processes and ecosystems, human socioeconomic systems, and interactions with OCS oil and gas development activities. Recently, intensified public concern has led to congressional moratoria on drilling in several OCS areas.

On February 9, 1989, President Bush announced his decision to postpone leasing for OCS areas off southwestern Florida (sale 116, part 2), northern California (sale 91), and southern California (sale 95). At the same time, the President created a cabinet-level task force to review the environmental concerns for these three OCS areas, and he also requested independent advice from the National Research Council (NRC). The NRC was asked to assess the adequacy of the available scientific and technical information on estimated hydrocarbon resources and potential environmental effects for the three specified areas.

The National Research Council has addressed these questions many times in the past. In 1973, President Nixon asked the Council on Environmental Quality and the National Research Council to review OCS environmental concerns. Again, in 1978, the National Research Council issued a review of the OCS Environmental Studies Program, which was then managed by the Bureau of Land Management; in 1983, it issued a report on drilling muds and fluids; and in 1985, it released its report, *Oil in the Sea: Inputs, Fates, and Effects*.

In addition, two directly relevant studies were already being carried out by the NRC when President Bush requested this new evaluation. The Committee on Undiscovered Oil and Gas Resources was already reviewing the methods used to estimate onshore and offshore hydrocarbon resources, and the Committee to Review the Outer Continental Shelf Environmental Studies Program (the OCS committee), along with its three panels on physical oceanography, ecology, and socioeconomics, was in the process of reviewing the Minerals Management Service (MMS) program of studies that provides environmental information for OCS oil and gas decisions nationwide. Because these studies had been under way for some time, the NRC committees had

the committees did not have to review the three specified OCS lease areas in isolation. A great deal of relevant information had already been developed by the committees in studying the relationships between scientific knowledge and the OCS leasing program as a whole.

This report, by the OCS committee and its three panels, reviews the adequacy of information bearing upon the potential environmental impacts of OCS oil and gas activities for the three sale areas. The review focuses on physical oceanography, ecology, and socioeconomics. To carry out its charge, the OCS committee and its panels had to consider the overall OCS leasing process, and particularly the leasing decision itself. This was essential to answer the main question regarding the "adequacy" of scientific information for leasing decisions. Scientific and technical questions dominated the committee's and panels' deliberations, but institutional aspects of the leasing process, the law and policies that shape it, and practical realities all influenced these deliberations and the committee's working concept of adequacy.

CRITERIA FOR ADEQUACY

The committee's working definition of "adequacy" for this assessment has two aspects: completeness and scientific quality. Of course, "complete" scientific information in the ultimate sense is neither feasible nor necessary for making decisions. Rather, the committee's criteria for completeness were based on what constitutes enough information for OCS decisions; they are detailed and explained in the three chapters that deal with physical oceanography, ecology, and socioeconomics. The standards of scientific quality entail repeatability, reliability, and validity of measurements and analyses, including appropriateness of methods and subject. The working definition of scientific quality used by the committee and panels was whether the methods described represent the current state of good practice in each scientific field (i.e., whether they would be likely to pass peer review). This does not imply that the criterion is actual publication in a peer-reviewed scientific journal, but rather that the quality of the data and scientific interpretations used for OCS decisions should meet this basic scientific standard. The committee applied this standard to the information for each of the three OCS regions considered in this report.

CONCLUSIONS AND RECOMMENDATIONS, BY LEASE SALE AREA

The committee concluded that the available scientific and technical information bearing on potential environmental impacts is currently inadequate for decisions about development and production in all three OCS lease sale areas. For decisions on leasing, the following table summarizes the committee's overall conclusions for each of the three areas (see text for discussion of the availability, quality, and use of the information).

<u>Lease Sale Area</u>	<u>Physical Oceanographic</u>	<u>Ecological</u>	<u>Socioeconomic</u>
Southwestern Florida (Area 116, Part 2)	Marginal	Inadequate	Inadequate
Northern California (Area 91)	Adequate	Adequate	Inadequate
Southern California (Area 95)	Inadequate	Adequate	Doubtful

Overall, the committee judged that the currently available information in some categories is at least marginally adequate to make leasing decisions for each of the sale areas, but better information in one or more categories is needed for every area. The present physical oceanographic information is marginally adequate for leasing decisions off northern California, but inadequate for southern California. For southwestern Florida, enough is known to provide

reasonable first-order estimates of the movement of spilled oil, but better information enabling error estimates would be desirable for a leasing decision. The ecological information is sufficient to make leasing decisions for both California areas (although better information is needed on birds in Baja California). The ecological information is inadequate for southwestern Florida. The available socioeconomics information is inadequate for a leasing decision for two of the three sale areas—southwestern Florida and northern California. The Socioeconomics Panel has not had sufficient time to evaluate the considerable literature on socioeconomics in southern California. No EIS has been produced for lease sale 95 in southern California, and the socioeconomics information provided by MMS to the panel is inadequate for informed decision making there.

Lease Sale 116, Part 2 (Southwestern Florida)

Physical oceanographic information is sufficient to predict that any oil spill in the sale area would probably soon hit the coast. The ecological and socioeconomics information currently being used or available for a leasing decision is inadequate or not sufficiently reliable for a leasing decision for the southwestern Florida OCS area. More information in all three scientific disciplines would be needed for development and production decisions.

The physical oceanography of the region is known with sufficient certainty to provide first-order estimates showing that oil spills associated with OCS activities would have a high probability of interacting with sections of the Florida coast. However, it is difficult without further data to ascertain the range of error in the results of models used to provide the first-order estimates. The uncertainties of oil spill trajectories could be narrowed with more focused studies of the physical oceanography of the region. These studies are within the current capabilities and state of knowledge in physical oceanography and could be accomplished within a few years after initiation.

Ecological information needed for a leasing decision should include characterization of the environment, identification of the biological resources at risk, and a basic understanding of ecological relationships. Where rare or endangered species and communities unique to the United States exist, as in the southwestern Florida leasing area, more extensive characterization should be required before a leasing decision is made. Additional information is needed to assess the sensitivity of unique coastal ecosystems, such as corals, seagrasses, and mangroves, to the long-term chronic releases from OCS production activities as well as to the immediate and long-term impacts of spilled oil. Therefore, more detailed site- and ecosystem-specific information is needed to assess potential impacts of OCS activities before a leasing decision is made.

The socioeconomic aspects of environmental impacts have been inadequately addressed in the assessments to date. Indeed, many potential and actual impacts have not even been considered.

Lease Sale 91 (Northern California)

Ecological information is adequate and physical oceanographic information is marginally adequate for a leasing decision, but socioeconomic aspects of the scientific and technical information now being used or available to make a leasing decision for the northern California OCS area are inadequate. More information in all three scientific disciplines would be needed for development and production decisions.

The physical oceanography of the area is reasonably well known; this information is adequate for a leasing decision for the area. However, there is a need for better coordination of actual field observations with the oil spill risk assessments for the area. Continued site-specific data gathering and assessment during exploration, development, and production—if they occur—are recommended to refine models and provide a more thorough understanding of the physical oceanography in the region.

Baseline information on the distribution and abundance of many species of marine organisms is sufficient for a leasing decision. More detailed site-specific studies on the sensitivity of different components of the ecosystem to various impacts of OCS activities should be obtained if exploration occurs.

The socioeconomic studies and assessments in this area are inadequate for making a leasing decision. Many potential and known impacts have not been considered.

Lease Sale 95 (Southern California)

Ecological information is adequate for a leasing decision, but physical oceanographic and socioeconomic aspects of the scientific and technical information now being used or available for the southern California OCS area are inadequate or not sufficiently reliable for a leasing decision. More information in all three scientific disciplines would be needed for development and production decisions.

The physical oceanography of the southern California lease sale area is extremely complex. Currently available information is insufficient to make a leasing decision. However, studies to provide adequate information for the area are within the current capabilities and state of knowledge in physical oceanography and could be accomplished within a few years after initiation.

Baseline information on the distribution and abundance of species of marine organisms is adequate for making a leasing decision for southern California. Additional information regarding the interaction of OCS activities with other disturbances (both anthropogenic and natural disturbances) is needed during exploration to predict future impacts of development and production.

There is a substantial body of socioeconomic information for southern California; the panel has not had enough time to review all of it. There is no EIS for sale 95. The staff papers provided by MMS for sale 95 in lieu of a draft EIS (U.S. DOI, 1989) are not adequate to make a leasing decision. The committee and panel cannot judge at this time whether additional studies are needed or whether there is enough information to support an adequate analysis.

CONCLUSIONS AND RECOMMENDATIONS, BY TYPE OF INFORMATION

Physical Oceanography

The body of knowledge on the physical oceanography of the three regions varies considerably in scope and quality. For example, the data base for southwestern Florida is relatively incomplete. Few modern oceanographic studies have been undertaken for this region, e.g., as compared to northern California. Present numerical modeling work for the Gulf of Mexico is marginal. Oil Spill Risk Analysis (OSRA) model results give reasonable first-order estimates; spilled oil can be expected to hit the shore because of the boundary Loop Current. However, it is difficult without further information to ascertain the range of error in results with the present OSRA model.

A considerable amount of information exists concerning the circulation off northern and central California. Although some features of the circulation could be studied further, new observations should focus on the estimation of trajectories and trajectory statistics. There is not a correspondingly complete description of circulation for the Southern California Bight. Although MMS has used a circulation model for input to the OSRA model, it has not taken advantage of all available observations. The flow field in the bight is not well known. The circulation model is not complete and does not reproduce several prominent observed features of the coastal circulation. This model may not be adequate for use in impact assessment. Substantial fieldwork to provide a better observational picture of circulation in the Southern California Bight needs to be undertaken. Numerical general circulation models alone will not provide sufficient realism for trajectory prediction or estimation of trajectory statistics. Model studies need to be supplemented

with observations. Trajectory predictions or estimations of trajectory statistics realistic for use in risk analysis or in accident management cannot be obtained without new fieldwork, including drifter studies. Although these observations may ultimately help the development of circulation models, which it is hoped will be in quantitative agreement with existing data, the first priority should be to take more observations and incorporate them into trajectory predictions.

Ecology

The basic information needed to make a leasing decision anywhere includes a characterization of the environment, identification of the biological resources at risk, and a basic understanding of ecological relationships. For southwestern Florida, where unique habitats and endangered and rare species exist, more extensive characterization of the sensitivity of biota to OCS-related activities, characterization of recovery rates, and identification of mitigating measures are needed.

For both California lease areas (91 and 95), there is enough baseline information to make an informed decision about leasing, although more information is needed about birds along the Pacific coast of Baja California (Mexico). More detailed site-specific analyses would be needed during exploration. If commercial quantities of petroleum are discovered, additional information will be necessary to assess the environmental impact of development and production. For lease sale 116, part 2 in Florida, the information is not currently adequate to make a leasing decision.

In addition to these general conclusions, the Ecology Panel had several overall concerns about the information available for decision making, especially concerning details of exploration, development, and production. First, the Department of the Interior (DOI) has relied too heavily upon the OSRA model for prediction of impacts. This has resulted in an emphasis on the probability of an oil spill instead of on the effects of a spill. Second, there is a lack of general process-level studies. Third, not enough attention has been paid to inshore, onshore, and estuarine areas. Fourth, there has been too narrow a focus on oil spills and not enough on the other potential impacts associated with development and production. Fifth, potential recovery rates of ecosystems after damage have been overestimated in the EISs. Sixth, sublethal and chronic effects of oil and gas activities have been largely ignored. Although such effects are difficult to predict, a much better understanding should have been obtained by now through investigations of oil and gas production in the Gulf of Mexico and southern California. Finally, much of the information on the distribution and abundance of various species covers too short a time span.

Socioeconomics

Socioeconomic information for two of the three lease sales—southwestern Florida (116, part 2) and northern California (91)—is not sufficient for informed decisions concerning OCS oil and gas activities. The panel has not had sufficient time to evaluate the considerable literature on socioeconomics in southern California. No EIS has been produced for lease sale 95 in southern California, and the information provided by MMS (U.S. DOI, 1989) to the panel is inadequate for informed decision making there. The panel has two major conclusions regarding lease sales 116, part 2 and 91:

- Standard social and economic analyses have been inadequately performed. In standard practice social and economic analyses of natural resource development focus on the direct and secondary impacts associated with development and production, as well as the related infrastructure and public-financing requirements. These analyses deal primarily with impacts that are quantifiable, often in economic terms. Such analyses were not systematically carried out by DOI; the data often were not current, not at the appropriate level of disaggregation to be useful at the local level, and not analyzed in a way that helps decision making. In addition, most of the studies have not built on previous work. Despite the abundant experience with OCS

development and production, there has been little followup research to validate assumptions and conclusions.

- Significant types of social and economic impacts have been ignored. Different kinds of social and economic impacts other than those that DOI has addressed can occur from OCS activities. Some begin even before a lease is sold. There is no program to systematically study and evaluate this class of impacts, and they have not even been considered in the EISs. The mere announcement of a lease sale can raise fear and uncertainty, stimulate organized political resistance, encourage land speculation, lead to lawsuits, and result in widespread anger and alienation among citizens who feel that their rights are being violated and their ways of life threatened. Responses to the possibility of sales have constituted intense, effective, and costly opposition to the government's leasing program, but the information necessary to analyze them and other prelease impacts has not been gathered. The panel has not yet completed its investigation of the management and policy implications of these impacts. For the present, the panel notes that these impacts are real and have proved costly.

SOME UNDERLYING CONCERNS

Separation of Leasing from Development and Production

One matter of underlying concern to the committee and panels involves the phasing of OCS leasing, exploration, development, and production as currently practiced. Studies by MMS's Environmental Studies Program and the assessments found in DOI's environmental impact statements have focused almost entirely on the lease sale stage. Two fundamental problems result from this practice. First, the exact location of oil and gas reservoirs is unknown at the prelease stage. As a result, it is impossible to identify the specific future location of facilities and to predict specific environmental impacts of development. Equally important, the uncertainty about actual oil and gas reserves at the prelease stage makes it difficult to balance the national benefits of production against the environmental risks. Second, by the time producing reservoirs are identified, the industrial lessor typically has committed enormous amounts of money to the lease. DOI has never implemented the procedures provided in the OCS Lands Act Amendments of 1978 (OCSLAA) for lease cancellation, and so a decision to lease is generally perceived as tantamount to a decision to develop and produce, provided that commercial reserves are found in a lease area. This point has been made in prior studies and was considered in depth by Congress in the deliberations leading to the 1978 OCSLAA. As DOI's EISs point out, it is often not possible to do adequate assessment before leasing. However, once it does become possible to generate the needed information and analysis, a decision not to proceed with development has already been effectively precluded.

The perception is widespread that leasing implies development and production if commercial quantities of hydrocarbon resources are found. In a 1984 Supreme Court decision (*Secretary of the Interior vs. California*, 104 S. Ct. 656), the majority wrote: "... a lease sale is a crucial step. Large sums of money change hands, and the sale may therefore generate momentum that makes eventual exploration, development, and production inevitable." The minority wrote: "Approval for exploration and development by the lessee is obviously the expected and intended result of leasing; if it were not, the Secretary would not bother to lease and the lessees would not bother to bid." In spite of provisions for a "focusing of analysis and review [that] will occur at later stages in lease sale planning ... most states doubt that adequate analysis will be performed, and that decision alternatives will be preserved through the process" (Hershman et al., 1988). Many local, state, and federal government officials have expressed similar points of view to the OCS committee and panels. Furthermore, several MMS officials have informed the committee that out of hundreds of OCS development and production plans submitted by industry since 1978, although modifications have been required, none has ever been denied by the Department of the Interior. For these reasons, the committee and panels cannot confirm that there is a de facto separation of OCS leasing from development and production decisions in actual current practice.

In requiring development and production plans (except in the Gulf of Mexico, where OCSLAA does not require them), OCSLAA recognizes the distinction between environmental

impacts at the exploration versus the development and production stages. Only one development and production plan in each planning area is required by OCSLAA to be declared "a major Federal action," and hence to need an EIS. This requirement has resulted in detailed EISs and extensive public debate over development plans in the Santa Maria Basin and Santa Barbara Channel of California. Presumably, similar analysis and dialog will take place as other new "frontier areas" (i.e., areas that do not yet have producing wells) are opened. But the perception that the "no development" scenario is effectively precluded after leasing has affected the tone of the debate.

The committee believes that until this problem is resolved, effective environmental assessment and a credible public dialog will be difficult. A more comprehensive EIS at the development and production stage could take advantage of improved knowledge and additional studies to gain information. The committee recognizes that such a change in procedure could imply important changes in how industry and the federal government treat lease sale bids, revenues from bids and royalties, and associated economic issues. Nevertheless, the current delays in timely and orderly leasing decisions caused by environmental concerns might be reduced significantly by changes in current leasing procedures. Therefore, the committee concludes,

If a more comprehensive assessment for the entire possible sequence of OCS oil and gas activities cannot be made at the time of the leasing decision, then leasing and exploration should be more clearly separated in practice from development and production, with distinctly different phases of scientific data-gathering and analysis.

Science and Public Opinion

A second matter of underlying concern to the committee involves the apparent effects of regional public opinion on the development of scientific information on which to base leasing decisions. The committee is struck by the differences it has found between regions with respect to the content and quality of MMS studies and environmental assessments. Socioeconomic elements that are emphasized in Alaska have not been emphasized elsewhere. Environmental studies funded in California are not funded in the Gulf of Mexico. Some of these differences in emphasis can be justified on scientific and technical grounds. For example, in some cases, less is done in one region because adequate information is already available or because the scientific significance of a particular study is greater at one place than another. Similarly, certain socioeconomic issues might be critical in rural or frontier areas, but of only marginal significance in Los Angeles. Nevertheless, substantially greater resources and effort have been expended for those areas in which offshore activity was being protested, perhaps at the expense of regions that had no less exposure to potential environmental impacts, but where there was less protest.

National Energy Policy

Finally, the committee notes the present uncertainties as to national (federal) energy policy. In the largest sense, the leasing of federal offshore petroleum resources represents an assertion of national objectives (energy policy and the management of federal resources) in a context with high potential for conflict. This potential has obviously been realized in conflicts between the federal programs responsible for offshore leasing and various environmental groups, affected states, local governments, and other governmental jurisdictions. These groups have raised many concerns about environmental quality, other uses of the ocean and coast, and the avoidance of undue socioeconomic impacts.

Adequate scientific information is clearly a key element in the effort to resolve these conflicts. However, the committee also is keenly aware of the demand for offshore energy and the federal revenues derived from offshore leasing. There is concern that these objectives, however legitimate, are not adequately defined or placed in context by national energy policy, although current efforts at the Department of Energy to reassess the national energy policy are

encouraging. Although largely undefined at present, these objectives nonetheless appear to drive the MMS program, largely determining the pace of leasing and the perceived need for MMS to meet program goals.

**Evaluation of the Hydrocarbon Resource Estimates
for the Offshore Areas of
Northern and Southern California
and Florida South of 26° Latitude**

**Committee on Undiscovered Oil and Gas Resources
Board on Earth Sciences and Resources
Commission on Physical Sciences, Mathematics, and Resources
National Research Council**

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

The National Academy of Sciences is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Frank Press is president of the National Academy of Sciences.

The National Academy of Engineering was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Robert M. White is president of the National Academy of Engineering.

The Institute of Medicine was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Samuel O. Thier is president of the Institute of Medicine.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Frank Press and Dr. Robert M. White are chairman and vice chairman, respectively, of the National Research Council.

Support for this project was provided by the Minerals Management Service of the Department of the Interior.

Available from
Board on Earth Sciences and Resources
2101 Constitution Avenue, N.W.
Washington, D.C. 20418

Printed in the United States of America

Committee on Undiscovered Oil and Gas Resources

CHARLES J. MANKIN, Oklahoma Geological Survey, *Chairman*
JOHN J. AMORUSO⁺, Amoruso Petroleum Company
GEOFFREY S. BAYLISS⁺, GeoChem-Laboratories, Inc.
DORIS M. CURTIS⁺, Curtis & Echols, Consultants
RICHARD A. DAVIS⁺, University of South Florida
LLOYD E. ELKINS⁺, Petroleum Consultant
ROBERT J. FINLEY, Texas Bureau of Economic Geology
JOHN D. HAUN, Barlow & Haun, Inc., Consultants
HARRISON C. JAMISON⁺, Petroleum Exploration Consultant
GORDON KAUFMAN⁺, Massachusetts Institute of Technology
RICHARD D. NEHRING, NRG Associates, Consultants
STEVEN E. PLOTKIN, Office of Technology Assessment
MICHAEL PRATS, Michael Prats & Associates, Inc.
RICHARD M. PROCTER⁺, Geological Survey of Canada
JOSEPH P. RIVA, Congressional Research Service
ENDERS A. ROBINSON⁺, University of Tulsa
PAUL SWITZER⁺, Stanford University

Liaison Members

CHARLES G. GROAT⁺, Louisiana Geological Survey
HARRY C. KENT⁺, Institute for Energy Research Studies

Staff

INA B. ALTERMAN, Staff Officer
SUZANNA L. GILBERT, Project Secretary

* Served on the panel on the northern and southern California OCS areas.

⁺ Served on the panel on the southwestern Florida OCS area.

Board on Earth Sciences and Resources

BRIAN J. SKINNER, Yale University, *Co-Chairman*
WILLIAM L. FISHER, University of Texas at Austin, *Co-Chairman*
SAMUEL S. ADAMS, Colorado School of Mines
KEIITI AKI, University of Southern California at Los Angeles
ALBERT W. BALLY, Rice University
JAMES R. BAROFFIO, Chevron USA, Inc.
SANDRA L. BLACKSTONE, University of Denver
DONALD J. DEPAOLO, University of California at Berkeley
GORDON P. EATON, Iowa State University
W. G. ERNST, Stanford University
ROBERT N. GINSBURG, University of Miami, Florida
ALEXANDER F. H. GOETZ, University of Colorado
PRISCILLA C. P. GREW, Minnesota Geological Survey
PERRY R. HAGENSTEIN, Resource Issues, Inc.
HARRISON C. JAMISON, Petroleum Exploration Consultant
THOMAS H. JORDAN, Massachusetts Institute of Technology
CHARLES J. MANKIN, University of Oklahoma
CAREL OTTE, JR., Unocal Corporation
FRANK M. RICHTER, University of Chicago
THE HONORABLE J. J. SIMMONS III, Interstate Commerce Commission
STEVEN M. STANLEY, Johns Hopkins University
IRVIN L. WHITE, New York State Energy Research and Development Authority

ROBERT S. LONG, Staff Director

Commission on Physical Sciences, Mathematics, and Resources

NORMAN HACKERMAN, Robert A. Welch Foundation, *Chairman*
ROBERT C. BEARDSLEY, Woods Hole Oceanographic Institution
B. CLARK BURCHFIEL, Massachusetts Institute of Technology
GEORGE F. CARRIER, Harvard University
RALPH J. CICERONE, University of California at Irvine
HERBERT D. DOAN, The Dow Chemical Company (retired)
PETER S. EAGLESON, Massachusetts Institute of Technology
DEAN E. EASTMAN, IBM T. J. Watson Research Center
MARYE ANNE FOX, University of Texas
GERHART FRIEDLANDER, Brookhaven National Laboratory
LAWRENCE W. FUNKHOUSER, Chevron Corporation (retired)
PHILLIP A. GRIFFITHS, Duke University
NEAL F. LANE, Rice University
CHRISTOPHER F. McKEE, University of California at Berkeley
RICHARD S. NICHOLSON, American Association for the Advancement of Science
JACK E. OLIVER, Cornell University
JEREMIAH P. OSTRIKER, Princeton University Observatory
PHILIP A. PALMER, E. I. du Pont de Nemours & Company
FRANK L. PARKER, Vanderbilt University
DENIS J. PRAGER, MacArthur Foundation
DAVID M. RAUP, University of Chicago
ROY F. SCHWITTERS, Superconducting Super Collider Laboratory
LARRY L. SMARR, University of Illinois at Urbana-Champaign
KARL K. TUREKIAN, Yale University

MYRON F. UMAN, Acting Executive Director
ROBERT M. SIMON, Acting Associate Executive Director

CONTENTS

EXECUTIVE SUMMARY	1
INTRODUCTION	2
NORTHERN AND SOUTHERN CALIFORNIA OUTER CONTINENTAL SHELF AREAS	3
Evaluation of Methodology, 3	
Conclusions, 4	
SOUTH FLORIDA BASIN OUTER CONTINENTAL SHELF, SOUTH OF 26° LATITUDE	6
Evaluation of Methodology, 6	
Geology/Geophysics Data Base, 6	
Resource Assessment Procedures, 7	
Conclusions, 7	

EXECUTIVE SUMMARY

The Committee on Undiscovered Oil and Gas Resources was asked to review and evaluate (1) the methods and procedures used by the Minerals Management Service (MMS) to estimate oil and gas resources for three outer continental shelf (OCS) areas and (2) the adequacy of the information for producing credible estimates for those areas. The committee established two panels to study these matters, one for the two areas of northern and southern California (lease sales 91 and 95, respectively) and the other for the South Florida Basin (lease sale 116, part 2). In working sessions at the MMS field offices where the information is maintained, the panels examined representative information, which is proprietary, pertinent to the OCS area and reviewed the methods and procedures applied to the information by the professional staff that conducted the resource estimate.

The panel that conducted the reviews of the northern and southern California areas finds that the MMS has an extensive and adequate data base for the two areas from which to develop resource estimates. The professional staff is judged to be highly qualified, and their methods and procedures in the assessment process appear to be generally appropriate. In the panel's opinion the current resource estimates are very likely conservative because of incomplete consideration of potential stratigraphic accumulations and other conceptual plays not detectable by seismic methods and because of MMS risking techniques and economic screening.

The panel was not able to evaluate directly the current MMS resource estimate for the South Florida Basin because the estimate was not available at the time the review was conducted. However, the panel examined the quantity and quality of available data and reviewed the methods and procedures employed in the resource estimation process.

Because no wells have been drilled in the basin, there is no firm basis for the determination of velocities or other stratigraphic control of the seismic data, no direct evidence of rock units that could serve as hydrocarbon reservoirs, and no direct method of recognizing potential hydrocarbon source rocks. Consequently, it is reasonable to expect large uncertainties in the resource estimate. However, good use is made of well data in adjacent areas, and the seismic lines, although sparse in parts of the basin, are of very high quality. The methods and procedures employed by the staff in extrapolating from areas with information to areas with little data are entirely appropriate for the level of information available for the basin.

The Committee on Undiscovered Oil and Gas Resources (the parent committee for the review of the three lease areas that are the subject of this report) is conducting a review of the methodologies and procedures used by MMS, and the information available to the agency in producing hydrocarbon resource estimates for all offshore areas of the United States. At the time of the preparation of the panel reports, the committee had not reached conclusions concerning some aspects of the methodologies and procedures that influence the hydrocarbon resource estimates produced by MMS. Therefore, the members of the two panels (who are members of the parent committee as well) conducted the review of these three lease areas without considering such issues of methodologies and procedures. The committee concurred with this approach, and will provide further elaboration in its report scheduled for release in March 1990.

INTRODUCTION

In his budget address to Congress on February 9, 1989, President Bush announced the establishment of a cabinet-level task force to review environmental concerns associated with outer continental shelf (OCS) oil and gas activities in three OCS lease areas: southwestern Florida (sale 116, part 2), southern California (sale 95), and northern California (sale 91). The National Research Council was asked to provide the task force with a review of scientific and technical information about environmental concerns and petroleum resources.

Committees in two boards of the National Research Council were already involved in relevant studies. The Committee on Undiscovered Oil and Gas Resources in the Board on Earth Sciences and Resources was reviewing methods of estimating onshore and offshore undiscovered hydrocarbon resources. The Committee to Review the Outer Continental Shelf Environmental Studies Program in the Board on Environmental Studies and Toxicology was reviewing the Environmental Studies Program (ESP) of the Minerals Management Service (MMS). On the basis of their experience with these nationwide reviews, the committees undertook to review the information pertaining to the three sale areas of concern. This report is from the Committee on Undiscovered Oil and Gas Resources.

To address the request, two panels of the committee were established: one panel was assigned the task of reviewing the Minerals Management Service (MMS) estimates of undiscovered hydrocarbon potential of the northern and southern California portions of the OCS (lease sales 91 and 95, respectively); the second panel was assigned to review the estimates for the southwestern Florida portion of the OCS (lease sale 116, part 2).

This report is the product of the combined efforts of the two panels.

The charge to each of the panels was to do the following:

1. Review and evaluate methodologies of estimates by MMS, and others, regarding the quantity and chemical composition of potential hydrocarbon resources in the OCS area(s).
2. Assess the adequacy and reliability of the existing scientific and technical information to make the following determinations in each subject and area under consideration; specifically (a) what is known, plus reasonable extrapolation accompanied by an expression of the error or uncertainty, (b) what information is missing and the reasons why (e.g., difficulty of measurement, confounding of data, lack of theory, or insufficient time), (c) what information could be obtained with reasonable increments of investigative resources (e.g., personnel, financial support, facilities, and time), and (d) what most needs to be known to support decision making on a factual basis comparable to other similar problems?

The findings presented herein are to be considered preliminary and subject to review and possible modification by the committee in its forthcoming report.

NORTHERN AND SOUTHERN CALIFORNIA OUTER CONTINENTAL SHELF AREAS

In order to evaluate the data and methodology used in estimating oil and gas resources in the northern and southern California OCS, the panel held a three-day meeting on June 26-28, 1989, at the regional office of MMS in Los Angeles. During the panel meetings with MMS, a thorough, detailed, in-depth review of the entire scope of lease sales evaluation procedures and resource assessment processes was conducted. Los Angeles MMS regional supervisor, Robert Paul, and his professional staff presented every aspect of their methodology to the panel with complete cooperation, openness, and constructive attitudes, and full access to data, thought processes, and systems applications was given. At least 12 MMS personnel participated in the review.

Evaluation of Methodology

The panel reviewed the entire process by which economic evaluations for lease sales are derived on a tract basis and by which oil and gas resources are calculated. Because of the extensive seismic data base available to MMS in both the northern and the southern California lease sale areas, structural prospect mapping is the primary focus for identifying undiscovered resources of oil and gas. The same method used to evaluate prospects for tract economics is used in the resource assessment process.

In the MMS Pacific Region a threefold, stratigraphically subdivided play definition is used: i.e., pre-Monterey, Monterey, and post-Monterey. Undiscovered resources are aggregated from prospect to basin to area to region. This process is consistent within the region, but does not conform to "play definition and analysis" as used both offshore and onshore elsewhere in the National Assessment.

In both the MONTCAR (tract evaluation) and the PRESTO (resource assessment) programs, critical aspects lie in the methods by which risk is assessed with respect to zones, prospects, basins, and areas. Definition and application of probabilistic dependence and independence in risk analysis may significantly alter resource estimates. For example, in one case where four zones were evaluated by individual chance of success (1 minus percent risk) to arrive at a prospect chance of success, the zones were assumed to be independent, an assumption that the panel judged to be unwarranted and which resulted in a prospect chance of success of 0.73. If the zones had been judged to be dependent, the result would have been 0.85 (zone chance factors used were 0.98, 0.97, 0.90, and 0.85). Because the chance of success is a direct multiplier in the operation which determines prospect reserves, significant reserve reduction would occur in multimillion barrel prospects. The significance of the probabilistic dependence/independence assumptions are currently under review and will be addressed in the committee's report.

It is apparent to the panel, though, that current practice may result in conservative estimates of undiscovered resources in both areas. A substantial effort to improve current risk assessment practice is warranted. First, statistical studies of well data to determine the empirical nature of zone risk dependencies should be undertaken. Few have been done. Second, the results of such studies should be incorporated into MMS risk assessment procedures.

Using all available subsurface well data and extensive seismic reflection data, MMS personnel do attempt to define, map, and estimate undiscovered resources for "postulated" or "unidentified" plays. These include stratigraphic traps (e.g., pinchouts or truncations), complex structures (e.g., thrust faults), diagenetic alterations (e.g., opal-chert), and statistical projections of unmapped structural closures in areas with widely spaced seismic grids.

Inherent difficulties in identifying, justifying, and quantifying unidentified prospects may result in underestimating undiscovered resources, particularly in the more remote frontier areas such as the Eel River Basin of the northern California OCS area and the outer banks and basins of the Southern California OCS area. For example, in the northern California Eel River Basin, the entire "postulated" resource was allocated to an estimated 4 "unidentified" structural prospects as compared to 92 "identified" structural prospects. In the entire basin the unidentified category yielded a risked total resource of only 5 million barrels of oil as compared to a total of 159 million barrels of oil for the identified category. This process does not include possible stratigraphic or other types of conceptual traps known to occur in other California basins.

With regard to the chemical composition of potential hydrocarbon resources, MMS has utilized available data sources including public as well as purchased proprietary geochemical analyses of specific wells, surface sections, bottom samples, basins, and areas. Engineering data from field and production history are effectively applied by direct projection or by analog comparisons.

Determination of total basin generative capacity as a means of estimating the quantity of hydrocarbons is not used except by analogy based upon onshore basin comparisons.

Focus upon the Monterey Formation as the dominant source (and reservoir) may have the effect of downplaying other potential hydrocarbon source beds and thus tend to understate their contribution to postulated or unidentified plays in resource assessment processes. Nevertheless, the MMS methodology in characterizing the types and compositions of hydrocarbons in potential accumulations seems to the panel to be a fundamentally sound state-of-the-art application of geochemical data and principles.

At this stage in the committee's review of the MMS methodology to estimate quantity and chemical composition of potential hydrocarbon resources, the assessments of the northern California area and the southern California area seem to be adequate for economic tract evaluation decision making. The panel considers that the process appears to develop a conservative estimate through application of multiple risking approaches and economic screening. If this is sustained in the committee's final report, the MMS resource estimation efforts will probably be found to understate the undiscovered resource base that could yield potentially recoverable reserves.¹

Conclusions

In reviewing what is known, it is apparent that MMS has an unequaled, extensive data base of geological, geophysical, engineering, and production information on the southern and northern California OCS. The panel views this data base as adequate for making sound estimates of the hydrocarbon resources in these areas. The staff is highly qualified and applies currently accepted, state-of-the-art methods to their analyses and interpretations. Continued study, review of methods, and sensitivity testing of results of risking and dependence versus independence could benefit the process of resource assessment.

A critical element with respect to missing information lies in the inability of MMS (or USGS) to obtain the use of certain confidential data concerning state of California waters in the 3-mile zone. The California State Lands Commission retains control over the data,

¹ The term "recoverable reserves" is used herein in its standard connotation of referring to those identified hydrocarbons that are recoverable by all existing methods except for enhanced oil/gas recovery.

which results in a critical gap in the transition area of projection of interpretive trends from onshore to offshore.

Although MMS has extensive seismic grid coverage, especially in the productive and more competitive basins and areas, northern portions of the Eel River Basin of northern California and the western extremities of the southern California outer banks and basins could be better understood with a denser seismic grid.

In order to enhance decision making based upon the relative values and significance of potential resource development, it is important to utilize the best possible knowledge and understanding of these resources. More emphasis on conceptual geologic plays or prospects could improve the "postulated" or "unidentified" component of the assessment.

Priorities within MMS now limit detached analysis of prospects to post-sale evaluation of tracts having received bids. Because the resource assessment process is directly related, and dependent upon, the lease sale process, more detailed mapping and evaluation of prospects as a routine treatment of tracts prior to sales could yield a more defensible result.

In the panel's view, MMS tends to emphasize the economic assessment of specific tracts for lease sale purposes. A policy of greater emphasis on resource base assessment processes within MMS, could result in more definitive knowledge of the resource base available for long-term exploration and development under different political, technological, and economic scenarios. This, in turn, could provide better support for enlightened decision making.

SOUTH FLORIDA BASIN OUTER CONTINENTAL SHELF, SOUTH OF 26° LATITUDE

In order to evaluate the data and methodology used in estimating oil and gas resources in the South Florida Basin OCS, the panel held a two-day meeting on June 27-28, 1989, at the regional offices of MMS in Metairie, Louisiana. The meeting was conducted in an informal, work-session format with excellent cooperation from the MMS regional supervisor for resource evaluation and his staff. Eight MMS professional staff members participated in the meetings.

Evaluations of Methodology

Geology/Geophysics Data Base

As their studies of the South Florida Basin were in an early stage of development and were ongoing, according to MMS staff, there is a limited data base. Extensive use of the available geologic literature was made in defining the nature of the basin and in focusing on the primary objective zones. No wells have been drilled in the offshore part of the basin to date, but well data from 6 dry holes along the Sarasota Arch, 11 dry holes along the Pine Key Arch, north and south of the basin, respectively, 3 dry holes in state waters on the south flank of the Sarasota Arch to the northeast of the basin, and data from the onshore, productive Sunniland Trend were extrapolated to define potentially productive zones. These data consisted of various types of well logs, sample logs, and well histories. At this stage of the studies, no samples had been examined by MMS personnel, but the panel was informed that this is planned for the near future.

Seismic data consisted of commercial seismic lines of good quality ranging in age from 1981 through 1988. The highest density of the seismic grid pattern was concentrated on and around acreage blocks associated with prior lease sales. Several Lower Cretaceous horizons and top of basement were identified on the seismic lines and were used to construct structure contour maps. A limited amount of geochemical data is commercially available for most of the wells drilled along the southern flank of the basin, but this has not been included in the MMS assessment. Total organic carbon sufficient for generating hydrocarbons is present in the onshore Sunniland source rocks. Thermal history plots for the onshore wells suggest that mature source rocks may be present offshore.

Lower Cretaceous formations make up most of the prospective section. Prospective horizons are the Dollar Bay carbonate and evaporite sequence, the Sunniland Formation, which has produced over 92 million barrels of oil from onshore fields, the porous Brown dolomite, the Pumpkin Bay and deeper carbonate sequence and the Lower Cretaceous Shelf Edge Reef Trend. Additional potential exists in Triassic(?) basal sands over the basement surface and in grabens. The presence of porous, prospective sections in the wells surrounding the basin leads to the interpretation that there may be zones of comparable reservoir quality within the basin itself.

A total of 141 structural traps have been mapped, using the available seismic grid. The traps are predominantly anticlinal closures and fault closures. An additional 119 structures have been interpreted by projecting the number of mapped prospects from areas of good seismic control into areas where seismic coverage is sparse or nonexistent.

Resource Assessment Procedures

The absence of wells drilled in the offshore parts of the basin results in greater uncertainty in resource estimation. Information obtained from wells aids in interpreting the seismic data through refinement of velocity profiles for the stratigraphic section and in correlating seismic reflectors with specific subsurface rock units. Furthermore, logs, samples, and cores from wells permit the identification and evaluation of potential source and reservoir rocks. If successful, these wells can provide for direct detection of hydrocarbons. The lack of such analytical tools impedes the assessment process. Although the panel is not in a position to determine either the number or the location of wells needed to characterize adequately the hydrocarbon potential of the basin, at least one stratigraphic test well is necessary for the reasons cited above.

Because of the nonuniform distribution of seismic control, it was necessary to extrapolate from areas of dense seismic grid where traps were well-defined to areas of no control in order to estimate the total number of possible traps in the resource assessment area. This extrapolation was done by direct analogy: the number of and size distribution of unidentified prospects in areas of sparse control are chosen to match experience in areas with good seismic control. Most of the identified traps are structural (e.g., fault or fold closures), and the estimated total number of traps is considered to be conservative. The panel had some concern with the narrow range of uncertainty expressed about the number of unidentified prospects at the time of its meeting with this branch of MMS.

Lack of data within the South Florida Basin generally has prevented the identification of stratigraphic traps (e.g., pinchouts or unconformities) to the extent to which they are probably present. Stratigraphic traps are very common in the equivalent stratigraphic intervals throughout the Gulf Coast region, and it is reasonable to expect that they will become increasingly important in this basin as the data necessary to identify them develop.

Various estimates of trap filling were used in calculating volumetric estimates of the resources of the basin, but the calculations were not complete at the time of the meeting. In the interim, calculated ultimate recoveries from other Lower Cretaceous fields along the Gulf Coast trend were used as indirect analogs to provide an indication of what order of magnitude might be expected in the resource estimate.

The current method of assessing unidentified prospects based on a sample of seismically generated prospects is subjective in character and might be usefully supplemented in future assessments with objective statistical methods specifically tailored to a seismic search for prospects.

The procedure for assigning risks to prospects follows standard MMS practice: judgmental probabilities of .90 to .94 for the prospect risk in frontier provinces is reasonable in light of experience elsewhere. In this assessment, MMS did not encounter the problem of assigning multiple zone risks. However, as exploration proceeds and information accumulates, the need will emerge to appraise multiple zone risks systematically. The committee will address this subject in more detail in its report.

Conclusions

At this writing, MMS is in the process of determining its resource estimate for the South Florida Basin but does not have it completed. The MMS regional supervisor for the Gulf Coast confirmed on August 29, 1989, that the resource estimate was in Washington pending final review. As the resource estimate of oil and gas for the basin was not available from MMS at the time this report was completed, the panel was not able to assess its credibility.

Although the available data are limited in the South Florida Basin, it is apparent to the panel from its meeting with MMS staff that they are using appropriate techniques for interpreting the geological potential of the basin. The methods used in predicting the number, distribution, and volume of structural traps are appropriate for this frontier area at this stage in its history. Because the estimation procedure does not include prediction of stratigraphic traps, the panel believes that the total resource estimate will probably be very conservative.

The Committee on Undiscovered Oil and Gas Resources (the parent committee for this panel) will comment further on the resource estimate of the South Florida Basin in its report to be issued in March 1990.



OUTER CONTINENTAL SHELF LEASING & DEVELOPMENT TASK FORCE

**A Report to the President
On Lease Sales 91, 95, and 116, Part II**

January 2, 1990

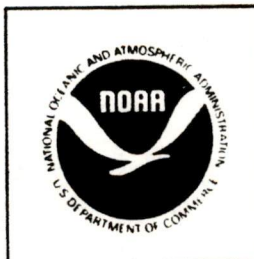
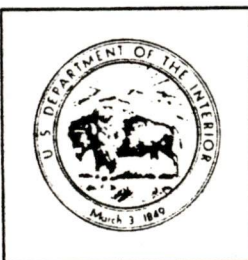
MANUEL LUJAN, JR., Chairman
Secretary of the Interior

JAMES WATKINS
Secretary of Energy

WILLIAM REILLY
Administrator of the
Environmental Protection Agency

JOHN KNAUSS
Administrator of the
National Oceanic and
Atmospheric Administration

RICHARD DARMAN
Director of the Office of
Management and Budget



**Outer Continental Shelf Leasing
and Development Task Force****Working Group Agency Representatives**

DOI	Tom Weimer Tim Glidden	NOAA	David Cottingham Ben Mieremet
DOE	David Doane	OMB	Robert Grady Gary Reisner
EPA	Brooks Bowen		

Task Force Staff

Robert E. Kallman, Executive Director
Richard Glynn, Deputy Executive Director
H. Theodore Heintz, Jr., Staff Director
Richard J. Ramsey, Policy Analyst
Paul D. Kranhold, Public Affairs Officer
Vicki Agnew, Administrative Officer
Carole Borton, Management Analyst
Ranieri Cavaceppi, Research Assistant
Christopher M. Dube, Research Assistant
James E. Sykes, Jr., Research Assistant

Agency Liaison

DOI	Jim Hughes Poe Leggette
DOE	Linda Stuntz Allan Fitzsimmons
EPA	Terry Davies Craig Hooks Alison Bird Robert Wayland
NOAA	Kent Burton
US Coast Guard	LCDR Wayne Hollingsworth
FWS	Columbus Brown
NPS	Kheryn Klubniken
MMS	Hugh Hilliard Ellen Aronson
US Geological Survey	Mike Fields
National Academy of Sciences	David Policansky

TABLE OF CONTENTS

	<u>Page</u>
CHAPTER 1: SUMMARY OF FINDINGS AND OPTIONS	
Introduction	I-1
Environmental Concerns Expressed to the Task Force	I-1
General Findings	I-2
Summary of Findings on Specific Environmental Concerns	I-4
Air Quality	I-4
Oil Spill Risk	I-4
Effects on Protected Lands	I-5
Effects on Protected Species and Other Wildlife	I-5
Effects on Commercial Fishing	I-5
Effects on Water Quality	I-6
Changes in Onshore Infrastructure and Land Use	I-6
Effects on Tourism and Recreation	I-6
Summary of Options Developed By The Task Force	I-6
Sale 116, Part II - Off Southwestern Florida	I-7
Option A	I-7
Option B	I-7
Option C	I-8
Protecting the Everglades and Keys from Oil Spills	I-9
Sale 95- Off Southern California	I-9
Option A	I-9
Option B	I-10
Option C	I-11
OCS Air Quality Regulations, Tanker Route Study, and Oil Spill Response	I-11
Sale 91- Off Northern California	I-12
Option A	I-12
Option B	I-12
Option C	I-13
Additional Environmental Control and Mitigation Measures	I-14
CHAPTER II: INTRODUCTION	
The President's Charge to the Task Force	II-1
The Workings of the Task Force	II-2
Agency Briefings	II-2
Public Workshops	II-4
Congressional Meetings	II-4
Field Trips	II-4
Federal Register Notice	II-5
CHAPTER III: A FRAMEWORK FOR CONSIDERING ENVIRONMENTAL EFFECTS	
Determining What is Environmentally Sound	III-1
Using Scientific Information To Resolve Concerns	III-1
Using Existing Standards	III-3
The Balancing Approach	III-4
The Consensus Building Approach	III-5
A Jurisdictional Perspective	III-5
Conclusions	III-7

CHAPTER IV: CONCERNS ABOUT ENVIRONMENTAL EFFECTS

Introduction	IV-1
Impacts on Air Quality	IV-2
Summary of Concerns	IV-2
Sale Specific Concerns	IV-4
Sale 116, Part II - Off Southwestern Florida	IV-4
Sale 95 - Off Southern California	IV-4
Sale 91 - Off Northern California	IV-6
Oil Spills	IV-7
Summary of Concerns	IV-7
Sale Specific Concerns	IV-13
Sale 116, Part II - Off Southwestern Florida	IV-13
Sale 95 - Off Southern California	IV-14
Sale 91 - Off Northern California	IV-14
Commercial Fisheries Concerns	IV-15
Summary of Concerns	IV-15
Sale Specific Concerns	IV-19
Sale 116, Part II - Off Southwestern Florida	IV-19
Sale 95 - Off Southern California	IV-19
Sale 91 - Off Northern California	IV-20
Effects on Protected Species	IV-21
Summary of Concerns	IV-21
Sale Specific Concerns	IV-22
Sale 116, Part II - Off Southwestern Florida	IV-22
Sale 95 - Off Southern California	IV-23
Sale 91 - Off Northern California	IV-24
Impacts on Protected Lands	IV-25
Summary of Concerns	IV-25
Sale Specific Concerns	IV-25
Sale 116, Part II - Off Southwestern Florida	IV-26
Sale 95 - Off Southern California	IV-26
Sale 91 - Off Northern California	IV-26
Social and Economic Impacts	IV-26
Summary of Concerns	IV-26
Sale Specific Concerns	IV-29
Impacts on Water Quality	IV-30
Summary of Concerns	IV-30
Sale Specific Concerns	IV-31
Sale 116, Part II - Off Southwestern Florida	IV-31
Sale 95 - Off Southern California	IV-31
Sale 91 - Off Northern California	IV-32

CHAPTER V: BENEFITS OF OCS OIL AND GAS PRODUCTION

Public Comments About OCS Benefits and Energy Policy	V-1
Benefits of OCS Oil and Gas Production	V-1
Energy Security Benefits	V-2
U.S. Vulnerability to Oil Supply Disruptions	V-3
Economic Benefits	V-3

Potential Benefits From the Three Sale Areas	V-3
Overview of the Current Situation: Declining Production and Rising Imports	V-4
Impact of Price on U.S. Production and Consumption	V-4
Oil Supply and Demand Outlook for the Future	V-5
Potential Contribution of OCS Resources to U.S. Oil Reserves	V-6
Concerns About the Estimated Amounts of Oil and Gas	V-7
Contribution of OCS Oil and Gas to the Economy	V-9
Energy Policy and Conservation	V-10
The Potential for Increased Oil Conservation	V-11
Potential Additional Oil Conservation Beyond Expected Savings	V-13
Summary of Oil Conservation Potential	V-14

CHAPTER VI: ASSESSMENT OF OPTIONS AND ENVIRONMENTAL PROTECTION MEASURES

Summary of Options Developed by the Task Force	VI-1
Sale 116, Part II - Off Southwestern Florida	VI-2
Location of Sale Area and Estimated Hydrocarbon Resources	VI-2
Option A	VI-3
Option B	VI-4
Option C	VI-5
Protecting the Everglades and Keys from Oil Spills	VI-6
Sale 95- Off Southern California	VI-7
Location of the Sale Area and Estimated Hydrocarbon Resources	VI-7
Option A	VI-8
Option B	VI-9
Option C	VI-10
OCS Air Quality Regulations and Tanker Route Study	VI-11
Sale 91- Off Northern California	VI-12
Location of the Sale Area and Estimated Hydrocarbon Resources	VI-12
Option A	VI-13
Option B	VI-14
Option C	VI-15
Additional Environmental Protection and Mitigation Measures	VI-16
Require Transport of OCS Oil in Pipelines Where Feasible and Environmentally Preferable	VI-16
Improve OCS Oil Spill Risk Assessment, Contingency Planning, and Response Capability	VI-16
Encourage Consolidation of Onshore Facilities to Reduce Demand on Existing Onshore Public Services, Infrastructure, and Land Use Changes	VI-19
Establish Processes to Assist Local Communities to Address Onshore Impacts Associated with OCS Development	VI-19
Require No Discharge of Drilling Muds/Fluids in Sensitive Areas	VI-19
Establish Joint Oil Industry/Fishing Industry Coordinating Committees in Areas Where OCS Activities are Likely to Conflict with Commercial Fishing	VI-20
Strengthen Policies to Protect Environmentally Sensitive Areas	VI-20

APPENDIX

"The Adequacy of Environmental Information for Outer Continental Shelf Oil and Gas Decisions: Florida and California," NAS/NRC, Executive Summary, 1989

LIST OF TABLES

		<u>Page</u>
Table I-1	Chances of An Oil Spill Over 30 Years Greater Than 10,000 Barrels	I-4
Table IV-1	Characterization of Air Quality Concerns	IV-2 +
Table IV-2	Air Pollutants from OCS Activities	IV-2
Table IV-3	Type and Quantities of Typical Emissions from OCS Activities and Platforms	IV-3
Table IV-4	Typical Nitrogen Oxide Emissions from California OCS Activities	IV-5
Table IV-5	OCS Oil Platform Spills/OCS Oil Pipeline Spills	IV-8
Table IV-6	Oil Spills by Source	IV-9
Table IV-7	OCS vs. Non-OCS Oil in the Sale Areas	IV-11
Table IV-8	Probability of One or More Oil Spills Greater Than 10,000 Barrels	IV-13
Table IV-9	Commercial Fisheries Harvest and Value	IV-16
Table IV-10	Characterization of Protected Species Concerns	IV-21 +
Table IV-11	Characterization of Social and Economic Concerns	IV-26 +

LIST OF FIGURES

		<u>Page</u>
Figure II-1	Lower 48 Planning Areas/Task Force Study Areas	II-1 +
Figure II-2	Lease Sale 116, Part II, Eastern Gulf of Mexico	II-1 +
Figure II-3	Lease Sale 95, Southern California	II-1 +
Figure II-4	Lease Sale 91, Northern California	II-1 +
Figure IV-1	Frequency of NAAQS Expected Exceedences: 1986-1988	IV-4 +
Figure IV-2	Oil in the Sea	IV-7 +
Figure IV-3	Cumulative Spill Risk - Southwestern Florida	IV-12 +
Figure IV-4	Cumulative Spill Risk - Southern California	IV-12 +
Figure IV-5	Cumulative Spill Risk - Northern California	IV-12 +
Figure V-1	World Oil Reserves	V-2 +
Figure V-2	U.S. Oil Consumption and Production	V-4 +
Figure V-3	U.S. Petroleum Net Imports: 1980-1989	V-4 +
Figure V-4	U.S. Oil Consumption, Production, and Imports: 1920-2000	V-5 +
Figure V-5	Comparison on Estimates of Undiscovered Economically Recoverable Oil and Gas	V-7 +
Figure V-6	U.S. Oil Use Intensity	V-11 +
Figure V-7	Oil Conservation Potential to the Year 2000	V-12 +
Figure V-8	Current U.S. Oil Use	V-13 +
Figure VI-1	Major Oil Bearing Regions in the Southern California Planning Area	VI-7 +
Figure VI-2	Possible Sale Configuration for Northern California (Option B)	VI-14 +

I. SUMMARY OF FINDINGS AND OPTIONS

INTRODUCTION

For many years, substantial controversy has surrounded the Federal Government's program to lease oil and gas resources on the Outer Continental Shelf (OCS) for exploration and development by the oil and gas industry. Concerns about the environmental effects of offshore oil and gas activities have given rise to strong opposition among the coastal residents of California and Florida. Where opposition has been strong, leasing, exploration, and development of oil and gas have been delayed by local permitting controversies, State coastal zone management actions, litigation, and congressional moratoria. It has become clear that past attempts to gain a consensus on the means of controlling environmental effects and the importance of developing offshore oil and gas resources have been unsuccessful in many cases in these areas.

In his message on the Fiscal Year 1990 budget, President Bush announced that he would establish a Cabinet level task force to "review and resolve environmental concerns" about three OCS oil and gas lease sales off Florida and California that had been scheduled for FY 1990. The three sales, shown in Figure II-1, are:

1. Lease Sale 116, Part II south of 26 degrees north latitude off the southwestern coast of Florida,
2. Lease Sale 95 off the southern coast of California, and
3. Lease Sale 91 off the northern coast of California.

The President ordered that the Minerals Management Service (MMS), the Agency in the Department of the Interior (DOI) responsible for OCS leasing, delay preparations for the three sales until concerns about environmental effects could be resolved.

This report presents the findings of the OCS Leasing and Development Task Force (Task Force) to the President and options for deciding whether and how to proceed with leasing in the three areas.

ENVIRONMENTAL CONCERNS EXPRESSED TO THE TASK FORCE

In its nine public workshops, the Task Force heard a wide variety of concerns expressed about undesirable environmental effects that people believe could result from OCS oil and gas activities in the three sale areas. In part because of the oil spill from the *Exxon Valdez*, the risks of oil spills from offshore oil development were a foremost concern. Other concerns included air quality, conflicts with fishing, effects on tourism and recreation, changes in onshore land use and "lifestyles," and effects on sensitive environmental areas and ecosystems.

Many people told the Task Force that the potential benefits of OCS oil and gas development in the three areas were small and that a national energy policy that placed emphasis on oil conservation and alternative energy sources, particularly alternative transportation fuels, could reduce or eliminate the need for development of these resources.

In general, people who expressed opposition to leasing felt very strongly that the potential

environmental effects were unacceptable.

Those supporting oil and gas exploration and development in the three areas stated their belief that these activities could be conducted in a way that protects environmental resources in a responsible manner. Those in favor of going ahead with leasing also emphasized the importance of domestic oil production, noting that the current trend of declining production and growing oil imports would increase the likelihood of future energy security and economic problems.

GENERAL FINDINGS

The Task Force reviewed a wide range of information about environmental effects that could occur if OCS oil and gas leasing proceeds in the three areas. Sources of information included MMS studies, Environmental Impact Statements (EIS's), briefings from various Federal Agencies, public workshops, and meetings with interested Members of Congress. The Task Force also asked the National Academy of Sciences/National Research Council (NAS/NRC) to evaluate the adequacy of the scientific and technical information base for making leasing decisions in the three areas.

The NAS/NRC had already been engaged by MMS to review the environmental studies program and oil and gas resource evaluation methods which MMS uses in its preparations for leasing decisions. The Secretary of the Interior's leasing decisions determine what tracts are offered for lease and what conditions are imposed upon the lessees. The Secretary makes these leasing decisions after a 2-year process of analysis, public comment, and consultation with the Governors of affected States.

The NAS/NRC Report concluded that some types of information in some of the areas are adequate for the Secretary's leasing decisions, while other types of information are not. The NAS/NRC found the oceanographic information adequate for northern California and the ecological information adequate for both northern and southern California. The NAS/NRC found the socioeconomic information inadequate for leasing decisions in southwestern Florida and northern California and doubted that it was adequate for southern California. It found the physical oceanographic information inadequate for southern California and marginal for southwestern Florida and the ecological information inadequate for southwestern Florida. The NAS/NRC did not assess potential environmental effects or draw conclusions about whether leasing should proceed.

The MMS has spent over \$41 million on environmental studies specifically for these areas during the past 15 years. **Nevertheless, the Task Force finds that some additional studies, in response to the NAS/NRC Report, are needed before the Secretary of the Interior makes leasing decisions in the three areas. The Task Force also found that MMS should revise its process for writing EIS's to improve the environmental assessment information available for leasing decisions.**

The Task Force carefully considered the information that it collected in briefings and workshops in order to determine what actions should be taken to resolve the environmental concerns about offshore oil and gas activities in the three areas. **In some cases, the Task Force found that environmental effects could be greater than the Task Force deems acceptable at this time. In these cases, additional controls or mitigation measures are needed. In other cases, the Task Force found that**

the actual effects of OCS activity are being controlled in an acceptable way.

The Task Force has also concluded that although many of the environmental effects of oil and gas activities, taken individually, are acceptable, collectively they could result in unacceptable changes to the local environments in or near the three sale areas unless new measures are taken to control or mitigate such effects.

The Task Force also reviewed information on the role of OCS oil and gas production from the three areas to our Nation's energy supplies as well as the relationship between leasing decisions and the development of a national energy policy. The MMS resource assessment shows that if oil and gas are found in these three areas, economically recoverable resources could range from 0.8 to 2.1 billion barrels of oil (equivalent to as much as 8% of current U.S. oil reserves) and 1.1 to 3.2 trillion cubic feet of natural gas. The NAS/NRC concluded that MMS resource estimates are based on an adequate data base and that the procedures used in estimation are generally appropriate.

Additional oil and gas production in such amounts would replace as much as \$40 billion worth of imported oil over 30 years. Such production would provide economic benefits in the form of Federal leasing revenues and net corporate income which together could reach as high as \$7.8 billion. The southern California OCS is currently producing over 30 million barrels of oil per year.

The Task Force has concluded that substantial economic and energy security benefits would be provided by the oil and gas production in future decades that could result from leasing in the three areas. Furthermore, it concluded that while additional oil conservation can substantially reduce U.S. oil consumption, it would not reduce or eliminate the economic and energy security benefits from additional OCS oil production. Both conservation and production projects and policies should be considered on their own merits, as they will be in formulating the National Energy Strategy currently in preparation by the Department of Energy.

The Task Force recognizes the substantial conflict that often exists between the goals of protecting coastal and marine environments and maintaining the quality of life in coastal areas, on the one hand, and the goals of promoting energy security and economic growth, on the other. The Task Force found no easy way to resolve this conflict. **Based on its review of available information, the Task Force concluded that additional time and effort are needed before environmental concerns can be resolved in a manner that provides an acceptable balance between these often conflicting goals.**

Although the OCS oil and gas program has generally had a good environmental record over the last decade, many people do not feel confident that oil and gas activities can be conducted off their coasts without causing damage to valuable environmental resources. In some instances, collection of more information about these effects will help to resolve these concerns. In other cases, additional environmental protection measures need to be developed, perhaps even tested, before leasing decisions proceed. New working relationships and institutional arrangements may be needed so that affected local communities have more influence on leasing, exploration, and development decisions.

The Task Force has developed a series of options that allow different periods of time for

studies. It has also suggested a number of additional environmental controls which should be considered in future leasing decisions. Some of these measures should be undertaken now to better control existing threats to the environment. The next section summarizes findings on specific environmental concerns. This is followed by a summary of the options and additional environmental protection measures.

SUMMARY OF FINDINGS ON SPECIFIC ENVIRONMENTAL CONCERNS

The Task Force's findings about specific environmental concerns and its recommendations for additional studies and specific environmental control measures are summarized below.

Air Quality

The effects of emissions from offshore oil and gas operations on the generally poor air quality in southern California is a primary concern. Outer Continental Shelf emissions may not make a substantial contribution to onshore air pollution in all coastal areas of California. The emission controls which the MMS currently imposes offshore are less stringent than required for similar activities onshore.

The Task Force has concluded that air emissions from OCS oil and gas facilities off the California coast should be subject to more stringent controls that are substantially equivalent to controls applicable to similar onshore facilities. The MMS now has efforts underway to develop a new proposed rulemaking to achieve this objective.

Oil Spill Risks

The MMS analysis of oil spill risk shows that development of oil and gas in each of the three lease sales would cause a small increase in the risk of an oil spill greater than 10,000 barrels during the next 30 years in their area. Table I-1 shows the MMS's estimates of the chances of an oil spill greater than 10,000 barrels both without additional leasing and with the proposed lease sale.

Table I-1: Chances of An Oil Spill Over 30 Years

Greater Than 10,000 Barrels

Lease Sale	Chance Without Leasing	Chance With Leasing
Sale 116, Part II	96%	97%
Sale 95	93%	94%
Sale 91	77%	85%

The Task Force has concluded that:

- **the risk that an oil spill of significant size will occur due to OCS-related activities in the three proposed lease sale areas is small compared to the risk of a significant spill from other existing sources, notably non-OCS tanker and barge traffic;**
- **although the risk of occurrence of a major OCS oil spill is relatively small, the environmental effect of such a spill could be significant;**
- **coastal and marine resources deserve greater protection from oil spills from all sources than is now available; and**
- **governments and the oil and shipping industries should act now to achieve significantly better protection against oil spills for coastal and marine resources, regardless of whether OCS leasing and development proceeds in the three proposed lease sale areas.**

Effects on Protected Lands

There are numerous protected areas such as parks, marine sanctuaries, and wildlife refuges near the three sale areas that could be affected by oil and gas activities including existing tanker transportation. These include the Everglades National Park, Looe Key National Marine Sanctuary, Key Largo National Marine Sanctuary, Channel Islands National Park, Channel Islands National Marine Sanctuary, Farallon Islands National Marine Sanctuary, and Cordell Bank National Marine Sanctuary.

The Task Force has concluded that the sensitive and highly valuable resources in protected areas such as National Parks deserve additional consideration and management to ensure that they are not seriously damaged by oil and gas activities.

Effects on Protected Species and Other Wildlife

A wide variety of endangered or threatened species inhabit areas in or near the sale areas. The effects of offshore oil and gas activities on these species is reviewed through the consultation procedures required by the Endangered Species Act. While most species are not jeopardized by oil and gas activities, concern has been expressed about potential harm to individuals and the cumulative effects of many different oil and gas developments.

The Task Force concluded that effects on protected species and wildlife are important enough to warrant additional management attention but are not, by themselves, sufficient to justify a delay in leasing.

Effects on Commercial Fishing

The Task Force concluded that there are conflicts between commercial fishing activity and offshore oil and gas activities, many of which can be resolved or significantly mitigated.

Effects on Water Quality

The Task Force concluded that environmental impacts from drilling muds, cuttings, and produced fluids can be adequately addressed under the existing National Pollutant Discharge Elimination System regulatory program.

Changes in Onshore Infrastructure and Land Use

The Task Force has concluded that development of offshore oil and gas resources may create onshore land use conflicts and demands on infrastructure that need to be better addressed. Conflict could be reduced if better consultative relationships were established among the oil industry, Federal, State, and local governments and other affected parties for planning and coordinating the onshore activities of OCS lessees.

Effects on Tourism and Recreation

The Task Force concluded that OCS impacts on tourism and recreation are a major concern for which further information is needed to determine the magnitude of impacts. However, tourism losses alone are not likely to be sufficient to provide a basis for canceling or delaying lease sales. They should be addressed as a part of other efforts or new efforts to control and mitigate onshore impacts.

SUMMARY OF OPTIONS DEVELOPED BY THE TASK FORCE

The Task Force developed three options for each of the three lease sales. In doing so, it recognized that OCS lease sales must be scheduled in a 5-year leasing program approved by the Secretary of the Interior. The three lease sales addressed by the Task Force, as well as follow on sales in the same OCS areas, are scheduled in the 1987-1992 5-Year Leasing Program. Additional sales could be scheduled in a new 5-year leasing program. The Secretary is tentatively planning to release a proposal for a new 5-year program for comment in March 1990. If gaps and overlaps between 5-year programs are avoided, the new program will cover the 1992-1997 period. It would be followed by a 1997-2002 program. The options for the three sale areas reflect the structure imposed by the 5-year program requirement.

In addition to the options for lease sales in the three areas, the Task Force also developed a list of additional environmental control or mitigation measures that can be used to further reduce undesirable effects of OCS oil and gas activities. The options and additional measures are summarized below.

Sale 116, Part II - Off Southwestern Florida

All three of the following options developed for Sale 116, Part II include recommendations to develop a program to better protect the Everglades and Florida Keys environmental resources from oil spills and to consider moving oil tanker routes to reduce the risk of damage from oil spills to these resources.

Option A:

Cancel Sale 116, Part II, and defer subsequent leasing decisions until additional oceanographic, ecological, and socioeconomic data in response to the NAS/NRC Report have been collected.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness, and develop improved means of assessing the risk of oil spill damage.

Canceling the sale would exclude the Part II area from any additional OCS leasing for the remainder of the 1987-1992 5-Year Program. Leasing in the Part II area could occur in the 1992-1997 5-Year Program only after additional oceanographic, ecological, and socioeconomic data in response to the NAS/NRC Report have been collected and after the ability to protect the Everglades from oil spills has been demonstrated.

The NAS/NRC Report identified gaps in the information record for the area off southwestern Florida and concluded that those gaps should be addressed prior to any decision regarding the leasing of tracts in the area. Consequently, the MMS would acquire and analyze additional information for leasing decisions.

The timing of future leasing decisions should be determined after analysis of the time required to complete the studies. Upon their completion, the Secretary of the Interior will decide whether or not to offer tracts for lease. If a decision to lease is made, the new information would be used in determining which tracts to offer and what environmental controls to apply to the leases in order to resolve environmental concerns.

Existing Leases: Proceed with decisions about exploration and development on existing leases under normal OCS Lands Act and Coastal Zone Management Act (CZMA) procedures.

This option would allow exploration and development on the 73 existing leases in the Part II area, subject to the OCS Lands Act and the CZMA. Decisions on two exploration plans are currently before the Secretary of Commerce under the CZMA. Any subsequent development on these leases should be conditioned on the demonstration of the ability to better protect Everglades and Keys ecosystem from oil spills and completion of additional ecological and socioeconomic studies in response to the NAS/NRC Report.

Option B:

Cancel Sale 116, Part II.

Exclude the Part II area from consideration in formulating the new 1992-1997 5-Year Program.

Canceling the sale and excluding the area from the 1992-1997 program would delay leasing until late 1997 at the earliest. If a sale in the Part II area is scheduled in the 1997-2002 5-Year Program, additional oceanographic, ecological, and socioeconomic studies will be conducted prior to leasing decisions. Leasing will proceed only after the ability to better protect the Everglades from oil spills has been demonstrated.

Existing Leases: Proceed with decisions about exploration and development on existing leases under normal OCS Lands Act and CZMA procedures.

The DOI should undertake discussions with Florida and existing lessees to facilitate purchase of existing leases by the State, if the State so desires.

This option would proceed with decisions regarding exploration and development on the 73 existing leases in the Part II area using the normal procedures under OCS Lands Act and the CZMA. Decisions on two exploration plans are currently before the Secretary of Commerce under the CZMA. Any subsequent development on these leases would be conditioned on the demonstration of the ability to better protect Everglades and Keys ecosystem from oil spills.

The State of Florida has been considering ways of compensating lessees in order to prevent drilling on existing leases. State purchase of some of the existing leases is one mechanism for achieving this objective.

Option C:

Cancel Sale 116, Part II.

Exclude the Part II area from consideration in formulating the new 1992-1997 5-Year Program and the 1997-2002 5-Year Program.

This option would not allow leasing before 2002, if ever. Future decisions on leasing would be based on additional information on environmental effects and energy benefits available by that time. Although there would be no drilling, the MMS would continue to refine its assessment of the oil and gas resources in the area to provide a basis for these future decisions.

Existing Leases: The DOI should undertake discussions with Florida and existing lessees to facilitate State purchase of existing leases. The Secretary should initiate procedures that could lead to cancellation of the existing leases pursuant to section 5 of the OCS Lands Act. If these leases are canceled, it would prevent drilling on existing leases. Selection of this option would reflect the view that the existing oil spill threat to environmental resources in this region is too great and that additional risk from any source, including OCS exploration and development, is not justified at this time.

The Secretary of the Interior should begin the lease cancellation process immediately. This process requires that, prior to cancellation, the leases be suspended for 5 years based on a determination by the Secretary that there is a threat of serious harm or damage to the environment from continued operations on the lease. In order to make this determination, the Secretary would need to review the information on the environmental effects of operations on existing leases. Leases cannot be drilled while under suspension. The State

of Florida may wish to purchase existing leases in order to reach a final resolution on drilling of existing leases at an earlier time than under the section 5 process.

Protecting the Everglades and Keys from Oil Spills

A key feature of all three options is the establishment of a program to provide greater protection from oil spills to the environmental resources of the Everglades and Keys ecosystem. The Task Force has found that even without OCS activity, the use, value, and unique environmental sensitivity of the Everglades and Keys resources are great enough to warrant increased protection from oil spills from existing sources including tanker transport. The Task Force suggests that the program develop a system for oil spill protection for the Everglades National Park and Florida Keys resources.

These efforts to improve protection of the Everglades and Keys should involve the DOI, the Department of Commerce, the U.S. Coast Guard, the Environmental Protection Agency (EPA), and representatives from the shipping and petroleum industries. In addition, the U.S. Coast Guard should study the feasibility of moving oil tanker routes further from the environmental resources in the Keys and Everglades.

Sale 95 - Off Southern California

Option A:

A-1: Proceed with preparations for a lease sale but defer final leasing decisions until after additional oceanographic and socioeconomic data in response to the NAS/NRC report have been collected.

A-2: Cancel Sale 95, and defer subsequent leasing decisions until additional oceanographic and socioeconomic data in response to the NAS/NRC report have been collected.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness, and develop improved means of assessing the risk of oil spill damage.

Option A-1 would give the Secretary of the Interior the discretion to proceed with preparations for a lease sale when he determines that it is appropriate in light of the progress in collecting additional data. Option A-2 directs the Secretary to cancel Sale 95. Both would allow future leasing decisions for the southern California OCS to be based on more extensive data about the oceanographic and socioeconomic effects of oil and gas activities. The NAS/NRC Report identified gaps in the information record for the southern California area and concluded that those gaps should be addressed prior to any decision regarding the leasing of tracts in the area. Consequently, the MMS would acquire and analyze additional information for leasing decisions.

Upon completion of the additional studies, the Secretary of the Interior would decide which tracts to offer, if any, and what environmental controls to apply to the leases in order to resolve environmental concerns.

Option B:

Defer leasing decisions until the 1992-1997 5-Year Leasing Program.

Offer tracts only in Santa Maria Basin and San Diego Outer Basin in the next sale off southern California.

Conduct additional oceanographic and socioeconomic studies prior to making leasing decisions for any future sale.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness, and develop improved means of assessing the risk of oil spill damage.

This option would allow a lease sale to be scheduled in the 1992-1997 5-Year Leasing Program. A sale could occur in the middle of this period, following completion of the additional studies. Leasing decisions by the Secretary of the Interior will draw on this information to determine the tracts to be offered and the environmental control measures to be applied in order to resolve environmental concerns.

The option for proceeding with leasing in the Santa Maria Basin needs to be considered in light of the likelihood that related onshore facilities would probably be located in Santa Barbara County, which has already experienced substantial development. Because there has been little drilling of the larger prospects in this area, there may be a greater chance for large discoveries than in the Channel. The generally deeper water, however, may make such resources less beneficial economically.

Leasing in the San Diego Outer Basin may be more acceptable environmentally than leasing closer to shore, because the greater distance from shore reduces visual impacts and reduces the chance that an oil spill from operations on a lease would contact the coast. Because there are a number of large prospects that have not been drilled, there is a fair chance for large discoveries. However, as the geology and economics are less favorable in this area, the chance of finding commercial quantities of oil and gas is considerably lower than in the Inner Basin.

This option would defer leasing in the Santa Barbara Channel in light of the intensity of current and planned oil and gas development on existing leases off Santa Barbara County. These developments have been slowed by concerns about the onshore impacts. Once such problems have been worked out, however, additional leasing and development should be possible without substantial increases in onshore facilities, if activities are appropriately phased. Additional leasing in the Santa Barbara Channel holds a lower probability of discovering new large oil fields, because most of the larger prospects there have already been drilled.

This option also defers leasing in the Inner Basin in light of its proximity to highly valued, intensively used coastal resources in San Diego County, Orange County, and Los Angeles County. However, because the larger prospects in this area have not been drilled, deferring leasing would forgo a good chance for large discoveries.

Option C:

Cancel Sales 95 and 138.

Exclude the southern California area from consideration in formulating the new 1992-1997 5-Year Program.

Conduct additional oceanographic and socioeconomic studies prior to making leasing decisions for the next sale.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness, and develop improved means of assessing the risk of oil spill damage.

Under this option, leasing would not be allowed until late 1997, at the earliest. A sale could be scheduled in the 1997-2002 5-Year Program. Leasing would proceed only if new OCS air quality controls have proven substantially equivalent with standards onshore and after collection of additional oceanographic and socioeconomic data in response to the NAS/NRC Report. The decision to proceed would be based on the treatment of additional OCS oil and gas production in the National Energy Strategy. Although there would be no drilling on new leases, exploration and development could continue on existing leases. The MMS would continue to refine its assessment of the oil and gas resources in the area to provide a basis for these future decisions.

OCS Air Quality Regulations, Tanker Route Study, and Oil Spill Response

A component of all three of the options above is the recommendation that MMS issue a rule making the standards for regulating air quality on the OCS substantially equivalent to regulatory standards onshore. Less stringent controls for OCS facilities would be allowed only if justified by safety and technical considerations applicable to OCS facilities. The MMS is already drafting a new proposed rulemaking intended to achieve this goal.

Also included in all three options is the recommendation that the U.S. Coast Guard conduct a study of the possibility of moving tanker routes out of the Santa Barbara Channel. This study should also include consideration of a vessel traffic system for this area and traffic separation zones for the area near the Channel Islands National Park and National Marine Sanctuary.

Oil spill concerns in the southern California area are substantial. The Task Force has concluded that they could be addressed more effectively by focusing more effort on the prevention and containment of oil spills from all sources of risk including tankers. It is possible that improvements in oil spill response capabilities in the area could reduce the potential damage to valuable coastal resources by more than the increased risk due to additional OCS oil production. Increased capabilities would also reduce the risk of damage from an OCS oil spill.

Sale 91 - Off Northern California**Option A:**

A-1: Proceed with preparations for a lease sale but defer final leasing decisions until after additional socioeconomic data in response to the NAS/NRC report have been collected.

A-2: Cancel Sale 91, and defer subsequent leasing decisions until additional socioeconomic data in response to the NAS/NRC report have been collected.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness, and develop improved means of assessing the risk of oil spill

Reevaluate the effects on fisheries and institute measures to reduce conflicts with commercial fishing.

Option A-1 would give the Secretary of the Interior the discretion to proceed with preparations for a lease sale when he determines that it is appropriate in light of the progress in collecting additional data. Option A-2 directs the Secretary to cancel Sale 91. Both options would allow future leasing decisions for the northern California OCS to be based on more extensive data about the socioeconomic effects of oil and gas activities. The NAS/NRC Report identified gaps in the information record for the northern California area and concluded that those gaps should be addressed prior to any decision regarding the leasing of tracts in the area. Consequently, the MMS would acquire and analyze additional information for leasing decisions.

Upon completion of the additional studies, the Secretary of the Interior would decide which tracts to offer, if any, and what environmental controls to apply to the leases in order to resolve environmental concerns.

Option B:

Defer leasing decisions until the 1992-1997 5-Year Leasing Program.

Offer tracts only in the Eel River Basin in the next sale off northern California.

Conduct additional socioeconomic studies prior to leasing decisions for the next sale.

Establish air quality controls for the California OCS that are substantially equivalent to those applied onshore.

Reevaluate the effects on fisheries and institute measures to reduce conflicts with commercial fishing.

Revise requirements for OCS oil spill contingency plans to improve their effectiveness, and develop improved means of assessing the risk of oil spill damage.

Under this option a lease sale could be scheduled for late 1992, at the earliest. This option would allow leases to be offered in the gas-prone Eel River Basin only, thus reducing the probability of finding oil in the sale area and causing much less risk of an oil spill. Leasing in the Point Arena Basin would be deferred, forgoing the best chances of major oil discoveries in the northern California area.

Option C:

Cancel Sale 91 and Sale 128.

Exclude the Northern California Planning Area from consideration in formulating the new 1992-1997 5-Year Program.

This option would not allow leasing in this area until late 1997, at the earliest. Leasing decisions would be made only after collection of additional socioeconomic data in response to the NAS/NRC Report. The decision to proceed would be based on the treatment of additional OCS oil and gas production in the National Energy Strategy. Although there would be no drilling, the MMS would continue to refine its assessment of the oil and gas resources in the area to provide a basis for these future decisions.

Additional Environmental Control and Mitigation Measures

The Task Force identified a number of additional measures which should be developed for consideration when future leasing decisions are made in the three areas. It also suggests that some of these measures be taken in the near future in order to reduce the environmental effects of exploration and development on existing leases or to protect environmental resources in one or more of the three areas from damages that could result from other existing activities. Because some of these measures could be instituted only at considerable cost to lessees, taken together they could substantially reduce the benefits of developing oil and gas and could discourage the industry from bidding for the right to OCS resources. The MMS, in consultation with other affected Agencies, should develop criteria for determining where and when they should be applied. The MMS should also develop regulations, lease stipulations, and other measures requiring such controls.

The additional measures are as follows:

- Require transport of OCS oil in pipelines where feasible and environmentally preferable.
- Improve OCS oil spill risk assessment, contingency planning and response capability.
- Encourage consolidation of onshore facilities to reduce demand on existing onshore public services infrastructure and land use changes.
- Establish processes to assist local communities to address onshore impacts associated with OCS development.
- Require no discharge of drilling muds/fluids in sensitive areas.
- Establish joint oil industry/fishing industry coordinating committees in areas where OCS activities are likely to conflict with commercial fishing.
- Strengthen policies to protect environmentally sensitive areas.

A more detailed description of these measures is provided in Chapter VI.

II. INTRODUCTION

THE PRESIDENT'S CHARGE TO THE TASK FORCE

In his February 9, 1989, budget address to Congress, President Bush announced the establishment of a Cabinet level Task Force to review and resolve environmental concerns about adverse impacts in three OCS oil and gas lease sales that were scheduled for Fiscal Year 1990: Sale 91, Northern California; Sale 95, Southern California; and Sale 116, Part II, Eastern Gulf of Mexico south of 26 degrees north latitude. The general locations of these three lease sales are shown in Figure II-1.

The President stated that he is committed to continued OCS oil and gas development in an environmentally sound manner. Nonetheless, he recognized that there are legitimate differences of opinion concerning the environmental effects of OCS leasing in these three areas. The President ordered that, until the Task Force resolves such concerns:

- leasing in the Sale 116, Part II area would be indefinitely postponed;
- leasing in the Sale 95 area would be delayed; and
- leasing in the Sale 91 area would be indefinitely postponed.

The three lease sales under review are shown in more detail in Figures II-2, II-3, and II-4.

Sale 116, Part II, Eastern Gulf of Mexico (Figure II-2) consists of approximately 14 million acres located between 26 degrees and 24 degrees north latitude offshore southwestern Florida (from Naples to the southern limits of the Eastern Gulf of Mexico Planning Area). The area is about 25 miles from the Dry Tortugas at its closest point to land.

Sale 95, Southern California (Figure II-3) includes approximately 6.7 million acres located offshore southern California from the northern border of San Luis Obispo County to the U.S. / Mexico provisional boundary.

Sale 91, Northern California (Figure II-4) consists of approximately 1.1 million acres located offshore portions of Mendocino and Humboldt Counties in the Northern California Planning Area. The proposal is in two segments: centering off Eureka in the north and from south of Cape Mendocino to south of Point Arena.

On March 21, 1989, the White House announced the structure of the President's OCS Leasing and Development Task Force. The members of the Task Force include: the Secretary of the Interior, who serves as Chairman; the Secretary of Energy; the Administrator of the National Oceanic and Atmospheric Administration (NOAA); the Director of the Office of Management and Budget (OMB); and the Administrator of the EPA. The National Academy of Sciences was asked to provide a technical review of the information about environmental concerns and petroleum resources to the Task Force.

Lower 48 Planning Areas

■ Task Force Study Areas



Figure II-1

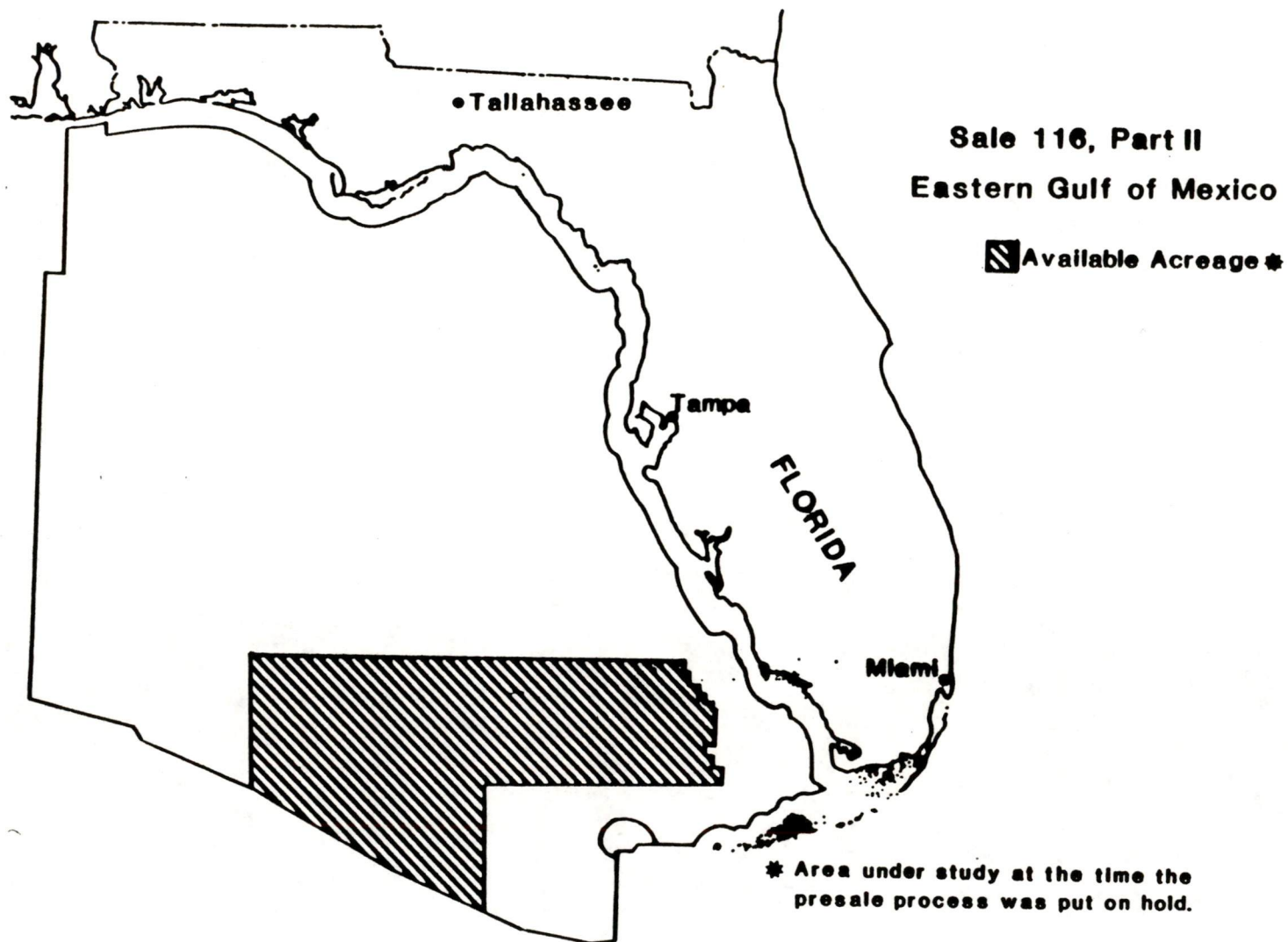
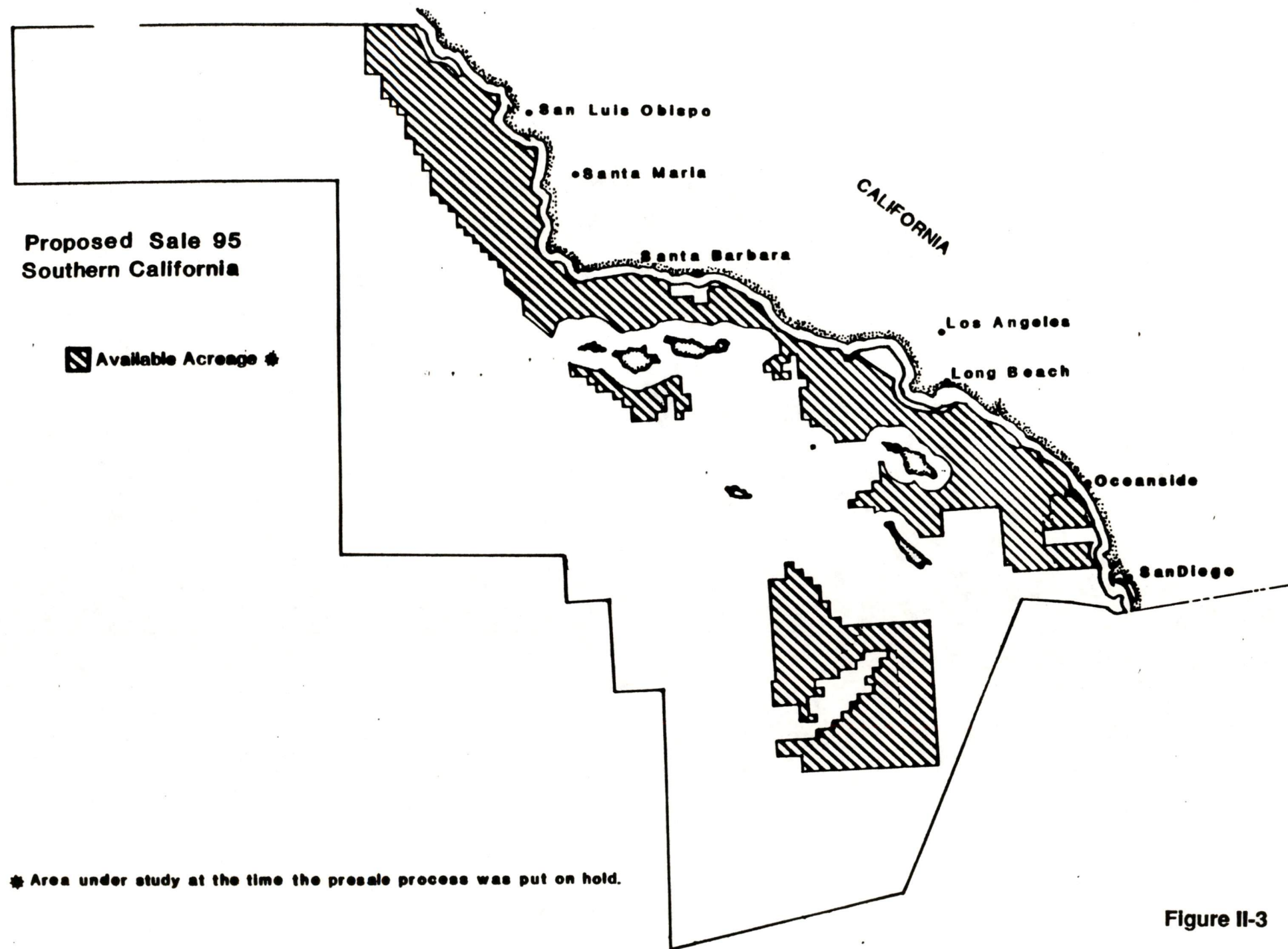


Figure II-2

**Proposed Sale 95
Southern California**

 **Available Acreage** *



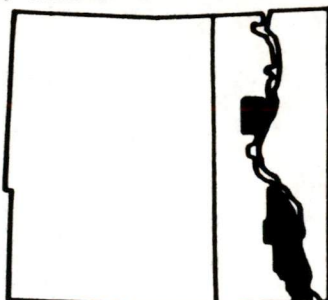
* Area under study at the time the presale process was put on hold.

Figure II-3

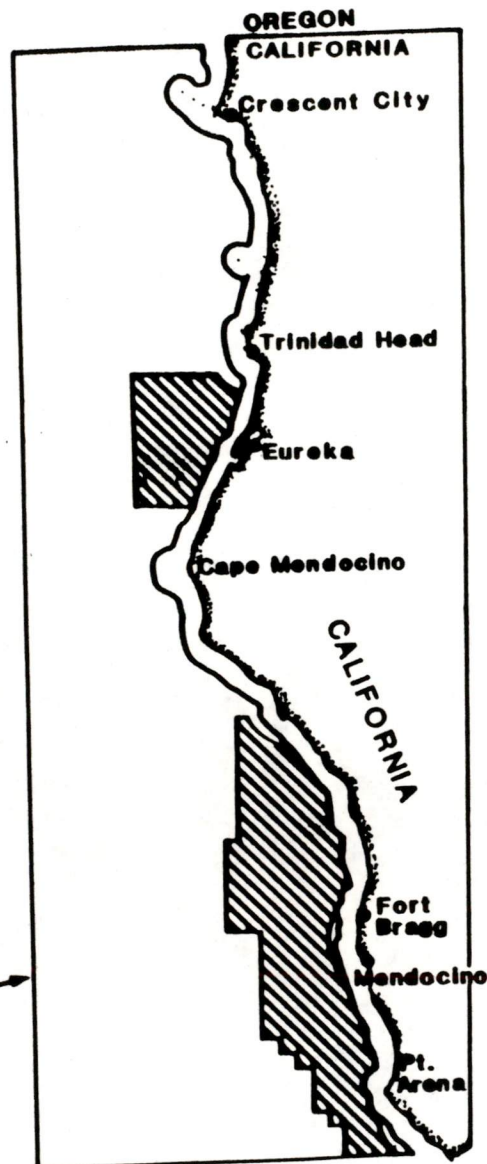
**Proposed Sale 91
Northern California**

 **Available Acreage** *

N. CALIFORNIA PLANNING AREA



SEE DETAIL MAP →



* Area under study at the time pre-sale process was put on hold.

Figure II-4

Based on the President's direction, the Task Force decided to pursue the following six objectives:

1. Review concerns about adverse environmental impacts in each of the three sale areas.
2. Identify and investigate environmental concerns.
3. Explore leasing proposals, including no leasing, for the three sale areas that might resolve environmental concerns.
4. Review the Administration's energy goals, environmental goals, and ocean management goals as they relate to OCS leasing.
5. Review the question of leasing and operations in the three sale areas, and make recommendations to the President.
6. Review and monitor information available about the *Exxon Valdez* oil spill and cleanup effort which may aid the Task Force in accomplishing the five previous objectives.

Based on guidance from the White House Staff, the Task Force limited the options and recommendations presented in this report to those which: (1) could be implemented within the President's and the Administration's current legal authorities; and (2) could apply specifically to the three lease sales which the President asked the Task Force to review.

THE WORKINGS OF THE TASK FORCE

As part of its review and analysis of the environmental effects of the three proposed lease sales, the Task Force obtained information from a wide range of sources and settings including Federal Government Agency briefings, public workshops in communities adjacent to the proposed sales, field trips, and meetings with Members of Congress. In addition, the Task Force accepted written comments from the public.

Agency Briefings

Federal Government Agencies whose responsibilities relate to the conduct of the OCS leasing program presented briefings to the Task Force on general environmental and resource issues as well as sale specific concerns. The Federal Agencies presenting materials to the Task Force are listed below:

- Department of the Interior
 - Minerals Management Service
 - National Park Service
 - U.S. Fish and Wildlife Service
 - U.S. Geological Survey
- Environmental Protection Agency
- National Oceanic and Atmospheric Administration
- U.S. Coast Guard
- Department of Energy

The general briefings presented by these Agencies covered the following subjects:

Oil Spills

- sources of oil in the marine environment
- oil spill history from OCS and non-OCS sources
- effects of oil spills
- oil spill prevention
- oil spill modeling
- oil spill contingency planning
- oil spill clean up and containment capabilities
- overview of the *Exxon Valdez* oil spill and response
- analysis of possible legislative changes to oil spill planning and response statutes

General Environmental Effects

- OCS Environmental Studies Program
- Clean Air Act and Clean Water Act
- Coastal Zone Management Act
- National Marine Sanctuary Program

Oil Production and Conservation

- preparation of the National Energy Strategy
- oil production and conservation history
- world oil supply and outlook
- potential for new sources of domestic production and conservation

The topics covered at briefings on each of the proposed lease sales included:

- status and 5-year program rankings of the proposed sale
- geology, leasing history, and resource estimates in the area
- existing OCS activity in the area
- location of the proposed sale in relation to environmental and recreation resources
- potential for effects on protected lands and protected species
- oceanography, fisheries, and live bottom resources
- oil spill probability and trajectory analyses
- oil spill response time
- issues of particular significance to the specific sale
- history of coastal consistency determinations for OCS oil and gas activities

Public Workshops

In order to obtain specific information about the effects of OCS activity on local communities and environmental resources, the Task Force held nine public workshops in Florida and California, organized by the Governor's Office in Florida and the county governments in California. The workshops were held in the following communities:

California

Carlsbad
Los Angeles
Eureka/Arcata
Santa Barbara
Sacramento

Florida

Tallahassee
Fort Myers
Miami
Key West

These workshops gave the Task Force the opportunity to discuss the proposed sales with State and local officials, scientists, business leaders, and interested groups. In addition to the panel discussions involving the Task Force, local officials, experts, and the general public were invited to express their concerns.

Congressional Meetings

The Task Force twice met with Members of Congress in Washington, D.C. The first meeting, with the delegations from Florida and California, was held prior to the Task Force workshops in the proposed sale areas. The second meeting, which followed the completion of the workshops, involved Members of Congress from States other than California and Florida.

Field Trips

An important component of the Task Force's information collection process was the direct examination of resources and facilities associated with OCS activity. Field trips were arranged for the Task Force in association with its workshops in the proposed sale areas. These field trips are listed below.

- Southern California Coast
- Aloha Research Vessel to Platform Gilda, CA
- 10,000 Islands / Everglades National Park, FL
- Shark Valley / Everglades National Park, FL
- Snorkeling / Viewing Coral in the Florida Keys
- Northern California Coast and Avenue of the Giants
- Platform Hondo and the Offshore Storage and Treatment Facility, offshore Santa Barbara, CA
- Los Flores Canyon Facility, CA
- Gaviota Oil and Gas Plant, CA
- Channel Islands National Park, CA

Federal Register Notice

At the conclusion of the workshops and field trips, the Task Force published a "Staff Summary of Environmental Concerns and Options" in the Federal Register (54 FR 33150-33165). The Notice summarized the environmental concerns about OCS leasing and potential options for resolution of those concerns which the Task Force heard in its workshops, briefings, meetings, and field trips.

As a part of the Federal Register Notice, the Task Force solicited public comment on concerns and options not included in the publication.

III. A FRAMEWORK FOR CONSIDERING ENVIRONMENTAL EFFECTS

DETERMINING WHAT IS ENVIRONMENTALLY SOUND

The fundamental problem with the development of oil and gas resources on the OCS is the potential for undesirable effects on the nearby environment and its many uses. The Task Force has heard first hand that many of these effects and risks are widely regarded by residents near the three sale areas as being substantial and very costly. Coastal residents and visitors value the environmental resources in those areas highly and do not want them degraded. While they would feel the losses resulting from such effects, they believe that, as individuals, they stand to benefit little from the development of oil and gas resources. In fact, most of the economic benefits are captured in the form of Federal leasing revenues which seldom have a direct noticeable effect on the lives of individual citizens.

The environmental effects and risks in and near the three sale areas that can result from OCS exploration and development, followed by the production and transportation of oil and gas, are real and concrete. Air and water can be polluted; plants, fish, and marine mammals can be hurt; beaches can be fouled; and ocean vistas can be marred by industrial facilities. Socioeconomic effects can also result in the form of damage to or displacement of existing economic activities, the construction and operation of onshore support facilities, and the demand for new public services and facilities to serve additional population and industrial activity. Although these changes can be offset by increases in jobs and local tax revenues, concerns have also been raised about changes in lifestyle and culture. To determine the extent of such effects and risks and to judge whether allowing them to occur would be environmentally sound, the Task Force addressed the following questions:

1. Given current environmental control policies, how could the oil and gas activities that would result from the three planned lease sales affect the environmental resources nearby?
2. To what extent would such effects damage other uses of environmental resources?
3. What options for configuring the three lease sales and controlling or mitigating environmental effects might reduce such damages?
4. Would the remaining effects and risks be regarded as environmentally sound?

The Task Force has been briefed by Federal Agencies regarding a wide variety of potential environmental effects of oil and gas activities in the three lease sale areas. In its workshops, it received further information both from experts and from the general public.

The Task Force recognizes that there are several different approaches that can be used in determining whether the effects of oil and gas activities are environmentally sound and resolving issues about leasing. Various approaches are discussed in the next sections.

Using Scientific Information to Resolve Concerns

A scientific and technological approach can be used to determine how and to what extent various environmental resources could be affected by offshore oil and gas activities in the

three sale areas. The Task Force has learned that there are numerous conflicting claims about potential effects and risks of oil and gas activities on the OCS. Environmental concerns about the proposed lease sales may be at least partially resolved if scientific studies can show that the effects will not be as damaging as feared. They may also be resolved if regulatory or technological means can be employed to prevent undesirable effects. Nevertheless, many people lack trust in the technology that is designed to prevent mishaps.

The Task Force asked the NAS/NRC to review the existing information on the potential oil and gas resources in the three sale areas and the environmental effects of the OCS activities that could result from leasing. The NAS/NRC was asked to judge the adequacy of the information for leasing decisions, but not to assess the environmental effects that could occur. The results of this work were provided to the Task Force in a report on November 3, 1989, so that they could be incorporated into this report to the President. The results are discussed in Chapter IV, the discussion of environmental concerns. The Executive Summary of the NAS/NRC Report is included in the Appendix to this report. The NAS/NRC Report is available in full from the Board on Environmental Studies and Toxicology, 2101 Constitution Avenue, NW., Washington, D.C. 20418.

The NAS/NRC Report concluded that in a number of cases, the available information is not scientifically adequate for the assessment of environmental effects needed for leasing decisions. Unfortunately, lack of complete scientific knowledge, combined with inherent uncertainty about the location and extent of undiscovered oil and gas resources, limits the capability to resolve concerns through science alone, particularly at the leasing stage.

The NAS/NRC Report also raises the issue of the relationship of leasing decisions to subsequent decisions about whether and how to develop oil and gas that is found. This relationship has a strong effect upon the information needed for leasing decisions. The NAS/NRC Report observes that many people doubt that the Secretary of the Interior will decide not to allow a lessee to proceed with development once a new oil and gas field has been discovered on a lease. In the NAS/NRC view, this burdens the environmental assessments performed for leasing decisions with the difficult task of analyzing specific effects from facilities and reserves whose size and location cannot be determined until after successful exploratory drilling. The NAS/NRC suggests that this problem would be eased by providing for a more distinct separation of leasing and development decisions to allow "distinctly different phases of scientific data-gathering and analysis."

The Task Force examined the question of whether different criteria for information adequacy should be used at different phases in the lengthy decision process that governs OCS leasing and development for the three sale areas. The Task Force found that it is not feasible to complete a detailed, scientifically rigorous assessment of the environmental effects of the specific reserves and facilities that might ultimately result from a leasing decision before that decision is made. The difficulty is substantially due to the lack of information on the size and location of the oil and gas, if any, that will be found. Environmental impact statements for leasing decisions currently use hypothetical scenarios of oil and gas development to assess a range of potential environmental impacts. Means for obtaining definitive information about oil and gas resources before leasing are beyond the Task Force's scope.

The NAS/NRC suggested that a more comprehensive EIS be written at the development stage. This would allow the information used in leasing decisions to be more general, while that used in later development decisions would be more specific. In this approach,

one purpose of the information used in leasing decisions is to identify potential effects which are so substantial that, if they occurred, they would make subsequent developments impossible to undertake in an environmentally sound manner. Leasing decisions, in this approach, need to be based on information that is adequate to detect environmental problems which would be insurmountable at the exploration and development stage. This is not to say that environmental concerns would not emerge at the development stage or that they could necessarily be resolved without controversy, delay, and substantial cost.

The Task Force examined the procedures established by the OCS Lands Act in light of this approach. The Task Force found that these procedures allow for additional information to be used in decisions at the exploration and, particularly, the development stage. In fact, before development can proceed on any oil and gas discovered in the three sale areas, the MMS will require a new EIS to be completed which assesses the effects of the proposed development plans. The Secretary has clear authority to require development plans to be modified if the specific information available at that point shows that the plan does not provide adequate "protection of the human, marine, or coastal environment." In the past, development plans for leases off southern California have been modified significantly after discussion with Federal Agencies and State and local governments.

The Secretary also has the authority to suspend and, after 5 years, cancel a lease if there is a threat of serious harm or damage that cannot be reduced. The NAS/NRC observed that no lease has ever been canceled and implied that this was due to the sizable investments which lessees have typically made by that point. The Task Force notes that the NAS/NRC Report provides no evidence to support this implication. **Nevertheless, the Task Force finds that strengthened data collection and environmental assessment coupled with more careful scrutiny of development plans for any leases issued in the three areas might yield greater public confidence that the environment will be protected.**

In addition, States with Federally approved coastal zone management programs have the authority to block the issuance of necessary Federal permits if they find activities affecting their coastal zone are not consistent with their coastal zone management programs. Thus, States can use additional information that becomes available at the exploration plan and development plan stages to force modifications or stop those activities. This has occurred on numerous exploration and development plans.

From this examination, the Task Force concluded that reliance on scientific information is useful to resolve environmental concerns in the three sale areas. The Task Force found that it is not feasible to produce the specific information necessary to estimate all of the effects of exploration and development prior to leasing decisions. The Task Force also concluded that it is not necessary that information for leasing decisions fully and precisely describe all of the effects of development, because there is, in fact, opportunity to collect more specific scientific information for subsequent development decisions.

Using Existing Standards

Another approach for resolving environmental concerns about the three lease sales is to examine Federal, State, and local laws and regulations to identify environmental standards that have been established. Existing standards would provide a reference that is, at least in part, determined outside the decision processes used to manage the OCS leasing program.

While using existing environmental policies to define "environmentally sound" has its advantages, it also has drawbacks. For many types of environmental effects, oil and gas activities, both onshore and offshore, are already legally required to comply with these policies. It is clear, however, that compliance with existing policies reduces but does not entirely eliminate environmental effects. Some routine emissions, discharges, changes in land and water use, and accidents will still occur. These effects may be acceptable under existing law or they may result in fines for violations and payments for damages. The level of controversy about OCS leasing suggests that many people do not regard the effects and risks that occur under existing standards as acceptable.

Furthermore, disagreements sometimes arise about whether the existing environmental standards are sufficiently protective. Amending existing policies to address such problems would require a determination of what is environmentally acceptable, undercutting the reliance on such standards for determining what is environmentally sound. **The Task Force decided to review existing environmental standards as they are applied to OCS oil and gas activities in the three sale areas to determine whether they yield results that are environmentally acceptable.**

THE BALANCING APPROACH

The Task Force recognizes that the primary approach used to make decisions under the OCS Lands Act is a "balancing" of the benefits from oil and gas production and the environmental costs. When such costs and benefits are considered at the national level, if the benefits are greater than the costs, including all environmental costs, the country as a whole will be better off if the decision is made to implement the activity. The cost/benefit approach has the advantage of providing a generally consistent, systematic treatment of similar effects for all of the OCS areas included in the leasing program.

The Task Force has learned that there has been substantial controversy over the way in which environmental costs have been treated and decisions made using the balancing approach, particularly in decisions about previous lease sales off southern California. Many of the participants in the Task Force workshops advocated use of the balancing approach but stated their belief that the environmental costs and risks far outweighed the benefits of offshore oil and gas development in one or more of the three sale areas. Although it could not review the socioeconomic information for southern California, the NAS/NRC was particularly critical of the socioeconomic analysis MMS conducted for the other two lease sales. This supports the view that a cost/benefit analysis that deals more carefully with local and regional costs and benefits is needed as a part of the balancing approach.

The "balancing" decisions made in the past for the three sale areas have generally favored leasing and development with some acreage restrictions and environmental controls as opposed to forgoing oil and gas production. The Task Force found that the reasons for this are evident in the analyses performed by the MMS. The estimated benefits of oil and gas development have been much larger than the estimated environmental costs. This is particularly evident, for example, in the analysis provided in MMS' 5-Year Leasing Program Mid-1987 to Mid-1992 (April 1987). It was this analysis that supported inclusion of the three lease sales in the 1987-1992 5-Year Program.

The MMS's estimates of the benefits from oil and gas development in the three areas are large because they reflect the substantial amounts of oil and gas that may be found and the

high value which oil and gas bring in the U.S. economy. People in the United States value the goods and services produced from oil and gas so highly that we continue to use them widely, even when oil prices are high. Thus, the environmental costs must be large for a decision based on balancing benefits and costs to go against leasing and development. The MMS' estimates of environmental costs in the three areas have been small in comparison with the estimated benefits.

The Task Force identified several features of the balancing approach that can account for the difference between the apparently dominant benefits at the national level and the strong and enduring opposition to offshore oil development among residents of California and Florida. First, while the environmental costs occur primarily at the local level, the economic benefits are captured primarily by the Federal Government or are experienced by Americans collectively. Thus, a cost/benefit test applied, say, to a California county, could possibly show that the local costs outweigh the local benefits even if the benefits outweigh the costs for the Nation as a whole. Moreover, the rapid population growth in southern California and southwestern Florida in the last decade suggests that people there value living in such environments more highly than they did in earlier times. During the same period, the potential economic benefits from oil and gas development have declined. These trends suggest the need for greater efforts to measure local costs.

A second problem with the balancing approach is the possibility that the methods MMS uses for the quantitative valuation of environmental costs are not capable of measuring the full range of environmental effects, particularly the high value which residents living near the three sale areas attach to their environment. The NAS/NRC concluded that more socioeconomic data, perhaps even survey data, is needed in all three areas to measure the costs reflected by the intense local opposition to leasing.

A further difficulty in using the balancing approach arises from the chance nature of the most catastrophic effects, oil spills. While the basic methods for analysis of such risks are well developed, they yield results which are difficult for most people to understand. Incorporating such analysis into the cost/benefit framework gives results that would yield the greatest economic benefit, but are often not acceptable to the people most directly exposed to the risks. The Task Force found in its workshops that people seem to be particularly averse to risks over which they have little or no control. Many expressed the view that with certain coastal and marine resources, no additional risk is acceptable. However, many people seem to be unaware of the existing risks to the same resources, even though they are sometimes greater than the risks from additional OCS leasing.

The Task Force concluded that the balancing approach is an appropriate basis for the leasing decisions made by the Secretary of the Interior, but that additional information about the environmental effects in the three sale areas needs to be considered in order to more fully reflect the high value that coastal residents and visitors in California and Florida place upon the environmental resources that may be affected by OCS activities.

THE CONSENSUS BUILDING APPROACH

Another approach to determining what is environmentally sound is to negotiate additional leasing restrictions, environmental controls, or mitigation measures for each proposed sale in a manner that reduces opposition and increases consensus. This approach has been used with limited success in some previous California lease sales, such as Sale 80 in 1984, and in the Eastern Gulf of Mexico. The procedures established by the OCS Lands Act for

formulating 5-year OCS leasing programs and making decisions on individual lease sales provide opportunities for comments and recommendations by the Governors of affected States as well as other governmental officials. These procedures can be used by the Secretary of the Interior to build a broader consensus on future leasing decisions.

A JURISDICTIONAL PERSPECTIVE

The Task Force has learned that, to an extent, controversies about OCS leasing and development arise from the way in which the benefits and costs are distributed among the various jurisdictions involved. Because most solutions to controversies raised by the three proposed lease sales would alter the distribution of benefits and costs, it is useful to understand how that distribution affects the various jurisdictions.

The Task Force recognizes that the Federal Government acts as a steward for the general public in managing the resources on public lands such as the OCS lands. As owner of the oil and gas resources of the OCS, the Federal Government tries to promote the realization of the economic benefits that can be result from developing those resources. These benefits are captured primarily in the form of leasing revenues which reduce the need for the public to pay higher Federal taxes.

The Federal Government is also the jurisdiction most sensitive to the benefits of improved energy security because of its national security and national economic responsibilities. Development of domestic oil and gas resources is clearly an important means of improving energy security. Furthermore, development of the oil and gas resources in the three areas is the only way of achieving the economic benefits inherent in those resources. The Federal Government's efforts to bring about economical and safe development of OCS oil and gas is thus an appropriate response to the national benefits it would yield for the general public.

The Federal Government is also responsible for maintaining the quality of many environmental resources including air and water, fish and wildlife, National Parks, marine sanctuaries, wildlife refuges, and other areas of national significance. These resources are so unique and valuable that they have been made a part of national systems so that they are preserved for the use of all the people of the United States. Protecting the resources of these areas is an important goal which Federal Agencies must consider in making decisions about OCS leasing.

The State and local governments of California and Florida, in contrast to the Federal Government, properly respond to the benefits and costs that would be experienced by their constituents rather than the Nation as a whole. The environmental costs and risks that might result from oil and gas activities on leases in the three areas would be borne primarily by residents and visitors in the coastal areas of California and Florida. On the other hand, these people often perceive little of the benefit because it is captured primarily at the Federal level. State and local jurisdictions benefit from the portion of the Federal leasing revenues that is paid to the States, 27% of the revenues from leases in the first 3 miles of the OCS. Current law does not specify, however, that the OCS revenues the States receive be transferred to local jurisdictions affected by OCS leasing and development. Local governments may not see enough benefit from the States' share of OCS revenues to outweigh the costs they experience. Furthermore, while States and localities may benefit from the economic growth that results from oil industry employment and investment, such benefits often go unnoticed.

Most of the solutions proposed to resolve OCS controversies would change the distribution of benefits and costs among the various affected jurisdictions. For example, some measures would impose stricter environmental controls in order to reduce the risk of damages and risks borne by coastal residents and visitors in California and Florida. The costs incurred to implement such controls would reduce the overall economic benefits shared by U.S. taxpayers in order to provide the benefits of greater environmental quality to coastal residents. Most measures that would compensate those affected for the environmental damages they sustain or that would increase the share of the Federal leasing revenues would similarly reduce the total costs borne by coastal residents while reducing the benefits to Federal taxpayers. However, changes in the allocation of OCS revenues within coastal States, could offset local costs without affecting Federal finances.

The Task Force has learned that resolving OCS controversies is difficult because of the issues of fairness and equity raised by the distributional consequences of leasing and development. From one perspective, it could be argued, residents and visitors in California and Florida who bear environmental risks in order that the general public may benefit should be compensated. From another perspective, if the general public gives up substantial benefits from developing the oil and gas resources it owns so that the residents and visitors in California and Florida can enjoy their coastal resources unaffected by oil and gas development, it could be argued that residents of these States should compensate the general public in some fashion. **The Task Force recognizes that there is clearly no easy solution to such an equity conflict. The President should give careful consideration to the effects of decisions about the three lease sales on both the Nation as a whole and State and local jurisdictions.**

CONCLUSIONS

The Task Force recognizes the complexity of the issues that arise from the environmental concerns about OCS oil and gas activities. Clearly, no single approach can easily resolve the conflicting views about the environmental effects that will occur, the extent to which effects can and should be controlled, and the proper balance between the benefits that may be achieved and the environmental costs and risks that must be borne. The strategic and economic importance of domestic oil and gas production, on the one hand, and the substantial public concern about degradation of environmental resources, on the other, make OCS leasing issues difficult to resolve in a manner that meets the objectives of all interested parties. **The Task Force has concluded that, over the long run, careful attention to each of the approaches outlined above will yield balanced OCS leasing decisions for the three sale areas.**