DOE/EA-1956

DRAFT

Site-Wide Environmental Assessment for the Divestiture of Rocky Mountain Oilfield Testing Center and Naval Petroleum Reserve No. 3

Natrona County, Wyoming

March 2014

Prepared for

Department of Energy
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Acronyms

ac	Acre
ACHP	Advisory Council on Historic Preservation
ASP	Alkaline-Surfactant-Polymer
bbls	Petroleum Barrels
bgs	Below Ground Surface
BLM	Bureau of Land Management
BMP	Best Management Practice
B.P.	Before Present
bpd	Barrels per Day
°C	Degrees Celsius
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation & Liability Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COD	Chemical Oxygen Demand
cm	Centimeter
dBA	Decibels
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
EA	Environmental Assessment
E.O.	Executive Order
EOR	Enhanced Oil Recovery
EPA	U. S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
°F	Degrees Fahrenheit
FHWA	Federal Highway Administration
ft	Feet
ft^3/s	Cubic Feet per Second
FWS	U.S. Fish & Wildlife Service
FY	Fiscal Year
Gal.	Gallon
ha	Hectare
in.	Inch

IND-1	Industrial Landfill No. 1
IND-2	Industrial Landfill No. 2
km	Kilometer
kph	Kilometers per Hour
L	Liters
lbs	Pounds
L/s	Liters per second
m	Meters
MER	Maximum Efficient Rate
m^3	Cubic Meters
Mcf	Mil Cubic Feet or 1,000 Cubic Feet
mg/L	Milligrams per Liter
$\mu g/m^3$	Microgram per Cubic Meter
mi	Mile
MOA	Memorandum of Agreement
mph	Miles per Hour
N/A	Not Available
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NORM	Naturally Occurring Radioactive Material
NOx	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPR-3	Naval Petroleum Reserve No. 3
NREL	National Renewable Energy Laboratory
NRHP	National Registry of Historic Places
PIE	Pressure-Induced Event
pCi/L	Picocuries per Liter
ppb	Parts per Billion
ppm	Parts per Million
RCRA	Resource Conservation and Recovery Act
RF	Ranching and Farming District
RMOTC	Rocky Mountain Oilfield Testing Center
SHWD	Solid and Hazardous Waste Division
SQC	Scenic Quality Class
SR	State Road
SPCC	Spill Prevention Control and Countermeasure
S.U.	Standard Units

SWEA	Site-wide Environmental Assessment
TDS	Total Dissolved Solids
TRI	Toxic Release Inventory
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USC	United States Code
USN	U.S. Navy
VRM	Visual Resource Management
WAS	Wyoming Archaeological Society
WGFD	Wyoming Game and Fish Department
WOGCC	Wyoming Oil and Gas Conservation Commission
WYDEQ	Wyoming Department of Environmental Quality
WYDOT	Wyoming Department of Transportation
WYGISC	Wyoming Geographical Information Science Center
WYPDES	Wyoming Pollutant Discharge Elimination System
WYSHPO	Wyoming State Historic Preservation Officer

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1.0 INTRODUCTION

The U.S. Department of Energy (DOE) is proposing to discontinue government operations at the Rocky Mountain Oilfield Testing Center (RMOTC) and Naval Petroleum Reserve No. 3 (NPR-3) and divest the property and mineral rights to a private entity or entities for continued commercial oil and gas production. NPR-3 and RMOTC are located in Natrona County, Wyoming, approximately 35 mi (56 km) north of Casper. This Draft Site-Wide Environmental Assessment (SWEA) is being prepared under the regulations of the National Environmental Policy Act (NEPA) established by the Council on Environmental Quality (CEQ) and DOE.

The Proposed Action – sale of NPR-3 to a private entity or entities – represents a shift in DOE policy from the expanded operations of RMOTC and continued operations of NPR-3 assessed in the 2008 *Rocky Mountain Oilfield Testing Center/Naval Petroleum Reserve No. 3 Site-wide Environmental Assessment and Finding of No Significant Impact*, and a return to the proposed actions addressed in the 1998 *Site-wide Environmental Assessment for Preparation for Transfer of Ownership of Naval Petroleum Reserve No. 3 (NPR-3)* (DOE 1998). Whereas the 1998 Site-wide Environmental Assessment (SWEA) addressed the actions DOE intended to perform in preparation for transferring ownership of the property, this Draft SWEA addresses the property transfer itself, as well as the environmental consequences of actions that a new owner(s) is(are) reasonably expected to take after obtaining the property. As such, this SWEA incorporates both the 1998 and 2008 documents in their entireties and addresses environmental issues that were not fully analyzed in the previous documents.

1.1 Proposed Action and Alternatives

Under the Proposed Action (which is also the preferred action), DOE would discontinue testing at RMOTC and sell NPR-3 to one or more entities for use in commercial oil production. DOE expects that the new owner(s) would continue to use conventional oil exploration and production methods similar to those DOE has employed at the site since 1976. This is likely to include well maintenance and rework, various down-hole stimulation activities, and drilling new wells as needed. Additionally, DOE expects private owners to implement Enhanced Oil Recovery (EOR) techniques such as carbon dioxide (CO_2) and/or steam flooding similar to those DOE has tested in the past and of the type private companies in adjacent oil fields are currently implementing.

One alternative to selling the property involves transferring NPR-3 to another federal agency that would then lease the property to private entities for continued oil production. This option would maintain federal ownership of the cultural and historic sites associated with NPR-3, but oil production activities are expected to be exactly the same as if the property was sold.

Given the current energy production environment, another alternative is to sell or lease the property for utility-scale renewable energy production. This would involve placing a wind farm, solar farm or geothermal plant on the property.

Under the No Action alternative, DOE would not sell or transfer the property and would continue operating it at current levels. Well maintenance and rework, down-hole stimulation and new well development would be the same as in the Proposed Action, but it is unlikely that DOE would implement site-wide EOR projects in the foreseeable future.

1.2 National Environmental Policy Act and Related Procedures

The CEQ regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508) and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021) require that DOE, as a federal agency:

- Assess the environmental impacts of its proposed actions;

- Identify any adverse environmental effects that cannot be avoided should a proposed action be implemented;
- Evaluate alternatives to the proposed action, including a no action alternative;
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- Characterize any irreversible and irretrievable commitments of resources that would be involved should the proposed action be implemented.

These requirements must be met before a final decision is made to proceed with any proposed federal action that could cause significant impacts to human health or the environment, including the sale of NPR-3 to a private entity.

This SWEA is part of an extensive collection of NEPA documentation that has been developed since 1976 to assess NPR-3 and RMOTC operations for environmental impact. This documentation includes the following:

- *Strategic Petroleum Reserve: Final Environmental Impact Statement*, which addressed the original plan to establish a national strategic petroleum reserve, including NPR-3 (U.S. Navy [USN] 1976)
- *Environmental Assessment EA-0334 Divestiture of Naval Petroleum Reserves Nos. 1 and 3*, which covered selling NPR-3 (DOE 1988)
- *Final Site-wide Environmental Assessment EA-1008 for Continued Development of Naval Petroleum Reserve No. 3 (NPR-3)*, which covered expanded operations, including drilling an additional 250 wells and increased use of Enhanced Oil Recovery (EOR) techniques (DOE 1995)
- *Final Site-wide Environmental Assessment EA-1236 for Preparation for Transfer of Ownership of Naval Petroleum Reserve No. 3 (NPR-3)*, which covered activities necessary for selling NPR-3 (DOE 1998)
- *Environmental Assessment EA-1350 for Preparation for Production of Crude Oil from a Subterranean Facility*, which covers the construction and operation of a subterranean facility with radiating horizontal wells and the related reclamation and restoration of the site (DOE 2001)
- *Final Site-wide Environmental Assessment for the Rocky Mountain Oilfield Testing Center/Naval Petroleum Reserve No. 3*, which covers additional drilling, EOR and renewable energy projects (DOE 2008)
- Numerous Categorical Exclusions pertaining to well and pipeline maintenance, experimental activities, and similar work

All EAs associated with NPR-3 have resulted in Findings of No Significant Impact.

1.3 Background

NPR-3 (Teapot Dome) is a 9,481-ac (3,837 ha) oilfield located in Natrona County, Wyoming, approximately 35 mi (56 km) north of the City of Casper (Figure 1-1). Production at NPR-3 began in the 1920's when leases were issued by the Interior Department under the Mineral Leasing Act. Production was discontinued after 1927 and renewed between 1959 and 1976 in a limited program to prevent the loss of U.S. Government oil to privately-owned wells on adjacent land. In 1976, Congress passed the Naval Petroleum Reserves Production Act (Public Law 94-258), which requires that the Naval Petroleum Reserves be produced at their maximum efficient rate (MER), consistent with sound engineering practices, for a period of six years. The law also provides that at the conclusion of the initial 6-year

production period, the President (with the approval of Congress) could extend production in increments of up to three years each, if continued production was found to be in the national interest. The President has routinely authorized continued production at NPR-3, extending production through April 15, 2015.

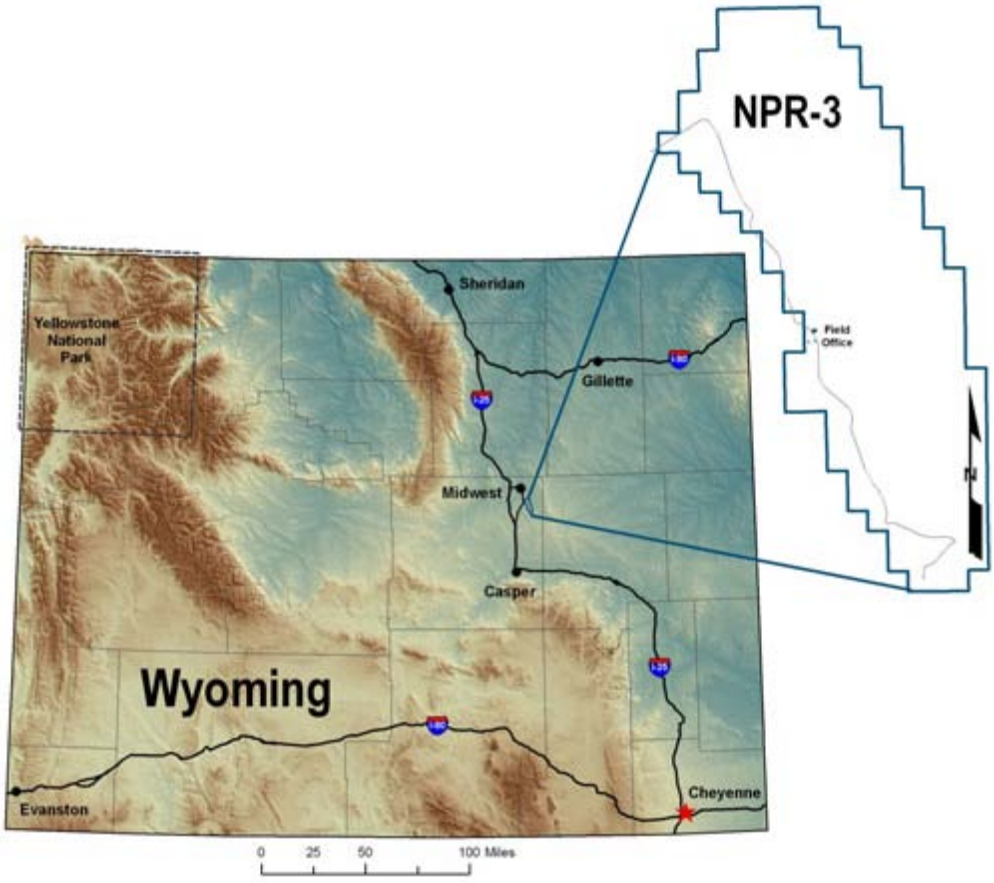

Figure 1-1: NPR-3 Location Map

Recently, however, the DOE Secretary determined that continued government operation of NPR-3 was not in the national interest. DOE developed a disposition plan, which it presented to Congress and is now pursuing divestment of the property (DOE 2013a). Given that NPR-3 has been operated at the MER since 1976, the operational goals of private ownership are not expected to be significantly different from those of DOE.

NPR-3 is DOE's only operating oil field in the continental United States. Production at NPR-3 peaked in 1981; since then, production has declined until the oil field has become a mature stripper field that produced approximately 225 barrels per day (bpd) in Fiscal Year (FY) 2013.

Production facilities at NPR-3 include pumping units, treaters, and tanks for storing petroleum and produced water; a low-temperature-separation gas plant; water and gas injection facilities; wastewater disposal system; wastewater treatment facility; and flow lines. In addition, there are numerous support facilities, including electric power distribution systems; cathodic protection systems; potable water and sewer systems; roads; bridges and fences; and buildings for maintenance, production support, administration, safety, security, and environmental purposes.

In 1993, DOE established RMOTC as an industry-driven endeavor to utilize NPR-3 resources and facilities to help strengthen the domestic energy industry by testing new petroleum and environmental technologies. The RMOTC concept quickly received support from industry and government alike. On

December 7, 1993, the Interstate Oil and Gas Compact Commission, consisting of governors from 29 oil- and gas producing states, passed a unanimous resolution supporting the concept of a demonstration and testing center at NPR-3. Industry organizations such as the Independent Petroleum Association of America, the Rocky Mountain Oil and Gas Association, the National Stripper Well Association, and the Independent Petroleum Association of the Mountain States, along with numerous universities and states, all endorsed RMOTC. These endorsements led to RMOTC being included in DOE's "Domestic Natural Gas and Oil Initiative," which outlined DOE's focus in support of the oil and gas industry's needs. Commercial field testing at RMOTC began in 1995. The majority of the technology and processes field tested at RMOTC have primary applications in drilling, oil production, enhanced recovery, alternative/renewable energy, and/or production cost reduction. Environmental testing and technology have been large growth areas of increasing importance in the industry, both domestically and worldwide.

The current target markets for the field test services available at RMOTC are small to large oil field service and equipment manufacturers and suppliers; oil and gas exploration and production companies; federal and national laboratories; private and public research institutions; universities; industry consortia and joint industry projects; and entrepreneurs and inventors working within the petroleum and environmental industries. The broad range of testing-partner types and sizes indicates the wide spectrum of relevance that RMOTC possesses. This relevance manifests itself in the form of diverse, widely felt benefits for the industry and the nation.

1.4 Scoping Process

On February 15, 2013, DOE announced its intent to prepare this SWEA to its mailing list of 260 interested parties. The Notice Letter and the distribution list of agencies, Tribes, and members of the public are included in Appendix A. Comments on the scope of this EA were received from the Wyoming Archaeological Society (WAS), various tribal agencies, U.S. Department of Interior (DOI) Bureau of Land Management (BLM), Solid and Hazardous Waste Division (SHWD) of the Wyoming Department of Environmental Quality (WYDEQ), Wyoming Game and Fish Department, and the Water Division of the WYDEQ. The following Sections summarize the scoping comments received from various organizations, agencies and tribes.

1.4.1 Summary of Wyoming Archaeological Society Scoping Comments

The WAS noted that the potential impacts of the Proposed Action on cultural resources and historic properties are required to be evaluated within this SWEA. Further, WAS stated that its preference was that NPR-3 remain under federal jurisdiction and recommended the completion of a Class III cultural resources inventory to modern standards, evaluation of all sites for inclusion in the National Registry of Historic Places (NRHP), and the development and implementation of conservation and preservation measures for sites of significance prior to title transfer. Additionally, WAS recommended that protection measures for historic properties be included as part of the bill of sale to assure continuation of the conservation and preservation efforts. DOE has reviewed these recommendations and addresses them in Sections 4, Affected Environment, and 5 Environmental Consequences. Moreover, additional Class II and III inventories have been completed and conservation/preservation measures are being addressed under the process outlined in Section 106 of the National Historic Preservation Act (NHPA).

1.4.2 Summary of Tribal Agency Scoping Comments

Several tribal agencies also noted that the potential impacts of the Proposed Action on cultural resources and historic properties are required to be evaluated within this SWEA. DOE concurred with this observation and addresses cultural resources in Sections 4, Affected Environment, and 5 Environmental Consequences. Moreover, additional Class II and III inventories have been completed and conservation/preservation measures are being addressed under the process outlined in Section 106 of the NHPA.

1.4.3 Summary of Bureau of Land Management Scoping Comments

The BLM Wyoming State Director issued a letter to DOE in which BLM explained that the transfer of NPR-3 to BLM would not be in the interest of the public and requested that the Lease Alternative be dropped from this SWEA. BLM noted the potential complexities of continuing oil production on the property under potential multiple lease holders, as well as potential environmental liabilities discussed in previous Phase I Environmental Site Assessments. Moreover, President Wilson's Order of Withdrawal (1915) establishing NPR-3 would need to be retracted in order for BLM to assume responsibility for the property.

1.4.4 Summary of WYDEQ Solid and Hazardous Waste Division Comments

WYDEQ SHWD noted that an inactive industrial waste landfill and associated landfarm do not currently have an approved closure permit. In response, DOE has confirmed that the landfill cover meets WYDEQ requirements and will submit a closure permit application by March 15, 2014. The closure permit will include a Post Closure Environmental Monitoring Plan that provides for semi-annual groundwater sampling, analysis and submittal of groundwater monitoring reports in accordance with WYDEQ regulations for up to 30 years. These comments are addressed in Sections 4.8 and 5.1.9.

1.4.5 Summary of Wyoming Game and Fish Department Comments

The Wyoming Game and Fish Department (WGFD) commented that the area had incurred vegetation damage over time, including cheatgrass invasion. WGFD recommended that cheatgrass control measures be implemented during reclamation and restoration activities associated with post construction site stabilization and well plug and abandonment. Moreover, WGFD noted that steps be taken to prevent the spread of aquatic invasive species. DOE concurs with the WGFD comments and addresses them to the extent possible in Sections 4 and 5, with the understanding that the Proposed Action is to sell the property to a private entity which will then be responsible for implementing invasive species controls.

1.4.6 Summary of WYDEQ Water Division Wyoming-Specific National Pollutant Discharge Elimination System (NPDES/WYPDES) Program Comments

The WYDEQ Water Division WYPDES Program commented on the transition requirements for DOE's existing WYPDES permit. Specifically, WYDEQ noted that a Notice of Transfer and Acceptance will have to be completed by both DOE and the purchasing entity in order to transfer the existing WYPDES permit to the new field owner. If the new owner were to choose to not operate the field for oil production, DOE would complete a Notice of Termination to cancel the existing permit. These comments are addressed in Sections 4.3 and 5.

1.5 Organization of the SWEA

Section 1 of this SWEA provides an overview of the Proposed Action, places the SWEA within the overall NEPA context for NPR-3, summarizes background information, and summarizes scoping comments and responses. Section 2 provides DOE's detailed statement of the purpose and need for its proposed action. Section 3 defines the Proposed Action, reasonable alternatives, and the No Action Alternative. Section 4 characterizes the affected environment. Section 5 assesses the impacts that the Proposed Action, reasonable alternatives and No Action Alternative would have on the affected environment if implemented. Section 6 identifies the various agencies and personnel consulted in developing this SWEA. References cited throughout the SWEA are listed in Section 7. The Appendices include a copy of the scoping letter and distribution list.

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2.0 PURPOSE AND NEED FOR AGENCY ACTION

As stated previously, Public Law 94-258 required DOE to operate NPR-3 at its maximum efficient rate. In addition, Title XXXIV of the National Defense Authorization Act for Fiscal Year 1996 directed the Secretary of Energy to maximize the value for NPR-3 under various scenarios, including continued operation and full divestment. At the time, DOE determined that the maximum value for NPR-3 would be achieved by continued DOE operation of the field.

However, in preparing the most recent authorization for continued drilling (Congressional Record 2011), DOE projected that minimally profitable operations would continue into the 2012 to 2015 authorization period, but that continued DOE production would become unprofitable by 2015. As such, continued DOE operation of the field no longer represents its maximum value and President Obama proposed the development of a disposition plan for the field in his FY 2012 Budget Request.

In response, DOE commissioned a utility analysis of the field to determine the economic feasibility of several disposition options and determine which one represented the maximal economic benefit for the public (Frahme and Moritz 2012). That report indicated that the best value option was to transfer the property to another federal agency to oversee leasing the field to private entities for continued oil production. However, additional analysis by GSA identified that private industry was more likely to want to perform work at NPR-3 if the entire field was available as a block. The Leasing Alternative would necessitate that the field be broken into no fewer than four parts, which would significantly reduce interest and result in substantially lower returns that had previously been suggested. Therefore, DOE determined that sale of the property was the best option to meet the legislative requirement to maximize value for the property. With that determination made, DOE developed the *Naval Petroleum Reserve No. 3 Disposition Plan*, which was delivered to Congress in January 2013 (DOE 2013a).

As such, DOE is proposing to sell NPR-3 per the conditions listed in Public Law 94-258, the National Defense Authorization Acts for 1996 and 1999, the November 2011 *Authorization of Continued Production* document and the President's FY 2012 Budget Request. These documents specify that the recommended disposal path maximize the value obtained for NPR-3 by the U.S. Government while minimizing the cost of remediation.

In accordance with DOE NEPA implementing regulations (10 CFR 1021), DOE is required to evaluate the potential environmental impact of this decision. DOE has prepared this SWEA to comply with NEPA regulations.

The proposed sale of NPR-3 is identical to what was assessed in the *Site-wide Environmental Assessment EA-1236 for Preparation for Transfer of Ownership of Naval Petroleum Reserve No. 3 (NPR-3)* (DOE 1998). However, that document addressed the actions DOE expected to take in preparing for the transfer of ownership. This SWEA examines the actual transfer and reasonably expected uses of the property after transfer. EA-1236, as well as the NEPA documentation listed in Section 1.2 above, is incorporated into this SWEA by reference in its entirety.

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3.0 PROPOSED ACTION AND ALTERNATIVES

As stated in Section 2, DOE is required by federal legislation to maximize the value of NPR-3 and is proposing to divest the property in order to meet this requirement. Therefore, DOE has prepared this SWEA to evaluate the foreseeable environmental effects of the following scenarios:

- Sale of NPR-3 to a private entity for continued oil production (Proposed Action),
- Transfer the property to another government agency who would then lease it to a private entity for continued oil production (Lease Alternative),
- Sale or lease the property for alternative energy development (Renewable Energy Alternative), or
- No Action Alternative.

3.1 Proposed Action (Preferred Alternative)

Under the Proposed Action (which is also DOE's preferred alternative), DOE would sell NPR-3 in its entirety to a private entity for continued use as an oilfield. Future management is expected to continue primary production activities (which also involve well refurbishment and down-hole stimulation), as well as reintroducing a combination of secondary recovery and EOR techniques to dramatically increase future oil production. While the Proposed Action is limited to sale of the field and the resulting property transfer, this SWEA investigates the environmental consequences the new owners' anticipated actions.

Crude oil development and production in U.S. oil reservoirs typically falls into three distinct phases: primary, secondary, and tertiary (or enhanced) recovery (DOE 2013b). During primary recovery, the natural pressure in the reservoir and/or gravitational flow drive oil into the wellbore where it is then pumped to the surface. Primary production activities usually recover about 10 percent of the oil originally in place (OOIP) in a formation. Oil production at NPR-3 has predominantly been from the primary phase. The drop-off from peak production (approximately 4000 bpd) to current production (approximately 225 bpd) has been largely due to pressure depletion in the field.

Secondary recovery techniques typically involve injecting water or natural gas into an oil reservoir to displace the oil and drive it to a production wellbore. Water re-injection techniques were used at NPR-3 starting in 1987, but were stopped when oil prices remained low.

Tertiary or Enhanced Oil Recovery (EOR) techniques fall into three main categories: thermal recovery, miscible gas injection or chemical injection. Steam flooding is a thermal recovery technique that was successfully used at NPR-3 in the 1980's, but no other EOR processes have been employed extensively on the site.

3.1.1 Primary Production Activities to Incrementally Increase Oil Production

As previously stated, approximately 1362 wells have been drilled on NPR-3. Of those, 755 have been formally plugged and abandoned. Of the remaining 607 active wells, 227 have been shut-in for various reasons. Many of the shut-in wells could be brought back online with moderate repair or refurbishment expenditures, including pump replacement, pipeline repair or replacement and manifold repair or replacement. Work on pipelines and manifolds would eliminate leaks that have caused some wells to be shut-in.

Well refurbishment activities (including swabbing and/or re-perforating wells as necessary, squeeze cementing corrosion holes and recompleting wells) are expected to continue under new ownership. Swabbing involves sending a wire rope and cup assembly down the well casing to remove material built up on the perforations that is blocking oil flow. Re-perforating involves cementing existing unproductive

perforations and using shape charges to perforate a different area of the casing, which may be in the same area as the original perforations or a different formation entirely. Squeeze cementing involves placing a bridge plug underneath a corroded spot within the casing and then pumping in cement to seal any corroded holes and surrounding annular space. Recompletion involves squeeze cementing and abandoning existing perforations, extending the well to a deeper formation (if necessary), and/or re-perforating in a different location or formation to access additional oil flow.

Further, new owners are expected to continue to implement down-hole stimulation activities such as hot oiling and acidizing. Hot oiling involves pumping heated oil into the well casing in order to melt paraffin that has solidified and is blocking oil flow. Once the paraffin is melted, flow returns and the hot oil is pumped out along with regular crude oil. To acidize a well, operators inject an acid solution (generally 15 percent hydrochloric acid) into the casing, out of the perforations and into the surrounding oil-producing rock formation. This process removes scale and improves permeability in carbonate formations or formations with carbonate cement. Table 3-1 lists the primary production activities expected to continue under new management.

Together, these routine activities could increase oil production by approximately 15 percent over current levels (Frahme and Moritz 2012).

Table 3-1: Primary Production Activities Expected to Continue Under New Ownership

Technique	Used previously at NPR-3	Likelihood of future use by private entity	Formations
Swabbing	Yes	High	All
Acidizing	Yes	High	All
Re-perforating	Yes	High	All
Squeeze Cementing	Yes	High	All
Recompletion	Yes	High	All
Well Rework	Yes	High	All
Pump Maintenance or Replacement	Yes	High	All
Pipeline Repair and Enhancement	Yes	High	All
Manifold Repair and Enhancement	Yes	High	All
Berm and Storage Tank Installation	Yes	High	NA
Hot Oiling	Yes	High	All

3.1.2 Potential Secondary Production

Secondary production typically entails injecting water or gas into a formation to displace the oil and drive it to production wells (DOE 2013b). This maintains or increases reservoir pressure, which may increase production from the affected wells. Secondary recovery reaches its limit when the production wells start recovering excessive amounts of the injected fluid and oil production drops off (Schlumberger 2013). Table 3-2 lists potential secondary production activities.

Table 3-2: Secondary Production Activities Expected to Continue Under New Ownership

Technique	Used previously at NPR-3	Likelihood of future use by private entity	Formations
Natural Gas Reinjection	Yes	High	All
Process Water Reinjection	Yes	Low	All

DOE implemented water flooding at NPR-3 in 1987 in the Second Wall Creek formation and in 1997 in the Third Wall Creek formation (BLM 2005). As such, water flooding has apparently already run its course in these two formations. While it is possible that water flooding could be employed in other formations at the site, DOE does not anticipate that future owners will employ additional water flooding at NPR-3. It is far more likely that future owners will use EOR techniques such as steam flooding, CO_2 injection or polymer flooding.

DOE previously implemented natural gas reinjection to maintain pressure in various formations at NPR-3 and believes it is likely that future owners will employ similar techniques.

3.1.3 Enhanced Oil Recovery

As mentioned above, Enhanced Oil Recovery (EOR) techniques generally fall into three main categories: thermal recovery, gas injection or chemical injection. The highest potential for EOR at NPR-3 is in the Shannon and Second Wall Creek Formations, with the Tensleep formation coming in at a distant third (Frahme and Moritz 2012). Table 3-3 lists potential EOR activities expected to be implemented under new ownership.

Table 3-3: EOR Activities Expected to be Implemented Under New Ownership

Technique	Used previously at NPR-3	Likelihood of future use by private entity	Formations
Nitrogen Gas Injection	No	Low	Second Wall Creek
Carbon Dioxide Injection	No	High	Shannon Second Wall Creek
Miscible Gas Injection	Yes	Moderate	Shannon Second Wall Creek
Polymer Water Flooding	Yes	Moderate	Shannon Second Wall Creek Tensleep
SP/ASP	No	High	Shannon
Steam Flooding	Yes	High	Shannon
Combustion	Yes	Low	Shannon

Predictive screening results suggest that the Shannon Formation would respond favorably to miscible gas injection (including CO_2 injection), surfactant-polymer/alkaline surfactant-polymer (SP/ASP) water flooding, or steam flooding (Frahme and Moritz 2012). Likewise, the Second Wall Creek Formation is predicted to respond favorably to SP/ASP flooding or miscible gas injection (Frahme and Moritz 2012). However, CO_2 flooding is an obvious choice for Second Wall Creek given that Anadarko Petroleum is using CO_2 flooding in this formation in the Salt Creek oil field northwest of and adjacent to NPR-3.

DOE anticipates that implementing EOR at NPR-3 will involve drilling several new injection wells and laying down pipelines to these new injection wells for the delivery of surfactant or CO_2. For the purposes of this assessment, DOE assumes that the new ownership will drill 100 new injection wells and disturb 300 ac (121.4 ha) for pipeline installation. Moreover, DOE anticipates that the new owners will follow existing crude oil product pipeline routes for EOR chemical distribution pipelines, so no additional disturbance will result.

3.1.4 Additional Drilling and Fracking

While NPR-3 has been extensively drilled over the past 35 years, there remain areas in the field where additional drilling and subsequent fracking of vertical wells may result in additional production. These are primarily in the Goose Egg (a cap rock for the Tensleep Formation) and Tensleep Formations (Frahme and Moritz 2012).

Nearly all wells drilled to date at NPR-3 have been vertical boreholes and most have been previously fracked. Fracking is a process by which rock formations are artificially fractured to improve their permeability and the subsequent oil yield. Typically, fracking is accomplished by pumping high-pressure water into oil bearing formations until new fractures form and propagate into the rock. Proppants and chemicals are mixed with the water to keep the fractures open and improve oil flow.

Prior investigation indicates that there is the potential to drill long reach horizontal wells in the Niobrara and Steele Shale Formations (Frahme and Moritz 2012). The Niobrara Shale is being actively horizontally drilled for petroleum production in other parts of Wyoming, as well as in Kansas, Colorado, and Nebraska. In most cases, horizontal boreholes are fracked using similar methods as for vertical wells. However, because horizontal boreholes are much longer than vertical wells, there is a much greater potential for fracking to create environmental issues.

Other issues complicating the decision to drill long-reach horizontal wells at NPR-3 include that directional drilling requires both a knowledge of the three dimensional geometry of the target formation and sophisticated equipment to direct the boring so it passes through the center of the formation as it is advanced. At NPR-3 the formations are cut by as many as ten faults per mile (6 faults/km). The faults may offer shortcuts for contaminants to migrate into other formations. The faulting also displaces the formation on one side relative to the other. In order to keep the boring in the target formation it may be necessary for the horizontal boring to follow a complicated pathway, repeatedly offset during drilling to attempt to remain near the center of the formation.

In addition, the easiest formation to drill horizontally is a flat lying unit. At NPR-3, the Niobrara Shale is doubly folded, which would require the drill bit to be sequentially turned in compass orientation to remain near the center of the formation. This further complicates the process of completing, perforating and maintaining the resulting well.

These factors have combined to influence Anadarko Petroleum's decision to not drill horizontal wells in the Salt Creek field adjacent to NPR-3 (and with a similar structural geology) to date. Officials with the company have indicated that such drilling is a very low priority given that more economical means to improve oil production have been demonstrated for the area. DOE expects the eventual buyer of the property to reach similar conclusions and de-emphasize horizontal drilling within NPR-3. Table 3-4 lists potential additional drilling activities expected to continue under new ownership.

Table 3-4: Additional Drilling Activities Expected to Continue Under New Ownership

Technique	Used previously at NPR-3	Likelihood of future use by private entity	Formations
Vertical Drilling and Subsequent Fracking	Yes	High	All
Horizontal Drilling and Subsequent Fracking	Yes	Low	Niobrara Shale Steele Shale

3.1.5 Summary of the Proposed Action

In summary, DOE proposes to sell NPR-3 to a private entity and that the new owner will continue routine operations to promote primary production while also employing an EOR strategy to increase oil production. This would be consistent with the site's highest economic use (Frahme and Moritz 2012; GSA 2013). While several EOR techniques are possible, DOE believes that CO_2 flooding is the most likely in the Shannon and Second Wall Creek Formations because this process is being used currently in those units on property adjacent to NPR-3. Further, DOE does not expect long-reach horizontal drilling in the Niobrara in the foreseeable future because this process is technically difficult at this site and substantially cheaper alternatives are available.

3.2 Property Transfer and Lease of NPR-3 to a Private Entity for Continued Oil Production

Under the Lease Alternative, NPR-3 would be transferred to the DOI and managed by BLM. Upon completion of the transfer, BLM's Casper Field Office would most likely be responsible for the field and would either develop a new Land Use Plan or modify its existing Casper Resource Management Plan prior to making management decisions or taking management actions related to the field. Then, BLM would likely follow its internal process for offering competitive leases to private entities for continued oil and gas production at the site. Due to regulatory requirements limiting the size of an individual lease to 2,560 ac (1,036 ha), BLM would need to offer multiple leases for the property.

DOE expects that the primary production and EOR activities addressed in Section 3.1 would be implemented under the Lease Alternative. Well refurbishment, down-hole stimulation and pump and pipeline maintenance would be the same under the Lease Alternative as the Proposed Action. Carbon dioxide injection, SP/ASP flooding and steam flooding are just as likely under the Lease Alternative and would have the same environmental effects.

Implementation of the Lease Alternative is unlikely. The property could not be leased in full because the Minerals Leasing Act (MLA) of 1920, as amended and administered by the Department of the Interior, limits individual leases to no more than 2,560 ac (1,036 ha) each. This situation would reduce the pool of potential lessees and thereby significantly impact the revenue potential to be gained from offering the leases. Moreover, because the site has operated as a single oilfield since its inception, current infrastructure and facilities are not designed to be operated by multiple entities. Therefore, it is likely that much of the existing infrastructure would need to be substantially modified or replaced in order for multiple lessees to be able to effectively operate on their portions of the field. Finally, the legislative language withdrawing the land and establishing NPR-3 would have to be rescinded by Congress before the property could be transferred to BLM. Given that BLM commented during the scoping process for this SWEA that the transfer would not be in the public's interest, DOE believes that the Lease Alternative is not feasible and will not be further discussed in this SWEA.

3.3 Renewable Energy Development Alternative

Under the Renewable Energy Development Alternative, NPR-3 would be sold or leased for utility-scale renewable energy development. NPR-3 has some potential for wind, solar or geothermal energy production, all of which have been studied by DOE's National Renewable Energy Laboratory (NREL) and Gustavson Associates LLC (Frahme and Moritz 2012).

3.3.1 Wind Power

The Gustavson report (Gustavson 1996) noted that Wyoming has one of the strongest wind resources in the U.S. (Frahme and Moritz 2012). There are several areas within the State that exhibit NREL Class 7 wind power densities and therefore are ideal candidates for utility-scale wind farms (Figure 3-1). In addition, Wyoming's geography is well suited for wind power development and the State had approximately 1,400 MW of installed wind power capacity at the end of 2011.

However, the wind power density at NPR-3 ranges from Class 2 to Class 4 (Frahme and Moritz 2012). Further, in 2004, staff from DOE's NREL and Gulf Engineers and Consultants assessed NPR-3 for wind power potential. They determined that utility-scale wind farming (30MW+) at NPR-3 was not economically viable due to insufficient land, poor ground conditions, potential impacts on cultural and historic sites, and strong competition from other sites within the State. In 2012, the Gustavson report came to a similar conclusion. Therefore, DOE believes that utility-scale development of wind energy at NPR-3 is not feasible and will not be further discussed in this SWEA.

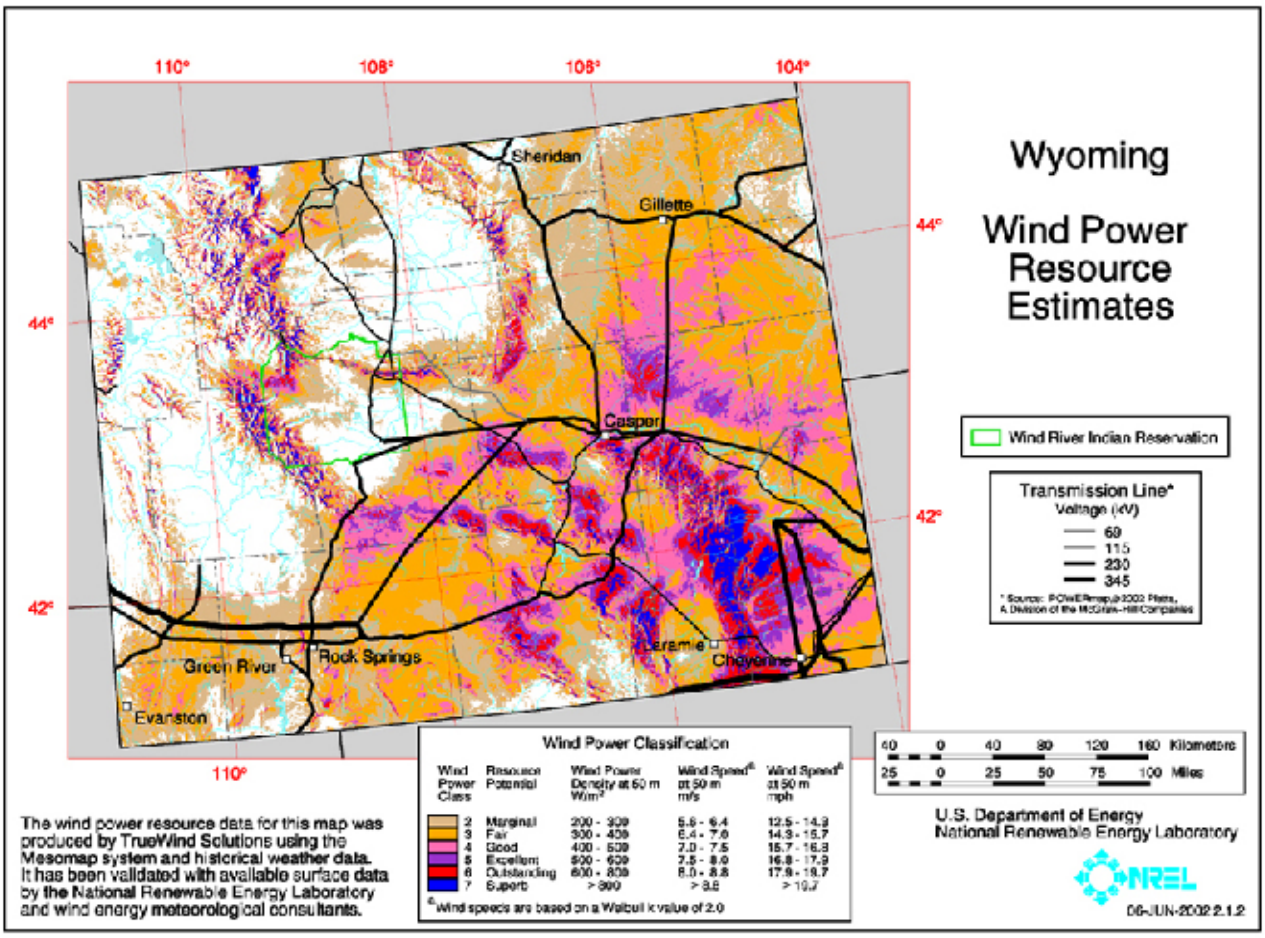

Figure 3-1: Wyoming Wind Map (DOE 2014)

3.3.2 Solar Power

The Gustavson report noted that Wyoming has an effective renewable solar resource rating that is fairly invariant, meaning that the ability to produce power from solar radiation is essentially the same throughout the state (Frahme and Moritz 2012). As such, the potential to produce utility scale solar power NPR-3 is the same as many other locations that are much closer to their served loads. Entities interested in utility-scale solar power would find that infrastructure costs would be substantially lower at sites that are within five miles of their primary customers. Therefore, DOE believes that utility-scale development of solar energy at NPR-3 is not feasible and will not be further discussed in this SWEA.

3.3.3 Geothermal Power

The geothermal gradient at NPR-3 is rather steep (approximately 20 ºF per thousand vertical ft.). The temperature of the water co-produced from the Pennsylvanian age Tensleep Sandstone (the deepest formation from which oil is produced at NPR-3) is about 180 ºF. Production from this formation includes approximately 800,000 gal. of water (3 million L or 19,048 bpd) per day.

For these reasons, DOE brought in a subcontractor to test the geothermal potential for electricity production. The goal was to determine if a geothermal system could produce electricity at competitive

prices, either for use at the site or to sell to the regional electrical grid. Results of the test indicated that if the geothermal gradient persists at great depths, water would have to be extracted from approximately 12,000 ft. (3.6 km) below land surface to make electrical production economical. Unfortunately, the top of the Precambrian basement at NPR-3 starts at approximately 7,000 ft. (2.1 km). The basement is composed mostly of Archean granites and granitic gneisses. These types of rocks typically do not have enough natural permeability to provide sufficient fluid for a successful geothermal power plant. Therefore, DOE believes that utility-scale development of geothermal energy at NPR-3 is not feasible and will not be further discussed in this SWEA.

3.4 No Action Alternative

Under the No Action Alternative, DOE would retain ownership of NPR-3 and would continue to employ conventional techniques to produce oil and provide field testing. The property would not be sold and transferred to a private entity. Primary production activities discussed above would continue. Steam flooding (which has been employed previously at NPR-3) would be re-started as long as oil prices remain high. Activities addressed in the 2008 SWEA would be implemented as described in that document. Table 3-5 shows the estimated land requirements under the No Action Alternative.

Based on production activities of the last few years, it is estimated that under the No Action Alternative, the existing infrastructure of roads, facilities, power lines, pipelines, storage tanks, and treatment systems at NPR-3 would continue to be maintained or replaced as necessary. Due to the size of NPR-3, annual maintenance activities could require the replacement of several miles of pipelines, roads and power lines each year in order to keep up with new production.

Table 3-5: Land Required to Implement the No Action Alternative

Operation	Area Required	Area Reclaimed	Notes
New well development	30 ac/yr. 12 ha/yr	—	Assumes 15 wells/yr at 2 ac/well
Plug and Abandonment	—	10 ac/yr 4 ha/yr	Assumes 5 wells/yr at 2 ac/well
Repair or replace existing infrastructure	30 ac/yr 12 ha/yr	—	Assumes 6 mi/yr at 5 ac/mi

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4.0 AFFECTED ENVIRONMENT

4.1 Land Resources

The following discussion provides an overview of the existing local and regional human environments.

4.1.1 Land Uses

NPR-3 is located in an unincorporated area of Natrona County, Wyoming, south of the towns of Midwest and Edgerton. Although NPR-3 is currently not zoned, Natrona County has established the area around NPR-3 as a Ranching and Farming District (RF) and DOE expects that NPR-3 would receive the same zone designation after the property is sold. Within a RF district, oil and gas development is considered to be an allowable use.

The land surrounding NPR-3 is currently used for the following activities:

- Oil and gas production intermingled with agricultural uses, primarily sheep and cattle grazing;
- Hunting (primarily big game), typically from September through November; and
- Recreational use of off-road vehicles.

However, hunting and recreational vehicle use are currently prohibited on NPR-3.

Current land use activities at NPR-3 are associated with oil and gas development (including exploration, pumping, processing, and transport), research and development (related to stimulating and increasing oil production) and sheep grazing. Also, site personnel routinely perform infrastructure and road maintenance, including grading the dirt roads as necessary, maintaining erosion controls and performing bridge maintenance.

Within the NPR-3 site, developed features include gravel and dirt roads, wellheads and pumping units, oil and gas production facilities and equipment, storage areas, and an office complex. The office is headquarters to approximately 50 staff members who provide field and administrative support to the site. Existing well locations are concentrated in a 5,463-ac (2,211-ha) area located in the center of the site, with substantially less development taking place in the northern and southern portions of the site (Figure 4-1). Most wells are located within the central basin area and at a considerable distance from the surrounding bluffs, although there are several wells in the extreme southern portion of the site near the steeper slopes. Since NPR-3's inception, 1,362 wells have been drilled onsite. Most (755) of these wells are inactive and have been plugged and abandoned. Of the remaining 607 wells, 227 are currently shut-in and 380 are producing oil. Site personnel routinely cycle well operations so that approximately 200 actively pump on any given day.

In addition, DOE currently holds 5 active land access permits and 15 Right of Way easements for pipelines, power lines, roads and grazing.

4.1.2 Land Ownership

The U.S. Government currently holds the surface ownership and mineral rights of NPR-3. Natrona County contains an estimated 3,417,824 ac (1,383,144 ha). Of this total, approximately one-half is under federal administration; the remainder consists largely of privately owned ranches or state-owned lands.

NPR-3 is surrounded by BLM, state, and private lands (Figure 4-2). The state-owned land adjacent to the site is located along the southwest and northern boundaries of NPR-3. The BLM lands are adjacent to the northwest boundary of the site. The remaining land bordering the site is owned by private ranchers, one of whom has a lease agreement to graze sheep onsite.

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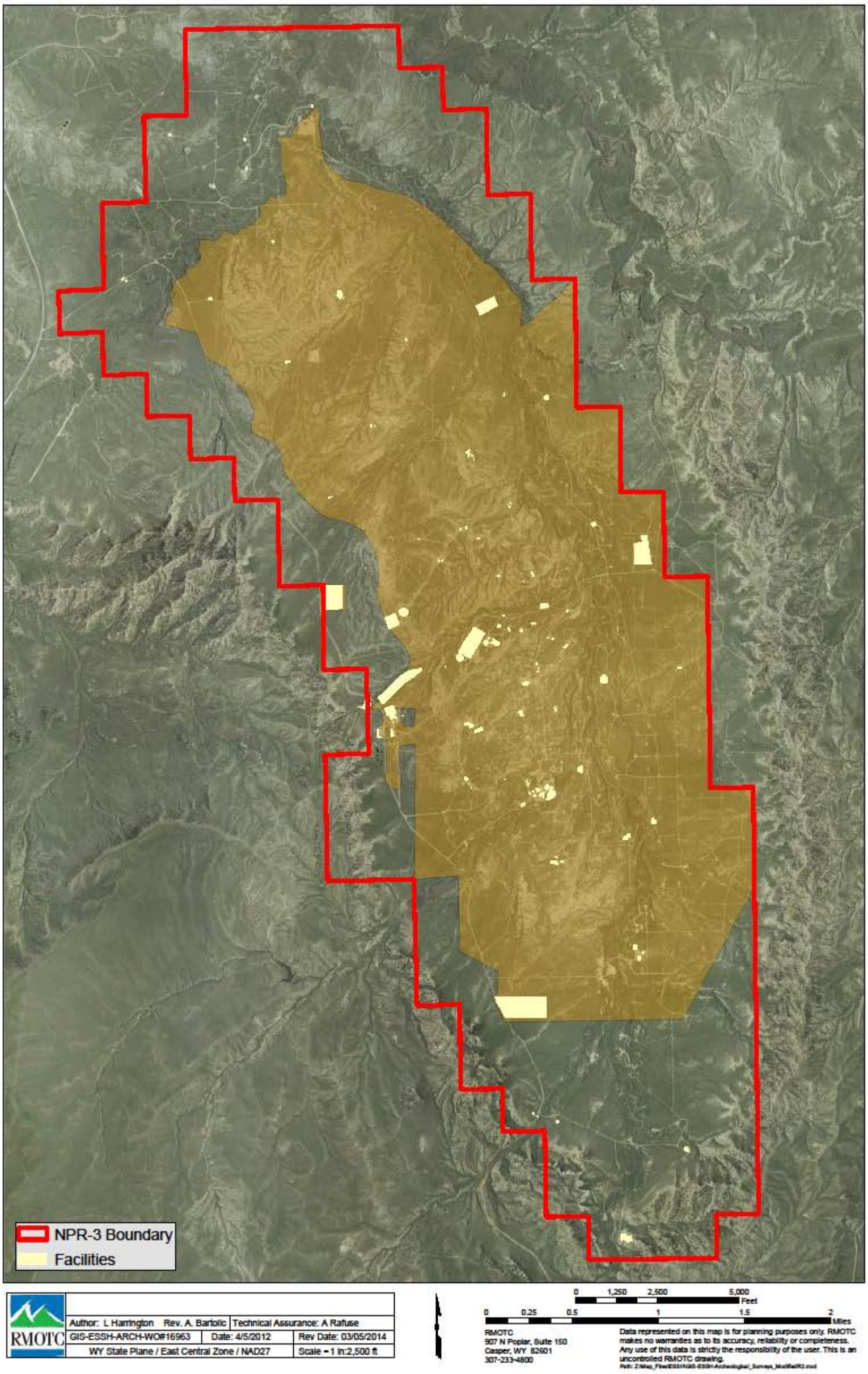

Figure 4-1: NPR-3 Terrain and Disturbed Areas

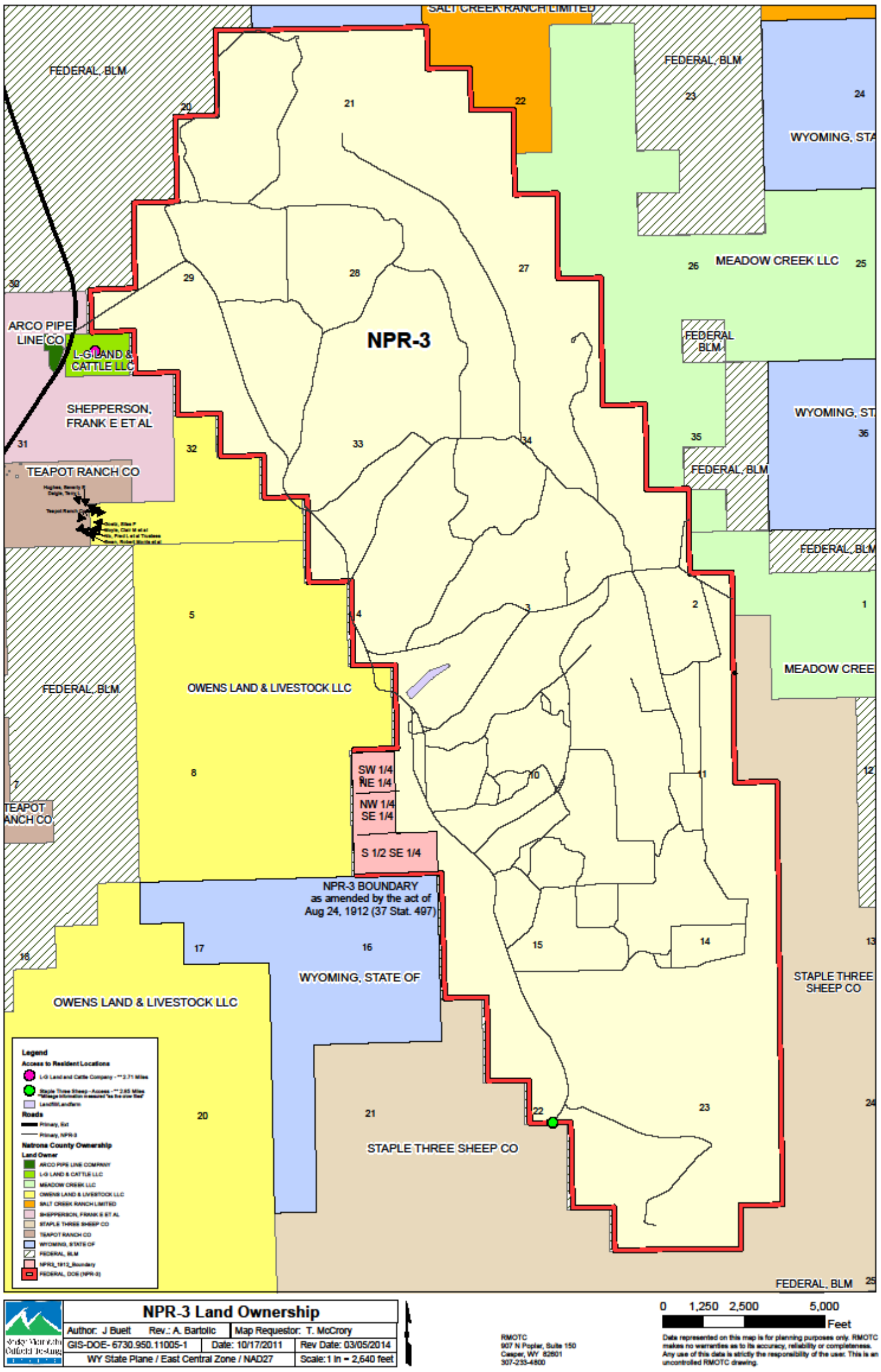

Figure 4-2: NPR-3 Surrounding Land Ownership

4.1.3 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 for recreational purposes. Hunting does occur in contiguous areas; however, it is not allowed on NPR-3. The nearest public recreational facilities are located in and near Midwest, Wyoming, approximately 7 mi (11 km) northwest of NPR-3. These facilities include ball fields, the Salt Creek Museum, developed parks, a recreation center, rodeo grounds, and a golf course. Other recreational facilities maintained within Natrona County include county parks, reservoirs, and recreation areas. These offer a variety of activities such as picnicking, camping, fishing, boating, swimming, and hiking. The Bozeman Trail, a nationally noted historic trail that was first used by gold miners seeking a short cut to the Montana gold fields is located north and east of NPR-3. The trail subsequently became a military and freight route through the area. Portions of the trail are on the National Register of Historic Trails (Stubbs 2013a) and a segment of the trail is believed to cross a small portion of NPR-3.

There are no Wild or Scenic rivers within NPR-3. The Teapot and Little Teapot Creeks do not meet minimum qualifications for Wild or Scenic status based on their low flow and seasonally dry creek beds. No areas within NPR-3 have been designated for protection status (e.g., wilderness study areas or areas of critical environmental concern).

As described above, no recreational facilities, nationally designated recreational resources, or dispersed recreational activities are found within the NPR-3; therefore, this resource is not considered further in this SWEA.

4.1.4 Visual Resources

The following discussion provides an overview of the existing visual resources related to NPR-3.

4.1.4.1 Natural Character

The natural setting of the NPR-3 site is typical of much of the central portion of Wyoming. It consists of rolling terrain covered with grasses and sagebrush and fragmented by numerous small gullies and deeply incised drainages. In the winter, vegetation (predominantly grass and scrub communities) is sparse. The region is generally covered in deep snow in winter. Grassy terrain predominates in the summer. Along the east, south, and west fringes of the NPR-3 property are rocky cliffs and sandstone bluffs covered with Ponderosa pine and juniper. Figure 4-1 provides a general view of the natural terrain that characterizes the site setting.

Small portions of the NPR-3 site are briefly visible from Wyoming Route 259 from the northwest, but bluffs to the south, east, and west of the site otherwise generally isolate it visually from the public. The sandstone rims along the southernmost end of the property provide observers with a panoramic view of the entire NPR-3 site, but this viewpoint is limited to NPR-3 employees and adjacent landowners.

4.1.4.2 Man-made Features

The natural setting of the NPR-3 landscape has been dramatically affected and interrupted by the installation of facilities, structures, and roads associated with oil and gas development (pump jacks, pipeline Rights of Way, compressor stations), ranching activities (fences, homesteads, and unimproved roads), transportation facilities, and electrical power transmission lines (Figure 4-1). The linear forms created by access roads, drill rigs, and power poles contrast sharply with the non-linear aspects of the natural rolling terrain, interrupting natural views. Likewise, manmade structures such as office buildings, sheds, warehouses, and pump jacks throughout the site contrast sharply in texture, color, and form with the natural landscape. The altered landscape on NPR-3, however, is aesthetically consistent with the surrounding privately owned and BLM-managed lands, which contain the same types of features and structures. No scenic routes or corridors occur in the project area.

4.1.4.3 Visual Resource Management

The BLM has inventoried visual resources for all BLM, state, and private land in the NPR-3 area to establish their Scenic Quality Class (SQC) and Visual Resource Management (VRM) Class. NPR-3 and its surrounding area are listed as an SQC C and VRM Class IV property. This classification allows activities that would result in major modifications to the existing character of the landscape, such as oil and gas development.

4.2 Air Quality and Meteorology

The Wyoming Ambient Air Quality Standards and National Ambient Air Quality Standards (NAAQS) are health-based standards which define the maximum concentration of air pollutions allowed at all locations to which the public has access. The U.S. Environmental Protection Agency (EPA) criteria air pollutants for which standards exist are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM) less than 10 microns in effective diameter (PM10), particulate matter less than 2.5 microns in effective diameter (PM2.5), and sulfur dioxide (SO_2).

4.2.1 Meteorology and Climate

NPR-3 is located in central Wyoming, Natrona County. The climate of the project area and central Wyoming is typically cool, dry, and windy. The site is generally characterized by rolling plains interspersed with ridges and bluffs, with elevations averaging over 7,000 ft (2,100 m).

The Midwest meteorological monitoring station is located approximately 7 mi (11 km) north of the project site. Several other monitoring stations operated by the private petroleum companies, the U.S. EPA, and the state also provide background information necessary to assess the meteorology and air quality in the project area

4.2.2 Temperature and Precipitation

Annual precipitation at NPR-3 ranges from 9 to 12 in. (23 to 30 cm) (DOE 2013c). The Midwest monitoring station recorded annual averages of approximately 12.5 in. (32 cm) of total precipitation (water equivalent) (WRCC 2014). The maximum period for precipitation occurs in the spring and early summer. Mountain ranges influence local precipitation; the western portions are wettest as air currents from the Pacific Ocean drop moisture during orographic uplift. Snow falls frequently from November through May, with an average annual snowfall in Midwest of 54.5 in. (138 cm) (WRCC 2014).

Large variations in diurnal and seasonal temperatures occur, with average monthly temperature for the Midwest monitoring station ranging from 89 °F (32 °C) for summer highs to winter lows of 12 °F (-11 °C) (WRCC 2014). Rapid and frequent temperature changes occur during the winter. The annual average maximum temperature is approximately 46.1 °F (7.8 °C), and the annual average minimum temperature is approximately 31.8 °F (-0.1 °C) (WRCC 2014). The record high temperature at Midwest was 106 °F (41 °C) in July 1973, while the record low was -40 °F (-40 °C) in December 1990 (WRCC 2014). Chinook winds, warm downslope winds, are common along the central Wyoming slopes. Numerous valleys provide pockets for cold air to collect and drain into at night. The higher terrain of the ridges and bluffs prevents wind from stirring the air and the heavier cold air settles in the valleys. It is common for temperatures in the valleys to be lower than temperatures on nearby mountainsides.

Data recorded at the Midwest Wyoming monitoring station show the predominant wind direction to be from the southwest. The wind is locally influenced by the general north-to-south-running mountain ranges. Wind speed is also a function of the area's topography. Mean wind speeds vary from approximately 10 to 15 mph (16 to 24 kph). Strong winds with speeds averaging 30 to 40 mph (48 to 64 kph) and gusts up to 65 mph (104 kph) are common in central Wyoming.

4.2.3 Air Pollutants

Natrona County is designated to be in attainment of all state and federal ambient air quality standards, in large part due to strong winds and the low density of emission sources and population centers. The EPA and WYDEQ have established air quality standards at the federal and state levels, respectively. The EPA implemented National Ambient Air Quality Standards (NAAQS, Table 4-1) to specify acceptable pollutant concentrations which may be equaled, but are not to be exceeded, more than once per year. NPR-3 does not currently have any permitted air emissions sources and the sale of the property will not cause any NAAQS to be exceeded.

However, Chapter 3 Section 39(b) of the WYOGCC Rules and Regulations allows up to 60 Mcf (1,699 m^3) of natural gas to be vented to the atmosphere per day per well. Current operations at NPR-3 vent between 100 and 200 Mcf (2,832 to 5,663 m^3) of natural gas per day collectively in order to reduce pressure in well casings and allow the oil to flow more freely.

Table 4-1: National Ambient Air Quality Standards

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide		primary	8-hour	9 parts per million (ppm)	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		primary and secondary	Rolling 3 month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide		primary	1-hour	100 parts per billion (ppb)	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb (2)	Annual Mean
Ozone		primary and secondary	8-hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	primary	Annual	12 µg/m^3	annual mean, averaged over 3 years
		secondary	Annual	15 µg/m^3	annual mean, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
		primary and secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide		primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

4.3 Water Resources

This section provides an overview of the local and regional surface water and groundwater resources.

4.3.1 Surface Water

Local Surface Hydrology

The NPR-3 area is tributary to two major drainage areas. The southern portion of NPR-3 is tributary to Little Teapot Creek, while the northern portion is tributary to Teapot Creek.

Little Teapot Creek enters the site on the southern boundary as a dry ephemeral wash. It transitions to an intermittent stream in places before becoming perennial below a WYPDES discharge point for produced water. From that point, it flows northwest into Teapot Creek at the northern end of the site.

Teapot Creek originates approximately 15 mi (24 km) southwest of NPR-3, and enters the site as a perennial stream, flows about 2 mi (3.2 km) across NPR-3 from the most western portion of the site in a northeastern direction, converges with Little Teapot Creek with a combined flow of approximately 5 ft^3/s (142 L/s), and leaves the site on the northern boundary. Approximately 1 mi (1.6 km) downstream from the site, Teapot Creek flows into Salt Creek (designated by BLM as sensitive), then into the Powder River approximately 25 mi (40 km) north. NPR-3 contains a large number of dry ephemeral washes and intermittent streams, all of which drain into Teapot Creek or Little Teapot Creek. Over 25 impoundments constructed in the 1920's exist on the site, and at least 18 of these meet wetland criteria.

The WYDEQ identifies four classes of streams, from Class 1 (highest level of protection) to Class 4 (lowest level of protection). Streams and washes on NPR-3 are classified by WYDEQ as Class 3B streams (WYDEQ 2001a). Class 3B waters are intermittent and ephemeral streams that do not, or do not have the potential to, support fish populations or drinking water supplies. However, the presence of frequent linear wetlands indicates that they provide habitat for invertebrates, amphibians, or other flora and fauna that inhabit waters of the state at some stage in their life cycles (WYDEQ 2007). Class 4 designations are based upon knowledge that a water body is an artificial, man-made conveyance (i.e., canals), or has been determined not to support aquatic life uses through an approved Use Attainability Analysis. Based on this designation, no waters on NPR-3 are currently Class 4.

4.3.1.1 Water Quality Permits

Wyoming is an NPDES authorized state (referred to in Wyoming as WYPDES). Wastewater discharges are regulated under the Clean Water Act (33 USC 1251–1387) and its associated EPA regulations (40 CFR Parts 122, 136, 403, and 405–471). Wyoming regulations are codified under the Wyoming Water Quality Rules and Regulations, Chapter 7.

NPR-3 currently holds one active WYPDES permit (WY-0028274-001) for discharge of produced water from wells in the Tensleep Battery. This discharge point is located in the central portion of the site. Water is cooled in a series of treatment ponds and discharged into an unnamed tributary of Little Teapot Creek. The treatment ponds were constructed in 1996. In the ponds, oil is skimmed from the surface, and the water is cooled from approximately 180°F to between 55°F and 80°F depending on the weather. The oil skimming pond is netted to prevent waterfowl from landing; other ponds are flagged. The facility is also fenced to prevent access by grazing animals.

The WYPDES Permit No. WY-0028274-001 contains discharge limits and sampling requirements for oil and grease, conductivity, total dissolved solids (TDS), pH, chlorides, chemical oxygen demand (COD), and radium-226. The Tensleep Battery discharges up to1.68 million gal. of water per day (6.36 million L/day). WYPDES sampling is conducted every two months. Discharge monitoring reports are filed with WYDEQ in January and June each year (Table 4-2).

Surface water is also sampled as it enters the site from adjacent properties, as it can contain elevated chlorides and sulfates. Surface water is sampled quarterly. In late 2006, off-site well operations began to inject produced water in some areas rather than discharging, and in these areas, surface water sampling was discontinued.

Table 4-2: Recent Analytical Results for Water Discharged Under WYPDES Permit WY-0028274-001

Date	Chloride (mg/L)	Oxygen Demand, Chemical (COD) (mg/L)	pH (Standard Units [S.U].)	Solids, Total Dissolved (TDS) at 180°C (mg/L)	Radium 226 (pCi/L)	Oil & Grease (mg/L)
WYDEQ Standard or Limit	*2,000 mg/L*	*N/A*	*6.5-9.0 S.U.*	*5,000 mg/L*	*60 pCi/L*	*10 mg/L*
12/13/2012	1040	56	8.13	3420	19	ND
2/7/2013	1080	11	8.04	3430	26	ND
4/4/2013	1120	27	8.08	3590	15	ND
6/3/2013	1080	48	8.09	3540	9.8	ND
8/6/2013	1100	26	8.14	3440	20	ND
10/1/2013	1590	104	7.97	4230	16	ND
12/11/2013	1000	39	8.11	3430	14	ND
2/3/2014	1040	43	7.97	3320	15	ND
2/3/2014	1040	43	7.97	3320	15	ND

4.3.1.2 Wetlands

Wetlands at the site are associated with two streams, Teapot Creek and Little Teapot Creek, and over 25 impoundments located across the site (Figure 4-3). Most of the impoundments were constructed in unnamed tributary drainages that lead to the creeks, and approximately 18 impoundments support wetlands. Wetland areas at NPR-3 are sustained by a combination of natural seeps and springs, runoff, and produced water from oil well operations. Some of the produced water enters from adjacent properties as surface and subsurface flow. Onsite, produced water is cooled and discharged into an unnamed tributary of Little Teapot Creek. In 2004, BKS Environmental Associates, Inc. conducted formal wetland delineations at NPR-3 (BKS 2005). Approximately 61 ac (25 ha) of wetlands exist at the site. The majority of these wetlands (51 ac [21 ha]) were classified as Palustrine Emergent and support hydrophytic vegetation. An additional 10 ac (4.0 ha) of Palustrine Aquatic Bed wetlands are unvegetated. BKS also identified 12 ac (5 ha) of "other waters of the U.S." and 56 mi (89 km) of dry ephemeral drainages at NPR-3. The wetland and non-wetland boundaries are gradual to abrupt based on changes in topography.

4.3.1.3 Floodplains

Floodplain maps do not exist for NPR-3 because there are no large population centers in the vicinity. The topography of the NPR-3 property is characterized by rolling hills divided by severely cut ravines and an encircling rim of sandstone bluffs. This suggests that floodplains are limited to lands within the embankments of the draws. Flood-prone areas are generally low-lying areas adjacent to wetlands and drainages.

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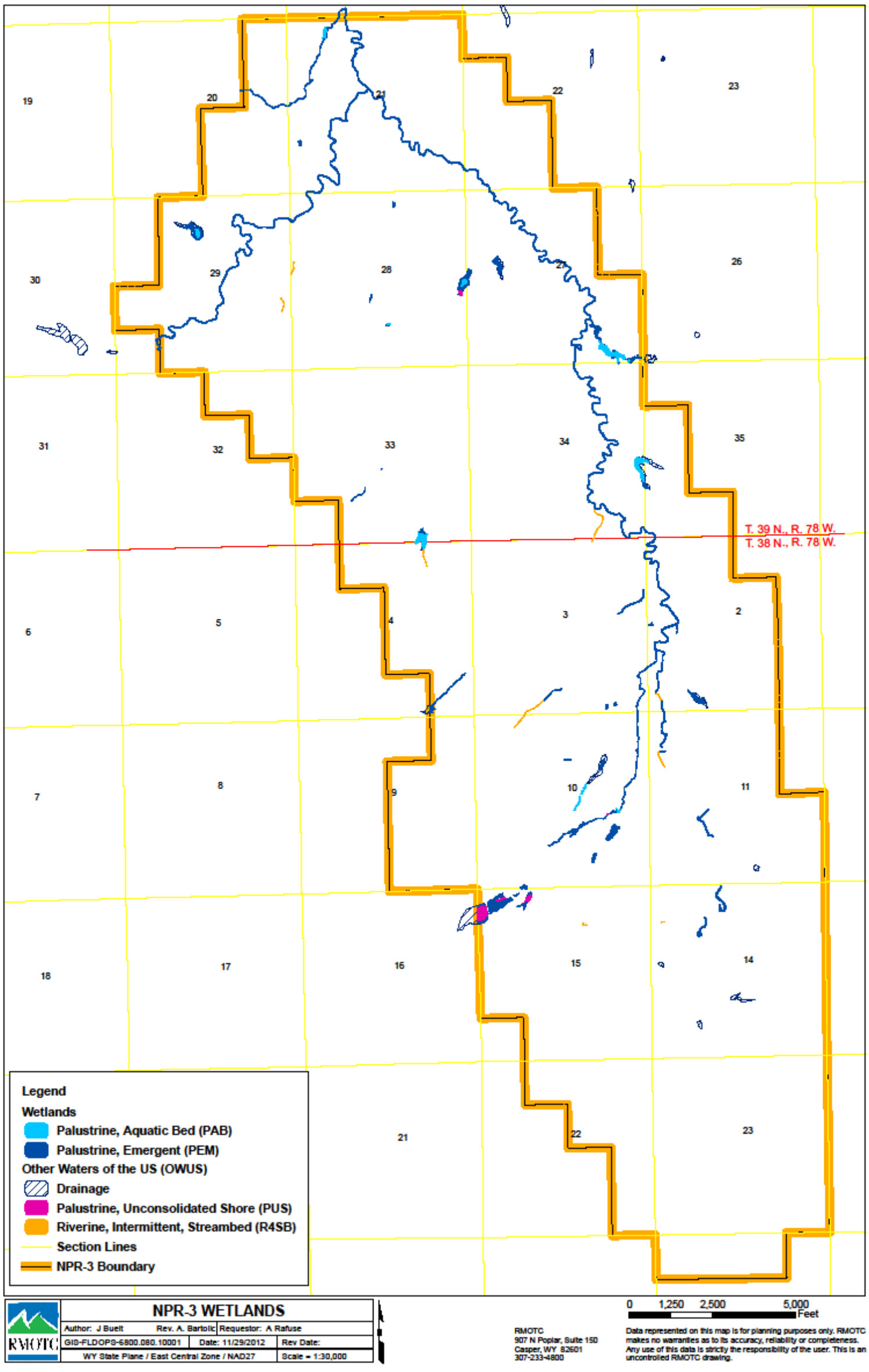

Figure 4-3: NPR-3 Wetland Areas

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4.3.2 Groundwater

There are six groundwater monitoring wells at the Industrial Landfill #2 (IND-2), which has not received any waste since 2001 and is currently undergoing closure. The wells are used to detect potential contamination of shallow groundwater in the water table aquifer as a result of dissolved constituents migrating from the landfill and land farm at IND-2. These wells are screened at depths up to 60 ft (18 m) below land surface. The shallow groundwater is not potable under natural conditions.

Permitted water disposal wells are used to dispose of produced water and wastewater that do not meet surface discharge requirements. The majority of these wells are screened in the Madison Limestone, which is approximately 6,000 ft (1.8 km) below land surface. Casing and annular space cementation is employed to prevent migration of fluids between zones. Injection wells are tested every five years to ensure the integrity of the casing and to detect migration of fluids.

Regional Groundwater Resources

Groundwater resources near NPR-3 occur in geologic formations (ranging from Precambrian to Holocene in age) exposed at points; most are known to yield some water to wells and springs. The major regional aquifer of the area is the High Plains. The High Plains aquifer is mostly alluvial, relatively shallow and thick, permeable, and generally productive for wells. Discharges to small streams or springs at outcrops occur in some areas (U.S. Geological Survey [USGS] 1996).

Groundwater recharge occurs primarily from direct infiltration of precipitation into the shallower aquifers, infiltration into the rock outcrop areas of the deeper aquifers, and leakage between aquifers. Groundwater quality depends primarily on the source geologic formation or aquifer.

Groundwater is used to meet the demand of current uses on public land, such as livestock, wildlife, mineral development, and recreation; groundwater sources are adequate to meet demand for these purposes. Baseline water quality data can be found in the USGS Groundwater Resources of Natrona County, Wyoming.

Local Groundwater Conditions

No underground sources of potable water have been encountered in more than 790 wells drilled since 1976 (DOE 2008). Based on this finding, there do not appear to be any potable water aquifers in any of the formations underlying NPR-3. Those strata that contain water have either excessive levels of TDS or a mixture of hydrocarbons and water. Water quality standards for TDS in Wyoming are 500 milligrams per liter (mg/L) for human consumption and 2,000 mg/L for livestock use.

Throughout the majority of NPR-3, the Steele Shale formation occupies the interval from the surface to an approximate depth of 2,000 ft (600 m). Two permeable sandstone units occur within the upper reaches of the Steele Shale. The upper unit, the Sussex sandstone, outcrops in a ring near the center of the Teapot Dome anticline structure and does not appear to contain an aquifer (DOE 1998). The lower unit, the Shannon sandstone, is an oil reservoir in much of the NPR-3 field. A fault separates the oil reservoir from the Shannon sandstone outcrop at Salt Creek to the north. Groundwater is encountered in the Shannon sandstone in some areas north of the fault, but the concentration of TDS at that location exceeds 10,000 mg/L.

Along the southern, eastern, and western boundary of NPR-3, the Parkman Sandstone member of the Mesa Verde formation outcrops as high ridges dipping away from the center of the dome. This geologic unit overlies the Steele Shale. No water wells have been completed within this geologic unit on NPR-3, as it does not exist underground at NPR-3 except on the very fringes of the property boundary. One water well is completed at a depth of 740 ft (225 m) in this unit approximately 0.5 mile (0.8 km) east of NPR-3 in Section 24, Township 38 North, Range 78 West. In 1972, the water level within the well was 400 ft

(122 m) below ground surface (Crist and Lowry 1972). The current quality and quantity of the groundwater are unknown.

The Madison formation, which in some areas of Wyoming is a high-yielding potable water aquifer, lies below the deepest petroleum producing geologic unit at NPR-3. It is at a depth of more than 6,000 ft (1.8 km) below the surface. This formation yields water of only fair quality, having a TDS concentration of approximately 3,000 mg/L (DOE 1998). Current water quality standards -prohibit use of water with this concentration of TDS for livestock, agricultural or domestic uses. It is occasionally used for site activities. A high-yielding aquifer also exists in the Tensleep formation (approximately 5,400 ft [1.6 km] below the surface). The quality of its water is similar to that from the Madison formation with the additional disadvantage of contact with petroleum.

Produced water flows into the Tensleep pits and is separated from the crude oil. The water flows through a series of four pits where oil is progressively separated from the water. The treated water effluent is then discharged into Little Teapot Creek. Groundwater appropriation and injection permits are summarized in Table 4-3.

Table 4-3: Groundwater Permits at NPR-3

Type of Permit	Permit Number	Facility
Groundwater Appropriation	UW-60713	B-1-3 Tank Battery
	UW-60714	B-1-10 Tank Battery
	UW-60716	B-TP-10 Tank Battery
	UW-60718	B-1-20 Tank Battery
	UW-43810	17-WX-21 Madison Water Well
	UW-85156	57-WX-3 Madison Water Well
Underground Injection Control	049-025-10929	34-CMX-10-WD for Brine Disposal
	049-025-11123	51-CMX-10-WD for Brine Disposal
	049-025-06338	74-CMX-10-WD for Brine Disposal
	049-025-10212	302-A-3 Gas Injector
	049-025-10880	401-A-10 Gas Injector
	049-025-10431	44-MX-10 Gas Injector
	049-025-10025	27-AX-34 Gas Injector
	049-025-10218	103-A-33 Gas Injector
	049-025-10799	85-AX-33 Gas Injector
	049-025-10871	65-AX-15 Gas Injector
	049-025-10903	13-AZ-10 Gas Injector

4.3.3 Potable Water

Drinking water is regulated under the SDWA (42 USC 300f through 300j-11). Regulations promulgated pursuant to the SDWA are codified in 40 CFR Parts 141 through 143.

Potable water for NPR-3 is transported from an EPA-approved water source (the town of Midwest, WY), which acquires its water from the Casper Municipal Water System via a pipeline. One 8,000-gal. (30,283 L) buried tank is used to store potable water at NPR-3. This tank is located at the Lower Office Complex. Proper amounts of Sodium Hypochlorite are added to maintain water quality. The Potable Water System at NPR-3 was activated as a Wyoming Public Water System on March 31, 2004. A Site Sampling Plan was developed and submitted to EPA on April 28, 2004 and updated in 2012. DOE maintains two certified Water Treatment Operators and potable water samples are collected and analyzed monthly.

4.4 Geology, Soils and Prime and Unique Farmlands

The following discussion provides an overview of the local and regional geological, soil, and farmland resources.

4.4.1 Geology

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 (DOE 1998). The area surrounding NPR-3 is not known to be seismically active (DOE 1998).

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 Oilfield, located to the north of NPR-3 (DOE 1998).

The geologic column for the Teapot Dome is shown on Figure 4-4. The oil-productive horizons are the Shannon, Steele Shale, Niobrara Shale, Second Wall Creek, Third Wall Creek, Muddy, Dakota, Lakota, and Tensleep formations.

Since 1915, 1,362 wells have been drilled into the structure, which consists of a doubly plunging anticline cored by a basement high-angle reverse fault. Peak production (during the early 1980's) of the structure yielded an average of 4,460 bpd and average production during the period was 3,790 bpd. Today at NPR-3, there are 607 active wells, of which 227 are shut-in and 380 are actively producing oil from several different geologic formations ranging in depth from 500 to 5,000 ft (150 to 1,500 m) bgs.

4.4.2 Soils

Soils and residual material and alluvium within NPR-3 have developed in a climatic regime characterized by cold winters, warm summers, and low to moderate precipitation. The upland soils are derived from both the residual material (derived from flat-lying, interbedded sandstone, siltstone, and shale) and stream alluvium. Valley soils have developed in unconsolidated stream sediments, including silt, sand and gravel. Soils are generally low in organic matter and are highly alkaline and saline. Textures range from clay loams to sandy loams with varying amounts of gravel or coarser materials. Slopes range from nearly level to very steep, with deeper soils found in the less steeply sloping areas. These soils support little vegetation except in perennial streams. The predominant land use on-site is dedicated to oil and gas collection as well as small amounts of rangeland. Vegetation is predominantly grass-shrub that is used for grazing and wildlife habitat.

In 1997, the U.S. Department of Agriculture (USDA) NRCS (formerly known as the Soil Conservation Service) completed a soil survey of the NPR-3 site and surrounding lands (NRCS 1997).

4.4.2.1 Soil Descriptions

Soils in the major draws on NPR-3 (Little Teapot Creek, Teapot Creek) are mapped as the Haverdad-Clarkelen complex (saline), which includes a mosaic of soils in the Haverdad loam series and the Clarkelen sandy loam series. Properties and characteristics of these soils are listed in Table 4-4. The majority of the upland areas throughout NPR-3, other than the peripheral bluffs and ridges, are mapped as the Arvada-Absted-Slickspots complex, the Cadoma-Renohill-Samday clay loams, and the Keyner sandy clay loam. Soils on and immediately at the base of the bluffs are mapped in the Rock Outcrop-Ustic Torriorthents, shallow-Rubble Land complex (Table 4-4).

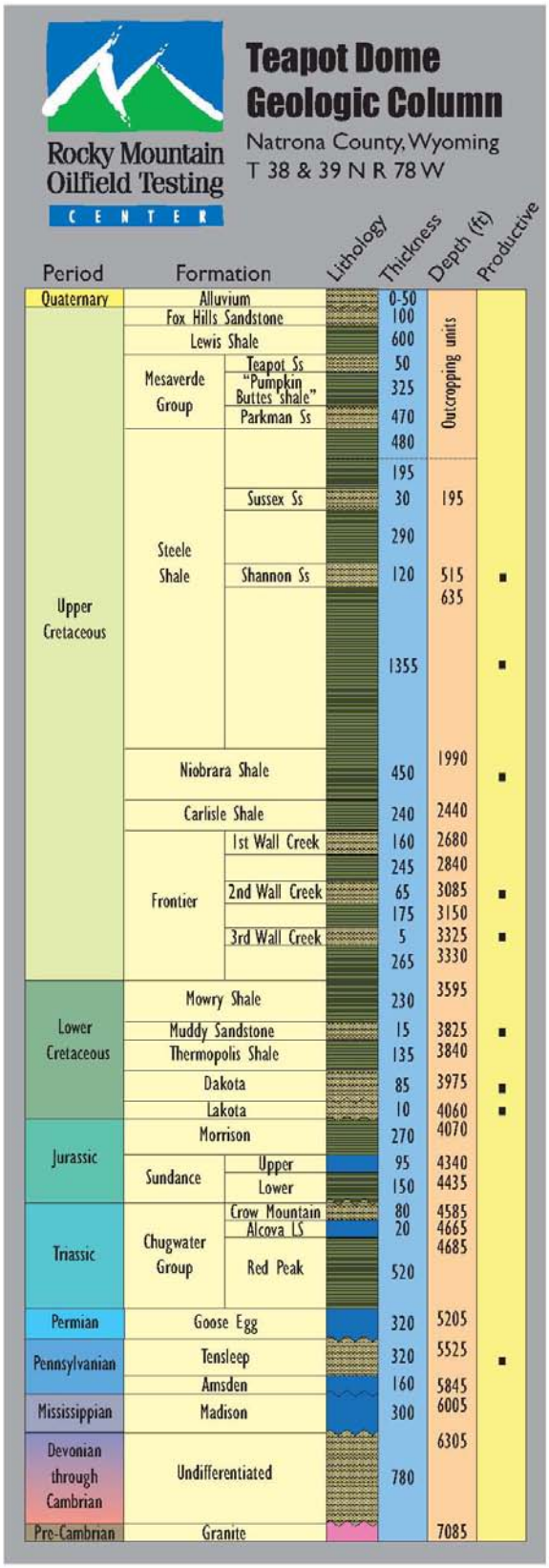

Figure 4-4: Teapot Dome Geologic Column

Table 4-4: Properties and Characteristics of Soils on NPR-3 (DOE 2008)

Soil series	Slope (%)	Landform	Parent material	Primary soil texture	Soil depth	Drainage	Water erosion hazard	Wind erosion hazard
Absted	0-6	Alluvial fans and low terraces	Alluvium from sodic shale	Clay loam	Very deep	Well	Slight	Moderate
Amodac	2-12	Hill slopes	Slopewash alluvium and residuum derived from sodic shale	Fine sandy loam	Very deep	Well	Moderate	Severe
Arvada	0-6%	Alluvial fans and low terraces	Alluvium derived from sodic shale	Clay loam	Deep	Well	Slight	Moderate
Blackdraw	3-15%	Hillsides	Slopewash alluvium and residuum derived from sodic shale	Clay loam	Very deep	Well	Severe	Moderate
Bowbac	6-10%	Foot slopes	Slopewash alluvium and residuum derived from sandstone	Sandy loam	Moderately deep	Well	Moderate	Severe
Cadoma	3-12$	Hillside	Slopewash alluvium and residuum derived from sodic shale	Clay loam	Moderately deep	Well	Moderate	Moderate
Clarkelen	0-3%	Floodplains	Alluvium derived from various sources	Sandy Loam	Very deep	Somewhat excessive	Slight	Severe
Gullied Land	Areas on hills where severe erosion has cut a dense network of many, small, steep-sided gullies; the gullies are 2-3 ft deep and 1-2 ft wide							
Haverdad	0-3%	Floodplains	Alluvium derived from various sources	Loam	Very deep	Well	Slight	Moderate
Keyner	3-10%	Alluvial fans and terraces	Alluvium derived from sodic sandstone and shale	Sandy clay loam	Very deep	Well	Moderate	Moderate
Kishona	6-20%	Hills dissected by gullies	Slopewash alluvium derived from siltstone, sandstone, and shale	Clay loam	Very deep	Well	Severe	Moderate
Lolite	6-20%	Hill crests	Residuum derived from sodic shale	Clay loam	Very deep	Well	Severe	Moderate

Soil series	Slope (%)	Landform	Parent material	Primary soil texture	Soil depth	Drainage	Water erosion hazard	Wind erosion hazard
Renohill	3-6%	Swales	Slopewash alluvium and residuum derived from shale	Clay loam	Moderately deep	Well	Slight	Moderate
Rock Outcrop	Consists of exposures of sandstone, siltstone, and shale							
Rubble Land	Consists of areas where colluvial boulders and stones have accumulated below sandstone ledges and escarpments; the voids between the boulders and stones are virtually free of soil material; these areas support no vegetation							
Samday	3-12%	Hill crests	Residuum derived for shale	Clay loam	Very shallow to shallow	Well	Moderate	Moderate
Shingle	10-40%	Escarpments and hills	Residuum and slopewash alluvium derived from siltstone and shale	Loam	Shallow	Well	Severe	Moderate
Slickspots	Areas of clayey soils that are very strongly alkaline and support little or no vegetation							
Taluse	6-20%	Hill crests	Residuum derived for sandstone	Sandy loam	Very shallow to shallow	Well	Severe	Severe
Terro	6-15%	Hill crests	Slopewash alluvium derived from sandstone	Fine sandy loam	Moderately deep	Well	Moderate	Severe
Theedle	10-30%	Hills dissected by gullies	Slopewash alluvium and residuum derived from siltstone, sandstone and shale	Clay loam	Moderately deep	Well	Severe	Moderate
Ustic Torriorthents	30-100%	Steep slopes	Residuum or colluvium derived from sedimentary rock	Varies	Very shallow or shallow	Well or excessively well	Severe	Varies
Note: To convert ft to m, multiply by 0.3								

4.4.3 Prime and Unique Farmlands

Prime and unique farmlands are regulated under the jurisdiction of the USDA Farmlands Protection Policy Act of 1981 and administered by the NRCS. Prime farmland is defined in the FPPA as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of the USDA (USDA 1981).

Unique farmland is land not recognized as prime farmland that is used for the production of specific high value food and fiber crops, as determined by the Secretary of the USDA. It has a combination of soil quality, location, growing season, and moisture availability necessary to produce economically sustainable high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods (USDA 1981).

Farmland of statewide or local importance is land not considered prime or unique farmland that is believed to be of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops, as determined by the State of Wyoming.

There are no prime or unique farmlands of local or statewide importance present within or in proximity to the NPR-3 (USDA 2013).

4.5 Biological Resources

The following discussion provides an overview of the local and regional biological resources and environments.

4.5.1 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. The intermittent and perennial streams on the site do not support any species of fish, but warm water game fish and non-game fish are found downstream in Salt Creek. Water in one of the impoundments consists of runoff from snowmelt and rain, and water in the other consists of produced water originating from the Madison formation on an adjoining, privately owned oilfield.

NPR-3 lies within the geographic range of approximately 17 fish species. Creek chub, flathead chub, fathead minnow, longnose dace and plains minnow have been identified downstream in Salt Creek (WYGISC 2013), and the remaining species may be present in the Powder River, which receives water from Salt Creek (Page and Burr 1991; BCA 2013).

The presence of wetland vegetation along portions of intermittent and perennial streams (Teapot and Little Teapot Creeks) at NPR-3 indicates that populations of aquatic macro invertebrates and other aquatic flora and fauna potentially inhabit these areas. However, because the main water supply is produced water, species diversity is expected to be relatively low, as it is in stretches of Salt Creek below its confluence with Teapot Creek (RETEC 2004). Most of the habitat for aquatic species exists because of on-site and off-site discharges of produced water to these streams. It is estimated that more than 75 percent of the wetlands along Salt Creek would not exist without the discharge of produced water (RETEC 2004).

Aquatic macro invertebrates would be expected to occur in impoundments with seasonal or perennial water supply. Over 25 such impoundments exist on the site, and at least 18 of these impoundments contain wetland vegetation. The remainders of the impoundments are normally dry and would not support aquatic organisms. Other than Teapot and Little Teapot Creeks, the majorities of drainages on NPR-3 are ephemeral and do not support aquatic life.

Salt Creek is a BLM-designated sensitive stream containing macro invertebrates, warm water game fish, and non-game fish. Other aquatic or semi-aquatic organisms such as amphibians are expected to occur in Salt Creek as well. Dry and intermittent tributaries to Salt Creek, Teapot Creek, and Castle Creek would not be expected to support aquatic organisms.

4.5.2 Terrestrial Vegetation

NPR-3 supports the following vegetation types (WYGISC 2013):

- Desert Shrublands;
- Prairie Grasslands;
- Riparian Areas;
- Sagebrush Shrublands; and
- Wetlands.

The desert shrubland areas are composed of drought-tolerant shrubs with an understory of grasses similar to those in the mixed grass prairie. Shrubs and subshrubs in these portions of NPR-3 include silver sagebrush (Atremisia cana), greasewood (Sarcobatus vermiculatus), rabbitbrush (Ericameria nauseosa), saltbrush (Atriplex spp.), and broom snakeweed (Gutierrezia sarothrae).

The prairie grasslands at NPR-3 contain a substantial proportion of weedy annual grasses and forbs, including cheatgrass (Bromus tectorum), Japanese brome (Bromus japonicas), tansy mustard (Descurainia pinnata), and kochia (Bassia scorparia), However, many species of desirable perennial grasses also occur, including western wheatgrass (Pascopyrum smithii), needle and thread (Hesperostipa comate), bluebunch wheatgrass (Pseudoroegneria spicata), wildrye (Elymus spp.), crested wheatgrass (Argopyron cristatum), and Indian rice grass (Achnatherum hymenoides).

Patches of two other vegetation types-ponderosa pine and Wyoming big sagebrush-also occur at NPR-3 (WYGISC 2013). Ponderosa pine (Pinus ponderosa) stands are found on the peripheral ridge at the southeastern portion of the site and include wider diversity of understory species such as silver sagebrush, bluebunch wheatgrass, Sandberg bluegrass (Poa secunda), threadleaf sedge (Carex filifolia), and a diversity of wildflowers.

The Wyoming big sagebrush vegetation type, dominated by several species of sagebrush (Artemisia spp.) with a grass understory, occurs in some locations along the southern and western periphery of the site.

Riparian areas exist along draws, impoundments, and perennial and intermittent streams at NPR-3. With the exception of salt cedar (Tamarix spp.) and scattered cottonwood (Populus sp.) and willow (Salix sp.) individuals, most riparian areas at the site are dominated by grasses. Wetland areas are described in Section 4.5.5.

The vegetation at NPR-3 has been strongly influenced by human activities over time. Livestock grazing has occurred for many decades across the site, and DOE continues to lease rangeland within portions of NPR-3 for periodic grazing. Prior to 1986, the area was reported to have been overgrazed (DOE 1998); this resulted in lower species diversity and increased weedy species. Historic disturbances associated with oil field operations have changed the vegetation at NPR-3; historically, work areas, wells, roads, pipelines, houses, ponds, and other structures have been constructed, abandoned, and / or removed. Recent reclamation efforts using native species have resulted in the successful reestablishment or desirable shrubs, grasses, and forbs in many portions of NPR-3; consequently, the species diversity has also increased. Oil field activities have generally not disturbed vegetation on the peripheral ridges and in riparian or wetland areas of the site. However, grazing has affected all areas, and some wetlands have also been affected by discharges of produced water.

Noxious weed species can be expected to occur in riparian and wetland areas, in historically overgrazed areas, along roads, and in disturbed soils. With the exception of cheatgrass, noxious weed infestations at NPR-3 are not large, and they are currently mapped and controlled by onsite staff. At present, the most common noxious weed at the site is Canada thistle (Cirsium arvense), but other weeds have been observed, including common burdock (Arctium minus) and salt cedar (Tamarix spp.).

As stated in Section 3.1.1, approximately 755 wells have been plugged and abandoned at NPR-3. Each of these sites has been re-graded to natural contours and re-vegetated with native plant species. Reclamation efforts following construction projects (such as pipeline installation) also involved re-seeding with native plant species.

4.5.3 Terrestrial Wildlife

The WGFD maintains a database (Wildlife Observation System) of wildlife sightings throughout the state by township, range, and section. This list includes some species that have been observed historically on the NPR-3 site by staff and contractors. The following information is both general and site-specific, but may not reflect the complexity of wildlife actually present on the site.

Several surveys, including raptor surveys that were conducted for energy development in the area, included portions of NPR-3. The most recent raptor survey was conducted in May 2007 in the general area. Other wildlife surveys were conducted in 1999, 2001, and 2005 (DOE 2008).

According to a bird and mammal distributive study for Wyoming (DOE 2008), approximately 222 avian species and 49 mammals species have been observed in the region containing the NPR-3 site, which also lies within the geographic range with at least 6 amphibian species and 9 reptile species.

Approximately 70 percent of the world's pronghorn antelope are found in the state of Wyoming. Pronghorn and mule deer are the principle big-game mammals seen on the site. No hunting is allowed by DOE within NPR-3. Critical winter range for either antelope or mule deer is not found within NPR-3. However, range within the 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 (DOE 2001).

Other characteristic mammal populations include raccoons, striped skunk, porcupine, badger, fox, bobcat, prairie dog (two known colonies), cottontail rabbit, and deer mouse (DOE 2001).

Avian species include raptors such as the American kestrel, red-tailed hawk, golden eagles, and northern harrier. Other species include horned lark, western meadowlark, Brewer's blackbird, mountain plover, vesper sparrow, Brewer's sparrow, lark bunting, and sage thrasher. These species would be considered common to any open prairie area. In addition, dabbling ducks such as teals, wigeons, mallards, snipe, gadwalls, etc., may be present in ponded and slow water areas. Past surveys indicate the presence of burrowing owls in association with prairie dog towns (DOE 2001).

Other species potentially found on the site include various toad species, sagebrush lizard, short-horned lizard, garter snake, gopher snake, and western rattlesnake.

Several surveys have been conducted for raptor presence on NPR-3. The bluffs near the site perimeter provide excellent nesting habitat for raptors. The following compilation includes the results of surveys conducted in 1996, 1999, 2005, and 2007 (DOE 2008). The results of the 1996 and 1999 surveys indentified golden eagles (Aquila chrysaetos), short-eared owls (Asio flammeus), red-tail hawks (Buteo jamaicensis), northern harrier hawks (Circus cyaneus), bald eagle (Haliaeetus leucocephalus), burrowing owls (Athene cunidularia), 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. Although a bald eagle was sighted during these surveys, the sighting was outside of the site boundaries.

Ten burrowing owls were observed during a survey of one of the prairie dog towns in August 2000. The most recent raptor survey, which was conducted in May 2007, evaluated portions of the NPR-3 site as well as adjacent areas for a larger project (DOE 2008). The aerial survey confirmed occupied nests for prairie falcons (three nests), golden eagle (one nest), red-tailed hawk (one nest), and great-horned owl (one nest). Additional nests were located during the survey, but they were dilapidated and the associated species could not be identified. These were located primarily in Township 38 North, Range 78 West, Section 22, which includes the bluffs along the southwestern site area. In May 2012, several nesting red-tailed hawks were observed on active power poles within NPR-3. The U.S. Fish and Wildlife Service (USFWS) currently lists six raptor nests within one mile of the NPR-3 boundary, including three golden eagle nests, one great horned owl nest, and two prairie falcon nests (WYGISC 2013). No sage grouse leks have been identified within two miles of the NPR-3 boundary in the past 15 years (WYGISC 2013). Sage grouse depend on the presence of sagebrush communities.

The results of a 2005 ground survey that included the northern portion of the NPR-3 site resulted in the identification of an active northern harrier hawk nest northwest of Teapot Creek but within the NPR-3 boundary. Little potential raptor nesting habitat was present in this area (Veritas DGC Land, Inc 2005).

The Veritas survey (2005) also included a field inventory for prairie dog colonies within NPR-3. All prairie dog colonies on NPR-3 within the project area were mapped. Low density was identified as less than five burrows per ac (or 12 burrows per ha). One black-tailed prairie dog (Cynomys ludovicianus) colony was documented and located on the western border of the site. The colony covered 3.4 ac (1.4 ha) and was considered low-density. No white-tailed prairie dogs (Cynomys leucurus) were documented on the site during this survey (Veritas DGC Land, Inc. 2005).

The presence of prairie dog colonies was also evaluated in a May 2007 survey. Less than 6 ac (2.4 ha) of active mounds were identified. None of the areas appeared to provide suitable mountain plover habitat. As mentioned earlier, site staff observed a lot of die off from tularemia, which may be affecting burrow active use (Wildlife Consulting Services 2007). In a 2008 site survey, a Range Manager observed no actively inhabited prairie dog colonies. In 2012, prairie dog populations were thriving. Employees have observed two large colonies on the NPR-3 site; one on the north eastern side of the field, and the other on the north western side of the field near the Gas Plant facility.

Mountain plover habitat suitable for nesting on NPR-3 lands within the survey area were mapped. Habitat indicators include level terrain, prairie dogs, bare ground (minimum 30 percent), prickly pear cactus pads (Opuntia sp.), heavily grazed pastures, widely spaced plants, and grass height typically less than 4 in. (10 cm). No suitable mountain plover habitat was located on the area surveyed within NPR-3. Potential habitat on a bench west of Little Teapot Creek is being encroached by dense stands of cheatgrass, which makes the area unsuitable. Although the mountain plover was originally proposed for listing as a threatened species in 1999, the USFWS withdrew listing in 2003.

4.5.4 Threatened, Endangered and Rare Species

The Endangered Species Act (16 USC 1531-1543) protects listed threatened and endangered plant and animal species and their critical habitats. No endangered raptors have been reported within NPR-3 since 1989 (WYGISC 2013), though a pair of Golden Eagles (Aquila chrysaetos) and their nest was found just outside of the site boundary in 1998 (DOE 1998).

Two colonies of black-tailed prairie dogs (Cynomys ludovicianus) currently exist on NPR-3 property. These colonies are located on the western border of NPR-3 in unfrequented areas of the field. Each colony exhibits a low population density and covers approximately 3 ac (1.2 ha). No documented white-tailed prairie dog colonies currently exist on NPR-3 property.

Vertebrate species diversity is known to be low across the NPR-3 site (WYGISC 2013), and low vertebrate diversity is highly correlated with low plant diversity (Hong Quian 2006). Moderate vertebrate

species diversity occurs along Teapot and Little Teapot Creeks and along Salt Creek to the north. High vertebrate species diversity exists in downstream sections of Salt Creek, north of the town of Midwest.

No federally listed endangered or threatened plant species are known to occur at NPR-3. In 1997, surveys were performed at NPR-3 for Ute Ladies' Tresses (Spiranthes diluvialis), a threatened species. No plants were found; additionally, no plants of this species have yet been found in Natrona County (Fertig et al. 2005). Because it is an early successional plant, it is possible, though highly unlikely, that this species may occur on the site along the edges of wetlands at NPR-3. The riparian areas and peripheral ridges on NPR-3 have been less affected by well-related activities than the basin area. Therefore, rare plant species could potentially be found in these areas, particularly in portions of the ridges with topography that would discourage grazing animals.

4.5.5 Floodplains and Wetlands

The predominant plant species in NPR-3 wetlands include inland salt grass (Distichlis spicata), alkali bulrush (Schoenoplectus maritimus), American bulrush (Schoenoplectus americanus), and foxtail barley (Hordeum jubatum). Less common species include summer cypress (Bassia scoparia), seepweed (Suaeda calceoliformis), Baltic rush (Juncus arcticus), alkali cordgrass (Spartina gracilis), Canada thistle (Cirsium arvense), salt cedar (Tamarix spp.), cattail (Typha latifolia), creeping bentgrass (Agrostis stolonifera), Sandberg bluegrass (Poa secunda), creeping spike rush (Eleocharis palustris), and seaside arrowgrass (Triglochin maritima).

Two Executive Orders (E.O. 11988 Floodplain Management and E.O. 11990 Protection of Wetlands) require Federal agencies to consider the effects of proposed actions on floodplains and wetlands. During 2004, a wetlands delineation study was conducted by an independent contractor. It was determined that the entire NPR-3 area was affected by an extended drought, which created a wetland delineation situation for seasonal wetland hydrology and associated vegetation parameters in some areas. Designated problem areas were deemed to have met the wetland criteria for all parameters for an appropriate time period, although some criteria may not have been met at the time of the wetland survey. Wetland and non-wetland area boundaries ranged from distinct and abrupt to very gradual based on changes in topography. All identified wetlands were recommended as jurisdictional. No closed basin watersheds were identified within the project area. During 2010, a consultant performed the field work involved in a wetlands delineation study. The results of the 2010 fieldwork became available in 2011 (DOE 2013c). The independent contractor confirmed the wetland areas defined in the 2004 study and re-inventoried many locations. Most of the classified wetlands remain dry for all but spring runoff events. The most common types of wetland found were:

- Palustrine, Aquatic Bed wetlands,
- Palustrine, Emergent wetlands,
- Palustrine, Unconsolidated Shore Other Waters of the United States, and
- Riverine, Intermittent, Streambed.

Wetland areas at NPR-3 are sustained by a combination of natural seeps and springs, runoff, and produced water from oil well operations. Some of the produced water enters from adjacent properties as surface and subsurface flow. Onsite, produced water is cooled and discharged into an unnamed tributary of Little Teapot Creek. This WYPDES-permitted discharge results in higher temperatures and increased flow into the downstream wetlands.

Floodplain maps do not exist for NPR-3 because there are no large population centers in the vicinity. Flood-prone areas are generally low-lying areas adjacent to wetlands and drainages. The majority of Little Teapot Creek is bounded by high cutbanks. Vegetation in the floodplains/riparian zones include desirable, perennial grasses (inland salt grass, many species of wheatgrass [Elymus sp.], prairie junegrass [Koeleria macrantha], alkali grass [Puccinellia nuttalliana], and green needlegrass [Nassella viridula]), and annual

weeds. Scattered woody plants, including salt cedar, cottonwood (Populus sp.), willow (Salix sp.), Douglas rabbitbrush (Chrysothamnus viscidiflorus), and sagebrush (Artemisia sp.) also occur. Structures at NPR-3 are located away from flood-prone areas.

4.6 Cultural Resources

Cultural resources include archaeological, historical, and ethnographic sites, and numerous sites have been identified onsite at NPR-3. These include, but are not limited to, sites related to the Teapot Dome Scandal and Native American encampment. These resources are protected by a variety of state and federal laws and regulations; the most significant regulations pertain to the NEPA, the National Historic Preservation Act, the Archaeological Resources Protection Act, and the American Indian Religious Freedom Act. Compliance with these regulations requires (1) the assessment and comparison of the impacts of the Proposed Action; (2) a cultural resource inventory (including fieldwork and archival research) of the field; (3) the evaluation of the significance of the sites that could be impacted; (4) the determination of Proposed Action effects on significant sites; and (5) the implementation of prudent and feasible measures to avoid or mitigate adverse effects to significant sites. During the course of conducting these project-related activities, the Wyoming State Historic Preservation Officer (WYSHPO) has been consulted.

DOE initiated the National Historic Preservation Act Section 106 process described in 36 CFR 800 in 2013 in order to consult with the WYSHPO, Advisory Council on Historic Preservation (ACHP), appropriate Native American tribes, and other members of the public as necessary to identify and implement appropriate mitigation for existing historic and cultural sites on the property. A site-wide Class I historic/cultural/archeological survey was completed, as were additional Class II and III surveys to identify all sites potentially eligible for listing on the NRHP. Ultimately, it is DOE's intent to develop a binding Memorandum of Agreement describing appropriate mitigation strategies for all sites eligible for the NRHP. All mitigation steps will be completed before the sale of the property.

Representatives from federal, state and local government; local historic societies and 22 Native American tribes were contacted and invited to attend site visits and provide comments or concerns related to the Proposed Action. Representatives of various Sioux and Crow tribes and the National Park Service participated in a series of site visits to evaluate the cultural significance of the existing historic properties. Previous Section 106 efforts did not identify any traditional cultural properties (DOE 2008) and recommended not drawing attention to previously identified properties by refraining from such actions as posting signs, putting up fences, creating trails or paths, or temporarily flagging the sites. This consultation process is on-going as of the publication of this SWEA. However, it is unknown if previous tribal representatives examined all historic properties on the NPR-3 site or only those in proximity to the proposed project areas discussed in earlier EAs. During the previous consultations, Native American representatives recommended that DOE avoid cultural sites entirely and not draw attention to them by refraining from such actions as posting signs, putting up fences, creating trails or paths, or temporarily flagging the sites.

Cultural Resource Sensitivity

The cultural history of the NPR-3 site dates back to 12,000 Before Present (B.P.), when Native American people lived and hunted in this area. During cultural resource inventories of the NPR-3 site, artifacts and features dating to the Paleo-Indian period (12,000+ to 7,500 B.P.) through the Historic period have been discovered (Goss et al. 2002; Hatcher and Goss 1995; Slensker and Goss 2005; Goss and Knesel 2007; Stubbs 2013). Cultural resource surveys conducted throughout the central Wyoming area indicate that most archaeological resources are dated to the Late Archaic and Late Prehistoric periods (about the last 5,000 years) (BLM 2007). Typical cultural resource discoveries in central Wyoming include open and sheltered camps, hearths, lithic scatters and workshops, stone circles, rock cairns, and petroglyphs.

Numerous cultural artifacts have been recovered from the NPR-3 site (Slensker and Goss 2005; Goss and Knesel 2007) and are curated at the University of Wyoming in Laramie.

Published and unpublished sources of ethnographic literature also indicate that Native American tribes have lived and hunted on and near the NPR-3 site since prehistoric times (Fritz 2007; Stubbs 2013). The colonization of the West by Euro-Americans in the late 1700's and 1800's created a dynamic situation, in which numerous tribes were displaced back and forth across the central Wyoming area. Figure 4-5 shows the specific Native American tribes that were believed to have occupied the NPR-3 area and the time periods during which they were believed to be present.

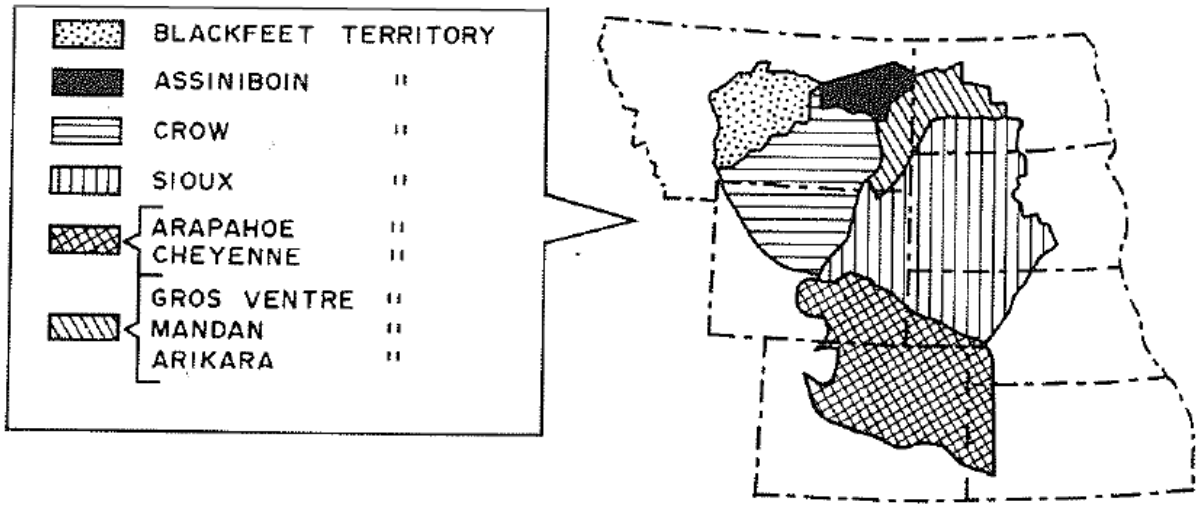

Figure 4-5: Tribal Territories, circa 1851. "Redrawn from the map presented to D.D. Mitchell by P.T. DeSmet in 1851" (Fowler 1982)

4.7 Socioeconomics

The following discussion provides an overview of the local and regional human environments.

4.7.1 Population and Housing

NPR-3 lies in an unincorporated area of Natrona County. The nearest major population center is the Midwest/Edgerton area, approximately 7 mi (11 km) north of the site's northern boundary. The latest census shows that Natrona County has a population of approximately 78,621 (US Census Bureau 2014). Casper is the county seat of Natrona County and the second largest city in Wyoming. The most recent census data from 2012 recorded a Casper population of approximately 57,813.

Casper has been important to area commerce since the mid-nineteenth century. It began as a ferry crossing in 1847; soon afterward, a military fort was constructed to protect the Platte River Bridge. After the Salt Creek Oil Field (north of NPR-3) was discovered in the 1880's and the Teapot Dome Oil Field several decades later, oil and gas drilling began to dominate Natrona County's economy. The energy sector remains the predominant employer and driver of economic growth in the county. Energy-related employment provides higher wages than other blue-collar employment opportunities in the area. Casper serves as a service center for the oil and gas industry, as well as a center for coal mining, uranium, and medical and financial services (BLM 2007).

The town of Midwest has a population of approximately 404; the town of Edgerton has a population of 195. The towns of Midwest and Edgerton, immediately adjacent to each other, have approximately 238

households. The population has decreased since 1980 when it had more inhabitants, and during the oil and gas development boom in 1983- 84.

4.7.2 Employment

The towns of Midwest and Edgerton are primarily a bedroom community for the mineral industry. The economy is based primarily on oil and gas operations and is inhabited mostly by operating crews for facilities in the area. It is likely that construction personnel reside in the towns. A small retail trade occurs in both towns to support the oil and gas industry in the project area.

4.7.3 Transportation

Interstate 25 (I-25) is a four-lane interstate highway that enters Wyoming near Cheyenne, north of the Colorado state line, and continues north to Douglas. It continues west to Casper, then north to Montana. It provides the primary north-south highway access in Natrona County. An estimated 21 mi (34 km) north of Casper, State Route 259 (SR-259) splits off from I-25, providing direct highway access to the western edge of the site for NPR-3 workers, and continues north to Midwest and Edgerton for oil field workers in surrounding areas. Actual site access off of SR-259, however, is by a restricted internal road within NPR-3.

Current use of I-25 and SR-259 has historically been and continues to be light; both routes operate below capacity at a Level of Service A, which indicates a lack of congestion. In 2011, recorded highway counts on I-25 between Casper and Midwest, Wyoming, showed an average daily vehicle count of 2,270 vehicles. SR-259 is a two-lane paved state road that similarly receives light use and is carrying traffic below highway design levels. In 2011, an average daily traffic count of 1,822 vehicles was recorded on this road (WYDOT 2014).

Injury and fatal accident data were reported for the period of 2010-2013 on I-25 between Casper and the Natrona-Johnson County lines. On I-25, there were 174 total crashes; of these 36 were injury crashes and 2 were fatal crashes. For SR-259 during the same reporting period, there were 43 total crashes; of these, 5 were injury crashes and none were fatal crashes. In comparison, there were a total of 10 fatal crashes and 432 injury crashes on all roads in Natrona County in 2012. Approximately 65 to 75 percent of all crashes in Natrona County occur in Casper. A crash is reported if there is over $1,000 damage, injury, or death (WYDOT 2014).

There are no scenic byways along the above-described highways. Air transportation services in Natrona are provided by the Natrona County International Airport in Casper. The airport offers both freight and passenger services.

4.7.4 Community Services

The Wyoming Medical Center hospital in Casper has a 191-bed capacity. Ambulance service is also available. Additionally Mountain View Region Hospital opened in 2008 as a surgical hospital with a 23-bed capacity. Mountain View currently has an Emergency room; however, the hospital was trying to close it as of 2012.

Electricity for NPR-3 is supplied by Rocky Mountain Power. Natural gas is supplied by the field for use in heating, air conditioning, and running equipment. Potable water is available from an on-site storage and distribution system that stores water transported from Midwest to the site. Sewage disposal facilities are available from on-site septic tanks with a large excess capacity. All utilities are currently operating with peak load demands well below the maximum supply capacity. Solid waste disposal is available at a City of Casper-owned landfill.

Natrona County fire departments would be the first to respond to a fire or emergency at the site. The county provides volunteer fire protection stations in the vicinity of NPR-3, as does the town of Midwest.

Onsite personnel have also been trained to respond to incipient fires. NPR-3 has mutual aid agreements with the adjacent towns to provide firefighting services to the site. Additional back-up units could be provided, as needed, from the Casper region located south of the project.

4.8 Waste Management

The following discussion addresses current operations associated with managing operational wastes from the various activities currently taking place on-site.

4.8.1 Hazardous Waste

The NPR-3 site has a waste management policy that provides direction for the appropriate disposition of hazardous waste materials generated during site operations. Hazardous and non-hazardous waste treatment, storage, and disposal of solid matter is regulated under the Resource Conservation and Recovery Act (RCRA) (42 USC 9601-9675 et seq.). 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 gases are produced at NPR-3 (DOE 2001).

DOE operations at NPR-3 currently meet the criteria as a small-quantity generator under RCRA. As such, operations at the site could generate no more than 2,204 lbs (1000 kg) of hazardous waste, 220 lbs (100 kg) of acute hazardous waste spill cleanup residue, 2.2 lbs (1 kg) of other acute hazardous waste per month. The existing drilling and production wastes at NPR-3 include oil, water, drilling mud, cuttings, well cement, produced waters, tank bottoms, sediments, pigging wastes, petroleum-contaminated soil, spent filters and sludge from produced water pits DOE 2001). Oil from wells is routed to test satellites and tank batteries, and water from the tank batteries is discharged into pits or injected into permitted wells.

In accordance with the Superfund Amendment Reauthorization Act Title III, chemicals are evaluated to determine if any are listed as extremely hazardous substances. If any of these are utilized at NPR-3 in reportable threshold planning quantities, 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 minimum quantity of all chemicals stored at NPR-3 at any given time is 25,000 gal. (95,000 L) (DOE 2008). Tier II Emergency and Hazardous Chemical Inventory forms for the facility were submitted in February 2013 for the 2012 calendar year. An inventory of RMOTC's Emergency Planning Community Right-to-Know (EPCRA) Section 313 chemical and chemical categories was conducted and the results were compared to the thresholds for the individual chemicals and chemical categories. The results of the analyses dictated that there were no reportable chemicals in exceedance of threshold reporting quantities and therefore no Toxic Release Inventory (TRI) report was filed (DOE 2013c).

4.8.2 Pesticides, Rodenticides and Herbicides

For parking lots, fence lines, and areas around production equipment and buildings, NPR-3 staff have historically used herbicides such as Roundup, Banvil, and Karmex. In 2012, RMOTC staff removed all unused herbicides from the site and sent them offsite as hazardous waste for proper treatment and disposal. Since 1012, a third-party contractor has provided weed control services to the site. No herbicide is stored onsite and the contractor removes all waste material for proper treatment and disposal.

4.8.3 Radioactive Wastes

Low-level radioactive waste is generated as a by-product of oil and gas production as "naturally occurring radioactive material (NORM)." There are two sources of NORM at RMOTC/NPR-3: 1) groundwater drawn from wells in the Madison formation; and 2) the build-up and storage of scale on equipment and

pipelines. Wells drilled in the Madison formation produce water at high temperatures and contain radium-226. Oilfield equipment can contain radiological scale and scale-bearing sludge.

No federal regulations specifically address the handling and disposal of oil-field NORM wastes. The maximum discharge amount is 60 picocuries per liter (pCi/L). In accordance with state regulations for solid waste disposal, radioactive materials below 5 pCi/L can be disposed of in a solid waste disposal facility without special action. However, if the waste exceeds the criteria limit, then it must then be covered with 4 ft (1.2 m) of soil after placement within a permitted solid waste facility.

4.8.4 Waste Disposal

NPR-3 has two inactive industrial waste landfills (IND-1 and IND-2), an inactive petroleum waste land farm (associated with IND-2) and four active petroleum waste composting facilities. IND-1 was a trench-and fill-type landfill composed of cells dug into the native soil using a bulldozer and/or backhoe. Waste is presumed to have been placed in the bottom of a given cell at one end, compacted and covered with soil previously excavated from the cell during the landfill construction. IND-1 pre-dates WYDEQ landfill permitting regulations and has been closed since 1991. IND-1 operated in two distinct phases, herein referred to as IND-1a and IND-1b. IND-1a operated in the 1960's and 1970's and was believed to be closed in 1981. IND-1b operated in the 1980's and was closed in 1991. Neither phase of IND-1 was permitted nor do records of the waste disposed in the associated pits exist.

The IND-2 landfill is a trench and fill type of landfill comprised of pyramid and trapezoidal shaped disposal cells dug into the native soil using a bulldozer and/or backhoe. Waste was placed in the bottom of a given cell at one end, compacted, and covered with soil excavated from the cell during the landfill construction. The depth of each trench varies depending on the soil conditions, size of the cell, and the depth to groundwater at the specific location.

IND-2 was intended for disposal of waste items/materials generated during oil exploration, drilling, research, and production activities at NPR-3. This includes office trash, warehousing shipping boxes, oil absorbent pads and used oil booms, iron sponge, water filters, rubber hoses, pipe insulation, plastic, spent charcoal, sheet rock, wood, and other non-hazardous and RCRA exempt oil field wastes. It may also include special waste items such as Low Temperature Separation gas plant glycol filters, an occasional bag of unused non-hazardous chemical (i.e., Potassium Chloride or Polyacrylamide). The IND-2 landfill also includes a land farm intended for the treatment of petroleum contaminated soils. The IND-2 landfill and land farm ceased operations in 2001 and are no longer in use. IND-2 is capped per current WYDEQ regulations and a closure permit application (including a Post Closure Environmental Monitoring Plan) is being developed.

DOE currently contracts for solid waste collection and disposal. Wyoming is a WYPDES authorized state, and wastewater discharges are regulated under the Clean Water Act and its associated EPA regulations. Wyoming regulations are codified under the Wyoming Water Quality Rules and Regulations. Petroleum discharges are regulated under the Clean Water Act. Petroleum management at NPR-3 consists of management of oil and associated waste (e.g., produced water, sludge) to prevent oil from being discharged into surface water. Oil spill prevention measures are outlined in the NPR-3 Spill Prevention Control and Countermeasure (SPCC) Plan, which was revised in 2010 and is reviewed for accuracy annually as part of RMOTC's Environmental Management System annual review process.

4.9 Environmental Justice

Environmental justice is related to the fair treatment and meaningful involvement of minority and low-income populations in proposed projects on federal land or using federal funding. When the impacts of a proposed federal action may involve such populations, an analysis of the potential for disproportionate and adverse impacts to these populations, combined with meaningful community outreach and public involvement, is required.

NPR-3 is on land that was withdrawn from other purposes for the production of oil and that is remote from urban centers and surrounded by large ranches and public land. The routine and construction operations anticipated by the Proposed Action would be conducted on NPR-3 and would not impact minority or low income populations. DOE expects that future owners of the site will comply with all federal, state and local hiring and contracting requirements, including those protecting minority workers. Moreover, there are no environmental pathways by which emissions, pollutants or hazardous products from NPR-3 could disproportionately affect minority or low-income populations. Therefore, minority and low income populations would not be affected by any of the anticipated activities described in this SWEA and this is not considered further in this SWEA.

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5.0 ENVIRONMENTAL CONSEQUENCES

This section describes and assesses the environmental effects associated with the Proposed Action, the Lease Alternative and the No Action Alternative.

5.1 Impacts of the Proposed Action

As stated previously, the Proposed Action is to sell NPR-3 to a private entity for continued oil production. It is understood that the new owner would continue routine production and maintenance activities while also implementing cost effective EOR projects to substantially increase oil production above its current rate of approximately 225 bpd. This Section addresses the environmental consequences of both continuing current routine operations and implementing potential EOR activities. However, EOR is addressed in a general fashion because it cannot be predicted with certainty which technique(s) will be implemented by the new owners.

5.1.1 Land Resources

The criteria used to assess land use impacts are based on potential conflicts between the Proposed Action and existing land uses, conformance with land use regulations of governing agencies with jurisdiction on the site, and duration of potential impacts.

5.1.1.1 Land Use

Selling NPR-3 to a private entity for continued oil production at the site is consistent and compatible with the current and past oil and gas industrial uses at the NPR-3 site. The facility is remote from human activities and the land has been withdrawn for use as a dedicated oil production facility. Routine operations performed by the new owner are expected to be essentially the same as those performed currently, with modest refinements. Selective or site-wide implementation of EOR represents a substantial change in how the field has been operated in the past, but is still consistent with historical use as an oil production facility. As such, no land use conflicts are expected for the Proposed Action. Further, Natrona County would consider the Proposed Action to be consistent with governing land use policies located in a known oil and gas resource area. Therefore, the sale of the property would comply with county land use requirements, which specify locating heavy resource-related land-based activities near the resource to be extracted.

Domestic grazing could be precluded on the property after the sale depending on which organization purchases the land. If grazing is prohibited by the new owner, the ban would be site-wide and essentially permanent for the duration of petroleum production. This would adversely affect the current grazing lease-holder, but is not expected to impact regional grazing operations.

5.1.1.2 Land Ownership

As described in Section 3, the sale of NPR-3 would affect the entirety of NPR-3. Because future owners are expected to engage in activities that are consistent in nature to those that have occurred onsite for the past 50 years, potential conflicts with adjacent property or land activities operated by private landowners or state and federal land managers are not expected.

In addition, the 5 active permits and 15 active easements mentioned in Section 4.1.1 would be transferred, revoked or re-negotiated as shown in Table 5-1.

Table 5-1: NPR-3 Permits and Easements

Permits			
From	To	Purpose	Expected Action
DOE	Private Entity	Electric Line Distribution Permit	Transfer
DOE	Private Entity	3-in. Pipeline Permit	Transfer
DOE	Private Entity	1.75-in. Pipeline Permit	Transfer
DOE	Private Entity	Underground Telephone Line Permit	Transfer
DOE	Private Entity	4-in. Pipeline Permit	Transfer
Easements			
From	To	Purpose	Expected Action
Private Entity	U.S. Government	Pipeline Right of Way Easement	Transfer
Private Entity	U.S. Government	Pipeline Right of Way Easement	Transfer
U.S. Government	Private Entity	Underground Communications Cable Right of Way Easement	Renegotiate
Private Entity	U.S. Government	Road Access Right of Way Easement	Transfer
DOE	Private Entity	Road Access Right of Way Easement	Transfer
DOE	Private Entity	Communications Line Right of Way Easement	Renegotiate
DOE	Private Entity	Road Access Right of Way Easement	Renegotiate
DOE	Private Entity	Road Access Right of Way Easement	Renegotiate
DOE	Private Entity	Road Access Right of Way Easement	Renegotiate
DOE	Private Entity	Road Access Right of Way Easement	Renegotiate
DOE	Private Entity	Road Access Right of Way Easement	Renegotiate
DOE	Private Entity	Grazing Easement	Renegotiate or Terminate

5.1.1.3 Recreation

As described in Section 4.1.3, no recreational facilities or resources currently exist at the NPR-3 site. DOE expects that the full-time work force at NPR-3 would increase by about 100 people under new ownership, which may nominally increase demand for regional recreational facilities. Because there are no recreational facilities, nationally designated recreational facilities, or dispersed recreational activities found within NPR-3, adverse effects are not expected under the Proposed Action.

Hunting is currently prohibited at NPR-3 and is expected to continue to be prohibited under new ownership. Therefore, there will be no effect on this activity under the Proposed Action.

5.1.1.4 Aesthetics

The NPR-3 site is located in an area characterized as having a low level of visual sensitivity based on prior modifications of the natural setting in the area. Under the Proposed Action, new well construction would be consistent with previous development. According to BLM Visual Sensitivity maps (BLM 2003a), the NPR-3 is a Scenic Quality Class C and Visual Resource Management Class III property. As such, the level of change to the characteristic landscape should be moderate, management activities may attract attention but should not dominate the view of the casual observer, and changes should repeat the

basic elements found in the predominant natural features of the characteristic landscape (BLM 2003a). The proposed sale of NPR-3 would not affect adjacent areas managed by a federal agency.

Under the Proposed Action, new ownership is expected to continue routine operations (installation of new production wells, infrastructure maintenance and plug/abandonment activities), while also implementing EOR projects (which also include installation of injection wells, purchase and deployment of chemicals, management of additional waste and substantially increased oil production). Construction-related visual impacts would be limited to earthwork and grading scars, heavy equipment tracks, support machinery storage, temporary tool storage and related waste materials and cuttings. Any visual impacts from constructing new well pads would be reduced by: 1) implementing standard re-vegetation efforts required by WYPDES construction stormwater management permits, and 2) minimizing the construction duration at the site. Residual impact would be short-term and landscape changes following re-vegetation would not be obvious or attract attention. Such landscape changes are not expected to be adverse and would not represent a change in the visual character of the area.

5.1.2 Air Quality

Air quality regulations stipulate that projects conducted by future owners of the site would be considered to have an adverse impact on air quality if they violate any ambient air quality standard, contribute measurably to an existing air quality violation, or expose sensitive receptors to substantial levels of pollutants. Discussions of the air quality impact of routine operations and EOR projects are provided below.

5.1.2.1 Air Quality Impacts of Routine Operations

After NPR-3 is sold, continued primary production and routine operations would generate air emissions from the following activities:

- Existing crude oil production,
- Ground disturbance for new well installation,
- Ground disturbance from general infrastructure maintenance, and
- Plug and abandonment operations.

As stated in Section 4.2.3 above, existing oil production currently vents between 100 and 200 Mcf (2,832 to 5,663 m^3) of natural gas per day in order to reduce pressure in well casings and allow the oil to flow more freely. Other current oil production activities do not generate emissions at levels that require an air quality permit or that constitute a significant adverse impact. Moreover, because this action assumes that new owners of the site would continue to install new wells while also plugging and abandoning non-productive wells at a similar rate, air emissions from ground disturbance related to these routine operations would be considered short-term and minimal. Plug and abandonment activities involve re-vegetation to stabilize each site, which will reduce fugitive dust generated by wind erosion.

5.1.2.2 Air Quality Impacts of EOR Projects

As discussed in Section 3, the new owners are expected to implement some type of EOR project and may also initiate horizontal drilling. Air quality impacts from EOR would generally entail the following:

- Fugitive dust from groundwork related to injection well installation and pipeline infrastructure construction;
- Heavy equipment emissions related to injection well installation and pipeline infrastructure installation;
- Off-gassing from chemical containers or wells;
- Emissions from transport vehicles bringing in chemicals and materials or removing wastes;

- Release of in situ gases from increased production;
- CO_2 release or sequestration if CO_2 flooding is implemented; and
- Emissions from boilers if steam flooding is implemented.

Dust and heavy equipment emissions from construction of pipeline infrastructure or injection well installation would be short-term, but could result in adverse impacts. Fugitive dust emissions would come from land clearing, ground excavation, and grading operations. Dust emissions would vary on a daily basis, depending on the level of activity, the specific operations and the prevailing weather. A large portion of the dust emissions would result from equipment traffic over dirt roads, followed by pipeline trench excavation and well pad clearing. The quantity of fugitive dust generated would be directly proportional to the land area being worked and the silt content of the soil (i.e., particles smaller than 75 microns in diameter). Conversely, the amount of fugitive dust generated would be inversely proportional to the square of the soil moisture. Because the construction activities are anticipated and will be planned by future owners, DOE does not know the timeframe, schedule, amount, or exact nature of the grading required for completing the anticipated EOR projects.

A general estimate of dust generation can be illustrated by applying the EPA dust generation factor of 1.2 tons of fugitive dust per ac (2.7 metric tons/ha) of disturbance per month of grading activity to an estimate of grading activity anticipated to be implemented by the new owners. As outlined in Section 3, DOE anticipates that the new owners will install approximately 100 new injection wells at NPR-3, which comes to 150 ac (61 ha) that could be subject to development grading. In addition, DOE anticipates that another 300 ac (122 ha) would be disturbed for the EOR chemical pipeline. Assuming an estimated 5-year development phase, an average of approximately 7.5 ac (3 ha) would be graded per month (450 ac [182 ha] divided by 60 months). Based on the EPA dust-generation factor of 1.2 tons/acre/month (2.7 metric tons/hectare/month), grading activities could generate approximately 9 tons (8.2 metric tons) of dust per month. This estimate is worst-case and does not account for dust control measures (e.g., watering, soil fixative).

While construction activities would be a significant source of fugitive dust emissions that could have a substantial temporary impact on local air quality, the duration of this impact would be short. Dust control measures, if correctly implemented, have been shown to control up to 95 percent of construction-related dust at a construction site. DOE expects that the new owners would implement dust control measures when implementing their EOR projects.

As stated in Section 4.2.3 above, existing oil production currently vents between 100 and 200 Mcf (2,832 to 5,663 m^3) of natural gas per day in order to reduce pressure in well casings and allow the oil to flow more freely. Under an EOR scenario, CO_2 or other flooding techniques would override backside pressure concerns and the gas currently being vented would likely be captured for beneficial use. As such, EOR would constitute a positive environmental impact.

Regarding other long-term stationary air emissions, WYDEQ has reviewed the emissions from ongoing operations at NPR-3 and determined that at production rates of 730 bpd there would be no emission sources throughout the production field that would require controls. The WYDEQ has also determined that the emissions from NPR-3 production are considered “insignificant in terms of ambient impact and rate” based on the Wyoming Air Quality Standards (WYDEQ 2001b). However, based on the Gustavson analysis of potential oil that could be recovered under an EOR regimen at the site, DOE estimates that future production could be as high as 4,300 petroleum barrels (bbls)/day over a 14 year period. This would mean that emission sources in the production field would require controls and a Title V Air Quality permit. Moreover, if future owners choose to implement steam flooding, the boilers used for steam production would require air permits and controls to mitigate emissions.

5.1.3 Noise

There are no noise-sensitive land uses at NPR-3 and no Wyoming state regulations governing noise levels during well pad construction, drilling or operation of the oilfield. Guidelines often used in assessing and abating noise impacts are contained in the *Federal Highway Administration (FHWA) Federal-Aid Highway Program Manual*, the FHWA *Construction Noise Handbook*, and EPA's *Protective Noise Levels* document. However, there are no FHWA noise abatement criteria for undeveloped lands.

Potential noise impacts associated with the Proposed Action can be divided into those deriving from routine operations and those coming from EOR projects. Routine impacts would occur from noise generated by stationary or mobile construction equipment involved in drilling new wells, maintaining infrastructure or plugging and abandoning wells. EOR impacts would occur from new equipment and operations related to EOR activities implemented by the new owners.

5.1.3.1 Noise Impacts of Routine Operations

The noise impact from routine well installation, maintenance and plug and abandonment activities is associated with earth movers, material handlers, portable generators and drill rigs. Average noise levels from these activities at 50 ft (15 m), measured in A-weighted decibels (dBA) range from 70 to 100 dBA (U.S. Department of Transportation [DOT] 2006). Noise at these levels constitute an occupational hazard and require employers to provide appropriate hearing protection for their employees. However, because such noise would be of a duration and intensity approximately equal to current levels, there should be no adverse impact from the Proposed Action.

5.1.3.2 Noise Impacts of EOR Projects

Noise impacts from EOR projects will generally entail the following:

- Noise associated with heavy equipment related to well installation or conversions and infrastructure installation;
- Transport of additional equipment, chemicals and waste associated with the EOR project; and
- Operation of boilers or other equipment related to the EOR project.

Noise from EOR well installations/conversions, infrastructure installation and drilling will require occupational hearing protection, but is not likely to affect the public due to the remote location of the site. Additionally, construction activities are expected to be complete within five years of selling the property, after which noise levels will drop to those associated with routine operations. Because there are no noise-sensitive land uses within or near NPR-3, the temporary noise created by construction is not expected to be an adverse impact.

Vehicular traffic (and road noise associated with it) is expected to increase during the EOR construction phase and remain higher than current levels after EOR becomes fully operational. While it is not clear exactly how much additional traffic will occur, it is reasonable to estimate that the scale of construction would be similar to other proposed actions. In the 2008 SWEA for RMOTC and NPR-3, DOE estimated that an additional 50 workers would be needed during construction (DOE 2008). Along with the Gustavson report's estimate of 100 new workers after the sale (Frahme and Moritz 2012), this would bring a traffic increase of approximately 150 vehicles per day as a worst-case scenario. Some personnel would likely carpool to the site, as is the case currently. Even so, noise from these additional vehicles is not expected to be a significant adverse effect.

5.1.4 Water Resources

Potential water impacts associated with the Proposed Action can be divided into those deriving from routine operations and those coming from EOR projects. Routine impacts involve process water production, treatment and discharge from existing wells, as well as erosion from drilling new wells,

maintaining infrastructure or plugging and abandoning wells. Water impacts from EOR projects would result from construction of new wells, fracking new wells, and increased process water production. Impacts could be to surface water, groundwater and potable water.

5.1.4.1 Water Resource Impacts of Routine Operations

Routine operations under the Proposed Action would incrementally increase process water generation at NPR-3 due to slightly increased oil production from rehabilitation and down-hole stimulation activities. Surface erosion would continue to be a concern at new well installation sites, as well as at road or other infrastructure maintenance sites. However, routine erosion impacts would continue to be mitigated by Best Management Practices (BMPs) and the re-vegetation of sites after plug and abandonment activities are completed. Fracking of new vertical production wells would utilize process water from existing wells, as is the case currently. Staffing levels are not expected to change because of routine operations, so these activities are not expected to increase potable water demand. Therefore, no adverse impacts would result from routine operations under the Proposed Action.

5.1.4.2 Water Resource Impacts of EOR Projects

EOR activities are much more water intensive than conventional production techniques. These impacts are addressed below.

5.1.4.2.1 Surface Water

As stated elsewhere, DOE anticipates that the new owners of NPR-3 will initiate construction to install injection wells, convert some existing production wells into injection wells, and install appropriate pipelines to deliver flood materials to the newly installed or retrofitted wells. Any new pipeline to retrofitted wells is expected to be within existing utility and pipeline corridors. Infrastructure for new wells will require some excavation and soil disturbance outside of existing corridors, though this is likely to be minimal.

Runoff from these construction activities could cause erosion and impact surface water onsite and downstream. Further, the construction could alter drainage patterns, stormwater flow rates and water volume coming from the affected project site. All of which is likely to impact surface water discharges during storms and lead to sediment deposition downstream. Erosion controls and other BMPs associated with the new owner's construction stormwater WYPDES permit and Construction Stormwater Pollution Prevention Plan are likely to mitigate downstream events by slowing water flow and reducing erosion from the impacted site. Once construction is complete, it is standard industry practice and a requirement of all construction WYPDES permits that the site be stabilized and runoff rates and volumes returned to pre-construction levels. Therefore, the surface water impacts from the likely construction projects are expected to be short-term (approximately 6 months for each individual construction site). As stated previously, DOE expects that the new owners will implement EOR projects that may increase oil production by more than 4,000 bbls/day, which is an 18-fold increase over current production. This level is comparable to production seen at the field's peak in 1981. Any increase in oil production will result in a proportional increase in produced water. Therefore, DOE anticipates that the EOR projects will result in an additional 504,000 gal./day of water (1.9 million L/day). While some of the increase may be diverted for site-wide flooding regimens (steam or surfactant) and new well fracking operations, the remaining water will be treated and released into Little Teapot Creek under a WYPDES permit. DOE anticipates that the new owners will need to modify the existing permit to accommodate the increased flow.

The released water would continue to flow to the Salt Creek basin and contribute to the basic flow conditions in the lower reaches of Salt Creek, resulting in a perennial stream. Based on this contribution, continued beneficial impacts are expected for wetland habitats and wildlife.

If the new owners choose to implement horizontal drilling in the Niobrara or Steele shale formations, then DOE estimates that each well would require approximately 160,000 gal. (0.6 million L) of water for fracking. This water would be produced water diverted from discharge to Little Teapot Creek after appropriate treatment. However, partly due to the complex structural geology and multiple offsets in the formation, DOE believes that horizontal drilling at NPR-3 is unlikely.

5.1.4.3 Groundwater

Potential impacts to groundwater resources associated with EOR construction include disruption of shallow or perched aquifers during excavation, cross-contamination between water-bearing formations and localized dewatering. Those impacts would be confined to a small area, would be of short duration and therefore would not be significant.

The potential impact of groundwater contamination due to accidental spills of petroleum from construction equipment or of other chemicals used during construction would likely be limited to areas in the vicinity of the construction. Because the water table at NPR-3 ranges from 50 to 100 ft (15 to 30 m) bgs and groundwater resources occur in localized areas, this impact is not considered adverse unless very large quantities were to be released. The new owners would fall under the same construction and spill prevention requirements that currently apply to DOE. It is expected that the new owners would use existing or comparable spill control equipment to contain any spill and minimize the economic impact of a release. Therefore, DOE believes that there is a low potential for a construction-related fuel or chemical spill to occur that is large enough to impact groundwater.

Based on the relatively shallow depth (approximately 5 ft [1.5 m] below land surface) of pipeline installation in relation to the expected groundwater at NPR-3, potential effects of EOR projects to local or regional groundwater resources are not likely. All water generated by EOR projects would be from oil-producing formations, not drinking-water quality aquifers.Water for fracking new wells (including horizontal wells if installed) would come from produced water out of oil-bearing formations rather than site groundwater.

With respect to groundwater quantity and drawdown, groundwater withdrawn from the underlying formations is high in TDS, salinity and hydrocarbons, which make it unsuitable for drinking. Therefore, no adverse competition with regional demands for potable water is possible. Moreover, the Madison Formation is deep and overlain by rigid strata not susceptible to compression. As such, there is no potential for land subsidence due to groundwater withdrawals resulting from future EOR projects. In addition, the Madison is used as the formation that receives injected waste water when the situation calls for it. Water is also likely to be injected into other formations as part of a surfactant flood operation. Therefore, it is unlikely that there will be significant drawdown of groundwater resources at the site.

5.1.4.4 Potable Water

Sale of NPR-3 would increase demand for potable water at the site over current levels because there would be an increase in personnel at the site. However, this increase would not be significantly more than what demand has been historically. From 1977 through 2010, the site routinely supported an operating staff of 100 to 200 personnel. Therefore, no adverse impacts to potable water resources are expected as a result of the Proposed Action. Current import of potable water from the town of Midwest is likely to continue.

5.1.5 Geology, Soils and Prime and Unique Farmlands

5.1.5.1 Geology

Intensive oil development has occurred on NPR-3 since 1977. Additional drilling and development by new owners is expected to avoid steep or unstable slopes, thereby avoiding impacts associated with

reduced slope stability. Some minor changes (such as leveling and vegetative clearing) in topography from well pad construction would be anticipated, but impacts would be minimal.

Implementing EOR practices at NPR-3 is not expected to impact geology at the site. While horizontal drilling and subsequent fracking and water reinjection have been associated with induced, low-grade seismic activity (NRC 2013, The Royal Society 2012, Goldman et al. 2013), DOE believes that at most ten such wells could be drilled at NPR-3 and that it is quite likely that no horizontal wells will ever be drilled at the site. This very small number of horizontal wells is not expected to induce seismic activity.

5.1.5.2 Soils

Well pad construction and pipeline installation would require clearing and grading a site. These areas would be more susceptible to erosion until stabilization is completed. Erosion impacts for cleared or stockpiled soil would be considered adverse. WYPDES requirements include the use of erosion controls and other BMPs to mitigate erosion effects. WYPDES permit compliance activities include reclamation, reseeding with native vegetation, and restoration of runoff potential to preconstruction conditions. Soil stabilization and re-vegetation are standard industry practices for mitigating erosion from surface disturbances. Therefore, erosion from anticipated EOR project implementation is not expected to be significant.

5.1.5.3 Unique Farmlands

There are no prime or unique farmlands, or other farmland of statewide or local importance, as defined at 7 CFR 658.2(a), "Farmland Protection Policy Act: Definitions," within or in proximity to NPR-3. Therefore, the proposed action will not impact designated prime or unique farmland.

5.1.6 Biological Resources

The potential impacts of the Proposed Action on vegetation and wildlife are addressed below.

5.1.6.1 Aquatic Biology

NPR-3 is bisected and drained by Teapot and Little Teapot Creeks. These drainages are naturally intermittent and are not considered to provide well-established aquatic habitat at the NPR-site. Because no perennial water bodies occur on or in close proximity to the site, well established aquatic habitats do not exist under natural conditions. Thus, adverse impacts to indigenous species associated with aquatic habitat or impacts to area fisheries would be unlikely.

However, produced water is currently treated onsite in an oil/water separator and released under a WYPDES permit. This continuous discharge has created a synthetic wetlands environment downstream from the treatment plant. If the new owners continue to discharge treated process water, then there would continue to be a beneficial impact to the aquatic habitat that occurs in the Salt Creek watershed. However, if the water discharge is stopped, the wetlands that are currently dependent on produced water discharges will revert back to their natural condition. This is not considered an adverse environmental impact, as it does not result in a condition inferior to that which existed before the start of oilfield operations.

5.1.6.2 Terrestrial Vegetation

Terrestrial vegetation would be locally affected by both routine and anticipated EOR activities. Routine new well installation would disturb approximately 40 ac (16.2 ha) of vegetated land per year, which represents 0.4 percent of the total acreage of NPR-3. However, plugging and abandonment activities would restore approximately the same amount per year, which will reduce the net magnitude of vegetation impacts.

Anticipated EOR project construction would also affect terrestrial vegetation. Clearing, excavation, and soil stockpiling related to new injection wells and new EOR pipeline infrastructure would disturb vegetation. EOR pipeline infrastructure would most likely be laid down in existing pipeline corridors within NPR-3 property boundaries, with the possible exception of running a CO_2 pipeline to the site (which was previously analyzed [DOE 2008]). The associated excavations would then be filled, contoured and re-seeded with native vegetation for stabilization.

Because the vegetation potentially affected by the anticipated EOR projects is not unique in the area and is generally poorly developed compared to similar habitats elsewhere in the region, these temporary impacts are not considered to be significant for widespread habitats such as the mixed grass prairie, desert shrub and Wyoming big sagebrush. Moreover, specific re-vegetation efforts using native seeds should mitigate potential construction-related impacts on vegetation. Such efforts include salvaging and replacing topsoil; loosening compacted soils to enhance water absorption; re-contouring disturbed areas to blend with surrounding topography and restore natural drainage patterns; stabilizing soils to minimize erosion; and seeding, fertilizing and mulching disturbed areas with a native seed mixture, rate and method conducive to rapid re-vegetation of disturbed areas. While such activities will not be under DOE jurisdiction once the property is sold, they are routinely recommended as part of the WYPDES construction permitting process. Therefore, it is reasonable to anticipate that they will be followed by the new owners.

5.1.6.3 Terrestrial Wildlife

Due to the apparent absence of nest sites in and around NPR-3 and the fact that raptors are relatively uncommon at the site, anticipated construction-related activities are not expected to impact raptor populations. Impacts to foraging habitat are expected to be minimal. Overall, adverse effects to raptor populations due to construction are expected to be temporary and negligible.

Because there are no major migratory staging areas for waterfowl or other avian species in the immediate area of the site, and no major geographic features that attract birds to the oilfield, adverse effects on migratory species are not anticipated. Additionally, due to the poorly developed habitat in the project area, no avian species of concern are expected to nest within the project area. Therefore, adverse impacts to raptors and migratory species are not expected.

Impacts to big-game species on the NPR-3 site during construction would likely be localized and minimal. Because construction activities would largely be confined to summer and fall, animals would not be affected while occupying winter range. As such, impacts would be limited to relatively small areas of temporary habitat loss. Impacts to sensitive wildlife species (i.e., big game) due to operation and maintenance of the anticipated projects are expected to be minimal. Interaction between wildlife and site workers would be negligible and temporary, and operation of the anticipated projects would likely result in minimal impacts to these species.

5.1.6.4 Threatened, Endangered and Rare Species

Biological resources that are considered sensitive must be given particular careful attention when analyzing the potential impacts of the Proposed Action. Loss of a population of state-or federally listed threatened, endangered, or rare plant or wildlife species would be considered an adverse impact. Impacts on other sensitive plant or wildlife species would be considered an adverse impact if they resulted in a threat to the continued existence of the resource.

Of the sensitive species possibly occurring on the site, only those with the potential for experiencing impacts as result of project implementation are discussed in this section. Species that are not likely to occur on the NPR-3 site, have a very low possibility of occurrence, or are expected to occur (or have been recorded as occurring) in areas of the NPR-3 site that would not be affected under the Proposed Action are not discussed, because no impacts would be likely to affect these species.

Vegetation

Federally listed threatened or endangered plant species are not expected to inhabit the NPR-3 site based on the following considerations:

- Prior to 1986, the NPR-3 site had been overgrazed, which likely resulted in the destruction of any potential threatened, endangered, or rare plant species.
- The area has incurred vegetation damage over time, including invasion by cheatgrass.
- Plant species diversity at the site is considered to be low. As discussed in Section 4.5.4, ridges located on the periphery of the site and riparian areas associated with drainages that bisect the project site have been less affected by site operations compared to the basin area. Therefore, although rare plant species may occur in these areas, ridges and riparian areas would likely be avoided during future project development.

Based on these considerations, threatened, endangered, and rare plant species are not expected to be affected by the various projects that are part of the Proposed Action or by existing operational activities.

Wildlife

Potential impacts to federally-listed threatened or endangered wildlife species are not expected to occur under the Proposed Action based on the following considerations:

- Prior NEPA consultations with the USFWS did not indicate that any currently listed species were likely present on the NPR-3 site (DOE 2008).
- Only two active prairie dog towns are on NPR-3 and there have been no sightings of black-footed ferrets onsite; therefore, construction- and operation-related activities would not impact this protected species.
- The USFWS is concerned with the loss of sagebrush that provides needed habitat for the Greater sage grouse (Centocercus urophasianus). However, the habitat type on the site that is generally associated with the Greater-sage grouse is limited and poorly developed; therefore, it is unlikely that the Greater-sage grouse occupies habitat at NPR-3. Thus, potential adverse impacts to the Greater-sage grouse are not expected.

Based on these considerations, threatened, endangered, and rare wildlife species would not be expected to be affected by the new owner's anticipated EOR projects or by ongoing routine operations.

5.1.7 Cultural Resources

As stated in Section 4.6, there are numerous cultural, archaeological and historical resources at NPR-3. Per 36 CFR 800.5(a)(2)(vii), the sale or transfer of NPR-3 to a private entity would be an adverse effect on these resources because federal protections for them would be removed. Further, Wyoming has no state regulations protecting cultural, archaeological or historic resources that are privately owned, and DOE would not have jurisdiction over whether anticipated new construction would physically alter these resources.

In response to this concern, DOE initiated the National Historic Preservation Act Section 106 process described in 36 CFR 800 in 2013 in order to consult with the WYSHPO, ACHP, appropriate Native American tribes, and other members of the public as necessary to identify and implement appropriate mitigation for existing historic and cultural sites on the property. A site-wide Class I historic/cultural/archeological survey was completed, as were additional Class II and III surveys to identify all sites potentially eligible for listing on the NRHP. Ultimately, it is DOE's intent to develop a binding Memorandum of Agreement describing appropriate mitigation strategies for all sites eligible for the NRHP. All mitigation steps will be completed before the sale of the property.

Representatives from federal, state and local government; local historic societies and 22 Native American tribes were contacted and invited to attend site visits and provide comments or concerns related to the Proposed Action. Representatives of various Sioux and Crow tribes and the National Park Service participated in a series of site visits to evaluate the cultural significance of the existing historic properties. Previous Section 106 efforts did not identify any traditional cultural properties (DOE 2008) and recommended not drawing attention to previously identified properties by refraining from such actions as posting signs, putting up fences, creating trails or paths, or temporarily flagging the sites.

5.1.8 Socioeconomics

5.1.8.1 Employment

Anticipated construction for EOR projects would require a variety of skills for varying periods of time. DOE estimates that construction would be similar to previously planned activities at the site. As such, it is estimated that the construction would take approximately five years, during which approximately 50 personnel will be needed. While several specialized skills could be required, the large historical and ongoing presence of the energy industry in this part of Wyoming suggests that skilled workers would be available in the general area. Positive impacts would be related to employment opportunities and revenues paid to federal, state, and local governments.

Based on staffing levels at nearby oilfields of similar size that are implementing EOR techniques, DOE projects that staffing may increase by 100 full-time personnel over the next 5 years. This employee increase would have a positive economic impact in the area, but would not negatively impact housing, schools or the demand for existing infrastructure of local communities.

5.1.8.2 Population and Housing

As stated in the previous Section, DOE expects the Proposed Action to result in the hiring of an additional 100 full-time personnel at NPR-3. No impacts to the housing supply, schools, or other infrastructure are anticipated from this increase in employment because the site is relatively close to Casper, Wyoming, there is a large historical presence of the energy industry in the area that suggests most of the new employees will be local residents, and NPR-3 has supported a staff of 100 or more employees historically. Positive impacts would be related to employment opportunities and revenues paid to federal, state and local governments.

5.1.8.3 Transportation

Transportation is not expected to be affected by continuing routine operations, but likely will be affected by EOR projects. As discussed in Section 5.1.3.3, vehicular traffic is expected to increase during the EOR construction phase and remain higher than current levels after EOR becomes fully operational. The effect of EOR construction would be to increase traffic by as many as 150 vehicles per day during construction, dropping to 100 per day afterward. Tractor-trailer traffic would also increase during construction. As discussed in Section 4.7, DOE believes that the additional workers expected to be needed by the new owners would be available in the general area of Midwest and Edgerton, as well as Casper. As a worst-case analysis, if all workers lived in Casper and each drove alone to NPR-3 on a daily basis, round trips would increase existing traffic on I-25 by approximately 7 percent over 2011 usage rates during construction and 5 percent thereafter. This is a negligible increase.

5.1.8.4 Community Services

Based on the analyses in Sections 5.1.8.1 through 5.1.8.3, community services within the project area are not expected to be affected by the Proposed Action and anticipated future actions of new ownership. Because the projected increase of the permanent workforce would be small relative to the population of the region, community services (such as fire and police protection, communication systems, solid waste

disposal services and facilities, hospital services, schools, public utilities and other government services) would likely continue without needing to expand capacity to accommodate additional demand.

5.1.9 Waste Management

As described in Section 4.8, continued routine operations would not affect waste quantities, characterization or regulatory status. Anticipated EOR projects, however, are likely to impact all three.

The volume of spent or off-specification chemical waste is expected to increase due to EOR project implementation, though the amount of the increase is not known at this time. Various surfactants and polymers are likely to be used in flooding operations in the Shannon and Second Wall Creek formations. Most of these materials will be used downhole, but off-specification materials will be returned to the manufacturer or disposed of as waste. Spent chemicals used for cleaning, lubricating or maintaining equipment are expected to be containerized, characterized and managed as hazardous or industrial waste as appropriate. Such wastes are expected to be stored safely onsite before being transported offsite for treatment and disposal. Spilled chemicals or products likewise are expected to be cleaned up, containerized and sent offsite for treatment and disposal as is currently the case.

CO_2 flooding, acidizing and other downhole activities using acidic chemicals may mobilize more naturally occurring radioactive material and heavy metals than would other types of flooding. It is likely that these wastes would be segregated and shipped offsite for treatment and disposal in an appropriate landfill.

Because the new owners are expected to drill new injection and production wells, there will be a short-term increase in the volume of drilling mud and fluids that need proper management. If horizontal wells are drilled, each one will produce five to ten times the mud and fluids of a typical vertical well at NPR-3.

As stated in Section 4.8.4, NPR-3 has two inactive industrial waste landfills (IND-1 and IND-2), an inactive petroleum waste land farm (associated with IND-2) and four active petroleum waste composting facilities. IND 1 (Phases 1a and 1b) pre-dated WYDEQ landfill permitting regulations. IND 1a was closed in approximately 1981, while IND 1b was closed in approximately 1991. IND 2 and its associated land farm have been inactive since approximately 2001. IND 2 is capped per current WYDEQ regulations and a closure permit application (including a Post Closure Environmental Monitoring Plan) is being developed. DOE will file a Notice on the Deed that will include an accurate legal description of the landfills and landfarm, notification to potential purchasers that waste was disposed of and remains onsite, a description of the wastes in the landfills and a legal prohibition on any excavation or other activity that may disturb the waste disposal area or monitoring system unless prior agreement with WYDEQ.

The three composting facilities currently comply with Wyoming Oil and Gas Conservation Commission (WOGCC) requirements and are used to treat petroleum contaminated soils. These facilities will transfer to the new owner in their existing condition.

5.1.10 Accidents and Intentional Destructive Acts

As an operating oil field, NPR-3 may experience the same types of accidents that any commercial oil field might encounter, such as oil spills, pipeline breaks, equipment failures, and fires. Routine operations by future owners could result in similar accidents, while EOR operations may produce slightly different accidents.

Whether an accident was the result of an operational failure or an intentional destructive act, its consequences at the site would be minimized by isolating the site from public access, evacuating nonessential workers and the nearby population as necessary and excluding nonessential workers from hazardous areas. Consequently (and consistent with the principle that impacts be discussed in proportion to their significance (40 CFR 1502.2[b]), a sliding-scale approach has been used to analyze both accidents and intentional acts of destruction. Therefore, the following discussions only qualitatively assess impacts.

Additionally, it should be noted that in many decades of operations, there has never been an onsite accident at NPR-3 that has resulted in off-site consequences.

5.1.10.1 Accidents

An accident is an unplanned event or sequence of events that results in undesirable consequences. Accidents may be caused by equipment malfunction, human error, or natural phenomena. The more typical or frequent types of industrial accidents, such as trips and falls, occur no more frequently at the NPR-3 site than at a commercial oilfield and there is no reason to believe that future employees will suffer occupational injuries at a significantly different rate than has been the case historically.

Active drilling or construction would involve heavy equipment, moving parts and excavations. Workers would face significant risk of injury or death while performing these activities, as they would at any site where these activities are taking place. However, offsite consequences would be limited.

All oilfield operations carry the risk of spills (oil, produced water and/or chemical) or fire. NPR-3 currently operates under the EPA SPCC regulations and the current SPCC Plan for the site would be transferred to the new owners. All well sites, pads, storage tanks, and other locations where oil is accumulated or stored are bermed to limit the extent of damage from any spill. SPCC requirements also include provisions for inspecting, protecting and repairing/maintaining tanks and pipelines to prevent leaks or ruptures. However, should a pipeline leak or rupture occur, it would result in surface contamination that would have to be remediated. The extent of damages would be directly proportional to the size, magnitude and duration of the spill. Large spills that occur during off hours could contaminate many acres, especially if any spilled material reaches the drainages receiving discharge waters and is spread offsite. Prevention of these types of spills is addressed in the site SPCC plan, which likely will be adopted by the new owners.

The produced oil and natural gas present an additional concern for explosions and fires. If worker activities provided the ignition source for such an event, the consequences to the involved worker could be serious or even fatal. Due to the large size of the site and its remoteness, uninvolved workers and the off-site public would likely not be affected by a fire or explosion unless such an event ignited site grasslands and spread to off-site rangeland.

Site-wide EOR implementation would affect the types of chemicals that could be spilled. If bulk chemicals used in polymer or AS/ASP flooding spilled while onsite, the resulting contamination would be very similar to an oil spill. Soil, equipment, vegetation and drainages could be affected, with the primary pathway for offsite contamination being contamination of surface water discharge. Chemicals used in polymer or AS/ASP flooding are not acutely hazardous, so contamination is unlikely to be life-threatening or to require evacuation of the nearby population.

With industrial scale injection there is also the possibility of a Pressure-Induced Event (PIE), steam or gas injection projects (including nitrogen, hydrocarbon, miscible or CO_2) could all force natural gas, hydrogen sulfide or the injected gas into the atmosphere and create low-lying pockets of hazardous, flammable or asphyxiating atmospheres. Wildlife that enter one of these pockets would die and a site-wide event could result in significant die off. For flammable atmospheres, there would be the additional hazard that fires could be started that would spread to surrounding grassland and then offsite.

5.1.10.2 Acts of Sabotage or Terrorism

Theoretically, offsite shipments of waste contaminated with NORM could be hijacked and used in a dirty bomb event. However, such wastes do not have enough concentrated radioactive material for this to be even remotely realistic. Explosive charges used to perforate casing during well installation are not sufficiently large enough to be targeted for theft and use in a bomb. Regardless, they are kept under tight control and security for health and safety reasons, and should be the same under new ownership. Therefore it is unlikely that these items would be targeted.

NPR-3 is remote from population and economic centers and is not a major oil production source in the region. Consequently, it is highly unlikely that it would be viewed as a particularly attractive potential target by saboteurs or terrorists. Even so, intentionally initiating a PIE, setting fire to oil wells, inducing spills, or setting off an explosion at the site would have the same effect as would a similar occupational accident. Further, the Proposed Action would not offer any credible targets of opportunity for terrorists or saboteurs to inflict significant adverse impacts to human life, heath, or safety, nor would the Proposed Action render the site as a whole any more susceptible to such acts.

5.1.11 Cumulative Effects

A wide range of cumulative and irreversible effects could occur under the Proposed Action. These are addressed individually in this Section.

With respect to air quality, the removal and subsequent use of oil from NPR-3 would contribute to global climate change. However, if CO_2 flooding is implemented at the site, then the impact on climate change would be reduced because a high percentage of the injected CO_2 would remain sequestered underground.

With respect to cultural resources, the Proposed Action would permanently and irretrievably remove NPR-3 and its associated historical, cultural and archaeological resources from federal ownership and protection. Cultural sites could be vandalized, dug up, looted or destroyed at will by private owners. Moreover, cultural sites could be mapped and shared with the public without legal recourse. While mitigation steps would be taken before the sale is finalized and certain requirements or prohibitions could be placed in the deed for the property, it is unlikely that the affected public would have much legal recourse if private owners chose not to protect these resources.

Long-term, terrestrial vegetation and the wildlife that depends on it could be affected in a number of ways. Reduced grazing would tend to increase biodiversity on the site. However, because the site is already impacted by invasive plant species, reduced grazing may allow the invasive species to become better established and ultimately make it easier to invade surrounding areas. If future owners establish a range management program to eliminate or control invasive species, the cumulative effect would be a gradual return to native ecosystems.

5.2 Impacts of Lease Alternative

As discussed in Sections 1.4.3 and 3.2, the Lease Alternative is unlikely to be selected and BLM recommended that it be dropped from this SWEA. Even so, the impacts of the Lease Alternative are expected to be exactly the same as those for the Proposed Action, with the exception of the impacts on cultural resources. The Lease Alternative would avoid the adverse effects on cultural resources associated with the Proposed Action because NPR-3 would remain under the ownership of a federal agency. The Memorandum of Agreement (MOA) being developed under the current Section 106 process will include mitigation steps that will be implemented before any property is transferred to BLM. Thereafter, BLM would have the option of reviewing and signing onto the MOA or establishing a new agreement.

After transfer of the property, BLM's existing procedures, agreements and the MOA would govern actions to be taken and protective measures to be implemented in the event that cultural resources are unearthed during construction activities.

5.3 Impacts of No Action Alternative

As described in Section 3.3, under the No Action Alternative, routine operations at the site (such as new well installation, plugging and abandoning old wells, routine maintenance and replacement of site infrastructure) would continue under DOE jurisdiction. As such, the types of impacts that would occur annually would be similar to those that have been occurring for many decades. More specific characterization of the impact that would occur under the No Action Alternative is discussed below.

5.3.1 Land Resources

Under the No Action Alternative, DOE would continue to operate NPR-3 as a mature stripper field using conventional techniques. Such operation would continue to be at the MER. No impacts to existing or proposed land uses would occur from continuing existing operations.

Currently, the facility does not have any recreational facilities. Access to the site for recreational purposes would continue to be prohibited under the No Action Alternative. Therefore, no impacts would occur.

As stated in Section 3.3, approximately 60 ac (24 ha) per year of disturbance related to ongoing operations is expected, while approximately 10 ac (4 ha) per year of disturbance related to reclamation and rehabilitation from abandoning and plugging non-productive wells is expected. For these reasons, changes to the current landscape would not occur. Moreover, the site is not considered to be visually sensitive or unique and is without significant visual classification from the BLM.

5.3.2 Air Quality

Under the No Action Alternative, DOE would continue to operate the facilities at the site in accordance with current operations, generating air emissions from existing crude oil and natural gas operations as described in Section 3. Because this alternative proposes that new wells continue to be installed and operated while abandoning and plugging non-productive wells at a similar rate, air emissions from ground disturbance in general maintenance/construction areas would be considered short-term and minimal. By restoring and reclaiming non-productive well areas, fugitive dust generated by wind erosion would be reduced significantly. As determined by WYDEQ, air quality impacts under this alternative would not be expected (WYDEQ 2001b).

5.3.3 Noise

The No Action Alternative does not propose that new equipment be installed and operated or that existing equipment be modified in a manner that could generate new levels of noise that could be considered a health effect or nuisance. Adverse impacts to the existing sound environment are not expected under this alternative.

5.3.4 Water Resources

The No Action Alternative would not adversely impact surface water, groundwater or potable water at the NPR-3 site. If this alternative is implemented, no adverse impacts would result from normal operations at the facility. The continued operations would likely meet existing water quality permit levels and meet the term of the site's existing WYPDES requirements.

5.3.5 Geology, Soils and Prime and Unique Farmlands

Because this alternative only includes small disturbances for new oil production (whose effects would be offset by areas reclaimed through plug and abandonment activities), soil impacts would not be expected. The site is devoid of prime and unique farmlands; therefore impacts would not occur to this resource.

5.3.6 Biological Resources

Neither the Proposed Action nor the No Action Alternative would adversely affect biological resources at the NPR-3 site. Under the No Action Alternative, produced water would continue to contribute to the regional aquatic habitat, thereby benefiting biological resources at the site, as well as downstream. With respect to terrestrial vegetation and wildlife resources, the additional surface disturbances associated with new well development would be approximately 60 ac (24 ha) per year, with approximately 10 ac (4 ha) reclaimed per year under plug and abandonment activities. Finally, this site is devoid of any threatened,

endangered or special species. Therefore, such species would not be affected by continued operations associated with the No Action Alternative.

5.3.7 Cultural Resources

The No Action Alternative would not be expected to result in any adverse impacts to cultural resources. While specific areas have not been identified for future oil well development, the general areas likely to see new development are devoid of any cultural resources. Moreover, DOE currently employs procedures in the event that cultural resources are unearthed during construction activities and prescribes protective measures to avoid adverse impacts.

5.3.8 Socioeconomics

The No Action Alternative proposes continued operations at the NPR-3 site. This alternative would not require additional workers and therefore would not have an effect on the area's community services, housing stock, utilities or transportation services. Continued operations would maintain current effect on the economy of the immediate area and region, but would forego the benefits expected under the Proposed Action.

5.3.9 Waste Management

Because there would be no change in operations at NPR-3 under the No Action Alternative, generation of waste or hazardous materials would continue at the same rate as is currently observed. There would be no adverse impacts from maintaining current operations.

5.3.10 Accidents and Intentional Destructive Acts

Under the No Action Alternative, operations would continue on the same scale as those described under the Proposed Action, with the exception that EOR activities would not be employed. Therefore, the No Action Alternative could experience the same accidents associated with routine operations described under the Proposed Action (see Section 5.1.10). Additionally, the likelihood and consequences of an intentional destructive act would be similar to the Proposed Action.

5.3.11 Cumulative Effects

A wide range of cumulative and irreversible effects could occur under the No Action Alternative. With respect to air quality, the removal and subsequent use of oil from NPR-3 would contribute to global climate change. However, while routine maintenance, repair and downhole stimulation would incrementally increase oil production, the site's contribution to climate change would be minimal. Continued grazing at the site would keep biodiversity down, but may also control invasive species and reduce the likelihood of their spreading to surrounding areas.

6.0 AGENCIES AND PERSONS CONSULTED

- Arapaho Tribe of the Wind River Reservation
- Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation
- Blackfeet Nation Tribe
- Bureau of Land Management
- Cheyenne and Arapaho Tribes, Oklahoma
- Cheyenne River Sioux Tribe
- Comanche Nation
- Crow Creek Sioux Tribe
- Crow Tribe of Montana
- Eastern Shoshone Tribe
- Kiowa Indian Tribe of Oklahoma
- Northern Arapaho Tribe
- Omaha Tribe of Nebraska
- Rosebud Sioux Tribe
- Shoshone-Bannock Tribe
- Sisseton-Wahpeton Oyate Tribe
- Standing Rock Sioux Tribe
- U.S. Fish and Wildlife Service
- U.S. National Park Service
- Wyoming Archaeological Society
- Wyoming Department of Environmental Quality
- Wyoming Game and Fish Department
- Wyoming State Historic Preservation Office

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8.0 APPENDICES

Appendix A: SWEA Scoping Letter and Distribution List

Appendix B: Draft SWEA Letter and Distribution List

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Appendix A: Distribution List and Scoping Letter

Distribution List

Alliance to Save Energy
Amalgamated Exploration Inc.
American Bird Conservancy
American Fuel & Petrochemical Manufacturers
American Heritage Center
American Petroleum Institute
American Recreation Coalition
American Wildlands
Anadarko Petroleum Corporation
Anschultz Corporation
Antelope Resources Inc.
Aquarius II Inc.
Arco Pipe Line (BP)
Arnell Oil Company
Audubon Rockies
Audubon Society
Beartooth Oil & Gas Company
Bill Owens
Biodiversity Conservation Alliance
Blackfeet Nation Tribes
Bradley JC
Brinkerhoff Drilling Company or Brinkerhoff LLC
Buck Allemand
Buckeye Oil & Gas, Inc.
Bureau of Indian Affairs Rocky Mountain Regional Office
Bureau of Land Management - Casper Field Office
Bureau of Land Management - Wyoming State Office
Bureau of Reclamation
Canada Southern Oil under Marathon Oil Canada Corp
Capital Ventures, Inc.
Carl D Underwood Oil & Gas
Carpenter Brice G Realty
Casper Dirt Riders
Cheyenne River Sioux Tribes
Citation Oil & Gas Corporation
Citizens for Clean Energy, Inc.
Clean Water Action
Coal Bed Methane Coordination Coalition
Colin Moody
Conservation of Phoenix

Distribution List

Continental Industries LC
Crow Creek Sioux Tribe
Crow Tribe of Indians
Davis Oil Company
Department of Environmental Quality
Department of Interior
Department of Justice
Department of Transportation
Duane Short
Eastern Shoshone Tribe
Elk Petroleum Inc.
Ellbogen Oil Producers
Environmental Protection Agency, Region 8
Farleigh Oil Properties
Federal Bureau of Land Management
Federal Highway Administration - Right-of-Way
FEMA
Fish & Wildlife Service
Flying J Oil & Gas Inc.
Foundation for North American Wild
Four G Oil Co
Game & Fish Department
Gastech Inc.
George Lyn
GLG Energy LP
Governor's Planning Office
Great Western Drilling Company
Greater Yellowstone Coalition – Jackson
Hess
Independent Petroleum Association of Mountain States (IPAMS)
Izaak Walton League
Jackson Hole Conservation Alliance
Jackson Hole Land & Trust
Keep Yellowstone Nuclear Free
Kemmerer Historic Preservation Commission
Kirkwood Oil & Gas
L-G Land and Cattle LLC
Managing Director-Infrastructure
Mark J. Davis Branch
Meadow Creek Enterprises LLC
Milestone Petroleum Inc.

Distribution List

MKM Oil, Inc.
Mormon Trails Association
Mountaintop Consulting LLC
Mr. Terry Gray
Ms. Marilyn Parsons
Ms. Nancy Borton
Murie Audubon Society
Nance Petroleum Corporation
National Association of Attorneys General
National Association of State Energy Officials
National Governor's Association
National Park Service
National Wildlife Federation
Natrona County Conservation District
Natrona County Historic Preservation Commission
Natrona County Public Library
Natural Resources Policy Advisor
Nature Conservancy Montgomery Building
North American Pronghorn Foundation
North Platte Valley Conservation District
North Star Operating Co
Northern Arapaho Tribe
Northern Cheyenne Tribe
O'Brien Energy Resources Corporation
Occidental Oil & Gas Corporation
Office of Surface Mining
Oglala Sioux Tribe
Oil & Gas Conservation Commission Don Likaarts
Outdoor Women of Wyoming
Owens Brothers Land & Livestock LLC
Pathfinder Back Country Horsemen
Petroleum Association of Wyoming
Phillips Petroleum Company
Plain Pipeline
Platte River Parkway Trust
Platte River Rod and Gun Club
Powder River Basin Resource Council
Preservation Office Cultural Resource Coordinator
Pubco Petroleum
Public Employees for Environmental Responsibility
Public Lands Advocacy

Distribution List

QEP Energy Company
Rawhide Western Inc
Rocky Mountain Elk Foundation
Rosebud Sioux Tribe
Sage Petroleum LLC
Shepperson, Frank E et al
Shiloh Oil Corp.
Shoshone-Bannock Tribe
Sinclair Oil
Sisseton-Wahpeton Oyate Tribe
South Goshen Conversation District
Standing Rock Sioux Tribe
Stanolind Oil and Gas Company
Staple Three Sheep Company
State Engineer's Office
State Office Bureau of Land Management
Stealth Energy USA Inc.
Stovall Oil Company
Strachan Exploration Inc.
Sweetwater County Historical Museum
Synder Oil Corporation
Teapot Ranch Company
Teselle Inc.
Tesoro Petroleum Corporation
The Conservation Fund
The Crow Tribe of Indians
The Honorable Dave Freudenthal, Governor of Wyoming
The Land Trust Alliance
The Nature Conservancy
The Wilderness Society
The Wildlife Society, Wyoming Chapter
Thorofare Resources
Tom Clayson Petroleum Association of Wyoming
Town of Glenrock
Twiford Exploration Inc.
U.S. Geological Survey
United State Energy Association
US Army Corps of Engineering
US Department of Energy
US Department of the Interior Bureau of Land Management
US Department of Interior, Bureau of Land Management

Distribution List

US Environmental Protection Agency
US Fish & Wildlife Service
US Geological Survey
USDA Service Center
USDA-Forest Service
USDI National Park Service
USGS Central Region Energy Resources Team
Warren E & P Inc.
Western Governor's Association
Western Land Exchange Project
Western Region Office, Sierra Club
Western Resource Advocates
Wildlife Habitat Council
Wildlife Heritage Foundation
Wold Oil Properties
Wyoming Association of Municipalities
Wyoming Back Country Horsemen of America
Wyoming Chapter of the Sierra Club
Wyoming County Commissioners
Wyoming Department of Agriculture
Wyoming Department of Environmental Quality
Wyoming Department of State Parks and Cultural Resource
Wyoming Department of Transportation - Right-of-Way
Wyoming Game & Fish Department
Wyoming Historical Foundation/Wyoming State Historical Society
Wyoming Independent Producers Association
Wyoming Mining Association
Wyoming Motorcycle Trails Association
Wyoming Natural Diversity Database
Wyoming of Coordinator Trout Unlimited
Wyoming Office of State Lands & Investments

RMOTC

U.S. DEPARTMENT OF ENERGY

Serial No.: MJT/04.392

February 15, 2013

Subject: Preparation of the Site-Wide Environmental Assessment for the Rocky Mountain Oilfield Testing Center & Naval Petroleum Reserve No. 3

The purpose of this scoping letter is to notify agencies and interested parties that the U.S. Department of Energy (DOE) is beginning the preparation of the Site-Wide Environmental Assessment (SWEA) for divestment of the Rocky Mountain Oilfield Testing Center (RMOTC) and Naval Petroleum Reserve No. 3 (NPR-3). DOE anticipates ceasing current operations and completing the transfer of the property to a new owner by April 15, 2015. The SWEA will address any environmental issues due to the divestment of the RMOTC and NPR-3 and the potential environmental impacts of the proposed actions and alternatives. Therefore, DOE is seeking input on the proposed actions, issues, concerns and opportunities that may arise as a result of this action.

The proposed action will entail the following:

- Discontinuing current government and private industrial testing and demonstration of new oil field and environmental technology at the RMOTC;
- Closing of existing on-site Industrial waste landfill;
- Plugging and abandoning uneconomic wells; and
- Discontinuing the on-going release of produced water at the Tensleep facility.

As part of the National Environmental Policy Act (NEPA) review, we welcome all comments to be considered in the implementation of the SWEA regarding the divestment of the RMOTC and NPR-3. Additional information regarding the proposed project alternative and where to send your comments are discussed in the following attachment.

We look forward to receiving your comments.

Michael J. Taylor

Michael J. Taylor
Director, Technical Assurance

RMOTC | U.S. Department of Energy, Office of Fossil Energy | www.rmotc.doe.gov
907 N. Poplar, Suite 150 | Casper, WY 82601 | (307) 233-4800 - main | (888) 599-2200 - toll-free

Appendix B: Draft SWEA Cover Letter

Serial No.: MJT/04.515

March 9, 2014

Draft Site-Wide Environmental Assessment for the Divestiture of Rocky Mountain Oilfield Testing Center and Naval Petroleum Reserve No. 3

RESPONSIBLE AGENCY: U.S. Department of Energy (DOE), Rocky Mountain Oilfield Testing Center (RMOTC), Casper, Wyoming
`

TITLE: *Draft Site-Wide Environmental Assessment for the Divestiture of Rocky Mountain Oilfield Testing Center and Naval Petroleum Reserve No. 3* (DOE/EA-1956)

ABSTRACT: U.S. Department of Energy (DOE) has prepared the *Draft Site-Wide Environmental Assessment for the Divestiture of Rocky Mountain Oilfield Testing Center and Naval Petroleum Reserve No. 3* (Draft SWEA) to evaluate the potential environmental consequences due to the discontinuation of the government operations at the Rocky Mountain Oilfield Testing Center (RMOTC) and Naval Petroleum Reserve No. 3 (NPR-3) property. According to Section 7422(c)(2) title 10, United State Code of Armed Forces, Congress extended oil and gas production of the NPR-3 until April 15, 2015. However, DOE has determined that continued governmental production of oil at NPR-3 is no longer in the national interest. Therefore, DOE expects to divest the RMOTC and NPR-3 to one or more entities by December 31, 2014.

According to the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021), DOE has prepared the Draft SWEA to:

- Assess the potential environmental impacts of the Proposed Action and the No-Action Alternative;
- Identify any adverse environmental effects that cannot be avoided should a proposed action be implemented;
- Evaluate alternatives to the Proposed Action, including the No Action Alternative;
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- Characterize any irreversible and irretrievable commitments of resources that would be involved should DOE decide to implement its Proposed Action.

In this Draft SWEA, DOE evaluated in detail potential impacts to air quality, cultural resources, Socioeconomics, geology, biological resources, land use, environmental justice, noise, and water resources. If DOE does not identify the estimated impact in this assessment as significant, it could issue a Finding of No Significant Impacts (FONSI) and proceed with the Proposed Action. If DOE identified potentially significant impacts, it would have to prepare an environmental impact statement before it could proceed with the proposed action or implement another alternative.

INTRODUCTION: NPR-3, also known as Teapot Dome, is a 9,481-acre (3,837 hectare) oilfield located in Natrona County, Wyoming, which is approximately 35 miles (56 km) north of the City of Casper. DOE has had jurisdiction for over NPR-3 since 1977, and is required to produce oil from the site at the maximum efficient rate (MER) consistent with sound engineering practice. Production at NPR-3 peaked in 1981, since then, production has declined and the oilfield has become a mature stripper field with average daily production of 225 barrels per day.

RMOTC was established in 1993 as an industry-driven endeavor to utilize NPR-3 resources and facilities to help strengthen the domestic energy industry by testing new petroleum and environmental technologies in operating oil and gas field owned by the U.S. Government. Commercial field testing at RMOTC began in 1995. Most of the technology and processes that have been field tested at RMOTC have primary application in drilling, oil production, enhanced recovery, renewable energy, and production cost reduction.

DOE is proposing to discontinue government operations at RMOTC and NPR-3 and sell the property and mineral rights to a private entity or entities per the conditions listed in Public Law 94-258, the National Defense Authorization Act of 1996, the National Defense Authorization Act of 1999, the November 2011 *Authorization of Continued Production* document and the President's FY 2012 Budget Request. These documents specify that the recommended disposal path maximize the value obtained for NPR-3 by the U.S. Government while minimizing the cost of remediation.

This Draft SWEA was prepared under the regulations of the NEPA established by the CEQ and DOE.

PROPOSED ACTION & ALTERNATIVES: Under the Proposed Action, DOE would discontinue testing at RMOTC and sell NPR-3 to one or more entities for use in commercial oil production. DOE expects that the new owner(s) would continue to use conventional oil exploration and production methods similar to what DOE has employed at the site since 1976. This is likely to include well maintenance and rework, various down-hole stimulation activities, and drilling new wells as needed. Additionally, DOE expects private owners to implement Enhanced Oil Recovery (EOR) techniques such as carbon dioxide (CO_2) and/or steam flooding similar to what DOE has piloted in the past and what private companies in adjacent oil fields are currently implementing.

One alternative to selling the property involves transferring NPR-3 to another federal agency that would then lease the property to private entities for continued oil production. This option would maintain federal ownership of the cultural and historic sites associated with NPR-3, but oil production activities are expected to be exactly the same as if the property was sold.

Given the current energy production environment, another alternative is to sell or lease the property for utility-scale renewable energy production. This would involve placing a wind farm, solar farm or geothermal plant on the property.

Under the No Action alternative, DOE would neither sell nor transfer the property and would continue operating it at current levels. Well maintenance and rework, down-hole stimulation and new well development would be the same as in the Proposed Action, but it is unlikely that DOE would implement site-wide EOR projects in the foreseeable future.

CONTACT: We appreciate any issues or comments that you may have regarding the Draft SWEA. Please provide comments and questions via phone, email or fax. In addition, you are welcome to send your comments by mail to the following address.

Mr. Mike Taylor
Director, Technical Assurance
U.S. Department of Energy
Rocky Mountain Oilfield Testing Center

907 North Poplar, Suite 150
Casper, Wyoming 82601

Fax: (307) 233-4851 Toll Free Voice: 1-888-599-2200
Email: RMOTCSWEA@rmotc.doe.gov

NOTE: Please note that all comments regarding the Draft SWEA are due by April 14, 2014.

PUBLIC AVAILABILITY: Letters regarding the availability of the Draft SWEA have been distributed to agencies and the public that have interest in or are affected by the proposed action. The Draft SWEA is available on DOE's NEPA Website at http://energy.gov/node/813679, as well as DOE's Public Comment Opportunities page (http://energy.gov/nepa/public-comment-opportunities) and RMOTC's Website (http://www.rmotc.doe.gov/SWEA.html).

Printed copies of the SWEA will be made available for public inspection at the following locations:

Natrona County Public Library
Reference Department
307 E 2nd Street
Casper, Wyoming 82601

Salt Creek Museum
531 Peake Street
Midwest, Wyoming 82643

We look forward to receiving your comments.

Michael J. Taylor
Director, Technical Assurance