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Naval Petroleum & Oil Shale Reserves

Annual Report of Operations

Fiscal Year 1992

U.S. Department of Energy
Assistant Secretary for Fossil Energy
Washington, DC 20585

Contents

PROGRAM DESCRIPTION

BACKGROUND

During fiscal year 1992, the Federal Government continued to operate Naval Petroleum Reserve No. 1 in California and Naval Petroleum Reserve No. 3 in Wyoming through its contractors and to produce the reserves at their maximum efficient rates as provided by the Naval Petroleum Reserves Production Act of 1976 (Public Law 94-258). In addition, natural gas production operations were conducted at Naval Oil Shale Reserve No. 3. All productive acreage owned by the Government in Naval Petroleum Reserve No. 2 in California is produced under lease to private companies. The locations of the reserves are shown in figure 1.

Under the Naval Petroleum Reserves Production Act of 1976, production was originally authorized for 6 years; based on findings of national interest, the President was authorized to extend production authority in 3-year increments. President Reagan exercised this authority three times, and on October 3, 1990, President Bush authorized production at the maximum efficient rates through April 5, 1994. The report on which the President based his action concluded that continued production, in contrast to shutting in the fields, would provide higher economic and national security benefits.

Fiscal year 1992 marked the 80th anniversary of the Naval Petroleum Reserve No. 1, established by Executive Order of President Taft on September 2, 1912. Thus, Naval Petroleum Reserve No. 1 is the oldest organizational entity in the Department of Energy.

FISCAL YEAR 1992 PROGRAM HIGHLIGHTS

During fiscal year 1992, the reserves generated $473 million in revenues, a $181 million decrease from the fiscal year 1991 revenues, primarily due to significant decreases in oil and natural gas prices. Total costs were $200 million, resulting in net cash flow of $273 million, compared with $454 million in fiscal year 1991. From 1976 through fiscal year 1992, the Naval Petroleum and Oil Shale Reserves generated more than $15 billion in revenues and a net operating income after costs of $12.5 billion. See figures 2, 3, and 4.

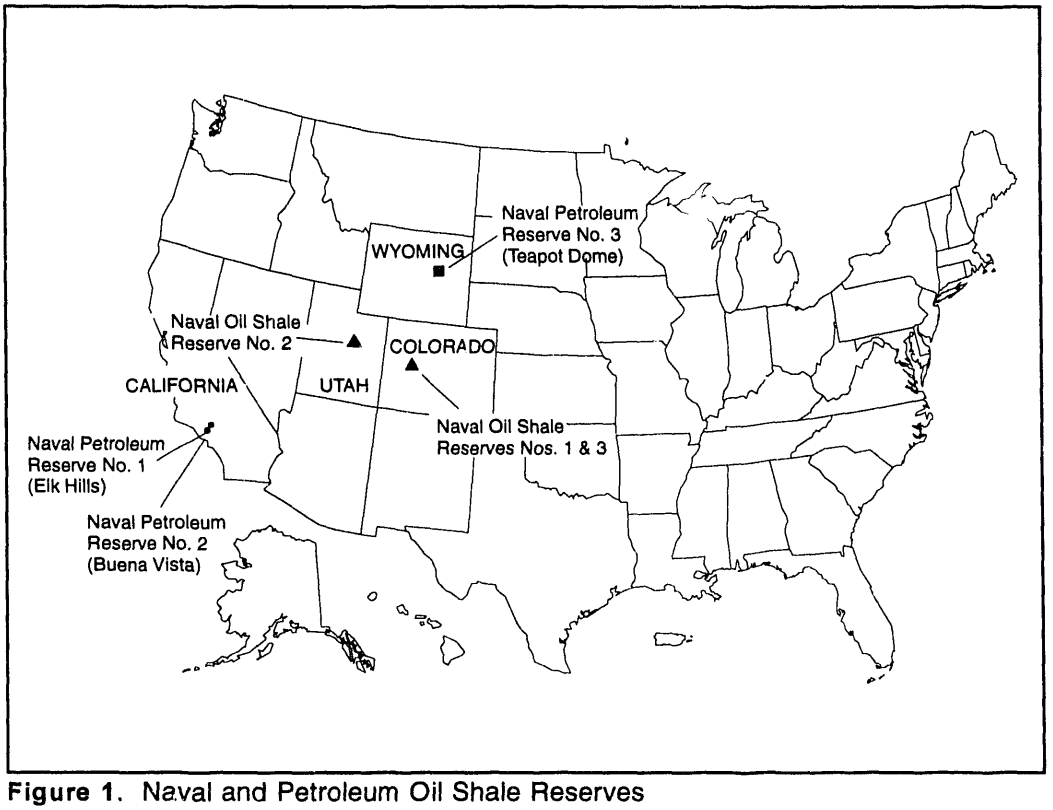


Figure 1. Naval and Petroleum Oil Shale Reserves

In fiscal year 1992, production at the Naval Petroleum Reserves at maximum efficient rates yielded 26 million barrels of crude oil, 119 billion cubic feet of natural gas, and 164 million gallons of natural gas liquids.

From April to November 1992, senior managers

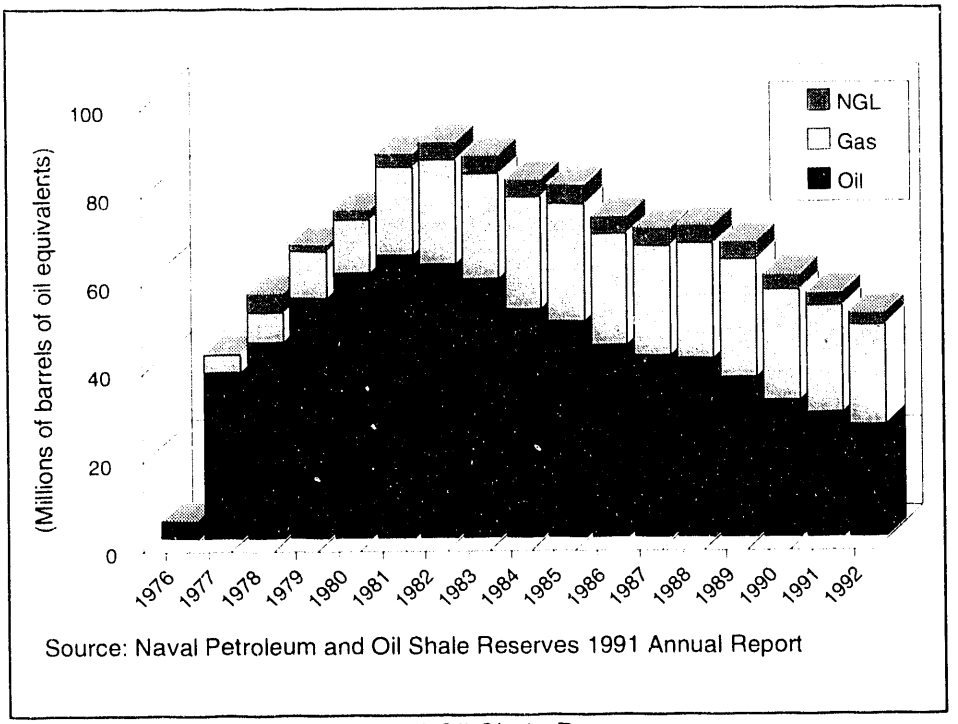


Figure 2. Naval Petroleum and Oil Shale Reserves Historical Production

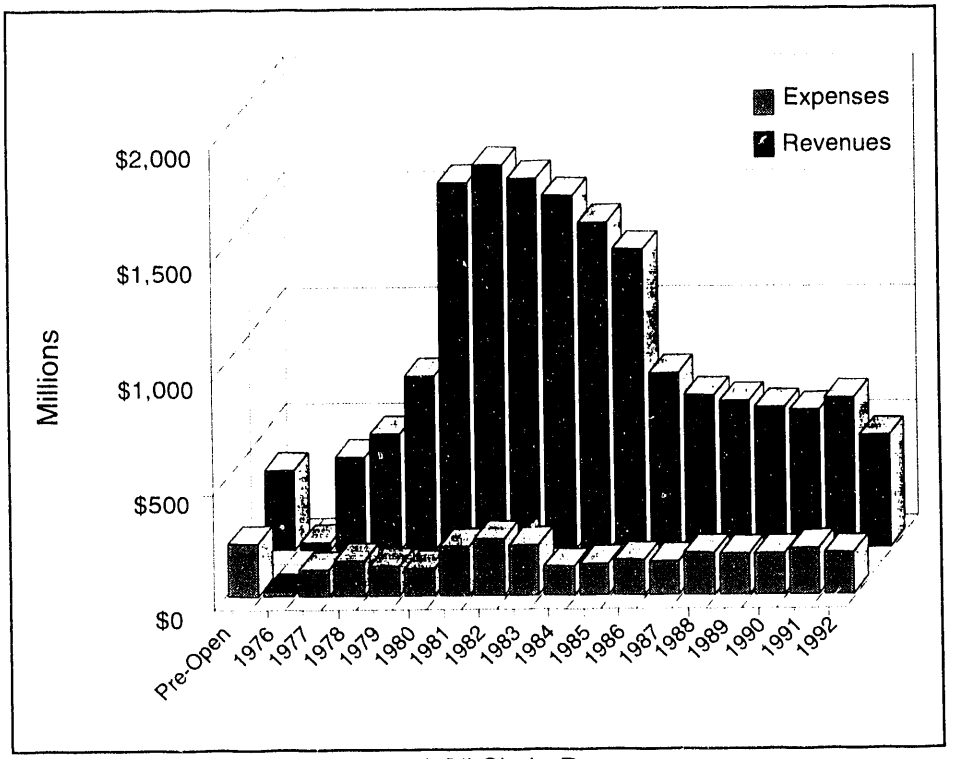


Figure 3. Naval Petroleum and Oil Shale Reserves Revenues versus Expenses

from the Naval Petroleum and Oil Shale Reserves held a series of three workshops in Boulder, Colorado, in order to build a comprehensive Strategic Plan as required by Secretary of Energy Notice 25A-91. The plan represents a consensus from all areas of the program and established a program mission and several goals. The mission is for the "Naval Petroleum and Oil Shale Reserves [to] manage, operate, maintain, and produce the Naval Petroleum and Oil Shale Reserves to achieve the greatest value and benefits to the United States with consideration of the interests of joint owners." The goals are the following:

- To continuously improve.
- To maximize profits, consistent with short- and long-term goals.
- To achieve environmental, safety, and health excellence.
- To determine and implement the most efficient organizational structure, including an analysis of Government corporatization.
- To conduct comprehensive resource and reserve assessments and associated exploration and development programs.
- To obtain the greatest revenues from the sale of hydrocarbon products.

- To selectively participate in research and development opportunities and enhance program relationships with established research and development organizations.

In addition, efforts to implement Total Quality Management were increased significantly in fiscal year 1992 with several workshops and training seminars for all Naval Petroleum and Oil Shale Reserves personnel. Additional efforts are planned for fiscal year 1993, including the formation of quality improvement teams to eliminate waste and improve productivity by streamlining work and management processes, empowering employees, and continuing training.

Other selected highlights for the year follow.

Naval Petroleum Reserve No. 1

Production Achievements

- In September 1992, the one billionth barrel of crude oil was produced from the Elk Hills Field, making it one of only 13 fields in the United States to achieve that distinction. Of the one billion barrels, about 839 million barrels have been produced since Naval Petroleum Reserve No. 1 was unitized between the U.S. Government and Standard Oil of California (now Chevron U.S.A., Inc.) in 1944. Of this amount, the Government received 641,250,964 barrels, selling 500,759,249 barrels to the private sector, shipping 2,141,966 barrels to the Strategic Petroleum Reserve, and transferring 138,349,749 barrels to the Department of Defense. The remaining 197,674,870 barrels produced during this period were delivered to Standard (now Chevron).

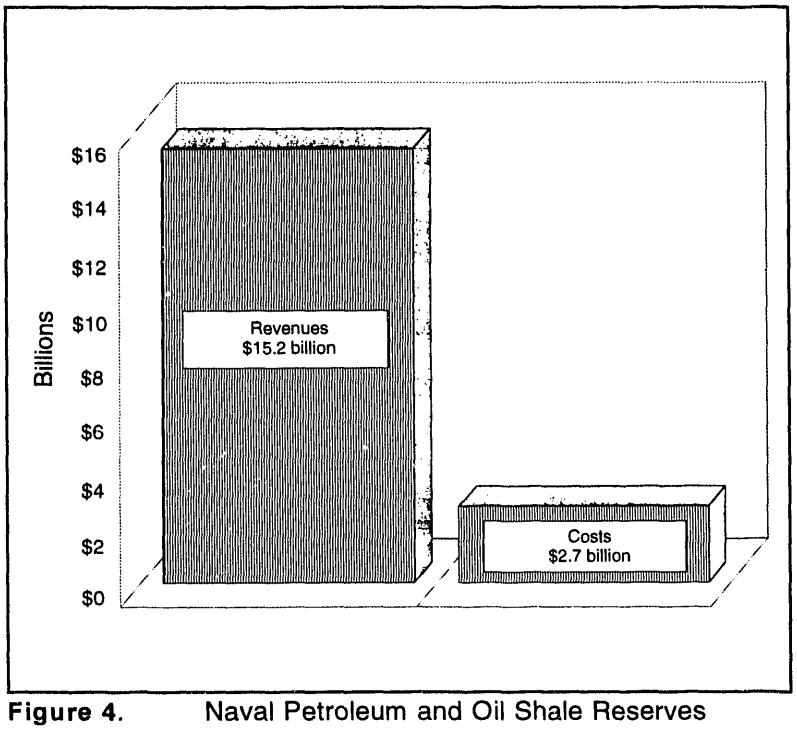


Figure 4. Naval Petroleum and Oil Shale Reserves Revenues and Costs, 1976-1992

Crude Oil Shipments to the Strategic Petroleum Reserve

- Pursuant to the Naval Petroleum Reserves Production Act of 1976 (10 U.S.C. 7430(b)(2)), the Department of Energy may not sell the Naval Petroleum Reserves crude oil at a price less than the higher of 90 percent of the current sales price of comparable petroleum in the same area or the price of petroleum being purchased for the Strategic Petroleum Reserve minus the cost of transporting crude oil from the Naval Petroleum Reserves to the Strategic Petroleum Reserve. During 1992, the Department determined that certain bid prices for Naval Petroleum Reserve No. 1 crude oil did not meet the statutory price test and initiated the delivery of 20,000 barrels per day of Naval Petroleum Reserve No. 1 crude oil to the Strategic Petroleum Reserve. This volume has been shipped from California through a network of six commercial pipeline systems to the Sun Terminal in Nederland, Texas, for storage at the Strategic Petroleum Reserve. The current deliveries began on June 1, 1992, and will continue through September 30, 1993. The Department estimates that the shipment of Naval Petroleum Reserves crude oil to the Strategic Petroleum Reserve achieved net savings in fiscal year 1992 of $1.3 million over the estimated cost of buying crude oil for the Strategic Petroleum Reserve on the open market.

Horizontal Drilling

- Naval Petroleum Reserve No. 1's fifth and sixth horizontal wells were spudded in the second and third quarters of fiscal year 1992 in the 26R Reservoir. Drilling operations have been completed in both wells. Well 365X-35R was completed and is on continuous production at slightly more than 1,000 barrels of oil per day. Well 338X-36R is still under testing and evaluation and has yet to be completed in the 26R sand.

Shallow Oil Zone Gas Injection Project

- In fiscal year 1992, highly positive results were obtained from the Fault Block 12 Gas Injection Pilot Project. In April 1991, gas injection was initiated in a partially confined portion of Fault Block 12 to increase reservoir pressure and production. Gas cap pressure was increased successfully in the pilot project from 4 pounds per square inch to 39 pounds per square inch, while production was increased almost 150 percent from 140 to 336 barrels of oil per day. The pilot project proved technically feasible and economically viable when compared with the current gravity drainage recovery mechanism. An expansion project to include the rest of Fault Block 12 plus Fault Block 13 will be initiated in the south flank of the Eastern Shallow Oil Zone.

Environment and Safety

- On June 27, 1989, Secretary of Energy James D. Watkins announced a 10-point Initiative to strengthen safety, environmental protection, and waste management activities at the Department of Energy's production, research, and testing facilities. In support of this Initiative, the Secretary established independent "Tiger Teams" to conduct compliance assessments at the Department of Energy's facilities. Most environment, safety, and health efforts in fiscal year 1992 were related to the Tiger Team assessment of the Naval Petroleum Reserves in California. The Naval Petroleum Reserves in California assessment was conducted from November 12 to December 13, 1991, and a Draft Corrective Action Plan was completed in April 1992. The Final Corrective Action Plan, submitted for approval in November 1992, identified 245 corrective actions that will take several years to complete.

- Work continued to complete corrective actions for the Department of Energy Environmental Survey and the Environmental Self-Assessment. The project to formally close out the 27R Hazardous Waste Site was completed and intensive training efforts continued. The project to complete a supplement to the Naval Petroleum Reserve No. 1 1979 Environmental Impact Statement also continued. The Department of Energy approved a Draft Supplemental Environmental Impact Statement for public release and conducted a public hearing. At the close of the fiscal year, work was in progress to respond to comments and finalize the document. Naval Petroleum Reserve No. 1 initiated consultations with the U.S. Fish and Wildlife Service pursuant to section 7 of the Endangered Species Act. These consultations were still in progress at the close of fiscal year 1992.

- Naval Petroleum Reserve No. 1 developed a 5-year Safety and Health Plan as well as a Chemical Hygiene Plan for laboratories. In fiscal year 1992, the employees of Bechtel Petroleum Operations, Inc., the contractor that currently operates Naval Petroleum Reserve No. 1 for the Department of Energy, reached a milestone of 500,000 consecutive hours without an injury; its goal is to reach 1,000,000 in fiscal year 1993. Work also continued to complete the remaining corrective actions identified in Technical Safety Appraisals I and II and in the Independent Fire Protection Survey.

Vanpool Program

- Naval Petroleum Reserve No. 1 initiated a vanpool program in August 1992, with 19 vans fueled by compressed natural gas. Besides improving employee safety and economics, Naval Petroleum Reserve No. 1 received the Regional Award of Merit for Transportation from the Kern Council of Governments and a commendation

from the San Joaquin Valley Unified Air Pollution Control Board for this program. Unrelated to the vanpool program, Naval Petroleum Reserve No. 1 replaced 49 trucks operating on gasoline with trucks fueled by compressed natural gas. Naval Petroleum Reserve No. 1 plans to expand the vanpool program in fiscal year 1993 and to complete construction of an onsite refueling station that will permit the vehicles to be fueled from Naval Petroleum Reserve No. 1's production in fiscal year 1993.

Naval Petroleum Reserve No. 2 Exploration Drilling

- Chevron completed five wells on its property adjacent to Section 12C at Naval Petroleum Reserve No. 2. As a result, the Department of Energy drilled Well 87-12C to determine the extent of the new reservoir and to protect Government land from potential drainage. The producing sand reservoir was not present at the 87-12C location, and the well was abandoned.

Naval Petroleum Reserve No. 3 New Management and Operating Contractor

- The Department of Energy recompeted a 5-year management and operating contract for the Naval Petroleum and Oil Shale Reserves in Colorado, Utah, and Wyoming, and FD Services, Inc. (a subsidiary of Fluor Daniel, Inc.) was selected.

Tiger Team Environmental and Safety Assessment of the Naval Petroleum and Oil Shale Reserves in Colorado, Utah, and Wyoming

- In response to the 10-point Initiative introduced by the Secretary of Energy in 1989, a Tiger Team Environmental and Safety Assessment was held at the Naval Petroleum and Oil Shale Reserves in Colorado, Utah, and Wyoming from June 15 to July 22, 1992. Work commenced immediately on developing a Corrective Action Plan in response to 196 findings, none of which presented an immediate risk to public health or to the environment.

Naval Petroleum Reserve No. 3 Steamflood

- Steamflood production out of the Shannon formation continues to account for a substantial amount of Naval Petroleum Reserve No. 3's production. In fiscal year 1992, the steam drive project continued with steam injection from Steam Generators Nos. 1, 2, 3, and 4. Crude oil production resulting from the Shannon Steamflood project averaged 934 barrels of oil per day throughout fiscal year 1992. Injection into the Steam Generator No. 5 pattern is scheduled to begin in early fiscal year 1993.

Naval Oil Shale Reserves Protection Program

- Through fiscal year 1992, 89 commercially producing natural gas wells were drilled by private industry within one mile of one of the two Naval Oil Shale Reserves located in Colorado. Thirteen nonproducing wells have also been drilled; these were either plugged and abandoned or were not produced due to their marginal production or distance from a pipeline.

- In accordance with Colorado spacing requirements and standard industry practices, the Department of Energy has acquired communitized interests in 18 wells that are operated by private interests, three of which were drilled and completed in fiscal year 1992. In addition, the Department of Energy drilled 13 offset wells that are owned entirely by the Government, and four wells that are communitized with adjacent private landowners or lease holders and operated by the Department of Energy. This 35-well program has mitigated significant drainage to existing private development. Sales of natural gas from these wells have become an increasingly important component of the income of the Naval Oil Shale

Reserves in Colorado, Utah, and Wyoming operations. The income contribution from the Naval Oil Shale Reserves properties in Colorado and Utah will continue to grow if increased development (beyond drainage protection) is permitted.

PROGRAM MANAGEMENT

The Department of Energy's Naval Petroleum and Oil Shale Reserves Program reports to the Assistant Secretary for Fossil Energy, who has been delegated the Secretary of Energy's overall responsibility for achieving the mission and goals of the Naval Petroleum and Oil Shale Reserves Program. The Deputy Assistant Secretary for the Naval Petroleum and Oil Shale Reserves, Captain Kenneth W. Meeks, CEC, USN, is responsible for the overall programmatic and operational management of the reserves through offices located in Washington, DC. Danny A. Hogan, Director of the Naval Petroleum Reserves in California, and C. Ray Williams, Director of the Naval Petroleum and Oil Shale Reserves in Colorado, Utah, and Wyoming, are responsible for onsite management of field operations. See figure 5.

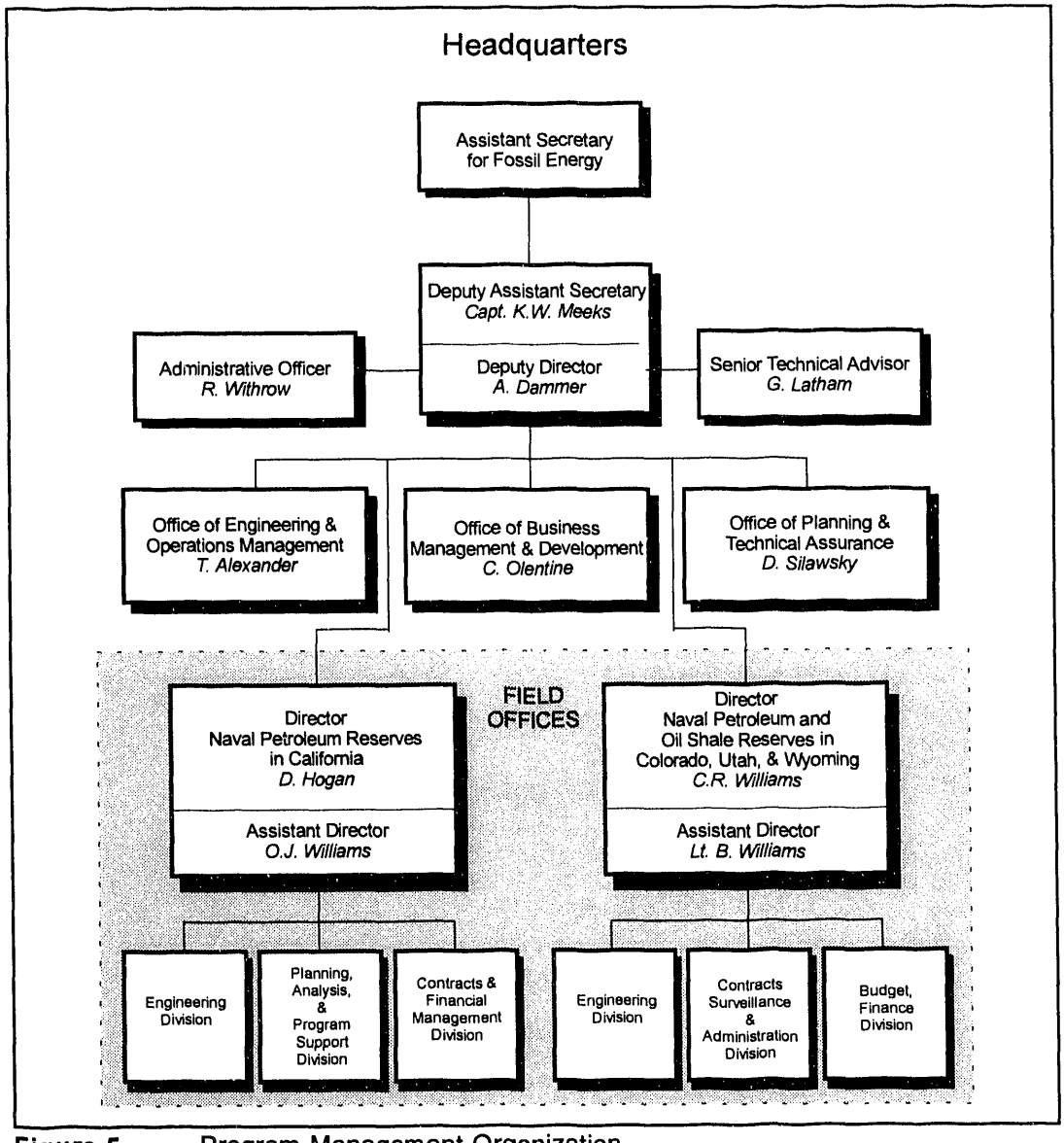


Figure 5. Program Management Organization

NAVAL PETROLEUM RESERVE NO. 1

Naval Petroleum Reserve No. 1, Elk Hills, covers 47,409 acres and is located about 35 miles west of Bakersfield in Kern County, California. More than 25 million barrels of crude oil were produced in 1992 from Elk Hills, which ranks among the ten largest domestic producing oil fields in the lower 48 States, with a fiscal year 1992 average daily production rate of more than 69,000 barrels of oil. Elk Hills is also one of the nation's top ten producing gas fields, producing 312 million cubic feet per day in fiscal year 1992, and processing 440,000 gallons per day of natural gas liquids.

Most of Naval Petroleum Reserve No. 1 is operated under a Unit Plan Contract executed in 1944 by its two owners, the United States Government and Standard Oil Company of California, now Chevron Corporation, the parent company of Chevron U.S.A., Inc. The Unit Plan Contract enables the unit participants to develop the field on a reservoir basis rather than on a parcel-by-parcel basis and allows for more efficient and greater recovery of petroleum resources by avoiding competitive production of the individual parcels. Under the Unit Plan Contract, each participant shares in unit costs and production of petroleum in proportion to the acre-feet of commercially productive formations (zones) underlying its surface lands.

The parties' percentage participation shares of the producing zones within the Elk Hills unit are as follows:

Zone	Government	Chevron U.S.A.
Dry Gas	77.0492%	22.9508%
Shallow Oil	70.0119%	29.9881%
Stevens	79.6357%	20.3643%
Carneros	100.0000%	0.0000%

A small amount of additional production comes from the Asphalto Field, a part of Naval Petroleum Reserve No. 1, and 100 percent Government-owned, but not unitized under the Unit Plan Contract. The Government's average share of total unit production from Naval Petroleum Reserve No. 1 is approximately 78 percent.

In fiscal year 1992, field development and daily operations were performed under a management and operating contract with Bechtel Petroleum Operations, Inc., which became effective August 1, 1985, and has been extended through July 31, 1995.

PRODUCTION AND RESERVES

Naval Petroleum Reserve No. 1 reached its peak rate of oil production (181,000 barrels of oil per day) in July 1981, and was producing at a rate of approximately 68,000 barrels of oil per day in September 1992. Production in fiscal year 1993 is forecast to average about 64,000 barrels of oil per day. Daily production for fiscal year 1992 averaged 69,514 barrels of oil, of which the Government's share was 54,161 barrels of oil per day. Most of the production, 55,956 barrels of oil per day, was of an average American Petroleum Institute gravity of approximately 35° produced from multiple reservoirs in the Stevens Zone. Shallow Oil Zone production averaged 13,201 barrels of oil per day with an average American Petroleum Institute gravity of approximately 25°. Small amounts of high-quality oil were also produced from the Asphalto Field and Carneros Zone. Production data for crude oil, natural gas, and associated liquids are provided in table 1.

Since the establishment of the reserve in 1912, more than one billion barrels of crude oil have been produced at Elk Hills, 713 million barrels of which have been produced since July 3, 1976. Based on the figures used in determining equity percentages with Chevron, total reserves remaining at the end of

Table 1
Naval Petroleum Reserve No. 1 Production by Zone and Owner During Fiscal Year 1992

Zone	Crude oil		Natural gas (thousands of cubic feet)	Propane (gallons)	Butane (gallons)	Isobutane (gallons)	Natural gasoline (gallons)
	Barrels per day	Total/year					
Stevens							
Government	44,561	16,309,384	81,516,171	42,633,898	29,600,501	6,558,148	38,395,342
Chevron	11,395	4,170,607	20,845,171	10,902,265	7,569,388	1,677,038	9,818,389
Shallow Oil							
Government	9,242	3,382,651	1,416,167	1,051,936	1,073,654	245,350	3,222,013
Chevron	3,959	1,448,886	606,585	450,575	459,877	105,090	1,380,080
Carneros							
Government	187	68,339	4,049,564	1,426,072	1,182,608	304,948	2,267,161
Dry Gas							
Government	0	0	4,228,813	0	0	0	0
Chevron			1,259,645				
Asphalto Field							
Government	171	62,426	368,167	150,509	134,197	36,132	298,628
Tulare							
Government	0	0	0	0	0	0	0
Total							
Government	**54,161**	**19,822,800**	**91,578,882**	**45,262,415**	**31,990,960**	**7,144,578**	**44,183,144**
Chevron	**15,354**	**5,619,493**	**22,711,401**	**11,352,840**	**8,029,265**	**1,782,128**	**11,198,469**
Grand Total	**69,515**	**25,442,293**	**114,290,283**	**56,615,255**	**40,020,225**	**8,926,706**	**55,381,613**

fiscal year 1992 are estimated at 474 million barrels of crude oil. Despite this very large reserve, improving profitability in the face of declining production is the most important issue at Naval Petroleum Reserve No. 1.

DEVELOPMENT AND EXPLORATION

During fiscal year 1992, 25 development wells were drilled at Naval Petroleum Reserve No. 1, for a total of 1,143 wells drilled since the inception of the Development Program in 1974. Fourteen of the 25 wells were drilled in the Stevens Zone: 12 as producers and two as waterflood injectors. Of the remaining 11 wells, ten were drilled in the Shallow Oil Zone: seven as producers, two as waterflood injectors, and one a dry hole. The remaining well was drilled as a Tulare Zone water source well.

There were 195 remedials completed in fiscal year 1992, with the majority (140 jobs) in support of the Stevens Zone waterfloods, producer-to-water injector conversion, and artificial lift installation and repair. Most of the Shallow Oil Zone remedials were acid stimulations.

As of the end of fiscal year 1992, a total of 2,386 wells had been completed since establishment of the reserve. Of these, 1,085 wells were classified as active producers or injectors, 979 were shut in for remedial action or economics, and 322 were abandoned (see table 2).

FACILITIES AND CONSTRUCTION

Construction activity during fiscal year 1992 declined from the levels in previous years. Sixty projects

were completed in fiscal year 1992 compared with the 200 projects completed in fiscal year 1991.

Major projects included the following:

- **Department of Energy Tank No. 1 Repairs ($225,000)**: A new seal ring for the floating roof on Tank No. 1 was installed and the tank was successfully hydrotested. Twenty thousand barrels per day of Department of Energy oil are presently shipped from the 18G Lease Automatic Custody Transfer facility to the Strategic Petroleum Reserve. Up to 210,000 barrels of Department of Energy oil can be stored in Tank No. 1, if required.

- **Deisobutanizer Modifications ($450,000)**: A deisobutanizer tower located at the 35R Lean Oil

Table 2
Inventory of Completed Wells at Naval Petroleum Reserve No. 1
As of September 30, 1992

	Well status				
Field zone	**Producer/ supply**	**Injection/ disposal**	**Shut-in[1]**	**Abandoned**	**Total**
UNIT					
Elk Hills					
Dry Gas	38	0	8	0	46
Shallow Oil	481	11	670	287	1,449
Stevens[2]	382	136	266	13	797
Carneros[3]	10	0	4	1	15
Subtotal	911	147	948	301	2,307
Section 14B[4]					
Shallow Oil	2	0	7	6	15
Unit Total	913	147	955	307	2,322
NONUNIT[3]					
Asphalto	7	0	5	3	15
Tulare[5]	4	12	14	6	36
Railroad Gap	2	0	5	6	13
Nonunit Total	13	12	24	15	64
Total[6]	**926**	**159**	**979**	**322**	**2,386**

1 Temporarily removed from production status due to field operating requirements.
2 Includes wells in Sections 7R and 8R incorporated into the unit during fiscal year 1980.
3 100 percent Government owned.
4 A field not wholly contained within the boundary of the Reserve.
5 The Tulare Zone is not part of the unit, but costs for the injection/disposal wells were shared by Chevron as part of overall field maintenance under the Unit Plan Contract.
6 The total does not include wells that have been spudded but not completed drilling.

Absorption Plant was reactivated in 1991 to recover and sell isobutane. Fiscal year 1992 modifications of the deisobutanizer have increased recovery of isobutane from 19,000 gallons per day, to more than 33,000 gallons per day.

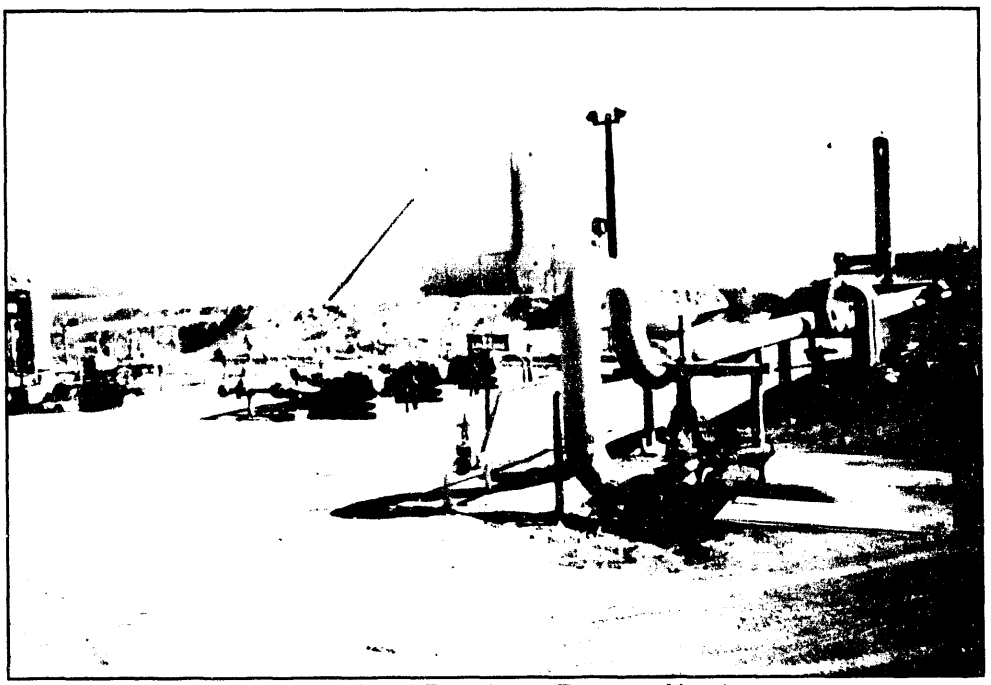
- **Tank Setting Liquid Containment Phase 2 ($470,000)**: State and Federal regulations require secondary liquid containment and/or diversionary structures around tanks containing oil to prevent major oil spills. Earthen and corrugated aluminum pipe berms or dikes were constructed for Stevens Zone and Shallow Oil Zone tank settings to complete the second phase of the project.

- **East End Well Electrification ($600,000)**: State and county regulations require reduction of pollutant emissions from engines greater than 50 horsepower. Gas engines on 38 pumping units were replaced with electric motors and nitrous oxide emissions were reduced by approximately 60 pounds per day.

- **Technical Safety Appraisal I Miscellaneous Items ($685,000)**: New safety concerns were identified and added to the original scope of work for a 1989 Department of Energy Technical Safety Appraisal. New Technical Safety Appraisal projects completed in fiscal year 1992 included fireproofing and installation of valves on therminol heaters at gas plants and installation of passive firewalls at the 35R Electrical Substation and 35R Natural Gas Liquids Rack.

- **Cathodic Protection—Phases III and IV ($700,000)**: With completion of the final two phases, the cathodic protection (or rust prevention) system now preserves 1,920 well casings and hundreds of miles of pipelines. In addition, Naval Petroleum Reserve No. 1 received a "Noteworthy Practice" recognition from the recent Tiger Team assessment for the Naval Petroleum Reserve No. 1 Cathodic Protection Program.

- **25S Dehydration/Lease Automatic Custody Transfer Removal and 23S Shallow Oil Zone Crude Handling Modifications ($3.7 Million)**: Prior to October 1, 1992, Shallow Oil Zone production was being sent to both the 10G and 25S Dehydration/Lease Automatic Custody Transfer facilities to separate water from oil and to sell the oil. The 25S facility was abandoned due to environmental concerns. Shallow Oil Zone production normally sent to the 25S Dehydration/Lease Automatic Custody Transfer facility is now sent to a refurbished 40,000 barrel tank in Section 23S. Production is then sent to the 10G facility where all Shallow Oil Zone oil is currently sold.



The 23S transfer station at Naval Petroleum Reserve No. 1

REVENUES AND EXPENDITURES

The Government's sales and other Naval Petroleum Reserve No. 1 revenues for fiscal year 1992 of $451,214,157 were deposited

in the Naval Petroleum and Oil Shale Reserves appropriation account at the U.S. Treasury pursuant to the Department of the Interior and Related Agencies Appropriation Act, 1992 (Public Law 102-154) of November 13, 1991. An accounting of revenues from petroleum product sales appears in the appendix, pages A-7 and A-9 to A-17.

During fiscal year 1992, total costs at Naval Petroleum Reserve No. 1 were $180,996,659. The majority of the costs, $166,116,771, were incurred under the Bechtel Petroleum Operations, Inc., contract for field development and operations, including $134,479,432 for operations and maintenance, $19,323,263 for development drilling, $38,656 for exploratory drilling, and $12,275,420 for facilities. The remainder includes $3,704,502 for salaries and support of the Government employees at Elk Hills and $11,175,386 for miscellaneous contracts. Chevron's payment for its share of the development and operating costs totaled $36,641,213, resulting in net costs of $144,355,446 and net income of $306,858,711. Reimbursement payments from Chevron were also deposited in the Naval Petroleum and Oil Shale Reserves appropriation account at the U.S. Treasury.

SALES

In fiscal year 1992, the Department of Energy sold the Government's share of Naval Petroleum Reserve No. 1 crude oil in two contracts, shown in tables 3 and 4.

For the contract period October 1, 1991, to April 1, 1992, the Department opened bids and awarded crude oil contracts for 55,000 barrels of oil per day. As explained below, these contracts were extended to May 1, 1992. Actual quantities delivered and the average prices paid are shown in table 3.

Bids for the next 6-month contract period beginning April 1, 1992, were rejected because they failed to meet the statutory minimum price established by the Naval Petroleum Reserves Production Act of 1976 (10 U.S.C. 7430(b)(2)). Under the Act, the Department may not sell Naval Petroleum Reserves crude oil at a price less than the higher of 90 percent of the current sales price of comparable petroleum in the same area or the price of oil being purchased for the Strategic Petroleum Reserve minus the cost of transporting oil from the Naval Petroleum Reserves to the Strategic Petroleum Reserve. As shown in table 3, the Department of Energy extended the previous sales contracts for 30 days and solicited new bids for 5-month contracts beginning May 1, 1992.

On April 15, 1992, the Department of Energy opened bids for 53,400 barrels of oil per day for 5-month sales contracts. Of these, bids for 20,000 barrels of oil per day also were below the statutory minimum price, and the Department decided to ship 20,000 barrels per day of Stevens Zone crude oil, the maximum amount that it could move via pipeline, to the Strategic Petroleum Reserve. Stevens Zone crude oil is the only Naval Petroleum Reserve oil meeting the Strategic Petroleum Reserve storage specifications. The Department awarded the remaining oil to the companies shown in table 4. The Department estimates that the shipment of 20,000 barrels per day of Naval Petroleum Reserve No. 1 crude oil to the Strategic Petroleum Reserve achieved a net savings in fiscal year 1992 of $1.3 million over the estimated cost of buying crude oil meeting Strategic Petroleum Reserve specifications on the open market.

In fiscal year 1992, approximately 17 percent of the Government's share of natural gas produced at Naval Petroleum Reserve No. 1 was sold, and the remainder was either injected to maintain reservoir pressures or used in field operations. There were three natural gas sales offerings, each of 4 months' duration. These are shown in tables 5, 6, 7, and 8.

During fiscal year 1992, all of the gas liquid products (natural gasoline, propane, butane, and isobutane) were sold in one offering for a full year. Delivery quantities and prices are shown in tables 9 and 10.

Table 3
Naval Petroleum Reserve No. 1 Crude Oil Sales, Fiscal Year 1992
October 1, 1991, to May 1, 1992[1/]
Offering of 55,000 Barrels of Oil Per Day

Company	Quantity delivered — barrels per day		Average billing price/barrel[2/]
	Shallow Oil Zone	Stevens Zone	
Arco Oil & Gas Company		10,027 3,004	$16.7926 16.7625
Casey Company	2,203		14.4694
Celeron Trading & Transportation Company	2,586		14.4188
Chevron U.S.A. Inc.	4,507	5,013 403	16.4917 17.0071 13.3531
Enron Oil Trading & Transportation		251	16.4653
Golden West Refining Company		4,152	16.5515
Kern Oil & Refining Company		6,016	16.3894
Lunday Thagard Company		2,005	16.5706
Sunland Refining Company		1,613	16.4626
Texaco Trading & Transportation		13,054	16.6825
Total deliveries	**9,296**	**45,538**	
Average sales price ($/barrel) based on actual deliveries	**$13.91**	**$16.63**	

1 Original contract period was October 1, 1991, to April 1, 1992; however, the Department of Energy exercised its option to extend each of the contracts until May 1, 1992.
2 Billing prices are adjusted monthly to reflect changes in spot market prices.

NOTE: Small refiners awarded 25 percent.

Table 4
Naval Petroleum Reserve No. 1 Crude Oil Sales, Fiscal Year 1992
May 1, 1992, through September 30, 1992
Offering of 53,400 Barrels of Oil Per Day

Company	Quantity delivered			Average Billing Prices	
	Shallow Oil Zone (barrels per day)	Stevens Zone/Carneros (barrels per day) (May 1992[1])	Stevens Zone/Carneros (prorated barrels per day) (June–September 1992)	Shallow Oil Zone Average Billing Price (May 1– September 30, 1992[2])	Stevens Zone/Carneros Average Billing Price (May 1– September 30, 1992[2])
Bravo Energy Trading		2,511	1,268		$16.950
Celeron Gathering Corporation		6,351	4,606		17.630
Celeron Trading & Transportation Company	2,908	5,041	2,552	$15.855	16.863
Chevron International Oil Company		5,043	2,536		17.088
Chevron U.S.A. Products Company	2,035	5,367	2,833	14.993	17.392
Crysen Refining Inc.		5,043	2,536		16.774
Enron Gas Liquids		1,824	918		16.883
Enron Oil Trading & Transportation	4,362	4,539	2,284	15.291	17.300
Huntway Refining Company		1,008	508		16.667
Sound Refining Company		756	380		16.883
Sunbelt Refining Company		1,008	508		16.884
U.S. Oil & Refining Company		5,646	2,841		16.669
Strategic Petroleum Reserve[3]			20,009		17.847 [3]
Total	**9,305**	**44,137**	**43,779**	**$15.777**	**$17.364**

1 The Assistant Secretary for Fossil Energy directed that beginning June 1, 1992 through September 30, 1992, 20,000 barrels per day of 18G Stevens Zone crude oil be shipped to the Strategic Petroleum Reserve. The remaining crude oil available at 18G was prorated among all other 18G awardees.

2 Billing prices are adjusted monthly based on relevant spot market prices.

3 The Strategic Petroleum Reserve pays the weighted average sales price of commercial purchasers for Stevens Zone crude oil delivered at 18G for the same delivery period.

NOTE: Small refiners awarded 25 percent.

Table 5
Naval Petroleum Reserve No. 1 Natural Gas Sales, Fiscal Year 1992
September 1, 1991, through December 31, 1991

Company	Quantity delivered (million British thermal units/day) 17Z	Average billing price[1/] ($/million British thermal units)
Mobil Natural Gas	15,954	$2.600
Shell Western E&P, Inc.	19,711	2.393
Texaco Exploration & Production Inc.	12,345	2.609
Total actual deliveries (million British thermal units/day)	**48,010**	
Average sales price ($/million British thermal units) based on actual deliveries		**$2.52**

[1] Contracts are for a fixed price.

Table 6
Naval Petroleum Reserve No. 1 Natural Gas Sales, Fiscal Year 1992
January 1, 1992, through April 30, 1992

Company	Quantity delivered (million British thermal units/day)	Average billing price[1/] ($/million British thermal units)
Southern California Gas Company	45,015	$2.2890

[1] Contracts are for a fixed price.

Table 7
Naval Petroleum Reserve No. 1 Natural Gas Sales, Fiscal Year 1992
May 1, 1992, through August 31, 1992

Company	Quantity delivered (million British thermal units/day)	Average billing price[1/] ($/million British thermal units)
San Diego Gas & Electric Company	51,054	$1.4001

[1] Contracts are for a fixed price.

Table 8
Naval Petroleum Reserve No. 1 Natural Gas Sales, Fiscal Year 1992
September 1, 1992, through December 31, 1992[1/]

Company	Quantity delivered (million British thermal units/day)	Average billing price[2/] ($/million British thermal units)
Midway Sunset Cogeneration Company	27,298	$1.8880
Mock Resources, Inc.	9,311	1.9000
Tiger Natural Gas, Inc.	12,399	2.0122
Total actual deliveries (million British thermal units/day)	**49,008**	
Average sales price ($/million British thermal units) based on actual deliveries		**$1.9217**

1 Deliveries from September 1–30, 1992.
2 Contracts are for a fixed price.

Table 9
Naval Petroleum Reserve No. 1 Natural Gasoline Sales, Fiscal Year 1992
October 1, 1991, through September 30, 1992

Company	Quantity delivered (gallons per day)	Average billing price[1/] ($/gallon)
PEG, Inc.	73,212	$0.48
Ultramar	47,490	0.48
Total actual deliveries (gallons per day)	**120,702**	

1 Billing prices are adjusted monthly based on relevant spot market prices.

Table 10
Naval Petroleum Reserve No. 1 Liquid Product Sales, Fiscal Year 1992
October 1, 1991, through September 30, 1992

Company	Quantity delivered — gallons per day			Average billing price ($/gallon)[1/]
	Propane	Butane	Isobutane	
Andrews Petroleum, Inc.			10,180	$0.4579
Enron Gas Liquids, Inc.		17,682		0.3160
Enron Oil Trading & Transportation		26,005		0.3099
PEG, Inc.		43,696		0.3059
			9,270	0.4641
Suburban Propane	121,087			0.3893
	2,911			0.4000
Total actual deliveries (gallons per day) and average sales price ($/gallon) 35R	**123,998 $0.39**	**87,383 $0.31**	**19,450 $0.46**	
Total actual deliveries (gallons per day) and average sales price ($/gallon) 17Z	**2,910 $0.40**			

[1] Billing prices are adjusted monthly based on relevant spot market prices.

ENVIRONMENT

Environmental activities at Naval Petroleum Reserve No. 1 in fiscal year 1992 focused on two areas: compliance with applicable Federal, State, and local environmental regulations and wildlife and habitat management.

Compliance

Air Quality

Work continued in fiscal year 1992 on projects designed to comply with Kern County Air Pollution Control District, Rule 427. Phase II work, which involves retrofitting approximately 175 internal combustion engines ranging in size from 50 to 500 horsepower, will be completed in fiscal year 1996.

A detailed inventory of air pollution sources and associated emissions, mandated by California's Air Toxics "Hotspots" Information and Assessment Act, was completed and submitted in fiscal year 1990 for calendar year 1989. A biennial update was completed and submitted in fiscal year 1992 for calendar year 1990. Testing of internal combustion engines and tank vapor spaces was completed in fiscal year 1992 to supplement the fiscal year 1991 submittal.

Efforts are under way to assess the amount of particulate matter generated on unpaved and paved

roadways. This information will be instrumental in the development of a master road plan, setting priorities for road closures and paving.

During fiscal year 1992, Naval Petroleum Reserve No. 1 instituted an employee vanpool service between its site and Taft using an alternative fuel, compressed natural gas. At year end, the vanpool served more than 200 employees (approximately 27 percent of the permanent work force) and significantly reduced automotive air emissions. An additional 225 employees are expected to use the vanpool service in fiscal year 1993. Additionally, 85 gasoline-powered unit vehicles have been replaced with vehicles powered by compressed natural gas.

Waste and Water Management

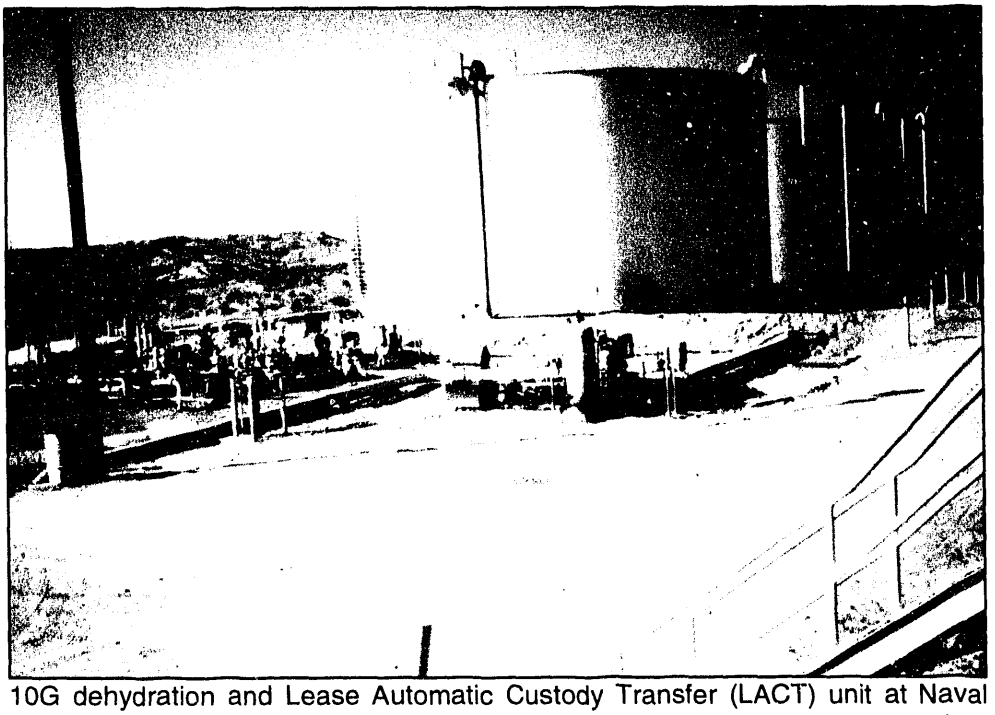
Waste management efforts in fiscal year 1992 concentrated on remedial action investigations of chromium- and arsenic-contaminated sites and an inactive hazardous waste disposal site. None of these sites is included on the Environmental Protection Agency's National Priorities List. Activities included the following:

- All 64 chromium-contaminated sites have been remediated and confirmation-tested. Remediation of 51 of the sites was completed in fiscal year 1991. The remaining 13 were remediated and tested in fiscal year 1992.

- A draft site investigation report and preliminary feasibility study confirmed the presence of excess arsenic at two sites. A draft Remedial Investigation/Feasibility Study was prepared in fiscal year 1992 to identify and evaluate potential remediation alternatives. The Remedial Investigation/ Feasibility Study will be finalized in fiscal year 1993.

- Work continued on the formal closure of the 27R Waste Management Facility, an inactive hazardous waste disposal site.

- The program to eliminate waste water sumps continued. An inventory of active and abandoned sumps was compiled in fiscal year 1992. The need for Waste Discharge Requirements Permits for active sumps will be evaluated further in fiscal year 1993.



10G dehydration and Lease Automatic Custody Transfer (LACT) unit at Naval Petroleum Reserve No. 1. This is now the sole Shallow Oil Zone shipping station.

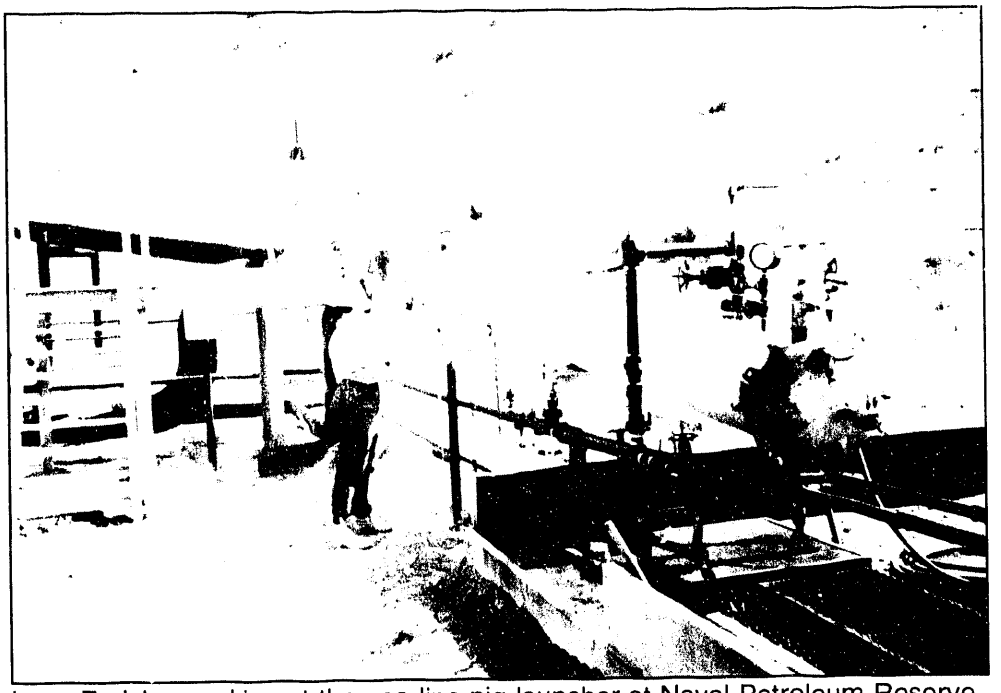
- Naval Petroleum Reserve No. 1 installed secondary containments at specifically identified crude oil tank settings.

- Naval Petroleum Reserve No. 1 established a Groundwater Task Force in fiscal year 1992 to provide guidance and direction for the development of the Naval Petroleum Reserve No. 1 Groundwater Protection Management Program and the Groundwater Monitoring Plan. These documents will be finalized in fiscal year 1993.

- Water Quality Solid Waste Assessment Tests on four abandoned landfills were completed.

- A Draft Supplementary Environmental Impact Statement for Naval Petroleum Reserve No. 1 operations and development is under review and final approval is expected in fiscal year 1993.

- A formal Tiger Team assessment of the Naval Petroleum Reserves in California was conducted and a Corrective Action Plan was developed. The staff worked to address the Tiger Team findings.



Lynn Endsley working at the gas line pig launcher at Naval Petroleum Reserve No. 1.

- The National Environmental Policy Act compliance at the Naval Petroleum Reserves in California consisted of one Environmental Assessment, one Interim Action, and eight Categorical Exclusion Determinations.

Wildlife and Habitat Management

Endangered Species Program

Naval Petroleum Reserve No. 1's comprehensive endangered species program encompasses research and various measures that are designed to develop and implement techniques to conserve and protect endangered and threatened species, while allowing for continued production of hydrocarbons at the maximum efficient rate. At present, the San Joaquin kit fox, Tipton kangaroo rat, giant kangaroo rat, blunt-nosed leopard lizard, and the Hoover Wooly-Star are the endangered and threatened species found at the Naval Petroleum Reserves in California. The fiscal year 1992 program activities included:

- Monitoring populations of San Joaquin kit foxes, rabbits, and coyotes. Rabbits and coyotes represent the major prey and predator for kit foxes. In addition, a draft report on the kit fox relocation program was completed and two workshops on the effects of radio collars on kit foxes were held.

- Preactivity surveys of endangered species and cultural resources for 677 projects on 1,027 acres of Naval Petroleum Reserve No. 1.

- A study of vegetation and wildlife responses to the reseeding of burned areas. Also, analysis of data collected on the effects of supplemental feeding on San Joaquin kit fox survival was completed.

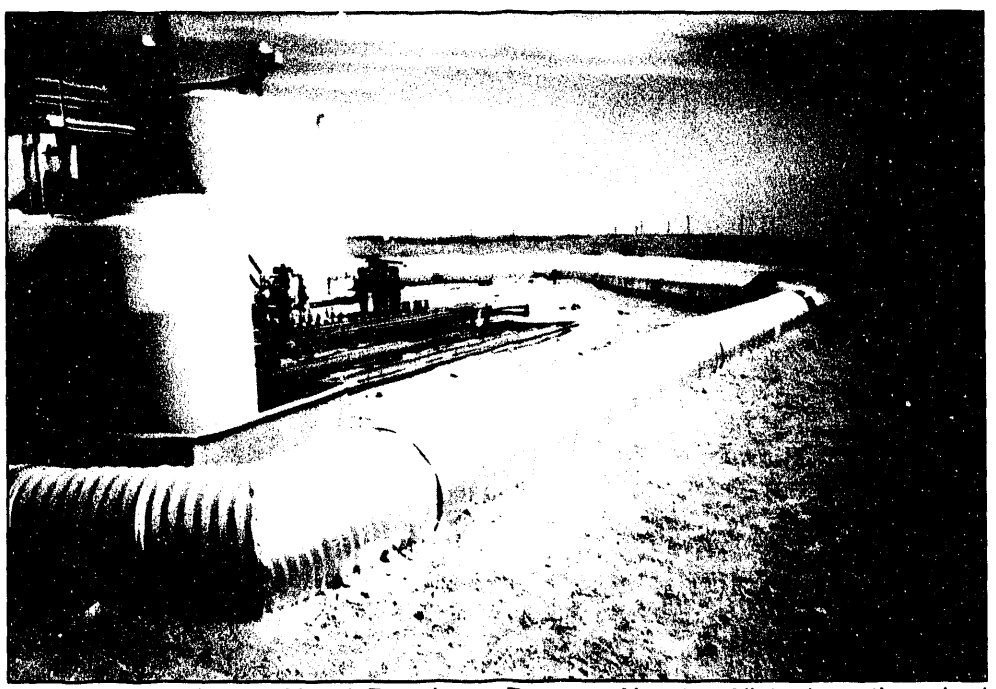
During fiscal year 1992, a major cultural resource survey was evaluated for all of Naval Petroleum Reserve No. 1 to support basic data required for the Naval Petroleum Reserve No. 1 Cultural Resource

Management Plan. A Memorandum of Agreement between the Department of Energy and the California State Historic Preservation Officer will be formulated upon approval of the Cultural Resource Management Plan by the California State Historic Preservation Officer.

SAFETY AND HEALTH

The Safety and Health Program at Naval Petroleum Reserve No. 1 in fiscal year 1992 concentrated on the following areas: assessments/appraisals, safety culture, training, planning, subcontractor safety, accident reduction fire protection, and emergency preparedness.

A Tiger Team assessment determined compliance levels with the Department of Energy's Orders and Occupational Safety and Health Administration regulations and a Corrective Action Plan was developed to correct noncompliances. Also, efforts continued in fiscal year 1992 to correct deficiencies identified in Technical Safety Appraisals I and II and the Independent Fire Protection Survey.



Berm tank setting at Naval Petroleum Reserve No. 1. All tank settings had earthen berms replaced with concrete-filled corrugated pipe berms.

The Bechtel Petroleum Operations, Inc., work force achieved 500,000 consecutive hours without a lost-time injury. Initiatives that contributed to the positive development of the safety culture included defining and publishing goals and performance, safety meetings, initiating a quarterly safety and health newsletter entitled "The Elk Hills Safety Clipboard," positive promotion of safety through incentives, promotion of the safety suggestion program, and "All Hands" meetings emphasizing senior management's commitment to the Safety and Health Program.

In addition, during fiscal year 1992, employees were trained extensively in safety and health areas such as fire extinguishers, hydrogen sulfide, chemical hygiene for laboratory personnel, heat stress, and lifting and strains/sprains. Also, a 5-year Safety and Health Plan, developed in fiscal year 1992, provides a framework under which safety and health activities are identified and prioritized as part of a Department of Energy-wide initiative.

To aid in monitoring subcontractor safety at Elk Hills, a Subcontractor Safety Specialist was employed. Also, a subcontractor inquiry form was developed and is being used to ensure that subcontractors meet the requirements set forth in California Occupational Safety and Health Administration laws. Monthly subcontractor safety meetings are held to increase subcontractor safety awareness and to aid in improving safety performance.

Construction work continued to address fire protection concerns resulting from Technical Safety Appraisals and the Independent Fire Protection Survey. Fire system upgrades at a shipping facility at 18G were completed. An Authorization for Expenditure for Phase I

of a two-phase fire-fighting water study for Elk Hills was approved and a project to install emergency lights and exit signs at Naval Petroleum Reserve No. 1 was 75 percent complete by the close of fiscal year 1992.

In addition, Naval Petroleum Reserve No. 1 developed and forwarded an Emergency Response Assurance Plan to Headquarters for review and comment. At year end Naval Petroleum Reserve No. 1 revised the document to respond to Headquarter's comments. During fiscal year 1992, Naval Petroleum Reserve No. 1 conducted a sitewide emergency exercise and five emergency drills.

Process Hazards Analysis

The Unit Operator established a Process Hazards Analysis staff to implement the Occupational Safety and Health Administration's Process Safety Management of Highly Hazardous Chemicals; Explosives and Blasting Agents (Code of Federal Regulations part 1910.119). Implementation of the regulation is intended to prevent and/or minimize the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals.

Four Naval Petroleum Reserve No. 1 facilities subject to these regulations have been identified: the 35R Storage/Loading Area, the 35R Lean Oil Absorption Process Plant, the Low Temperature Separation Plant No. 1, and the Low Temperature Separation Plant No. 2. The Process Hazards Analysis of the first facility is scheduled to start early in fiscal year 1993. All regulated processes are scheduled to be completed by September 1996.

LITIGATION

- ***State of California ex rel.*** v. ***John Herrington et al.***, Civil Action No. CV-F-87 665 EDP (E.D. Calif.). In late 1987, the State of California filed suit to enjoin the Government from selling Naval Petroleum Reserve No. 1, Elk Hills, to obtain title to the "school lands," Sections 16 and 36, Township 30S, Range 23E, M.D.B.& M., and royalties under the Mineral Leasing Act. The United States was successful in all aspects of the case, and the court entered judgment for the United States on March 14, 1992. California did not appeal the judgment.

- ***United States*** v. ***California State Board of Equalization***, Civil Action No. 88-600-LKK-EM (N.D. Calif.). The Department of Energy brought this action against the California State Board of Equalization, seeking $27 million in State sales taxes paid by Williams Brothers Engineering Co., the Naval Petroleum Reserves in California contract operator from 1975 through 1981. The district court granted the State summary judgment in June 1989; the Ninth Circuit Court of Appeals affirmed and denied the Department of Energy's petition for a rehearing *en banc*. The Supreme Court granted the Department of Energy's petition for *certiorari* and oral arguments were heard on February 23, 1993.

- Appeals of ***Powerine Oil Company*** (EBCA No. 278-2-83), ***USA Petrochem*** (EBCA Nos. 280-2-83 and 300-10-83), ***Tosco Corporation*** (EBCA Nos. 281-2-83 and 282-2-83), ***LaJet*** (EBCA No. 283-2-83), ***Pacific Refining Company*** (EBCA Nos. 290-6-83 and 321-8-84), ***C. Itoh & Company*** (EBCA No. 296-9-83), ***Fletcher Oil & Refining Company*** (EBCA Nos. 301-11-83 and 307-12-83), ***Newhall Refining Company, Inc.*** (EBCA Nos. 302-11-83, 303-11-83, and 304-11-83), and ***Oasis Petroleum Corporation*** (EBCA No. 305-11-83). Nine purchasers of Naval Petroleum Reserve No. 1 crude oil during 1978, 1979, and 1980 filed appeals before the Energy Board of Contract Appeals claiming the Government overcharged them a total of approximately $17 million by using incorrect posted prices as the "crude base price" under their contracts' price provisions.

  The U.S. Court of Appeals for the Federal Circuit remanded the Energy Board of Contract Appeals' initial February 1987 ruling in favor of the Department of Energy on the basis of the appellants'

delay in filing their claims to the Energy Board of Contract Appeals for additional findings. The board subsequently ruled in 1989 that the appellants' claims were timely filed. In February 1990, the appellants sought to reopen the evidentiary record. The board denied this motion in part in May 1990 and, in June and July 1990, denied the parties' motion for reconsideration. On May 14, 1991, the Energy Board of Contract Appeals ruled for the Department of Energy on 14 out of the 15 appeals, ruling for Newhall Refining on its 1978 contract claim for approximately $88,000. The remaining appellants have appealed the Energy Board of Contract Appeals decision to the U.S. Court of Appeals for the Federal Circuit, and the parties are awaiting the court's decision on the remaining 14 appeals.[1]

- Appeals of ***Beacon Oil Company*** (EBCA Nos. 215-6-82, 216-2-82, and 345-12-85). A Naval Petroleum Reserves crude oil purchaser filed two actions before the Energy Board of Contract Appeals during fiscal year 1985 seeking recovery of alleged overcharges under its 1978 and 1979 contracts. The Energy Board of Contract Appeals initially dismissed the appeals, but, after a lengthy appeal process, the U.S. Court of Appeals for the Federal Circuit vacated those decisions. Pursuant to a subsequent Energy Board of Contract Appeals order, Beacon filed two complaints on May 31, 1988, claiming approximately $1.3 million. The board denied Beacon's motion for partial summary judgment on the issue of timeliness in June 1990 and denied Beacon's motion for reconsideration in July 1990. The parties are awaiting the board's decision on the Department of Energy's motion for summary judgment on the 1979 contract claims. The parties settled the 1978 contract claim in fiscal year 1991.

- Appeals of ***Golden West Refining Co.***, ***Kern Oil & Refining Co.***, ***Lunday-Thagard Co.***, and ***Sunland Refining Corp.*** (EBCA Nos. C-9208134 through C-9208137, respectively). These appellants filed virtually identical contract claims alleging that the Department of Energy wrongfully extended their contracts to purchase Naval Petroleum Reserve No. 1, Elk Hills, crude oil for 30 days beyond their April 1, 1992, expiration date and that as a result the appellants incurred damages totaling in excess of $860,000. The Department of Energy contracting officer denied the four claims, and appellants appealed those decisions to the Energy Board of Contract Appeals. The board has tentatively scheduled oral arguments on these claims for August 1993.

[1] On June 8, 1993, the Court of Appeals for the Federal Circuit upheld the Energy Board of Contract Appeals decision denying claims of overcharges.

NAVAL PETROLEUM RESERVE NO. 2

Naval Petroleum Reserve No. 2, Buena Vista Hills, California, covers 30,181 acres adjacent to and south of Naval Petroleum Reserve No. 1. The Buena Vista Hills Field has been producing crude oil continuously since the early 1920's. The Government owns 10,446 acres (34.6 percent) of Naval Petroleum Reserve No. 2, and the remainder is privately owned. All of the Government's productive land (9,224 acres) has been leased in 17 separate parcels that "checkerboard" Naval Petroleum Reserve No. 2. All Naval Petroleum Reserve No. 2 development and production operations are performed by the lessees, with the Government receiving production royalties.

EXPLORATION

Chevron has completed five oil wells on its fee and leased property adjacent to Section 12, T. 32S., R23E. The new pool Chevron is producing appeared to extend under the Department of Energy land, Section 12C. The Department of Energy drilled Well 87-12C on its parcel in Section 12C to determine the extent of the new pool and to protect the Government land from potential hydrocarbon drainage. The producing sand was not present at the 87-12C location and the well was abandoned. Evaluation of the information on this well will aid the Department of Energy in determining what offset wells are required for drainage protection of Federal lands in the Taft/Ford City area of Naval Petroleum Reserve No. 2.

A private party drilled a producing oil well on a Phillips Petroleum Company Federal oil and gas lease at Naval Petroleum Reserve No. 2 under a farm-out agreement with Phillips. In fiscal year 1992 the private party submitted to the Department of Energy an application for a permit to drill two wells on the Phillips lease in fiscal year 1993.

PRODUCTION

Total Naval Petroleum Reserve No. 2 production, predominantly from stripper wells, averaged 3,530 barrels of oil per day during fiscal year 1992. More than 648 million barrels of oil have been produced from Naval Petroleum Reserve No. 2 from the early 1920's through fiscal year 1992. Total remaining recoverable reserves for Naval Petroleum Reserve No. 2 are estimated at 4 million barrels (table 11).

During fiscal year 1992, the Government's royalty share of oil averaged 194 barrels of oil per day from the 1,506 barrels of oil per day produced from the Government leased properties. Table 12 lists the quantities of crude oil, natural gas, and associated liquids produced and sold from Government leases on Naval Petroleum Reserve No. 2 during fiscal year 1992.

Table 11
Reserves and Cumulative and Annual Oil Production at Naval Petroleum Reserve No. 2 As of September 30, 1992

Pool/unit	Cumulative production (barrels)	Percentage of ultimate recovery	Total Naval Petroleum Reserve No. 2 remaining reserves (barrels)	Government lease reserves (barrels)	Total fiscal year 1992 production (barrels)	Government lease production (barrels)
27-B Pool Unit	99,551,200	99.1	20,000	4,109	14,510	2,981
Antelope Shale Zone Unit	22,415,889	99.6	100,000	37,586	85,814	32,254
Antelope Shale Pool Nonunit	10,117,207	93.5	706,252	286,520	54,975	26,544
555 Stevens Pool Unit	49,935,587	99.4	320,000	247,009	245,782	189,720
Stevens Pool Nonunit	4,321,335	99.5	20,000	20,000	13,992	13,992
2-D Unit	418,648	95.4	20,000	6,535	18,299	5,978
11-D Unit	936,899	97.9	20,000	4,330	14,124	3,058
Shallow Pool	460,032,086	99.4	2,890,926	496,039	840,806	269,317
Total	**647,728,851**	**99.4**	**4,097,178**	**1,102,128**	**1,288,302**	**543,844**

REVENUES AND EXPENDITURES

The Government's royalty revenues from Naval Petroleum Reserve No. 2 during fiscal year 1992 totaled $2,071,969. A breakdown of revenues by product appears in the appendix, pages A-9 to A-17. Minimal expenditures for Naval Petroleum Reserve No. 2 in fiscal year 1992 provided for lease surveillance, production accounting, and oversight.

ENVIRONMENT

The Department of Energy's environmental activities at Naval Petroleum Reserve No. 2 in fiscal year 1992 included endangered species research and protection, habitat reclamation, cultural resource protection, Department of Energy Environmental Survey Corrective Action activities, general environmental inspections and surveys, National Environmental Policy Act documentation, and Endangered Species Act section 7 compliance activities.

Table 12
Naval Petroleum Reserve No. 2 Production and Royalty Data
Fiscal Year 1992

Zone	Oil (barrels)	Natural gas (thousands of cubic feet)	Liquid products		
			Propane (gallons)	Natural gasoline (gallons)	Butane (gallons)
27-B Pool Unit					
Government lease sales	3,418	38,274	11,369	65,017	23,001
Royalty rate (%)	12.9	12.5	5.6	5.6	5.6
Royalty quantity	441	4,784	632	3,612	1,278
Antelope Shale Zone Unit					
Government lease sales	34,051	644,026	192,923	517,790	127,331
Royalty rate (%)	14.0	14.0	4.7	4.7	4.7
Royalty quantity	4,767	90,164	9,003	24,164	5,942
Antelope Shale Nonunit					
Government lease sales	32,673	335,572	63,857	289,320	102,634
Royalty rate (%)	12.7	12.5	6.3	6.3	6.1
Royalty quantity	4,162	41,952	4,045	18,211	6,307
555 Stevens Pool Unit					
Government lease sales	192,308	282,017	-	-	-
Royalty rate (%)	12.5	12.5	-	-	-
Royalty quantity	24,039	35,252	-	-	-
Stevens Pool Nonunit					
Government lease sales	15,479	38,190	13,911	193,276	28,465
Royalty rate (%)	12.5	12.5	5.9	5.9	5.8
Royalty quantity	1,936	4,774	815	11,315	1,644
2-D Unit					
Government lease sales	5,862	-	-	-	-
Royalty rate (%)	13.5	-	-	-	-
Royalty quantity	791				
11-D Unit					
Government lease sales	3,055	-	-	-	-
Royalty rate (%)	13.5	-	-	-	-
Royalty quantity	412	-	-	-	-
Shallow Pool					
Government lease sales	262,768	652,223	364,365	1,617,913	75,418
Royalty rate (%)	13.1	14.9	7.2	6.5	5.6
Royalty quantity	34,300	97,098	26,410	104,536	4,251
Total					
Government lease sales	**549,614**	**1,990,302**	**646,425**	**2,683,316**	**356,849**
(Daily average)	**(1,506)**	**(5,453)**	**(1,771)**	**(7,352)**	**(978)**
Royalty quantity	**70,848**	**274,024**	**40,905**	**161,838**	**19,422**
(Daily average)	**(194)**	**(751)**	**(112)**	**(443)**	**(53)**

NAVAL PETROLEUM RESERVE NO. 3

Naval Petroleum Reserve No. 3, Teapot Dome, is a Federally owned oil field of 9,481 acres located 35 miles north of Casper, Wyoming, in Natrona County. Full production was initiated in 1976. Prior activity included lease production in the 1920's and offset production from 1958 to 1976. John Brown E & C Inc., formerly Lawrence-Allison & Associates West, Inc., had been the management and operating contractor for Naval Petroleum Reserve No. 3 since September 1981. It began a second 5-year contract on October 1, 1986, which was extended through September 30, 1992. The Department of Energy recompeted the 5-year contract and FD Services, Inc. (a subsidiary of Fluor Daniel, Inc.) was selected and currently serves as the management and operating contractor at Naval Petroleum Reserve No. 3.

PRODUCTION AND RESERVES

More than 850,000 barrels of oil were produced from Naval Petroleum Reserve No. 3 during fiscal year 1992 at an average rate of 2,345 barrels of oil per day. Just over 24 million barrels of oil have been produced from Naval Petroleum Reserve No. 3 since initiation of production at the reserve in 1922, and 16.6 million barrels since July 3, 1976. The Shannon and the Second Wall Creek formations account for 71 percent of the total production at Naval Petroleum Reserve No. 3. Except for 99 barrels of oil per day produced from the Tensleep formation, all oil produced from the nine reservoirs at Naval Petroleum Reserve No. 3 is light, sweet (low sulfur) crude. Table 13 shows production data for crude oil, natural gas, and associated liquids by zone.

Estimated remaining recoverable reserves at Naval Petroleum Reserve No. 3 are 3.7 million barrels using primary and secondary production techniques. It is estimated that steamflooding portions of the Shannon formation could add 9.7 million barrels of otherwise unrecoverable oil.

DEVELOPMENT AND EXPLORATION

Prior to initiating the Development and Exploration Program at Naval Petroleum Reserve No. 3 in 1976, 233 wells had been drilled. Since fiscal year 1976, an additional 866 development wells and 90 exploratory wells have been drilled. During fiscal year 1992, 49 development wells were drilled.

A total of 1,189 wells have been drilled at Naval Petroleum Reserve No. 3 since it was created. At the end of fiscal year 1992, 697 wells were classified as active producers, injectors, or observation wells, and 338 wells were shut in, 56 more than the fiscal year 1991 year end total of 282 shut-in wells. Naval Petroleum Reserve No. 3 completed 39 wells in 1992, and has plugged and abandoned 141 wells since 1922 (table 14).

ENHANCED OIL RECOVERY

The Shannon reservoir is estimated to have originally contained 144 million barrels of oil, of which only 7 million barrels are estimated to be recoverable by primary means. To determine the optimum method to recover more of this resource, planning for Enhanced Oil Recovery pilot projects began in fiscal year 1980. Pilot projects were implemented to test in-situ combustion and polymer-improved waterflood in the early 1980's and were completed in fiscal year 1986. Favorable production responses to steam preheating in the in-situ combustion pilot led to the development of a steam drive pilot in October 1985, which operated with an increasingly favorable production response in fiscal year 1986 and fiscal year 1987. From fiscal years 1988 through 1991, the project was expanded as four steam generators were purchased and placed in service.

During fiscal year 1992, Naval Petroleum Reserve No. 3 conducted two in-fill drilling programs

Table 13
Naval Petroleum Reserve No. 3 Production
Fiscal Year 1992

Zone	Crude oil (barrels of oil per day)	Crude oil (barrels)	Natural gas (thousands of cubic feet)	Propane[1/] (gallons)	Butane-plus[1/] (gallons)
Shannon	1,351	494,544	0		
Steele Shale	274	100,018	16,983		
Niobrara Shale	176	64,522	5,439		
Second Wall Creek	313	114,537	2,496,158		
Third Wall Creek	26	9,554	0		
Muddy Sand	99	36,271	270,249		
Dakota	4	1,484	608		
Lakota	3	1,159	19,998		
Tensleep	99	36,344	0		
Total	**2,345**	**858,433**	**2,809,435**	**655,631**	**2,131,255**

[1] Data for propane and butane-plus production by zone are not available.

involving a total of seven wells in the Steam Generator No. 3 and No. 4 patterns. Twelve producing wells and 10 injection wells were drilled in the new Steam Generator No. 5 pattern. Steam Generator No. 5 is scheduled to begin injection in October 1993.

Development of the Shannon Steamflood will continue during fiscal year 1993. A total of 21 additional steam patterns are planned, with an estimated recovery of 10.5 million barrels of oil throughout the life of the project. Injection of steam is expected to discontinue in 2006.

Approximately one-half of the natural gas produced at Naval Petroleum Reserve No. 3 (primarily from the Second Wall Creek) is being used to fuel the steam generators. At the current rate of consumption, the available gas is sufficient to support this operation for approximately 3 more years (i.e., through 1995). Eventual purchase of gas to fuel the steam generators would add between two and three million dollars per year to the cost of operations at Naval Petroleum Reserve No. 3. This factor, coupled with declining production from the steamflood, has prompted a thorough evaluation of the economics of the project. This evaluation effort is scheduled for completion by May 1, 1993, with possible changes in steamflood operations to follow.

Methods to increase profitability at Naval Petroleum Reserve No. 3, currently under investigation, include

- improved efficiency of the steam drive process,
- water flooding, and
- use of horizontal wells

Based on industry experience in mature oil and gas fields throughout the United States over the past decade, use of horizontal wells in the Naval Petroleum Reserve No. 3 field appears to have the

Table 14
Inventory of Wells, Naval Petroleum Reserve No. 3
As of September 30, 1992

Zone	Injector/ observer	Producer	Enhanced Oil Recovery[1]	Water source	Shut-in	Plugged & abandoned	Drilling/ completing[2]	Total
Shannon	0	297	181	0	148	6	10	642
Shales[3]	0	87	0	0	36	57	1	181
Second Wall Creek	15	87	0	0	133	41	0	276
First & Third Wall Creek	0	5	0	0	3	3	1	12
Muddy/Dakota/Lakota[1]	2	13	0	0	9	8	0	32
Morrison	0	0	0	0	0	8	0	8
Tensleep	0	6	0	0	0	4	0	10
Madison[4]	3	0	0	1	9	14	1	28
Total	**20**	**495**	**181**	**1**	**338**	**141**	**13**	**1,189**

1 Includes Enhanced Oil Recovery producers, injection wells, and observation wells.
2 As of September 30, 1992, these are the wells under completion or drilling but do not reflect total fiscal year 1992 completions. Total completions for fiscal year 1992 were 39 wells.
3 Includes 27 Shallow Steele Shale wells that were plugged and abandoned and not included on previously listed well totals.
4 Includes Crow Mountain, potable water wells, and historical wells of unknown purposes.

highest probability of producing major increases in production. However, all reasonable approaches will be evaluated. With current estimates of remaining oil-in-place at more than 100 million barrels in the Shannon formation alone, even modestly increased recovery factors can yield substantial increases in revenue.

REVENUES AND EXPENDITURES

The fiscal year 1992 revenues derived from all sources at Naval Petroleum Reserve No. 3 totaled $18,266,621. These revenues were deposited in the Naval Petroleum and Oil Shale Reserves appropriation account at the U.S. Treasury. A breakdown of revenues by product appears in the appendix, pages A-9 to A-17. For fiscal year 1992, expenditures at Naval Petroleum Reserve No. 3 totaled $17,728,698. Net cash flow for the year was $537,923. Fiscal year 1992 expenditures for program direction totaled $1,370,275.

SALES

In fiscal year 1992, Naval Petroleum Reserve No. 3 crude oil was sold at an average price of $20.21 per barrel (table 15). Due to field operating requirements, natural gas has not been sold since

Table 15
Naval Petroleum Reserve No. 3 Crude Oil Sales (Deliveries)
Fiscal Year 1992

Company	Sweet (barrels of oil per day)	Average billing price[1/] ($/barrel)	Sour (barrels of oil per day)	Average billing price[1/] ($/barrel)
Wyoming Refining Company October 1, 1991-November 30, 1991	2,355	$22.34		
Sinclair Oil Corporation October 1, 1991-November 30, 1991			53	$17.20
Wyoming Refining Company December 1, 1991-May 31, 1992	2,335	$19.21		
Sinclair Oil Corporation December 1, 1991-May 31, 1992			77	$13.69
Enron Oil Trading & Transportation Co. June 1, 1992-September 30, 1992	2,141	$21.19		
Conoco Inc. June 1, 1992-September 30, 1992			79	$16.59
Average daily sales volume	**2,274**		**74**	
Average sales price ($/barrel)		**$20.91**		**$15.68**

[1] Prices for Naval Petroleum Reserve No. 3 crude are the average of the three highest prices for similar oil produced from Wyoming oil fields, plus a bonus or discount bid.

May 1, 1983; it is primarily reinjected. Associated gas liquids sales totaled 655,631 gallons of propane and 2,131,255 gallons of butane-plus natural gasoline at average prices of $0.264 and $0.342 per gallon, respectively (table 16).

In fiscal year 1993, Naval Petroleum Reserve No. 3 will continue to be produced at its maximum efficient rate and all the crude oil and natural gas liquids produced will be sold competitively.

ENVIRONMENT AND SAFETY

Environment

The Naval Petroleum and Oil Shale Reserves in Colorado, Utah, and Wyoming underwent a Tiger Team Environmental and Safety Assessment in fiscal year 1992. This assessment, which took place from June to July 22, 1992, was in response to a 10-point Initiative introduced by Secretary of Energy James D. Watkins in 1989. The Tiger Team found that the site had made significant progress in its own self-assessment program. The Department of Energy and contractor self-assessments conducted at the site prior to the Tiger Team review identified a high percentage of the findings ultimately identified during the review.

The Tiger Team assessment findings were grouped into three categories: environment, safety and health, and management. Work commenced immediately on developing a Corrective Action Plan in response to the assessment's findings.

Table 16
Naval Petroleum Reserve No. 3 Liquid Product Sales (Deliveries)
Fiscal Year 1992

Company	Propane (gallons per day)	Average billing price ($/gallon)[1/]	Butane-plus (gallons per day)	Average billing price ($/gallon)
Farmers Co-op Association October 1, 1991-September 30, 1992	1,791	$0.2640		
Vessels Oil & Gas Company October 1, 1991-September 30, 1992			5,823	$0.3424

[1] Billing prices are adjusted monthly based on relevant spot market prices.

Naval Petroleum Reserve No. 3 strove to comply with all applicable environmental and safety laws, regulations, and Department of Energy Orders and monitoring requirements in fiscal year 1992. Air quality permits from the Wyoming Department of Environmental Quality were maintained at the Low Temperature Separation Gas Plant and the gas-fired Steam Generators Nos. 1, 2, 3, 4, and 5. National Pollutant Discharge Elimination System permits from the Wyoming Department of Environmental Quality were maintained for all Naval Petroleum Reserve No. 3 locations discharging water to the surface.

Class II underground disposal well permits from the Wyoming Oil and Gas Conservation Commission were maintained for three disposal wells that receive produced waters from all formations and brine from the Shannon Steam Drive water softening system. The Wyoming Oil and Gas Conservation Commission's Secondary Recovery Permits and Aquifer Exemptions were maintained for production operations in the Shannon, Second Wall Creek, and Muddy formations. Ten new steam injection wells for Steam Generator No. 5 were added to the Secondary Recovery Permit for the Shannon formation.

Safety and Health

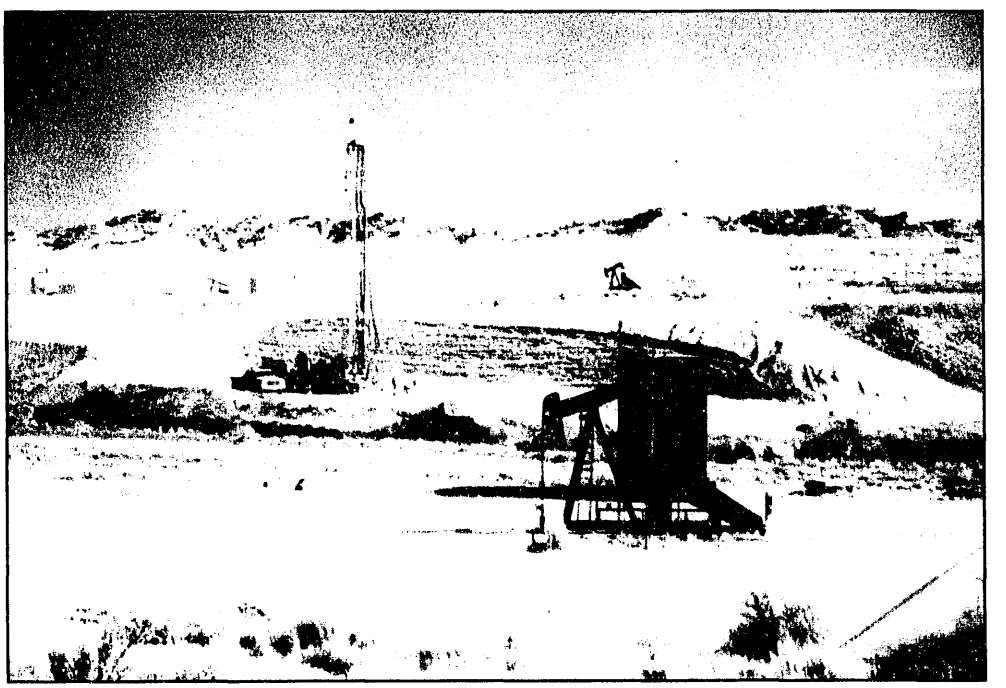
Principal fiscal year 1992 safety and health activities at Naval Petroleum Reserve No. 3 included completion of the reserve's self-assessment, the Tiger Team audit, and the development of the Corrective Action Plan responding to the Tiger Team audit findings.

LITIGATION

- ***In re Black Thunder Marketing, Inc.*** (U.S. Bankruptcy Court, District of Wyoming, No. 90-05344-B). Black Thunder Marketing, Inc., failed to provide a required performance guarantee and defaulted in fiscal year 1990 on a 92-day contract to buy 6,800 gallons per day of Naval Petroleum Reserve No. 3 butanes-plus at $0.3640 per gallon. The Department of Energy terminated the Black Thunder contract for default, recovered the $9,000 bid guarantee, resold Black Thunder's butanes-plus at $0.22 per gallon, and billed Black Thunder for liquidated damages of $86,533.92 under its contract for the

difference between the contract price and the price the Department of Energy received for Black Thunder's butanes-plus. The Department of Energy's claim totals about $107,000, which includes the liquidated amount plus about $20,000 incurred for tankage used to store the product until it could be resold pursuant to an emergency invitation for bids.

In November 1990, Black Thunder filed for protection and reorganization under Chapter 11 of the Bankruptcy Act, was appointed Debtor-in-Possession, and continued to operate its business under the protection of the Bankruptcy Court. Since Black Thunder failed to provide a timely reorganization plan, the court has converted the action to a Chapter 7 liquidation of the estate in bankruptcy, and the Chapter 7 Trustee is proceeding with the sale of Black Thunder's assets. The Cheyenne U.S. Attorney's office is representing the Department of Energy's interests.



Naval Petroleum Reserve No. 3 Drill Rig # 3 88-2-SX-3

NAVAL OIL SHALE RESERVES

Naval Oil Shale Reserve No. 1 and Naval Oil Shale Reserve No. 3 are adjacent oil shale reserves of 40,760 and 14,130 acres, respectively, located eight miles west of Rifle, Colorado, in Garfield County. Except for private oil shale claims of about 600 acres of Naval Oil Shale Reserve No. 1, the Government owns all lands and minerals at Naval Oil Shale Reserve Nos. 1 and 3. Naval Oil Shale Reserve No. 1 is estimated to have more than 18 billion barrels of shale oil in place, with approximately 2.5 billion barrels of oil recoverable from shale rated at 30 gallons or more per ton. Naval Oil Shale Reserve No. 3 has no commercial oil shale, but was set aside to gain closer access to the Colorado River for water and as working space to support Naval Oil Shale Reserve No. 1 activities.

Naval Oil Shale Reserve No. 2 covers 90,400 acres located in Carbon and Uintah Counties, Utah. The Government owns all of the minerals at Naval Oil Shale Reserve No. 2, except for those contained in 640 acres of State lands and 320 acres of homestead entries. Approximately 40 percent of Naval Oil Shale Reserve No. 2 is contained within the Uintah-Ouray Indian Reservation. Naval Oil Shale Reserve No. 2 is estimated to have almost 4 billion barrels of shale oil in place. No estimate of recoverable reserves has been made, but the shale beds are thought to be too thin to be economically recoverable using current, available technologies. Seismic surveys, however, indicate potential traps for the accumulation of oil and natural gas within Naval Oil Shale Reserve No. 2.

The Department of Energy has no current plans to develop the Naval Oil Shale Reserves' shale resources. The Naval Oil Shale Reserve No. 1 Pre-Development Plan, completed in fiscal year 1982, provided a compilation and analysis of important technical, environmental, and economic data that identified the potential for production of 200,000 barrels of shale oil per day for more than 30 years. The new operating contract with FD Services requires the operator periodically to update these plans according to current economic factors and technology. Table 17 shows the Naval Oil Shale Reserves' expenditures since 1978 for the (1) Oil Shale Pre-Development Project, (2) costs of surface resource management paid to the Bureau of Land Management, (3) costs of Anvil Points oil shale facility demolition, and (4) costs of the Department of Energy's Gas Protection Drilling Program.

The Naval Petroleum and Oil Shale Reserves' Strategic Plan recognizes that although development of shale oil has been deferred, the potential for conventional oil and gas resources within the Naval Oil Shale Reserves' properties must be assessed and plans formulated to develop these resources in the near to mid-term. Toward this end, a resource/reserve assessment project was planned during fiscal year 1992 and will be initiated through the U.S. Geological Survey in fiscal year 1993. Proposals for follow-on verification drilling will be developed and submitted during fiscal years 1993 and 1994.

SURFACE RESOURCE MANAGEMENT

A Memorandum of Understanding was completed in 1987 between the Department of Energy and the Department of the Interior's Bureau of Land Management for the latter's surface resource management of the Naval Oil Shale Reserves. Under this agreement, the Bureau of Land Management receives funding from the Department of Energy to maintain multiple use of the lands within the Naval Oil Shale Reserves and to prevent the surface resource values from declining.

During fiscal year 1992, the Bureau of Land Management maintained access roads at the Naval Oil Shale Reserves in Colorado and Utah and maintained the Department of Energy Administrative Site at Naval Oil Shale Reserve No. 1. Since the Bureau of Land Management has management responsibility for all public lands owned by the Federal Government, the Department of Energy utilizes the Bureau of Land Management's expertise and requests

Table 17
Naval Oil Shale Reserves Program
Estimated Total Cost Through 1992

Year	Oil Shale Pre-Development & Restoration	Bureau of Land Management surface management	Anvil Points Demolition	Naval Oil Shale Reserves Gas Protection Drilling Program	Total
1978	$1,448,144				$1,448,144
1979	1,320,051				1,320,051
1980	3,177,132	$ 54,774			3,231,906
1981	3,283,386	58,374			3,341,760
1982	622,944	21,833			644,777
1983	189,901	41,157			231,058
1984	277,047				277,047
1985	320,012	16,171	$ 736,785	$1,299,380	2,372,348
1986	17,500	70,717	2,133,775	1,047,781	3,269,773
1987		51,526		9,917	61,443
1988	23,211	37,054		92,258	152,523
1989	22,769	48,617		1,928,347	1,999,733
1990	28,200	65,154		2,504,637	2,597,991
1991	19,380	131,609		2,198,577	2,349,566
1992		107,100		1,394,906	1,502,006
Total	**$10,749,677**	**$704,086**	**$2,870,560**	**$10,475,803**	**$24,800,126**

its review and recommendations to mitigate the environmental impacts of the Department of Energy's drilling activities. In Utah, the Bureau of Land Management also provides liaison with the Bureau of Indian Affairs and the Tribal Council on management of the Indian portions of Naval Oil Shale Reserve No. 2.

NATURAL GAS PROTECTION PROGRAM

General Description

Naval Oil Shale Reserve No. 1 and Naval Oil Shale Reserve No. 3 are situated on the north and northwest flanks of three large natural gas-producing fields: the Parachute, Rulison, and Grand Valley (see figure 6). The Office of Naval Petroleum and Oil Shale Reserves continuously monitors development activities on lands adjacent to the reserves to evaluate potential drainage and migration of natural gas from the reserves. The natural gas deposits on the reserves requiring protection are contained on lands located along the reserves' boundaries. Private property owners or their lessees have been developing land adjacent to the Naval Oil Shale Reserves through drilling, resulting in increasing pressure differences between natural gas deposits and commercial producing wells adjacent to the reserves.

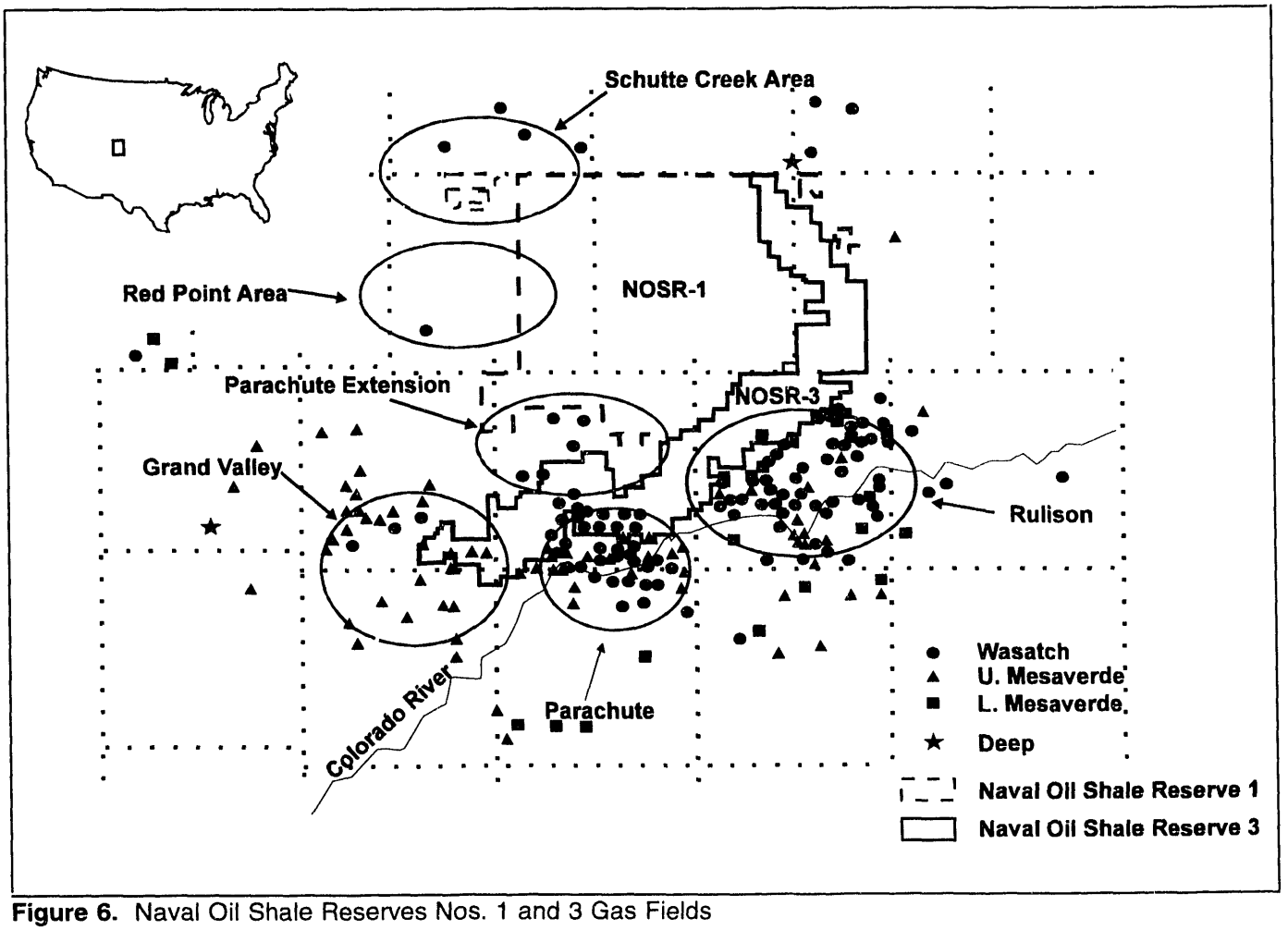


Figure 6. Naval Oil Shale Reserves Nos. 1 and 3 Gas Fields

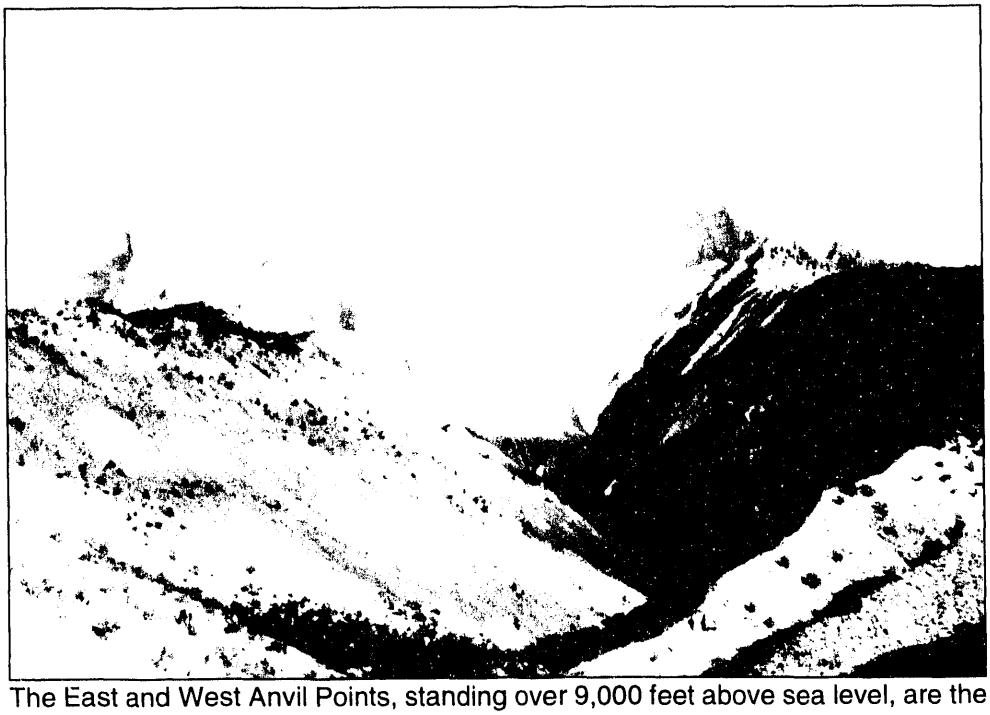
The Department of Energy's monitoring activities determined in 1983 that the potential existed for drainage of natural gas by commercial development in the Rulison Field on the southeast boundary of Naval Oil Shale Reserve No. 3. Since 1983, additional commercial gas wells have been drilled near the Naval Oil Shale Reserves' boundaries in the Parachute and Grand Valley Fields.

To protect the Government's interest in the natural gas underlying the Naval Oil Shale Reserves, the Department of Energy has developed a program with two key elements, communitization and offset drilling. In communitization, the Government by agreement shares in the production and costs from wells drilled near the boundary of the Naval Oil Shale Reserves. Under the communitization agreements, each well is operated as a unit and development costs and hydrocarbon production are shared among the unit partners, with the actual percentage of ownership based on the acreage of each partner's mineral rights within the unit. Tracts are pooled under communitization agreements when the separate tracts cannot be developed and operated independently in conformity with State well-spacing requirements or established well-development programs.

In addition to communitization, it is necessary for the Government to drill its own gas wells inside the reserves' boundaries to directly offset wells drilled on private lands. Although most of these wells are entirely Government-owned and operated, some offset wells may be communitized with adjacent private property owners and/or lessees.

Through fiscal year 1992, 89 wells have been drilled by private industry within one mile of the Naval Oil Shale Reserves' boundaries. Thirteen nonproducing commercial wells have also been drilled; these were either plugged and abandoned or have not been produced due to their marginal production or distance from a pipeline.

The Department of Energy has entered communitization agreements for 18 wells that are operated by private interests, three of which were drilled and completed in fiscal year 1992. To mitigate drainage and migration of natural gas to the commercial producers, the Department of Energy has drilled 13 offset wells that are owned entirely by the Government, and four wells that are communitized with adjacent private landowners or leaseholders and operated by the Department of Energy. This 35-well program (see table 18) has mitigated significant drainage. Six wells for drainage protection are planned for fiscal year 1993: three in the Wasatch formation and three in the Mesaverde.



The East and West Anvil Points, standing over 9,000 feet above sea level, are the prominent landmarks of Naval Oil Shale Reserve No. 1, near Rifle, Colorado.

Table 18
Naval Oil Shale Reserve No. 1 and Naval Oil Shale Reserve No. 3
Natural Gas Wells

Well #	Operator	Location	Department of Energy Interest	Formation[1/]	Date Drilled
Rulison Field					
1-M-9	DOE	SWSW 9-6S-94W	100%	Mesaverde	1985
1-M-19	DOE	NENE 19-6S-94W	73.0908%	Mesaverde	1986
1-W-9	DOE	SWSW 9-6S-94W	100%	Wasatch	1990
1-W-17	DOE	SWSW 17-6S-94W	58.705203%	Wasatch	1990
1-W-19	DOE	NENE 19-6S-94W	67.094285%	Wasatch	1990
1-M-17	DOE	SWSW 17-6S-94W	98.360753%	Mv/Cameo	1991
9-17-MV	Fina	NESE 17-6S-94W	12.6839%	Mv/Cameo	1991
Parachute Field					
W-29-26	Barrett	SWSW 26-6S-95W	50%	Wasatch	1987
W-18-27	Barrett	SWSW 27-6S-95W	50%	Wasatch	1987
W-17-27	Barrett	SWSE 27-6S-95W	75%	Wasatch	1987
W-43-28	Barrett	NENW 28-6S-95W	50%	Wasatch	1987
W-9-28	Barrett	SWSE 28-6S-95W	50%	Wasatch	1987
W-19-28	Barrett	SENE 28-6S-95W	50%	Wasatch	1987
W-20-32	Barrett	NENW 33-6S-95W	75%	Wasatch	1987
W-5-33	Barrett	SESW 21-6S-95W	50%	Wasatch	1987
1-W-21	DOE	SENW 26-6S-95W	100%	Wasatch	1989
1-W-26	DOE	SWNW 27-6S-95W	100%	Wasatch	1989
1-W-27	DOE	SENE 27-6S-95W	100%	Wasatch	1989
2-W-27	DOE	SWNE 29-6S-95W	100%	Wasatch	1989
1-W-28	DOE	SWNE 28-6S-95W	100%	Wasatch	1989
1-W-29	DOE	NESE 29-6S-95W	100%	Wasatch	1989
2-W-29	DOE	NENE 29-6S-95W	100%	Wasatch	1989
1-W-32	DOE	SENW 32-6S-95W	100%	Wasatch	1989
GV-39-32	Barrett	SWSW 32-6S-95W	50%	Mv/Cameo	1990
1-895	Barrett	NENW 8-6S-95W	26.21875%	Wasatch	1990
1-995	Barrett	NENW 9-6S-95W	25.7625%	Wasatch	1990
1-1695	Barrett	NENW 16-6S-95W	36.825%	Wasatch	1990
1-20	Barrett	NENW 20-6S-95W	4.25%	Wasatch	1990
1-W-20	DOE	SWSE 20-6S-95W	100%	Wasatch	1991
2-W-21	DOE	C-SE 21-6S-95W	100%	Wasatch	1991
3-W-29	DOE	SESW 29-6S-95W	100%	Wasatch	1991
MV-43-31	Barrett	SESE 31-6S-95W	87.24205%	Mv/Cameo	1992
MV-37-32	Barrett	SWNE 32-S-95W	75%	Mv/Cameo	1992
MV-13-33	Barrett	SENW 33-6S-95W	50%	Mv/Cameo	1992
Grand Valley Field					
GV-24-36	Barrett	SWNE 36-6S-96W	47.5723%	Mv/Cameo	1990

[1] The Wasatch wells are drilled in the Wasatch formation which is at the relatively shallow average depth of 2,000 feet. The deeper Mesaverde wells range between 5,500 feet and 8,500 feet.

The gas protection program is a reactive, ongoing program that is constantly being revised in response to commercial drilling along the Naval Oil Shale Reserves' boundaries. Based on the Department of Energy projections of future drilling plans by neighboring operators, engineering estimates, current Colorado well- spacing regulations, and standard industry practices, the Department of Energy expects that it may ultimately communitize approximately 89 wells with private owners and drill approximately 111 offset wells within Naval Oil Shale Reserve Nos. 1 and 3. These projections are revised as appropriate in response to budgetary constraints, actual commercial gas development along the Naval Oil Shale Reserve borders, transportation constraints, and the natural gas market.

Naval Oil Shale Reserve Nos. 1 and 3 Drainage Protection

Production from wells near the Naval Oil Shale Reserve Nos. 1 and 3 boundaries is being monitored to maintain a current estimate of the quantity of gas drained from the Naval Oil Shale Reserves and the effect of the Department of Energy's protective drilling efforts. As of July 1992, 20.1 billion cubic feet of gas had been produced from 71 non-Department of Energy wells within a mile of the Naval Oil Shale Reserves' boundary. Eighteen Department of Energy communitized wells produced 5.1 billion cubic feet, and 13 Department of Energy-owned offset wells produced 2.1 billion cubic feet. The Department of Energy's share from both wholly owned and communitized wells totaled 5.4 billion cubic feet.

Naval Oil Shale Reserve No. 2

Naval Oil Shale Reserve No. 2 is located in an area of known oil and gas production. Within a 30-mile radius of the reserve there are a large number of fields producing hydrocarbons from ten different geologic formations, at least seven of which are believed to underlie Naval Oil Shale Reserve No. 2. A 1981 seismic study confirmed a high probability of trapped hydrocarbons in structural and stratigraphic traps within Naval Oil Shale Reserve No. 2. Monitoring of nearby oil and gas exploration and development continued in fiscal year 1992.

SALES

In fiscal year 1992, purchasers of Naval Oil Shale Reserve No. 3 natural gas received an average of 3,014 million British thermal units per day of Naval Oil Shale Reserve No. 3 natural gas at an average price of $0.94 per million British thermal units. Sales of associated gas liquids totaled 2,325 barrels of natural gas condensate at an average price of $17.46 per barrel (table 19).

In fiscal year 1993, Naval Oil Shale Reserve No. 3 gas will continue to be sold from the eight communitized Parachute wells, the four communitized Parachute Extension wells, the 11 100-percent Department of Energy Parachute wells, the five communitized Mesaverde/Cameo wells operated by Barrett in the Parachute and Grand Valley Fields, the six Department of Energy Rulison wells, and the one communitized Rulison Field well operated by Fina. Associated condensate production is sold as it is produced.

REVENUES AND EXPENDITURES

The fiscal year 1992 Naval Oil Shale Reserve No. 3 sales revenues totaled $1,247,361, which was deposited in the Naval Petroleum and Oil Shale Reserves appropriation account at the U.S. Treasury. For fiscal year 1992 expenditures totaled $1,502,006, for the drilling of three communitized Mesaverde/Cameo wells in the Parachute Field and for miscellaneous operation and maintenance expenses.

Table 19
Naval Oil Shale Reserve No. 3
Natural Gas and Condensate Sales, Fiscal Year 1992
Quantity Delivered

Natural gas

Company	Average quantity delivered[1] (million British thermal units/day)	Average billing price (paid to Department of Energy)	Gathering fee (paid by purchaser to pipeline company)	Questar tariff (paid by purchaser to pipeline company)	Purchaser's cost of gas delivered to pipeline
Bonneville Fuels Marketing Corporation					
October 1–31, 1991	251	$0.65	$0.35	$0.22[2]	$1.22
October 1–31, 1991	264	0.83	0.31	0.22	1.36
Kimball Energy Corporation					
November 1, 1991 – September 30, 1992	2,708	1.00	0.35	0.22[2]	1.57
Grand Valley Gas Company					
December 1, 1991 – September 30, 1992	4,068	0.93	0.31	0.22	1.46

Condensate

Company	Average quantity delivered (barrels per day)	Average billing price ($/barrel)
Enron Oil Trading and Transportation Corporation		
October 1, 1991 – September 30, 1992	6	$17.46

[1] The daily averages shown are average quantities delivered during periods of sales, not for the whole year. During the first 5 months of the sales contract, the Department of Energy must make natural gas available for purchase, and purchasers must buy a minimum quantity of natural gas. For each month during the balance of the contract, the Department of Energy may nominate quantities of natural gas for purchasers to buy or decline to buy.

[2] Natural gas flowing through the Northwest Gathering System must flow through Questar Pipeline. Natural gas flowing through the Barrett Gathering System may flow through the Questar Pipeline, or it could flow through the Union Lateral into the Northwest Pipeline's main line, avoiding the $0.22 Questar tariff.

FUTURE PLANS

Naval Oil Share Reserve Nos. 1 and 3

The Department of Energy plans to spend approximately $10 million of prior year funds for the ongoing protective drilling program over the next 2 fiscal years. Private operators may recomplete some of the existing communitized wells into the Upper Mesaverde, in which case funds will be redirected from drilling to recompletions.

Because existing pipelines in the area are near capacity, it may be necessary for the Department of Energy to install additional pipelines in the next 5 years. The Department of Energy is considering an

interconnect with the Grand Valley Gathering System in the Parachute Field to give the Department more flexibility in marketing gas. A larger gas compressor will be necessary to handle the larger volumes of gas produced as a result of the drilling of additional protective wells.

Naval Oil Shale Reserve No. 2

There is commercial natural gas development to the north of Naval Oil Shale Reserve No. 2 and recent wells have been drilled about three miles from the northern boundary. If a producible commercial well is completed near enough to Naval Oil Shale Reserve No. 2 to threaten drainage, the Department of Energy will prepare a Naval Oil Shale Reserve No. 2 Drainage Protection Plan.

ENVIRONMENT AND SAFETY

Oil shale development efforts at the Anvil Points Facility on Naval Oil Shale Reserve No. 3 between 1946 and 1982 generated a 178,000-cubic-yard waste shale pile. The Naval Energy and Environmental Support Activity studied the potential for environmental contamination from this pile and concluded in February 1985 that the waste pile presents no significant threat to human health or the environment. The Naval Energy and Environmental Support Activity recommended that a groundwater monitoring survey further define the existing conditions. A Martin Marietta fiscal year 1991 investigation of the shale pile determined that it presents a low risk.

The Department of Energy, the Bureau of Land Management, and the U.S. Fish and Wildlife Service jointly have been studying peregrine falcons since 1990, when a nest was discovered on the cliffs at Naval Oil Shale Reserve No. 1, approximately one-quarter mile from the shale oil mine bench. Since then one nest has been located in the area. The Naval Petroleum and Oil Shale Reserves in Colorado, Utah, and Wyoming restricts work in this area during the nesting period.

The Bureau of Land Management conducted environmental and cultural resource surveys on a number of wellsites, access roads, and flowline routes constructed on Naval Oil Shale Reserve No. 3 as part of the gas protection program and has studied proposed pipeline easements and a number of maintenance and improvement projects on existing roads across Naval Oil Shale Reserve No. 3.

Demolition work on the Anvil Points mine buildings started September 29, 1992, with removal of transite siding.

STATISTICAL APPENDIX

PRODUCTION CRUDE OIL - Barrels

Fiscal Year	Naval Petroleum Reserve No. 1[1]	Naval Petroleum Reserve No. 2[2]	Naval Petroleum Reserve No. 3[1]	Total
FY7T[3]	3,807,974	33,769	147,392	3,989,135
1977	36,999,238	142,714	388,861	37,530,813
1978	43,485,349	128,971	714,467	44,328,787
1979	52,639,748	121,331	1,540,200	54,301,279
1980	58,281,170	107,340	1,603,477	59,991,987
1981	62,609,584	98,606	1,235,835	63,944,025
1982	60,698,376	97,283	1,144,500	61,940,159
1983	57,353,109	93,080	1,043,248	58,489,437
1984	50,473,675	94,179	1,074,799	51,642,653
1985	47,683,491	92,122	1,061,098	48,836,711
1986	42,166,485	83,209	1,150,411	43,400,105
1987	39,812,627	69,663	1,130,402	41,012,692
1988	39,316,391	67,848	979,279	40,363,518
1989	35,214,837	63,250	832,643	36,110,730
1990	29,945,732	70,429	829,492	30,845,653
1991	27,154,434	70,432	819,886	28,044,752
1992	25,442,293	70,743	858,433	26,371,469
TOTAL	**713,084,513**	**1,504,969**	**16,554,423**	**731,143,905**

[1]Total Reserve production.
[2]Government's royalty share of production.
[3]Transition period for change of fiscal year —7/1/76 to 9/30/76.

NATURAL GAS - Thousands of Cubic Feet

Fiscal Year	Naval Petroleum Reserve No. 1[1]	Naval Petroleum Reserve No. 2[2]	Naval Petroleum Reserve No. 3[1]	Naval Oil Shale Reserve No. 3[3]	Total
FY7T[4]	768,125	117,698	7,595	---	893,418
1977	19,535,104	428,179	179,226	---	20,142,509
1978	34,347,853	379,581	530,145	---	35,257,579
1979	53,310,089	361,982	1,269,530	---	54,941,601
1980	60,615,227	297,787	1,792,477	---	62,705,491
1981	101,043,169	251,902	2,799,377	---	104,094,448
1982	119,485,538	274,806	2,774,155	---	122,534,499
1983	121,254,625	254,306	2,641,015	---	124,149,946
1984	128,969,441	256,450	2,907,516	---	132,133,407
1985	134,745,060	268,262	3,033,315	---	138,046,637
1986	127,430,198	262,488	3,037,404	---	130,730,090
1987	125,249,760	231,372	3,906,102	---	129,387,234
1988	131,379,158	225,870	3,923,434	---	135,528,462
1989	134,832,380	245,979	3,386,559	215,535	138,680,453
1990	125,586,458	271,653	3,042,560	1,575,731	130,476,402
1991	120,664,855	274,011	3,210,393	2,079,745	126,229,204
1992	114,290,283	271,547	2,809,435	1,497,850	118,869,115
TOTAL	**1,653,507,323**	**4,673,873**	**41,250,238**	**5,368,861**	**1,704,800,495**

1 Total Reserve production on a wet basis - includes reinjection, sales, shrinkage, and usage.
2 Government's royalty share of sales on a dry basis.
3 Department of Energy share from both wholly-owned and communitized wells.
4 Transition period for change of fiscal year — 7/1/76 to 9/30/76.

PROPANE - Gallons

Fiscal Year	Naval Petroleum Reserve No. 1[1]	Naval Petroleum Reserve No. 2[2]	Naval Petroleum Reserve No. 3[1]	Total
FY7T[3]	740,604	57,206	---	797,810
1977	13,099,501	270,945	---	13,370,446
1978	20,490,769	247,109	---	20,737,878
1979	40,123,793	226,877	---	40,350,670
1980	54,282,703	235,308	---	54,518,011
1981	75,906,589	228,134	600,294	76,735,017
1982	100,094,374	224,167	1,986,637	102,305,178
1983	96,275,277	182,996	2,012,841	98,471,114
1984	89,311,465	220,703	2,466,499	91,998,667
1985	96,662,714	161,815	2,185,776	99,010,305
1986	93,123,652	153,509	1,785,883	95,063,044
1987	89,514,424	120,403	1,882,298	91,517,125
1988	89,496,614	122,609	1,325,162	90,944,385
1989	86,759,718	124,289	1,154,060	88,038,067
1990	74,060,718	87,876	812,161	74,960,755
1991	66,432,443	73,109	729,815	67,235,367
1992	56,615,255	40,903	655,631	57,311,789
TOTAL	**1,142,990,613**	**2,777,958**	**17,597,057**	**1,163,365,678**

1 Total Reserve volume extracted from wet gas.
2 Government's royalty share of LPG (propane and/or butane) extracted from wet gas.
3 Transition period for change of fiscal year — 7/1/76 to 9/30/76.

NATURAL GASOLINE - Gallons

Fiscal Year	Naval Petroleum Reserve No. 1[1]	Naval Petroleum Reserve No. 2[2]	Naval Petroleum Reserve No. 3[1]	Total
FY7T[3]	477,168	160,195	---	637,363
1977	8,664,010	657,568	---	9,321,578
1978	19,391,317	626,530	---	20,017,847
1979	35,076,349	514,950	---	35,591,299
1980	40,466,632	740,197	2,051,043[4]	41,206,829
1981	48,871,367	483,588	4,142,815[4]	49,354,955
1982	63,308,858	447,417	---	63,756,275
1983	61,583,866	411,652	---	61,995,518
1984	64,099,013	453,442	---	64,552,455
1985	80,675,823	333,846	---	81,009,669
1986	68,960,820	269,675	---	69,230,495
1987	71,028,620	216,619	---	71,245,239
1988	75,729,193	233,417	---	75,962,610
1989	75,852,694	233,451	---	76,086,145
1990	65,025,816	158,374	---	65,184,190
1991	59,094,208	167,728	---	59,261,936
1992	55,381,613	160,743	---	55,542,356
TOTAL	**893,687,367**	**6,269,392**	**6,193,858**	**899,956,759**

1 Total Reserve volume extracted from wet gas.
2 Government's royalty share of volume extracted from wet gas.
3 Transition period for change of fiscal year — 7/1/76 to 9/30/76.
4 De-ethanized LPG (natural gasoline plus propane and butane) extracted from wet gas, not included in natural gasoline totals.

MIXED BUTANE - Gallons

Fiscal Year	Naval Petroleum Reserve No. 1[1]	Naval Petroleum Reserve No. 2[2]	Naval Petroleum Reserve No. 3[1/3]	Total
FY7T[4]	393,138	---	---	393,138
1977	12,466,858	---	---	12,466,858
1978	16,351,281	---	---	16,351,281
1979	21,071,136	---	---	21,071,136
1980	38,060,833	---	---	38,060,833
1981	60,743,858	---	1,136,676	61,880,534
1982	72,909,022	---	3,376,161	76,285,183
1983	79,494,982	---	3,084,910	82,579,892
1984	74,608,592	---	3,144,964	77,753,556
1985	71,865,022	30,677	3,013,570	74,909,269
1986	68,881,553	24,786	2,825,464	71,731,803
1987	69,852,117	21,812	3,298,409	73,172,338
1988	71,686,357	17,588	2,820,663	74,524,608
1989	68,796,470	12,922	2,843,090	71,652,482
1990	58,718,305	17,539	2,406,607	61,142,451
1991	49,660,429	16,320	2,338,454	52,015,203
1992	40,020,225	19,403	2,131,255	42,170,883
TOTAL	**875,580,178**	**161,047**	**32,420,223**	**908,161,448**

1 Total Reserve volume extracted from wet gas.
2 Government's royalty share of production.
3 Butane-plus heavier liquids extracted from wet gas.
4 Transition period for change of fiscal year — 7/1/76 to 9/30/76.

ISOBUTANE - Gallons

Fiscal Year	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
1991	4,049,633	---	---	4,049,633
1992	8,926,706	---	---	8,926,706
TOTAL	**12,976,339**	**---**	**---**	**12,976,339**

CARBON DIOXIDE - Gallons

Fiscal Year	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2[1/]	Naval Petroleum Reserve No. 3	Total
FY7T[2/]	---	6,644	---	6,644
1977	---	26,793	---	26,793
1978	---	18,274	---	18,274
1979	---	27,449	---	27,449
1980	---	27,208	---	27,208
1981	---	24,491	---	24,491
1982	---	15,575	---	15,575
1983	---	21,197	---	21,197
1984	---	1,398	---	1,398
1985	---	0	---	0
1986	---	0	---	0
1987	---	0	---	0
1988	---	0	---	0
1989	---	0	---	0
1990	---	0	---	0
1991	---	0	---	0
1992	---	0	---	0
TOTAL	**---**	**169,029**	**---**	**169,029**

1 Government's royalty share of production.
2 Transition period for change of fiscal year — 7/1/76 to 9/30/76.

REVENUES - All Sources

Fiscal Year	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Naval Oil Shale Reserves	Total
FY7T[1]	$ 31,484,923	$ 552,843	$ 2,001,105	---	$ 34,038,871
1977	395,596,017	1,668,707	5,671,709	---	402,936,433
1978	492,405,349	2,288,024	11,027,244	---	505,720,617
1979	719,072,530	2,637,088	32,800,360	---	754,509,978
1980[2]	1,518,057,603	4,154,637	68,251,699	---	1,590,463,939
1981[2]	1,615,111,610	3,920,794	47,429,283	---	1,666,461,687
1982[2]	1,560,022,925	4,005,332	42,774,817	---	1,606,803,074
1983[2]	1,492,359,890	3,607,751	36,626,029	---	1,532,593,670
1984[2]	1,375,874,960	3,667,670	34,969,021	---	1,414,511,651
1985[2]	1,264,265,523	3,481,073	31,482,721	---	1,299,229,317
1986[2]	737,822,563	2,453,465	23,096,234	---	763,372,262
1987	644,983,493	1,833,539	21,346,149	---	668,163,181
1988	622,857,317	1,769,096	17,868,311	---	642,494,724
1989	613,546,143	1,781,214	16,096,309	$ 143,570	631,567,236
1990	580,376,895	2,070,647	18,610,484	1,428,345	602,486,371
1991	629,260,321	2,339,349	20,396,852	2,185,342	654,181,864
1992	451,214,157	2,071,969	18,266,925	1,247,361	472,800,412
TOTAL	**$14,744,312,219**	**$44,303,198**	**$448,715,252**	**$5,004,618**	**$15,242,335,287**

1 Transition period for change of fiscal year — 7/1/76 to 9/30/76.
2 Includes Windfall Profit Taxes.

EXPENDITURES - All Sources

Fiscal Year	Naval Petroleum Reserves Nos. 1 & 2	Naval Petroleum Reserve No. 3	Naval Oil Shale Reserves	Total
FY7T[1/]	$ 19,415,052	$ 325,197	$ 0	$ 19,740,249
1977	97,900,910	17,350,000	0	115,250,910
1978	126,678,825	24,258,434	1,448,144	152,385,403
1979	107,701,600	21,344,958	1,320,051	130,366,609
1980	98,815,854	18,210,312	3,231,906	120,258,072
1981	192,357,818	18,615,440	3,341,760	214,315,018
1982	224,585,590	20,222,965	644,777	245,453,332
1983	196,724,031	20,502,543	231,058	217,457,632
1984	103,313,414	21,812,456	277,047	125,402,917
1985	110,945,390	24,219,175	2,372,348	137,536,913
1986	132,047,125	19,471,206	3,265,773	154,784,104
1987	132,129,532	13,552,081	61,443	145,743,056
1988	167,225,441	14,488,726	152,523	181,866,690
1989	159,100,177	13,721,502	1,999,733	174,821,412
1990	161,153,546	15,184,654	2,597,991	178,936,191
1991	179,761,945	18,375,143	2,349,566	200,486,654
1992	180,996,659	17,728,698	1,502,006	200,227,363
TOTAL	**$2,390,852,909**	**$299,383,490**	**$24,796,126**	**$2,715,032,525**

Transition period for change of fiscal year — 7/1/76 to 9/30/76.

REVENUES - Fiscal Year 7T[1/]

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil	$30,451,322	$403,690	$2,001,105	$32,856,117
Natural gas	---	110,697	---	110,697
Propane	175,594	9,672	---	185,266
Butane	69,998	---	---	69,998
Gasoline	82,065	28,473	---	110,538
Carbon dioxide	---	311	---	311
Subtotal	30,778,979	552,843	2,001,105	33,332,927
Other	705,944	---	---	705,944
TOTAL	**$31,484,923**	**$552,843**	**$2,001,105**	**$34,038,871**

1 Transition period for change fiscal year — 7/1/76 to 9/30/76.

REVENUES - Fiscal Year 1977

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil	$366,382,890	$ 948,904	$5,639,664	$372,971,458
Natural gas	---	502,747	---	502,747
Propane	2,189,201	57,486	---	2,246,687
Butane	1,493,916	---	---	1,493,916
Gasoline	1,452,572	157,358	---	1,609,930
Carbon dioxide	---	1,252	---	1,252
Subtotal	371,518,579	1,667,747	5,639,664	378,825,990
Other	24,077,438	960	32,045	24,110,443
TOTAL	**$395,596,017**	**$1,668,707**	**$5,671,709**	**$402,936,433**

REVENUES - Fiscal Year 1978

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil	$458,662,162	$1,449,662	$11,014,212	$471,126,036
Natural gas	---	574,564	---	574,564
Propane	4,257,529	70,388	---	4,327,917
Butane	3,164,961	---	---	3,164,961
Gasoline	4,257,736	191,156	---	4,448,892
Carbon dioxide	---	1,294	---	1,294
Subtotal	470,342,388	2,287,064	11,014,212	483,643,664
Other	22,062,961	960	13,032	22,076,953
TOTAL	**$492,405,349**	**$2,288,024**	**$11,027,244**	**$505,720,617**

REVENUES - Fiscal Year 1979

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil	$656,385,700	$1,725,560	$32,796,213	$690,907,473
Natural gas	---	617,201	---	617,201
Propane	7,664,366	55,586	---	7,719,952
Butane	4,619,905	---	---	4,619,905
Gasoline	8,523,008	235,499	---	8,758,507
Carbon dioxide	---	2,282	---	2,282
Subtotal	677,192,979	2,636,128	32,796,213	712,625,320
Other	41,879,551	960	4,147	41,884,658
TOTAL	**$719,072,530**	**$2,637,088**	**$32,800,360**	**$754,509,978**

REVENUES - Fiscal Year 1980

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil[1/]	$1,437,284,113	$3,083,379	$67,505,561	$1,507,873,053
Natural gas	5,561,808	669,573	---	6,231,381
Propane	14,237,566	70,475	---	14,308,041
Butane	13,570,458	---	---	13,570,458
Gasoline	19,212,861	327,937	728,325[2/]	20,269,123
Carbon dioxide	---	2,313	---	2,313
Subtotal	1,489,866,806	4,153,677	68,233,886	1,562,254,369
Other	28,190,797	960	17,813	28,209,570
TOTAL	**$1,518,057,603**	**$4,154,637**	**$68,251,699**	**$1,590,463,939**

1 Includes Windfall Profit Taxes.
2 De-ethanized LPG sales.

REVENUES - Fiscal Year 1981

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil[1/]	$1,430,543,043	$2,849,575	$44,901,638	$1,478,294,256
Natural gas	61,517,438	639,056	141,519	62,298,013
Propane	29,417,603	98,750	234,114	29,750,467
Butane	22,799,279	---	693,373	23,492,652
Gasoline	29,785,069	330,371	1,421,512[2/]	31,536,952
Carbon dioxide	---	2,082	---	2,082
Subtotal	1,574,062,432	3,919,834	47,392,156	1,625,374,422
Other	41,049,178	960	37,127	41,087,265
TOTAL	**$1,615,111,610**	**$3,920,794**	**$47,429,283**	**$1,666,461,687**

1 Includes Windfall Profit Taxes.
2 De-ethanized LPG sales.

REVENUES - Fiscal Year 1982

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil[1/]	$1,296,145,893	$2,707,616	$37,810,098	$1,336,663,607
Natural gas	110,067,587	879,605	2,319,619	113,266,811
Propane	36,564,609	103,778	688,429	37,356,816
Butane	26,811,192	---	1,936,678	28,747,870
Gasoline	39,109,867	308,843	---	39,418,710
Carbon dioxide	---	1,324	---	1,324
Subtotal	1,508,699,148	4,001,166	42,754,824	1,555,455,138
Other	51,323,777	4,166	19,993	51,347,936
TOTAL	**$1,560,022,925**	**$4,005,332**	**$42,774,817**	**$1,606,803,074**

[1] Includes Windfall Profit Taxes.

REVENUES - Fiscal Year 1983

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil[1/]	$1,184,364,058	$2,353,182	$32,101,634	$1,218,818,874
Natural gas	168,825,590	879,333	2,135,679	171,840,602
Propane	32,844,166	94,335	664,573	33,603,074
Butane	32,642,055	---	1,705,465	34,347,520
Gasoline	36,142,539	278,149	---	36,420,688
Carbon dioxide	---	1,792	---	1,792
Subtotal	1,454,818,408	3,606,791	36,607,351	1,495,032,550
Other	37,541,482	960	18,678	37,561,120
TOTAL	**$1,492,359,890**	**$3,607,751**	**$36,626,029**	**$1,532,593,670**

[1] Includes Windfall Profit Taxes.

REVENUES - Fiscal Year 1984

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil[1/]	$1,076,981,925	$2,324,197	$32,018,705	$1,111,324,827
Natural gas	174,278,241	956,175	---	175,234,416
Propane	34,283,975	113,676	1,029,954	35,427,605
Butane	36,261,900	---	1,914,737	38,176,637
Gasoline	35,604,763	272,543	---	35,877,306
Carbon dioxide	---	119	---	119
Subtotal	1,357,410,804	3,666,710	34,963,396	1,396,040,910
Other	18,464,156	960	5,625	18,470,741
TOTAL	**$1,375,874,960**	**$3,667,670**	**$34,969,021**	**$1,414,511,651**

[1] Includes Windfall Profit Taxes.

REVENUES - Fiscal Year 1985

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil[1/]	$957,211,205	$2,261,874	$29,179,047	$988,652,126
Natural gas	186,850,058	940,999	---	187,791,057
Propane	37,027,630	77,626	794,504	37,899,760
Butane	27,260,501	14,070	1,493,501	28,768,072
Gasoline	35,722,005	185,544	---	35,907,549
Carbon dioxide	---	---	---	0
Subtotal	1,244,071,399	3,480,113	31,467,052	1,279,018,564
Other	20,194,124	960	15,669	20,210,753
TOTAL	**$1,264,265,523**	**$3,481,073**	**$31,482,721**	**$1,299,229,317**

[1] Includes Windfall Profit Taxes.

REVENUES - Fiscal Year 1986

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil[1/]	$524,200,210	$1,434,686	$21,373,493	$547,008,389
Natural gas	119,654,200	821,509	---	120,475,709
Propane	27,581,098	57,092	548,682	28,186,872
Butane	18,102,838	9,433	1,136,650	19,248,921
Gasoline	23,719,211	129,785	---	23,848,996
Carbon dioxide	---	---	---	0
Subtotal	713,257,557	2,452,505	23,058,825	738,768,887
Other	24,565,006	960	37,409	24,603,375
TOTAL	**$737,822,563**	**$2,453,465**	**$23,096,234**	**$763,372,262**

[1] Includes Windfall Profit Taxes.

REVENUES - Fiscal Year 1987

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil[1/]	$498,142,010	$1,033,756	$19,539,710	$518,715,476
Natural gas	73,872,765	672,485	---	74,545,250
Propane	17,949,731	34,338	403,874	18,387,943
Butane	12,978,619	5,981	1,139,591	14,124,191
Gasoline	20,894,746	82,981	---	20,977,727
Carbon dioxide	---	---	---	0
Subtotal	623,837,871	1,829,541	21,083,175	646,750,587
Other	21,145,622	3,998	262,974	21,412,594
TOTAL	**$644,983,493**	**$1,833,539**	**$21,346,149**	**$668,163,181**

REVENUES - Fiscal Year 1988

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Total
Crude oil[1/]	$453,378,011	$999,692	$16,563,866	$470,941,569
Natural gas	79,087,749	638,315	---	79,726,064
Propane	20,312,185	35,490	267,301	20,614,976
Butane	14,647,458	4,916	1,023,419	15,675,793
Gasoline	24,192,974	89,403	---	24,282,377
Carbon dioxide	---	---	---	0
Subtotal	591,618,377	1,767,816	17,854,586	611,240,779
Other	31,238,940	1,280	13,725	31,253,945
TOTAL	**$622,857,317**	**$1,769,096**	**$17,868,311**	**$642,494,724**

1 Revenues represent accrued earnings.

REVENUES - Fiscal Year 1989

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Naval Oil Shale Reserve No. 3	Total
Crude oil[1/]	$441,898,134	$920,165	$14,921,345	---	$457,739,644
Natural gas	89,277,429	709,684	---	$143,570	90,130,683
Propane	19,078,608	36,664	212,004	---	19,327,276
Butane	13,981,521	3,565	958,607	---	14,943,693
Gasoline	25,030,467	80,179	---	---	25,110,646
Carbon dioxide	---	---	---	---	0
Subtotal	589,266,159	1,750,257	16,091,956	143,570	607,251,395
Other	24,279,984[2/]	30,957	4,353	---	24,315,294
TOTAL	**$613,546,143**	**$1,781,214**	**$16,096,309**	**$143,570**	**$632,081,236**

1 Revenues represent accrued earnings.
2 Includes refunds to DFSC, settlement of court cases, and a write-off as a result of bankruptcy proceedings.

REVENUES - Fiscal Year 1990

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Naval Oil Shale Reserve No. 3	Total
Crude oil[1/]	$422,054,994	$1,115,015	$17,572,488	$ 35,346	$440,777,843
Natural gas	67,805,847	789,650	---	1,362,329	69,957,826
Propane	20,116,810	30,418	197,700	---	20,344,928
Butane	13,398,830	4,287	824,378	---	14,227,495
Gasoline	23,930,568	62,386	---	---	23,992,954
Carbon dioxide	---	---	---	---	0
Subtotal	547,307,049	2,001,756	18,594,566	1,397,675	569,301,046
Other	33,069,846	68,891	15,918	30,670	33,185,285
TOTAL	**$580,376,895**	**$2,070,647**	**$18,610,484**	**$1,428,345**	**$602,486,331**

[1] Revenues represent accrued earnings.

REVENUES - Fiscal Year 1991

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Naval Oil Shale Reserve No. 3	Total
Crude oil	$459,198,105	$1,419,348	$19,324,074	$ 35,115	$479,976,642
Natural gas	69,670,222	777,910	---	2,150,227	72,598,359
Propane	21,716,102	30,356	207,014	---	21,953,472
Mixed butane	15,610,643	6,478	865,764	---	16,482,885
Isobutane	1,588,063	---	---	---	1,588,063
Gasoline	26,349,756	88,397	---	---	26,438,153
Carbon dioxide	---	---	---	---	0
Subtotal	594,132,891	2,322,489	20,396,852	2,185,342	619,037,574
Other	35,127,430	16,860	0	0	35,144,290
TOTAL	**$629,260,321**	**$2,339,349**	**$20,396,852**	**$2,185,342**	**$654,181,864**

REVENUES - Fiscal Year 1992

Product	Naval Petroleum Reserve No. 1	Naval Petroleum Reserve No. 2	Naval Petroleum Reserve No. 3	Naval Oil Shale Reserve No. 3	Total
Crude oil[1/]	$326,616,795	$1,079,460	$17,364,144	$ 40,595	$345,100,994
Natural gas	35,203,883	664,600	---	1,206,766	37,075,249
Propane	17,678,715	13,702	173,063	---	17,865,480
Mixed butane	9,887,300	5,246	729,414	---	10,621,960
Isobutane	3,280,460	---	---	---	3,280,460
Gasoline	21,211,609	63,569	---	---	21,275,178
Subtotal	413,878,762	1,826,577	18,266,621	1,247,361	435,219,321
Other	37,335,395	245,392	304	---	37,581,091
TOTAL	**$451,214,157**	**$2,071,969**	**$18,266,925**	**$1,247,361**	**$472,800,412**

[1] Revenues represent accrued earnings.

Naval Petroleum Reserve No. 1
Development and Exploratory Program — Wells Drilled

	1974 Through Fiscal Year 77T		Fiscal Year 77		Fiscal Year 78		Fiscal Year 79		Fiscal Year 80		Fiscal Year 81		Fiscal Year 82		Fiscal Year 83		Fiscal Year 84	
	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.
Tulare	0	2	0	0	0	0	2	0	2	0	4	0	8	0	0	0	4	0
Dry Gas	12	3	5	0	6	0	3	0	0	0	0	0	0	0	0	0	0	0
Shallow	163	3	99	0	65	0	34	0	16	0	0	0	31	0	25	0	10	0
Olig	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Stevens	81	5	63	1	47	1	43	0	46	1	42	3	61	5	62	2	15	3
Carneros	2	1	1	0	2	0	0	3	0	0	0	0	0	1	0	1	1	0
Basement	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**258**	**14**	**168**	**1**	**120**	**3**	**82**	**3**	**64**	**1**	**46**	**3**	**101**	**6**	**87**	**3**	**30**	**3**

[1] Initiated in Fiscal Year 1985.

	Fiscal Year 85		Fiscal Year 86		Fiscal Year 87		Fiscal Year 88		Fiscal Year 89		Fiscal Year 90		Fiscal Year 91		Fiscal Year 92		Total		Grand Total
	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	
Tulare	4	0	0	0	1	0	0	0	0	0	6	0	1	0	1	0	33	2	35
Dry Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	3	29
Shallow	8	0	12	0	4	0	9	0	7	0	0	0	4	0	10	0	497	3	500
Olig	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Stevens	10	0	10	0	24	0	28	0	13	0	12	0	9	0	14	0	580	21	601
Carneros	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6	8	14
Basement	0	1[1]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
TOTAL	**22**	**2**	**22**	**0**	**29**	**1**	**37**	**0**	**20**	**0**	**18**	**0**	**14**	**0**	**25**	**0**	**1,143**	**40**	**1,183**

[1] Initiated in Fiscal Year 1985.

Naval Petroleum Reserve No. 3
Development and Exploratory Program — Wells Drilled/Later Recompletions

	1974 Thru Fiscal Year 76		Fiscal Year 77		Fiscal Year 78		Fiscal Year 79		Fiscal Year 80		Fiscal Year 81		Fiscal Year 82		Fiscal Year 83		Fiscal Year 84	
	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.
Shannon	0	0	78	0	105	0	41	0	4	0	0	0	0	0	0	0	9	0
Wall Creek	0	1	76	0	23	0	0	0	12	0	20	0	9	0	3	0	7	0
Shale[1]	0	0	1	0	15	0	20	0	10	0	0	0	87	0	5	20	10	7
Tensleep	0	1	0	0	0	3	0	1	0	0	2	0	1	0	1	0	0	0
MDL[2]	0	2	0	0	0	7	0	6	1	1	0	0	1	0	8	0	8	0
Subtotal	0	4	155	0	143	10	61	7	27	1	22	0	19	0	17	20	34	7
Shannon EOR[4]	0	0	0	0	0	0	0	0	29	0	0	0	5	0	0	0	6	0
TOTAL	**0**	**4**	**155**	**0**	**143**	**10**	**61**	**7**	**56**	**1**	**22**	**0**	**24**	**0**	**17**	**20**	**40**	**7**

	Fiscal Year 85		Fiscal Year 86		Fiscal Year 87		Fiscal Year 88		Fiscal Year 89		Fiscal Year 90		Fiscal Year 91		Fiscal Year 92		Total		Grand Total[3]
	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	Dev.	Exp.	
Shannon	6	0	18	0	15	0	8	0	4	0	0	0	1	0	6	0	295	0	295
Wall Creek	9	0	17	0	7	0	5	1	0	0	0	0	0	0	0	0	188	2	190
Shale[1]	10	0	26	0	18	16	2	19	6	5	0	0	0	0	13	0	144	67	211
Tensleep	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	7	5	12
MDL[2]	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	25	16	41
Subtotal	32	0	63	0	41	16	15	20	10	5	0	0	1	0	19	0	659	90	749
Shannon EOR[4]	26	0	0	0	7	0	32	0	12	0	40	0	20	0	30	0	207	0	207
TOTAL	**58**	**0**	**63**	**0**	**48**	**16**	**47**	**20**	**22**	**5**	**40**	**0**	**21**	**0**	**49**	**0**	**866**	**90**	**956**

1 Includes 27 Shallow Steele Shale Wells not previously accounted for that were drilled in fiscal year 1983 and 1984 and were plugged and abandoned.

2 Muddy/Dakota/Lakota and other (Morrison, Madison, Crow Mountain, potable wells and X unknown)

3 Does not reflect the current number of active wells in each formation. Subsequent recompletion to other formations during the period fiscal year 1974 through fiscal year 1992 are not listed in this table.

4 Enhanced Oil Recovery

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