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NAVAL PETROLEUM RESERVES

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HEARING

BEFORE THE

SUBCOMMITTEE ON
MILITARY CONSTRUCTION AND STOCKPILES

OF THE

COMMITTEE ON ARMED SERVICES

UNITED STATES SENATE

NINETY-SIXTH CONGRESS

FIRST SESSION

ON

H.R. 3354

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 1980 FOR
CONSERVATION, EXPLORATION, DEVELOPMENT, AND USE OF
NAVAL PETROLEUM RESERVES AND NAVAL OIL SHALE RE-
SERVES, AND FOR OTHER PURPOSES

JULY 19, 1979

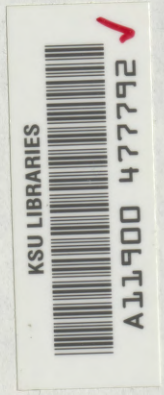
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NAVAL PETROLEUM RESERVES

THURSDAY, JULY 19, 1979

U.S. SENATE,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON MILITARY CONSTRUCTION AND STOCKPILES,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to notice, in room 224, Russell Senate Office Building, Hon. Gary Hart, chairman, presiding.
Present: Senators Hart, Cannon, and Thurmond.

Also present: James C. Smith and Edward B. Kenney, professional staff members, and Jeanie Killgore, clerical assistant.

Members' assistants present: Frank Gaffney, assistant to Senator Jackson; Frank Krebs, assistant to Senator Cannon.

[The bill, H.R. 3354 follows:]

[H.R. 3354, 96th Congress, 1st session]

AN ACT To authorize appropriations for fiscal year 1980 for conservation, exploration, development, and use of naval petroleum reserves and naval oil shale reserves, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is authorized to be appropriated to the Department of Energy for fiscal year 1980 for conservation, exploration, development, and use of the naval petroleum reserves and the naval oil shale reserves under chapter 641 of title 10, United States Code, the sum of \$85,210,000, of which—

(1) \$5,300,000 shall be available for exploration of Naval Petroleum Reserves Numbered 1 and 2;

(2) \$52,911,000 shall be available for operation and maintenance of Naval Petroleum Reserves Numbered 1 and 2;

(3) \$16,089,000 shall be available for operation, maintenance, and development drilling of Naval Petroleum Reserve Numbered 3;

(4) \$5,010,000 shall be available for oil and gas exploration of Naval Oil Shale Reserve Numbered 2; and

(5) \$2,000,000 shall be available for development of Naval Oil Shale Reserves Numbered 1, 2, and 3.

SEC. 2. During fiscal year 1980, there shall be detailed to the Department of Energy for service in the Office of Naval Petroleum and Oil Shale Reserves not less than sixteen commissioned officers of the Navy.

OPENING STATEMENT BY SENATOR GARY HART, CHAIRMAN

Senator HART. The hearing will come to order.

The purpose of our hearing this morning is to review the operation of the Naval Petroleum Reserves [NPR] with special emphasis on the fiscal year 1980 authorization requirements as contained in H.R. 3354, as passed by the House.

The Naval Petroleum Reserves consists of three crude oil reserves, Elk Hills and Buena Vista in California, and Teapot Dome in Wyoming; and three oil shale reserves, two in Colorado and one in Utah.

As the energy situation continues to get more severe these reserves take on added importance, obviously. The Elk Hills reserve is especially important since it now produces over 150,000 barrels of oil per day, making it one of the largest oilfields in the continental United States.

The budget request for fiscal year 1980 is about \$75 million, with most of that earmarked for the operating costs of the oil reserves. It is interesting to note that receipts from the sale of oil produced at these reserves is estimated to go over \$1 billion next year.

These hearings will be open and conducted in the usual manner.

We have invited interested members of the Energy Committee to attend and participate, and some of them will be here.

The hearing, of course, will remain open for the remainder of this week for interested parties to submit information to be included in the public record.

Our witnesses from the Department of Energy are Mr. R. Dobie Langenkamp, Deputy Assistant Secretary of Energy for Oil, Natural Gas and Shale Resources; and Captain Robert H. Nelson, Director, Naval Petroleum and Oil Shale Reserves.

STATEMENT OF R. DOBIE LANGENKAMP, DEPUTY ASSISTANT SECRETARY OF ENERGY FOR OIL, NATURAL GAS AND SHALE RESOURCES, ACCOMPANIED BY CAPT. ROBERT H. NELSON, U.S. NAVY, DIRECTOR, NAVAL PETROLEUM AND OIL SHALE RESERVES; AND COMDR. LAWRENCE VOGEL, CIVIL ENGINEER CORPS, U.S. NAVY, DIRECTOR, OPERATIONS AND ENGINEERING, NAVAL PETROLEUM AND OIL SHALE RESERVES

Senator HART. Mr. Langenkamp, please proceed as you desire.

Mr. LANGENKAMP. Thank you, Mr. Chairman.

We have prepared, and I would like to offer at this time into the record, a written statement setting forth in detail a summary of the operations of Teapot Dome, Elk Hills, the shale reserves, and the budget background.

I would like, with your permission, to summarize that statement informally at this point.

Senator HART. Without objection, the entire statement, of course, will appear in the record as if delivered. We will appreciate your summarization.

[The prepared statement follows:]

PREPARED STATEMENT OF R. DOBIE LANGENKAMP, DEPUTY ASSISTANT SECRETARY FOR OIL, NATURAL GAS, AND SHALE RESOURCES RESOURCE APPLICATIONS

INTRODUCTION

Mr. Chairman and members of the Committee, thank you for the opportunity to discuss the Naval Petroleum and Oil Shale Reserves. I am R. Dobie Langenkamp, Deputy Assistant Secretary for Oil, Natural Gas and Shale Resources. Accompanying me is Captain Robert H. Nelson, Civil Engineer Corps, U.S. Navy, who is the Director, Naval Petroleum and Oil Shale Reserves.

BACKGROUND

The Naval Petroleum and Oil Shale Reserves (NPOSR) include three Naval Petroleum Reserves (NPRs) and three Naval Oil Shale Reserves (NOSRs).

Naval Petroleum Reserve No. 1, (Elk Hills) was set aside in 1912 and is located about 110 miles north-northwest of Los Angeles and about 30 miles southwest of Bakersfield in Kern County, California. This is the largest producing Naval Petroleum Reserve and is one of the largest producing oil fields in the continental United States. The recoverable reserves of NPR-1 are estimated to be about 1.1 billion barrels of oil. The United States owns approximately 80% of the lands within NPR-1 while Chevron U.S.A., Inc., owns the remaining 20%. A unitization agreement was entered into by the United States and Chevron in 1944 which gives the Government control over the time and rate of production from the unitized lands.

Naval Petroleum Reserve No. 2 (Buena Vista Hills) is directly contiguous to the southwest of NPR-1. During the period from 1920-1923, the Government lands in Naval Petroleum Reserve No. 2 were predominantly leased to private operators pursuant to the 1920 Mineral Leasing Act, and have been produced continuously. Total proven remaining reserves in the field are about 20 million barrels of oil. NPR-2 production from Government leases during FY 1978 was 2,800 barrels of oil per day (BOPD) with the Government's royalty share being 378 BOPD.

Naval Petroleum No. 3 (Teapot Dome) was created in 1915 and is completely Government-owned and controlled. This Reserve is located in Natrona County, Wyoming, northeast of Casper, Wyoming. It is estimated that the remaining recoverable reserves at NPR-3 are approximately 29 million barrels of oil.

Naval Oil Shale Reserve Nos. 1 and 3 were set aside in 1916 and 1924, respectively, and lie in Garfield County, Colorado. Naval Oil Shale Reserve No. 2 was set aside in 1916 and is located in Carbon and Uinta Counties, Utah. There is an estimated total of 26 billion barrels of shale oil located in those reserves (22 billion at NOSR-1 and 4 billion at NOSR-2) of which approximately 5.1 billion barrels of NOSR-1 are considered to have potential for economic recovery using the types of technology presently under development.

Since production commenced under the Naval Petroleum Reserves Production Act of 1976 (July 3, 1976), through the end of June 1979, approximately 120 million barrels of oil have been sold by the United States from NPR-1 and NPR-3 and over \$1.4 billion in revenues have been realized from the sale of this oil and the associated liquid products.

REVIEW OF FISCAL YEAR 1978

During FY 1978, total production from NPR-1 averaged approximately 119,000 BOPD. The Government's share of this production amounted to about 36 million barrels of oil and approximately 47 million gallons of natural gas liquids processed from the produced gas. Revenues from the sale of the crude oil and products exceeded \$470 million in FY 1978. During FY 1978, 120 development wells and three exploratory wells were drilled at NPR-1.

At Teapot Dome (NPR-3), during FY 1978, production averaged just under 2,000 BOPD. Revenues generated from the sale of this production were in excess of \$11 million for FY 1978. A total of 144 development wells and 10 exploratory wells were drilled at NPR-3 during this period.

During FY 1978, at the Naval Oil Shale Reserves, a management support and systems engineering contract was awarded to TRW, Inc. to assist the Department of Energy in implementing a Pre-Development Program for the oil shale reserves. The second year of a three-year surface hydrology monitoring program at NOSR-1 was completed as was a seven-hole coring program, during FY 1978.

FISCAL YEAR 1979

At Naval Petroleum Reserve No. 1, it is expected that production will reach approximately 155,000 BOPD by the end of FY 1979 and will average approximately 143,500 BOPD during that period. Approximately 80 percent of this daily average will be the Government's share to be offered for sale. Estimated total revenues during FY 1979, will be in excess of \$600 million. During FY 1979, one of the two new gas processing plants will be completed and placed on production together with the associated oil and gas gathering and gas injection facilities. Oil shipping facilities in the amount of 50,000 barrels will also be completed, as will the high pressure gas injection facilities. Finally, the first phases of an electrical distribution system and a cathodic protection system will be completed during FY 1979. A total of 87 wells (four exploratory and 83 de-

velopment) are expected to be drilled during FY 1979. (A chart depicting the number of wells drilled, and planned to be drilled, is attached hereto). As of July 1, 1979, a total of 65 wells have been drilled at NPR-1. During the first 10 days of July, production at Elk Hills averaged 154,100 BOPD. During the month of June 1979, the average price of crude oil sold at NPR-1 was \$15.85 per barrel.

Production at NPR-3 is expected to average approximately 4,400 BOPD during FY 1979. Revenues from the sale of this production will exceed \$30 million. While it was originally planned to drill 109 wells at NPR-3 during FY 1979, it now appears that in order to allow the proper engineering evaluation of well data, 63 wells will actually be drilled (60 development wells and 3 exploratory wells) in FY 1979 with the remainder to be completed during FY 1980 to the extent justified by the reservoir data and other information obtained in drilling the initial 63 wells. During the first 10 days of July, production at NPR-3 averaged 5,000 BOPD. During the month of June 1979, the average price of all crude oil sold at NPR-3 was \$20.18 per barrel. As of July 1, 1979, 53 wells have been drilled (see attached chart). Construction of waterflood facilities have been completed and, are expected to support increased production at NPR-3. Preliminary enhanced oil recovery studies will continue during this time and design of a pilot enhanced oil recovery (EOR) project will be initiated in late FY 1979.

The Naval Oil Shale Reserve (NOSR) Pre-Development Plan is in its third year. During FY 1979, the surface hydrology study at NOSR-1 will be completed as will the Fischer assays on the core holes which were drilled during FY 1978. It is also expected that a revision to the NOSR-1 oil shale resource estimate will be completed during this period. Finally, the environmental/meteorological baseline monitoring requirements will be established.

FISCAL YEAR 1980 BUDGET REQUEST

The total budget request for the Naval Petroleum Reserves for FY 1980 is \$72,900,000. It is anticipated that \$168 million of funds appropriated to the President will be outlayed during this period.

The FY 1980 budget request for NPR-1 is \$52,911,000. These funds are being requested for operation and maintenance of that Reserve. This amount represents an approximate increase of \$8 million over the FY 1979 operations and maintenance request. This increase is primarily as a result of the operation and maintenance of the additional production facilities which will be on line during the 1979-1980 time period. The development facilities construction program will continue during FY 1980 with completion of the second gas processing plant and associated gas and oil collection facilities. While it was originally anticipated that the FY 1980 drilling program would provide for 90 development wells, analyses of engineering and geologic data to date has caused us to reevaluate the FY 1980 drilling program. On the basis of this reevaluation, we now anticipate drilling 87 development wells during this period. As more geological and reservoir information is gathered from the ongoing drilling program, the number of wells required may vary. In that case, appropriate reprogramming actions will be taken. With respect to the exploratory drilling program of FY 1980, the Department has determined that during this period primary emphasis should be on the development drilling program. This decision should in no way be interpreted as an abandonment of the exploratory drilling program at Elk Hills. In fact, towards the end of the FY 1979 and into FY 1980, seismic work will be conducted at Elk Hills in furtherance of the exploratory program. The data received from the FY 1979 exploratory program (4 wells) and the seismic work will not be fully evaluated until well into FY 1980. Therefore, it is believed that during FY 1980 it is more prudent to perform geological and engineering analysis of the development and exploration wells drilled during FY 1979 in order to develop a more comprehensive and coordinated exploration program for FY 1981 and out years.

The FY 1980 budget request of \$16,089,000 for NPR-3 provides funding for operations and maintenance and development drilling. It is estimated that 39 development wells will be drilled during FY 1980. A pilot EOR project will be conducted during this timeframe. It is estimated that if this pilot study is successful, production at NPR-3 will be substantially increased by the mid-1980's. No funds are being requested for development facilities, as no additional construction is being planned for FY 1980 at this time.

The remaining \$3,900,000 of the 1980 budget request will be used to cover the Program Direction costs (salaries, travel, office supplies, etc.) for both field offices and the Naval Petroleum Reserves Headquarters Office.

Pursuant to the Naval Petroleum Reserves Production Act of 1976 (P.L. 94-258, April 5, 1976), the petroleum reserves are currently being produced at their maximum efficient rate (MER) for a period of six years. The United States' share of production from these petroleum reserves is offered for sale to the highest qualified bidder. The construction of necessary production facilities required to reach peak MER are ongoing at Elk Hills and Teapot Dome. An extensive drilling program is also under way in order to increase production at both of these petroleum reserves.

At this time, I would like to briefly discuss the Department of Energy's projection for the peak MER of production at NPR-1 (Elk Hills). MER is defined by the law as meaning the highest sustainable daily rate of production from a reservoir which will permit its economic development to depletion without detriment to ultimate recovery. The "peak" MER is the MER at the time a field achieves its highest production prior to gradual decline. In short, the peak MER is the highest point on the production curve. The MER of a field will change as more wells are drilled and more is learned regarding reservoir characteristics. Each month of operation provides the reservoir engineers more data regarding gas/oil ratios and bottom hole pressures to use in determining the proper rate of production.

As production from a field continues, both the pressure available and the amount of oil in the field decline, and at some point, despite continued drilling and development, the daily production level from the field will peak and begin to fall.

By far the most accurate method of determining MER and ultimate recovery from a reservoir is through use of well production data. It is a general engineering rule of thumb that usually 15% of a reservoir must be produced before reliable estimates of MER and ultimate primary production can be obtained.

In 1975, the principal producing horizon at Elk Hills (the Stevens Zone, consisting of six distinct producing pools and estimated to contain 800 million barrels of producible oil) was a virgin reservoir, with no significant production. Today only about 8% of its estimated recoverable reserves have been produced. The other major producing horizon, the Shallow Zone, had produced over 40% of its estimated recoverable reserves in 1975, and its production was reasonably predictable.

Generally, if the field is small or development is very rapid, peak MER will be reached quickly. The ultimate method of raising peak MER would be to completely drill and develop a field but produce no oil until the development was complete. In this case, the first day of production would be the peak and production would fall continuously thereafter. However, this method of development is inconsistent with the requirements of the Naval Petroleum Reserves Production Act.

Prior to the NPR Production Act of 1976 this latter means of development and production was planned for the NPR program. Development was to take place but production would be minimal. Consequently, in testimony before the House Armed Services Committee in April 1975, projections of the peak MER were given as 300,000 BOPD assuming production for no more than two years at from 130,000 to 150,000 BOPD. It was recognized, however, at that time that production for a longer period of time at that rate would reduce the peak MER figure.

In late 1977, recognizing that production exceeding 100,000 BOPD had occurred for well in excess of a year, the Officer in Charge at Elk Hills commissioned a study, utilizing the production data available, which concluded that MER would be between 220,000 and 260,000 BOPD, and occur later (1981) due to delays in opening up portions of the reservoirs. During the 1978 Appropriation and Authorization Hearings, representatives of the NPSOR testified that a MER of 260,000 BOPD was the DOE objective.

It now appears that the previous estimate of peak MER should be less than previously stated. This is primarily attributable to the fact that the six individual pools in the Stevens Zone will not be produced simultaneously, and as a result each pool's individual MER will peak at a different time. The reasons for this are delays encountered in the waterflood program, the completion of certain key production facilities and the pending litigation with Chevron U.S.A. involving the Northwest "R" area.

At the present time the current peak MER estimate is approximately 200,000 BOPD in 1982. This projection of necessity makes certain assumptions, one of which is that the 7R area (now in litigation) is produced on or before 1982. Another important assumption is that the waterflood program, which is currently being designed and will be implemented in FY 1981, will prove successful. Due to the production of the reserve, which has already taken place, and what is

known regarding the various reservoirs, it does not presently appear reasonable to return to earlier projections of peak MER regardless of the method of development. It must be emphasized that this revision does not lower our projections of ultimate recovery but only changes the shape of the production curve. Needless to say, we shall continue to review our MER estimates and will keep the Committee informed of any changes in our projections.

REPLACEMENT OF MILITARY OFFICERS

The Department of Energy Organization Act specifically provides for the participation of Armed Forces personnel as detailees under DOE direction in carrying out the functions authorized to be performed regarding the Naval Petroleum and Oil Shale Reserves. The Department of Defense has requested the return of all detailed personnel by September 30, 1979. In addition, DOE has not replaced those officers whose tours of duty have expired during the last year. As a result, the number of naval personnel has declined to 9 from a previous allowance of 20. Of these 9 officers, 4 are located in Washington, 2 at Elk Hills, and 3 at Teapot Dome. The Department of Defense has agreed that 2 of these officers will be detailed to the program until their retirement dates in FY 80. This includes the Director of the Program, Captain Robert Nelson. Several officers, who are key managers of these reserves, have elected to stay with the NPOSr in a civilian capacity rather than return to other assignments or retire. This will help provide management continuity. Among these is the former Officer in Charge at Elk Hills, who was sworn in as Director of the Elk Hills' operation just 15 days ago.

In order to replace the managerial and engineering skills which have been and are being lost due to the departure of the other military personnel, and to meet the need of adequate staffing of this important operation, the Department has allotted 17 positions to the program to allow a one-for-one replacement of all military billets previously assigned to the NPOSr. Hiring for these positions is in progress.

In short, the Department has sought to retain the expertise of key military officers, while cooperating with the Department of the Navy in terminating its policy of detailing officers to DOE. Therefore, we feel the requirement for the mandatory detailing of Naval officers to the program is unnecessary and we recommend the deletion of this requirement from the Bill.

EFFORTS TO FURTHER INCREASE PRODUCTION

At this time, Mr. Chairman, I would like to briefly set forth the actions that the Department of Energy is undertaking in order to increase production from Elk Hills. I "R" area could be placed on immediate production. As indicated in previous testimony, the United States is presently involved in litigation with its unit partner at Elk Hills, Chevron U.S.A., regarding the inclusion of Chevron's Section 7R under the Unit Plan Contract. This suit originally arose when Chevron unilaterally attempted to produce Section 7R independently. It was producing this section at the rate of about 20,000 BOPD until the Government obtained an injunction prohibiting further production therefrom. The Court ordered that the parties attempt to arrive at fair and equitable terms and conditions for the inclusion of Section 7R into the Unit. The parties negotiated, but were unable to arrive at acceptable terms and conditions, and on June 10, 1976, the Acting Secretary of the Navy for Naval Petroleum and Oil Shale Reserves (predecessor to the Secretary of Energy) issued a final decision. The decision was upheld by the United States District Court, which ruled that Section 7R does lie on the same geologic structure underlying the present limits of the Reserve and that the terms and conditions established by the Acting Secretary are fair and equitable. Chevron was successful in obtaining a stay of the District Court's order while it appealed the Court's decision to the Ninth Circuit Court of Appeals. Although there is a 3-4 year backlog for civil cases of this nature, we have granted an expedited hearing of the case. The hearing will be scheduled in September. We are hopeful that the court will rule quickly and favorably. Once 7R is placed on production, it is estimated that production at Elk Hills could increase by approximately 31,000 BOPD within 90 to 180 days.

In addition to seeking a resolution of the 7R matter, the Department of Energy has also taken the necessary actions to include other Chevron lands into the Unit in order that they may be placed on immediate production.

PIPELINE CAPACITY

The Naval Petroleum Reserves Production Act of 1976 requires that pipelines and associated facilities constructed at or acquired for NPR-1 shall have adequate capacity to accommodate not less than 350,000 BOPD and shall be fully operable no later than April 5, 1979. On April 6, 1978, the Department of Energy made the decision to begin the final design for the construction of a Government pipeline from Elk Hills to the Redlands, California, area, where it would tie in to the proposed SOHIO pipeline going from Long Beach, California, to Midland, Texas. Included in this decision to begin final design was a proviso that at the end of four months, if SOHIO had still been unable to receive all necessary permits to begin construction of its pipeline, a reevaluation would be made regarding the continuation of the Government's pipeline. During August 1978, it became apparent that SOHIO would not receive the necessary permits from the State of California to complete the construction of its pipeline in sufficient time for the Government to comply with the April 5, 1979, Congressional mandate. The Chairmen of the House and Senate Committees on Armed Services were notified of this development by letter dated August 18, 1978. In light of the problems experienced by SOHIO and the revision of the estimated MER of production from Elk Hills, discussed above, a decision was made to suspend further work on this pipeline in order to allow Congressional review of this matter. Several amendments to the Naval Petroleum Reserve Production Act of 1976, regarding the time limits imposed by the law, were introduced in the 95th Congress but were not acted upon by either the House or the Senate. It presently appears that there is at least 215,000 BOPD of spare pipeline capacity in the vicinity of Elk Hills that could be utilized, excluding Chevron's capability to transport a part of the production from Section 7R.

Thus, at the present time, it appears that adequate pipeline capacity exists to transport production from Elk Hills. It is my understanding that the Department of Energy is submitting a proposal to amend Section 7422(c) (2) of Title 10, United States Code Annotated, to delete the requirement that the Government construct or procure pipelines and associated facilities with the capability to accommodate 350,000 BOPD by April 5, 1979. This proposed amendment will more closely tie the pipeline capacity to the present estimated field MER of production. I should add that the legislation will propose that the receipt from the sale of NPR oil will be deposited in the general fund of the Treasury rather than the Special Account used under current legislation.

This concludes my formal statement, and I will be happy to answer any questions you may have.

[The charts follow:]

DRILLING PROGRAMS—NAVAL PETROLEUM RESERVES

		Fiscal year 1979			
	Fiscal year 1978	Total	Drilled as of July 1, 1979	Remaining	Fiscal year 1980
ELK HILLS					
Development:					
Tulare.....	0	3	2	1	3
Dry gas zone.....	6	3	0	3	3
Shallow oil zone.....	65	34	29	5	31
Olig zone.....	0	0	0	0	0
Stevens zone.....	47	43	31	12	50
Carneros zone.....	2	0	0	0	0
Subtotal.....	120	83	62	21	87
Exploration:					
Tulare.....	0	0	0	0	0
Dry gas zone.....	0	0	0	0	0
Shallow oil zone.....	0	0	0	0	0
Olig zone.....	0	0	0	0	0
Stevens zone.....	1	1	0	1	0
Carneros zone.....	0	3	3	0	0
Deep.....	2	0	0	0	0
Subtotal.....	3	4	3	1	0
Total, Elk Hills.....	123	87	65	22	87

Drilling Programs—Naval Petroleum Reserves—Continued

		Fiscal year 1979			
	Fiscal year 1978	Total	Drilling as of Apr. 1, 1979	Remaining	Fiscal year 1980
TEAPOT DOME					
Development:					
Shannon.....	105	31	31	0	10
Shale.....	15	20	13	7	20
2d Wall Creek.....	23	5	0	5	5
Muddy/Dakota/Lakota.....	0	4	3	1	4
Tensleep.....	1	0	0	0	0
Subtotal.....	144	60	47	13	39
Exploration:					
Shannon.....	0	0	0	0	0
Shale.....	0	0	0	0	0
2d Wall Creek.....	0	0	0	0	0
Muddy/Dakota/Lakota.....	7	17	6	1	0
Tensleep.....	3	0	0	0	0
Subtotal.....	10	7	6	1	0
Total, Teapot Dome.....	154	67	53	14	39

¹ Includes 4 wells from fiscal year 1978 program which are funded with fiscal year 1978 funds.

Mr. LANGENKAMP. As you pointed out, the production at this time of the Naval Petroleum Reserve has reached an all-time high. We hope it will go higher. We had production during the month of July on an average basis at Elk Hills of 155,000 barrels. We have passed the 5,000-barrel-per-day mark at Teapot Dome. The revenues for 1978 were about \$470 million. In this fiscal year the revenues will be in the \$688 million range.

We have this year planned for Teapot Dome the drilling of approximately 39 wells. We have planned for the year 1979 at Elk Hills the drilling of 83 developmental wells and four exploratory wells.

To date, we have completed 62 of those 83 wells; most of those are Stevens Zone wells. We have completed three of the four exploratory wells.

Senator HART. Excuse me. Just to get some perspective, how many wells does that mean are presently operating?

Mr. LANGENKAMP. At Teapot Dome we presently have 340 wells operating. At Elk Hills we have 600 Shallow Zone wells, and 400 Stevens Zone wells. The Shallow Zone was discovered some time ago and is on the down side of the production curve.

We bring in, I think, approximately 40,000 barrels a day from the Shallow Zone. The Stevens Zone is the more profile zone, and it also produces higher quality oil, 34 gravity Stevens crude, which is probably some of the best crude produced in the United States, and certainly some of the best in California—comparable to Indonesian crude.

We are in the developmental program primarily fleshing out in the Shallow Zone. Basically, it is a Stevens Zone developmental program.

In regard to the exploratory wells, we are not only drilling Stevens Zone exploratory wells in stratigraphic traps and other areas that would be deemed to be exploratory, but we are also testing the Carneros Zone, Dry Gas Zone, and Tulare Zone.

Last year we did something which has not been attempted many times in California: We attempted to drill an extremely deep well, in the 18,000-foot category, which was unsuccessful.

By and large, the exploratory program at Elk Hills should be put in perspective. We are talking about a reserve center that is 46,000 acres. Since the creation of the reserve, almost 2,000 wells have been drilled.

In the Stevens Zone we have a well per 25 acres. If you talk to any oilman in the United States and tell him you have property and you have tested it in your primary zone, one well per 25 acres, he will say, "Well, you have tested it out rather well."

This does not mean that we are not continuing to seek exploratory locations. The Elk Hills field, one of the best in the world, has been substantially explored, as can be seen by the fact that we are doing six exploratory wells in 1979 and 87 developmental wells.

One of the things that might be of interest to you is that we took the production from the various domestic oil companies and tried to see where Teapot Dome and Elk Hills fit. We have found that at 162,000 barrels a day, based on 1977 figures, the Naval Petroleum Reserve was tied with Continental Oil for 14th place in production in the country. That puts it in a category with many of these substantial companies.

In terms of reserves, there are approximately 1 billion barrels of reserves in the three reserves. Most of that is Elk Hills, of course. We have about 20 million barrels in the Buena Vista Reserve, 30 million barrels in the Teapot Dome, and about 1 billion at Elk Hills. That puts us ninth in terms of domestic reserves, behind Gulf Oil and right ahead of Mobil Oil. That, of course, includes the reserves each company reflects for Prudhoe Bay.

So it is clear that the Naval Petroleum Reserve is a substantial asset of the United States.

In terms of our accomplishments for the last year, the production at Teapot Dome has gone from 2,000 to 5,000 barrels of petroleum drilled; at Elk Hills from 119,000 to 155,000 barrels; and over 100 wells have been drilled.

Let me just say a word about our request for funds.

There are a couple of things which strike you when you look at our budget request. The first is that we appear to be asking for less money than the previous year. We are certainly asking for less and we are going to come in for less next year. This is because of previously authorized but unexpended funds appropriated to the President (FAP).

As you are perhaps aware, when the Naval Petroleum Reserve opened up, Congress appropriated over \$400 million for development drilling and for facilities construction. About \$100 million of that was split off and allocated to the Department of the Interior in connection with PET. 4. The remaining \$300 million was available to the Naval Petroleum and Oil Shale Reserves. When this was transferred to the Department of Energy, it became the budget authorization we have, and we have over the past several years utilized that.

The decision was made last year, partly at the prodding of committees on Capitol Hill and partly on prodding of decisionmakers in the Department of Energy, to expend the FAP funds, no longer continue to expend them on a partial basis each year but to expend them and come in on an annual basis.

What we have done in this year's budget is, we have outlays of \$168 million for the funds appropriated at present, previously authorized, plus the \$72 million, which makes \$240 million, which is probably one of the biggest years, if not the biggest year, the NPR has ever had.

Of that \$168 million, we have allocated \$57 million to developmental drilling, and \$111 million to construction. That, added to the \$72 million, makes up the total sum.

The O. & M. budget for Elk Hills, which is the big item shown on the budget, is \$52,900,000, slightly up from the 1978 figures.

The Teapot Dome operating budget was \$6 million, and developmental drilling, \$9 million. We think the 1980 year reflects what is probably the peak in terms of developmental drilling and exploration, as well as construction.

Now a word about our construction project.

When the opening up was ordered, we had, of course, a number of wells in operation and production of some 40,000 barrels a day. What we have done is engage in a rather massive construction program, the kind that anyone is forced to engage in if he has a big oilfield.

Mainly, the big ticket items are gas compressors and gas treatment plants. We are in the process of completing LTS plants 1 and 2. These are 102 million cubic feet per day gas treatment plants. The first is supposed to come on line in September—it is already being debugged at the present time—the second one in January.

We will have about 364 million cubic feet of gas handling capability, which means that as the gas/oil ratio in these wells increases with age, as it usually does, we will be able not only to take the gas, strip it of its products, but also reinject it and maintain pressure in the field.

The construction project also involves a large facility for handling these products, like propane, butane, and so forth, and involves gathering systems, water flood and tank batteries, and the normal field facilities.

We are this year going to emphasize spending funds on fire control and safety procedures.

Let me just say a word about what the House of Representatives did with regard to our budget request. They have added to our budget request \$5 million for an exploratory program on the Naval Oil Shale Reserve. I think it is frank to say—we have testified in the House—that this figure is a DOE-generated figure. If anything, we had originally scheduled for exploration a \$5 million item. Their main concern is why the exploration was deleted. The decision to delete that \$5 million figure was caused by the distinction between exploratory wells and developmental wells at Elk Hills and Teapot Dome, which is not a very good distinction, as seen by the fact that there are wells at Teapot on 5- and 10-acre spacing, and at Elk Hills on 25-acre spacing.

We felt that we would better utilize the manpower we had, the engineers, reservoir engineers, and just the general strength on an organization that is emphasizing the developmental wells. We were drilling a lot of developmental wells. You have to analyze the logs and determine where the next well will be. Exploratory wells constitute a drain on your manpower. The decision was not one to do away

with exploration; the decision was to emphasize the development wells in the 1980 timeframe and take up exploration in Elk Hills and Teapot Dome in the 1981 year.

A reallocation of efforts in this regard is by no means a disaster. Our judgment was at the time, and I think still would be, that we could better spend our efforts on development wells rather than six wells we categorize as exploratory wells on Elk Hills.

So, that is the \$5,300,000 that was put in specifically for exploratory wells. If we receive that \$5,300,000, it would not destroy the program. We still feel that the decision as to which wells to drill out there is one that engineers ought to make and that we think development wells might be more profitable.

Now, the \$5 million for the exploratory wells on the Naval Shale Reserve is a different kettle of fish. These are real exploratory wells. In fact, these are probably as rank a wildcat as anybody will drill in the overthrust belt.

Our indications of hydrocarbons there are limited to the fact that we had a couple of companies ask us for leases. In the overthrust belt we are going to spend about \$400,000 to do some seismic shooting—do geophysical work. If it looks positive, we think we will go forward with it. If these funds are received, we will, in effect, have funds in 1980, whereas our present plans call for getting into this in 1981.

There are rank wildcats; they are very expensive; they are way out in the Desolation Canyon area in Utah. We think this \$5 million can be justified.

The question is whether or not we can justify it in the 1980 timeframe as opposed to the 1981 timeframe.

Senator HART. This is principally natural gas exploration?

Mr. LANGENKAMP. Until we have done the geophysical work, we cannot be sure. I think that it is more likely to be gas than oil.

Senator HART. Geologically, how does that occur with regard to the shale formation, is it above or below the shale zone?

Mr. LANGENKAMP. These would be considerably below the oil-shale zone.

Senator HART. How far below?

Mr. LANGENKAMP. We have two different zones we are going to test. One is a deep well; it is in the 14,000-foot range. The other is 8,000 feet.

Of course, the Piceance Basin out there ranges in depth but it is considerably shallower; it ranges all the way from surface to 1,500 feet.

Senator HART. Do you have any information that leads you to believe there is much natural gas below the shale in Colorado?

Mr. LANGENKAMP. We would not have any information on that that would be worthy of making a record on at this time. The work that we are going to have done would be on the Naval Shale Reserve in Utah. Our indications are that there do not appear to be particular oil and gas reserves on the Naval Shale Reserves in your State.

Let me say a word about our shale reserves: We have three of them, as you know. The major one, in terms of reserve potential, is in Colorado, a 40,000-acre zone, NOSR-1 and 15,000 on the small NOR attached to it.

Then we have 90,000 acres in Utah. The richer shale, the greater potential in terms of oil in place, is the Colorado shale reserve. We calculate NOSR-1 will have about 22 billion barrels of oil in place, recoverable under current technology.

NOSR-2 will have about 4 billion barrels.

As you are perhaps aware, we have a predevelopment plan. We have a contractor for working on it, and the contractor has analyzed Naval Shale Reserves in comparison with other areas in the Piceance Basin. I would characterize the conclusion as being that this is one of the better reserves, not the best. There are, we think, probable areas that have richer shale and perhaps more easily mined shale. This is well within the range of the more attractive sites.

Senator HART. What is the range of barrels per ton in those reserves?

Mr. LANGENKAMP. It is in the 0.5 to 2.0 barrels-per-ton category. What we have done is request \$2 million for that predevelopment plan. We plan to develop the shale reserve in the following sequence: Do the environmental and hydrologic work; prepare a programmatic EIS; do a certain amount of engineering; make a decision as to the best technology to use; and then go forward with a decision on whether to develop it ourselves or whether to engage some other type of development, financial arrangement.

There are a number of options available. We did not want to make that decision until the resource assessment and programmatic EIS are completed.

Senator HART. I have a half dozen questions or so about shale:

What is the status of the Paraho Project right now?

Mr. LANGENKAMP. As you know, the lease expires in 1982. As we understand it, the Paraho Project is not operating at the present time. I think Paraho is one of the companies that is very interested in competing under the program opportunity notice for the \$15 million design funds.

I have talked to Mr. Pforzheimer about it. He has talked to a lot of people at the Department about it. They are going to take a lead on that. At the present time, nothing is going on at Paraho with regard to production of shale oil. Of course, that plant has served its purpose sometime ago. It is larger than bench scale but smaller than commercial size, with a 200 barrel per day potential.

It is interesting—Mr. Pforzheimer has always been clear in saying it was the only oil shale producing plant in the United States at the time it was shut down. It has proved that shale oil can be produced. The question is the commercial cost.

Senator HART. What were the costs over the last year or so per barrel?

Mr. LANGENKAMP. I do not really know, but it was very high. It was well beyond the range that, even with OPEC oil price increases, would be commercial. It is not quite fair; they were producing less than 200 barrels a day. Paraho has figures, as do all these companies, as to what it can be produced for on a commercial basis. Generally, they range up to \$25 a barrel. I do not think anyone really knows at this time, Senator.

I think that the President's speech did not indicate any desire to enhance that development with this Energy Security Corporation. I

think that the Naval Shale Reserve presents a different question. These are resources owned by the Federal Government and in a relatively advanced stage of development. We have 40,000 acres. The largest private block is smaller than that. We have an environmental impact statement on its way, baseline studies, hydrology studies and so forth.

We are in a timeframe on the decision of what to do with the Naval Shale Reserves, I think. We have delayed it to the overall policy but it is not totally hinging on it.

Senator HART. No decision to your knowledge has been made?

Mr. LANGENKAMP. We have not made a decision with regard to the Naval Oil Shale Reserves beyond the decision to complete a predevelopment plan of some reasonable scope that will give us the answers that would enable us to make the decision whether we were going to commence production ourselves with a Government-owned contractor operating type arrangement, or perhaps some sort of license arrangement, or maybe request authority for a lease, or do nothing at all. Those roughly are options that spring to mind.

The urgency that all of us realize, and the President has reflected, indicates that decisions should be made now in a shorter timeframe than we previously contemplated.

As we testified last year, the pace of our predevelopment plan was such that it would take us until 1983-84, or 1985 to get these answers. I think it is fair to say we want the answers quicker than that and want to make that decision.

Senator HART. First, let me say that I introduced a proposal for the \$3 tax credit as something to be phased out at a somewhat lower range than I think the administration is proposing, and all of it phased out by the end of the century—I guess you would call it century—together with some environmental and human resources legislation. I think it is necessary to protect the value of our area. Is it your judgment that a tax credit approach will be sufficient to stimulate a domestic, essentially privately financed, oil-shale drilling industry in this country, or a Government financial corporation, whatever it is going to be, will be necessary also?

I am still having trouble meshing the two.

Mr. LANGENKAMP. I think they both are going to be needed. You know, the history of the oil shale is, there are oldtimers in it who will tell you that they remember the \$5 a barrel figure being tossed out as one that they could get commercial—

Senator HART. I am old enough to remember \$4. I worked for the Department of the Interior in 1960. They said when oil got to \$4 a barrel there would be an industry.

Mr. LANGENKAMP. There has been a certain amount of skepticism as to whether that \$3 will be sufficient. I think it is clear that we have to go further than the tax credit if we want to insure a synthetic fuel industry.

One of the things you could do, if you had the luxury of time, is try the \$3 tax credit. If that didn't work, you probably would not realize it until 1983 or 1984. It might work in a very small way. That is to say, you might get a Union plant and nothing more. You might get Union and one other.

Senator HART. You don't have any ballpark figures as to what the cost is?

Mr. LANGENKAMP. I have a statement in excess of \$50 a barrel. Once again, when you are only producing 200 barrels a day maximum, that figure really is misleading.

Senator HART. Your appearance here could not be more timely with regard to the President's statements earlier this week.

What I would like to pursue is your understanding of the role that the Naval Oil Shale Reserves would play in any administration effort to stimulate or develop an oil shale program. Have you been involved, any or either of your officers, in discussions with the White House or the Department of Energy on the role of your operations in an American oil shale industry?

Mr. LANGENKAMP. First of all, I will make a disclaimer: I did not go to Camp David.

Senator HART. Neither did I. We must be the only two who did not.

Mr. LANGENKAMP. I can't really at this point speak on the broader issue of shale policy. As you know, the general position was that we thought that the \$3 tax credit together with other minor administration maneuvers, such as the entitlements and perhaps help on the permitting and so forth, would unlock the doors and a commercial industry would develop. The Department still believes that.

I think the real question is whether or not we can afford the luxury of relying on this kind of financial incentive, and then sitting around to see if it works.

I think the decision that the President made—and I think it is a good one—is to go forward on two tracks, because of the urgency of the matter.

Senator HART. Then it seems to me what you are saying is that the second track necessarily is Government production, because none of the other ranges of alternatives having to do with whatever kind of Government corporation we are talking about—loan guarantees, leasing and so on—will be sufficient either, if the economics are not there. Maybe make an attractive interest rate or something like that.

It seems to me, if you are saying a \$3 a barrel tax credit in your judgment, may not be or is not in and of itself sufficient to attract private capital. Necessarily we are going to need what still seems to me to be an amorphous Government entity to go forward. Necessarily, it seems to me that Government entity is going to be doing the producing.

Mr. LANGENKAMP. I maybe should say that the administration's approach has not abandoned the concept of economic incentives, but the Energy Security Corporation approach is a quantum leap forward from the \$3 tax credit. I do not think it is tantamount to a position that the Government wants to get into the business of actually building and operating its shale plants.

Senator HART. Maybe you can help me out. What kind of devices are we talking about this Government corporation using to get itself to do it if it is not sufficiently economically attractive with a \$3 a barrel tax credit?

Mr. LANGENKAMP. The administration this morning is working on the outlines, specific details, of the Energy Security Corporation. I am really not apprised of exactly what form that will take.

Senator HART. I don't want to get you in a bad position in regard to your superiors, but would you be willing to give your own personal

view on this, understanding that they are your personal views and not necessarily those of the administration?

Mr. LANGENKAMP. I really don't think it would be productive for me to speculate. I have read the charter. I spent 2 hours reading the charter for the Energy Independent Authority. I saw what that proposal was. It was primarily a financial device; in fact, the Government agency makes loan guarantees, sort of an investment banker of last resort, with a decided emphasis against Government actually producing. I think this is a decision that the administration is making right now. When I say right now, I really mean right now.

Of course, you can see the positive and negative aspects of it. Basically, we think that the private enterprise system has a strong capability to get out there and get things done, and we are not willing to abandon that.

I have seen no signs that the Government wants to get into the business of producing oil shale, itself.

Now, that is separate and apart from the Naval Petroleum Reserve. As you know, we are in the business for historical and other reasons of producing oil ourselves. I think that you can separate those decisions, and I think the fact that we are perhaps considering as one option Government production of oil from shale reserves should not indicate that the administration is leaning in that direction in general.

Senator HART. It seems to me what we have here is a classic case of an economic system premised on private investment and private production, but because of international circumstances a political system which needs to do some things which are not attractive at the present time to that private investment, private enterprise system.

The question then remains, how much responsibility and what role should the Government, namely, the public sector, play in accomplishing a public good when it is not attractive at the present time for one reason or another, or the returns will not be seen soon enough to justify massive near-term investment, when to take such public action is anti-thetical to the system that you have. That is a matter of great concern to me; and I think Members of Congress, and I think to the degree that the administration can clarify as quickly as possible what the corporation could do, for that matter all the congressional proposals on so-called synfuels, it will help a lot of us who are not as keen on Government mechanisms of this sort, particularly ill-defined, to understand better where everybody is headed.

I think, myself, it would be a very serious mistake for the Congress and the Senate to enact a so-called synfuels program involving a very amorphous Government entity or mechanism until people are really clear on what the impact of tens of billions or hundreds of billions of public dollars are going to be on an essentially private marketplace, long term.

I am hopeful that whoever is spelling this out at the very minute will answer some of these questions. They have not been answered so far as I can tell.

Mr. LANGENKAMP. I understand that the answer in the very near future—I have heard tomorrow given as a deadline for this proposal, and I have heard early next week—I think certainly we are talking about the very near future.

Senator HART. I think it is important, frankly, because, as you know, the steamroller is going in Congress. The House has already acted on one or more so-called synfuel bills. We are being pressed to do something before the August recess.

I contacted the Chairman of the Budget Committee, on which I serve, Senator Muskie. He has agreed to create a task group in our Budget Committee to look at the economic implications of all these so-called synfuel programs, budget indications, long-term impact on our efforts to try to balance the budget and in general the whole economic effects of a massive Government involvement in the marketplace.

I don't think until we get those questions answered we should be prepared to sign off the President's program.

As you know, I am sure, Senator Jackson and others have introduced a bill, S. 1308, that among other things dictates construction of three Government oil shale plants.

Are you familiar with that, and what is your position?

Mr. LANGENKAMP. We testified before the committee on that bill a week or so ago before the President's speech. Basically, we feel that the Government should not get into the business of building Government-owned contractor-operated plants. We feel that the commercialization approach is the approach that ought to be taken. We agree with the Jackson bill emphasis on synthetic fuels. We do not take particular issue with locating them along the Naval Petroleum Reserve.

If you are going to locate them somewhere, this would be as good a place as any, maybe better. We do not feel that the Government ought to get into that business. We do not think that the Government is as capable of moving forward swiftly and efficiently as private industry would if the economic incentives were there.

Senator HART. I don't want to be contentious, but that seems to me to contradict what you said a minute ago. The tax credit, in your judgment, is not sufficient to induce private investment and therefore the administration proposed Government corporation is going to be necessary.

How do those two positions square?

Mr. LANGENKAMP. The Government corporation, although it has not been negotiated out, would probably constitute additional economic incentive rather than actual Government construction of the facilities themselves.

As I understood the Jackson program, you take the \$15 million design study and then you go out and the Government actually builds these plants, hires a major contractor who actually builds them. The administration policy, so far as I can summarize it here, is that that is something of absolutely last resort. I do not think that you will see that the corporation will be the entity to go out and actually build these plants.

Senator HART. What are the other incentives? For example, might there be guaranteed purchase, guaranteed price?

Mr. LANGENKAMP. Guaranteed purchase, guaranteed price, loan guarantees. The Office of Shale Resources, which is under my jurisdiction, considered all the range of economic incentives. There is a list of them. You can give tax benefits, tax credits, entitlements, and so forth.

There is a large range of them. I guess the issue is that no one wants to provide more than is necessary to get the industry moving.

On the other hand, no one wants to provide less. You see what we are faced with in regard to timing; if we come up with a \$3 tax credit, which is a figure, as you know, which sprung up last year, if the thing doesn't work, where will we be?

How many additional sessions of Congress will we have to have to come up and either tune it down or tune it up? The result is that the corporation with a bag full of incentives might be able to fine tune it in a much better way.

Senator HART. Also once removed from the scrutiny of Congress, which I think is an important consideration.

Mr. LANGENKAMP. It has positive and negative aspects.

Senator HART. I think what we are trying to get is the so-called efficiency that private investment, private operations are purported to represent. But it is not real free enterprise when you talk about Government giving a tax credit, providing an entitlement program or continuing one, guaranteeing a purchase, guaranteeing a price, making a loan guarantee, also hedging the investment around all sorts of protections against failure.

What are you doing? You have all the downside of public investment and none of the private sector assuming any of the risk. So you are paying a tremendous price in terms of the public commitment here for so-called private efficiency, presuming the benefits flowing from this would be available to the private corporation with very few risks, and all of the liabilities would fall into the hands of the taxpayer. Is that essentially what we are talking about?

Mr. LANGENKAMP. First, I want to disclaim any ability to predict the precise nature of this entity.

Senator HART. This is hypothetical.

Mr. LANGENKAMP. There are examples, Senator, and Colorado is a good example; my home State of Oklahoma is a good example of places where private industry received substantial Government favors. The railroad industry is one that springs to mind. To a certain extent, the petroleum industry has benefited, thrived, and I think the payoff to the American people has been pretty great. Admittedly nobody wants to over do it. It is clear, though, to us who have watched this shale thing for a while, that it is going to take something more than status quo to get the industry moving. It may take a lot more than the \$3 tax credit.

Senator HART. If it does take that, it may have my support. What I would like to have in return for my support is guarantee on the part of those who are getting a benefit to not keep depending on the Federal Government. I guess some of us are tired of people lining up to get help from the Federal Government, as you have indicated over the years, and at the same time spending a lot of time advertising in the newspapers to criticize the Federal Government that is helping them out.

Mr. LANGENKAMP. The whole energy situation as it stands now presents more starkly the philosophic question of the role of Government and the role of free enterprise.

Senator HART. One final question on shale.

As you know, water is a key consideration there. It is my understanding that we are heading, in the Colorado situation at least, where if production does go forward or if it is contemplated that production might go forward on the Naval Oil Shale Reserves, water is going to be a consideration.

Can you tell me where we stand on the Federal assertion of water rights, particularly in Colorado?

Mr. LANGENKAMP. We know approximately how much water is going to be needed. It can be calculated by the number of barrels that you want to plan for.

Senator HART. What is that figure?

Mr. LANGENKAMP. If you are producing, I am told—perhaps we ought to make absolutely certain that these figures are correct—but I am told if you produce a million barrels a day, you would need in excess of 200,000 acre feet per year. You scale that down, depending on the size of the plant. That, of course, hinges on technology which is, as you know, in a state of flux. There is no question about it; water will be required if the Naval Shale Reserve is to produce, and water will be required for all of those plants. I know it is a concern of people in Colorado.

Senator HART. Is the Government, to your knowledge, any of its agencies, the Navy or any other Government agency, taking steps to perfect water rights in Colorado with this in mind?

Mr. LANGENKAMP. As I understand it, we have a case that is presently pending, has been filed but has not been reactivated, that is of some years' standing. We are presently making a determination whether to pursue that lawsuit or whether we will continue to let it lie fallow. We are a number of years off on production, even on the fastest track.

Although water is a concern, the water constraint has not been our biggest problem. Our biggest problem is assessing the shale resource and getting the environmental baseline.

Senator HART. At such time as you make a determination as to whether to reinstitute or activate that suit would you notify me both in my capacity as chairman of the subcommittee and also as the Senator from Colorado?

Mr. LANGENKAMP. I will be glad to do so. Let me make one statement as a lawyer. As you know, once someone raises a question in regard to title to your house, the fact that he doesn't pursue the lawsuit doesn't eliminate the issue. The issue of whether or not the Naval Shale Reserves have water resource rights in Colorado is not going to go away. It is really a question of timing. I do not see how we can in good faith not see that issue resolved. If we do not resolve it, I would assume that others would have the right to raise the issue and in effect, try to conclude it. It looks to me like the issue is going to have to be resolved. It is really only a question of time. We will be glad to do that. In fact, I will make sure that you are kept apprised of our progress.

Senator HART. I appreciate the problems and I think they are enormous in regard to the economics of oil shale, specifically synthetic fuels generally.

In our State, with the massive amounts of shale that we have, those issues may be becoming minor compared to the issue of water. The

water availability question could become the Achilles heel of the oil industry. I am sure you are aware of that.

I am pleased that Senator Cannon is here. He has taken a continued interest over the years in the question of petroleum reserves.

I have a number of questions on the petroleum reserves but I want to recognize Senator Cannon for any opening remarks or comments or questions he might have at this point.

Senator CANNON. Thank you very much. I am sorry I was delayed but I was chairing another hearing.

I have just been reviewing our statement here. I want to talk for a moment about NPR-1 at Elk Hills. I note what your production level is now. I recall a few years ago when we considered going into bigger production at Elk Hills we talked in terms of 300,000 barrels a day. Now you are far short of that at the present time. Are you moving up to that point? My second question is, you drilled a number of wells last year and a number were development wells and a few were exploratory wells. What were the results of those development wells and exploratory wells, and has the size of the reserve increased insofar as our estimates are concerned.

Mr. LANGENKAMP. First, about the 300,000 barrel figure. The current MER, maximum efficient rate, Senator, is probably 200,000 barrels per day. As you are probably aware, the maximum efficient rate is really the point at which all of the production curves from all of the reserves, when aggregated, peak. The result is that, if you have a stringing out of your production with various fields coming into their flushest production at different points in time, you have a flatter production curve and a lower production curve.

Now the MER figure which has been discussed in regard to Elk Hills has sort of a long history. The initial figure that was put out was one that assumed very little initial production. It is assumed that the field would be fully developed and then put on production at a relatively high rate, which would then decline. That is the 300,000 barrel figure.

Last year we testified that, based on our reserve study, assuming you would produce the field for a number of years before you hit the MER, we would have an MER of somewhere around 240,000 to 260,000 barrels. Since that time, our production schedule indicates that we are going to have a flatter production curve. The size of the reserve has not declined, but our peak will come in 1982 rather than 1981. It will be around 200,000 barrels. We will reach that point only if we can win the pending Federal court suit against Chevron that is now before the U.S. Court of Appeals.

Last year we drilled about 90 wells at Elk Hills. Virtually all of them were producers. The production increased from 119,000 barrels to its present rate of about 155,000 to 160,000 barrels.

Senator CANNON. That was as a result of those new wells that were drilled.

Mr. LANGENKAMP. A combination of the result of the wells and also completion of some of the production facilities. We will have all of the major production facilities online by mid-1980.

We are waiting primarily for the gas compressor and gas treatment plants, which are scheduled for completion in September and January. Those will put gas capacity online that will enable us to get close

to 200,000 barrels once we get our area on production. This is the one that is shut in by the court order.

Senator CANNON. Does that lawsuit involve the slant drilling or the drilling in one of these sections that was presumably not included within the MPR-1 at the time?

Mr. LANGENKAMP. That is correct. Section 7R was on the northern edge of the reserve. Chevron commenced to produce it some years ago. The Department of the Navy at that time got an injunction and prevented them from producing it. They had already, I think, gotten up to 20,000 barrels a day. The lawsuit took place. It was won by the Government at the District Court level, including that section in the reserves. That case is pending before the Ninth Circuit Court of Appeals now.

Senator CANNON. To get up to the 200,000 barrels a day then, your new MER figure will require you to drill a number of additional development wells?

Mr. LANGENKAMP. It will require a continued development program, yes. We have 87 set forth for the year 1980. We have a number for 1981 scheduled as well.

Senator CANNON. In your exploration wells, were you able to expand the size of the field or did it remain just about where you had estimated it was?

Mr. LANGENKAMP. The reserve figure we presently believe is approximately 1.1 billion barrels, that reserve figure has not changed. We have not been disappointed with the exploration and the development, but neither has the development indicated that reserves are any greater than we first thought.

Now, at Teapot Dome, of course, the situation is considerably different. We drilled a couple of dry holes last year; and I think it is pretty clear that, as far as exploratory sites and additional development in terms of many new wells are concerned, we have probably reached the maximum point. We will have a number of exploratory and development wells at Elk Hills for the next 4 or 5 years.

Senator CANNON. Does that indicate that you will probably not have additional exploratory wells at Teapot Dome, then?

Mr. LANGENKAMP. I don't believe we have any exploratory wells scheduled for Teapot Dome.

Senator CANNON. You make no reference to PET. 4, the Alaska Reserves. That is because of the legislation that transferred those to Interior?

Mr. LANGENKAMP. That is correct. We have no responsibility for that program.

Senator CANNON. The Production Act of 1976 provided for production for 3 to 6 years. What do you plan to do at the end of that 6-year period?

Mr. LANGENKAMP. Senator Cannon, we have not made a decision on that. We are obligated to make a recommendation to the President in about a year. I would not want to speculate at this point as to what that decision will be. I think it is easy to see what the pros and cons will be. The pros will be that we will be in the same situation with regard to domestic production as we are today. Perhaps domestic production will have declined even more. Perhaps we would have even fur-

ther international disturbance, but we will be in approximately the same situation.

Senator CANNON. We will recess very briefly. We are in the second half of the vote. Senator Hart will be back very shortly.

Senator THURMOND. Mr. Langenkamp, I am now due at another committee. I have some questions here. If you will answer them for the record I would appreciate it. I will just ask you one. Once Elk Hills production is increased, by what percentage will this raise your output?

Mr. LANGENKAMP. Would you repeat that question, Senator?

Senator THURMOND. Once the Elk Hills production is increased by what percent will this raise your output?

Mr. LANGENKAMP. We are producing 155,000 barrels a day at Elk Hills and 5,000 at Teapot Dome. So, an overwhelming percentage of our production does come from Elk Hills. Virtually all of our increase from this point on will come from Elk Hills.

Senator THURMOND. If you will answer the rest of the questions for the record I would appreciate it.

Thank you very much.

[Questions submitted by Senator Thurmond, and answers supplied by Mr. Langenkamp follow:]

Question. Once the Elk Hills production is increased, by what percentage will this raise your output?

Answer. We expect that production from the Elk Hills field will increase approximately 30% above its present level when the field is fully developed.

Question. Does the recently announced program of the President impact on these Reserves in any way?

Answer. It is possible that the Oil Shale Reserves in Colorado will contribute in some way to meet the Administration's synthetic fuel production goals.

Our studies have shown that the reserve in Colorado could easily support a 50-100 thousand barrels per day shale oil production operation. The development of this capacity, whether by government, private industry, or some combination of the two has not yet been determined.

A thorough assessment of the potential for development of the Colorado reserve is in its second year. This program is evaluating the oil shale and water resources, the conceptual facilities, engineering, and the environmental baseline specific to that reserve. This ground work is essential before any development of the Reserve lands can begin.

Question. How much of the \$72.9 million requested in H.R. 3354 goes for Operation and Maintenance of these reserves?

Answer.

Operation and maintenance

NPR-1 (Elk Hills)	\$52, 911, 000
NPR-3 (Teapot Dome)	6, 653, 000
Total	59, 564, 000

Question. What is the size of your current exploration and development program and is it expected to increase? (Senator Thurmond) Where do you stand on the exploration and development program? When will it be finished?

Answer. Development program: Outlays for the Development Program at NPR-1 are \$108,000,000 is Fiscal Year 1980 which will be funded totally out of a prior year appropriation (Funds Appropriated to the President). Approximately 90 development wells will be drilled with \$57,000,000 of this amount. The remaining \$111,000,000 will be expended against the Facilities Construction program.

The requested budget authority for the Development Program at NPR-3 is \$9,436,000 which will provide funds for drilling approximately 41 development wells and other important projects, e.g. Enhanced Recovery Program, Flowline Connections, Reservoir Studies, etc.

The Development Program at both Reserves is a continuous on-going project. Funding in the coming fiscal years should decline to a budget request of approxi-

mately one-half the FY 1980 request by FY 1984. However, the magnitude of this Development Program could change since it is subject to the multitude of variables that are present in any operating oil field, e.g., the results of the Enhanced Oil Recovery Program at NPR-3, and the evaluation of geological and petrophysical data derived from previous development and exploratory activities.

Exploration Program: No funds have been requested for the Exploration Program in FY 1980 at either NPR-1 or NPR-3. However this should not be interpreted as a permanent halt to exploration, at these reserves. Exploration is also an on-going program and as geologic data is evaluated and interpreted more exploration will be required.

The Exploration Program at NPR-1 is now being reviewed; funding in the coming fiscal years may be approximately the same level as in FY 1979. This could be increased if the geologic data indicates potential for petroleum at levels deeper than presently being drilled. If there is justification and high potential for petroleum at these deeper levels the request for Exploration Funds will be increased.

At this time, there are no plans for continuing an Exploration Program at NPR-3 in the next several fiscal years. This is subject to change, based upon the interpretation of geologic and drilling data.

Question. Has the policy of offering these products to the highest bidder been a successful one from a financial standpoint?

Answer. The sales policy of selling the United States' share of petroleum products to the highest qualified bidder has been successful. It has insured that the maximum value of the reserve is returned to the Federal Government. FY 1978 receipts were \$481 million; receipts in FY 1979 will be over \$650 million.

Question. At the current rate of production, how long will these reserves last?

Answer. Assuming production at maximum efficient rates as defined in 10 U.S.C. 7422 the reserves will last:

NPR-1	-----	40 years
NPR-3	-----	25 years

[Whereupon, a recess was taken.]

Senator HART. The hearing will come to order.

I apologize for the delay.

Mr. Langenkamp, in a recent story in the newspaper, the Washington Post, there was a discussion of the inefficiency of Government operations versus privately operated oilfields.

As I recall, the thesis of that article was that private companies were more efficient, based on a calculation involving the number of employees per barrel of oil produced per day. I think the standard of comparison was with foreign government operated fields.

First of all, are you familiar with either the article or the situations behind the article and how do your operations compare with private oilfields?

Mr. LANGENKAMP. I am familiar with the article, Mr. Chairman. The first thing I did after reading the article was talk to Captain Nelson and Commander Vogel and ask them to do a quick analysis to see where we stand in comparison.

We did that. I do not think we look very good incidentally on that comparison. I am not sure it is really fair. We looked at all of our contractors, all of our employees, and all our subcontractors. We came up with 1,500 people. That includes the 105 that are actually on the DOE payroll, our drilling contractors, and all of their subcontractors at both Teapot Dome and Elk Hills. Based on that 1,500 people and assuming we reached the 200,000-barrel production within the next 12 to 18 months, it would be about 130 barrels a day per employee. If you divide that 1,500 employees into current production of approximately 150,000, 160,000 barrels, it is about 100 barrels a day. Rather than

being a statistic used in this philosophical battle we were talking about before, I would like to say that probably most of those statistics are companies that are integrated, and a lot of those employees are not related to the production and exploration developments.

I would assume that it includes all of them. The only real comparable figures would be to go to some company that is only producing oil from one or two fields, very lucrative fields, and does not have any integrated operations. I have not been able to find that. There are a couple of companies that have big fields and we have talked to their people. I think it is fair to say that we compare reasonably with all of them. But we could not find any company that was comparable to it. I think we measure up adequately but I do not think we make the argument that the Government can do it a lot easier.

Senator HART. Just to refer briefly back to the conversation we were having before about the sort of economic philosophy, the argument is made among other things private enterprise is more efficient and there is risk involved and this requires a reduction of overhead. What concerns me is the whole idea of Government guarantees helping private operations all around; you eliminate the risk.

It seems to me you induce high overhead, induce all kinds of things that private enterprise is supposed to resist. If the Government gets into the business of getting private companies to operate things at essentially no risk to themselves it seems to me you are inviting the kind of inefficiency that the people claim the Government is responsible for all the time.

Mr. LANGENKAMP. One thing ought to be said about this synthetic fuel push. The Paraho plant where they would sell 200 barrels per day when it was operating, and oftentimes producing less than 200 barrels, is the maximum that has been done as I understand it. To go from that 200 barrel semiworks plant to 2 million barrels of synthetic fuel or 400,000 barrels of shale oil is a massive undertaking. You are talking about billion dollar plants.

I have not seen any hesitation on the part of the energy companies to take some risk, but up to this point the shale industry, particularly with its front end cost, has just proved to be a little too big of an apple to bite on. I think the synthetic fuels and shale that we are familiar with are really going to require the massive capital investments that distinguish it from some of these other areas.

Senator HART. I agree. Will you say a word about your oil reserves and elaborate on the record and for the record the details and sizes of contract?

Mr. LANGENKAMP. I think we have 14 contracts now. We sell on the open market by sealed bid at the world price, at the free market price. Interestingly enough the free market price in California is lower than the free market price in Oklahoma or Colorado.

I think our most recent price on Tea Pot Dome was \$22, reflecting the recent OPEC increases. Now, this is \$5 more than we get for Elk Hills. The latest Elk Hill price was in the \$16 to \$17 range. What we do is make this crude available to the highest bidder. We recognize our obligation with regard to small business, but in the past we have always had more small businesses bidding on this oil and succeeding than the law requires.

I think 44 percent of our contracts the last time went to small business.

In connection with shut-in, this is one of the aspects that we would have to focus on. There are a number of small firms, many of them defense related. We found many of them supply jet fuels to local Air Force bases and so forth, and are relying on Elk Hills production at the time.

One of the reasons that our oil sells for \$22 at Tea Pot and \$17 at Elk Hills—it used to be \$15 and \$19—is that we do have a transportation problem. We are selling into the California market, as is everyone else in California. We are not able to sell in the midcontinent market because of the fact that the Sohio Pipeline is not built and we are limited in east-west transportation.

You are selling in a market that is not as tight as it is elsewhere. The result is that you are unable to realize that extra few dollars.

Senator HART. I would urge you, by the way, in response to the first part of your answer to resist temptation to follow the industry line and talk about a free market price. There is not a free market price. It is established by a cartel.

Mr. LANGENKAMP. I guess a less controversial way would be to say the market clearing price.

We are always asked to explain the so-called California glut. There is no glut in California to the extent you can sell your oil. There is a glut to the extent you have a slightly less heated market and therefore the profit is less.

One of the silver linings in the OPEC price increase is the increase that the Naval Petroleum Reserve gets.

Senator HART. That is a high price to pay.

Mr. LANGENKAMP. One thing I would like to mention is the issue of personnel for the Naval Petroleum Reserve and the 16 positions that have been detailed by the House bill.

When the Department of Energy was created and assumed the responsibility for the Naval Petroleum Reserve, the Act provided that the Department of Energy direct the Naval Petroleum Reserve and these officers who are detailed to the Department. We were fortunate enough to get some very able people and they have continued to serve since that time, except when the Navy rotated them out to other tours of duty.

The Navy stopped rotating officers back in. They continue to rotate them out but not back in. The result is that we are down to, I think, about 9 of the original officers from 20. We have recognized that we have to confront the problem of personnel. In a number of cases where we had Naval officers who really wished to stay with the program, we have encouraged them to take retirement to enable them to do so.

The officer in charge at Elk Hills, one of the biggest fields in the United States, one of the biggest fields in the world really outside of the Middle East, is now the officer in charge there.

The project manager is the commander who was in charge at the time the Navy, per se, was running the NPR. He took retirement 2 weeks ago and was sworn in as the project manager for Elk Hills. The project manager for Teapot Dome is Lieutenant Commander Watson. We are hoping that Commander Watson will also remain with the pro-

gram. We have asked the Department of the Navy to keep Commander Vogel and Captain Nelson on detail for an additional 2 years. We have a number of other officers who are going to stay with the program. The result is that we are making an orderly transition. We are keeping the talent that the Navy bestowed on us and we are bringing in these people on a permanent basis. To have detailed to us 16 officers that the Navy does not desire to detail and who may not be trained certainly could not fit into this organizational pattern we have spent about 18 months to develop. It would detract from the successful operation of the program. We hope very much that the Senate does not include in its version this detailing of these Navy officers. We think we have all the leadership positions nailed down and as a matter of fact most of them will be nailed down by the same people who have done such a good job in the last couple of years.

Senator HART. What does it cost for you to produce a barrel of oil at the well head?

Mr. LANGENKAMP. The figure varies monthly. At Teapot, which is a more marginal field, about \$2.50. It ranges from \$2.30 to \$2.50. At Elk Hills you are talking about 50 to 60 cents per barrel.

Senator HART. What does it sell for?

Mr. LANGENKAMP. As I told you it sells for \$16 or \$17 at Elk Hills. The last sale price at Teapot was \$22.

Senator HART. If you were a private oil company, I would want to buy your stock.

Mr. LANGENKAMP. Senator, once again I want to get out of the mode of combat on these large philosophical questions that Deputy Assistant Secretaries are not qualified to speak on.

First of all, you would have to look at the lifting cost. The lifting cost is not one that I have looked into with a great deal of detail. The lifting cost is not a magic number on a tablet of stone. Let us say that Elk Hills if it were owned entirely by an oil company would be a very lucrative proposition. In fact, it is 20 percent owned by a major oil company, approximately 18 percent, Chevron, and 20 percent of the production goes to them.

Senator HART. When you give me the cost of producing, what does that include?

Mr. LANGENKAMP. Let me ask either Captain Nelson or Commander Vogel.

Captain NELSON. It includes all the cost, Senator, to produce it from the well and gather it and store it in the tanks and then from those tanks from which the gas is separated, to then treat it, separate it, and then deliver it to the phase of the unit that goes into the pipeline. It includes all those costs, the O. & M. costs of doing that.

Significantly it does not include capitalization costs of the wells or any other part of the field, nor does it include exploration cost, that type of thing. These are significant costs that others must add in.

Senator STONE. Have you ever calculated those?

Captain NELSON. Yes. As a matter of fact we made a calculation—you will recall we covered this approximate subject 2 years ago. After that discussion we did make a calculation. I am not sure that Commander Vogel has that available but he still may have.

Commander VOGEL. I am just reviewing the reply we provided for record at that time. It appears at Elk Hills that all told from beginning

of time we took about \$3 a barrel to depletion; at Teapot Dome about \$5 a barrel. That would include the development and exploration.

Senator HART. That is as of 1977?

Commander VOGEL. In 1977 the total cost for producing a barrel of oil at Elk Hill was \$3.

This would have included the capital costs as well. Of course I would have to go back and review the calculations that make up this to know the basis of it.

Captain NELSON. It did include the capitalization.

Senator HART. Capitalization and exploration.

Captain NELSON. Yes.

Senator HART. \$3 a barrel?

Mr. LANGENKAMP. I think it is fascinating. The question is whether it is right.

Senator HART. You can always tell that.

Mr. LANGENKAMP. That is right. If you are interested in it, we will be glad to do a little calculating and give you some better figures.

For instance, I just go through making my presentation on the 1981 budget which is, of course, something I cannot get into now except to say that, when we went in for O. & M. costs, we had to justify a rather overwhelming increase in O. & M. cost. I asked the captain and commander to do so. For instance, we had one item of \$5 million increased cost of electricity for water flood operations and electrifying a field. We have seen in the oil industry in the last couple of years a phenomenal increase in cost. To me it makes any 1977 figures, even if they were done properly, somewhat suspect.

We will be glad to make a few little calculations and tell you what it looks like.

Senator HART. I am sure the answer you provided in 1977 was done properly. I can't imagine your not doing it properly. If you want to rescrub those figures any way you want to, please do and resubmit them.

Mr. LANGENKAMP. Of course you have to look at your assumptions. You are talking about a field which started many, many years ago. You are talking about a field that is part Government and part private. You are talking about one of the most lucrative oil fields in the lower 48, if not the most lucrative in its geographical area.

Therefore, I will take any kind of figure with regard to Elk Hills as an industry comparison with a grain of salt.

Senator HART. I understand. For my purpose I will take all those caveats into consideration. It is still informative, I think. It is at least informative and most constructive. We are trying to legislate decontrol and I am personally for decontrol. There is a lot of rhetoric and speculation and argument on all sides of that issue as to what constitutes profits and how much those profits are.

You are talking about a situation where, given all those factors you have just stated, 4 years after price controls were put on by the Nixon administration on oil discovered in 1973-74, you were producing oil at \$3 a barrel.

If you want to restudy that and revise it any way you want to, fine. Particularly if you want to submit some 1979 figures, that will be wonderful, given inflation and increased cost and all the rest of it.

One of my colleagues and there were others that advocated that we have some national oil company of some kind if for no other reason than to have a benchmark for the cost of production so that we know, when we are legislating these massive public policy issues about profits and decontrol and deregulation and all the rest, what we are talking about.

The administration has a windfall profit tax premised on the fact that oil produced before 1974 is going to necessarily quadruple in value to the owner. We have essentially that proposition before us here, again even given all the caveats you have stated, the peculiar natures of these reserves, and so forth. It is still helpful to us in trying to understand the economics of oil to have this kind of information. What you are saying is based on at least what you thought was accurate information in 1977, \$3 a barrel to produce oil now worth \$20 a barrel or more.

We would more than welcome any reconsideration of the \$3 figure in 1977 or certainly any figures you have for 1979; slice them any way you want to, just so you put appropriate astericks on what is included and what is not.

I am not trying to make a point here. I am just saying I, as one person, prefer to legislate in the light rather than in the dark. We get every kind of qualification when we try to understand what the cost of oil is today or what the cost was to produce in 1974, every kind of exception and qualification that one can think of as to why no figure really makes any sense.

How in the world are you supposed to legislate public policy based on calculations and economics that no one can agree on and everyone wants to dispute and everyone wants to qualify?

Mr. LANGENKAMP. In my other responsibilities, we have done some looking into the question of why there isn't more exploration being done, and so forth. There is a great deal of misinformation. I think there are two kinds. One is, "If you get your hands off us we will produce us out of the problem", which is an oversimplification.

The other is that the oil companies are somehow making great profit but holding back their exploration for other reasons. The figure that I think ought to be taken into consideration in a discussion like this is the finding rate figure. That itself is a large argument with figures ranging all over the place. It is the finding rate of new supplies which is critical.

Senator HART. And the strongest argument for immediate decontrol of new oil, in my judgment.

Well, we are solving all the other problems but the Naval Petroleum Reserves.

Mr. LANGENKAMP. One other point that I was going to make in the initial statement is that we are conducting an enhanced oil recovery project at Teapot Dome. We have asked for \$2 million in 1980 to start that process. We are going to ask for it in 1981. This is going to be a very interesting project that could boost our production by 5,000 barrels per day.

The jury is still out on whether the technology is going to work. It is a shallow formation. It is innovative and it is a way by which we might double the reserves at Teapot. By the time we come back next

year, we should have some answers on whether or not this enhanced oil recovery project might work.

Senator HART. I think it is well worth a try. I think it is very important to help solve the problem.

A couple more questions on the future of the field. If you were to decide to shut the fields down—I am now talking about Elk Hills—in 1982, what would be the consequences of that, and could that be done without ultimate loss of oil?

Mr. LANGENKAMP. I think it could be done without ultimate loss of recovery. The problem is whether or not it could be done economically, whether it makes economic sense. There are two problems. One is that there are a number of refineries that are purchasing a large portion of their crude from Elk Hills. We are in a tight supply situation and to take 150,000 to 200,000 barrels out of the California market would of itself inevitably impact.

The second thing is that economically it is very difficult to justify doing all the things you have to do to keep the field in operating condition. What we would have to do would be to produce wells intermittently. There would be risks that the wells would sand up. You have continuing maintenance cost. You would have a certain number of people you would have to keep on duty. Very frankly, I think the cost of shutting it in and then maintaining it, I assume as some sort of reserve, would be very high on a per barrel basis. It could be done without damaging the reservoirs. It has been there millions of years; it can stay there with proper engineering.

The question is whether we want to spend that kind of money on a per barrel basis. Then you are in a position where you are really forced to ask, is 100,000 to 200,000, 250,000 or 300,000 barrels of petroleum drilled if you put the field on flush production and produce it in the same mode we were thinking of when we said we were going to have 30,000 barrels a day—the question is, is 300,000 barrels from NPR better than 300,000 barrels per day from the strategic petroleum reserve in terms of capability and cost?

Senator HART. Why not shut that field in and, in effect, use it as part of the strategic petroleum reserve or dedicate the oil produced from it to the strategic petroleum reserve?

Mr. LANGENKAMP. We have no objection to dedicating the oil or funds to this strategic petroleum reserve. Our problem is transportation. The Stevens Zone oil would fit very nicely in the parameters for strategic petroleum reserve oil, but you cannot get it there without a pipeline to the coast and tankering it to the Gulf, and so forth.

Economically, you are in the same position; the money goes into the general fund and you use the general fund to purchase high quality crude on the coast.

As far as using it as a strategic petroleum reserve, there are a couple of problems. For the strategic petroleum reserve, you need more on a daily basis. You need 3 or 4 million barrels a day. This would be a quarter of a million, a good figure to use, maybe 300,000, for 6 or 8 months.

Senator HART. I did not advocate that it be a replacement for, but rather a part of.

Mr. LANGENKAMP. Then the question is whether or not, on a per barrel basis, it is competitive. It is also in the wrong place. It is

quite clear, if we had an interdiction of some sort, the one place in the country that would be hurt the least would be the west coast. The scenario of Indo-China being interdicted is very remote. More remote still for you to have an Alaska interdiction. California's production continues to climb. Then you have a lot of offshore activities. Really the last place you would want the strategic petroleum reserve from the standpoint of location would be on the west coast. All things considered, it would be used, but I think the per-barrel-per-year cost would be very high.

Senator HART. I have some questions in regard to Teapot Dome, and accumulated in regard to Elk Hills, that I would like for you to respond to for the record. [See questions following testimony.] I think that the activities that you are involved in are extremely important. The petroleum reserve, the oil shale reserves are very valuable national assets. It is unfortunate that more attention has not been paid to them, even by Members of Congress. I think the work that all of you are doing is extremely important as a result of that. I for one am grateful for it; the committee is. We want to continue to follow your activities and we wish you well with them.

Do you have any concluding comments or thought?

Mr. LANGENKAMP. I would just like to reemphasize this one point that I made briefly before, regarding our personnel. One of the arguments made about Government is that it is difficult for politicians to operate in the same mode as businessmen. They make the kind of decisions that businessmen don't make. You have heard all of that.

What I have done in the last year and a half with the Naval Petroleum Reserve is attempt to avoid making those kinds of mistakes; in other words, making rapid political changes, changes of personnel, and so forth. What we have tried to do is maintain some continuity here. We are facing the end of the trail as far as utilizing these Navy personnel, who have served now, most of them, for 4 or 5 years. Many of them have been trained by the Navy and have been brought on board. They have been here. Captain Nelson has been here a number of years; Larry Vogel has.

The head men at Elk Hills and Teapot Dome are both career oilmen now. We have taken a lot of pains to see that this continuity is maintained.

For the House committee to, in effect, request us to take 16 new naval officers, who may or may not be trained, and try to integrate them into this organization that has been set up, and I think is functioning pretty well—we have no problem with the personnel we inherited from the Navy, we are very proud of them—but what we would like to do is run this thing on a businesslike basis. To do that we do not need the help that the House committee offers. I am sure they wanted to be helpful.

Senator HART. I appreciate that. We will consider it.

Mr. LANGENKAMP. That is all I have.

Mr. Chairman, I appreciate the opportunity to be here and testify before you.

Senator HART. Thank you very much.

We would appreciate your cooperation in filling out the record on a number of these items.

[Questions submitted by Senator Gary Hart, and answers supplied by R. Dobie Langenkamp follow:]

Question. Discuss your oil sales. (For the record provide details on the number, size and price of contracts and revenue history).

Answer. There are four public sales of crude oil from Naval Petroleum Reserves (NPR) in California and Wyoming each year. Unit Prices are bid as a bonus or a discount from the highest posted stripper well price for comparable oil in the area. The results of the last four such sales are summarized below:

A. Sale of 121,151 barrels of oil per day (BOPD) from NPR No. 1 (NPR-1) (Elk Hills), Tupman, California.

(1) Invitation for Bid (IFB) Number DE-FB01-79RA32001.

(2) Contract Period: February 1, 1979—February 1, 1980.

(3) Special Conditions:

(a) maximum award may not exceed 20% of total being offered;

(b) Small Business Refiner Preference Evaluation.

(4) Number of Bidders Solicited: 141.

(5) Number of Bids Received: 24.

(6) Number of Awards: 16.

(7) Percentage to Small Business: 43 percent.

(8) Highest Unit Bid Received: \$1.01 Bonus.

(9) Lowest Unit Bid Awarded: (\$.35) Discount.

(10) Award Unit Price: \$0.176 bonus. Weighted average for 16 awards.

(11) A complete breakout of awards is contained in Attachment A.

B. Sale of 190 BOPD royalty crude oil from NPR No. 2 (NPR-2), Tupman, California.

(1) IFB Number E1-78-B-01-7261.

(2) Contract Period: November 30, 1978—November 30, 1979.

(3) Special Conditions: None.

(4) Number of Bidders Solicited: 68.

(5) Number of Bids Received: One.

(6) Number of Awards: One, to U.S.A. Petrochem Corporation, Santa Monica, California (SB).

(7) Award Unit Price: (\$1.35) Discount.

(8) Quantity awarded was 175 BOPD. Bidders did not submit a bid on the full 190 BOPD offered.

C. Sale of 400 BOPD sour crude (high sulphur) oil from NPR No. 3 (NPR-3), Casper, Wyoming.

(1) IFB Number E1-78-B-01-7241.

(2) Contract Period: October 1, 1978—October 1, 1979.

(3) Special Conditions: None.

(4) Number of Bidders Solicited: 12.

(5) Number of Bids Received: 1.

(6) Number of Awards: One, to Western Crude Oil, Inc., Denver Colorado (LB).

(7) Award Unit Price: (\$1.16) Discount.

D. Sale of 5,650 BOPD of crude oil from NPR-3, Casper, Wyoming.

(1) IFB Number DE-FB01-79RA32003.

(2) Contract Period: February 1, 1979—February 1, 1980.

(3) Special Conditions: None.

(4) Number of Bidders Solicited: 68.

(5) Number of Bids Received: 5.

(6) Number of Awards: One, to Sinclair Oil Corp., Englewood, Colorado (LB).

(7) Award Unit Price: \$0.65 Bonus.

ATTACHMENT A

The following is a complete breakout of the awards made as a result of Invitation for Bids Number DE-FB01-79RA32001 for the sale of crude oil from Naval Petroleum Reserve No. 1 (Elk Hills, California):

Company (size)	Item No.	BOPD	Bonus/ discount
Beacon (S).....	1	3,400	-\$0.30
	3	1,000	+ .47
	3	1,000	+ .48
	3	1,000	+ .49
Tosco (L).....	1	1,000	+ .173
	1	1,000	+ .135
	1	4,000	+ .195
	2	2,000	+ .175
	2	3,000	+ .134
	2	1,500	0
	4	4,000	+ .254
	4	4,000	0
	4	3,000	- .096
	5	250	+ .259
Chevron (L).....	1	500	- .40
	3	4,000	- .35
	6	15	- .35
Powerline (S).....	2	2,500	- .096
	2	2,000	+ .066
	2	2,000	+ .036
	4	5,000	- .176
	4	2,000	- .216
Basin (S).....	2	2,000	+ .055
	2	1,000	- .005
	4	2,000	- .245
Newhall (S).....	2	2,000	0
	4	2,000	- .20
	4	2,000	- .25
	4	986	- .30
Sunland (S).....	2	2,000	+ .558
	2	2,000	+ .458
	4	2,000	+ .458
	4	2,000	+ .358
	4	2,000	+ .258
	4	2,000	+ .158
Fletcher (S).....	2	1,000	+ .10
Marion (S).....	4	3,000	+ 1.01
LaJet (S).....	4	2,000	- .07
	4	3,000	- .12
	4	2,000	- .28
USA Petrochem (S).....	4	4,000	- .2143
	4	4,000	- .2964
Pacific Refining (L).....	4	5,000	+ .465
	4	10,000	+ .415
Shell (L).....	4	7,500	+ .17
	4	7,500	+ .31
Mellon (L).....	4	-----	+ .088
Texaco (L).....	4	-----	+ .36
Husky (L).....	4	-----	- .275

Question. The 1976 Production Act requires a small business set aside. Explain this set aside provision and how you have implemented it.

Answer. The sale of crude oil from NPR-1 (Elk Hills), California, has a Small Business Refiners's Evaluation Preference. It is the Government's objective, on this sale, to award 25 percent of the petroleum produced from NPR-1 to small business refineries. If this objective is not met through the normal bid evaluation process, small business refineries submitting bids not otherwise in line for awards will be offered petroleum at the prices offered by the displaced large refineries until the 25 percent objective is reached. In the last sale from NPR-1, 43 percent of the petroleum was awardable to small business refiners without the preference evaluation; therefore, no preference evaluation procedure was used.

Question. Your budget for FY-80 for Elk Hills is about \$52 million. How much of that budget goes to your Operating Contractor at Elk Hills?

Answer. All of these funds are going to the Operating Contractor.

Question. Discuss the proven reserves at Teapot Dome. Have they gone up or down?

Answer. The current estimate of recoverable reserves is 29 million barrels. There has been no significant change in the estimate of reserves since the field began undergoing development subsequent to the implementation of the 1976 Production Act.

Question. Your budget for Teapot Dome is about \$16 million. How much of that budget goes to the Operating Contractor?

Answer. All of these funds are going to the Operating Contractor, Fenix and Scisson.

Question. What is the potential for significant new oil discoveries at Teapot Dome?

Answer. Results of exploratory drilling this year indicate little prospect for locating significant new reserves. However, there is potential for added reserves which may be secured through application of secondary and enhanced recovery techniques in the Shannon Reservoir. The primary recovery from this reservoir is estimated to be only 5% and studies are underway to select a secondary or enhanced recovery technique for more profitable exploitation. It is planned to install a pilot program in FY 80.

Question. Title V of S. 1363, the Department of Energy Housekeeping Act of 1979, contains certain provisions regarding the Naval Petroleum Reserves. Please explain these provisions and indicate why you have asked for them to be enacted. (Hart)

Answer. Title V of the Department of Energy Housekeeping Bill has two major provisions; the first deletes the statutory requirement to construct or procure 350,000 barrels per day of pipeline capacity for carrying the output of the Elk Hills' field and the requirement that such pipeline capacity be acquired or constructed by April 5, 1979. As explained in the prepared testimony, the output of the field is now expected peak at approximately 200,000 BOPD. This amount of pipeline capacity already exists in the area of the Reserve, and there is no economic or policy reason for construction of pipeline capacity up to the 350,000 BOPD level. The proposed amendment still leaves the Secretary with the necessary flexibility to acquire additional pipeline capacity should the situation warrant.

The second change provides for the deletion of a special account in the Treasury to accept the revenues from the Naval Petroleum Reserves. This account has been utilized only once since its inception, complicated the Treasury system of accounts, and is no longer needed. The activities which the special account was set up to take care of have been amply funded by appropriations outside the special account.

All other provisions of the Bill are saving provisions which will allow NPR to use its funds over multiple fiscal years as is required in large developmental and facilities development projects.

Senator HART. Thank you Mr. Langenkamp, Captain Nelson, and Commander Vogel.

The hearing is adjourned.

[Whereupon, at 11:35 a.m. the subcommittee adjourned, subject to the call of the Chair.]