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# REPORT TO THE CONGRESS



## Capability Of The Naval Petroleum And Oil Shale Reserves To Meet Emergency Oil Needs B-66927

Department of the Navy  
Department of the Interior

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BY THE COMPTROLLER GENERAL  
OF THE UNITED STATES

~~701285~~ 096281

OCT. 5, 1972



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

B-66927

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

This is our report on the capability of the Naval Petroleum and Oil Shale Reserves to meet emergency oil needs.

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

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of Defense; the Secretary of the Navy; and the Secretary of the Interior.

A handwritten signature in black ink, reading "James B. Argets".

Comptroller General  
of the United States

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ABBREVIATIONS

GAO	General Accounting Office
ONPR	Office of Naval Petroleum and Oil Shale Reserves

CAPABILITY OF THE NAVAL PETROLEUM  
AND OIL SHALE RESERVES TO MEET  
EMERGENCY OIL NEEDS

- 1 Department of the Navy
- 2 Department of the Interior 33
- 3 B-66927

D I G E S T

KEY WORDS AND PHRASES

Between 1912 and 1924 Executive orders established four Naval Petroleum Reserves and three Naval Oil Shale Reserves to provide sources of oil for Navy ships. The purpose of these reserves, as later stated by law, is to maintain petroleum resources in a standby production status until needed for national defense.

The proven recoverable oil resources (federally owned) within the Petroleum Reserves total about 1.2 billion barrels, including 100 million barrels in Petroleum Reserve No. 4 in Alaska. The Geological Survey has estimated that the Alaskan Reserve could contain from 10 billion to 33 billion barrels of oil. If the latter estimate proves accurate, recoverable resources in the Naval Petroleum Reserves will come close to the current proven recoverable oil in all domestic oil fields--about 39 billion barrels.

The Office of Naval Petroleum and Oil Shale Reserves (ONPR) has defined an event requiring oil for national defense as any crisis determined by the Congress, such as an armed conflict, which would reduce or eliminate oil imports or overseas military fuel purchases. According to ONPR officials, usefulness of the reserves depends on their ability to substitute for

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such losses. Therefore, the Navy must be able to:

- Produce significant quantities of oil from the Reserves on short notice.
- Preserve the oil in the ground until needed by restricting production to the minimum necessary to maintain the fields in a state of readiness.

The General Accounting Office (GAO) reviewed the status of the Reserves to advise the Congress as to (1) their capability of meeting the stated objectives and (2) the possible effects of proposed legislation on that capability.

FINDINGS AND CONCLUSIONS

The Naval Petroleum Reserves capability of producing oil for emergency needs has not been fully developed. Without additional development which would take time and could cost more than \$2 billion, the Reserves could supply only a very small portion of the oil that the Navy believes might be needed in an emergency. (See pp. 12 to 19 and 31 and 32.)

Petroleum Reserve No. 1, the only Reserve for which an operational readiness requirement has been established, does not have adequate facilities to meet this requirement

due to lack of funds. The ability of the other Petroleum Reserves to produce oil for emergency needs, in short notice is negligible. (See pp. 11 to 13.)

The Navy has had to produce oil from Petroleum Reserves Nos. 1, 2, and 3 in excess of the minimum amount considered necessary to maintain the fields in a state of readiness and believes that production should be limited to the minimum amount to effectively meet the Navy's conservation responsibilities under the law.

Except at Petroleum Reserve No. 4, excess production has been necessary, in part, to prevent drainage of oil from the Reserves by adjacent commercial wells, many of which are on Federal land administered by the Department of the Interior. Lands adjacent to Petroleum Reserve No. 4 have been leased commercially, and their development may force the Navy into offset production. (See pp. 20 to 30.)

Currently the Petroleum Reserves could not substitute for the loss of oil imports and/or overseas purchases, and the Navy estimates that full development of the Reserves will take up to 10 years. Oil imports are expected to increase sharply by the mid-1980s and it does not appear that the Reserves could substitute totally for them, even if developed fully. (See pp. 31 and 32.)

The Oil Shale Reserves are totally undeveloped. The ability of these Reserves to supplement existing oil supplies significantly in the near future is questionable. (See pp. 34 and 35.)

Legislation currently under consideration by the Congress could af-

fect directly the disposition and usefulness of the Naval Petroleum Reserves. For example, one bill proposed production and sale of oil from Petroleum Reserve No. 1 to cover costs of terminating certain offshore oil leases in the Santa Barbara Channel and of exploring Petroleum Reserve No. 4. Such production would reduce substantially the recoverable resources in one of Reserve No. 1's major oil deposits, whose production facilities comprise the bulk of the Reserve's operational readiness capability. (See pp. 36 to 39.)

The present state of the Reserves and the extensive oil production which would be required to comply with the proposed Santa Barbara Channel legislation are not consistent with the intent of the legislation which established the Reserves (10 U.S.C. 7421-7438).

Although GAO made no specific determination of the quantity of oil which would be required from the Reserves in an emergency situation, such a determination must be made to establish objectives specifying the best use of the Reserves.

The Departments of the Interior and the Navy should coordinate their efforts to insure that the administration of petroleum resources and leases contiguous to the Reserves will be consistent with these objectives.

#### RECOMMENDATIONS FOR ACTION

The Secretary of the Navy, with the approval of the President, should

--first determine how much oil the Naval Petroleum and Oil Shale Reserves should be able to produce and how soon the oil should be available to meet national defense needs and then

--submit to the Congress for its consideration a plan for the adequate development and conservation of the Reserves.

RECOMMENDATIONS AND COMMENTS

The Navy concurred with these findings and recommendations and stated that, with the approval of the President, it would, within a reasonable period of time, submit to the Congress a proposal for development of the Reserves. The Navy noted, however, that the current Five Year Defense Plan contained no provision for implementation of such a program.

The Navy also said that it was currently defining officially the boundaries of Petroleum Reserve No. 4 and that, once it had done this, it would work jointly with Interior to resolve any potential

leasing and drainage problems. The Department of the Interior agreed that a determination should be made of the extent to which the Naval Petroleum Reserves should be explored but suggested that such exploration be limited to Petroleum Reserves Nos. 1 and 4.

QUESTIONS FOR CONSIDERATION  
BY THE CONGRESS

This assessment of the current status of the Naval Petroleum and Oil Shale Reserves--including their availability as additional sources of oil in the event of a national emergency--should be useful to the Congress in (1) evaluating any program or budget request that the Navy submits in response to GAO's recommendations and (2) deliberating on proposed legislation affecting the Naval Petroleum and Oil Shale Reserves.

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CHAPTER 1

INTRODUCTION

Between 1912 and 1924 Executive orders established four Naval Petroleum Reserves and three Naval Oil Shale Reserves to provide sources of oil for Navy warships. A chronological history of the Reserves is presented as Exhibit A. The purpose of these Reserves, as later stated in amendments to sections 7421 to 7438 of title 10, United States Code, is to maintain petroleum resources in a standby production status until needed for national defense.

Section 7422 provides that

"\*\*\* the Secretary of the Navy, directly or by contract, lease, or otherwise, shall explore, prospect, conserve, develop, use, and operate the Naval Petroleum and Oil Shale Reserves in his discretion, subject to approval by the President."

This section further states that the Reserves

"\*\*\* shall be used and operated for-

- (1) The protection, conservation, maintenance and testing of those Reserves; or
- (2) The production of petroleum, gas, oil shale, and products thereof whenever and to the extent that the Secretary, with the approval of the President, finds it is needed for national defense and the production is authorized by a joint resolution of Congress."

The production by the Reserves for national defense has been authorized by Congress only once. During World War II Petroleum Reserve No. 1 was authorized to produce 65,000 barrels per day.

The legislation does not define "national defense" or specify the extent to which the Reserves should be developed to meet national defense requirements, i.e., how much oil the Reserves should be able to produce and how soon it



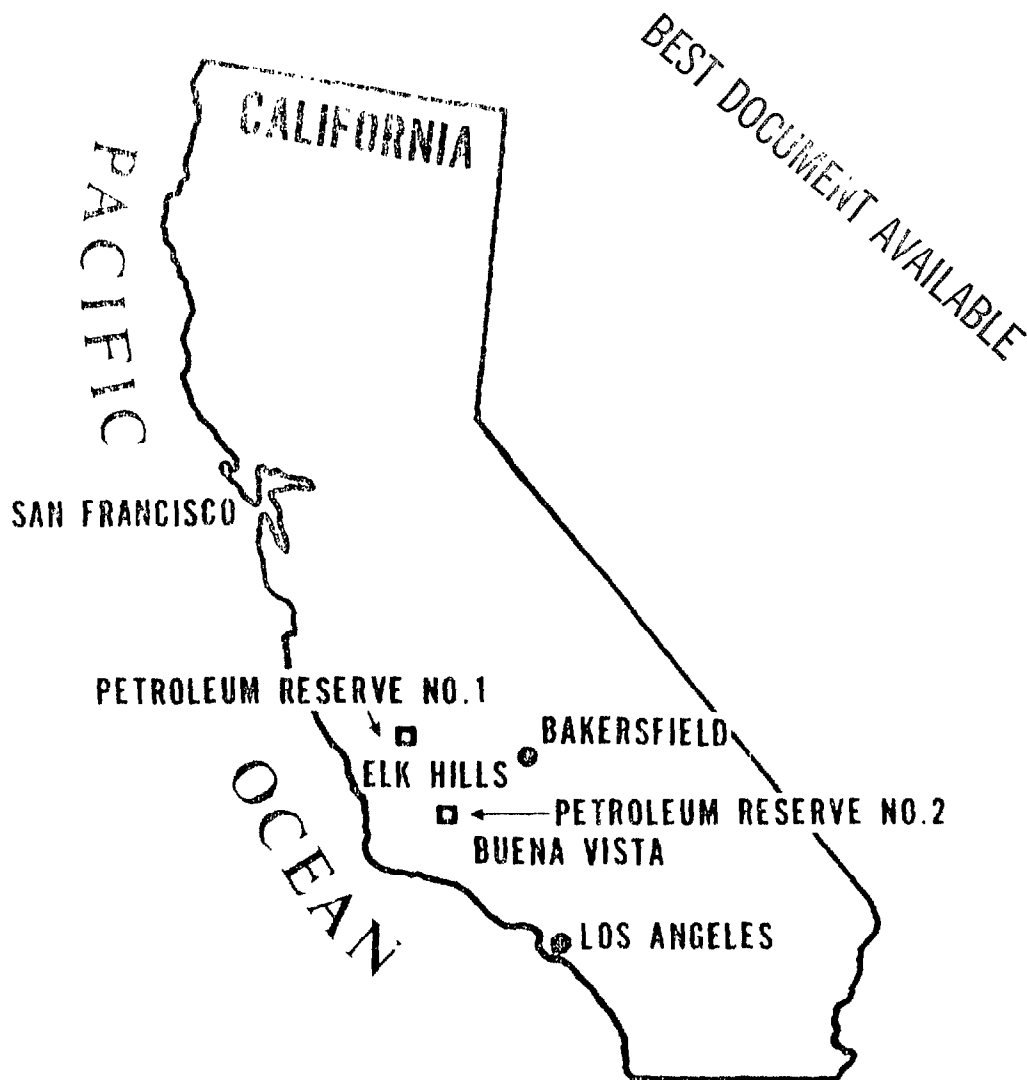
should be available. The Secretary of the Navy, however, has established an operational readiness requirement for Reserve No. 1. The Office of Naval Petroleum and Oil Shale Reserves (ONPR), which manages and operates the Reserves, has defined an event requiring oil for national defense as any crisis determined by the Congress, such as an armed conflict, which would reduce or eliminate oil imports or overseas military fuel purchases. According to ONPR officials, the usefulness of the Reserves depends on their ability to substitute for such losses. To accomplish this goal and effectively meet its responsibilities under the law, ONPR says it must be able to:

- Produce significant quantities of oil from the Reserves on short notice.
- Preserve the oil in the ground until needed by restricting production to the minimum necessary to maintain the fields in a state of readiness.

The ability of the Navy to accomplish these objectives is discussed in chapters 2, 3, and 4.

#### NAVAL PETROLEUM RESERVES

Petroleum Reserves Nos. 1 and 2 are located about 20 miles west of Bakersfield, California. About 82 percent of the land and 80 percent of the proven recoverable resources in Petroleum Reserve No. 1 are Government-owned. The remainder is owned by an oil company which, under terms of a Unit Plan contract (see p. 23), agreed that its lands would be operated as a unit with most of the Navy's. The Navy has control over the exploration, prospecting, development, production, and operation of the Reserve.

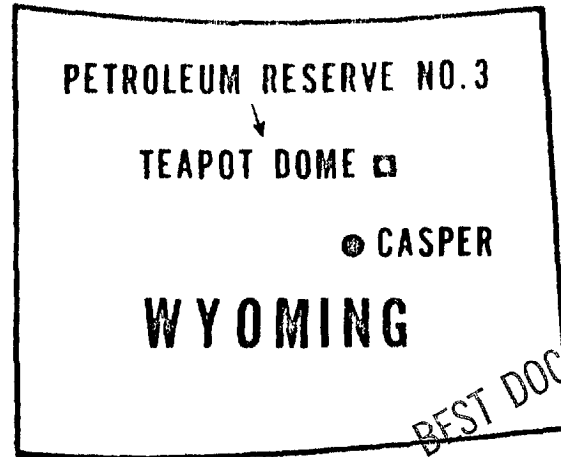


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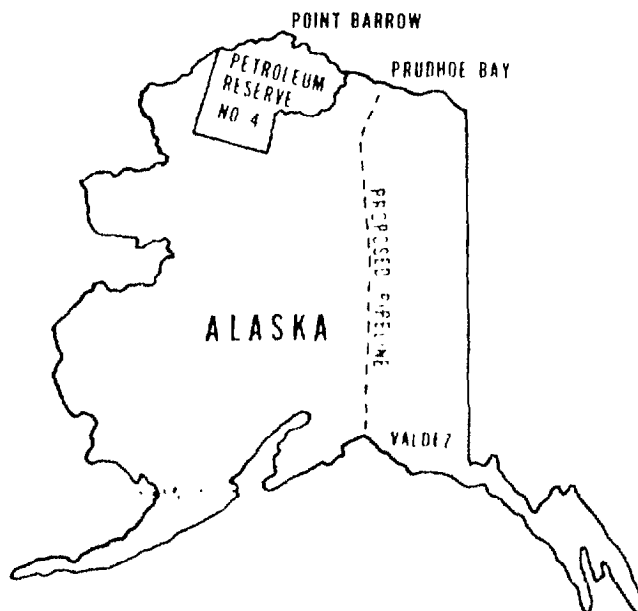
The Federal Government owns about 35 percent of the lands in Petroleum Reserve No. 2. The Reserve is producing at capacity, including the Government's lands, which were leased to private operators in the early 1920s. The Navy must produce to prevent drainage of the oil beneath the Government lands into the wells of adjacent producers. The Government retains title to this land and receives royalty income from the lessees.

Petroleum Reserve No. 3, Teapot Dome, Wyoming, is completely Government owned. It was developed during the 1920s under leases awarded by the Department of the Interior. Because of the Teapot Dome Scandal, these leases were canceled and the wells were closed in 1927. The Reserve remained closed until the Government started exploration and

production in the 1950s to protect against drainage by adjacent operators.



Petroleum Reserve No. 4, located on the Alaskan North Slope, contains approximately 24 million acres and is completely Government owned. The Navy has not fully explored and developed these lands, and no oil is being produced. Also, there are currently no means to transport oil from the Alaskan North Slope. However, natural gas is produced at Point Barrow for use as fuel by Federal facilities and is sold to certain Alaskan native villages, as authorized by section 7422 of title 10, United States Code.



The current proven recoverable resources (Federally owned) within the Naval Petroleum Reserves total about 1.7 billion barrels of oil, including 100 million barrels in the Alaskan Reserve. The Geological Survey has estimated that Petroleum Reserve No. 4 could contain from 10 to 33 billion barrels of oil. If the latter estimate proves accurate, the recoverable resources will come close to the current proven recoverable oil in all domestic oilfields - about 39 billion barrels.

The following illustration presents a comparison of the worldwide and domestic proven oil resources.

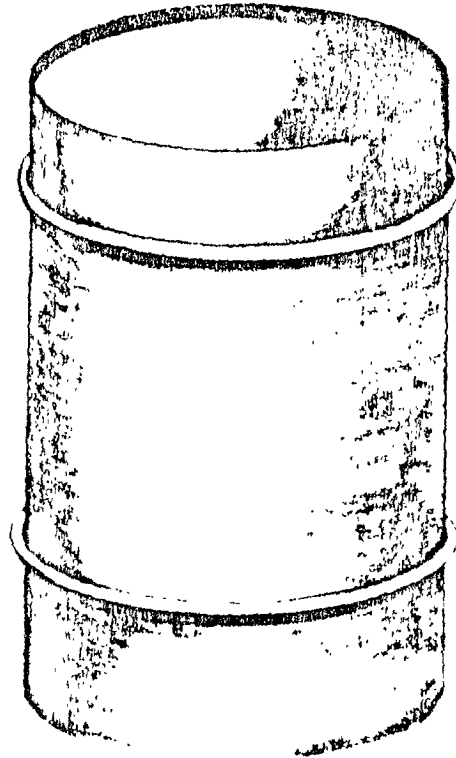
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# WORLDWIDE AND DOMESTIC PROVEN OIL RESERVES (EXCLUDING SHALE OIL)

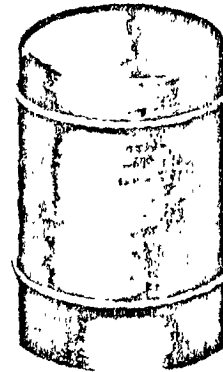
(Billions of Barrels)

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WORLDWIDE  
611.4



DOMESTIC  
39.0



NAVAL PETROLEUM  
RESERVES 1.2\*

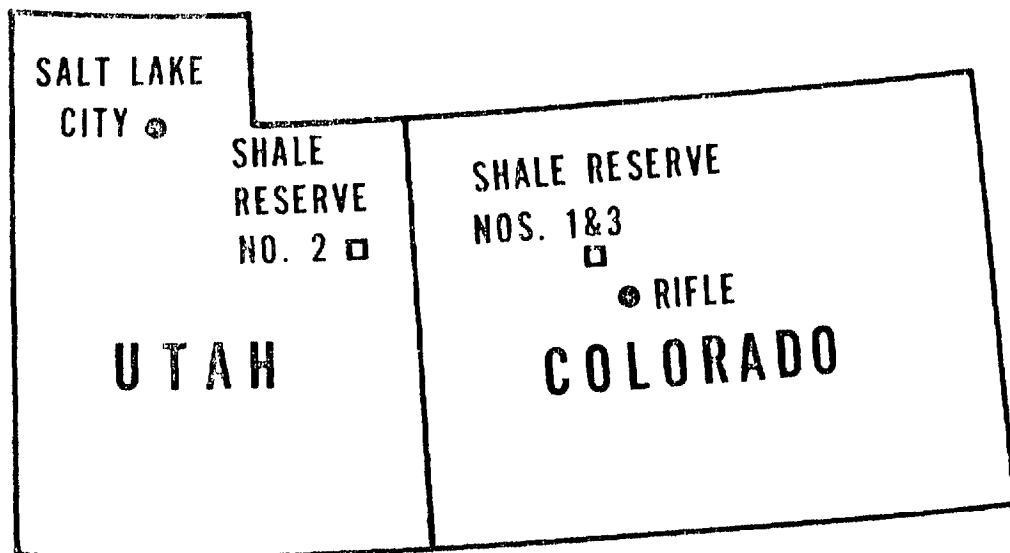


\*INCLUDES 100 MILLION BARRELS  
PROVEN RECOVERABLE OIL  
IN PETROLEUM RESERVE NO. 4.  
HOWEVER, LATEST U.S. GEOLOGICAL  
SURVEY ESTIMATE FOR PETROLEUM  
RESERVE NO. 4 IS 10 TO 33 BILLION

NAVAL OIL SHALE RESERVES

Naval Oil Shale Reserves Nos. 1 and 3 (in Colorado) and No. 2 (in Utah) comprise less than 1.8 percent of the federally owned oil shale lands, and the remaining 98.2 percent are administered by the Department of the Interior. The Navy estimates that, at 10 gallons of oil or more per ton of shale, its Shale Reserves contain about 26 billion barrels of oil, but the cost of producing shale oil presently is not commercially competitive with conventionally produced crude oil.

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## CHAPTER 1

PETROLEUM RESERVES NOT DEVELOPED  
TO FULL PRODUCTIVE CAPACITY

The capability of the Petroleum Reserves to produce for emergency needs has not been fully developed. Without additional development, which would take time and money, the Reserves could supply only a very small portion of the oil ONPR believes might be needed in an emergency.

Section 7422 of title 10, United States Code, provides that the Secretary of the Navy, subject to the approval of the President, shall develop the Reserves, but it does not specify to what extent they should be developed to meet national defense requirements. In 1967 the Secretary of the Navy placed an operational readiness requirement on Petroleum Reserve No. 1, but the Reserve cannot presently meet this prescribed level due to lack of funds. The ability of the other Petroleum Reserves to produce oil in significant quantities on short notice is negligible, and no operational readiness requirements have been established for them.

As indicated in the table below, the Petroleum Reserves could produce only an additional 95,500 barrels per day in an emergency. Only Petroleum Reserves Nos. 1 and 3 are currently capable of additional production without further development. Petroleum Reserve No. 2 is producing at capacity under leases to private contractors and is of minimal value as a reserve. Petroleum Reserve No. 4 is essentially unexplored and undeveloped and has no current production capability.

The Navy estimates that it would cost a minimum of \$2 billion over a 10-year period to develop Petroleum Reserves Nos. 1, 3, and 4 to their maximum deliverable production rates. As indicated in the table, this amount includes \$78.4 million for the development of Nos. 1 and 3 and \$1.9 billion for the development of No. 4 as a 10-billion-barrel reserve.

	1960	1961	1962	1963	1964
Proved reserves (barrels)	10,000,000,000	10,000,000,000	10,000,000,000	10,000,000,000	10,000,000,000
Reserves available (barrels)	10,000,000,000	10,000,000,000	10,000,000,000	10,000,000,000	10,000,000,000
Proved daily production capability (barrels per day)	100,000	1,900	1,000	-	100,000
Already in use	1,000	7,900	1,000	-	13,000
Balance available for emergency	99,000	-	500	-	97,000
Development potential and costs:					
Maximum daily deliverable rate (barrels per day)	102,440	7,900	1,200	3,000,000 <sup>c</sup>	3,280,140
Increase over present capability (barrels per day)	102,440	-	1,200	3,000,000 <sup>c</sup>	3,171,140
Cost to develop (millions)	69	-	9.4	1,000 <sup>c</sup>	1,900,000
Total available for emergency (barrels per day)	102,440	-	1,200	3,000,000 <sup>c</sup>	3,271,140

<sup>a</sup> If, as estimated by the Geological Survey, Petroleum Reserve No. 4 contains from 10 to 33 billion barrels of oil, its market value would be from \$30 billion to \$66 billion.

<sup>b</sup> Average daily rate for a 5-year period that would deliver the maximum volume of oil without adversely affecting the recoverable resource.

<sup>c</sup> Navy estimates based on the assumption that Petroleum Reserve No. 4 contains 10 billion barrels. The Navy has made no estimate of developing No. 4 as a 33 billion barrel reserve.



CAPABILITY OF PETROLEUM RESERVE NO. 1

After the Six Day War in the Middle East (June 5 to 11, 1967), the Secretary of the Navy established an initial operational readiness requirement for Petroleum Reserve No. 1. This stipulated that a 5-year average oil production rate of 160,000 barrels per day be achieved within 60 days after the Congress authorizes national defense production.

ONPR estimates that about \$21.6 million would be needed to bring Petroleum Reserve No. 1 to its operational readiness level. ONPR annual requests for operational readiness funds have been denied by the Offices of the Secretary of the Navy or the Secretary of Defense, beginning with the initial fiscal 1969 budget request for \$4 million. Petroleum Reserve No. 1 officials have stated that the Reserve is presently capable of producing a maximum of 100,000 barrels per day within 60 days, given sufficient emergency funds and manpower.

The Reserve's oil pipeline system can transport 90,000 barrels per day to its boundaries. To meet operational readiness production levels, additional crude oil collection, storage, and shipping facilities would have to be constructed and pipeline connections to transport the oil from the Reserve would have to be installed. A pipeline capability study made in 1970 by the National Petroleum Council estimated that it would take 1-1/2 to 2 years to make the necessary pipeline modifications. However, as a result of inquiries made in 1970 by Petroleum Reserve No. 1 engineers, some of the major pipeline companies in the San Joaquin Valley said that they could build the pipeline connections in 1 year.

The Reserve presently does not have adequate collection, compression, and processing facilities for the amount of natural gas that would be produced in producing oil at a rate of 160,000 barrels per day. Under sound oilfield engineering practices, the natural gas extracted in oil production is processed and the residual dry gas is reinjected into the oilfield to maintain the pressure and prevent possible loss of recoverable resources. Some of the dry gas and most of the liquid byproducts of natural gas are sold and used as fuels. By the end of 1971, Petroleum Reserve No. 1 facilities were expected to be capable of handling gas without

loss up to an oil production level of only 4,000 barrels per day. Oil production in excess of 4,000 barrels per day results in the venting of gas into the atmosphere, reduced pressures in the oilfield, and the loss of processed gas by-products.

The Emergency Petroleum and Gas Administration of the Department of the Interior's Office of Oil and Gas is responsible for preparing national emergency plans, developing preparedness programs covering petroleum, and implementing the plans and programs in the event of a national emergency. An Office of Oil and Gas official stated that current plans did not adequately consider such matters as the (1) type and quantity of oil to be produced by Petroleum Reserve No. 1, (2) points of connection with off-Reserve pipelines, (3) extent and location of the connection pipeline from the Reserve to the main pipeline about 6 miles away, (4) identification of the landowners along with the proposed main pipeline connection right-of-way, and (5) assignment of financial responsibilities for the additional facilities required. These plans are based on a production rate for Petroleum Reserve No. 1 of 8,000 to 10,000 barrels per day. No plans have been made to transport 160,000 barrels per day off the Reserve. Another official of the Office of Oil and Gas stated that it would coordinate its activities with the Navy in the event of a national emergency.

An ONPR official advised us that major oil companies would be anxious to obtain additional production from Petroleum Reserve No. 1 if it became available and that there would be no problem for them to lay pipelines to the Reserve.

ONPR officials said the Secretary's initial operational readiness production rate (160,000 barrels per day) was based on the requirement that it be able to substitute for the possible loss of crude oil imported to the West Coast or the refined petroleum products purchased overseas by the Western Pacific Fleet. This prescribed rate, however, would not compensate for the 303,000 barrels per day of water-borne crude oil imported to the West Coast during 1971. Although details of the fuel requirements for the Fleet are classified, an ONPR official estimated that Petroleum Reserve No. 1 would have to produce at least 230,000 barrels per day to meet the fuel requirements of the Western Pacific Fleet.

According to ONPR, the Secretary's initial operational readiness rate for Petroleum Reserve No. 1 does not represent the maximum efficient rate of production of the Elk Hills Field. ONPR estimates that the maximum efficient rate of production for the Reserve with existing wells and facilities, and a few additions, would approximate 267,440 barrels per day over a 5-year period. ONPR estimates also that more than \$69 million would be required to develop Petroleum Reserve No. 1 to this productive capability. On the basis of information obtained from Petroleum Reserve No. 1 officials, we estimate the value of the proven recoverable resources owned by the Navy in the Reserve to be about \$2.6 billion.

During World War II, the only time when Petroleum Reserve No. 1 had an emergency production status, it produced at a level of about 62,000 barrels per day. A production level of 65,000 barrels per day during this period was authorized by joint resolution of Congress.

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CAPABILITY OF PETROLEUM RESERVE NO. 2

Most of the federally owned lands, comprising about one-third of the Reserve, have been under lease to private operators for about 50 years and are producing at capacity. A Navy geologist advised us in April 1971 that exploratory drilling had not resulted in the location of any additional producible oil deposits. Therefore, it appears that no additional oil could be obtained from Petroleum Reserve No. 2 in the event of a national emergency. ONPR officials have stated, however, that more oil may be in the Reserve, since they believe that the field has not been fully explored. They maintain that requests by some major oil companies for the Navy to issue oil and gas leases on certain unleased lands within the Reserve support their belief. All such requests have been denied.

CAPABILITY OF PETROLEUM RESERVE NO. 3

Petroleum Reserve No. 3 contains about 43 million barrels and has a current daily productive capacity of about 1,000 barrels. The estimated maximum deliverable rate is about 5,200 barrels per day for a 5-year period. The Navy estimates that it would cost about \$9.4 million to develop the Reserve to this level. We estimate the value of the Navy-owned proven recoverable resources in Petroleum Reserve No. 3 to be about \$130 million.

In a report dated July 25, 1967, a petroleum consulting firm pointed out that Petroleum Reserve No. 3 was small and that its initial productive capacity, if developed, would have only a minor effect for any short-term emergency. The oil-bearing sands were not completely defined or developed and the field was not in a state of readiness to produce in an emergency. Therefore, the report recommended that the Secretary of the Navy forego development of the Reserve.

CAPABILITY OF PETROLEUM RESERVE NO. 4

Petroleum Reserve No. 4 has not been fully explored or developed. From 1944 through 1953 the Navy conducted an exploration program which proved the presence of about 100 million barrels of recoverable oil and established a producing natural gas field to supply fuel to Federal facilities

in Alaska. The discovery of the nearby Prudhoe Bay Field has resulted in estimates by the Geological Survey that the Reserve could contain as much as 10 billion to 33 billion barrels of oil.

The Navy estimates that development of the oil fields, as a 10-billion-barrel reserve capable of producing about 3 million barrels per day, would cost at least \$1.9 billion. We estimate the value of the recoverable resources of such a reserve to be about \$20 billion. If the Reserve contains 33 billion barrels of oil, the value of the recoverable resources would be about \$66 billion. The Navy has made no estimates of the additional costs required to develop Petroleum Reserve No. 4 as a 33-billion-barrel reserve.

The utility of the Reserve depends on a feasible method of transporting the oil to refineries. Commercial producers propose to construct a crude-oil pipeline and delivery system from Prudhoe Bay to the ice-free port of Valdez, Alaska. (See map on p. 8.) According to ONPR, connections from the Reserve to the proposed pipeline at Prudhoe Bay could be constructed for about \$38 million, assuming the proposed pipeline can accommodate emergency input from the Reserve.<sup>1</sup> They also estimate that a separate pipeline for Navy use, with a capacity of 3 million barrels per day, could be

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<sup>1</sup>The Department of the Interior believes that excess capacity will not be available on the proposed pipeline for a number of years. Although an ONPR engineer agreed, he estimated that, barring additional large discoveries on the North Slope, excess capacity of the proposed Prudhoe Bay-Valdez pipeline will approximate (1) 700,000 barrels per day within 5 years and (2) 1,200,000 barrels per day within 10 years after the Prudhoe Bay oilfield has reached its planned peak output of 2 million barrels per day. The ONPR engineer also believed that the capacity of the proposed commercial pipeline could be increased by 50 percent (to 3 million barrels per day) by constructing more pumping stations than are currently being planned.

constructed from the Reserve to Valdez for about \$1.9 billion.<sup>1</sup>

ONPR estimates the annual maintenance cost of an operationally ready Petroleum Reserve No. 4 to be about \$242 million if the proposed commercial pipeline is used or \$476 million<sup>1</sup> if a Navy-owned pipeline is used.

The determination of the seaward boundary is another factor which directly affects the value of the Reserve. The northern or seaward boundary of Petroleum Reserve No. 4 was specifically defined by Executive Order 3797-A, dated February 27, 1923, except along the northeastern corner at Harrison and Smith Bays. The Bureau of Land Management defined the boundary on a recent map by following the sinu-  
osities of the bays. This placed the two bays in the State-owned portion of the Outer Continental Shelf. The Navy's proposed map had boundary lines drawn from headland to headland, placing the bays within the reserve, as did a July 1958 Bureau of Land Management map. The settlement of this dispute could affect the value of Petroleum Reserve No. 4 since Harrison Bay is a potentially large oilfield.

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<sup>1</sup>The Department of the Interior, in its comments on our report, said that these cost estimates were probably too low. Also, Interior questioned the feasibility of maintaining a standby pipeline from the North Slope, as it would require continuous oil circulation to keep it in a state of readiness.

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CHAPTER 3

PRODUCTION IN EXCESS OF MINIMUM

LEVELS REQUIRED FOR READINESS MAINTENANCE

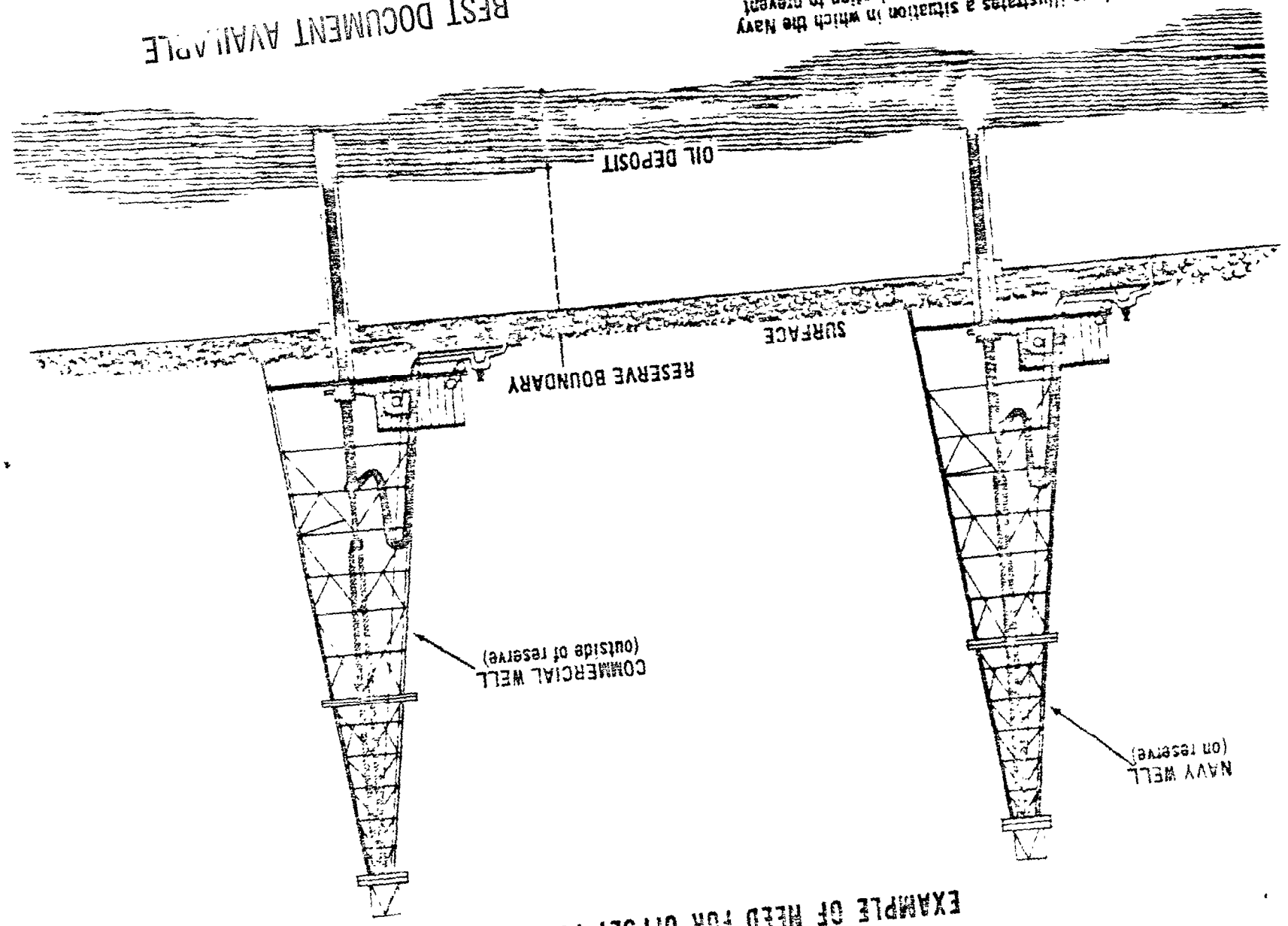
To effectively meet its conservation responsibilities under the law, ONPR says that it should restrict production to the minimum amount considered necessary to maintain the oilfields in a state of readiness. However, the Navy has had to produce oil in excess of this amount.

According to the most current information at the time of our review, the Petroleum Reserves produce about 13,400 barrels of oil daily. According to an ONPR engineer, readiness production is required only on a portion of Petroleum Reserve No. 1. This production, which amounts to about 2,200 barrels of oil a day, is required because of unique characteristics of the oil deposits in that area. The production of the remaining 11,200 barrels of oil per day is required to protect the Government's share of the recoverable oil in Reserves Nos. 1, 2, and 3.

Offset production (see illustration on the following page) is carried out at Petroleum Reserves Nos. 1 and 3 to counteract the threats of drainage, reduced pressures, or flooding caused by production on leased Federal and privately owned lands adjacent to the Reserves. Similarly, offset production is carried out at Petroleum Reserve No. 2 because of commercial production by private operators who own a majority of the lands within the Reserve.

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The above illustrates a situation in which the Navy would have to conduct offset production to prevent its share of the oil deposit from being drained off through the adjacent commercial oil well.



EXAMPLE OF NEED FOR OFFSET PRODUCTION



The often conflicting objectives of the Navy and the Department of the Interior regarding petroleum resources administration have necessitated many of these instances of offset production and have raised the possibility of future offset production at Petroleum Reserve No. 4. Briefly, the objective of the Department of the Interior in issuing the leases is to have oil produced in an efficient manner consistent with goals of environmental protection and conservation. ONPR, however, is charged by law with the responsibility of retaining the maximum possible amount of its oil in the ground until needed for national defense.

During calendar year 1970, Petroleum Reserves Nos. 1, 2, and 3 produced about 4.9 million barrels of oil, reaching a cumulative total, as of December 31, 1970, of over 500 million barrels. Individual production and proven recoverable resources remaining for each Reserve follow.

Petroleum Reserve	Total barrels of oil produced		Proven remaining barrels
	<u>1970</u>	<u>Cumulative total</u>	
No. 1	1,812,724	291,986,813	1,022,225,000
No. 2	2,868,585 <sup>a</sup>	201,360,000 <sup>a</sup>	21,414,000 <sup>a</sup>
No. 3	224,851	6,791,670	43,200,000
No. 4	-	-	100,000,000 <sup>b</sup>
Total	4,906,160	500,138,483	1,186,839,000

<sup>a</sup>Navy lands only.

<sup>b</sup>Current unofficial estimate of the Geological Survey is 10 to 33 billion barrels of oil.

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PROTECTIVE AND MAINTENANCE PRODUCTION  
AT PETROLEUM RESERVE NO. 1

Commercial operators on leased Federal and privately owned lands contiguous to the southwestern portion of the Reserve are producing oil from the same geological zone and structure as lands within the boundary of the Reserve. In this area, known as the Asphalto Field, the Navy has had to produce oil from a 160-acre parcel of land within the Reserve to prevent it from draining into the commercial wells on the leased land just outside the Reserve's boundary.

The Bureau of Land Management leased land in this area to commercial producers in 1962. Federal regulations prohibit issuance of oil and gas leases by the Bureau of Land Management within a mile of a Petroleum Reserve boundary, unless the land is being drained by private operators or it is determined after consultation with Navy officials that the Reserve would not be adversely affected. In December 1962 and January 1963, ONPR officials expressed concern over the issuance of the leases within the 1-mile buffer zone and the subsequent drilling activity. Bureau of Land Management officials informed them that in August 1955 the Director of ONPR had given blanket permission for new leases or renewal of leases previously approved by the Navy. Although the Navy canceled the 1955 waiver in January 1963, it was unable to provide sufficient grounds to the Bureau of Land Management for canceling the leases.

In December 1962 oil was also discovered on land within the Asphalto Field adjacent to Petroleum Reserve No. 1, which is owned in fee by a private oil company. (The term "in fee" indicates that the company owns both the land and the subsurface minerals.) Two wells were drilled in February 1964 by the oil company on its fee land.

This same oil company had entered into a Unit Plan contract with the Navy in June 1944 to prevent condemnation of its lands in Petroleum Reserve No. 1. Under the Unit Plan contract, land owned by the company within the Reserve is operated as a unit with most of the Government-owned land in the Reserve. The contract provides for (1) the orderly and efficient development of the Reserve to furnish oil for wartime needs and (2) the conservation of the oil field

until needed. The oil company, which owns about 18 percent of the land in the Reserve, has agreed that the Navy is to have control over the exploration, prospecting, development, production, and operation of the Reserve.

A unit agreement, a common arrangement in the petroleum industry, is between two or more owners having interests in a common pool. They agree to share production and costs proportionately. The particular unit agreement mentioned above is unusual because its purpose is not to produce oil but to conserve as much of it as possible until needed for national defense.

The contract allows the Navy to bring additional lands owned by the oil company into the Plan, if it can show that the lands are on the same geological structure as an oilfield in Petroleum Reserve No. 1. According to the Navy, it attempted to implement this provision of the contract with respect to the Asphalto Field but these attempts were resisted by the oil company. Claiming that drainage was occurring from the unit area into the company's fee land in this area, the Navy initiated a suit against the company in 1967 to include portions of this fee land in the Unit Plan. On May 18, 1972, the United States District Court for the Northern District of California decided the case in favor of the oil company.

The Navy drilled its first offset well in the Asphalto Field in April 1963. By December 1970 it had taken out about 84 percent of its share of the recoverable resources in the Asphalto Field. The Navy also drilled water injection wells between the Asphalto Field and the main oilfield in Petroleum Reserve No. 1 to prevent movement of oil from that pool into the Asphalto Field.

A section of Navy land in Petroleum Reserve No. 1 excluded from the Unit Plan is located over a portion of an oilfield adjacent to the western boundary of the Reserve. Certain parcels of land in this field (Railroad Gap), but outside the Reserve, are owned by the Unit Plan contractor. Production by this company at Railroad Gap caused drainage from the Navy's portion of the field and forced the Navy into offset production in 1964. The offset production totaled about 391,000 barrels of oil by 1969, when it

dropped to a rate of about 5 barrels per day and was discontinued.

Section 5(f) of the Unit Plan contract provides for an exception to the Navy's exclusive control over production. This section assures the oil company that, when the Navy is not causing the Reserve to produce for national defense purposes, enough oil is to be produced and charged to the company share of recoverable oil to allow the company to pay for its share of the operational and maintenance expenses, including costs of testing and taxes.

Before 1971 the maintenance and testing operations of Petroleum Reserve No. 1 generally produced enough oil, valued at the market price, to cover the company's expenses reimbursable under section 5(f). The possibility of increased production, as proposed in the pending Santa Barbara Channel legislation (see pp. 36 to 38), caused Kern County to increase its 1971 tax assessment of the value of the mineral rights in the oil company's lands. This then caused the quarterly production of oil allocated under the terms of the contract for the company's taxes to increase from about 58,000 to about 137,000 barrels.

PROTECTIVE PRODUCTION AT  
PETROLEUM RESERVE NO. 2

Between May 1921 and March 1927, the Department of the Interior administered the Reserves and leased all federally owned lands within Petroleum Reserves Nos. 2 and 3, as well as portions of Petroleum Reserve No. 1, to private oil companies for commercial development. The circumstances surrounding these leases (the Teapot Dome Scandal) were the subject of congressional investigation and litigation, resulting in cancellation of the leases in Petroleum Reserves Nos. 1 and 3 but not in Petroleum Reserve No. 2. In March 1927 the administration of the Petroleum Reserves was returned to the Secretary of the Navy.

According to a Navy official, Petroleum Reserve No. 2 has always had to conduct offset production because about 65 percent of the land is owned by private operators who have been producing oil at capacity rates since the 1920s. This offset production is performed by private operators, under Navy leases, and the Navy receives royalties from the lessees.

PROTECTIVE PRODUCTION AT  
PETROLEUM RESERVE NO. 3

Following the Teapot Dome Scandal, Petroleum Reserve No. 3 was completely closed in 1927. Commercial operations adjacent to the Reserve prompted an exploratory drilling program conducted from 1951 to 1953, which showed that little drainage was occurring. More significant drainage from deposits previously considered unproductive started in 1954 when operators on the eastern boundary instituted new oil-field recovery procedures. The Navy drilled wells to offset this adjacent production in 1958.

Between 1960 and 1966 the Navy and Interior discussed permitting a secondary recovery program by producers on Federal leases adjacent to the northwest boundary of Petroleum Reserve No. 3. The lessees wanted to place production and/or water injection wells about 50 feet from the Reserve boundary to force production of oil in other wells. Part 221.20, title 30, Code of Federal Regulations, prohibits drilling on leased Federal land within 200 feet of its

boundary. This provision can be waived if Interior agrees that such drilling is necessary. Failing to get an agreement with the Navy, the Geological Survey waived the regulation in January 1965 and allowed the producers to drill the wells. The Navy asked the Secretary of the Interior to reverse the decision, but he refused.

After studying the effects of the wells, the Navy decided to begin offset production since it believed that water would invade the Reserve and that about 50 percent of its oil would be trapped behind the flood front. As of April 1971 Petroleum Reserve No. 3 was producing about 500 barrels of oil per day--50 percent of its current capacity.

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POSSIBILITY OF PROTECTIVE PRODUCTION  
AT PETROLEUM RESERVE NO. 4

The State of Alaska and the Department of the Interior have leased lands adjacent to Petroleum Reserve No. 4, and, if oil is discovered on these lands, the Navy may have to enter into offset production to safeguard the Government's interests.

The Department of the Interior, in Public Land Order 1621, April 13, 1958, as amended, established a 2-mile buffer zone of Federal lands along the boundaries of Petroleum Reserve No. 4 in which leasing was prohibited. The purpose of the buffer zone was to protect the Reserve against drainage by adjacent production.

The Alaska Statehood Act of July 7, 1958, entitled the State of Alaska to a certain amount of Federal lands which were vacant, unappropriated, and unreserved. The Secretary of the Interior, with the concurrence of the Secretary of Defense, was responsible for approving the State selection of lands. In 1965 the State selected some Federal lands, including a portion of the 2-mile buffer zone adjacent to the northeast corner of Petroleum Reserve No. 4. The Bureau of Land Management approved the selection, but the Navy objected and requested that the Secretary of Defense not concur with the action because it would remove the Federal buffer zone protection. In a memorandum of October 15, 1965, the Assistant Secretary of Defense (Installations and Logistics) overruled the Navy's objections and stated that, if significant quantities of oil should be discovered within the buffer zone, the value to the Government of such a commercially financed discovery would tend to more than offset possible threats of drainage. Alaska leased these lands to prospective producers for commercial oil production. No oil had been produced as of July 1972.

A boundary dispute between the Bureau of Land Management and the Navy resulted in the issuance of commercial leases at locations considered by the Navy to be in the buffer zone. The boundary line established by the Bureau of Land Management in the southeastern part of the Reserve excluded the Colville River, which the Navy thought should be included. In March 1969 ONPR notified the Bureau of Land

Management of apparent discrepancies in its determination of the Colville River boundary based on Executive Order 3797-A, which described the boundaries of Petroleum Reserve No. 4.

The Bureau of Land Management referred the matter to the Office of the Solicitor in the Department of the Interior, who issued a decision on December 2, 1969, affirming the Navy's position. The redefinition of the river boundary placed the riverbed within the Reserve and extended the 2-mile buffer zone accordingly. The Bureau of Land Management had already issued several leases in the extended buffer zone area. ONPR officials believed these leases should be canceled, but Department of the Interior officials stated that they had no valid basis for doing so and appealed to the Solicitor to reverse his decision.

In a letter of October 6, 1971, the Acting Associate Solicitor informed the Bureau of Land Management that his review of additional historical evidence revealed that from 1923 to 1969 both the Navy and the Department of the Interior had assumed that the Colville River was not included within the Reserve. He further concluded that ambiguous language in Executive Order 3797-A which supported the Navy's position was erroneous and suggested that the dispute be settled between the Secretary of the Navy and the Secretary of the Interior in light of the additional historical evidence.

Subsequently, the Navy Judge Advocate General advised the Secretary of the Navy that, under the law, the Secretary had the responsibility for interpreting the Executive order and drawing the boundaries. He therefore recommended that the Secretary exercise this responsibility and give public notice to all concerned that he had done so. As a result, on May 19, 1972, the Judge Advocate General published notice in the Federal Register that the Secretary of the Navy, in execution of his authority and responsibility for administering the Naval Petroleum and Oil Shale Reserves as stated in sections 7421 to 7438, title 10, United States Code, had corrected and redefined the boundaries of Petroleum Reserve No. 4. The corrected boundaries included the Colville River within the Reserve. According to the Office of the Judge Advocate General, these will be the official boundaries unless (1) the Attorney General is asked to render an opinion



on the legality of the Secretary's boundary determination and deems it illegal or (2) the Congress enacts legislation to change the boundaries.

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## CHAPTER 4

INABILITY OF THE PETROLEUM RESERVES  
TO SUBSTITUTE FOR THE POSSIBLE LOSS  
OF OIL IMPORTS AND OVERSEAS MILITARY PURCHASES

ONPR believes that the usefulness of the Reserves depends on their ability to substitute for a reduction or the elimination of oil imports and/or overseas military fuel purchases in a national emergency. The Reserves could not currently substitute for such losses, and the Navy estimates that full development would take up to 10 years. By the mid-1980s, however, imports are expected to increase to a point where the Reserves, even if fully developed, could not totally substitute for them.

During 1971 the United States had a domestic demand for about 15.2 million barrels of petroleum products daily. About 25 percent of this demand (3.9 million barrels a day) was satisfied by imports. In addition, in fiscal year 1971, the Department of Defense procured about 353,000 barrels a day of refined petroleum products at overseas locations.

Petroleum Reserves Nos. 1 and 3 (the only ones currently capable of increased production) could, at their current capacity rates, produce an additional 95,500 barrels per day in an emergency. This output could have replaced 2.4 percent of the 1971 imports, or 27 percent of the fiscal year 1971 military overseas procurements.

As discussed in chapter 2, the Petroleum Reserves have not been fully developed. Assuming that the Reserves were fully developed and that Reserve No. 4 contained 10 billion barrels, the Navy estimates the maximum deliverable rate for the Reserves to be 3.3 million barrels per day. At this rate, the Reserves could have substituted for a major portion of the petroleum products imported by the United States in 1971.

Forecasts of petroleum demands indicate a substantial increase in the level of U.S. imports. According to a National Petroleum Council report (July 1971), the United States

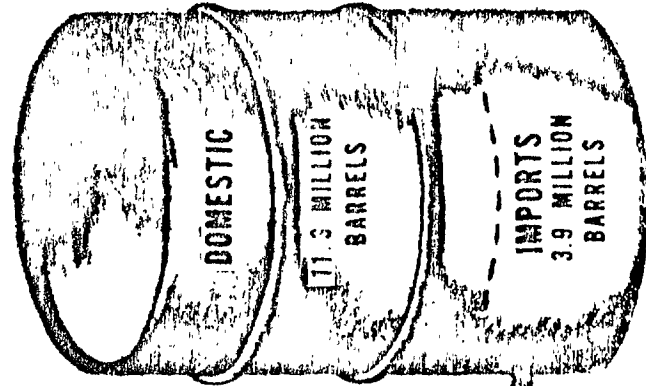
will be importing daily almost 11 million barrels of petroleum products by 1980. The Department of the Interior has estimated, in congressional testimony, that by 1985, barring commercial production of the Alaskan North Slope, the United States will be importing about 15 million barrels per day. At that rate, even if the Reserves were fully developed and Reserve No. 4 contained 33 billion barrels (according to Geological Survey estimates), it does not appear that the Reserves could totally substitute for the projected oil imports by the mid-1980s.

A graphic comparison of the current emergency capacity of the Reserves with the current and projected U.S. demands for petroleum products is shown below.

**COMPARISON OF DAILY CAPACITY OF NAVAL PETROLEUM RESERVES WITH DAILY CURRENT AND PROJECTED UNITED STATES DEMANDS FOR PETROLEUM PRODUCTS**

**1971**

**TOTAL U.S. DEMANDS  
15.2 MILLION BARRELS**

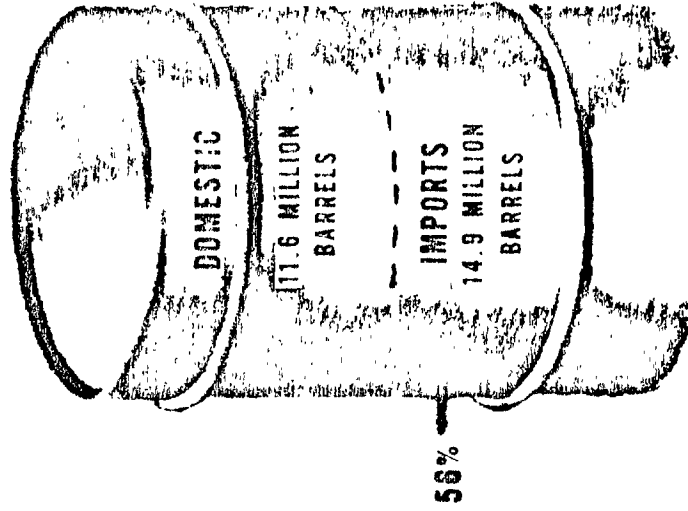


**NAVAL PETROLEUM  
RESERVES CURRENT  
EMERGENCY CAPACITY**



**1985**

**TOTAL U.S. DEMANDS  
26.5 MILLION BARRELS**



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CHAPTER 5

OIL SHALE RESERVES - RETAILS UNDEVELOPED

The Naval Oil Shale Reserves cannot currently produce because environmental, economic, and technical problems have prevented the development of a method of extracting oil from oil shale that is commercially competitive with conventionally produced crude oil. The Secretary of the Interior estimates that it will be at least 10 years before shale oil can significantly supplement existing oil supplies.

Certain sections of public lands in Colorado and Utah containing oil shale were set aside from 1916 through 1924 to further guarantee oil for Navy use in future emergencies. The Navy was not given the authority to operate or develop the Shale Reserves in the same manner as the Petroleum Reserves until the enactment of Public Law 87-796 in October 1962. About 80 percent of the Nation's oil shale resources are on 8.3 million acres of Federal lands, of which about 1.8 percent are Navy owned.

The Navy's policy toward the Shale Reserves has been to (1) observe improvements in oil shale technology, (2) encourage development wherever appropriate, and (3) be prepared to take an active role when appropriate.

According to current Department of the Interior criteria, oil shale deposits that could be commercially feasible to process in the foreseeable future are those which yield 30 or more gallons of oil per ton and which lie in deposits 50 or more feet thick. The Navy estimates that about 4 billion of the 26 billion barrels of oil in the Shale Reserves meet these criteria. Most of these deposits lie in Shale Reserve No. 1.

Officials of the Bureau of Land Management, which manages the surface resources (such as timber and wildlife) of the Shale Reserves on a reimbursable basis, stated that the Bureau could adequately protect oil shale deposits in the Naval Reserves if the lands were returned to the public domain. Under such an arrangement, however, the resources

could no longer be reserved for the Navy. They noted that leasing and disposal of oil shale deposits were prohibited by an Executive order of April 1930 and that location of new mining claims for other minerals on public oil shale lands had been prohibited since 1968. In July 1971, however, the Secretary of the Interior announced that his Department would establish a prototype oil shale leasing program in 1972 to encourage the development of an oil shale industry.

Commenting on our report, the Department of the Interior stated that Shale Reserves Nos. 1 and 3, if they could be developed to produce about 100,000 barrels of oil per day, would provide a 60-year supply. Such oil would probably be more costly than conventional crude oil, and it would require at least 3 to 5 years to start up production. Interior also believes that Shale Reserve No. 2 has doubtful value and would probably be better restored to the public domain.

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CHAPTER 6

POSSIBLE EFFECTS OF PROPOSED LEGISLATION

Legislation currently under consideration by the Congress which could affect the mission and utilization of the Naval Petroleum Reserves includes bills relating to the:

1. Sale of oil from Petroleum Reserve No. 1 to cover the costs of terminating certain offshore oil leases in the Santa Barbara Channel and of exploring Petroleum Reserve No. 4.
2. Construction of an oil pipeline system in Alaska.
3. Establishment of National Defense Petroleum Reserves.
4. Termination of the Oil Import Quota program.

SANTA BARBARA CHANNEL

After oil spills occurred in the Santa Barbara Channel in January 1969, numerous bills were introduced in the Congress to terminate oil leases issued by the Bureau of Land Management for oil exploration, development, and production in the portion of the Outer Continental Shelf contained in the Santa Barbara Channel. One of these bills was prepared by the Department of the Interior and submitted by the Secretary to the Ninety-second Congress on April 21, 1971. It specifically provided for production and sale of oil from Petroleum Reserve No. 1 to cover the costs of (1) terminating 35 leases in the Federal portion of the Santa Barbara Channel, (2) creating a National Energy Reserve in the Channel, and (3) exploring Petroleum Reserve No. 4. In July 1971 the Assistant Secretary of Defense (Installations and Logistics) informed the Navy that this legislation was the only current expression of administration policy on the exploration and development of the Reserves and that, specifically, the proposal to fund the exploration of Petroleum Reserve No. 4 from the sale of oil produced from Petroleum Reserve No. 1

"\*\*\* emphasizes that, for the present, appropriated funds should not be the instrument for exploration and development of the Reserves."

Of the 72 oil and gas leases which the Bureau of Land Management had granted in the Santa Barbara Channel in the period 1966-68, only 11 had producible wells as of June 1971. Three of these were in production--two leases which cover the oilfield in which the spills occurred and one which was offsetting a producing State lease. None of the 35 leases proposed for termination lie in the area where the spills occurred, nor have any of these leases (not all of which have been fully explored) resulted in producible wells.

On the basis of information supplied by the Navy and the Department of the Interior, we estimate that a minimum of \$368 million would be needed to cancel these leases and to explore Petroleum Reserve No. 4. The Department of the Interior, commenting on our report, stated that this estimate was much too low, in view of the present day valuation being placed in the tracts by various court cases. It should be noted that the estimate is a minimum; it does not include the additional court costs required to cancel the leases, the awards for the loss of potential production revenue, and the interest costs on the investments made in lease development. None of these costs can currently be estimated. In addition, revenues of about \$155 million would be needed to cover costs of operation, development, and facilities acquisition at Petroleum Reserve No. 1 to produce the required oil at a reasonable rate.

On the basis of production schedules supplied by ONPR engineers, we estimate that, to realize \$523 million (the total of the above minimum estimate of \$368 million and \$155 million), about 172 million barrels of oil would have to be extracted from Petroleum Reserve No. 1 over a 4-year period. At present there are two major oil-producing geological zones beneath Petroleum Reserve No. 1--the Shallow and Stevens zones. The Navy production schedules indicate that about 67 percent of the oil would come from the Shallow oil zone and 33 percent from the Stevens oil zone. Such production would have the following effects.

- The recoverable resources in the Shallow oil zone would be depleted by 36 percent. The production facilities of this zone comprise the bulk of Petroleum Reserve No. 1's operational readiness capability.



- The recoverable resources in the Stevens oil zone would be depleted by 8 percent, excluding the oil in similarly located zones in the Asphalt Field.
- The Navy would possibly violate the Unit Plan contract, which provides that the Navy and the oil company will not produce oil from the lands included in the Unit Plan, except in a national defense emergency or to cover the annual cost of operating, maintaining, and protecting the oilfield.

### ALASKAN PIPELINE

Several bills have been introduced in the Congress proposing that the Secretary of the Interior not grant any right-of-way or take any other action in connection with the construction of an Alaskan pipeline, unless first authorized to do so by legislation. On May 11, 1972, the Secretary of the Interior stated that after careful consideration and study of the environmental, economic, and national security aspects of a proposed trans-Alaska pipeline, he had decided, in the national interest, to grant a right-of-way permit for the pipeline's construction. The pipeline, proposed by commercial producers, would be between the North Slope and Valdez. According to the Department of the Interior, however, the permit cannot currently be granted because of injunctions issued in pending litigation but it will be granted as soon as it is possible to do so without violating any court order.

As indicated on pages 17 to 19, discussions regarding the construction of this proposed commercial pipeline have a bearing on planning methods to transport oil from Petroleum Reserve No. 4 to refineries.

### NATIONAL DEFENSE PETROLEUM RESERVES

Legislation has been presented proposing that the United States acquire additional oilfields and retain them as shut-in reserves after developing their productive capability. The legislation would require that these fields, to be known as National Defense Petroleum Reserves, be able to produce enough oil to substitute for the loss of oil imported from

insecure countries for 1 continuous year. The proposed legislation is based on studies by two economics professors who claim that this program would be a cheaper alternative to the present oil import quota and would more effectively accomplish national security objectives.

This legislation could increase the importance of the Naval Petroleum Reserves, since it authorizes the President to include existing reserves as part of the proposed program to the extent that he deems it necessary or appropriate. The bill also authorizes the President to acquire lands adjacent to existing reserves and to take other measures to protect or increase their capacity.

#### TERMINATION OF OIL IMPORT QUOTA PROGRAM

Legislation has been presented proposing termination of the Oil Import Quota program, which was established by Presidential proclamation on March 10, 1959, to encourage domestic oil production, exploration, and development by restricting oil imports. Similar to that of the Naval Petroleum Reserves, the objective of this program is to maintain the national security by providing for greater reliance on domestic petroleum resources. Termination of this program and greater use of imported oil would increase our reliance on petroleum reserves, such as the Navy's, to substitute for the loss of imports in a national emergency.

## CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONSCONCLUSIONS

The Naval Petroleum Reserves have not been developed to the extent the Navy believes is necessary to meet estimated emergency oil needs. The Petroleum Reserves could not currently substitute for the loss of oil imports and/or overseas military fuel purchases, and the Navy estimates it would take about 10 years to develop the Reserves to full capacity. The need for imported oil, however, is expected to increase sharply and it does not appear that the Reserves could totally substitute for projected oil imports by the mid-1980s, even if fully developed. Petroleum Reserve No. 1, the only one for which an operational readiness requirement has been established, does not have adequate facilities to produce at this prescribed rate due to lack of funds. The ability of the other Petroleum Reserves to produce significant quantities of oil on short notice is limited or nonexistent. The Oil Shale Reserves are totally undeveloped, and the ability of these Reserves to supplement existing oil supplies in the near future is questionable.

The Navy has had to produce oil from Petroleum Reserves Nos. 1, 2, and 3 in excess of the minimum amount considered necessary to maintain the oil fields in a state of readiness. The Navy believes that production should be limited to the minimum amount needed to effectively meet its conservation responsibilities under the law.

Excess production has been necessary, in part, to prevent drainage of oil from the Reserves by adjacent commercial oil wells, many of which are on leased Federal land administered by the Department of the Interior. Although such excess production has not yet been necessary at Petroleum Reserve No. 4, lands adjacent to the Reserve have been leased commercially and their development may force the Navy into offset production. Extensive production of oil at Petroleum Reserve No. 1 will be required if the Congress passes the legislation currently before it providing for the sale of oil from Petroleum Reserve No. 1 to cover the costs

of terminating certain leases in the Santa Barbara Channel and of exploring Petroleum Reserve No. 4.

The present state of the Reserves and the extensive production of oil which would be required to comply with the proposed Santa Barbara Channel legislation are not consistent with the intent of the legislation establishing the Reserves. Although we made no specific determination of the quantity of oil which would be required from the Reserves in an emergency situation, such a determination must be made to establish objectives which specify how the Reserves can be best utilized for the national good. The Departments of the Interior and the Navy need to coordinate their efforts to insure that the administration of petroleum resources and leases contiguous to the Reserves is consistent with these objectives.

#### RECOMMENDATIONS

The Secretary of the Navy, with the approval of the President, should

- first determine how much oil the Naval Petroleum and Oil Shale Reserves should be able to produce and how soon it should be available to meet national defense needs and then
- submit to the Congress for its consideration a plan for the development and conservation of the Reserves on the basis of such a determination.

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CHAPTER 8

AGENCY COMMENTS

The Department of the Navy concurred with our findings and recommendations in a letter dated June 29, 1972. (See app. I.)

According to the Navy:

--ONPR has developed plans for exploring and developing Petroleum Reserves Nos. 1 and 4 to their currently estimated potential productive capacity but has been unsuccessful in obtaining funds to initiate its proposed programs.

--Plans exist to more fully explore the relatively well-developed Petroleum Reserves Nos. 2 and 3.

--A general master plan for the future development of the Naval Oil Shale Reserves was initiated in 1971.

The Navy stated that it will consolidate and update its exploration and development plans for the Naval Petroleum and Oil Shale Reserves and, with the approval of the President, will submit these plans, within a reasonable period of time, to the Congress as a proposal for development. The Navy has noted, however, that the current Five Year Defense Plan contains no provision for implementation of such a program.

The Department of the Interior commented on our findings and recommendations in a letter dated April 14, 1972 (see app. II), and agreed that a determination should be made of the extent to which the Naval Petroleum Reserves should be explored. Interior suggested, however, that exploration be limited to Petroleum Reserves Nos. 1 and 4 and that Petroleum Reserve No. 4 not be fully developed, since Interior believes that standby wells would be almost impossible to maintain in a continuous state of readiness in the frigid weather of northern Alaska.

Interior also made various comments regarding the validity or completeness of some of the descriptive information

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in our draft report. These comments have been considered in the final report.

Interior did not comment on the fact that in some instances the Navy has had to produce excess oil to protect the Government's interest and that offset production might be necessary in the future at Petroleum Reserve No. 4. The Navy did state that, after it takes steps to officially define the boundaries of Petroleum Reserve No. 4, the two agencies will work together to resolve any potential leasing and drainage problems.

CHAPTER 9

SCOPE OF REVIEW

We conducted our review of the management of the Naval Petroleum and Oil Shale Reserves at ONPR, Washington, D.C.; Petroleum Reserves Nos. 1 and 2, California; Petroleum Reserve No. 3, Wyoming; and the shale reserves in Colorado, Utah, and Wyoming. We also contacted officials of the California State Land Office of the Bureau of Land Management; the Pacific regional office of the Conservation Division, Geological Survey; the Western Region of the Emergency Petroleum and Gas Administration; the Washington, D.C., offices of the Department of the Interior, Bureau of Land Management, Office of Oil and Gas, Geological Survey; the Office of Emergency Preparedness; and the Office of Science and Technology.

We examined pertinent laws, regulations, and policies relating to the administration of the Nation's petroleum reserves and resources. We also reviewed correspondence, consultant reports, proposed legislation, and other related documents.

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## CHRONOLOGICAL HISTORY

OF

## NAVAL PETROLEUM AND OIL SHALE RESERVES

<u>Date</u>	<u>Event</u>
9-27-09	An Executive order temporarily withdrew certain large areas of probable oil-bearing lands in the public domain in California and Wyoming from entry and settlement under the public land laws.
6-25-10	The act of June 25, 1910 (36 Stat. 847), the so-called Pickett Act, was passed and vested the President with discretionary power to make temporary withdrawals of public lands.
7- 2-10	An Executive order issued in accordance with the authority of the Pickett Act confirmed the action taken under the Executive order of September 27, 1909.
6-25-12	The Secretary of the Navy requested assistance of the Secretary of the Interior in securing the reservation for the Navy of oil-bearing public lands in California sufficient to insure a supply of 500,000,000 barrels of oil.
9- 2-12	An Executive order set aside 38,072.71 acres of land in Elk Hills of Kern County, California, as Naval Petroleum Reserve No. 1.
12-13-12	An Executive order created Naval Petroleum Reserve No. 2 in the Buena Vista Hills of Kern County immediately adjacent to the southern boundary of Naval Petroleum Reserve No. 1.
6-29-14	The Secretary of the Navy requested the Secretary of the Interior to nominate possible sites in Wyoming for a proposed petroleum reserve.
4-30-15	An Executive order established Naval Petroleum Reserve No. 3 at Teapot Dome, Wyoming.



## EXHIBIT A

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<u>Date</u>	<u>Event</u>
12- 6-16	An Executive order designated 44,560 acres of public land in Colorado as Naval Oil Shale Reserve No. 1.
12- 6-16	An Executive order established Naval Oil Shale Reserve No. 2 consisting of 90,440 acres in Utah.
6-12-19	An Executive order restored 3,800 acres of Naval Oil Shale Reserve No. 1 to the public domain.
2-25-20	The Mineral Leasing Act prohibited leasing of mineral rights in the Naval Petroleum and Oil Shale Reserves.
6- 4-20	An act (41 Stat. 813) placed the Naval Petroleum Reserves in the possession and under the authority of the Secretary of the Navy.
5-31-21	An Executive order transferred the administration of the Reserves to the Secretary of the Interior.
2-27-23	An Executive order designated an area of 37,000 square miles in the northern part of Alaska as Naval Petroleum Reserve No. 4.
9-27-24	An Executive order established Naval Oil Shale Reserve No. 3 in Colorado.
3-17-27	An Executive order returned the Reserves to the jurisdiction of the Navy as a climax to the Teapot Dome Scandal.
10- -27	The Secretary of the Navy established the Office of Naval Petroleum and Oil Shale Reserves.
2-25-28	An act (45 Stat. 148) transferred the power to administer all outstanding leases on the Reserves from the Secretary of the Interior to the Secretary of the Navy.
7- 7-58	An act (72 Stat. 339) admitted the State of Alaska into the Union.

<u>Date</u>	<u>Event</u>
10-11-62	Public Law 87-796 (76 Stat. 904) authorized the Secretary of the Navy to take possession of the Naval Oil Shale Reserves and to prescribe the conditions for use and operation of the Reserves.
12-18-71	The Alaska Native Claims Settlement Act (85 Stat. 688) entitled Natives of Alaska to claim certain lands in Alaska, including surface rights but excluding the mineral rights to some land in Naval Petroleum Reserve No. 4.

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EXHIBIT B

OTHER FEDERAL AGENCIES ASSOCIATED WITH

NATIONAL PETROLEUM RESOURCES

AGENCY

RESPONSIBILITY

EXECUTIVE OFFICE OF THE  
PRESIDENT:

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Office of Emergency  
Preparedness and Of-  
fice of Science and  
Technology

Advises the President on the  
emergency preparedness and  
national security aspects  
of the Nation's petroleum  
policies and resources.

DEPARTMENT OF THE  
INTERIOR:

Bureau of Land Man-  
agement

Issues oil and gas leases un-  
der the Mineral Leasing Act  
of 1920, as amended, to  
achieve the orderly devel-  
opment, conservation, and  
utilization of resources.  
Administers unproductive  
leases.

Geological Survey

Administers productive oil  
and gas leases and collects  
and accounts for royalty  
revenues.

Office of Oil and Gas

Serves as the focal point of  
leadership and information  
on petroleum matters in the  
Federal Government. Admin-  
isters the Oil Import Quota  
program.

Bureau of Mines

Provides statistics on the  
production, supply, and  
stocks of the Nation's pe-  
troleum and gas resources.  
Supports research of oil  
shale extraction techniques.

AGENCY

RESPONSIBILITY

DEPARTMENT OF THE  
INTERIOR (continued):

Emergency Petroleum  
and Gas Administra-  
tion

Prepares national emergency  
plans and develops prepared-  
ness programs covering pe-  
troleum. Implements the  
plans and programs in the  
event of a national emer-  
gency.

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DEPARTMENT OF THE NAVY  
OFFICE OF THE SECRETARY  
WASHINGTON, D. C. 20350

29 JUN 1972

Mr. Robert G. Rothwell  
Deputy Director, Logistics and  
Communications Division  
U. S. General Accounting Office  
Washington, D. C. 20548

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Dear Mr. Rothwell:

The Secretary of Defense has asked me to reply to your letter of 7 February 1972 which forwarded the GAO draft report on the capability of the Naval Petroleum and Oil Shale Reserves to meet emergency oil needs.

I am enclosing the Navy reply to the report.

Sincerely yours,

A handwritten signature in cursive script, reading "R. D. Neesen".

ROBERT D. NESEN  
ASSISTANT SECRETARY OF THE NAVY  
(FINANCIAL MANAGEMENT)

Encl:

- (1) Department of the Navy Reply to GAO Draft Report of 7 Feb 1972 on Capability of the Naval Petroleum and Oil Shale Reserves to Meet Emergency Oil Needs (OSD Case #3412)

APPENDIX I

Department of the Navy  
on  
GAO Draft Report of 7 Feb 1972  
on  
CAPABILITY OF THE NAVAL PETROLEUM  
AND OIL SHALE RESERVES TO MEET  
EMERGENCY OIL NEEDS  
(OSD CASE NO. 3412)

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Summary of GAO findings and recommendations

A. FINDINGS AND CONCLUSIONS

1. GAO believes that the following adverse situations are the result of the lack of specific determinations as to what extent the Reserves should be developed to satisfy national defense requirements:
  - (a) The capability of the Naval Petroleum Reserves to produce for emergency needs has not been fully developed. Without additional development, which would take time and money, the Reserves could supply only a very small portion of the oil that the Office of Naval Petroleum and Oil Shale Reserves believes might be needed in an emergency. (See pp. 12-19, 30-31).
  - (b) Petroleum Reserve No. 1, the only one for which an operational readiness requirement has been established, does not have adequate facilities to meet this requirement due to lack of funds. The ability of the other Petroleum Reserves to produce significant quantities of oil on short notice is limited or nonexistent. (See pp. 12-19).
  - (c) The Navy has had to produce oil from Petroleum Reserves Nos. 1, 2, and 3 in excess of the quantity it believes is necessary to effectively meet its conservation responsibilities under the law. This has been necessary, in part, to prevent drainage of oil from the Reserves by adjacent

re . .

NO note: Links referred to in this appendix refer to the GAO draft report  
dated 7 Feb 1972, and not to this report.

commercial oil wells. The Navy and Department of the Interior also recognize the possibility of similar problems relative to Naval Petroleum Reserve No. 4, and are discussing means of preventing offset production in the future. (See pp. 20-29).

(d) The Petroleum Reserves could not currently substitute for the loss of oil imports and/or overseas military fuel purchases, and the Navy estimates it will take up to 10 years to develop the Reserves to full capacity. The need for imported oil, however, is expected to increase sharply, and it does not appear that the Reserves could totally substitute for projected oil imports by the mid-1980's, even if fully developed. (See pp. 30-31).

(e) The Oil Shale Reserves are totally undeveloped and cannot be of value as a standby source of oil for emergency use until a commercially feasible method of extracting oil from oil shale is developed. (See pp. 33-34).

2. Legislation currently under consideration by the Congress could directly affect the mission and usefulness of the Naval Petroleum Reserves. (See pp. 35-39).

#### B. RECOMMENDATIONS OR SUGGESTIONS

GAO recommends that the Secretary of the Navy, with the approval of the President:

1. Determine the extent to which the Naval Petroleum and Oil Shale Reserves should be developed and conserved to meet national defense needs, and
2. Submit to the Congress for its consideration a plan for development of the Reserves on the basis of such determinations.

#### C. SUMMARY OF DEPARTMENT OF THE NAVY POSITION

The Department of the Navy concurs with all GAO findings and recommendations.

#### D. STATEMENT

GAO Draft Report (OSD Case No. 3412) accurately describes the development and readiness of the Naval Petroleum and

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APPENDIX I

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oil (Naval Petroleum Reserve). The Department of the Navy has been unable to secure the resources to establish plans, regulations, requirements and funding procedures that would adequately prepare the Reserves to meet the statutory intent for an effective national defense oil resource.

The Office of Naval Petroleum and Oil Shale Reserves has developed plans for exploring and developing its two largest Petroleum Reserves, Nos. 1 and 4, and has unsuccessfully sought funding to initiate its proposed programs. Briefly, the objectives of the plans are to: (1) develop Naval Petroleum Reserve No. 1 to its presently estimated potential of 267,440 barrels of oil per day productive capacity, and to initiate a comprehensive exploratory program to develop new proven oil reserves, which could conceivably double the current proved recoverable reserves figure of approximately 1.022 billion barrels; and (2) in Naval Petroleum Reserve No. 4 explore for and develop 10 billion barrels of proven recoverable oil reserves with a daily deliverability of 3 million barrels. Plans also exist to more fully explore the relatively well developed Naval Petroleum Reserves Nos. 2 and 3. Additionally, a general master plan for the future development of Naval Oil Shale Reserves Nos. 1, 2, and 3 was initiated in calendar year 1971. The Naval Oil Shale Reserves development plan includes not only the oil shale resources but also their oil and gas potentials.

The Department of the Navy will consolidate and update its exploration and development plans for the Naval Petroleum and Oil Shale Reserves. With the approval of the President, these plans will be submitted to the Congress in the format of a development proposal within a reasonable period of time. However, there is no provision in the current Five Year Defense Plan for implementation of this program.

With respect to conclusion (1) (c) above, Navy is currently taking steps to officially define the boundaries of Naval Petroleum Reserve No. 4. When this action is complete, the Departments of Navy and Interior will jointly work to resolve any potential leasing and drainage problems.





## United States Department of the Interior

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20210

APR 14 1972

Mr. Max Hirschhorn  
Associate Director  
Civil Division  
U.S. General Accounting Office  
Washington, D.C. 20548

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Dear Mr. Hirschhorn:

The Department of the Interior has reviewed with interest the GAO draft report entitled, "Capability of the Naval Petroleum and Oil Shale Reserves to Meet Emergency Oil Needs, Department of the Navy, Department of the Interior, January 1972." The officials involved in the subject material reviewed the draft and offer the following comments on the material presented:

A misleading impression has been given in the report for Naval Petroleum Reserve No. 4's producing ability as it has proven oil reserves of only about 100 million barrels. The potential reserves estimate credited to Geological Survey figures (10 to 33 billion barrels) is completely speculative in nature. This fact has not been reported and these potential reserve figures are used as though they were adequate for the firm conclusions and recommendations reached in the report. The table on page 12 is an example of the misleading use of the 10 to 33 billion barrel potential reserves figures. In this table, the maximum deliverable rate for all Naval Petroleum Reserves is given as 3,280,540 barrels per day but 3 million of this is based on the highly speculative, but not yet proven, potential from NPR-4. Therefore, the maximum deliverable rate is 280,540 barrels per day.

The discussion of Alaska pipelines (page 18) should consider the Trans-Alaska pipeline as proposed as being used to its full capacity by production from Prudhoe Bay and other North Slope oil fields outside NPR-4. As now contemplated, there will not be any excess TAl capacity available for shipping NPR-4 oil until many years after the pipeline has been built. The current cost estimates for the Trans-Alaska pipeline are now over 5 billion dollars and some estimate its cost will be closer to 9 billion dollars if and when it is actually constructed.

Secondly, it is doubtful that it would be feasible to maintain a standby pipeline from the North Slope as it would require continuous oil circulation to keep it in a state of readiness. Also, the cost estimates for building such a pipeline and maintaining it in a continuous state of readiness are probably too low.

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In our opinion, the OPEC 1971 forecast of oil imports for 1980 is low (Table II). A figure of 9.2 million b/d would be more realistic, assuming that the Prudhoe Bay field will be producing 2 million b/d in 1980.

If Naval Oil Shale Reserves 1 and 3 could be developed to produce about 100,000 barrels of oil per day, they would provide 60 years supply at this rate. Such oil would doubtlessly be more costly than currently available normal crude oil from other areas and production would require at least 3 to 5 years to start up. It is not the kind of resource that could be produced on 60-day notice.

Naval Oil Shale Reserve 2 contains shallow shale units that are too thin to be of much interest and the thicker rich shale is deeply buried in the north eastern part of the Reserve. This Reserve has doubtful value and should probably be better restored to the Public Domain.

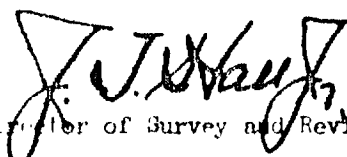
The figure of \$368 million for cancelled Santa Barbara leases and to explore NPR-4 (page 36) seems much too low, in view of the present day valuation being placed on the tracts by the various court cases.

We agree with the recommendation that a determination be made of the extent that the Naval Petroleum Reserves should be explored. However, we suggest exploration in NPR's No. 1 and No. 4 only. For NPR-1, this would involve testing to depths of about 17,500 feet to determine if other oil reservoirs lie below the known accumulations. Reservoirs in deeper zones are known to exist in nearby fields. For NPR-4, this will require completion of a geological, geophysical and test drilling program of the promising structures of the region. However, we do not believe that full development of any newly discovered oil fields in NPR-4 should be made since standby wells will be almost impossible to maintain in a continuous state of readiness in the frigid weather of northern Alaska.

Finally, Appendix II should be revised to reflect the recent reorganization which combines the Oil Import Administration and the Office of Oil and Gas.

We appreciate the opportunity to have reviewed the material in draft and comment on its factuality.

Sincerely yours,

  
Director of Survey and Review

RECENT PRINCIPAL OFFICIALS RESPONSIBLE  
FOR THE ADMINISTRATION OF ACTIVITIES  
DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
<u>DEPARTMENT OF DEFENSE</u>		
SECRETARY OF DEFENSE: Melvin R. Laird	Jan. 1969	Present
ASSISTANT SECRETARY OF DEFENSE (COMPTROLLER): Robert C. Moot	BEST DOCUMENT AVAILABLE	
	Aug. 1968	Present
ASSISTANT SECRETARY OF DEFENSE (INSTALLATIONS AND LOGISTICS): Barry J. Shillito	Feb. 1969	Present
<u>DEPARTMENT OF THE NAVY</u>		
SECRETARY OF THE NAVY: John W. Warner (acting) John H. Chafee	Apr. 1972	Present
	Jan. 1969	Apr. 1972
ASSISTANT SECRETARY OF THE NAVY (FINANCIAL MANAGEMENT): Robert D. Nesen Frank P. Sanders	May 1972	Present
	June 1971	Apr. 1972
ASSISTANT SECRETARY OF THE NAVY (INSTALLATIONS AND LOGISTICS): Charles L. Ill Frank P. Sanders	July 1971	Present
	Feb. 1969	June 1971

APPENDIX III

Temure of office  
From To

DEPARTMENT OF THE NAVY (continued)

DIRECTOR, OFFICE OF NAVAL PETRO-  
LEUM AND OIL SHALE RESERVES:

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Commander Joseph P.

Trunz, Jr.

July 1972 Present

Captain Emory C. Smith

June 1969 June 1972

DEPARTMENT OF THE INTERIOR

SECRETARY OF THE INTERIOR:

Rogers C. B. Morton

Jan. 1971 Present

ASSISTANT SECRETARY OF THE INTE-  
RIOR (PUBLIC LAND MANAGEMENT):

Harrison Loesch

Apr. 1969 Present

ASSISTANT SECRETARY OF THE INTE-  
RIOR (MINERAL RESOURCES):

Hollis M. Dole

Mar. 1969 Present

DIRECTOR, BUREAU OF LAND MANAGE-  
MENT:

Burton W. Silcock

July 1971 Present

DIRECTOR, OFFICE OF OIL AND GAS:

Gene P. Morrell

Oct. 1971 Present

DIRECTOR, GEOLOGICAL SURVEY:

Vincent E. McKelvey

Dec. 1971 Present

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