FINAL

ENVIRONMENTAL ASSESSMENT

EA-1350

for

PREPARATION FOR PRODUCTION OF CRUDE OIL FROM A SUBTERRANEAN FACILITY

Natrona County, Wyoming

Prepared By
U.S. Department of Energy
Casper, Wyoming

July 2001

Cover Sheet

Proposed Action:	The Proposed Action is to construct a Subterranean Facility approximately 1000' beneath the surface of the ground. This facility would include approximately 40 wells drilled up to 10,000' horizontally
Type of Statement:	Final Environmental Assessment (EA)
Lead Agency:	The United States Department of Energy
Cooperating Agencies:	None
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EXECUTIVE SUMMARY

This Environmental Assessment (EA) has been prepared by the United States Department of Energy (DOE) for the proposed construction and operation of a Subterranean Production Facility (Proposed Action).

DOE has had jurisdiction over NPR-3 since 1977, and is required to produce the reserve at the "maximum efficient rate" (MER) consistent with sound engineering practices. DOE prepared this EA in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 USC 4321, et seq.), DOE's implementing regulations for NEPA (10 CFR 1021), and DOE's NPOSR-CUW NEPA Guidance Manual (DOE, 1992a).

The Proposed Action includes the following principal elements:

- Drilling a 10’ diameter shaft to a depth of 1000'. At the final depth a 80’ diameter room would be constructed and would include approximately 40 horizontal wells that can be up to 10,000' long in a 360^{N} radius encircling the 80’ room.

- Complete reclamation and restoration of NPR-3 sites no longer in use. Restoration would include dismantling surface facilities, batteries, roads, test satellites, electrical distribution systems and associated power poles, when they are no longer needed for production. Soil contaminated by hydrocarbons would be biologically treated. Roads, facilities, batteries, and well sites would be ripped up, recontoured, disked and seeded with native vegetation as outlined in the Sitewide Environmental Assessment No. 1236. In addition, as horizontal wells are drilled from the proposed new production facility, wells along their path would be abandoned and plugged. DOE estimates that there would be approximately 325 wells to be plugged and abandoned over the next 5 years.

- Alternatives to the Proposed Action are (1) No Action, and (2) Drilling either Horizontal or (3) Vertical Wells from the surface.

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ABBREVIATIONS AND ACRONYMS

AQCR	Air Quality Control Region
ASP	Alkaline-Surfactant-Polymer (flood)
AUM	Animal Unit-Month
CAEDA	Casper Area Economic Development Alliance, Inc.
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act
CO_2	Carbon Dioxide Gas
CX	Categorical Exclusion
DOE	U.S. Department of Energy
EA	Environmental Assessment
EOR	Enhanced Oil Recovery
FD	Fluor Daniel (NPOSR), Inc. (Formerly FD Services)
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FWS	U.S. Fish & Wildlife Service
H_2S	Hydrogen Sulfide
LPG	Liquefied Petroleum Gas
MEOR	Microbial Enhanced Oil Recovery
MER	Maximum Efficient Rate
M&O	Management and Operation
NEPA	National Environmental Policy Act
NORM	Naturally Occurring Radioactive Material
NOx	Nitrogen Oxides
NOSR	Naval Oil Shale Reserves
NPDES	National Pollutant Discharge Elimination System
NPOSR-CUW	Naval Petroleum and Oil Shale Reserves in Colorado, Utah and Wyoming
NPR-3	Naval Petroleum Reserve No. 3
NTCHS	National Technical Committee for Hydric Soils
NWI	National Wetland Inventory
OSHA	Occupational Safety & Health Administration
PCB	Polychlorinated Biphenyl
RCRA	Resource Conservation & Recovery Act
RMOTC	Rocky Mountain Oilfield Testing Center
SARA	Superfund Amendment Reauthorization Act
SCS	U.S. Soil Conservation Service
SHPO	State Historic Preservation Officer
T&E	Threatened and Endangered
TDS	Total Dissolved Solids
TPQ	Threshold Planning Quantities
TSD	Treatment, Storage and Disposal
TSP	Total Suspended Particulates
UIC	Underground Injection Control
USDA	U.S. Department of Agriculture
USDW	Underground Sources of Drinking Water
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VPD/ADT	Vehicles Per Day/Average Daily Totals
WGFD	Wyoming Game and Fish Department
WNDDB	Wyoming Natural Diversity Data Base
WYDEQ	Wyoming Department of Environmental Quality

Table i-1
ISSUES TRACKING MATRIX

Issue	Executive Summary	Section 1.0 Purpose & Need	Section 2.0 Alternatives	Section 3.0 Affected Environment	Section 4.0 Environmental Consequences
Land Resources	I	1-2	2-1, 2-3	3-1, 3-3, 3-30	4-1– 4-3
Air Quality	I	1-2	2-1, 2-3	3-3 – 3-5, 3-30	4-3 – 4-5
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Biological Resources	I	1-2	2-1, 2-3	3-14 – 3-23, 3-31	4-9 – 4-12,
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Socio-economics	I	1-2	2-1, 2-3	3-24 – 3-26, 3-32	4-13 – 4-15
Waste Management	I	1-2	2-1, 2-3	3-27 – 3-30, 3-32	4-15, 4-16

1.0 PURPOSE OF AND NEED FOR ACTION

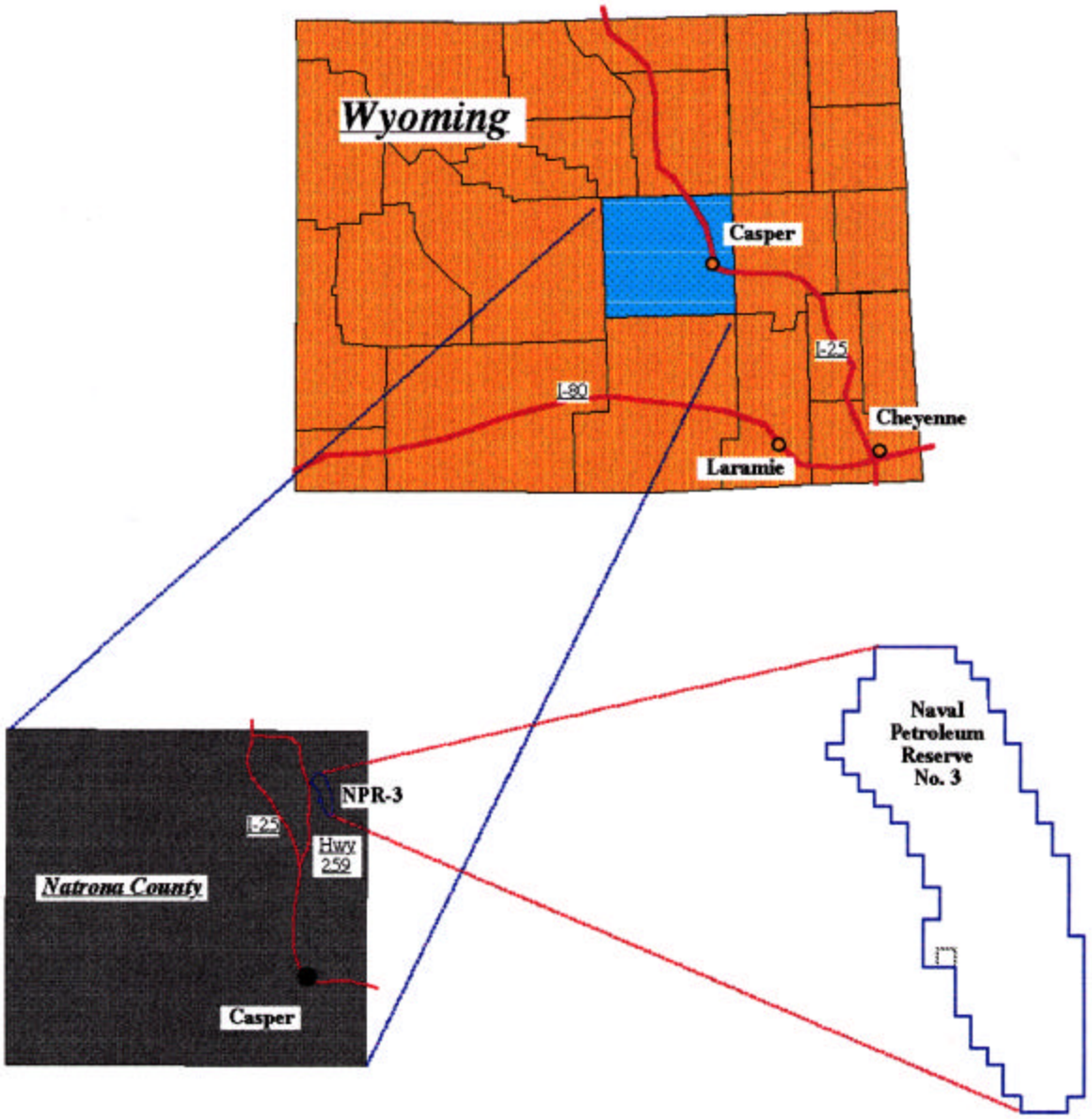
Introduction

The U.S. Department of Energy (DOE) has prepared this Environmental Assessment (EA) to address activities related to the proposed construction of a coiled tubing multiple horizontal subterranean oil well production facility. Naval Petroleum Reserve No. 3 (NPR-3) is a 9,481 acre oil field in Natrona County, Wyoming (Figure 1-1). DOE has operated NPR-3 since 1977. The EA has been prepared to comply with the National Environmental Policy Act of 1969 (NEPA) (42 USC 4321, et seq.), DOE's implementing regulations for NEPA (10 CFR 1021), and DOE's NPOSR-CUW NEPA Guidance Manuel (DOE, 1992a).

An Executive Order of President Wilson created NPR-3 in 1915 as an emergency fuel source for the military. Production began in the early under leases executed by the Secretary of the Department of Interior under the Mineral Leasing Act. Litigation surrounding the Teapot Dome Scandal lead to lease cancellation in the late 1920s. Production resumed in 1959 under a government-directed offset drilling program to prevent drainage by private development on adjacent land.

In response to the Arab oil embargo of 1973-74, which demonstrated the nation's vulnerability to oil supply interruptions, Congress passed the Naval Petroleum Reserves Production Act in 1976 (Public Law 94-258). Public Law 94-258 authorized the production of the Naval Petroleum Reserves at their maximum efficient rate (MER), consistent with sound engineering practices, for a period of six years. The law provides that at the conclusion of the initial six-year production period, the President (with the approval of Congress) may extend production in increments of up to three years each, if continued production was found to be in the national interest. The President has authorized six, three-year extensions since 1982, extending production continuously to date.

This EA addresses certain construction activities at NPR-3 over the next two years. These activities represent substantial changes to the scope and character of production activities at NPR-3 and require new NEPA documentation beyond that approved in 1995. These activities relate primarily to construction efforts to build a coiled tubing multiple horizontal subterranean oil well.



NPR-3 Vicinity Map

Decisions needed

Material in this document require decisions that must be made regarding:

- Whether any issues have been raised by the proposed action or any of the alternatives,
- Whether the proposed action or any of the alternatives would result in impact to the environment, and
- Whether the DOE would prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) in response to this Environmental Assessment.

Scoping Summary

1.1.1 Internal Scoping

Management and technical staff held meetings to determine the probable level of activity over 2001 and 2002 and supply the necessary background information. DOE conducted site surveys, reviewed available background information, and adopted the general scope of the EA as it appears in Sections 3.0 and 4.0.

1.1.2 External Scoping

Discussion of Major Issues

Summary of Federal Permits, Licenses, and Entitlements

Table 1-1 presents information regarding environmental permits held by DOE for activities at NPR-3. Most of the permits presented in this table are for Federal programs for which the State of Wyoming has obtained primacy. For example, the Wyoming Department of Environmental Quality (WYDEQ) regulates and permits wastewater discharges under the National Pollutant Discharge Elimination System (NPDES), as described in the Clean Water Act.

It is envisioned that the number of active NPDES permits would be reduced over the next 5 years, since many of the permitted facilities would be decommissioned.

Table 1-1
Federal Permits in Effect at NPR-3

Item	Permit No.	Facility
Air Quality	**CT-360**	**1.1.2.1.1.1.1 LTS Heat Medium Heater**
	CT-361A	**Gas Plant Smokeless Flare**
	CT1202	**LTS Gas Plant Amine Reboiler**
	CT-937	**Steam Generator No. 5**
Water Quality (NPDES Permits)	**WY-0028894**	**B-1-3 Tank Battery**
	WY-0028908	**B-1-10 Tank Battery**
	WY-0028274	**B-TP-10 Tank Battery**
	WY-0032115	**Water Disposal Facility**
Solid Waste	**96-057**	**NPR-3 Roads-Application of oil sludge to roads**
Ground Water Appropriation	**UW-60713**	**B-1-3 Tank Battery**
	UW-60714	**B-1-10 Tank Battery**
	UW-60715	**B-2-10 Tank Battery**
	UW-60716	**B-TP-10 Tank Battery**
	UW-43810	**17-WX-21 Madison Water Well**
	UW-85156	**57-WX-3 Madison Water Well**
Underground Injection Control	**Permit number not required**	**13 Water Injection Wells**
	Permit number not required	**34, 51 & 74-CMX-10 for Oilfield Brine Disposal**
	Permit number not required	**86-LX-10, 25-LX-11**
EPA Hazardous Waste ID No.	**WY 4890090042**	**Hazardous Waste Disposal ID for NPR-3 (Also amended for PCB activity) Conditionally Exempt Small Quantity Generator Status**

Preview of Remaining Chapters

Four alternatives, including the Proposed Action are considered in this EA and are discussed in Section 2.0. They include:

1) Production of crude oil from a subterranean facility

2) Drilling horizontal wells from the surface

3) Drilling vertical wells from the surface

4) No action

The affected environment on and surrounding NPR-3 is described in Section 3.0. This description has been updated from earlier characterizations provided in the 1990 and 1995 NEPA documents to reflect present conditions at NPR-3. Environmental consequences potentially resulting from the Proposed Action and each alternative are discussed in Section 4.0, which also details the mitigation measures necessary to offset any potential adverse environmental consequences identified for the Proposed Action. A discussion of potential cumulative impacts from the Proposed Action is also provided in Section 4.0, as are the potential impacts from the Alternatives to the Proposed Action. Sections 5.0, 6.0 and 7.0 provide a list of preparers, agencies and persons consulted, and bibliography, respectively.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Proposed Action

2.1.1 Production of crude oil from a subterranean facility

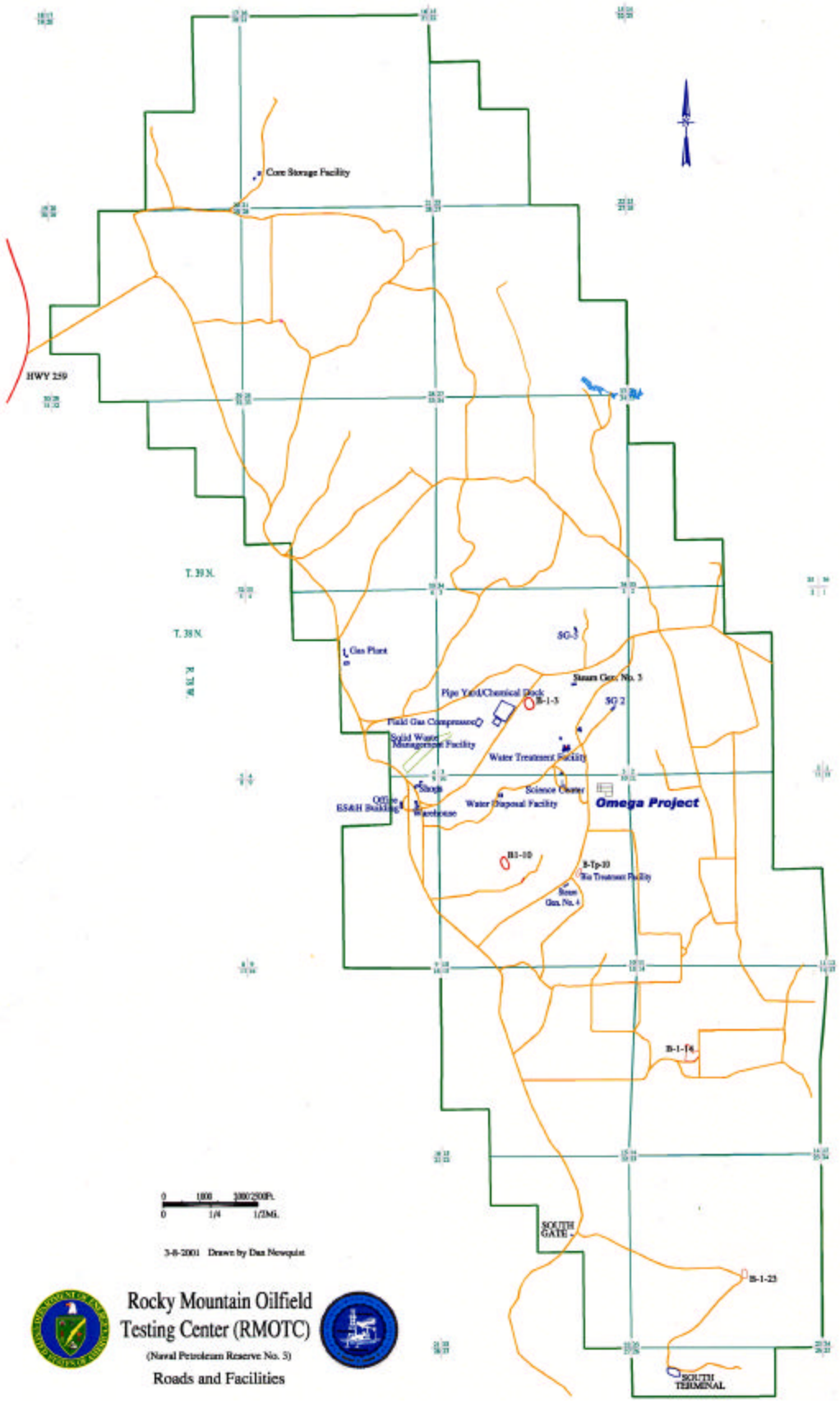
The proposed action would entail drilling a 10' diameter shaft to a depth of 1000'. This shaft would be lined with steel and cemented into place. At the final depth, standard mining techniques would be used to excavate a 80' diameter room. Approximately 40 horizontal wells up to 10,000' in length (4.75" diameter) would be drilled in a 360° circle. The 80' room would be lined with shotcrete. A landfarm pit approximately 200' by 200' by 10' would be constructed on stable ground near the mine and would be lined with 6" of raw bentonite to hold tailings from the mine shaft. The location of the Subterranean Facility is in Figure 2-1. There are no known potable aquifers under NPR-3.

The first near potable water is located at 6000' in the Mesaverde formation. Listed are the formations from shallowest to deepest and what they secrete. Shannon, oil and water, Steele Shale, oil and water, Niobrara Shale, oil and water, 1st Wall Creek, water, 2nd Wall Creek, oil, water, and gas, 3rd Wall Creek, oil, water, and gas, Red Peak, nothing, Muddy, oil, water, and gas, Dakota, oil, water, and gas, Lakota, oil, water, and gas, Morrison, oil, water, and gas, Mowrey, oil, water, and gas, Crow Mountain, used as a disposal, Tensleep, water and oil, Madison, water. None of the wells that produce water produce potable water.

The total volume of the mineshaft would be approximately 4,187 cubic yards. This was derived from computing the volume of the mineshaft ($v=\pi \cdot r^2 \cdot h$) in cubic feet ($113,040=3.14 \cdot 6^2 \cdot 1000'$) and dividing by 27 to determine its cubic yard volume. The total volume of the 40 horizontal wells would be approximately 1,453 cubic yards. This was derived from computing the cubic feet volume of the horizontal wells ($v=\pi \cdot r^2 \cdot l) \cdot (40)$ ($39,250=(3.14 \cdot .25^2 \cdot 5,000 \cdot (40))$ and dividing the cubic feet by 27 to determine it cubic yard volume. The total volume of both the mineshaft and the 40 horizontal wells is approximately 5,640 cubic yards. The drill room at the bottom of the shaft is planned to be semi ellipsoidal, with the major axis 100' and the minor axis 50' and the height 15'. The cubic yard volume of the workroom was derived by ($v=\pi \cdot a \cdot b \cdot h$) ($235,500=3.14 \cdot 100 \cdot 50 \cdot 15$) and dividing the cubic feet by 27 to determine its cubic yard volume. The total volume of the workroom is approximately 8,722.

After the subterranean facility's economic life has been reached, the plug and abandonment plan (Attachment C) will be executed.

The total cost of the project is estimated to be $24 million, including restoration of seven acres of surface, which would be disturbed by the Proposed Action.


Core Storage Facility
HWY 259
T. 39 N.
T. 38 N.
R. 78 W.
Gas Plant
SG-3
Steam Gen. No. 3
Pipe Yard/Chemical Rack
B-1-3
SG 2
Field Gas Compressor
Solid Waste Management Facility
Water Treatment Facility
Shops
Science Center
Office
ES&H Building
Warehouse
Water Disposal Facility
Omega Project
B1-10
B-Tp-10
Gas Treatment Facility
Steam Gen. No. 4
B-1-16
SOUTH GATE
B-1-23
SOUTH TERMINAL
0 1000 2000/2500Ft.
0 1/4 1/2MI.
3-8-2001 Drawn by Dan Newquist
Rocky Mountain Oilfield Testing Center (RMOTC)
(Naval Petroleum Reserve No. 3)
Roads and Facilities

Alternatives to the Proposed Action

2.1.2 Drilling horizontal wells from the surface

Shallow horizontal wells are difficult to drill. There is no proven method at this time to efficiently drill horizontal wells at a shallow depth. It is also very difficult to create any radius with horizontal wells. In order to drill 40 horizontal wells, at approximately one million dollars per well, it would cost forty million dollars and makes the project uneconomical. The Proposed Action would cost an estimated $24 million. Environmental impact also makes it very difficult to drill 40 horizontal wells. Drilling 40 horizontal wells from the surface would disturb approximately 80 acres of land. After the wells become uneconomic, additional money is required for the restoration and eventual reclamation of this acreage.

2.1.3 Drilling vertical wells from the surface

Vertical wells are uneconomical to drill because of the small amount of area they are able to drain. Vertical wells would need to be drilled at a 4:1 ratio from the horizontal wells in order to produce volumes comparable to projected production from the proposed facility. Ground disturbances from this drilling would be forty times greater than the proposed action. This alternative would disturb an estimated 400 acres of land and increase environmental impacts.

2.1.4 No Action

If no action is taken, the field would continue to decline and potential oil production foregone. DOE would lose the estimated $3.6 million/yr, (2.7 million average barrels X $20 per barrel)/15 years, in net revenue from the proposed production facility.

3.0 AFFECTED ENVIRONMENT

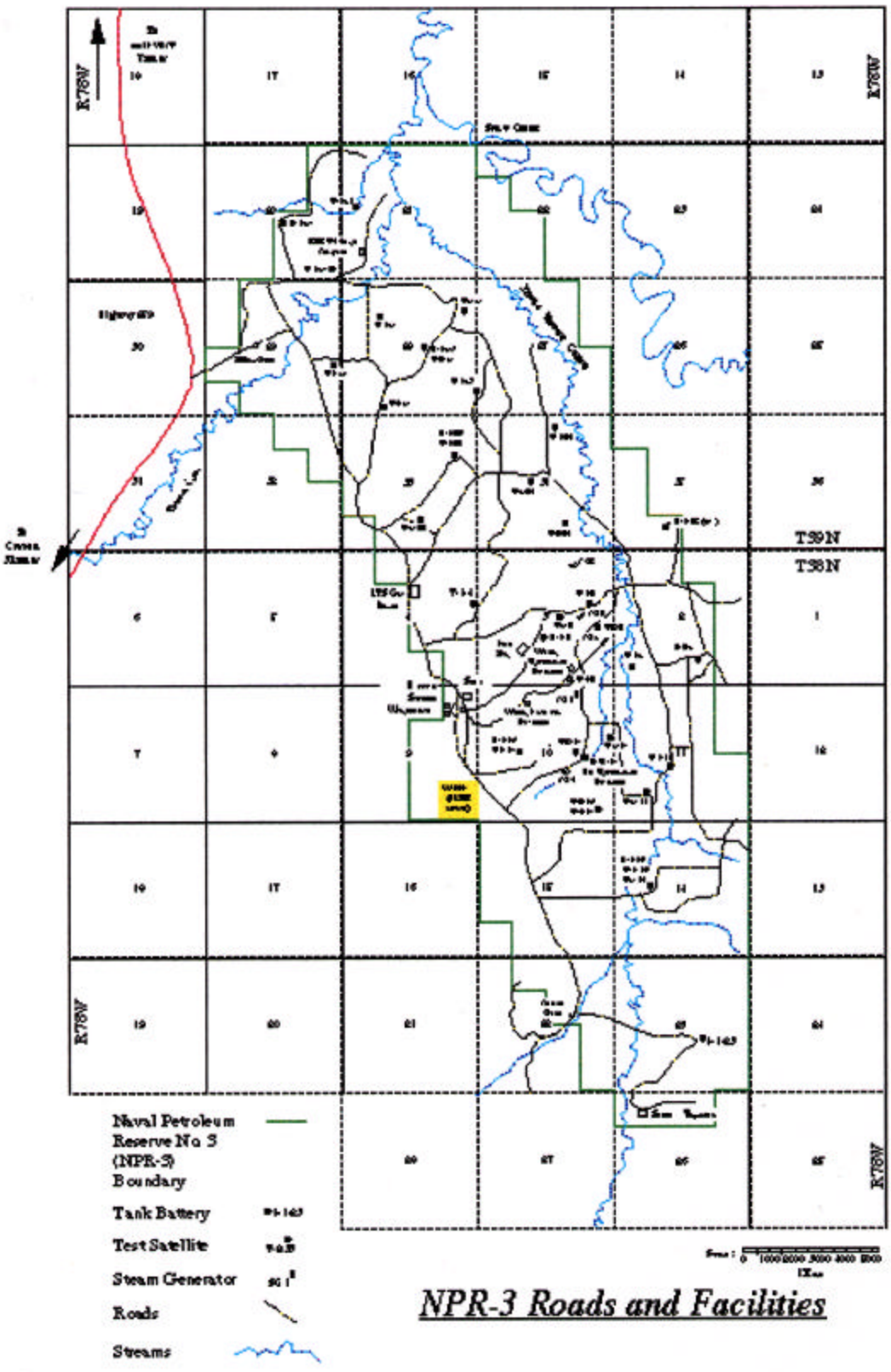
Land Resources

3.1.1 Land Use

The principal land use of Natrona County (5,300 square miles or 13,700 square km) is sheep and cattle ranching. Areas adjacent to NPR-3 are utilized primarily for oil production, with limited livestock grazing. Under the Zoning Ordinance of Natrona County, these lands are zoned RF (Ranching and Farming) although mineral extraction activities are exempt from the Zoning Resolution (Natrona County, 1978). No residential development is currently present or proposed for the immediate area surrounding NPR-3 (Halliburton NUS, 1993), largely because of the lack of potable water.

Land at NPR-3 is utilized primarily for oil production. Sheep grazing is a secondary use of land resources at NPR-3. During restoration, grazing activities would cease during the summer months so that newly seeded areas would be able to reestablish themselves.

The land surface is characterized by prairie with occasional sagebrush, severely cut ravines, and sandstone bluffs. Developed features on NPR-3 include gravel and dirt roads, wellheads and pumping units, oil and gas production facilities and equipment, storage areas, and an office complex. Existing well locations are concentrated in a 2,500-acre (1,000 ha) area located in the center of NPR-3, with substantially less development taking place in the northern and southern portions of the site. Most wells are located within the basin and at a considerable distance from the surrounding bluffs. Several wells in the extreme southern portion of NPR-3 are located near steeper slopes. Existing roads and facility locations, similarly concentrated in the center of NPR-3, are depicted in Figure 3-1.



NPR-3 Roads and Facilities

Construction of facilities and supporting infrastructure requirements from 1915 to 1997 have resulted in the disturbance of approximately 1,723 acres (657 ha), approximately 17% of the total acreage of NPR-3. As of 1997, approximately 939 of these disturbed acres (380 ha) had been reclaimed (revegetated) and the other 684 acres (277 ha) were required to support ongoing production operations (DOE, 1997). Between 1990 and the present, additional construction of wells, roads and pipelines have disturbed approximately 100 additional acres, although 80 acres of previous well sites and roads have been reclaimed. From 1998 to the present, we have plugged 350 wells and reclaimed 100 sites leaving 704 acres of disturbed land.

3.1.2 Aesthetics

NPR-3 is typical of much of the central portion of Wyoming. It consists of rolling terrain covered with native grass and sagebrush, and is fragmented by numerous small gullies. A rim of sandstone bluffs surrounds NPR-3. Although portions of NPR-3 operations are visible from the north along Wyoming Route 259, bluffs to the south, east and west generally isolate NPR-3 visually from the public (Halliburton NUS, 1993). The southern-most end of this rim does provide a panoramic view of the entire project, although this viewpoint is limited to NPR-3 employees and a few local ranchers (DOE,

1990). The panoramic view is available from most any of the bluffs on the westside as well.

Much of the area inside the sandstone bluffs at NPR-3 has been altered to some degree by installation of facilities and service roads since operations first began in the 1920's, and especially since full scale development (at MER) was ordered in 1976. To ensure each reclaimed well site can be located, a GPS reading is taken using an Omni LR 3000. This survey instrument has an accuracy reading of within 3 feet. The coordinates for each well would be properly logged and kept for future reference.

3.1.3 Recreation

There are no public recreation facilities in the immediate vicinity of NPR-3, and no areas within NPR-3 are open to the public (Halliburton NUS, 1993). The nearest public recreation facility to NPR-3 is the Moses Ballfield, located approximately 7 miles (11 km) north near the town of Midwest. Additional recreational facilities maintained within Natrona County include several county parks, reservoirs, and recreation areas. These offer a large variety of activities including picnicking, camping, fishing, boating, swimming, and hiking (Natrona County, 1978).

Air Quality and Acoustics

3.1.4 Meteorology and Climate

The climate of NPR-3 is characterized as semi-arid with approximately 9-12 inches (23 - 30 cm) of precipitation annually. Precipitation is seldom sufficiently abundant and evenly distributed to keep the soil moist throughout the entire summer. The average high temperature in the summer (July) Is 87.6°F (30.9°C), and the average low temperature in the winter is around 12°F (-11°C). However, temperatures reach 115°F

(46°C) in summer and -60°F (-51°C) in winter. Winds are usually westerly or southwesterly and are most predominant during the late fall and spring months (FD Services, 1992a).

3.1.5 Air Quality

NPR-3 is located in Natrona County, Wyoming, which is part of the Casper Intrastate Air Quality Control Region (AQCR)(40 CFR 81.213), designated as being in attainment by the EPA for all criteria pollutants (40 CFR 81.351). An ambient air quality monitoring program was established at NPR-3 to monitor air quality parameters set forth by the Wyoming Department of Environmental Quality (WYDEQ), Division of Air Quality, and as recommended by the June 1989 Environmental Survey Team. Ambient air quality meets State of Wyoming standards at the perimeter of the property (FD Services, 1992a). The air quality program includes ambient air monitoring for H_2S, nitrogen oxides (NOx) and hydrocarbons. In order to address worker health and safety, H_2S sampling has been conducted in the areas of highest potential concentrations (FD Services, 1992a). The primary areas associated with elevated H_2S levels were facilities in the steamflood patterns, the main one being B-1-3 tank battery (Miles & Clark, 2001).

Prior to the NPR-3 studies, ambient air quality data for Natrona County generally, and NPR-3 specifically, were limited. Data prior to 1976 indicate that background levels of suspended particulates in the area ranged from 20 to 30 mg/m^3. No values for hydrocarbons were available for Natrona County. However, hydrocarbon sampling done in Converse County (adjacent to Natrona County) revealed that background levels were apparently exceeding state standards. Levels of H_2S measured on NPR-3 in June 1976 were less than 4 ppm.

Although continuous monitoring for SO_2 has not been required by WYDEQ, it has requested periodic analyses. Onsite personnel conduct monitoring for SO2. The ambient SO_2 concentration around the flares is undetectable with a Sensidyne Detector tube. Air sampling and analysis, using gas chromatography and flame photometry, was conducted by a subcontractor on September 9, 1993. Results from these samples showed the highest SO_2 concentration to be 0.081 ppm, well within the WYDEQ limits (0.1 ppm max 24-hr and 0.5 ppm max 3-hr concentration).

Hydrogen sulfide gas was flared at NPR-3 between November 1992 and March of 1995. Since March of 1995 H_2S flares have not operated and Wyoming Department of Environmental Quality (WYDEQ) has never required operating permits for the flares for NPR-3.

Table 3-1 lists the NPR-3 facilities currently operating under air quality permits issued by the Wyoming Department of Environmental Quality and their respective emission inventories for calendar year 1996.

NPR-3 currently holds construction permits for the LTS Gas Plant, its associated flare and amine reboiler. Permits for Steam Generators 1, 2, 3, and 4 have been deactivated. Of the five steam generators, three steam generators have been removed.

Steam Generators 4 and 5 are in place, but no longer operate.

3.1.6 Acoustics

The major noise sources within NPR-3 include the Gas Plant, equipment and machines (engines, pumps, drilling rigs, vehicles, etc.) (Miles and Clark, 2000). Although sound-level monitoring of ambient acoustic conditions at NPR-3 has not been conducted, the contribution from NPR-3 operations to ambient noise levels beyond the Reserve boundary is estimated to be minimal, and no residences are located within human audible range of general operations.

Table 3-1
Permitted Air Quality Emission Sources at NPR-3

Source	Permit Number	1999 Emissions Data			
		Particulate Matter	Sulfur Dioxide	Nitrogen Oxide	Carbon Monoxide
LTS Gas Plant Heater	CT-360 (replaced by CT-1202)	.01 lb/hr	<.01 lb/hr	.14 lb/hr	.03 lb/hr
Gas Plant Smokeless Flare	CT-361A (inactivated 1987)	<1 lb/hr	<1 lb/hr	.28 lb/hr	.06 lb/hr

Source:1999 State of Wyoming Annual Emission inventory of Criteria Pollutants

Water Resources

3.1.7 Surface Water Quantity

NPR-3 is drained by a series of ephemeral or intermittent stream channels that flow through steep topographic swales, locally referred to as draws. Little Teapot Creek originates in the highlands south of NPR-3 and enters NPR-3 in a northerly direction across the southern boundary as an intermittent stream. Teapot Creek originates approximately 15 miles (24 km) southwest of NPR-3 and enters NPR-3 in an easterly direction across the northwestern boundary as an intermittent stream. All other ephemeral and intermittent streams on NPR-3 drain into Little Teapot or Teapot Creeks. Little Teapot and Teapot Creeks merge immediately south of NPR-3's northern boundary and exit NPR-3 in a northerly direction. The merged stream flows into Salt Creek less than 1 mile (1.6 km) north of NPR-3, which flows to the Powder River, approximately 25 miles (40 km) to the north (USGS, 1974).

Several small impoundments, none larger than 10 acres (4 ha), have been constructed in the draws to serve as reservoirs during earlier operations on NPR-3 in the 1920's (Halliburton NUS, 1993). The remains of several of these impoundments still exist, but

the basins only support wetlands.

Produced water obtained from all producing formations is discharged to Little Teapot Creek and its tributaries through the biotreatment facility NPDES discharge allowed by the Clean Water Act. This facility was constructed in 1996. Its primary function is to clean the produced water previously injected underground. Discharges through each outfall are regulated under NPDES permits issued by WYDEQ, Water Quality Division. Only one outfall, the B-Tp-10 tank battery, is discharging. The remaining permitted outfalls do not discharge. Sampling indicated compliance with NPDES permit limits. Current operations at NPR-3 do not involve the withdrawal of any surface water from the streams or ponds.

3.1.8 Ground Water Quantity

There are no high quality fresh water aquifers in the strata underlying NPR-3. Those strata that produce fluids either produce water with excessive levels of total dissolved solids (TDS) or a mixture of hydrocarbons and water. The Steele Shale formation occupies the interval from the surface to an approximate depth of 2,000 feet (610 m). There are two porous and permeable sandstone formations within the Steele Shale. The Sussex sandstone outcrops in a ring near the center of the Teapot Dome structure, but does not appear to contain an aquifer. The second sandstone body is the Shannon sandstone which is an oil reservoir in much of the field. A fault separates the oil reservoir from the Shannon outcrop at Salt Creek to the north. Groundwater is encountered in the Shannon in some areas north of the fault, but the concentration of Total Dissolved Solids exceeds 10,000 mg/l. No Underground Sources of Drinking Water (USDWs) or other shallow fresh water aquifers have been detected in the 795 wells drilled since 1976.

It should be noted that there is a strong distinction at NPR-3 between "fresh water aquifers" and "USDWs". Exempted aquifers are not USDW's under the Safe Drinking Water Act, which permits aquifer exemptions for fresh water aquifers being used for Class II injection. Several such aquifer exemptions exist at NPR-3. In addition, aquifers that contain crude oil, natural gas, or other contaminants that make it undesirable for a water supply, could also be exempted. Several other aquifers at NPR-3 qualify for exemption under this criteria, although the actual exemption has not been pursued with the Wyoming Oil & Gas Conservation Commission. Produced water from oil and gas production is put to beneficial use for livestock and wildlife at NPR-3, but there would be no intention to protect it as a source of municipal water supply.

The Madison formation, which could be a high yield, fresh water aquifer if the high levels of magnesium, sodium and chloride could be removed, lies below the deepest producing geologic unit within NPR-3 at a depth of below 6,000 feet (1,800 m) but yields water of only fair quality, with a TDS level of approximately 3,000 mg/L. (DOE, 1990) The Madison could be considered a USDW, but activities at NPR-3 are not likely to impact this aquifer.

3.1.9 Surface Water Quality

The effluent limits from each National Pollutant Discharge Elimination System (NPDES) permit under which water is discharged to the draws at NPR-3 are listed in Table 3-2. The DOE submits semi-annual Discharge Monitoring Reports to the WYDEQ. Samples are taken bimonthly to monitor discharge water quality (Miles, 2001a).

Water is discharged in large quantities only from the Tensleep Battery (B-TP-10) (NPDES Permit WY-0028274). The other NPDES permits listed in Table 3-2 are inactive. Water discharged from the Tensleep Battery is formation water produced from all formations. Although the temperature of water at the surface from Tensleep formation is 180°F (82°C), temperatures of the effluent are typically under 70°F (21°C) (Miles, 2000b). Because of the cooling tower within the bio-treatment facility, the elevated temperatures at the point of discharge rapidly diminish to ambient levels through atmospheric cooling.

The WYDEQ has determined that the streams at NPR-3 are all Category IV streams (Doyle, 1993). Category IV streams are defined in the Wyoming Water Standards as "surface waters, other than those classified as Class I, which are determined by the Wyoming Game and Fish Department not to have the hydrologic or natural water quality potential to support fish." Thermal effluent limits are not established by the WYDEQ for NPDES Permits for discharges to Class IV streams.

3.1.10 Ground Water Quality

Groundwater produced with crude oil and natural gas is disposed of through the biotreatment facility or, in an emergency, by underground injection into the Crow Mountain formation. These wells are permitted through EPA's Underground Injection Control (UIC) program, which is managed by the Wyoming Oil and Gas Conservation Commission. Geologic formations that receive injected water also have an aquifer exemption authorized by the Oil and Gas Conservation Commission, which has primacy for regulating class II injection wells under the Safe Drinking Water Act.

3.1.11 Potable Water

Because there are no potable water wells in the vicinity of NPR-3, all potable water must be trucked to NPR-3 from either the city of Casper or the town of Midwest. Both supplies are community water systems and have been approved by the EPA as drinking water systems.

Table 3-2
Summary of NPDES Permit Limits

Permit Number	Name of Source	Oil and Grease[1]	Specific Conductance[2]	COD[3]
WY-0028274	B-Tp-10 Tank Battery	10	7500	N/A
WY-0028894	Tank Battery B-1-3	10	7500	N/A
WY-0028908	Tank Battery B-1-10	10	7500	N/A

[1]In mg/l, daily maximum
[2]In umhos/cm, daily maximum
[3]In mg/l, daily maximum

Geology, Soils, and Prime and Unique Farmlands

3.1.12 Geology

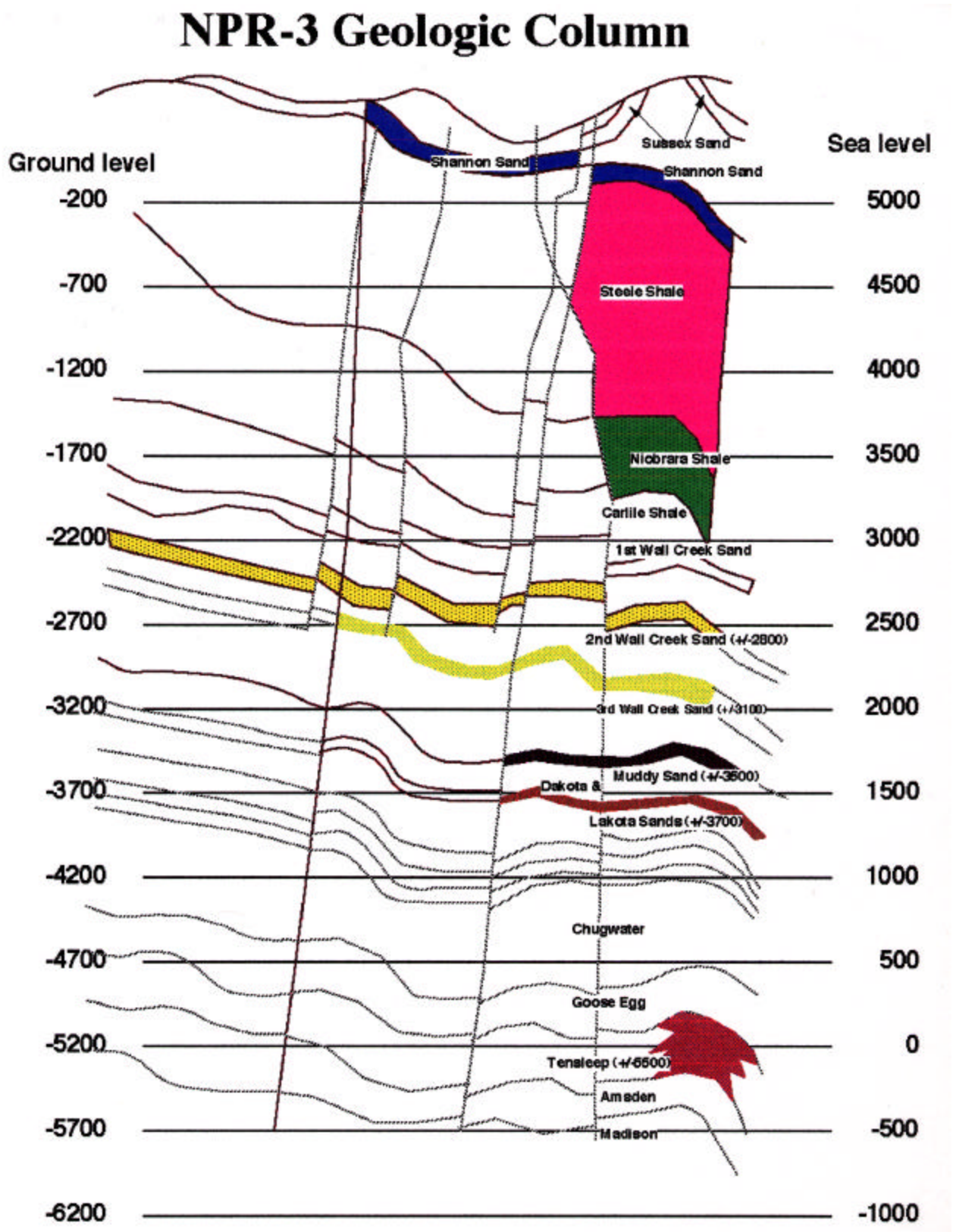
NPR-3 is centered over the crestal axis of an asymmetrical doubly-plunging anticline called the Teapot Dome, which is the southern extension of the much larger Salt Creek anticline. The Salt Creek anticline underlies the prolific Salt Creek Oil field, located to the north of NPR-3 (DOE, 1990).

The geologic column for the Teapot Dome is shown in Figure 3-2. The oil productive horizons are the Shannon, Steele Shale, Niobrara Shale, Second Wall Creek, Third Wall Creek, Muddy, Dakota, Lakota, and Tensleep formations. Currently, enhanced oil recovery operations affect only the Shannon formation. 3,000 bbls/day of chase water is injected into Steam Pattern 2-B. There are no plans to expand EOR beyond this level of effort.

The topography of the region surrounding NPR-3 is characterized by rolling plains interspersed with ridges and isolated bluffs. The central part of NPR-3 consists of a large plain, dissected by ravines (draws), that is encircled to the east, west, and south by a rim of sandstone (U.S. Navy, 1976). The area surrounding NPR-3 is not known to be seismically active (Halliburton NUS, 1993).

3.1.13 Soils

The USDA Soil Conservation Service (SCS) has completed a Class III soil survey of portions of Natrona County, including NPR-3 and surrounding lands. Map pages from the soil survey covering NPR-3 are provided in Table 3-3. Soils throughout NPR-3 are largely derived from sodic (alkaline) parent materials and are highly alkaline and saline. The high salinity of soils on NPR-3 limits plant growth. All soils on NPR-3 are well drained. Most soils on NPR-3 are highly or moderately susceptible to erosion caused by heavy downpours (Davis, 1993a).


NPR-3 Geologic Column
Ground level
Sea level
-200
5000
-700
4500
-1200
4000
-1700
3500
-2200
3000
-2700
2500
-3200
2000
-3700
1500
-4200
1000
-4700
500
-5200
0
-5700
-500
-6200
-1000
Shannon Sand
Sussex Sand
Shannon Sand
Steele Shale
Niobrara Shale
Carlile Shale
1st Wall Creek Sand
2nd Wall Creek Sand (+/-2800)
3rd Wall Creek Sand (+/-3100)
Muddy Sand (+/-3600)
Dakota &
Lakota Sands (+/-3700)
Chugwater
Goose Egg
Tensleep (+/-6500)
Amsden
Madison

Most upland soils throughout all parts of NPR-3 other than the peripheral ridges are mapped as Cadoma-Renohill-Samday clay loams. The Cadoma soil series is typically found on hillsides of 3 to 12 percent slope, the Renohill soil series is typically found in swales of 3 to 6 percent slope, and the Samday soil series is typically found on ridges of 3 to 12 percent slopes. These soils are derived from slopewash alluvium and residuum derived dominantly from sodic shale. The Cadoma and Renohill soils are moderately deep and well drained, while the Samday soils are shallow and well drained. All of these soils are highly susceptible to water erosion (Davis, 1993a).

Scattered areas of upland soils are mapped under other names and comprise soils mapped in other soil series. Most of these other upland soils are also derived from sodic materials. All are well drained but differ widely in their susceptibility to water erosion (Davis, 1993a). Soils in the major draws on NPR-3 are mapped in the Haverdad-Clarkelen complex, a mosaic of soils in the Haverdad series (Haverdad loam) and the Clarkelen series (Clarkelen sandy loam). The Haverdad and Clarkelen soils are very deep and well drained, and they are only slightly susceptible to water erosion (Davis, 1993a).

Table 3-3
NPR-3 Soil Survey Mapping Units

Map Unit 112:Arvada-Absted-Slickspots complex, 0 to 6 percent slopes
Location on NPR-3:Scattered upland areas throughout all parts of the reserve except for the bluffs. Composition:35% Arvada clay loam; 30% Absted clay loam; and 15% Slickspots. Origin:Alluvium derived dominantly from sodic shale (Arvada and Absted soils). Drainage:Well drained (Arvada and Absted soils). Hazard of Water Erosion:Slight (Arvada and Absted). Capability Subclass:VIs (Arvada and Absted soils)
Map Unit 113:Arvada, runon-Slickspots complex, 0 to 3 percent slopes
Location on NPR-3:Isolated upland area in the northern part of the reserve. Composition:60% Arvada loam, overflow and 25% Slickspots. Origin:Alluvium derived dominantly from sodic shale (Arvada soil). Drainage:Well drained (Arvada soil). Hazard of Water Erosion:Slight (Arvada soil). Capability Subclass:VIs (Arvada soil).

Map Unit 125:Blackdraw-Lolite-Gulli ed land complex, 3 to 20 percent slopes

Location on NPR-3:Scattered upland areas in the northern part of the reserve.
Composition:45% Blackdraw clay loam; 20% Lolite clay loam; and 20% gullied land.
Origin:Slopewash alluvium and residuum derived dominantly from noncalcareous sodic shale (Blackdraw soil); residuum derived dominantly from noncalcareous sodic shale (Lolite soil).
Drainage:Well drained (Blackdraw and Lolite soils).
Hazard of Water Erosion:Severe (Blackdraw and Lolite soils)
Capability Subclass:VIe (Blackdraw soil); VIIe (Lolite soil).

Map Unit 134:Bowbac-Taluce-Terro complex, 6 to 20 percent slopes

Location on NPR-3:Scattered upland areas in the northern part of the reserve.
Composition:40% Bowbac sandy loam; 25% Taluce sandy loam; and 15% Terro fine sandy loam.
Origin:Slopewash alluvium and residuum derived dominantly from sandstone (Bowbac soil); residuum derived dominantly from sandstone (Taluce soil); alluvium derived dominantly from sandstone (Terro soil).
Drainage:Well drained.
Hazard of Water Erosion:Moderate (Bowbac and Terro soils); High (Taluce soil)
Capability Subclass:IVe (Bowbac and Terro soils); VIIe (Taluce soil).

Map Unit 140:Cadoma-Renohill-Samday clay loams, 3 to 12 percent slopes

Location on NPR-3:Characteristic soil on the uplands throughout all parts of the reserve except for the bluffs.
Composition:40% Cadoma clay loam; 25% Renohill clay loam; and 25% Samday clay loam.
Origin:Slopewash alluvium and residuum derived dominantly from sodic shale (Cadoma and Renohill soils).
Drainage:Well drained.
Hazard of Water Erosion:Severe.
Capability Subclass:VIe (Cadoma soil); IVe (Renohill soil); VIIe (Samday soil).

Map Unit 195:Haverdad-Clarkelen complex, saline, 0 to 3 percent slopes

Location on NPR-3:Characteristic soil within the larger draws throughout all parts of the reserve.
Composition:50% Haverdad loam, saline and 35% Clarkelen sandy loam, saline
Origin:Stratified alluvium from mixed sources.
Drainage:Well drained.
Hazard of Water Erosion:Slight.
Capability Subclass:IVS - irrigated; VIs - nonirrigated.

Map Unit 208:Kayner sandy clay loam, 3 to 10 percent slopes

Location on NPR-3:Characteristic soil on the high ground at the foot of the bluffs near the eastern, western, and southern boundaries.
Composition:Over 80% of this map unit is Kayner sandy clay loam.
Origin:Alluvium derived dominantly from sodic sandstone and shale.
Drainage:Well drained.
Hazard of Water Erosion:Moderate.
Capability Subclass:VIe.

Map Unit 209:Keyner-Absted-Slickspots complex, 0 to 6 percent slopes

Location on NPR-3:Small, isolated area of uplands near the western boundary.
Composition:50% Keyner sandy loam; 20% Absted sandy clay loam; and 15% slickspots.
Origin:Alkaline alluvium derived from mixed sources (Keyner soil); alluvium derived dominantly from sodic shale (Absted soil).
Drainage:Well drained.
Hazard of Water Erosion:Slight (Keyner and Absted soils).
Capability Subclass:No information.

Map Unit 214:Lolite-Rock outcrop complex, 10 to 40 percent slopes

Location on NPR-3:Small, scattered areas of uplands in the northern part of the reserve.
Composition:60% Lolite clay and 20% Rock outcrop.
Origin:Residuum derived dominantly from sodic shale (Lolite soil).
Drainage:Well Drained.
Hazard of Water Erosion:Severe (Lolite soil).
Capability Subclass:VIIe.

Map Unit 215:Lolite, dry-Rock outcrop, 5 to 50 percent slopes

Location on NPR-3:Isolated area of uplands near the interior of NPR-3.
Composition:50% Lolite clay, dry and 30% Rock outcrop.
Origin:Residuum derived dominantly from noncalcareous, sodic shale (Lolite soil).
Drainage:Well drained (Lolite soil).
Hazard of Water Erosion:High (Lolite soil).
Capability subclass:VIIe (Lolite soil).

Map Unit 256:Rock outcrop-Ustic torriorthents, shallow-Rubble land complex, 30 to 100 percent slopes

Location on NPR-3:Characteristic soil on the bluffs near the eastern, western, and southern boundaries.
Composition:40% Rock outcrop; 25% Ustic torriorthents, shallow; and 15% Rubble land
Drainage:Well to excessively well drained (Ustic torriorthents).
Hazard of Water Erosion:Moderate to severe. (Ustic torriorthents)
Capability Subclass:VIII.

Map Unit 278:Silhouette-Petrie clay loams, 1 to 6 percent slopes Location on NPR-3:Small upland area in northwestern corner. Composition:50% Silhouette clay loam and 30% Petrie clay loam Origin:Alluvium derived dominantly from shale (Silhouette soil); alluvium derived dominantly from sodic shale (Petrie soil). Drainage:Well drained. Hazard of Water Erosion:Moderate. Capability Subclass:VIII.
Map Unit 283:Theedle-Shingle-Kishona complex, 6 to 40 percent slopes, gullied Location on NPR-3:Small area on extreme west-central periphery Composition:30% Theedle clay loam, 25% Single loam, and 20% Kishona clay loam Origin:Slopewash alluvium and residuum derived dominantly from sedimentary rocks Drainage:Well drained. Hazard of Water Erosion:High (Theedle and Single soils); Moderate (Kishona soil) Capability Subclass:VIe (Theedle and Kishona soils); VIIe (Shingle soil)

Higher elevation lands approaching the peripheral ridges are mapped as Keyner sandy clay loam. These soils are deep and well drained. The hazard of water erosion is moderate. Soils on and immediately at the base of the bluffs are mapped in the Rock outcrop-Ustic Torriorthents, shallow-Rubble land complex. These areas are characterized by exposed rock, colluvial boulders, and shallow soil. (Davis, 1993a)

3.1.14 Prime and Unique Farmlands

The SCS does not presently recognize any prime or unique farmlands or farmlands of local importance within the boundaries of NPR-3 (Davis, 1993b). All soils on NPR-3 are mapped in Capability Classes IV or higher, and the majority are mapped in Capability Classes VI and higher (Davis, 1993a). The SCS defines Class IV soils as soils that have very severe limitations that reduce the choice of plants or that require very careful management, or both. The SCS defines Class VI soils as soils having severe limitations that make them unsuitable for cultivation. In general, soils in the higher numbered Capability Classes are less suitable for cultivation than soils in the lower numbered Capability Classes.

Biological Resources

3.1.15 Aquatic Biology

Aquatic habitats at NPR-3 are limited to intermittent streams within the draws, shallow perennial streams fed primarily by produced water discharged under NPDES permits, and man-made ponds. Fish have not previously been reported in the draws on NPR-3 (Miles, 2000a). The Wyoming Game and Fish Department (WGFD) stocked fingerling (5 to 6 inch/14 cm) rainbow trout in two of the abandoned impoundments at NPR-3 between 1987 and 1989. Water in one of the impoundments is run-off from snow melt and rain, and water in the other is produced water originating from the Madison formation on an adjoining privately owned oil field. One year later, the trout in the

second pond had grown to 11-14 inches (28-36 cm) in length, while the first pond dried up. The following year, they had reached a length of approximately 18 inches (46 cm) (Miles, 2000a). DOE continues to stock this pond on an annual basis.

A fish survey of the surface waters on NPR-3 has not been conducted. NPR-3 lies within the geographic range of approximately 17 fish species. Although only a few of these species (such as creek chub or killifish) would be expected in streams onsite, NPR-3 is within the watershed of the Powder River, which may contain most of these species (Page and Burr, 1991).

3.1.16 Terrestrial Vegetation

NPR-3 is located in part of North America where vegetation is characterized by shortgrass prairie. The last vegetation survey of NPR-3, performed prior to development of the Reserve under DOE jurisdiction, identified six major vegetation associations. These include three rangeland associations on the upland plains, two riparian associations in the bottoms of the draws, and a pine-juniper association on the peripheral ridges (U.S. Navy, 1976).

Much of the rangeland vegetation has been physically disturbed by construction of wells, drill pads, access roads, and other DOE activity since 1978. Disturbance is generally continuous throughout certain areas of intensive activity in the center of the Reserve east of the office and warehouse complexes. Disturbance elsewhere is generally localized around scattered wells and other work areas. The pine-juniper vegetation on the peripheral ridges has not generally been disturbed by DOE operations since 1978. Except at a few road crossings, riparian vegetation in the draws has not generally been physically disturbed by DOE operations. However, riparian vegetation downstream of NPDES-permitted points of discharge has experienced increased water flows and increased water temperatures (Halliburton NUS, 1993).

The DOE reclaims and reseeds drill pads, flowline rights-of-way, and abandoned well sites on NPR-3, using guidelines provided by the SCS (SCS, 1992). The reseeded areas provide browse for the larger mammals, habitat for smaller animals, and reduce water and wind erosion.

The DOE presently leases the rangeland within NPR-3 for grazing of sheep. Prior to 1986, the rangeland within NPR-3 was overgrazed (Young, 1986; Watson, 1987).

Trees at NPR-3 are largely limited to piñon pine, ponderosa pine, and juniper within small zones of pine-juniper forests on the peripheral ridges, and to a few cottonwood trees among the riparian vegetation in the draws (Miles, 2000a). Except for the peripheral ridges, uplands throughout NPR-3 lack trees. No land on NPR-3 is managed for timber production (Miles, 2000a).

During the summer of 1987, and spring of 1988, a pilot project was initiated to introduce narrow leaf cottonwood (*Populus Angustifolia*) and Russian olive (*Eleagnus*

Angustifolia) trees to NPR-3. Both species are hardy and were expected to adapt to the dry summers and cold winters. Four hundred and fifty cottonwood trees, Russian olive trees, and wouldow (*Salix* sp.) shrubs were planted along streams and ponds on the Reserve. Due to drought conditions that occurred during these years and damage done by wildlife, few of the trees survived (DOE, 1990). This project may be tried again, but using indigenous species to increase the probability of success.

3.1.17 Biotreatment Facility

In January 1996, the Biotreatment Facility constructed adjacent to the B-Tp-10 tank battery began treating produced water. The project was constructed at the discharging outfall of the majority of produced water at NPR-3. This system is the final process for waste water treatment under an issued NPDES permit allowed by the Clean Water Act. The facility consists of a skimming pit, cooling trench, aeration stairstep and surface flow wetland. The wetland contains a growth of emergent wetland plants.

The process naturally cleans produced water from the field production facilities by utilizing algae, bacteria, and plants. Water discharges from the existing B-Tp-10 pit (used as a skimming and mixing pond) through a cooling canal on the northern boundary of the pit designed to cool the produced water. Produced water then flows through a series of stairsteps for aeration and further cooling, finally reaching the constructed wetland. The water then discharges from the wetland into a lagoon and finally into an unnamed tributary to Little Teapot Creek (the original receiving waters for the B-Tp-10 discharge).

This biological treatment allows produced water from the NPR-3 oil field to be discharged. Prior to the operation of the biotreatment facility, up to 12,000 barrels a day of produced water were injected into the Crow Mountain reservoir at a cost of $180,000 per year. The project is beneficial to the oil industry and to the environment as a whole by lowering costs per barrel of oil produced while providing a wetland habitat and more flowing water for fisheries, livestock, wildlife and NPR-3's neighboring ranchers. The NPDES discharge parameters have consistently been met after treatment at the Biotreatment Facility.

3.1.18 Terrestrial Wildlife

The Wyoming Game and Fish Department (WGFD) maintains a database (Wildlife Observation System) of wildlife sightings throughout the state by township, range, and section. This list included some species which have been observed over the years on NPR-3 by the DOE staff and its contractors (US Navy, 1976; Stark, 1993). This does not represent a systematic inventory of terrestrial wildlife known to occur on NPR-3. According to a bird and mammal distributive study for Wyoming, approximately 222 bird species and 49 mammal species have been observed in the region containing the NPR-3 site (WGFD, 1991). NPR-3 lies within the geographic range with at least 6 amphibians and 9 reptile species (Stebbins,1985). Table 3-5 indicates recorded observations of 3 amphibian, 4 reptile, 61 bird, and 20 mammal species at NPR-3.

Pronghorn antelope and mule deer are the principal big game mammals seen at NPR-3 (Miles, 2000a). The DOE does not presently allow any hunting on NPR-3 (Miles, 2000b). NPR-3 does not contain any Critical Winter Range for either antelope or deer. Range within NPR-3 is classified by the WGFD as Winter Year-Long Range for both species. The range is utilized by both species throughout the year but is not depended upon during the winter by transient deer or antelope populations that reside elsewhere during the growing season (Thiele, 1993).

Other characteristic mammal species of NPR-3 include: raccoons, striped skunk, porcupine, badger, fox, bobcat, prairie dog (two known colonies), cotton-tail rabbit, and deer mouse. Apparently common species among the variety of birds found at NPR-3 are the red-tailed hawk, American kestrel, golden eagle, horned lark, western meadowlark, Brewer's blackbird, mountain plover, vesper sparrow, Brewer's sparrow, lark bunting, and sage thrasher. Characteristic amphibians and reptiles found on NPR-3 include: toad species, sagebrush lizard, short-horned lizard, garter snake, gopher snake and western rattlesnake (Miles, 2000a; WGFD, 1993).

3.1.19 NPR-3 Raptor Study

The office of the U.S. Fish and Wildlife Services (FWS) requested a survey of NPR-3 for possible raptors and raptor nesting sites present on the property. The survey was conducted during the month of July 1996 and again during the summer of 1999.

Surveying began at the southern-most end of the field. Sandstone bluffs encircle NPR-3 on the south, east, and west ends. Although these bluffs are not within NPR-3 boundary lines they do border the property. Special care and attention was taken to survey these bluffs as they provide an appropriate nesting sites for raptors hunting on NPR-3. Beyond surveying the bluffs and overhead for signs of raptors, ground surveys and interviews with field personnel were also conducted for possible sightings.

Survey sightings included golden eagles (*Aquila Chrysaetos*), short-eared owls (*Asio Flammeus*), red-tail hawks (*Buteo Jamaicensis*), northern harrier hawks (*Circus Cyaneus*), bald eagle (*Haliaeetus Leucecephalus*), burrowing owls *(Athene Cunicularia),* mountain plover *(Charadrius Montanus),* and loggerhead shrike (*Lanius Ludovicianus*). Two occupied nests were found, a golden eagle nest containing one eaglet and a red-tail hawk nest containing three fledglings. It is important to note that while a bald eagle was sited during the survey, the sighting was outside of reserve boundaries. There was no evidence that the bald eagle was nesting on NPR-3.

To ensure that Federal actions are not likely to jeopardize the continued existence of an endangered or threatened species, regulatory protection is provided under Section 7 of the Endangered Species Act (ESA) of 1973 (16 USC 1536). Results from the July 1996 survey did not identify any raptors classified as threatened or endangered species at NPR-3, however ten burrowing owls were observed in a survey of one of the prairie dog towns in August 2000 (Zarate & Clark, 2000). Burrowing owls are listed on the US Forest Service Region 2 Sensitive Species List.

3.1.20 Ute Ladies'-tresses Orchid Survey

Surveys were completed for the Ute ladies'-tresses orchid (*Spiranthes diluvialis*) on the NPR-3 study area the first week of August and again in the third week of August 1997. Survey dates were based on site conditions and discussions with experts familiar with the ecology of this species. Survey conditions were excellent due to the abundant moisture for this year and the fact no grazing occurred onsite to affect vegetation in the study area and potential habitats. No Ute ladies'-tresses orchids were found within the study area during these surveys. Potential habitats based on hydrological criteria were abundant on the study area. However, most of these habitats were alkaline to extremely alkaline which, based on the survey guidelines, may limit the potential for this species to occur within the survey area.

3.1.21 Threatened and Endangered Species

The offices of the U.S. Fish and Wildlife Service (FWS) and the WGFD, both in Cheyenne, Wyoming, and the Nature Conservancy in Laramie, Wyoming, were consulted to determine which federally or state listed threatened, endangered, or candidate species or critical habitats could potentially occur at NPR-3.

In a letter dated August 22, 2000, (attached) the FWS indicated that several of the species shown in Table 3-5 could be present in the area of NPR-3. According to the FWS, the black-footed ferret (Federally-listed endangered) could inhabit prairie dog towns in the vicinity of NPR-3 (Davis, C. P., 1993). Two prairie dog colonies, each less than 100 acres (40 ha) in area, are known to occur in NPR-3 on rangeland that is undisturbed by present oil drilling operations. In the first of the colonies, 5 prairie dogs and 7 fresh mounds were observed. This colony has reduced in size due to natural causes and is not large enough to potentially support the black-footed ferret. A black footed-ferret survey was conducted beginning December 1, 1997 and ending March 1, 1998. No evidence of the black-footed ferret was found during this survey. Based on the results of the survey, it appears that black-footed ferrets do not inhabit the prairie dog colonies on the NPR-3 area.

The Wyoming Natural Diversity Database also indicated that the burrowing owl *(Athene Cunicularia)* is on the US Forest Service Region 2 Sensitive Species List. In an observation of abandoned prairie dog burrows, ten burrowing owls were observed (Zarate & Clark, 2000).

The second prairie dog colony was observed near the southwestern boundary of NPR-3 on rangeland that is presently undisturbed by oil drilling operations. The area was driven and paced off and is of a diamond shape with the width being .15 miles and the length being .2 miles (Miles, September 2000). Forty-one prairie dogs were observed along with 60 fresh mounds. This colony could be large enough to potentially support the black footed-ferret, but none were observed. There were also no burrowing owls present at this colony (Zarate & Clark, September 2000). One Mountain Plover *(Charadrius Montanus)* (Federally proposed for listing) was observed (Miles, 2000). This area is approximately two miles from where the proposed facility would be located. The mountain plover's habitat is very compatible with mining operations. They are

known to nest near mining operations due to the exposure of the grounds surface and sparse vegitation. (Internet article by USGS (Parrish 1988))

The FWS also indicated that the bald eagle (Federally-listed threatened) could be a winter resident or a migrant to the area of NPR-3 (Davis, C. P., 1993). An adult bald eagle has been observed perched on the bluffs immediately west of the administration building on NPR-3 (Soehn, 1993) and an adult bald eagle was spotted just east of NPR-3 near the entrance gate (Clark, 1996). There are no known bald eagle nests in the vicinity of NPR-3. The closest known bald eagle nests to NPR-3 are on the Platte River east of Glenrock and in Ednes Kimball Wilkens Park in Casper approximately 50 miles from NPR-3 (Thiele, 1993).

There are no other listed species by the Fish and Wildlife Service which may be present in the project area.

Table 3-5
Species Known to Inhabit NPR-3

Common Name	**Scientific Name**
AMPHIBIANS	
Boreal chorus frog	*Pseudacris triseriata malculata*
Tiger salamander[b]	*Ambystomia tigrinum*
Toad sp.[c]	*Bufo sp.*
REPTILES	
Sagebrush lizard[b]	*Sceloporus graciosus*
Short-horned lizard[b]	*Phrynosoma douglassi*
Western terrestrial garter snake[bc]	*Thamnophis elegans*
Western rattlesnake[bc]	*Crotalis viridis*
FISH	
Rainbow Trout[c]	*Oncorhynchus mykiss*
BIRDS	
American robin[a]	*Turdus migratorius*
American kestrel[ab]	*Falco sparverius*
American wigeon[ab]	*Anas americana*
American avocet[ac]	*Recurvirostra americana*

Bald eagle[ac]	*Haliaeetus leucocephalus*
Black-billed magpie[abc]	*Pica pica*
Blue-winged teal[ab]	*Anas discors*
Brewer's blackbird[a]	*Euphagus cyanocephalus*
Brewer's sparrow[ab]	*Spizella breweri*
Chukar[a]	*Alectoris chukar*
Cliff swallow[a]	*Hirundo pyrrhonota*
Common poorwould[ab]	*Phalaenoptilus nuttaillii*
Common nighthawk[a]	*Chordeiles minor*
Common snipe[b]	*Capella gallinago*
Double-crested cormorant[c]	*Phalacrocorax auritus*
European starling[a]	*Sturnus vulgaris*
Gadwall[ab]	*Anas strepera*
Golden eagle[abc]	*Aquila chrysaetos*
Great horned owl[ab]	*Bubo virginianus*
Green-winged teal[ab]	*Anas crecca*
Horned lark[ab]	*Eremophila alpestris*
House wren[ab]	*Troglodytes aedon*
Jack Rabbit[ac]	*Lepus californicus*
Killdeer[ab]	*Charadrius vociferus*
Lark bunting[a]	*Calamospiza melanocorys*
Lark sparrow[b]	*Chondestes grammacus*
Lesser yellowlegs[b]	*Tringa flavipes*
Loggerhead shrike[abc]	*Lanius ludovicianus*
Mallard[bc]	*Anas platyrhyndios*
McCown's longspur[a]	*Calcarius mccownii*
Mountain bluebird[ab]	*Sialia currucoides*
Mourning dove[ab]	*Zenaidura macroura*
Northern shrike[a]	*Lanius excubitor*
Northern (red-shafted) flicker[a]	*Colaptes (cafer) auratus*

Northern (yellow-shafted) flicker[ab]	*Colaptes auratus*
Northern harrier[ab]	*Circus cyaneus*
Northern rough-winged swallow[b]	*Stelgidopteryx serripennis*
Pectoral sandpiper[b]	*Calidris melanotos*
Pintail[b]	*Anas acuta*
Pinyon jay[b]	*Gymnorhinus cyanocephalus*
Plover sp.[c]	*Charadrius sp.*
Prairie falcon[ab]	*Falco mexicanus*
Red-tailed hawk[abc]	*Buteo jamaicensis*
Red-winged blackbird[ab]	*Agelaius phoeniceus*
Rock wren[ab]	*Salpinctes obsoletus*
Rough-legged hawk[c]	*Buteo lagopus*
Sage sparrow[ab]	*Amphispiza belli*
Sage grouse[ab]	*Centrocercus urophasianns*
Sage thrasher[ab]	*Oreoscoptes montanus*
Say's phoebe[ab]	*Sayornis saya*
Sharp-shinned hawk[a]	*Accipiter striatus*
Short-eared owl[a]	*Asio flammeus*
Spotted sandpiper[a]	*Actitis macularia*
Swainson's hawk[ab]	*Buteo swainsoni*
Turkey vulture[a]	*Cathartes aura*
Vesper sparrow[ab]	*Pooecetes gramineus*
Violet-green swallow[b]	*Tochycineta thalassina*
Western grebe[c]	Aechmophorus occidentalis
Western meadowlark[abc]	*Sturnella neglecta*
Western kingbird[ab]	*Tyrannus verticalis*
White-throated swift[a]	*Aeronautes saxatalis*
Wilson's phalarope[a]	*Phalaropus tricolor*
MAMMALS	

Black-tailed prairie dog[a]	*Cynomys ludovicanus*
Bobcat[ac]	*Lynx rufus*
Brush-tailed woodrat[b]	*Neotoma cinerea*
Coyote[bc]	*Canus latrans*
Deer mouse[b]	*Peromyscus maniculatus*
Desert cottontail[b]	*Sylvilagus auduboni*
Eastern cottontail[a]	*Sylvilagus floridanus*
Least chipmunk[b]	*Eutamias minimus*
Mountain lion[a]	*Felis concolor*
Mountain cottontail[a]	*Sylvilagus nuttallii*
Mule deer[ac]	*Odocoileus hemionus*
Muskrat[c]	*Ondatra zibethica*
Northern pocket gopher[b]	*Thomomys talpoides*
Porcupine[bc]	*Erethizon dorsatum*
Pronghorn[ac]	*Antilocapra americana*
Raccoon[c]	*Procyon lotor*
Red fox[ac]	*Vulpes vulpes*
Striped skunk[bc]	*Mephitis mephitis*
Swift fox[b]	*Vulpes velox*
Wyoming pocket mouse[b]	*Perognathus fasciatus*

Source: WGFD, 1993; US Navy, 1976; Stark, 1993; Soehn, 1993.
[a] Species observed within Township T 38-39N, Range R78W (on or in the vicinity of NPR-3).
[b] Species observed during survey of NPR-3, August 1975 (US Navy, 1976).
[c] Species observed by DOE & Critique staff.

3.1.22 Floodplains and Wetlands

Although Flood Insurance Rate Maps (FIRM's) are available for certain parts of Natrona County, none have been prepared for the area around NPR-3 (Keller, 1993a). The FWS prepared National Wetland Inventory (NWI) Maps for the area surrounding NPR-3 in February 1993, which document the many impoundments and reservoirs within NPR-3. Some portions of the major stream beds are also classified as wetlands.

The topography of NPR-3, characterized by gently rolling uplands punctuated by narrow draws with steep embankments, suggests that floodplains are limited to lands within the embankments of the draws. It is likely that the areal extent of floodplains on NPR-3 roughly corresponds to Map Unit 195 in the soil survey in Table 3-3. The low permeability of the sodic soils which predominate in much of the watershed of the draws

(Davis, 1993a) suggests that brief but very intense floods could occur following infrequent downpours.

Wetlands and other areas at NPR-3 that are regulated under Section 404 of the Clean Water Act appear to be limited to man-made ponds, stream channels, and to certain areas within the embankments of the draws. The basins of several small impoundments constructed in the larger draws on NPR-3 during the 1920's to create reservoirs to support early oil drilling efforts (Doyle, 1993) are likely to be wetlands. No soils on the list of hydric soils compiled by the SCS for Natrona County (Davis, 1993c) or Hydric Soils of the United States (NTCHS, 1991) appear on the soil survey for areas at NPR-3 outside of the draws.

The channels of perennial and intermittent streams within the draws are regulated under Section 404 of the Clean Water Act, even if they lack vegetation and therefore do not technically meet the definition of wetlands. Available information suggests that some portions of the draw bottoms are wetlands, although further study would be required to determine exactly how much. Areas with the Flowing and Impounded (Wet) Riparian Vegetation Association, which is dominated by sedges (*Carex* sp. and *Cyperus* sp.), rushes (*Juncus* sp.), and cattails (*Typha* sp.), were likely to have met the definition of wetlands at the time that the figure was generated. Areas mapped with the Upland (Dry) Riparian Vegetation Association, which is characterized by thistle (*Cirsium flodmanii*), yarrow (Achillea *lanulosa*), goldenrod (*Solidago* sp.) and occasional grasses and grass-like species, were likely not to have met the definition of wetlands (US Navy, 1976). The distribution of riparian vegetation may have changed since 1976 in draw bottoms downstream of NPDES-permitted points of discharge.

The partial extent of wetlands within the draw bottoms is also supported by soil survey data. The soil survey mapping unit which encompasses the draw bottoms (Figure 3-2) is primarily comprised of soils in the Haverdad and Clarkelen soil series, which are not listed as hydric by the National Technical Committee for Hydric Soils (NTCHS, 1991). However, the SCS notes that inclusions of other soil series which are hydric are known to occur within Map Unit 195. (Davis, 1993c)The FWS has developed a system to classify wetlands and other waters of the United States (Cowardin, 1979). The man-made ponds discussed in Section 3.5.1 could be classified as Palustrine Open Water (POW) wetlands. The intermittent stream channels could be classified by the FWS as Riverine Intermittent Streambeds (R4SB). The perennial stream channels could be classified as Riverine, Upper Perennial Streambeds (R3SB). Areas within the draw bottoms but outside of the channels could be classified as Palustrine Emergent (PEM) or Palustrine Scrub-Shrub (PSS) Wetlands.

Cultural Resources

Shoshoni and Sioux tribes lived on the Wyoming Plains until the 1840's, when westward movement brought settlers on their way to Oregon via the Oregon Trail. The Oregon Trail followed a portion of the North Platte River Valley through Fort Laramie, Fort Caspar, and Fort Bridger. The land on which NPR-3 is located was used as hunting grounds by Native American tribes in the area (Halliburton NUS, 1993).

Surveys of NPR-3 which were conducted in 1976 were unable to identify specific tribal groups which may have used the property. Six areas were identified as having a concentration of flakes or artifacts. Only one of these areas was recommended for additional survey work in 1976, and the remaining areas were determined to be of no importance. The one area identified for additional work is located in the southeast part of NPR-3. This area was classified as lithic, ceramic scatter, with possible rock shelters. The area contained a large number of scattered tools and ceramic shards, suggesting that the area could have been occupied on a seasonal basis. All of the artifacts collected during the survey were estimated to date back to 400 AD (U.S. Navy, 1976).

During the comment period for the 1995 EA-1008, the Wyoming State Historic Preservation Office (SHPO) requested that additional surveys be done to locate cultural resources at NPR-3. The resulting Class III cultural resource inventory was completed in June 1995. The inventory identified 17 prehistoric sites, 13 isolated artifacts, and one historic site. Two of the 17 prehistoric sites are recommended for additional survey work and are considered eligible for listing on the National Register of Historic Places. Both of these sites contain hearth and rock shelter features which could provide additional information.

Petroleum development has shaped the history of NPR-3 and its immediate surroundings since the turn of the century. NPR-3 was established in 1915 in the wake of a national emphasis toward mineral resource conservation. Public versus private use of petroleum resources on these lands was a hotly contested political issue in the early 1900's, culminating in the "Teapot Dome Scandal" of 1924 (US Navy, 1976). Oil production at NPR-3 was discontinued in 1927 and did not resume again until 1959. From 1959 until 1976, oil production operations were established at NPR-3 in order to prevent the loss of oil to adjacent lands (Lawrence Allison, 1987; Halliburton NUS, 1993). In response to the oil shortages of the mid-1970's, President Carter authorized the production of NPR-3 at the maximum efficient rate (MER). Since that time, oil has been continuously produced at NPR-3.

Teapot Dome Oil Field (Site 48NA831) has been determined to be eligible for inclusion in the National Register of Historic Places. This was confirmed by the 1995 inventory. All cultural sites identified on NPR-3 would be avoided during field reclamation activities.

Several other sites which are eligible for listing or are listed on the National Register are located close to NPR-3. These include: Casper Buffalo Trap, Casper (6/25/74); Fort Casper, Casper (8/12/71 and 7/19/76); Independence Rock, Casper (10/15/66); Martin's Cove, Casper (3/8/77); Midwest Oils Company Hotel, Casper (11/17/83); South Wolcott Street Historic District, Casper (11/23/88); Stone Ranch Stage Station, Casper (11/01/82), Teapot Rock, 6 miles SW of NPR-3 (12/30/74); and Townsend Hotel, Casper (12/25/83). (U.S. National Park Service, 1991)

Socioeconomics

3.1.23 Population and Employment

The socioeconomic study area is defined for the purposes of this EA as Natrona County (including the City of Casper and other incorporated municipalities. Although 1996 estimate for Natrona County predicted the population of Casper would rise to 50,308, up 7 percent from the 1990 census, the actual estimated population of the City of Casper was 48,283 in July 1998 (CAEDA, 1993). Natrona County had an estimated 65,154 residents in 1996, up 7 percent from the 1990 Census (CAEDA, 1996), but this estimate dropped to 63,157 in July 1999 (Internet article, www.ohwy.com, 2000).

Although actual figures are unavailable, the County's population was expected to grow at a slow but steady rate to nearly 70,000 in 2000. This would be a 13 percent increase over the 1990 total population, but is still less than the peak 1980 population of 71,856 (State of Wyoming, 1992a). This growth rate is approximately the same as that projected for the entire state, which is also expected to grow by about 6 percent over the same period (State of Wyoming, 1992a). The majority of Natrona County's population growth is expected to occur in and around the City of Casper.

Total employment in Natrona County was 32,749 for 1996 (Economic Conditions, Casper and Natrona County, 2nd Quarter, 1997). Unemployment in Natrona County during the same period was 6.3 percent, down from 6.9 percent in 1989, and slightly higher than the statewide average of 4.9 percent (Economic Conditions, Casper and Natrona County, 2nd Quarter, 1997). The largest employment sectors in the county (for non-proprietary employees) are in services (26.3%), retail trade (21.0%), government and government enterprises (19.3%), and mining and construction (14.9%) which together as of February 1995 employed 82 percent of all workers in the study area (CAEDA 1996). On a statewide level, these sectors accounted for about 62.3 percent of all jobs in 1990 (State of Wyoming, 1992b).

3.1.24 Housing

Natrona County has approximately 29,082 housing units, of which approximately 69 percent are owner-occupied and approximately 31 percent renter-occupied. Within the City of Casper, the ratio is 66 percent owner-occupied to 34 percent renter-occupied (Morris, 1993). Eighteen percent of all housing units in Natrona County were vacant in 1990, compared to 14.7 percent in Casper that same year (Morris, 1993). The median home value in Natrona County in 1990 was $53,100, approximately 16 percent lower than the median value of $61,600 for the State of Wyoming. For the renter-occupied housing units, the median rent in 1990 was $252, compared to the statewide average of $270 (Wyoming State Data Center, 1992). New construction in Natrona County (as indicated by the number of building permits issued) decreased by 43 percent between 1980 and 1990, from 1,343 to 764 (CAEDA, 1992).

3.1.25 Transportation

Interstate Highway 25 provides the major north-south access through much of Natrona County, and is located approximately 8 miles (13 km) west of the NPR-3 site. Interstate 25 is a four-lane interstate highway with a median and narrow shoulders. Wyoming Route 259 is a two-lane secondary road with no median and narrow shoulders, which runs in a general north-south direction, connecting Interstate 25 with Wyoming Route 387. The NPR-3 site is accessed by a gravel road which is entered from Route 259, approximately 5 miles (8 km) south of the town of Midwest.

In 1991, the estimated Vehicles Per Day/Average Daily Totals (VPD/ADT) for Interstate 25 at the north Casper city limit was 3,710 (both directions). The VPD/ADT for Interstate 25 at Ormsby Road was also 3,710, and the VPD/ADT for Interstate 25 at Wyoming Route 259 was 3,270 in 1991. Wyoming Route 259 had an estimated VPD/ADT of 1,490 in 1991 (Leek, 1993). VPD/ADT totals show the current level of service on these road segments to be well below their carrying capacity. Traffic conditions on these roads, therefore, could be characterized as free-flowing with no congestion (Leek, 1993).

Air transportation services in Natrona County are provided at the Natrona County International Airport in Casper. The airport offers both freight and passenger services. Private airstrips are likely to exist in the county, although information concerning their exact number and location is not available (Keller, 1993b).

Rail transportation services are provided by the Burlington Northern Railroad and the Chicago and Northwestern Railroad. Both railroads run in a northwest-southeast direction and are located approximately 35 miles (56 km) south of NPR-3. Both railroads provide freight service only (no passenger service) to the Casper area.

3.1.26 Community Services

Public education in Natrona County is provided by the Natrona County School District No. 1, which has jurisdiction over the entire county. Total enrollment during the 1997-1998 school year was 12,588 students. The total number of certified teachers was 950. The district operates a total of 39 schools, including 30 elementary schools, 4 high schools, 5 junior high schools. Attendance in these schools is generally below capacity (Kirk, 1997).

Health services in Natrona County are provided by the Wyoming Medical Center in Casper, which has a maximum capacity of 225 beds.

Police protection in Natrona County is provided by the Natrona County Sheriff's Office, which has one police station and approximately 73 sworn officers (CAEDA, 1996). The City of Casper also maintains a police force, consisting of one station and approximately 75 sworn officers (Taylor, 1997).

Fire protection services in the county are provided by the Natrona County Fire Department, which has 1 fire station and 9 full-time firefighters (Baker, 1997).

Additional fire protection is provided by 6 volunteer fire departments, which are located throughout the county. Fire protection services for NPR-3 are provided by the Midwest and Edgerton volunteer fire departments, approximately 15-20 minutes away (Sullivan, 1993). The City of Casper Fire Department consists of 5 stations and 69 firefighters (Miller, 1997).

The chief provider of electric service in Natrona County is the Pacific Power & Light Company. Gas service is provided by K N Energy, Inc. (CAECA, 1996).

Municipal water for the City of Casper is derived from the North Platte River and local wells, and is treated locally by chlorination. Total capacity is 40 million gal (151,000 m^3)/day, with a storage capacity of 21.5 million gallons (81,400 m^3). Peak demand is 28 million gal (106,000 m^3)/day (CAECA, 1996). The town of Midwest receives its potable water from Casper through an underground pipeline.

The Casper sewage treatment system serves the Casper metropolitan area. The system consists of primary and secondary treatment, chlorination and chlorine removal. The current capacity is 14 million gal (52,990 M^3)/day and the current load is 6 million gal (22,710 m^3)/day. (CAECA, 1996)

Residential garbage collection in the City of Casper is provided primarily by the City of Casper. Private hauling services are provided in Natrona County by BAI, as well as other smaller garbage haulers. The county has three landfills: in Casper, Alcova, and Midwest. (Dundas, 1993)

Waste Management

3.1.27 Hazardous Waste

The Resource Conservation and Recovery Act (RCRA) (42 USC 9601-9675 et. seq.) regulates the treatment, storage, and disposal of solid waste (both hazardous and non-hazardous). Much of the waste generated at the site is exempt under 40 CFR 261.4 (b)(5), which defines the following solid wastes as exempt from the designation of hazardous: "drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas, or geothermal energy". Crude oil, natural gas, and associated liquid petroleum gasses (LPG) are produced at NPR-3. (Lawrence Allison, 1987)

NPR-3 is listed as a conditionally exempt small quantity generator under RCRA. As such, NPR-3 could generate no more than 220 lb (100 kg) of hazardous waste per month and total on-site accumulation could not exceed 2,205 lbs (1,000 kg) of hazardous waste, or 2.2 lbs (1 kg) of acutely hazardous waste, at one time.

Drilling and production wastes at NPR-3 include oil, water, drilling mud, cuttings, well cement, produced waters, and sediments and sludges from produced water pits. Oil from wells is routed to test satellites and tank batteries, and water from the tank batteries is discharged into pits or injected into a USC-permitted well. This water

contains residual oil. Other RCRA-exempt wastes generated at NPR-3 include sediment and tank bottoms from pits and storage tanks, pigging wastes, soil contaminated with crude oil, and spent filters (Miles, 2000a).

In accordance with the Superfund Amendment Reauthorization Act (SARA) Title III, chemicals are evaluated to determine if any are listed as extremely hazardous substances, and if any of these are utilized at NPR-3 in reportable threshold planning quantities (TPQ). NPR-3 submits annual Tier II reports for items such as treating chemicals, hydrochloric acid, gasoline, diesel fuel, ethylene glycol, propane, and butane-gasoline mixture. The current maximum quantity of all chemicals stored at NPR-3 at any given time is 25,000 gallons (95 m^3) (Miles, 2000a). Table 3-6 lists substances currently used at NPR-3 and the approximate annual usage.

Table 3-6
Substances Presently Used at NPR-3

Substance	Monthly Amount (gal)	Use
Baker Petrolite RBW0239A	30.0	Reverse Emulsion Breaker/Water Clarifyer
Baker Petrolite PA0035F	40.0	Paraffin Control
Baker Petrolite DMO0103F	40.0	Paraffin Control
Baker Petrolite AY0080	33.0	KCL Substitute
Baker Petrolite SCW2600H	22.5	Scale Inhibitor
Baker Petrolite 05169F	75.0	Desalting Emulsion Breaker
Baker Petrolite DMO2256G	10.0	Emulsion Breaker
Baker Petrolite DM05036F	10.0	Emulsion Breaker
Solvent	420.0	Parrafin Control
Ethly Mercaptan	0.5	Stenching Propane

Notes: Substances are noted by Manufacturers name. Usage rate is based on gallons per month.

There are two above ground fuel tanks at NPR-3: one 2,000 gallon (7.6 m^3) diesel tank and one 4,000 gallon (15.1 m^3) gasoline tank (Miles, 2000).

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601-9675 et. seq.), establishes liability, compensation, clean-up, and emergency response by the Federal Government for hazardous substances released into the environment and for the clean-up of inactive hazardous waste disposal

sites. A Phase I study of the site was completed in 1987 (Lawrence Allison, 1987). A Phase I study is designed to evaluate site history and records to locate and identify hazardous waste disposal sites. Historically, a variety of CERCLA-regulated substances have been used at NPR-3 (Table 3-7).

Table 3-7
Hazardous Substances Historically Used at NPR-3

Substance	Approximate Dates of Usage	Use
Caustic Soda (Anhydrous sodium hydroxide)	1940-1950, 1970's- 1980's, 1993-1995	Treatment of native mud, drilling additive, water treatment plant
Chrome lignosulfonate	1960's	Corrosion inhibitor
Hydrochloric Acid	1950's - Present	Cleaning of wells and flowlines
Sodium chromate	Late 1970's	Drilling additive
Sodium bichromate	Late 1970's	Drilling additive
Xylene	Unknown to present	Well production
Ethylene glycol	Unknown to present	Gas processing
Methanol	Unknown to present	Gas processing
n-butyl alcohol	Unknown to 1997	Well production

Other substances used in the past on NPR-3 include additives to drilling mud (crude oil, quebracho, phosphate), dehydrators (sulfonated oleic acid), aromatic solvents, emulsion breakers, polymers, oxyalkyl phenols, glycol, and isopropyl alcohol.

3.1.28 Pesticides

Onsite personnel began using the general-use herbicides Roundup, Banvil and Karmex for clearing parking lots, fence lines and areas around production equipment and buildings. Herbicides are stored in a shed at the chemical dock. Herbicides are purchased in small quantities and return agreements made with vendors whenever possible to limit the amount stored onsite.

3.1.29 Radioactive Waste

NPR-3 generates radioactive waste, which is classified as "Naturally Occurring Radioactive Material" (NORM). These wastes are the by-products of oil and gas production in an area with naturally high radioactivity in the subsurface (UNC Remediation, 1990). Tests done to detect NORM have indicated a NORM level below proposed State limits.

This project may use logging tools, which contain sealed radioactive sources, to

measure the properties of the rock formations. In the event of an accident involving a sealed radioactive source, emergency procedures have been coordinated between the DOE, Contractor, and owner of the tools. These procedures would be used to minimize the potential exposure to radiation, and ensure that the source is properly contained. Small amounts of liquid radioactive tracers are also occasionally used. These isotopes are specially selected for their short half-life and quick decay.

3.1.30 Waste Disposal

Disposal sites at NPR-3 include an industrial solid waste landfill, reserve pits and, injection wells (Miles, 2000a). Past disposal practices are fully covered in the Phase I study (Lawrence Allison, 1987) and are repeated here only when clarification is needed.

Thirteen solid waste disposal areas have been identified on the property. Eleven of these sites were used for non-hazardous waste. Two sites were used for the disposal of drilling mud (Lawrence Allison, 1987). Presently, NPR-3 has one industrial solid waste landfill which is 7.55 acres (1.9 ha) in size. The landfill is currently in Phase I, which consists of the eastern third of the landfill (FD Services, 1992c). The landfill would be closed (Miles, 2000a).

At the present time, NPR-3 contracts for solid waste collection and disposal. One 30-yard roll-off container is stationed in the field and is picked up and hauled to Casper as needed. On-going labor costs for operation and maintenance of the facility makes daily operation of the landfill impractical.

Reserve pits handle wastes generated during well drilling, completion and workover (Miles, 2000a). There are also four injection (disposal) wells on-site, used for backwash water from the water softener, produced water from oil reservoirs, and for disposal of other exploration and production (E&P) exempt wastes unused since 1996. Finally, there is a Bad Oil Facility which is used to hold oil for recycling, and sludge recovered from drilling pits, well servicing, tank and treater cleaning. Sludge from the Bad Oil Facility is collected in aboveground storage tanks and then applied to roads on-site in accordance with permits issued by WYDEQ (DOE, 1992).

Summary of the Affected Environment

The affected environment at NPR-3 considered by this EA is summarized in Table 3-8.

Table 3-8
Summary of Affected Environment

LAND RESOURCES	**3.1**	
Land Use	3.1.1	Intensive development in central third, scattered development in northern third, little or no development in southern third or on bluffs.
Aesthetics	3.1.2	Typical of oil fields. Cleaner than most.

Recreation	3.1.3	No recreational facilities within or adjoining NPR-3.
AIR QUALITY AND ACOUSTICS	**3.2**	
Meteorology and Climate	3.2.1	Semi-arid with approximately 9 to 12 inches (23-30 cm) of precipitation annually; average low temperature in winter about 0^{o}F (-18^{o}C); average max temperature in summer 80 to 85^{o}F (27-30 ^{o}C).
Air Quality	3.2.2	H_2S emissions from EOR activities.
Acoustics	3.2.3	Typical of oil fields.
WATER RESOURCES	**3.3**	
Surface Water Quantity	3.3.1	Ephemeral and intermittent streams in draws, small man-made ponds.
Ground Water Quantity	3.3.2	No high quality freshwater aquifers under NPR-3.
Surface Water Quality	3.3.3	Oil well production water discharged to draws under NPDES permits from WYDEQ.
Ground Water Quality	3.3.4	Water injection under UIC permits from WYOGCC.
Potable Water	3.3.5	Purchased from town of Midwest.
GEOLOGY AND SOILS	**3.4**	
Geology	3.4.1	Series of oil-bearing strata (reservoirs), several faults evidenced by the draws, seismically inactive.
Soils	3.4.2	Highly alkaline and saline soils derived from alkaline parent materials.
Prime Farmlands	3.4.3	None present within NPR-3 according to USDA Soil Conservation Service.
BIOLOGICAL RESOURCES	**3.5**	
Aquatic Biology	3.5.1	No fish reported in ephemeral and intermittent streams. One stocked pond exists at NPR-3.
Terrestrial Vegetation	3.5.2	Primarily rangeland, small areas of riparian vegetation (in draws) and pine-juniper forest (on bluffs). No forest management.
Biotreatment Facility	3.5.3	Biological treatment of produced water. Effluent discharged under existing NPDES permit. Provides wetland habitat.

Terrestrial Wildlife	3.5.4	Typical of eastern Wyoming, no hunting or active wildlife management.
Raptor Study	3.5.5	No evidence that raptors classified as threatened or endangered were nesting on NPR-3.
Ute Ladies'-tresses Orchid Survey	3.5.6	Potential habitats based on hydrological criteria were abundant however, most were alkaline to extremely alkaline which may limit the potential for this species to occur on NPR-3.
Threatened and Endangered Species	3.5.7	Federally-listed species possible: Blackfooted ferret, bald eagle (sighted, but no known nest within NPR-3), peregrine falcon. Previous blackfooted ferret survey negative.
Floodplains and Wetlands	3.5.5	Narrow zones within draws.
CULTURAL RESOURCES	**3.6**	Evidence of previous habitation by Native American tribes (likely Shoshoni and Sioux); Historical value of site due to Teapot Dome scandal in 1920's.
SOCIOECONOMICS	**3.7**	
Population and Employment	3.7.1	Natrona County characterized by slow population growth and unemployment rates similar to the state average.
Housing	3.7.2	No housing at NPR-3, housing availability abundant in Natrona County.
Transportation	3.7.3	All public highways servicing NPR-3 are free-flowing with no congestion.
Community Amenities	3.7.4	No shortages in Natrona County.
WASTE MANAGEMENT	**3.8**	
Hazardous Waste	3.8.1	Small quantities present at NPR-3, off-site disposal if required.
Pesticides	3.8.2	Small quantities used and stored onsite at chemical dock.
Radioactive Waste	3.8.3	Only concern is low level of naturally occurring radioactive material (NORM's) generated by oil and gas production operations. Past tests show that the site is below state limits for NORM.

Waste Disposal	3.8.4	Small quantities of waste disposal at the following on-site facilities: industrial solid waste landfill, reserve pits, injection wells, and bad oil facility.

4.0 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

Section 4.0 discusses environmental consequences (impacts) that could result from implementation of the Proposed Action and each alternative. The potential impacts of the Proposed Action are presented first. For each potential impact identified, specific mitigation measures have been proposed that would render the impact inconsequential. No potential impacts to any resource area from the Proposed Action have been identified for which practicable mitigation measures could not be developed.

Resource areas are addressed in the same order as the affected environment discussions in Section 3.0: land resources (Section 4.1), air quality and acoustics (Section 4.2), water resources (Section 4.3), geology and soils (Section 4.4), biological resources (Section 4.5), cultural resources (Section 4.6), socioeconomics (Section 4.7), and waste management (Section 4.8). The discussion under each resource area includes environmental consequences (impacts) and mitigation measures. Section 4.9 covers a brief discussion of cumulative impacts.

Land Resources

4.1.1 Land Use

Environmental Consequences of the Proposed Action:
A subterranean facility would be constructed approximately 1000' below the surface. As horizontal wells are drilled, wells along their path would be plugged and abandoned as they become uneconomical. Approximately 325 wells would be plugged, abandoned, and respective well pads restored to natural habitat. An estimated 5 surface facilities would be dismantled and reclaimed in the same manner. Roughly 50,000 feet of electrical distribution systems and 200 associated electrical poles would be dismantled along with reclaiming around 5 acres of road, and 5 abandoned pits. All previously disturbed acreage would be returned to natural habitat. Livestock grazing would cease during the summer months due to the potential damage grazing may cause to newly seeded locations. Summer grazing activities may resume after reclamation of NPR-3 is complete.

After the subterranean facility's economic life has been reached, the plug and abandonment plan (Attachment C) will be executed.

Mitigation Measures:
Disturbed areas would be mitigated in accordance with recommended reclamation procedures included in this plan cooperatively developed for NPR-3 by DOE and the Wyoming Oil and Gas Conservation Commission. Remaining areas would be revegetated upon completion of a horizontal well.

Environmental Consequences of No-Action Alternative:
Under the No-Action Alternative, approximately 200 wells would be plugged,

abandoned, and respective well pads restored to natural habitat. An estimated 3 surface facilities would be dismantled and reclaimed in the same manner. Roughly 30,000 feet of electrical distribution systems and 120 associated electrical poles would be dismantled along with reclaiming around 3 acres of road, and 3 abandoned pits. All previously disturbed acreage would be returned to natural habitat. Livestock grazing would cease during the summer months due to the potential damage grazing may cause to newly seeded locations. Summer grazing activities may resume after reclamation of NPR-3 is complete.

Mitigation Measures:
There are no mitigation measures required under this alternative.

Environmental Consequences of Drilling Horizontal Wells From The Surface:
Under this alternative, NPR-3 would drill 40 horizontal wells. This would require approximately 200 acres of land and additional money would be required for disturbance and eventual reclamation of this acreage.

Mitigation Measures:
None needed.

Environmental Consequences of Drilling Vertical Wells From the Surface:
Under this alternative, DOE would drill 160 vertical wells. Ground disturbances from the drilling would require 320 acres of land, therefore increasing the environmental impacts.

Mitigation Measures:
None needed.

4.1.2 Aesthetics

Environmental Consequences of the Proposed Action:
Because of the existing state of disturbance throughout most of NPR-3 and the presence of other privately owned oil fields in the surrounding area, activities under the Proposed Action would have positive visual impacts. The Proposed Action would result in an expedited restoration of roads, well locations, and support facilities to natural habitat. Because of the rim of bluffs surrounding much of NPR-3, the Proposed Action would not have an impact on any regional view sheds nor would those sites be visible to the general public or from the Wyoming Highway 259 corridor.

A large amount of material would be excavated in order to construct the subterranean facility.

Mitigation Measures:
Mitigation measures would consist of drying out the pit and contouring with top soil and reseeding. At the end of the respective life of 20 years the contents of the pit would be used to fill the shaft and the site reclaimed.

Environmental Consequences of the other Alternatives:

The drilling of 40 horizontal or 160 vertical wells from the surface would generate a visual impact in that new wells and pits would be created. Under a no action scenario, no visual impact would be generated.

Mitigation Measures:
Mitigation measures would consist of plugging and abandoning the wells after they are no longer economical, re-contour and reseed to its natural state.

4.1.3 Recreation

Environmental Consequences of the Proposed Action:
There would be no impacts on recreational facilities as a result of the Proposed Action. No major recreational facilities exist at or in the immediate vicinity of NPR-3. The anticipated demand for regional recreational facilities would not be increased.

Mitigation Measures:
Because there are no major existing recreational facilities that could be adversely impacted by the Proposed Action and because the Proposed Action would not increase the demand for regional recreational facilities, no mitigation measures are necessary.

Environmental Consequences of the other Alternatives:
None of the alternatives would generate any impacts to recreational resources, for the same reasons as discussed in the Proposed Action.

Mitigation Measures:
No mitigation measures to offset resulting from the alternatives are necessary.

Air Quality and Acoustics

4.1.4 Meteorology and Climate

Environmental Consequences of the Proposed Action:
No impacts on the meteorology and climate of the region containing NPR-3 would result from the Proposed Action at NPR-3.

Mitigation Measures:
Because the Proposed Action would not adversely affect the regional climate, no mitigation measures are necessary.

Environmental Consequences of the other Alternatives:
No impacts on meteorology and climate of the region containing NPR-3 would result from adoption of any of the alternatives.
Mitigation Measures:
Because the alternatives would not adversely affect the regional climate, no mitigation measures are necessary.

4.1.5 Air Quality

Environmental Consequences of the Proposed Action:

Impacts on air quality from the Proposed Action would be limited. Although some petroleum operations would continue, operations are expected to be minimal in comparison to previous levels of activity at NPR-3. Emissions of air pollutants, including particulates, sulfur dioxide, carbon monoxide, hydrogen sulfide, nitrogen oxides and hydrocarbons would be well below permitted levels. Such activities may cause negligible fugitive dust levels, however, those levels would be lower than levels experienced from past activities.

Mitigation Measures:
Fugitive dust emissions would be in direct proportion to disturbed acreage, and with reclamation, would not exceed the WYDEQ standard within the project area or at the boundary. During project dismantling, fugitive dust would be reduced by wetting problem areas using water obtained from the Madison formation, and by restricting vehicle travel wherever practicable. Application of crude oil sludge to the roads would continue but in lesser quantities as those roads currently receiving crude oil sludge applications are reclaimed. The application of sludge to the roads is permitted by WYOGCC for dust control.

Environmental Consequences of the No-Action Alternative:
Air emissions would start at the same level and then slowly decrease in all criteria as production becomes non-profitable and related activities decrease or cease.

Mitigation Measures:
Mitigation measures would be similar to those of the Proposed Action, except that only those measures that make sense in the context of a short remaining project life would be executed.

Environmental Consequences of All Other Alternatives:
Most major emissions sources would increase. Other sources, such as fugitive dust and hydrocarbon emissions, would increase due to drilling activities.

Mitigation Measures:
Same as those in the Proposed Action.

4.1.6 Acoustics

Environmental Consequences of the Proposed Action:
Noise emissions from the proposed action and onsite operation are not anticipated to increase ambient noise levels outside of the boundaries of NPR-3. During the construction phase, limited increases to ambient noise levels may potentially occur on NPR-3, and would primarily be associated with heavy equipment, drilling rigs, and vehicle traffic.

Mitigation Measures:
No increase in noise levels are expected to occur from the Proposed Action outside the boundaries of NPR-3. Ongoing measures for the protection of workers' hearing inside the boundaries of NPR-3 would continue to be implemented. These measures would

include the use of standard silencing packages on heavy equipment, and the use of OSHA-approved earmuffs or earplugs in designated areas or building which experience elevated noise levels.

Environmental Consequences of Alternatives:
Noise levels from the alternatives would generate environmental consequences similar to those in the Proposed Action. A generally reduced level of activity would not reduce high noise levels at specific sites. However, field wide noise levels would increase as new wells were drilled.

Mitigation Measures:
Mitigation measures would be similar to those in the Proposed Action.

Water Resources

4.1.7 Surface Water Quantity

Environmental Consequences of the Proposed Action:
Water withdrawn from any surface water bodies under the Proposed Action would remain the same or may increase or decrease slightly, however, no large changes are expected to occur.

Mitigation Measures:
None needed.

Environmental Consequences of the No-Action Alternative:
Surface water flow would return to pre-development levels after production reaches its economic limit and decommissioning begins.

Mitigation Measures:
Mitigation measures would include possible use of Madison water supply wells to compensate for lost oil field discharges.

Environmental Consequences of All Other Alternatives:
Same as the proposed action.

Mitigation Measures:
None needed.

4.1.8 Ground Water Quantity

Environmental Consequences of the Proposed Action:
Because no aquifers bearing high quality fresh water exist in the immediate vicinity of NPR-3, no such aquifers can be potentially depleted or contaminated by the Proposed Action. The water withdrawn from the formations is high in total dissolved solids (TDS) and hydrocarbons and is not suitable for use as potable water. In particular, the salinity of the Madison formation water renders it unsuitable as potable water, therefore no

adverse competition with regional demands for potable water is known.

Mitigation Measures:
As there are no potentially competing uses for Madison formation water or other groundwater resources present at NPR-3, and because there is no potential for land subsidence, there is no potential overdraft of groundwater at NPR-3.

Environmental Consequences of the other Alternatives:
No impacts on groundwater quantity at NPR-3 would result from adoption of any of the Alternatives.

Mitigation Measures:
Because the alternatives would not adversely affect groundwater quantity, no mitigation measures are necessary.

4.1.9 Surface Water Quality

Environmental Consequences of the Proposed Action:
All produced water is currently pumped to the biological treatment facility and discharged through a NPDES permit into the Little Teapot Creek. The quality of this water is equal to or better than that of current discharges. The process water effluent originating from the deep Tensleep and Madison formations are hot but engineering controls and the in-stream temperature rapidly cools the water to ambient temperatures through atmospheric exchange. The amount of surface water discharged through the biological treatment facility would remain the same or increase slightly as the new horizontal wells are put on production. All discharges would continue to comply with the terms of NPDES permits. Existing NPDES permits would not be renewed as those facilities are no longer required for production operations.

Minor quantities of surface runoff may reach the streams at NPR-3. Both the quantity of and quality of this runoff is similar to that runoff presently reaching the streams. As sites are restored to natural habitat, surface runoff would decrease. Engineering controls would be used to ensure surface disturbance during reclamation does not result in sedimentation of the intermittent and ephemeral streams.

Mitigation Measures:
None Needed.

Environmental Consequences of all Alternatives:
All alternatives would be expected to continue largely unchanged from current practices. Therefore, surface water quality impacts would not change.

Mitigation Measures:
None needed.

4.1.10 Ground Water Quality

Environmental Consequences of the Proposed Action:
Due to the depth of Madison formation water, surface activities are not expected to affect ground water quality under the Proposed Action.

Mitigation Measures:
Surface facilities such as reserve pits and disposal ponds would be restored to natural habitat. Soil samples would be tested by a certified independent laboratory to ensure soil contamination is fully remediated prior to restoring sites to natural habitat. Spills of crude oil and other chemicals would be fully remediated and locations restored to natural habitat. Finally, routine groundwater monitoring would continue.

Environmental Consequences of the other Alternatives:
Consequences of the other alternatives are similar to those of the Proposed Action.

Mitigation Measures:
Mitigation measures would be similar to those in the Proposed Action.

4.1.11 Potable Water

Environmental Consequences of the Proposed Action:
Water would continue to be provided from the Casper and Midwest municipal systems and monitored as it is presently.

Mitigation Measures:
Mitigation measures are not necessary to offset the limited use of potable water attributable to the Proposed Action.

Environmental Consequences of the other Alternatives:
Same as the proposed action.

Mitigation Measures:
Mitigation measures are not necessary to offset the limited use of potable water attributable to any of the alternatives.

Geology, Soils, and Prime and Unique Farmlands

4.1.12 Geology

Environmental Consequences of the Proposed Action:
Activities under the Proposed Action would involve restoring areas of surface soil previously disturbed by construction and drilling activities to their natural habitat. Grazing would cease during the summer months under the Proposed Action because migration of livestock is difficult to control and would interfere with restoration activities.

Mitigation Measures:
No mitigation measures are necessary under the Proposed Action.

Environmental Consequences of the All Other Alternatives:
Same as the proposed action.

Mitigation Measures:
No mitigation measures are necessary under other alternatives.

4.1.13 Soils

Environmental Consequences of the Proposed Action:
Activities under the Proposed Action would involve restoring areas of surface soil previously disturbed by construction and drilling activities. Severe water erosion hazards typically associated with intense downpours would be virtually eliminated. In the past, surface disturbance has been shallow and has not involved removal of large quantities of soil. Erosion in these areas has been minimal.

Summer grazing in conjunction with restoration activities would have a negative impact on the areas being restored because migration of livestock is difficult to control and it would interfere with restoration activities.

Mitigation Measures:
Mitigation measures would involve restoring most areas of surface disturbance. The greatest need for soil replacement and expanded restoration activities would occur at those locations along the horizontal well paths. Surface soil restoration would involve replacing areas of topsoil where necessary, bio-remediation of contaminated soils and restoring locations to natural habitat.

Environmental Consequences of No-Action Alternative:
No new construction or surface disturbance would occur under the No-Action Alternative.

Mitigation Measures:
Mitigation measures would be similar to those in the Proposed Action.

Environmental Consequences of All Other Alternatives:
Same as the proposed action.

Mitigation Measures:
Mitigation measures would be similar to those in the Proposed Action.

4.1.14 Prime and Unique Farmlands

Environmental Consequences of the Proposed Action:
Because no prime or unique farmlands are present within NPR-3 (Davis, 1993b), no part of the Proposed Action has any potential for impact.

Mitigation Measures:

As there are no prime farmlands present on or in the vicinity of NPR-3, no mitigation measures are necessary.

Environmental Consequences of the other Alternatives:
None of the proposed alternatives has any potential for impact because no prime or unique farmlands are present within NPR-3.

Mitigation Measures:
As there are no prime farmlands present on or in the vicinity of NPR-3, no mitigation measures are necessary.

Biological Resources

4.1.15 Aquatic Biology

Environmental Consequences of the Proposed Action:
Ground disturbance could result in a temporary increase of sedimentation of streams at NPR-3. The Powder River is already adversely affected by poor water quality from other sources other than NPR-3, and the river provides important habitat for sturgeon chubs and shovelnose sturgeon. However, as discussed in Section 4.3.3, the use of a biological treatment area for the treatment of produced water originating from NPR-3 actually improve the quality of water discharged.

Mitigation Measures:
Mitigation measures would be developed in consultation with the WGFD. To ensure that impacts on fisheries in the Powder River basin are minimized, WGFD has recommended that special precautions be taken to prevent the release of pollutants from work areas at NPR-3. Where effluent must be discharged under existing NPDES permits, WGFD recommends that the creation of appropriately sized wetlands be considered as a means of improving water quality. The DOE has already implemented this suggestion through the use of a biological treatment facility. As discussed previously, effluent discharged under the NPDES permit for the biotreatment facility improves quality of water discharged to the Powder River System.

Another alternative is the use of Madison water in the event that Tensleep water is no longer being produced and treated through the biological treatment area. The water from the Madison formation comes from a free-flowing well and is not pressurized through any type of engineering controls.

Environmental Consequences of the No-Action Alternative:
As facilities and wells are shut in the amount of produced water discharged would gradually decrease. This would have an effect on the streams and wetlands at NPR-3, and may also have a negative effect on the aquatic organisms.

Mitigation Measures:
Mitigation measures employed to protect aquatic biological resources would be similar

to those of the Proposed Action.

Environmental Consequences of All Other Alternatives:
Same as the proposed action.

Mitigation Measures:
Same as the proposed action.

4.1.16 Terrestrial Vegetation

Environmental Consequences of the Proposed Action:
Under the Proposed Action surface areas previously disturbed by construction and drilling operations would be revegetated. Road crossings, and utility lines and poles would be removed and restored to natural habitat. Particular care would be taken to restore riparian areas. Leasing of NPR-3 rangeland for summer livestock grazing would cease during restoration operations.

Mitigation Measures:
Exposed soils would be reclaimed following a plan developed cooperatively by DOE and Wyoming Oil and Gas Conservation Commission. No summer grazing would be allowed during restoration in order to minimize grazing impacts on newly restored areas.

Environmental Consequences of All Other Alternatives:
Same as the proposed action

Mitigation Measures:
Same as the proposed action.

4.1.17 Terrestrial Wildlife

Environmental Consequences of the Proposed Action:
Natural habitat, particularly native grasses destroyed by previous construction and drilling activities would be restored. More area would be available for wildlife and future livestock grazing. Increased activity in localized parts of NPR-3 due to proposed action activities would not impact the pronghorn antelope and mule deer population, whose natural mobility allows for movement throughout NPR-3 and adjoining undisturbed lands. The less mobile wildlife species (amphibian, reptiles and small mammals) would have more natural habitat available to repopulate due to the revegetation of NPR-3.

Noise generated by activities under the Proposed Action would be generally consistent with noise generated by existing activities at NPR-3. Workers at NPR-3 have noticed that antelope and deer have become conditioned to the noise (Halliburton NUS, 1993). Noise levels associated with oil drilling , restoration and demolition activities, such as those already present at NPR-3 are not unusually high for industrial operations. Noise generated by heavy equipment under the Proposed Action would be minimal. Ambient drilling noise associated with continued production have been measured 50 feet (15 m)

from a drill rig and recorded at 75 dbA (DOE, 1990).

Mitigation Measures:
No mitigation measures are necessary to compensate for the increases in activities that would result from the Proposed Action.

Environmental Consequences of the No-Action Alternative:
None needed.

Mitigation Measures:
Mitigation measures are not necessary under this alternative.

Environmental Consequences of All Other Alternatives:
Same as the proposed action.

Mitigation Measures:
Same as the proposed action.

4.1.18 Threatened and Endangered Species

Environmental Consequences of the Proposed Action:
There are no Federally-listed threatened or endangered species known to consistently inhabit NPR-3. Since the bald eagle and peregrine falcon (both endangered) are rare migrants, and the black-footed ferret (endangered) is believed to be absent from the area, none of these species would be impacted by the Proposed Action.

Mountain Plover *(Charadrius Montanus)* (Federally proposed for listing) are known to dwell in the area, however, they occur approximately two miles from where the proposed facility would be located. The mountain plover's habitat is very compatible with mining operations. They are known to nest near mining operations due to the exposure of the grounds surface and sparse vegetation (Internet article by USGS (Parrish 1988)).

Also located on the property are Burrowing Owls *(Athene Cunicularia)* which are listed on the US Forest Service Region 2 Sensitive Species List. The mine would not be located near where the Burrowing Owls are located.

Mitigation Measures:
No mitigation measures are necessary under the Proposed Action.

Environmental Consequences of the other Alternatives:
Continued operations under any of the proposed alternatives would result in impacts

similar to those current operations. The difference would be in the remaining life of the project, and the time until the project site would be returned to its former condition.

Mitigation Measures:
Mitigation measures would be similar to those used for current operations. The restoration of the project after termination of operations would require no mitigation.

4.1.19 Floodplains and Wetlands

Environmental Consequences of the Proposed Action:
Pipelines and utility lines would be removed and draws would be returned to natural habitat. Wetlands receiving NPDES discharges may be impacted by the Proposed Action since many areas of wetlands within the draws owe their existence to these discharges. The manmade wetland created by the biological treatment facility would experience the greatest effect from the Proposed Action. Closure of existing wells by DOE, when they become uneconomic, would result in a decrease in water discharges through the biological treatment facility and may result in the shrinkage or elimination of some wetlands.

Since summer grazing would not take place under the Proposed Action, damage to riparian vegetation, stream banks, or fouling of surface water is not a concern.

Mitigation Measures:
DOE would investigate all practicable alternatives meeting the objectives of its mission at NPR-3 prior to even minor modifications to wetlands or floodplains. Under the Proposed Action, mitigation of lost wetlands would include the construction of nearby wetlands as compensation. Alternatively, the Madison water supply wells can continue to produce water and feed the existing wetlands at NPR-3. If an activity under the Proposed Action would adversely affect a wetland, mitigation measures would be developed in consultation with the Corps of Engineers. Since summer livestock grazing would not take place under the Proposed Action, mitigation measures are not necessary.

Environmental Consequences of the other Alternatives:
Activities under the other alternatives would be conducted in a manner similar to that of the Proposed Action, in that wetlands would be generally avoided. Discharges of produced water would generally decrease with time, as production becomes uneconomic. None of the alternatives propose drilling additional wells in the Tensleep formation, thereby increasing water discharge volumes to the biological treatment facility. Mitigation of lost wetlands is covered under the Proposed Action.

Mitigation Measures:
During operation of the project, mitigation would be similar to that of the Proposed Action.

Cultural Resources

Environmental Consequences of the Proposed Action:
All activities at NPR-3 would decrease and the major portion of the property would be restored to its former state. The shaft of the Subterranean Facility will not be located near cultural resources and no disturbance would occur.

Mitigation Measures:
Since no new ground near cultural resources would be disturbed there is no potential for disturbance of any cultural sites. All cultural sites previously identified on NPR-3 would be avoided during construction of the Subterranean Facility.

Environmental Consequences of the No Action Alternatives:
New construction under the No-Action Alternative would be halted. Only minor surface disturbance would occur until decommissioning of the field. Disturbance of cultural resource sites would be avoided.

Mitigation Measures:
Mitigation measures outlined in EA-1008, Continued Development of Naval Petroleum Reserve No. 3 would be used.

Environmental Consequences of All Other Alternatives:
All other alternatives would avoid all cultural sites.

Mitigation Measures:
None needed.

Socioeconomics

4.1.20 Population and Employment

Environmental Consequences of the Proposed Action:
Under the Proposed Action, employment levels at NPR-3 would stay at their present levels.

Mitigation Measures:
Because the Proposed Action would not substantially change regional population or employment levels, no mitigation measures are necessary.

Environmental Consequences of the No-Action Alternative:
Employment levels would generally decline since oil production rates would continue to decline.

Mitigation Measures:
Job retraining and severance benefits would be awarded to Federal employees who are displaced as a result of declining activity at NPR-3.

Environmental Consequences of All Other Alternatives:

Under all other Alternatives employment levels would stay the same.

Mitigation Measures:
Because all other alternatives would not substantially change regional population or employment levels, no mitigation measures are necessary.

4.1.21 Housing

Environmental Consequences of the Proposed Action:
Because the Proposed Action would not immediately change employment levels at NPR-3, the value of housing units in Natrona County would not be affected.

Mitigation Measures:
No mitigation necessary.

Environmental Consequences of the No-Action Alternative:
As employment levels decline with the oil production a slight effect might be seen in local housing values.

Mitigation Measures:
No mitigation is necessary

Environmental Consequences of All Other Alternatives:
Because all other alternatives would not immediately change employment levels at NPR-3, the value of housing units in Natrona County would not be affected.

Mitigation Measures:
No mitigation is necessary.

4.1.22 Transportation

Environmental Consequences of the Proposed Action:
Transportation of heavy machinery and materials to and from NPR-3 using Interstate 25 and Wyoming Route 259 would be necessary under the Proposed Action. Because the current level of service on these roads is substantially below capacity, no disruption of traffic flow would occur as a result.

Mitigation Measures:
Because of the adequacy of regional transportation facilities, no mitigation measures are necessary.

Environmental Consequences of the other Alternatives:
Highway traffic resulting from the adoption of any of the alternatives would be less than or approximately equal to that resulting from continued development.

Mitigation Measures:
Because of the adequacy of regional transportation facilities, no mitigation measures

are necessary.

4.1.23 Community Services

Environmental Consequences of Proposed Action:
Because employment and population levels are expected to remain generally constant under the Proposed Action, community services in Natrona County would not be affected.

Mitigation Measures:
Because of the adequacy of regional community services, no mitigation measures are necessary.

Environmental Consequences of the other Alternatives:
Employment and population levels resulting from the adoption of any of the alternatives would be less than or approximately equal to that resulting from the Alternative discussed in Section 4.7.1.

Mitigation Measures:
Because of the adequacy of regional community services, no mitigation measures are necessary.

Waste Management

Environmental Consequences of the Proposed Action:
High-level radioactive waste is not expected, but might be generated by an accident involving sealed radioactive sources. Naturally Occurring Radioactive Materials (NORM) would be present in production equipment in extremely low levels and below proposed state and Federal regulations.

Mitigation Measures:
Mitigation measures for hazardous substances would include waste minimization, product substitution and the monitoring of usage to ensure compliance with applicable laws and regulations. Proper disposal of all hazardous and non-hazardous materials would be ensured by training and environmental compliance audits.

Solid waste would be hauled offsite by a commercial hauler.

Mitigation for high-level radioactive wastes would include training in operational procedures intended to prevent accidental releases. Prompt and effective spill response would minimize the quantity of waste generated in the event of a release.

Continuing to assess the extent of its occurrence at NPR-3 would mitigate NORM. If it is found to be at regulated levels, a scale prevention program would be investigated as a means to prevent the deposition of NORM-containing carbonate/sulfate scale. Inspection procedures would ensure that contaminated equipment is discovered, decontaminated, and that disposal of the NORM debris is properly administered.

Environmental Consequences of the No-Action Alternative:
Because this alternative is to continue business as usual, no additional waste would be incurred.

Mitigation Measures:
No mitigation measures necessary.

Environmental Consequences of Horizontal and Vertical Well Alternative:
Due to established methods of handling, there would be no increase of wastes expected.

Mitigation Measures:
No mitigation measures necessary.

Cumulative Impacts of the Proposed Action and Alternatives

The proposed action would create cumulative impacts that are environmentally positive. Surface that had been disturbed by wells that are no longer economical, would be restored to their natural state.

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Wyoming State Data Center. 1992. WSDC Bulletin.

Young, J. F. 1986. Letter dated September 9, 1986 from J. Young of the USDA Soil Conservation Service, Casper Field Office to David R. McCallister of Lawrence-Allison & Associates West, Inc. Subject- Grazing and vegetation.

Zarate, C. and Clark, D. 2000. Survey of the prairie dog town.

APPENDIX A - RESPONSE TO COMMENTS

The following concerns and comments were noted during the public comment phase. Each issue is listed below and is immediately followed by a response, in bold. Copies of all letters received appear at the end of this section.

Issues raised by the State of Wyoming, Oil and Gas Conservation Commission.

2.1.1 The first issue pertains to the details of the landfarm treatment process, pit construction, and materials extracted.

The landfarm treatment process will consist of putting all tailings into the pit, dry them out and cover with topsoil and reseeded. Pit construction is addressed in 2.1.1. Materials extracted are expected to be all hydrocarbon materials and drilling fluids.

The second issue pertains to proper plugging of the horizontal wells, as well as the mine shaft and “room” upon completion of the project.

A plug and abandonment plan has been prepared and approved by the Wyoming Oil and Gas Commission and has been added as Attachment C to the Final Environmental Assessment.

Issues raised by the Department of the Army, Corps of Engineers, Omaha District.

3.5.8 The first issue pertains to the placement of dredged or fill material into wetlands and other waters of the United States.

There will not be any dredged or fill material placed into the wetlands or other waters of the United States. There also will not be any work near the wetlands or other waters of the United States.

APPENDIX B - SECTION 107 OF ENDANGERED SPECIES ACT

Copy FYI – Dale

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4000 Airport Parkway
Cheyenne, Wyoming 82001

5460

ES-61411
br/W.35/WY3920

August 22, 2000

David Miles
NPOSR-CUW
907 N. Poplar, Suite 150
Casper, Wyoming 82601

Dear Mr. Miles:

Thank you for your letter of July 24 regarding the proposed drilling of a mine shaft in the center of the Naval Petroleum Reserve Number 3 (NPR-3) in Natrona County, Wyoming. I understand the proposed project is envisioned to consist of a 10-foot diameter mine shaft 900-feet deep with 100 horizontal wells 2,000-feet long radiating out from the mine shaft in a 360 degree circle at the 900 foot depth.

In accordance with section 7(c) of the Endangered Species Act of 1973, as amended (Act), I am providing you with information on threatened or endangered species, or species proposed for listing under the Act, that may be present in the project area (see enclosed information).

Section 7(d) of the Act requires that the Federal agency and permit or license applicant shall not make any irreversible or irretrievable commitment of resources which would preclude the formulation of reasonable and prudent alternatives until consultation on listed species is completed.

Thank you for the opportunity to review the proposed work. Please keep this office informed of any developments or decisions concerning this project.

If you have any questions please contact Bradley Rogers of my staff at the letterhead address or phone (307) 772-2374 extension 25.

Sincerely,

Michael M. Long
Field Supervisor
Wyoming Field Office

Enclosures (5)

cc: Director, WGFD, Cheyenne, WY
Nongame Coordinator, WGFD, Lander, WY

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4000 Airport Parkway
Cheyenne, Wyoming 82001

THREATENED AND ENDANGERED SPECIES OF NATRONA COUNTY, WYOMING

Last Updated Apr 10, 2000

Status Key: **E** = Endangered, **T**= Threatened, **P** = Proposed for Listing, **X** = Experimental

SPECIES	STATUS	HABITAT
BALD EAGLE (*Haliaeetus leucocephalus*)	T	Found throughout state
BLACK-FOOTED FERRET (*Mustela nigripes*)	E	Prairie dog towns
MOUNTAIN PLOVER (*Charadrius montanus*)	P	Grasslands

If the proposed action will lead to water depletion (consumption) in the North Platte River System, impacts to threatened and endangered species inhabiting the downstream reaches of the Platte River in Nebraska should be included in the evaluation (Please read detailed information in the following page).

BALD EAGLE: While habitat loss still remains a threat to the bald eagle's full recovery, most experts agree that its recovery to date is encouraging. Bald eagles are believed to live 30 years or longer in the wild, and even longer in captivity. They mate for life and build huge nests in the tops of large trees near rivers, lakes, marshes, or other wetland areas. Nests are often re-used year after year. With additions to the nests made annually, some may reach 10 feet across and weigh as much as 2,000 pounds. Although bald eagles may range over great distances, they usually return to nest within 100 miles of where they were raised.

Bald eagles normally lay two to three eggs once a year and the eggs hatch after about 35 days. The young eagles are flying within 3 months and are on their own about a month later. However, disease, lack of food, bad weather, or human interference can kill many eaglets; sometimes only about half will survive their first year.

A disturbance-free buffer zone of one mile should be maintained around eagle nests. Activity within one mile of an eagle nest may disturb the eagles and result in "take". If a disturbance-free buffer zone of one mile is not practicable, then the activity should be conducted outside of the nesting season which is from Feb 15 - Aug 15.

The staple of most bald eagle diets is fish, but they will feed on almost anything they can catch, including ducks, rodents, snakes, and carrion. In winter, northern birds migrate south and gather in large numbers near open water areas where fish or other prey are plentiful.

BLACK-FOOTED FERRETS: Black-footed ferrets may be affected if prairie dog colonies are impacted. **If black-tailed prairie dog (*Cynomys ludovicianus*) colonies or complexes greater than 79 acres or white-tailed prairie dog (*C. leucurus*) colonies or complexes greater than 200 acres will be disturbed, surveys for ferrets should be conducted even if only a portion of the colony or complex will be disturbed.** A white-tailed prairie dog town or complex consists of two or more neighboring prairie dog towns each less than 7 kilometers (4.34 miles) from each other (Black-footed Ferret Survey Guidelines, USFWS, 1989) . If a field check indicates that prairie dog towns may be affected, you should contact this office for guidance on ferret surveys.

MOUNTAIN PLOVER: Mountain plover breeding and wintering habitats are known to include grasslands, mixed grassland areas and short-grass prairie, shrub-steppe, plains, alkali flats, agricultural lands, cultivated lands, sod farms, and prairie dog towns. Plovers may nest on sites where vegetation is sparse or absent, or near closely cropped areas, manure piles or rocky areas. Mountain plovers are rarely found near water and show a preference for previously disturbed areas or modified habitat. They may be found on heavily grazed pastures throughout their breeding range and may selectively nest in or near prairie dog towns.

The Service recommends surveys for mountain plovers in all suitable habitat as well as avoidance of nesting areas to minimize impact to plovers in a site planned for development. While the Service believes that plover surveys, avoidance of nesting and brood rearing areas, and timing restrictions (avoidance of important areas during nesting) will lessen the chance of direct impacts to and mortality of individual mountain plovers in the area, these restrictions do nothing to mitigate indirect effects, including changes in habitat suitability and habitat loss. Surveys are, however, a necessary starting point.

In some cases, activities can be conducted between August 15th and March 15th to avoid affecting this species.

NORTH PLATTE RIVER WATER DEPLETIONS: Water depletions to the Platte River system may affect the endangered whooping crane (*Grus americana*), endangered interior least tern (*Sterna antillarum*), threatened piping plover (*Charadrius melodus*), and endangered pallid sturgeon (*Scaphirhynchus albus*), the threatened bald eagle (*Haliaeetus leucocephalus*), the endangered Eskimo curlew (*Numenius borealis*) and threatened western prairie fringed orchid (*Platanthera praeclara*). Depletions include evaporative losses and/or consumptive use, often characterized as diversions from the Platte River or its tributaries less return flows. Project elements that could be associated with depletions to the Platte River system include, but are not limited to, ponds (detention/recreation/irrigation storage/stock watering), lakes (recreation/irrigation storage/municipal storage/power generation), reservoirs (recreation/irrigation storage/municipal storage/power generation), created or enhanced wetlands, pipelines, wells, diversion structures, and water treatment facilities. Any actions that may result in a water depletion to the Platte River system should be identified. The document should also include an estimate of the amount and timing (by month) of average annual water depletion (both existing and new depletions), and describe methods of arriving at such estimates.

Consultation with the U.S. Fish and Wildlife Service Under Section 7(c) of the Endangered Species Act

Section 7(c) of the Act requires the preparation of a biological assessment for any Federal action that is a major construction activity to determine the effects of the proposed action on listed and proposed species. If a biological assessment is not required (i.e., all other actions), the lead Federal agency is responsible for review of proposed activities to determine whether listed species will be affected. If it is determined that the proposed activities may affect a listed species, you should contact the U.S. Fish and Wildlife Service (Service) to discuss consultation requirements:

If it is determined that any Federal agency program or project "is likely to adversely affect" any listed species, formal consultation should be initiated with this office. Alternatively, informal consultation can be continued so the Service can assist you to determine how the project could be modified to reduce impacts to listed species to the "not likely to adversely affect" threshold. If it is concluded that the project "is not likely to adversely affect" listed species, you should request the Service to review the assessment and concur with the determination of not likely to adversely affect.

For those actions where a biological assessment is necessary, it should be completed within **180 days** of receipt of a species list, but can be extended by mutual agreement between the lead agency and the Service. If the assessment is not initiated within 90 days of receipt of a species list, the list of threatened and endangered species should be verified with the Service prior to initiation of the assessment. The biological assessment may be undertaken as part of the agency's compliance of section 102 of the National Environmental Policy Act (NEPA), and incorporated into the NEPA documents. The Service recommends that biological assessments include:

1. a description of the project;
2. a description of the specific area potentially affected by the action;
3. the current status, habitat use, and behavior of threatened and endangered species in the project area;
4. discussion of the methods used to determine the information in item 3;
5. direct and indirect impacts of the project to threatened and endangered species;
6. an analysis of the effects of the action on listed and proposed species and their habitats including cumulative impacts from Federal, State, or private projects in the area;
7. measures that will reduce or eliminate adverse impacts to threatened and endangered species;
8. the expected status of threatened and endangered species in the future (short and long term) during and after project completion;
9. determination of "is likely to adversely affect" or "is not likely to adversely affect" for listed species;
10. determination of "is likely to jeopardize" or "is not likely to jeopardize" for proposed species;
11. citation of literature and personal contacts used in the assessment.

A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare biological assessments. However, the ultimate responsibility for section 7 compliance remains with the Federal agency, and written notice should be provided to the Service upon such a designation. The Service recommends that Federal agencies provide their non-Federal representatives with proper guidance and oversight during preparation of biological assessments and evaluation of potential impacts to listed species.

Section 7(d) of the Act requires that the Federal agency and permit or license applicant shall not make any irreversible or irretrievable commitment of resources which would preclude the formulation of reasonable and prudent alternatives until consultation on listed species is completed.

Proposed Species: Federal agencies must determine whether any of their proposed activities are likely to jeopardize the continued existence of a species proposed for listing, . If jeopardy is likely, that agency must confer with the Service.

Take: If there is no Federal involvement in the project (e.g., permitting, funding, actual construction), and take of a

threatened or endangered species may occur as a result of the project, a permit pursuant to section 10 of the Endangered Species Act may need to be obtained. Section 9 of the Act prohibits the "take" of any threatened or endangered species. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. If the project may result in the take of a listed species the project proponent should contact the Service to discuss the need for appropriate permits under section 10 of the Act.

Interrelated & Interdependent Impacts: The analysis of project impacts must assess direct impacts of the project, as well as those impacts that are interrelated to or interdependent with the proposed action. Impacts to listed species on non-Federal lands must be evaluated along with such impacts on Federal lands. Any measures that are ultimately required to avoid or reduce impacts to listed species will apply to Federal as well as non-Federal lands.

Water Depletions in the Platte and Colorado River Watersheds: Where projects may lead to depletions of water to the Platte or Colorado river systems, formal consultation is required. Federal agency actions resulting in water depletions to the Platte River system may affect the endangered whooping crane (*Grus americana*), endangered interior least tern (*Sterna antillarum*), threatened piping plover (*Charadrius melodus*), and endangered pallid sturgeon (*Scaphirhynchus albus*), the threatened bald eagle (*Haliaeetus leucocephalus*), the endangered eskimo curlew (*Numenius borealis*) and threatened western prairie fringed orchid (*Platanthera praeclara*) downstream in Nebraska. Federal agency actions resulting in water depletions to the Colorado River system may affect the endangered Bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), Humpback chub (*Gila cypha*), and Razorback sucker (*Xyrauchen texanus*) downstream in the Green and Colorado river systems.

In general, depletions include evaporative losses and/or consumptive use of surface or groundwater within the affected basin, often characterized as diversions less return flows. Project elements that could be associated with depletions include, but are not limited to, ponds (detention/recreation/irrigation storage/stock watering), lakes (recreation/irrigation storage/municipal storage/power generation), reservoirs (recreation/irrigation storage/municipal storage/power generation), pipelines, wells, diversion structures, and water treatment facilities. Any actions that may result in a water depletion should be identified. The document should also include an estimate of the amount and timing (by month) of average annual water depletion (both existing and new depletions), and describe methods of arriving at such estimates.

Contact:

Field Supervisor
U.S. Fish and Wildlife Service
Ecological Services Field Office
4000 Airport Parkway
Cheyenne, Wyoming 82001

307-772-2374
email: R6FWE_CHE@fws.gov

CANDIDATE SPECIES OF WYOMING
Last Updated on May 9, 2000

Candidate Species
Species that are candidates for listing as threatened or endangered that may occur in Wyoming are identified below.

Species	Scientific Name	Status	Distribution
Arctic grayling	(Thymallus arcticus)	Candidate	Greater Yellowstone Ecosystem
Black-tailed prairie dog	(Cynomys ludovicianus)	Candidate	Eastern Wyoming
Sturgeon chub	(Macrhybopsis gelida)	Candidate	Powder & Bighorn River Drainages
Swift fox	(Vulpes velox)	Candidate	Grasslands statewide
Western boreal toad	(Bufo boreas boreas)	Candidate	Mountains of southeast Wyoming

Many Federal agencies have policies to protect candidate species from further population declines. The U.S. Fish and Wildlife Service would appreciate receiving any information available on the status of these species in or near the project area. In addition, if one or more of these species is listed prior to the completion of your project, unnecessary delays may be avoided by considering project impacts to candidates now.

Should any of these species be proposed for listing, the lead Federal agency would be required to confer with the U.S. Fish and Wildlife Service if that agency determines their action (e.g. approval of the project) is likely to jeopardize the continued existence of any of these species.

Contact:

Field Supervisor
U.S. Fish and Wildlife Service
Ecological Services Field Office
4000 Airport Parkway
Cheyenne, Wyoming 82001

307-772-2374
email: R6FWE_CHE@fws.gov

RAPTOR CONSERVATION MEASURES

LAWS PROTECTING RAPTORS: The Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703, enacted in 1918, prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations and does not require intent to be proven. Section 703 of the Act states, "Unless and except as permitted by regulations ... it shall be unlawful at any time, by any means or in any manner, to ... take, capture, kill, attempt to take, capture, or kill, or possess ... any migratory bird, any part, nest, or eggs of any such bird..." The Bald and Golden Eagle Protection Act, 16 U.S.C. 668, prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald or golden eagles or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing.

Work that could lead to the take of a migratory bird or eagle, their young, eggs, or nests (for example, if you are going to erect new well sites, roads, or power lines in the vicinity of a nest), should be coordinated with our office before any actions are taken. Removal or destruction of such nests, or causing abandonment of a nest could constitute violation of the above statutes. Removal of nests or nest trees is prohibited, but may be allowed once young have fledged and/or a permit has been issued. In either case, timing is a significant consideration and you need to allow for this in your project planning. We also recommend the project area be surveyed for raptor nests and roost areas.

To minimize effects on nesting raptors and the possibility of "take" under the MBTA, protective/mitigation measures may be necessary. Any analysis of the project should address potential adverse impacts including habitat loss or degradation, nest abandonment, and electrocution/collision hazards to raptors and specifically outline all measures that will be implemented to minimize adverse effects to these species. Planning documents should describe proposed protective measures including, but not limited to: possible timing restrictions for construction, establishment of buffer zones around raptor nests, proper raptor-proofing of power lines, and placement of multiple wells on one pad to minimize site disturbance. Projects that create electrocution/collision hazards should include a monitoring program to detect problem areas.

POWERLINES & RAPTOR ELECTROCUTIONS: Two primary causes of raptor mortality are electrocutions and collisions with power lines. If any part of this project will involve construction of new power lines or modification of existing lines, the U.S. Fish and Wildlife Service (Service) recommends strong precautionary measures to protect raptors by raptor-proofing the power lines. Federal Register 49 Section 1729.10, 1984, allows for deviations from REA construction standards for raptor protection. Structures which are designed for raptor protection should be in accordance with Suggested Practices For Raptor Protection on Power Lines. The State of the Art. Raptor ResearchReport, 1996, (or more current edition, if available) published by the Raptor Research Foundation, Inc., provided that such structures meet with the National Electrical Safety Code. Authority for these measures resides with Section 9 of the Endangered Species Act of 1973 (as amended), the Migratory Bird Treaty Act and the Bald Eagle Protection Act which protects bald and golden eagles. In the above cited Federal Register publication, the following bulletins are also recommended: REA Bulletin 40-7, National Electrical Safety Code-ANSI C2, 1981 Edition and REA Bulletin 61-60, Powerline Contacts by Eagles and Other Large Birds.

PEREGRINE FALCON: Please be advised, the U.S. Fish and Wildlife Service has determined that the American peregrine falcon (*Falco peregrinus anatum*) is no longer an endangered or threatened species pursuant to the Endangered Species Act of 1973, as amended. Available data indicates that this subspecies has recovered following restrictions on organochlorine pesticides, and implementation of successful management activities. Removal from protection under the Act will not affect protection provided to this species by the Migratory Bird Treaty Act, or state laws and regulations. At least five years of monitoring are required under Section 4(g)(1) of the Act. A monitoring plan was provided in the proposed delisting rule on August 26, 1998 (63 FR 45446). A revised monitoring plan will be published in the Federal Register in the near future.

WETLAND & RIPARIAN HABITAT CONSERVATION

Wetlands/Riparian Areas: The U.S. Fish and Wildlife Service (Service) recommends measures to avoid any wetland losses in accordance with Section 404 of the Clean Water Act, Executive Order 11990 (wetland protection) and Executive Order 11988 (floodplain management) as well as the goal of "**no net loss of wetlands**."

If wetlands may be destroyed or degraded by the proposed action, the Service recommends the following measures:

- inventory and fully describe affected wetlands in terms of functions and values;
- determine the acreage of wetlands, by type; and
- identify specific actions to minimize impacts and compensate for all unavoidable wetland impacts.

Riparian or streamside areas are a valuable natural resource and impacts to these areas should be avoided whenever possible. Riparian areas are the single most productive wildlife habitat type in North America. They support a greater variety of wildlife than any other habitat. Riparian vegetation plays an important role in protecting streams, reducing erosion and sedimentation as well as improving water quality, maintaining the water table, controlling flooding, and providing shade and cover. In view of their importance and relative scarcity, impacts to riparian areas should be avoided. Any potential, unavoidable encroachment into these areas should be minimized and quantitatively assessed in terms of functions and values, areas and vegetation type lost, potential effects on wildlife, and streams (bank stability and water quality). Measures to compensate for unavoidable losses of riparian areas should be developed and implemented as part of the project.

Plans for mitigating unavoidable impacts to wetland and riparian areas should include:

- mitigation goals and objectives,
- methodologies,
- time frames for implementation,
- success criteria,
- monitoring to determine if the mitigation is successful, and
- a contingency plan to be implemented should the mitigation fail.

Contact:

Field Supervisor
U.S. Fish and Wildlife Service
Ecological Services Field Office
4000 Airport Parkway
Cheyenne, Wyoming 82001

307-772-2374
email: R6FWE_CHE@fws.gov

APPENDIX C -Plugging And Abandonment Procedure for Lateral Holes, Drill Room and Shafts for the Below the Reservoir Production Facility Teapot Dome, NPR-3, Natrona County, Wyoming

Laterals

1. Tie onto the wellhead and pump a 20-sack cement plug in and out of the 3½" liner. Displace cement with drilling mud. **Note: 3½" liner runs through the shale section.**
2. Hold pressure on plug for eight hours.
3. Open wellhead and determine fluid or pressure flow from 3½" liner. If no-flow condition exists strip off wellhead and blind off 3½" liner. If flow condition exists pump additional cement until no-flow condition exists.
4. Rig up to next lateral and repeat same operation. Repeat for all laterals.

Drill Room

1. Remove all equipment from the drill room and shafts to a point 20' above the highest point in the drill room.
2. Pump fresh water bentonite slurry from the surface into the drill room until it reaches a level that is 15' above the highest point of the drill room.
3. Pump a 10-sack cement plug (No. 1) on the top of the bentonite in the raceway and a 50-sack plug in the emergency/ventilation shaft.
4. Place a reinforced concrete bulkhead (No. 1) on top of the bentonite in the production shaft after attaining a 500 psi compressive strength in the raceway and emergency/ventilation shaft plugs.

Production Shaft

1. Remove all shaft guides and pipe from the production shaft to a level 30' above the bulkhead (No. 1).
2. Place a 20' cement plug on the bulkhead.
3. Remove all shaft guides and pipe from the shaft to a level 10' above the contact of the Upper Shannon and Steele formation after the cement attains a 500 psi compressive strength.
4. Fill the production shaft between bulkhead No. 1 and the contact of the Upper Shannon and Steel formation (+4,860' SS) with drilling mud.
5. Place a reinforced cement bulkhead (No. 2) on the drilling mud at the contact of the Upper Shannon (+4,860' SS) and Steel formation.
6. Remove all shaft guides and pipe from the production shaft to a level 30' above the bulkhead (No. 2).
7. Place a 20' cement plug on the top of the bulkhead (No. 2).
8. Remove all shaft guides and pipe from the production shaft to a level 30' below the shaft collar.
9. Fill the production shaft above the bulkhead (No. 2) with drilling mud to a point 40' below the collar.
10. Place a reinforced cement bulkhead (No. 3) on the top of the drilling mud.
11. Remove all remaining shaft guides and pipe from the production shaft.

12. Place a cement plug on top of bulkhead (No. 3) to 4' below grade.
13. Cut the shaft casing 4' below grade and remove the shaft collar.
14. Weld a steel cap over the plugged opening and return grade to original level.

Emergency/Ventilation Shaft

1. Place a 50-sack cement plug (No. 1) on top of the bentonite slurry (See Drill Room Plug and Abandon Procedure section).
2. Fill the shaft with drilling mud from the top of the cement plug to a point that is at the contact of the Upper Shannon (+4,860' SS).
3. Place a 20' cement plug (No. 2) on top of the drilling mud.
4. Fill the shaft with drilling mud to a level 15' below the shaft collar.
5. Place a cement plug (No. 3) on top of the drilling mud to a level 4' below grade.
6. Cut the shaft casings at the 4' below grade level. Weld a steel cap on the casing stub and return grade to original level.

Raceway

1. Place a 10-sack cement plug (No.1) on top of the bentonite slurry (See Drill Room Plug and Abandonment Procedure section).
2. Fill the raceway with drilling mud from the top of the cement plug to a point that is at the contact of the Upper Shannon and Steele Shale (+4,860' SS).
3. Place a 20' cement plug (No. 2) on top of the drilling mud.
4. Fill the raceway with drilling mud to a point 15' below the shaft collar.
5. Place a cement plug (No. 3) on top of the drilling mud and fill the hole to a level 4' below grade.
6. Cut the casing strings 4' below grade level. Weld a steel cap on the stub and backfill the hole to grade.

State of Wyoming

Oil and Gas Conservation Commission

March 23, 2001

Mr. Clark D. Turner
Director
Naval Petroleum and Oil Shale Reserves
in CO, UT and WY
907 N. Poplar Street, Suite 150
Casper, WY 82601

Re: Draft Environmental Assessment for Production of Crude Oil from a Subterranean Facility

Dear Mr. Turner:

A review of the referenced draft document by my staff raised the following questions which this agency believes should be addressed:

2.1.1 Details on the landfarm treatment process and pit construction should be provided. Total volume of the mine shaft is estimated to be 4,187 cubic yards which appears to be Steele shale. Is this all hydrocarbon bearing material, or are other contaminants proposed to be treated?

Previously, the staff has verbally advised your staff that closure plans for both the mine shaft and 60' diameter room must be provided prior to construction. Wyoming Statute 30-5-104 (H)(ii)(F) provides the Commission with authority to regulate oil mining operations which are defined as "... operations associated with the production of oil or gas from reservoir access holes drilled from underground shafts or tunnels." Section 39 of the Rules and Regulations provides that the owner shall first apply for and obtain a permit and that oil mining shall comply with the Commission's rules. On completion of the project, proper plugging of the horizontal wells, as well as the mine shaft and "room", are required by rule. We view it as important that those details, including specific materials being considered for plugs, be provided as part of the environmental assessment.

Thank you for the opportunity to provide comment.

Very truly yours,

Don J. Likwartz

Don J. Likwartz
State Oil and Gas Supervisor

cc: David A. Mi[illegible]

777 West First Street, P. O. Box 2640
Casper, WY 82602-2640
Phone: (307) 234-7147
Fax: (307) 234-5306
Internet: http://wogcc.state.wy.us

Environmental Assessment (EA) for "Preparation For Production of Crude Oil From A Subterranean Facility" dated January 2001 (EA-1350). The facility is located at Naval Petroleum Reserve No. 3 in the northeast quarter northeast quarter of Section 10, Township 38 North, Range 78 West, Natrona County, Wyoming.

The U.S. Army Corps of Engineers regulates the placement of dredged and fill material into wetlands and other waters of the United States as authorized primarily by Section 404 of the Clean Water Act (33 U.S.C. 1344). The term "waters of the United States" has been broadly defined by statute, regulation, and judicial interpretation to include all waters that were, are, or could be used in interstate commerce such as rivers, streams (including ephemeral streams), reservoirs, and lakes as well as wetlands adjacent to those areas. The Corps regulations were published in the November 13, 1986, edition of the Federal Register (Vol. 51, No. 219) at 33 CFR Parts 320 through 330. Information on Section 404 program requirements in Wyoming can be obtained by visiting our web site at http://www.nwo.usace.army.mil/html/od-rwy/Wyoming.html.

In order to settle a lawsuit (North Carolina Wildlife Federation, et al. v. Tulloch, Civil No. C90-713-CIV-5-BO[E.D.N.C. 1992]) the Corps published changes to the regulations in the August 23, 1993, edition of the Federal Register (Vol. 58, No. 163); and began regulating discharges associated with excavation activities such as mechanized landclearing, ditching, channelization, and other activities that destroy or degrade waters of the United States, including wetlands, under the so called "Tulloch Rule." As a result of a decision by the U.S. Court of Appeals for the District of Columbia Circuit on June 19, 1998, that overturned the "Tulloch Rule," the Corps amended the definition of dredged and fill material at 33 CFR Part 323 to exclude "incidental fallback" in the January 17, 2001, edition of the Federal Register (Vol. 66, No. 11). Therefore, the Corps no longer regulates excavation activities if the only discharge is due to incidental fallback.

5430

FILE

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO ATTENTION OF

RECEIVED
APR 11 2001

April 2, 2001

Wyoming Regulatory Office
2232 Dell Range Blvd., Suite 210
Cheyenne, Wyoming 82009-4942

COPY 04 Dan
cc ESH MAA
APR 30 2001

Mr. David A. Miles
Rocky Mountain Oilfield Testing Center
907 North Poplar Street, Suite 150
Casper, Wyoming 82601

Dear Mr. Miles:

This letter is in response to your request we received today for comments on the Draft Environmental Assessment (EA) for "Preparation For Production of Crude Oil From A

March 9, 2000 (Volume 65, No. 47). A copy of the Public Notice is also available from our web site. A project specific (individual) permit would be required if the projects total impacts on waters of the U.S., including wetlands, exceeds the nationwide permit criteria.

If you have any questions concerning these comments or would like to discuss our permit requirements in more detail, please contact me at (307) 772-2300 and reference file No. 200140068.

Sincerely,

Thomas B. Johnson, P.E.
Project Manager
Wyoming Regulatory Office

Based upon information contained in paragraph 3.5.8 in the EA and the National Wetlands Inventory map for the area, it appears that there are wetlands and other waters of the U.S. in close proximity to the project location. However, figures in the EA do not have sufficient detail to determine if any aspects of the project would be located in waters of the U.S. and we agree that it is likely that all waters of the U.S. could be avoided, except for stream restoration activities as described in paragraph 4.5.5. Please note that the potential loss of wetlands due to a decrease in water discharged from the treatment facility would not require authorization from the Corps. Therefore, any mitigative measures for those losses would be at the Department of Energy's (DOE) sole discretion.

The DOE is responsible for obtaining authorization prior to commencing with any activities that include a discharge of dredged or fill material in waters of the U. S. The type of authorization depends on the extent of impacts. Many activities with minor impacts can be authorized under existing general permits known as nationwide permits. On June 7, 2000, our office issued a Public Notice describing all of the nationwide permits currently in effect in Wyoming based upon information contained in Part VII of the Federal Register published on December 13, 1996 (Volume 61, No. 241) and Part III of the Federal Register published on