

**ENVIRONMENTAL ASSESSMENT FOR
THE POISON SPIDER OIL FIELD
UNDERGROUND-ACCESS OIL RECOVERY FACILITY PROJECT,
NATRONA COUNTY, WYOMING
EA No. WY-060-EA06-145**

Prepared for

**Bureau of Land Management
Casper Field Office**

By

**Taylor Environmental Consulting
Casper, Wyoming**

September 2006



**Bureau of Land Management
Casper Field Office**



EA No. WY-060-EA06-145

RockWell Petroleum

**UNDERGROUND ACCESS ENHANCED OIL RECOVERY FACILITY
POISON SPIDER FIELD
NATRONA COUNTY, WYOMING**

**DECISION RECORD
AND
FINDING OF NO SIGNIFICANT IMPACT**

DECISION

It is my decision to approve the RockWell Petroleum (RWP) Application for Permit to Drill (APD) for the underground-access portal and the applicable components of the Poison Spider Field Plan of Development (POD). RWP has proposed the construction of an Underground Access Oil Recovery Facility (UAORF) that is an enhanced oil recovery (EOR) project utilizing underground gravity drainage to extract previously unrecoverable oil from the existing Poison Spider Field. The UAORF project components approved by this decision include:

1. Vertical shaft construction;
2. Tunnel construction;
3. Applicable surface-related construction, operations, maintenance, abandonment, reclamation activities, and any other surface activity associated with the Poison Spider UAORF project as described in this decision and in the POD.

Successful implementation of the proposed action will result in the recovery of oil through an underground enhanced oil recovery project from federal oil and gas lease WYC038870. The surface lands in the project area are public lands administered by the BLM Casper Field Office (CFO). Maps and diagrams of the proposed surface construction areas, facility operations and storage areas, associated infrastructure construction, and reclamation areas are included in the POD and the EA. Diagrams and photographs of underground excavation and production equipment, shaft and tunnel construction designs, and ventilation shaft designs are also included in the POD.

The APD for the tunnel portal was originally submitted to the BLM Casper Field Office (CFO) on April 7, 2006; a revised APD proposing a vertical shaft instead of an inclined tunnel was

submitted to the CFO on August 28, 2006. A Reclamation Plan for the proposed action was submitted by RWP to the CFO on May 23, 2006, and the final Plan of Development (POD) was submitted to the CFO on September 1, 2006. Reclamation cost calculations for the proposed action were submitted to the CFO on August 17, 2006; these were evaluated for adequacy by the BLM State Engineer and the CFO Civil Engineer to determine Bonding requirements for the project.

The proposed action is described in detail in Chapter 2.0 of the “Environmental Assessment For The Poison Spider Oil Field Underground-Access Oil Recovery Facility Project” (EA) No. WY-060-EA06-145, and in the POD. The APD includes a surface use and operations plan and a drilling prognosis that briefly describe the surface and drilling operations for the vertical shaft and tunnel construction and the reclamation plans for the portal surface area. A summary of the proposed action as submitted in the POD is included in the Project Background and Description section below.

The proposed action in the POD and Chapter 2.0 of the EA includes a detail description of the following components of the proposed action:

1. Project access;
2. Surface shaft area;
3. Vertical shaft construction;
4. Tunnel construction including drill station construction;
5. Underground well drilling operations;
6. Well completions;
7. Underground production operations;
8. Surface service facilities including tank battery;
9. Water injection;
10. Mine ventilation;
11. Vent shaft escapeway;
12. Electrical power requirements, generation, and line installations;
13. Production flowlines;
14. Waste management and fuel storage;
15. Transportation requirements;
16. Reclamation plans;
17. Work force and timing;
18. Disturbance summary.

In addition to the environmental mitigation measures developed in Chapter 4 of the EA and those proposed in the POD, the following sections of the EA include environmental protection measures that also require implementation to ensure that undue or unnecessary environmental impacts to the environment do not occur as a result of the proposed action:

- Section 2.1.11: Reclamation
- Section 2.1.14: Applicant Committed Environmental Protection Measures (ACEPM)
- Appendix A: Poison Spider Reclamation Plan (from the POD).

Appendix C of the EA contains an Emergency Plan for the proposed action that includes a Mine Escape and Evacuation Plan required pursuant to MSHA Standard 57.11053.

Section 1.6 of the EA outlines the relationship of federal, state, county and local agencies to the Poison Spider UAORF project regarding NEPA compliance; BLM APD and Sundry Notice approvals; U.S. Fish and Wildlife consultation and coordination; Mine Safety and Health Administration (MSHA) healthy and safety requirements; local emergency response coordination; Wyoming DEQ air, water, and hazardous waste permitting and compliance; Wyoming DOT conformance; Wyoming State Division of Mine Inspections and Safety conformance and oversight inspections; Wyoming State Engineer's Office (WSEO) permitting requirements; Wyoming Oil and Gas Conservation Commission (WOGCC) authority, permitting, and regulatory requirements; and the Wyoming State Historic Preservation Office (SHPO) consultation requirements.

All of the above-referenced sections of the EA, the SUP, the Drilling Prognosis, the Reclamation Plan, and other applicable environmental protection, mitigation, monitoring, and safety measures presented and developed in the EA are incorporated by this decision into the POD for the Poison Spider UAORF project.

Necessary permits and authorizations from the Bureau of Land Management will be issued pursuant to the Mineral Leasing Act of 1920, as amended, and the Federal Land Policy and Management Act of 1976, as amended, and will be subject to the rules and regulations in 43 CFR 2800 and 43 CFR 3000, and the terms and conditions described below.

PROJECT BACKGROUND

Jones Draw and Greybull Projects

RWP has developed the technology for their underground access enhance oil recovery technique over several years and presently have four ongoing projects, including the Poison Spider project, in Wyoming involving similar applications of the UAOR process although differing somewhat in depth of tunneling and underground access methods. The Jones Draw project in southwestern Natrona County on the north flank of the Rattlesnake Hills is on federal oil and gas leases and involves an inclined tunnel to be constructed beneath the steeply dipping Lower Cretaceous Muddy Formation starting at a surface point beneath the Muddy Formation outcrop. The Jones Draw Notice of Staking was submitted to the CFO on January 31, 2006, and to date several core holes have been drilled to evaluate the subsurface extent and quality of the Muddy Formation target. The final POD and EA for the Jones Draw project have not been submitted to the CFO at this date.

The Greybull Project, located on fee mineral lands in the Greybull Field in Washakie County, Wyoming, involves an inclined tunnel extending from the surface downward several hundred feet to an underground location in a downthrown fault block from which wells are being drilled horizontally into the productive Upper Cretaceous Peay Sandstone reservoir located across the trapping fault in the up-thrown fault block. On September 12, 2006, CFO BLM representatives inspected the Greybull site and observed the underground construction, completed wells, and the

production facilities where 31 underground wells had been drilled to date and put into production.

RWP has another UAORF project in Eastern Wyoming on the west flank of the Black Hills that is in the early stages of development

Poison Spider UAORF Project

The Poison Spider project is located on the 560-acre federal oil and gas lease WYC 037870 and involves the construction of a 7.5-acre shaft surface area from which a 10½-foot diameter vertical shaft will be drilled with a large-bore drill rig to 1600 feet, which is below the level of the target Jurassic-age Sundance Formation. A grout curtain will be injected into the penetrated formations while drilling to protect water and oil zones. After completion, the vertical shaft will be lined with casing and cemented to surface. The casing provides the support for the installation of the utilities needed for the underground operations such as water and production lines, ventilation ducts, electric lines, and an equipment and personnel lift.

The 14-foot by 16-foot tunnel construction will extend 2000 feet horizontally from the vertical shaft below the target Sundance Formation; the tunnel roof will be supported by standard mining techniques including roof bolts, reinforcing mesh, and shotcrete. Disassembled tunnel construction equipment including a loader, header, haul trucks, drill, etc. will be lowered into the tunnel area and re-assembled in the tunnel/shaft area for service. During tunnel construction, the work area will be ventilated by a temporary fan and duct system; a permanent combination vent and emergency exit will be drilled from the surface to intersect the tunnel once tunneling operations reach the proposed vent shaft area.

Two or more drill stations capable of handling over 250 drill sites each will be constructed at pre-determined intervals along the tunnel. Each drill station will be permitted as a single APD by the BLM and WOGCC, and each APD will specify the center point of the drill station and the estimated number and location of well bores within each drill station. The wells will be drilled with a pneumatic drill from the drill station upward at various angles and distances into the overlying Sundance Formation; each drilling station will contain a closed mud-handling system designed to remove mud and cuttings from the drill hole to the surface and return fresh mud to the drill hole. Water for the drilling operations will be supplied from existing surface field operations initially, and eventually, from a new-drill water supply well in the project area or from project-produced water.

The 5 to 6-inch production boreholes will be completed either open-hole or through perforated casing in the oil reservoir and cased with 3-inch pipe from the tunnel wall into the oil reservoir. The produced fluids will flow through a closable 4-inch wellhead connection, through 1-inch flexible hydraulic line to a multiple well receiver header before being pumped to the surface. The receiver header is designed to monitor flow rates of any or all of the wellheads and contains a central pressure vessel designed to withstand pressures up to 1440 psi, well above the estimated working pressure of 810 psi. From the receiver header, the production fluids will be pumped to the surface oil-water treatment and storage facilities.

Four BLM and WOGCC-approved water injection wells will be required to dispose of the anticipated 20,000 bbl of water at peak production.

In addition to the portal entrance and its associated facilities, the 7.5-acre shaft surface area will be utilized for shaft and tunnel spoil storage, a drilling reserve pit, and an equipment and facility operational area. A 4.0-acre surface service facility will be constructed adjacent and east of the shaft area that will contain storage, maintenance, office, and parking facilities for the project. Another 5.5 acres of surface disturbance for a total of 17.0 acres of total disturbance will be required for additional access roads, water disposal wells, vent shaft construction, and storage areas. Approximately 8.4 acres of this surface disturbance will be phased short-term disturbance that will be reclaimed as the shaft and tunnel construction, and then the drilling phase of the proposed action is completed. Tables 2.2 and 2.3 in the EA summarize the amount of surface disturbance and the reclamation time frame for the proposed action.

In addition to the reclamation of surface disturbance resulting from implementation of the proposed action, the Poison Spider Reclamation Plan outlines a reclamation plan for 31.51 acres pre-existing surface disturbance in the project area commencing within one year of initiating tunnel excavation. Table 2 in the Reclamation Plan summarizes the pre-existing disturbance to be reclaimed and a timetable for reclamation, and includes the Poison Spider oil camp, existing well pads and access roads, and the slope area below the oil camp impacted by previous oil spills.

Shaft and tunnel construction is expected to last 12 to 18 months, while drilling is expected to last one to two years.

MITIGATION AND MONITORING

All construction, operations, maintenance, abandonment, reclamation, and any other activity associated with the Poison Spider UAORF project shall be implemented in accordance with the September 1, 2006 POD and the all of the measures incorporated into the POD as discussed above.

In order to ensure that undue or unnecessary environmental impacts to the environment are not occurring as a result of the proposed action RWP and representatives of the BLM authorized officer shall monitor project implementation through routine compliance inspections. All of the components of the submitted POD are not approved with this decision, and the approved components of the proposed action require additional notification to the BLM Authorized Officer prior to initiating construction, installation, and reclamation activities. The following table summarizes the BLM approval and notification requirements for the proposed action through the life of the project. The BLM Authorized Officer may impose additional reporting and monitoring requirements for the proposed action at a later date in order to ensure that undue or unnecessary environmental impacts to the environment are not occurring as a result of the proposed action. The BLM Authorized Officer may also impose additional mitigation or corrective measures if it is perceived that the proposed action is causing undue adverse impact to the environment in the project area.

**POISON SPIDER UDERGROUND ACCESS OIL RECOVERY PROJECT
SUMMARY OF BLM APPROVAL STATUS AND OTHER REQUIREMENTS**

Project Phase	Components	Approval Status	Additional Requirements	Comments
Portal area, service facility, topsoil storage area, access road construction	Portal, drilling pit, spoil storage, service facility area, topsoil storage, access roads, pipeline and power lines, access shaft, tunnel	Pre-approved with portal APD and POD	48 hour notification prior to beginning each separate construction phase	Sundry Notice required for any changes to POD submittal
Vent shaft surface area	Vent shaft drilling and associated installation	Requires approved APD for vent shaft drilling	48 hour notification prior to beginning each construction phase	Sundry Notice required for any changes to POD submittal
Tunnel drilling station with associated wells and production facilities	Drilling station, underground well drilling, underground and surface production facilities and pipeline installation	Requires approved APD for each drilling station	Center point location and estimated number and location of boreholes in APD	Maps and diagrams required for each new drilling station; new surface facilities maps not required if no change from POD
Water disposal well	Well drilling, pipelines and power lines	Requires approved APD for each water disposal well	Require POD that includes all potential water disposal wells	Require new maps for wells and infrastructure not included in POD
Interim reclamation	Interim reclamation of portal and vent shaft areas and other project-related disturbance areas including pit closure	Pre-approved with POD	48 hour notification prior to beginning each separate construction phase	Sundry Notice required for any changes to POD submittal
Reclamation of pre-existing disturbance	Oil camp, well pads, well access roads, oil spill impacted slope area	Pre-approved with POD	48 hour notification prior to beginning each separate reclamation phase	Sundry Notice required for any changes to POD submittal
Plugging and Abandonment (P&A)	Access and vent shafts, water disposal wells, underground wells	P&A Notice requires approval	Sundry Subsequent Report when completed	Master P&A procedure developed for wells in Drilling Station APDs
Final Abandonment Notice (FAN)	All project-related and pre-existing surface disturbance areas as described in the POD	Submit FAN when all surface reclamation successful	Requires successful reclamation for FAN approval and Bond release	Pre-existing disturbance reclamation approved through Sundry Notice approval.

RATIONALE FOR THE DECISION

The decision to approve the RWP Poison Spider UAORF project is based on the impact analysis contained in the above referenced EA. The analysis shows that there will be no undue or

unnecessary environmental impacts to the surface environment caused by construction, reclamation, operation, maintenance, or abandonment of the approved components of the proposed action which include:

1. Vertical shaft construction;
2. Tunnel construction;
3. Vent shaft construction;
4. Applicable surface-related construction, operations, maintenance, abandonment, reclamation, and any other surface activity associated with the Poison Spider UAORF project as described in this decision.

It is expected that as project phases are completed the information gained will lead to minor modifications to the proposed action outlined in the EA and POD; however, the overall environmental consequences from the modifications to the proposed action are anticipated to be similar to the impacts identified and described in the project EA. The determination that the reasonably foreseeable development can occur and likely not exceed the identified impacts relies upon the successful implementation of the following environmental protection and mitigation measures that were developed:

1. In Chapter 4 of the EA and included as Conditions of Approval (attached) to the proposed action;
2. In the proposed POD;
3. In the following sections of the EA:
 - o Section 2.1.11: Reclamation
 - o Section 2.1.14: Applicant Committed Environmental Protection Measures;
4. In the Surface Use Plan and Drilling Prognosis of the APD;
5. In the Surface Reclamation Plan.

The proposed action will recover oil from the existing Poison Spider Field by enhanced oil recovery methods utilizing underground gravity drainage technology that would otherwise remain in the reservoir, representing a significant loss of domestic oil production. Positive economic benefits will be realized from the increased daily oil production and the extended field life of the Poison Spider Field.

A No Action and an In-fill Drilling Alternative were analyzed in the EA. As presented in Table 2.4 of the EA, the total Life of Project (LOP) surface disturbance of 8.6 acres from the proposed action is much less than the estimated 80 acres of LOP surface disturbance that would be associated with the conventional In-fill Drilling Alternative for field development or the 31.7 acres LOP surface disturbance resulting from the No Action Alternative. Also, the No Action Alternative would not provide for additional oil production or an extended field life for Poison Spider Field. The proposed action is the preferred alternative because it involves less surface disturbance than the In-fill Drilling Alternative, and it will recover oil from the existing Poison Spider Field by enhanced oil recovery methods that would otherwise remain unrecoverable in the reservoir.

The approved components of the Poison Spider Underground Access Oil Recovery Facility project included in this decision are in conformance with the Platte River RMP (1985), BLM's land use plan guiding management of the federal land within the project area.

SCOPING

The CFO did not initiate public scoping on the Poison Spider UAORF project because the proposed action utilizes enhanced oil recovery technology and is entirely contained within a producing oil field. All project drilling submittals are posted for public review in the CFO.

Internal BLM scoping led to the identification of the following issues and concerns associated with the proposed action:

- Project impacts to the surface water (Poison Spider Creek and Oil Camp Spring) and groundwater resources, specifically water quality and quantity.
- Impacts to wildlife and their habitats.
- Increased traffic and associated impacts on existing county roads.
- Emissions from shaft and tunnel construction, and production operations, and power generation equipment.
- Noise from the construction operation and operation of the tunnel vent.
- Reclamation of disturbed areas.
- Social and economic impact to local communities and landowners.
- Effects to cultural resources.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Based on the analysis of the potential environmental impacts contained in the above referenced EA, I have determined that the impacts are not expected to be significant and an environmental impact statement is not needed.

APPEAL OPPORTUNITY

This decision is subject to appeal. Under BLM regulation, this decision is subject to administrative review in accordance with 43 CFR 3165. Any request for administrative review of this decision must include information required under 43 CFR 3165.3(b) State Director Review, including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, WY, 82003 within 20 business days of the date of this decision.

APPROVED BY: _____

Patrick J. Moore
Assistant Field Manager,
Minerals and Lands

DATE: 9/29/2006

Attachment: Conditions of Approval



THE DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CASPER FIELD OFFICE



**ROCKWELL PETROLEUM, INC.
UNDERGROUND ACCESS ENHANCED OIL RECOVERY FACILITY
POISON SPIDER FIELD
NATRONA COUNTY, WYOMING**

**CONDITIONS OF APPROVAL
APPLICATION FOR PERMIT TO DRILL**

The following are Conditions of Approval (COAs) for the RockWell Petroleum, Inc. (RWP) for the approved components of the POD for the RWP Underground Access Oil Recovery Facility (UAORF) and approved portal APD in the Poison Spider Field. The approved components of the POD are the surface construction, operations, maintenance, abandonment, reclamation activities, and any other surface activity associated with the Poison Spider UAORF project as described in this decision and in the POD

The proposed action involves the construction of a vertical access shaft for equipment and personnel drilled to 1600 feet from which a horizontal tunnel will extend below the target oil reservoir, the Sundance Formation. From the tunnel area, wells will be drilled upward into the Sundance Formation and completed as oil well. The oil and water produced will be pumped to the surface for processing and storage.

Underground construction activities on federal oil and gas leases outside of conventional small bore oil and gas drilling are not typically regulated by the BLM oil and gas staff, and these Conditions of Approval were developed to protect the surface resources in the project area from undue and unnecessary harmful impacts to the surface environment.

RWP and their contractors and subcontractors shall conduct operations in full compliance with applicable Federal, State, and local laws and regulations applicable to any activity associated with the Poison Spider UAORF project, whether it takes place at the surface or underground. RWP and its contractors and subcontractors shall abide by all of the requirements and guidelines of the BLM Authorized Officer (AO) as stated in approved APDs, Sundry Notices, and other permits issued by the BLM. The standards, procedures and requirements described below are derived from BLM State and District standards, and the Platte River Resource Area (PRRA) Resource Management Plan (RMP). The standard operating procedures for surface-disturbing activities must be adhered to during

all proposed activities unless a BLM AO-approved written exception has been granted. The BLM CFO Manager will be the AO for the project area.

Operator: Rockwell Petroleum, Inc.

Approved: 9/29/2006

**A COPY OF THESE CONDITIONS OF APPROVAL MUST BE FURNISHED
TO YOUR FIELD REPRESENTATIVE TO INSURE COMPLIANCE**

Government Contacts

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Site Specific Conditions of Approval

RockWell Petroleum, Inc. (HPC) shall implement the surface protective mitigation measures as outlined in the September 1, 2006 Plan of Development (POD) and the all of the measures included in the Surface Use Plan (SUP), Reclamation Plan, and the Applicant Committed Environmental Protection Measures that were incorporated into the POD by the approval of the Poison Spider UAORF Decision Record.

- All project activities including equipment emissions shall meet or exceed all state and federal standards for air quality as regulated by the Air Quality Division of the Wyoming DEQ.
- All drilling approved under an Application for Permit to Drill will be plugged and abandoned pursuant to Wyoming Oil and gas Conservation Commission (WOGCC) rules and regulations.
- A construction Storm Water Pollution and Prevention Plan (SWPPP) shall be prepared and implemented as required by the Water Quality Division of the DEQ.
- All boreholes and wells shall cased, cemented, and abandoned according to WOGCC and BLM regulations.
- To protect important raptor nesting habitat in the project area, drilling and/or surface use will not be allowed within 0.50 mile of occupied raptor nests during the period from February 1 to July 31.
- All reclaimed and reseeded areas shall be fenced for at least 2 years following reseeded to prevent overgrazing and allow for the new vegetation to be established. The reclamation sites shall be inspected and monitored at the end of 2 years and on a yearly basis thereafter to determine if additional fencing protection is needed.

General Conditions of Approval

1. Approval of this APD does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. In addition, approval of this APD does not imply that the operator has legal access to the drilling location. When crossing private surface 43 CFR 3814 regulations must be complied with and when crossing public surface off-lease the operator must have an approved right-of-way.
2. This APD is valid for a period of one year from the date of approval or until the oil and gas lease expires/terminates, whichever occurs first. If the APD terminates, any surface disturbance created under the application must be reclaimed in accordance with the approved plan.
3. All applicable local, state and/or federal laws, regulations, and/or statutes must be complied with.
4. A complete copy of the approved APD must be at the drill site during the construction of the roads and drill pad, the drilling of the well, and the completion of the well.
5. The spud date will be reported orally to the Authorized Officer 24 HOURS PRIOR TO SPUDDING, unless otherwise required in site specific conditions of approval.
6. Verbal notification shall be given to the Authorized Officer at least 24 hours in advance of formation tests, BOP tests, running and cementing casing (other than conductor casing), and drilling over lease expiration dates.
7. A progress report must be filed a minimum of once a month starting with the month the well was spud and continuing until the well is completed. The report must be filed by the 25th of each month on a Sundry Notice (Form 3160-5). The report will include the spud date, casing information such as size, grade, weight, hole size, and setting depth, amount and type of cement used, top of cement, depth of cementing tools, casing test method, intervals tested, perforated, acidized, fractured and results obtained and the dates all work done.
8. The operator is responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any archaeological, historical, or vertebrate fossil objects on site. If archaeological, historical, or vertebrate fossil materials are discovered, the operator is to suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Operations are not to resume until written authorization to proceed is issued by the Authorized Officer.

Within five (5) working days, the Authorized Officer will evaluate the discovery and inform the operator of actions that will be necessary to prevent loss of significant cultural or scientific values.

The operator is responsible for the cost of any mitigation required by the Authorized Officer. The Authorized Officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required

mitigation has been completed, the operator will be allowed to resume operations.

9. The operator shall be responsible for the prevention and suppression of fires on public lands caused by its employees, contractors or subcontractors. During conditions of extreme fire danger, surface use operations may be limited or suspended in specific areas.
10. All survey monuments found within the area of operations shall be protected. Survey monuments include, but are not limited to: General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U. S. Coast and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any survey monuments, the incident shall be reported in writing to the Authorized Officer.
11. If at any time the facilities located on public lands authorized by the terms of the lease are no longer included in the lease (due to a contraction in the unit or other lease or unit boundary change) the BLM will process a change in authorization to the appropriate statute. The authorization will be subject to appropriate rental, or other financial obligation determined by the authorized officer.
12. Gas produced from this well may not be vented or flared beyond an initial, authorized test period of 30 days or 50 MMcf following its completion, whichever first occurs, without the prior, written approval of the authorized officer. Should gas be vented or flared without approval beyond the test period authorized above, you may be directed to shut-in the well until the gas can be captured or approval to continue venting or flaring as uneconomic is granted, and you shall be required to compensate the lessor for that portion of the gas vented or flared without approval which is determined to have been avoidably lost.

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LIST OF ABBREVIATIONS AND ACRONYMS USED IN THIS DOCUMENT

ACEPM		Applicant-committed environmental protection measures
APD		Application for Permit to Drill
APLIC		Avian Power Line Interaction Committee
AQD	Air	Quality Division
AUM	Ani	mal Unit Month
BACT	Best	Available Control Technology
BBL	Bar	rels(s)
BLM		Bureau of Land Management
BMP	Best	Management Practices
BOP	B	lowout Preventer
BWPD	Barrels	of Water per Day
CERCLA		Comprehensive Environmental Response Compensation and Liability Act
CEQ		Council on Environmental Quality
cfm	cubic	feet per minute
CFO	Casp	er Field Office
CFR	Cod	e of Federal Regulations
cfr	cubic	feet per second
CO	Carbon	monoxide
CR	Cou	ntry Roads
dBA	D	ecibels
EA	En	vironmental Assessment
EIS	E	nvironmental Impact Study
EOR	enhanced	oil recovery
EPA	En	vironmental Protection Agency
FLPMA		Federal Land Policy Management Act
FWKO	free	water knockout
FWS		United States Fish and Wildlife Service
HAP		Hazardous Air Pollutant
LOP	Life	of Project
LT	Long	Term
mg/L	milli	grams per liter
MLA	M	ineral Leasing Act
MSDS		Materials Safety Data Sheet
MSHA		Mine Safety and Health Administration
NAAQS		National Ambient Air Quality Standard
NEPA		National Environmental Policy Act
NO ₂	Nitroge	n dioxide
NO _x		Nitrogen oxide
NRCS		Natural Resource Conservation Service
NRHP		National Register of Historic Places
ns	No	Standard
O ₃	Ozo	ne
OSHA		Occupational Safety and Health Administration
PM ₁₀		Particulate Matter <10 microns in diameter
PM ₂₅		Particulate Matter <2.5 microns in diameter
POD	Plan	of Development

PRRA		Platte River Resource Area
PSD	P	Prevention of Significant Deterioration
PSF	Poiso	on Spider Field
RMP	Reso	Resource Management Plan
SHWD		Solid and Hazardous Waste Division
SO ₂	S	Sulfur dioxide
SPCC	Spill	Prevention and Control Counter Measure
ST	Sho	ort Term
SUP	Sur	face Use Plan
SWPPP		Storm Water Pollution Protection Plan
TCP	Traditional	Cultural Properties
T&E	Thre	atened or Endangered
TEPC		Threatened, Endangered, Proposed and Candidate
TSP	Total	Suspended Particulate
UBC	Unif	orm Building Code
UAGD	underground-a	ccess gravity drainage
UAOR	underground-access	oil recovery
umhos/cm		microhos per centimeter
USFWS		United States Fish and Wildlife Service
VOC	Vola	tile Organic Compounds
VRM	Visual	Resource Management
WAAQS		Wyoming Ambient Air Quality Systems
WDEQ		Wyoming Department of Environmental Quality
WOGCC		Wyoming Oil and Gas Conservation Commission
WPDES		Wyoming Pollution Discharge Elimination System
WSEO		Wyoming State Engineers Office
WYNDD		Wyoming Natural Diversity Data Base

CHAPTER 1: PURPOSE OF, AND NEED FOR THE ACTION

1.1 Introduction

Rock Well Petroleum, (US) Inc. (RWP) submitted an Application for Permit to Drill (APD) that was received by the BLM Casper Field Office (CFO) on April 7, 2006 in which RWP proposes to develop an underground-access oil recovery facility (UAORF) in the existing South Poison Spider Oil Field. This proposed action is located in portions of T. 33 N., R. 82 and 83 W., approximately 30 miles west of Casper, Wyoming (Figure 1-1). Access to the project is from Poison Spider Road, Natrona County Road 201 at Oil Camp Road.

A revised Surface Use Plan (SUP) and Drilling Prognosis for the APD and a Plan of Development (POD) for the Proposed Action was received by the CFO on August 28 and September 1, 2006, respectively.

RWP plans to produce federal oil reserves by an enhanced recovery technique utilizing underground-access gravity drainage (UAGD). This entails extracting crude oil by gravity drainage from production boreholes drilled upward at various angles from underground drilling stations. The underground drilling stations will be located in a shaft/tunnel system constructed below the oil reservoir. During production, the oil will flow downward via the natural forces of gravity and remaining reservoir pressure. Produced oil will be gathered from boreholes and pumped from the underground drilling/production stations through the tunnel to surface handling facilities.

The WYC037870 federal lease contains 560 acres. Within the lease boundary, the proposed action will involve approximately 17 acres of new surface disturbance and 31.37 acres of previous surface disturbance. Land and mineral ownership are 100% federal, managed by the Bureau of Land Management.

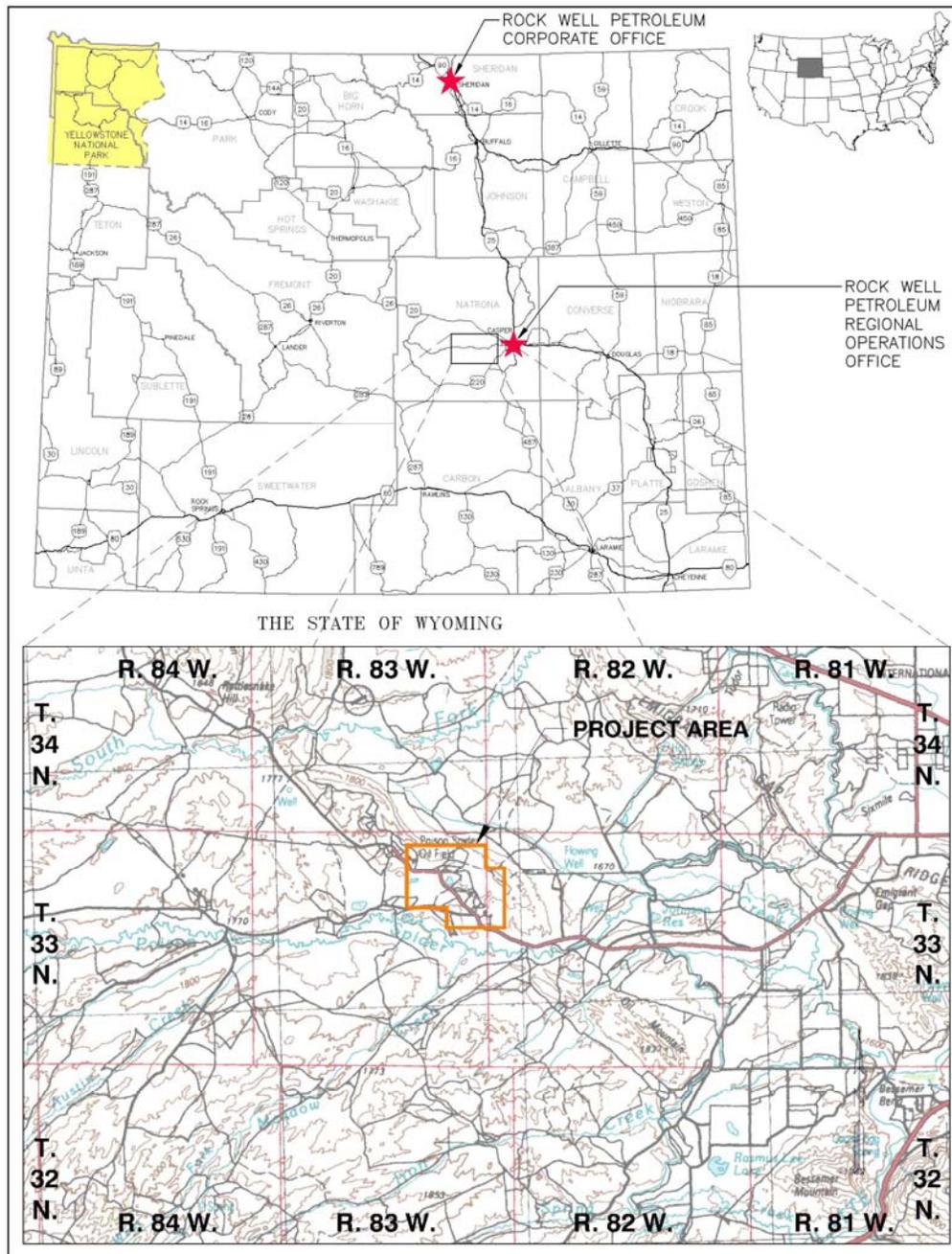
1.2 Project Description

RWP plans to produce the remaining reserves in place in the Poison Spider Field (PSF) using underground-access gravity drainage; this production technique will minimize surface disturbance while maximizing oil recovery. The entire underground access project area (service facilities, main shaft, access roads and ventilation shafts) consists of approximately 17 acres of new surface disturbance within the 560-acre lease. Upon implementation, the Proposed Action will be completed in approximately 3 years. Actual development time could be extended as new reservoir data is acquired or market conditions change. The productive life of the project is estimated to be 20 years. The PSF is 100% federally managed minerals and surface.

Figures 1-2 and 1-3 show the project area, the existing PSF and the proposed location of new surface facilities.

The Proposed Action includes continued operation of the existing PSF while developing the shaft and tunnel, drilling and completing underground wells, drilling and completing additional water injection wells, and constructing the service area which comprises a shop, office and production facility. Concurrent with the development of the underground project RWP will begin decommissioning unnecessary structures and reclaiming existing surface disturbance. Once the underground access project has achieved oil production rates at least comparable to the existing conventional operation the remaining surface production infrastructure will be

decommissioned and reclaimed. The proposed Reclamation Plan, found in Appendix A, provides a time line for decommissioning surface facilities.



Poison Spider Field General Location Map.

Figure 1-1 Project Location and Access

Development of the UAORF includes drilling a 1600 foot long vertical shaft to a location below the Sundance formation. A tunnel will then be excavated from the bottom of the shaft, proceeding in a northwesterly direction. Drill stations will be excavated along the tunnel alignment. Production boreholes will be drilled from the drill stations upward into the Sundance

formation, approximately 1400 feet below ground surface. RWP predicts it will take 12-18 months to complete the shaft and tunnel construction and up to 18 months to fully complete well development. The anticipated life of the project is approximately 20 years with final reclamation achieved five years (depending on weather) after plugging the wells, sealing the shaft, and removing all surface equipment.

Approval and implementation of the proposed UAGD project will result in the production of additional in-place oil reserves that otherwise would not be produced at this time and the reclamation of 31.37 acres of existing surface disturbance that otherwise would not be reclaimed at this time.

The original Poison Spider Plan of Development (POD) has been modified to meet natural resource requirements identified by BLM in its interdisciplinary review and field visits.

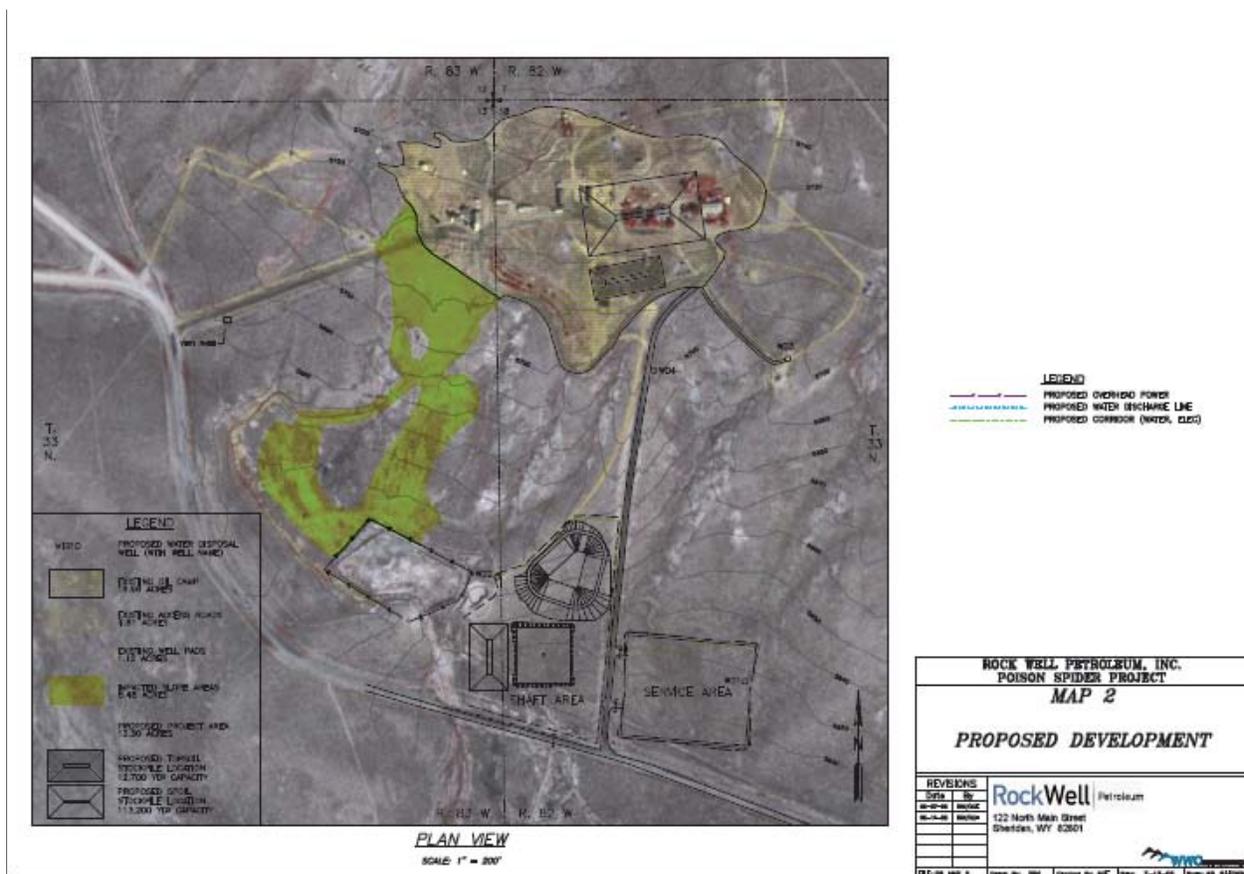


Figure 1-2 Aerial Photo of Current Operations and Proposed Shaft and Service Areas

BLM planning for the project area is documented in the Platte River Resource Area Resource Management Plan (BLM 1984). The project is located in Resource Management Unit 14. Resource Management Plan (RMP) decisions applicable to the proposal are listed below.

- G1/G2 : Grazing Management and Weed Control: The PSF is within an active BLM grazing allotment.
- L3 : Corridors: Major rights-of-way will be confined to these designated corridors whenever possible. When placement of a major facility within a designated corridor is not possible, and for smaller right-of-way facilities, placement will be adjacent to existing facilities or disturbances. Cross-country right-of-way placement will be allowed only when placement in a designated corridor or adjacent to an existing facility is not practical or feasible. The proposed use of the existing roads on public land within the field is an example of implementing this planning prescription, and other proposed facilities on public land are parallel to, or make use of, existing linear facilities to the extent possible.
- M1 : Oil and Gas: “BLM administered lands will remain open to oil and gas leasing and exploration.” This leasing decision is subject to “the provisions contained in referenced mitigation guidelines, developed to standardize the wording used by BLM in Wyoming.” The original lease for the project area, issued in 1942, contains no special lease stipulations.
- SWA 2: Surface Water Protection : For the protection of surface water, surface development will be prohibited in the following areas: within ¼ mile of the North Platte River; within 500 feet of live streams, lakes, reservoirs, and canals and associated riparian habitat; and within 500 feet of water wells, springs, or artesian and flowing wells. These restrictions, including the restriction on intermittent and ephemeral streams described below, may be waived in writing by the Authorized Officer if potential impacts can be acceptably mitigated. The ¼ mile limitation is not to be waived on the Trappers Route tracts, but it does not apply to recreation facilities. Surface development proposals that involve intermittent and ephemeral streams (as identified on USGS 7 1/2 minute topographic maps) will be evaluated, and site-specific mitigation will be applied as necessary, or the development will be moved a sufficient distance to ensure natural drainage in integrity. This restriction applies to intermittent streams and well-defined ephemeral streams where watershed conditions indicate that the potential exists for the stream to carry sufficient quantities of water to result in damage to surface facilities or to dike channels.
- WL2/WL3 : Antelope and Deer Habitat Management: Surface development in antelope and deer critical winter ranges is restricted from November 15 through April 30. No critical habitats for deer or antelope were identified in the project area.
- WL7 : Raptors: Where surface disturbance proposals threaten the active nests of high federal or state interest raptor species, the PRRA will designate a suitable biologic buffer zone around the nests or nests where no surface development is permitted during the nesting season. Species identified jointly by the BLM, the US Fish and Wildlife Service, and the Wyoming Game and Fish Department as high interest are Golden Eagle, Red Tailed Hawk and Ferruginous Hawk. An active nest is defined as one that had been used at least once during the previous three years.

The proposed action is in conformance with BLM planning, and is consistent with local planning and zoning.

1.5 Relationship to Statutes, Regulations and Other Plans

1.5.1 NEPA Compliance

The proposed project has been analyzed in accordance with the requirements of the National Environmental Policy Act (NEPA), as amended. To comply with NEPA and the Council on Environmental Quality (CEQ) regulations, which implement NEPA, the BLM is required to prepare an environmental analysis. This environmental assessment (EA) serves several purposes.

- It provides the public and government agencies with information about the potential environmental consequences of the project and alternatives;
- It identifies all practicable means to avoid or minimize environmental harm from the project and alternatives;
- It provides the responsible official with information with which to make an informed decision regarding the project.

NEPA requires federal agencies to use a systematic, interdisciplinary approach to ensure the integrated use of natural and social sciences in planning and decision making. Factors considered during the environmental analysis process regarding the Poison Spider project include the following:

- A determination of whether the proposal and alternatives are in conformance with BLM policies, regulations, and approved resource management plan direction.
- A determination of whether the proposal and alternatives are in conformance with policies and regulations of other agencies likely associated with the project.

This EA is not a decision document. It documents the process used to analyze the potential impacts of the proposed action and alternatives and discloses the effects of the proposed action and alternatives to that action. A Decision Record (DR), signed by the BLM Authorized Officer will document the final decision regarding the selected alternative. The BLM will document whether or not significant impacts would occur with implementation of any of the alternatives. If the BLM determines that no significant impacts will occur, a Finding of No Significant Impact (FONSI) Decision Record will be issued. If significant impacts are identified, the BLM may require that an environmental impact statement (EIS) be prepared for the proposed action.

Authority for the proposed action and alternatives is contained in the Mineral Leasing Act (MLA), as amended, the Federal Land Policy Management Act (FLPMA), as amended, and federal regulations contained in 43 CFR 2800 and 3100. Other relevant guidance includes BLM Manual and Handbook sections in the 2800, 3160, and 9113 series.

This EA was prepared by a third party contractor under the direction of the BLM CFO.

1.6 Authorizing Actions

Some of the federal, state, county, and local actions required to implement the Poison Spider project are listed in Table 1-1.

Table 1-1 Federal, State, and County Authorizing Actions

Agency	Nature of Action
DEPARTMENT OF THE INTERIOR	
Bureau of Land Management, Casper Field Office	NEPA compliance Approval of APDs (shaft, drill stations, disposal wells) Approval of Sundry Notices
US Fish and Wildlife Service	Coordination, consultation, and impact review on federally listed or proposed for listing, threatened or endangered species of fish, wildlife, and plants.
DEPARTMENT OF LABOR	
Mine Safety and Health Administration	Mine inspection to ensure conformance with all laws, rules and regulations in regard to health and safety (30 CFR 57.22003)
ENVIRONMENTAL PROTECTION AGENCY	
	Spill Prevention Control and Countermeasures (SPCC) Plan. Regulate hazardous waste treatment, storage, and /or disposal.
NATRONA COUNTY	
Road and Bridge Department	Assure county roads are maintained as appropriate for service.
Local Emergency Response Office (LEPC)	Provide EPCRA (Community Right-to-Know) coordination and planning
WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY	
Air Quality Division	New Source Review (NSR) Permit: all pollution emission sources, including compressor engines and portable diesel and gas generators. Require conformance with all ambient air quality standards.
Water Quality Division	National Pollution Discharge Elimination System (WYPDES) permit storm water runoff. Conformance with all surface water standards; Air Quality permit to construct and permit to operate. Administrative approval for discharge of hydrostatic test water.
Solid and Hazardous Waste Division	Require compliance with Resource Conservation and Recovery Act and CERCLA regulatory

	programs, and Wyoming Solid Waste regulations.
WYOMING DEPARTMENT OF TRANSPORTATION	
	Conformance with applicable size and weight limits for trucks.
WYOMING DIVISION OF MINE INSPECTIONS AND SAFETY	
	Mine inspection to ensure conformance with all laws, rules and regulations in regard to health and safety
WYOMING OIL AND GAS CONSERVATION COMMISSION	
	<p>Primary authority for drilling on state and privately held mineral resources and secondary authority for drilling on federal lands.</p> <p>Authority to allow or prohibit flaring or venting of gas on private or state owned minerals</p> <p>Permit produced water injection and disposal wells.</p> <p>Regulate disposal of drilling fluids from reserve pits.</p> <p>Directional drilling.</p> <p>Approve the Applications for Permit to Drill for the wells from each drilling station, the shaft and tunnel construction and to determine appropriate spacing for the recovery of the oil resource.</p> <p>Approve the Plan of Development (POD) boundary and well spacing for the project.</p> <p>Approve the Class II injection wells, drilled for the management of produced water.</p>
WYOMING STATE ENGINEER'S OFFICE	
	<p>Issue permits to appropriate groundwater and surface water.</p> <p>Issue temporary water rights for construction permits to appropriate surface water</p>
WYOMING STATE HISTORIC PRESERVATION OFFICE	
	Consultation concerning identification, evaluation, assessments effect and treatment of adverse effects on historic properties.
WYOMING STATE DIVISION OF MINE SAFETY AND INSPECTIONS	
	Provide regulatory oversight and standards for mining safety.

1.7 Scoping and Issues Identification

In accordance with NEPA and Council of Environmental Quality regulations, public scoping was not initiated on this project as it because it is entirely contained within a producing oil field and constitutes an enhanced oil recovery project. All project-related NOS/APD submittals are posted

for public review for 30 days. The EA and the FONSI/DR for the project will also be available for review in the CFO.

Internal BLM scoping led to the identification of the following issues and concerns associated with the proposed action:

- Project impacts to the surface water (Poison Spider Creek and Oil Camp Spring) and groundwater resources, specifically water quality and quantity.
- Impacts to wildlife and their habitats.
- Increased traffic and associated impacts on existing county roads.
- Emissions from shaft and tunnel construction, and production operations, and power generation equipment.
- Noise from the construction operation and operation of the tunnel vent.
- Reclamation of disturbed areas.
- Social and economic impact to local communities and landowners.
- Effects to cultural resources.

2.0 Proposed Action and Alternatives

The basic goal in formulating alternatives is to identify combinations of management practices for, and uses of, the public lands and resources. Alternative courses of action must be considered and assessed whenever there are unresolved conflicts for a project involving alternative use of resources or options offering meaningful differences in environmental impacts. This chapter describes the RWP Proposed Action to develop an underground-access oil recovery (UAOR) facility in the Poison Spider Field (PSF) west of Casper. The Proposed Action and the No Action alternative are analyzed in detail; one additional alternative was considered but not analyzed in detail in this document.

2.1. Proposed Action, with Additional Mitigation

2.1.1 Proposed Action - Introduction

RWP plans to produce the remaining reserves in place on its leased holdings in the PSF through an enhanced oil recovery (EOR) technique using underground-access gravity drainage (UAGD) which will minimize surface disturbance while maximizing oil recovery using the proposed underground access technique. The entire underground access project area (service facilities, main shaft, access roads and ventilation shafts) consists of approximately 17.0 acres of new surface disturbance within the 560-acre lease area. If implemented the Proposed Action will be completed in approximately 3 years; RWP predicts it will take 12-18 months to complete the shaft and tunnel construction and up to 18 months to fully complete well development although actual development time could be extended as new reservoir data is acquired or market conditions change. The productive life of the project is estimated to be 20 years with final reclamation achieved five years (depending on weather) after plugging the wells, sealing the shaft, and removing all surface equipment.

The Proposed Action includes continued operation of the existing PSF while developing the shaft and tunnel, drilling and completing underground wells, drilling and completing additional water injection wells, and constructing the Service Facility which comprises a shop, office and production facility. Concurrent with the development of the underground project RWP will begin decommissioning unnecessary structures and reclaiming existing surface disturbance. Once the underground access project has achieved oil production rates at least comparable to the existing conventional operation the remaining surface production infrastructure will be decommissioned and reclaimed. The proposed Reclamation Plan, Appendix A, provides a time line for decommissioning surface facilities.

Figure 1-2 shows the existing production operations in the PSF and the Proposed Action including access roads, the shaft entrance, pipelines (crude oil and water), power lines, and a Service Facility for production separation and support facilities, stockpiles and existing surface facilities in the Poison Spider Field. Figure 1-3 is an enhanced diagram of the shaft and service facilities layout as proposed by RWP.

The Reclamation Plan found in Appendix A provides the time line for decommissioning surface facilities. Portions of the existing road system will be maintained or improved while the majority of the roads will be eliminated. Inactive wells will be plugged and abandoned, equipment will be removed, the sites re-contoured and re-seeded. A similar process will be implemented relative to the housing camp and other structures. The existing buildings will be demolished or moved

from the site, foundations crushed and backfilled, and the area re-contoured and re-seeded. This process will be repeated across the site until the existing 31.37 acres of existing disturbance has been reclaimed and replaced with the approximately 8.6 acres of life of project (LOP) disturbance required to support the new underground operation.

All facilities will be fenced for security and public safety. All applicable and appropriate state and federal regulations will be followed including those of the Mine Safety and Health Administration (MSHA) and the Wyoming Division of Mine Inspections and Safety.

The Poison Spider Plan of Development (POD) has been modified from its original submittal to the BLM in order to meet natural resource and environmental protection requirements identified by the BLM, and as a result of the interdisciplinary review and onsite field inspections.

2.1.2 Access

The Service Facility and shaft area will be located immediately north of the Poison Spider Road (County Road 201) on either side of the existing Oil Camp Road. Oil Camp Road will be widened and improved to accommodate haulage equipment and to maintain access to the planned vent raise and injection wells. Pipelines from the shaft to the Service Facility will be installed under Oil Camp Road. Injection wells will be accessed via existing oil field roads or are located within other operating areas of the project as indicated on Figure 1-2. Produced water pipelines will be installed along the Oil Camp Road and along access roads to proposed injection wells, WD-3 and WD-4. Electricity needed for the project will be provided by upgrading the existing system currently on the lease.

Field roads will be maintained with a 10 foot driving surface; power lines will be adjacent to the roads, and produced water lines will be buried in the road corridor. The pipeline corridors, road ditches and borrow areas will be reclaimed during the first available growing season after construction.

Existing oil field roads will be used to the extent possible. Oil Camp Road will be upgraded, resulting in approximately 0.9 acres of long term or life of project (LOP) disturbance. All road maintenance and construction will conform to BLM Gold Book standards.

RWP will work with the Natrona County Road and Bridge Department regarding road maintenance.

2.1.3 Shaft Area

The shaft area is located on BLM managed land and in the Wind River Formation at the surface. The federal Mine Safety and Health Administration (MSHA) has regulatory authority for safety of all activities at the Poison Spider facility. Rock Well Petroleum LLC is registered under MSHA and is fully, legally accountable for compliance with all standards of the federal Mine Safety and Health Act. RWP likewise will be accountable for compliance with all standards of the State of Wyoming's Division of Mine Safety and Inspections.

As stated in 30 CFR 57.22003, Petroleum Mines, Category VB will be applicable to the Proposed Action since RWP will operate outside of and drill into an oil reservoir. MSHA has classifications ranging from IA to VB. Each classification denotes what type of mine being operated with an atmosphere that contains methane or has the potential to contain methane. Should a concentration of methane (CH₄) above 0.25% in atmosphere, verified by chemical

analysis, be detected the operation would immediately will be reclassified VA. RWP is prepared to comply with a VA classification if necessary.

The shaft area is located approximately 2250 feet north of Poison Spider Creek. Poison Spider Creek will be protected by a vegetated buffer zone of approximately 2000 feet, implementation of storm water best management practices (BMPs), and secondary containment around all oil containers.

The disturbance area at the shaft will be approximately 7.5 acres; approximately 4.0 acres may be available for interim reclamation resulting in 3.5-acres of LOP disturbance. Clearing and site preparation will be done using conventional construction and excavation equipment such as backhoe, loaders and scrapers, etc. The shaft area will include spoils stockpiles, shaft drilling reserve pit, portable storage area, temporary power generator, up to 10,000 gallons of diesel fuel storage, electrical transformer, exhaust fan, light plant and parking/equipment staging area. In the short term the area will also contain an air compressor and a bore hole drilling closed mud system with a small lined and netted cuttings pit. The air compressor, mud system and pits will be removed from the site once tunnel and well development activities have been completed. It is expected that high voltage electrical power will be brought to the shaft area replacing the portable generator. All fuel/oil storage will be provided with secondary containment and be managed pursuant to a Spill Prevention Countermeasure and Control (SPCC) Plan (40 CFR 112).

Shaft construction activities will be audible and visible to anyone traveling on Poison Spider Road. Tunnel construction and production operations will not be audible or visible from the surface with the exception of moving waste rock (spoils) from the adframe opening to the stockpile and the movement of crews and materials. The tunnel headframe will be visible throughout the life of the project.

Shaft and tunnel construction will be permitted through the BLM and the WOGCC Application for Permit to Drill (APD) process.

2.1.3.1 Shaft Construction

Heavy equipment will be used to construct the shaft, including a large bore drill rig, bulldozers, loaders, motor graders, excavators, scrapers, crushers, water trucks, fuel trucks, rock drilling equipment, and haul trucks.

The 12 foot 6 inch diameter shaft will be constructed using a large diameter, electric powered drilling rig or shaft borer (see Photo 2-1). Drilling will continue 24 hours a day until the shaft is 1600 feet deep. Native material drilling mud will be used and recycled to a lined reserve pit located off the shaft construction pad. The reserve pit for shaft drilling has a design capacity of roughly 10.5 acre-ft with a 3 ft free board. Drilling water will be reused to the maximum extent possible. Drilling fluids will be allowed to dry on site before backfilling as allowed by BLM and WOGCC regulations.

Drilling will penetrate both the shallow water zone at approximately 730 feet, and the Sundance, a hydrocarbon zone at approximately 1300 feet. Grout curtains will be placed over both these formations to protect them during continued drilling operations. A grout curtain is constructed by pressure-injecting grout directly into the soil at closely spaced intervals.



Photo 2-1 Shaft Bore Drilling Unit

Upon reaching total depth, the shaft will be lined with prefabricated sections of welded steel casing. These sections will extend to total depth and are stacked and welded together to case the entire shaft. Once in place, cement is injected behind the casing to attach the casing to the shaft wall. When shaft construction is completed a headframe and hoist system will be installed to facilitate material and crew movements within the shaft. The headframe is approximately 80 feet tall. Photo 2-2 provides an example of a headframe.



Photo 2-2 Headframe Example

Tunnel construction will commence utilizing drill and blast methods once the shaft is completed. Approximately 50 linear feet of tunnel will be constructed using this approach. A subsurface room of sufficient size to stage tunneling equipment will also be constructed. The staging area will be used throughout the life of the project to maintain and assemble equipment needed at various stages of development. Fuel and new and used vehicle maintenance fluids will be maintained in limited quantities in this area. Fuel will be supplied to an underground storage tank via piping attached to the casing wall or brought in bulk packaging on the "skip". A "skip" is a device that is used to raise and lower people and materials within the shaft. Used vehicle maintenance fluids will be lifted back to the surface for appropriate management.

The casing provides support for the installation and attachment of the utilities needed underground, including electricity, water, production pipelines, ventilation ducts and the lift or "skip". Figure 2-1 indicates the proposed placement of these features in the shaft cross section.

RWP will implement measures that preclude the public from entering work areas such as fencing and lighting. Warning and traffic control signs will be installed as necessary. Shaft construction is expected to be completed within 12-18 months.

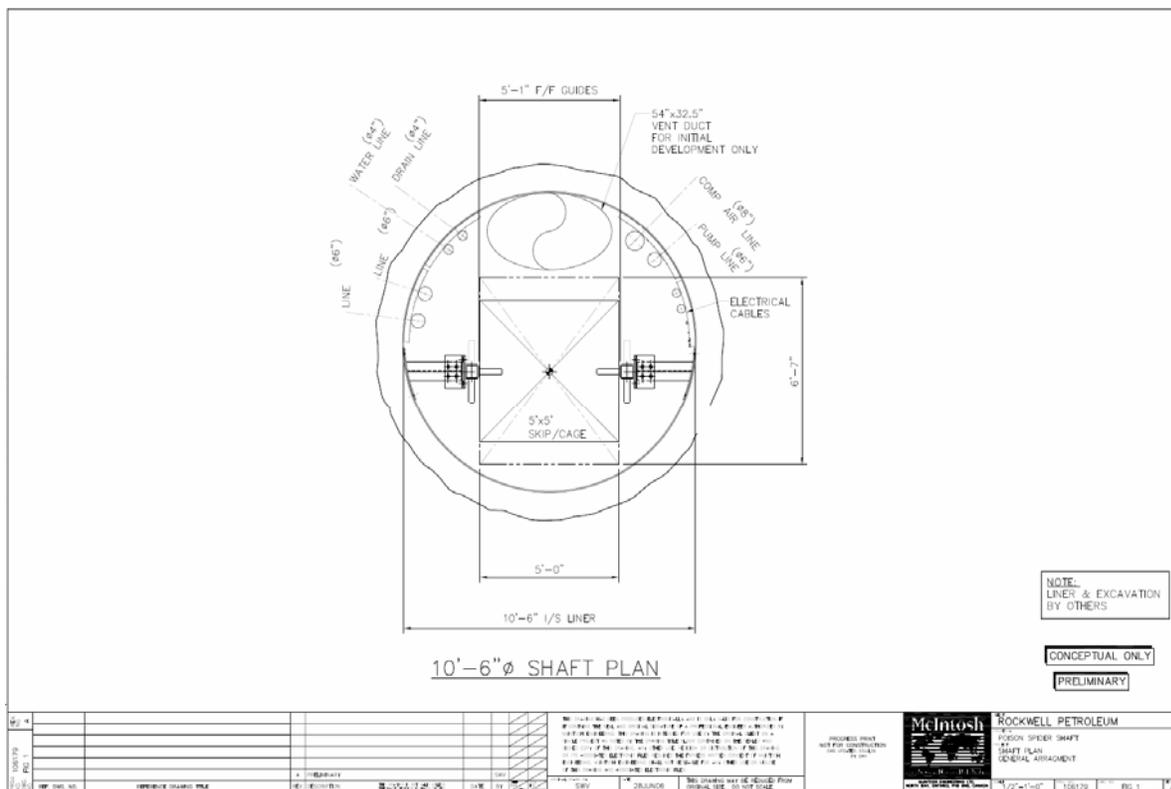


Figure 2-1 Completed Shaft Cross Section and Utility Attachment

2.1.3.2 Tunnel Construction

Once the shaft and subsurface staging area are constructed equipment components will be lowered into the shaft either by a crane or on the skip depending on the size of the piece being moved. The equipment (loader, haul trucks, roadheader, drill, etc) will be re-assembled in the staging area and put into service constructing the tunnel. The tunnel will be approximately 2000 feet long, 12 feet high and 14 feet wide and will be constructed using a roadheader thereby minimizing the need for blasting. Initially, electrical power for the roadheader will be supplied by two diesel fueled 1-mW, 4160-V/60-hz/3-phase portable electric power generator sets set on the surface. High voltage power will eventually be extended to the shaft area from the service located on the northern portion of the lease area. The tunnel roof will be supported using standard mining techniques including roof bolts, reinforcing mesh, and shotcrete. Excavated material will be removed from the tunnel area using a loader and dump trucks. The removed spoil material will then be transported up the shaft on the skip to the surface handling area.

During construction of the tunnel, the working face will be ventilated by a temporary fan & duct system, per standard industry practice and MSHA requirements. A permanent vent raise/escapeway (emergency exit) for fresh air and emergency escape will be drilled from the surface (as located on Figure 2-2). This shaft will be equipped with a rescue hoist or “cage” for emergency evacuation purposes.

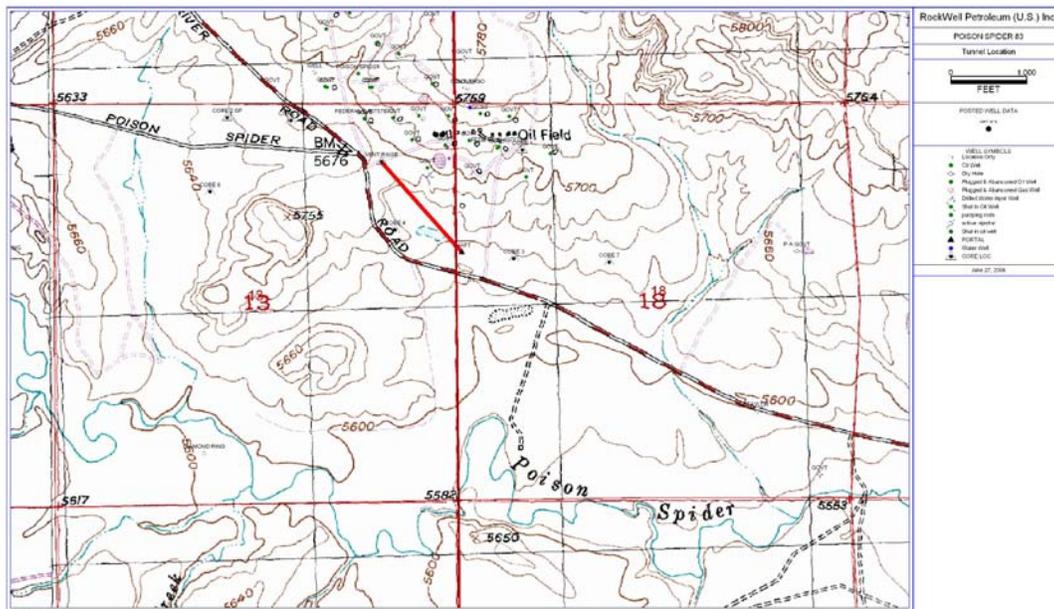


Figure 2-2 Tunnel Configuration and Vent Raise Location

Key: vent raise tunnel

Material removed during tunnel construction will be stockpiled for use in the reclamation of the existing oil field disturbance as detailed in the Reclamation Plan (Appendix A). The stockpiles will be enlarged and decreased over the life of the reclamation and tunnel construction phases of the Proposed Action. Material not needed for the near term reclamation project and that needed for final closure of the shaft will be re-contoured, stabilized and seeded.

2.1.3.3 Drilling Operations

Once the shaft is completed and the tunnel is approximately 500 feet long drill stations will be constructed. Current plans anticipate up to 10 drill stations will be constructed along the tunnel alignment. The exact length and configuration of each drill station will be determined by reservoir characteristics, geology, well design and equipment requirements. Initial drill station design indicates an area approximately 12 feet high, 14 feet wide and 40 feet long will be required for an estimated 100 well bores per station. Each drill station will be permitted through the BLM and WOGCC APD process, the APD application will specify the center point of the station and estimated number and location of bore holes within the station. The surveyed location of each well head and the total depth of each well in each station will be provided to the agencies following completion of the drill station.

Each of the drill stations will contain a fluid handling system to send drilling fluids and cuttings between the pneumatic drilling unit (Figure 2-3) and the closed mud system (see Figure 2-4) located within the shaft of operations. The mud will be transported via two inch steel piping coupled with 3000 psi threaded flanges; a 25 horsepower pump will drive the mud to surface system. Recycled drilling fluids and make-up water will be returned to the drilling unit in a similar configuration of piping and pumps.

Water for drilling will initially be obtained from the supply well and produced water from existing conventional operations at the camp and later from a well drilled within the Service Facility. As the project progresses and production volumes increase, produced water may be used for drilling make-up water. Use of a closed mud system will allow maximum re-use and conservation of water. Spent drilling fluids will be managed as required by BLM and WOGCC waste management regulations. The earthen cuttings pits will be fenced and netted to prevent entry by wildlife.

Blowout preventers (BOPs) and related well control equipment will be installed and maintained during the borehole drilling. The Poison Spider Drilling Prognosis which includes a detailed discussion of Pressure Control Equipment is found in Appendix B. The total number and length of drainage holes to be drilled at each station will depend on the drilling architecture to be derived from information gathered during initial drilling. All fluids will be contained in piping and closed vessels. The drainage boreholes, drilled five to six inches in diameter, will be set with 4 inch surface casing and three inch production casing, cemented from the tunnel walls (ribs) and ceiling (back) up into the oil reservoir (see Figure 2-5, underground facilities). Depending on reservoir rock quality, the boreholes may be completed with perforated casing or left uncased (open hole) in the producing formation. Drilling is expected to be completed within 18 months.

ONRAM 1000/3

DIAMOND CORE DRILL

TECHNICAL SPECIFICATION

ONRAM 1000/3 is a new version of the ONRAM model that was originally designed in 1983. Over the years a number of re-designs, modifications, improvements and adaptations to various applications have taken place. This process goes on continuously in co-operation between Manufacturer and User.

A large number of options are available to match the most varied drilling conditions. The ONRAM 1000/3 has proven itself in a number of field applications to be the most reliable and economic drill for the general drilling contractor or mine, in both surface and underground applications.

Hagby-Asahi AB has a world wide net of Distributors, Service and Spare Part Stocking available to ONRAM users.

Some applications where ONRAM 1000/3 has proven its value:

- Horizontal de-watering drilling H size to 330 m in a mine de-watering project
- Wireline coring 46 mm to over 1200 m
- High accuracy coring \varnothing 222 mm in vertical pillars in a construction project
- Coring \varnothing 131 mm and DTH drilling \varnothing 127 mm in harbour quay reinforcement project
- N and B size coring at altitudes over 5500 metres in the Andean Cordillera



Figure 2-3 Drilling Unit Specification
(<http://www.hagbyusa.com/documents/onram10003.pdf>)

MUD SYSTEM PROCESS FLOW DIAGRAM

OVERVIEW

Closed loop system circulates clean mud to the drill station, then mud and outtings to the surface.

All mud is mixed and treated on the surface.

Circulates continuously.

Feeds Hagby beam-pump in drill station.

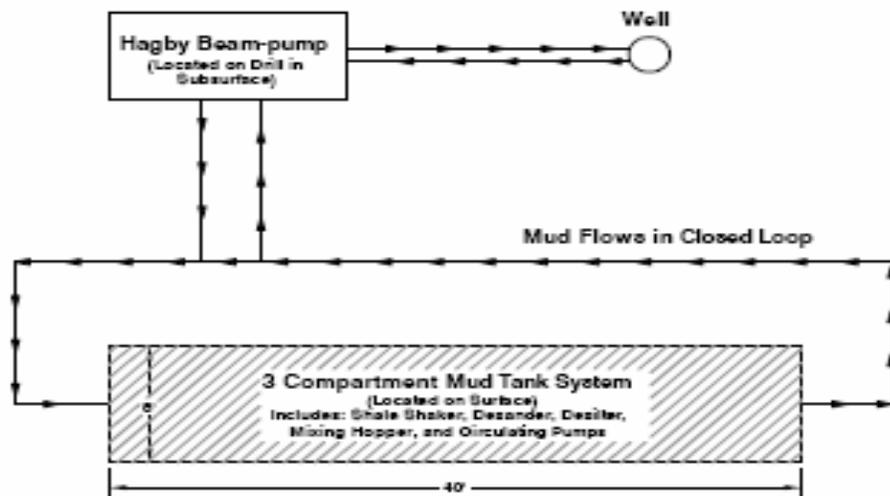


Figure 2-4 Mud System Flow Diagram

2.1.3.4 Well Completions

Standard well completions are planned; well completions using stimulation and fracturing are not anticipated. The inverted nature of the wells provides gravity flow from the well bore through the well head to the receiver/header. The standard well completion design is illustrated in Figure 2-5.

2.1.4 Underground Production Operations

The drill stations become the production stations upon completion of the boreholes. Each station will contain an oil/water collection or fluids handling system (Figure 2-5) including piping and well head connections, receiver/headers, pumps and atmospheric monitoring systems.

Produced fluids (oil and water) from the boreholes will be collected via 3-inch casing cemented in the tunnel walls (ribs) and ceiling (back). From there, produced fluid will flow through a four inch well head which can be closed allowing each well head to be isolated from the station and control valves. From the well head connection, produced fluid will flow through a 1-inch diameter steel lined hydraulic flex line that will be connected to a 1-inch diameter steel pipe. The pipe(s) will be installed on a pipe rack.

From the pipe, the oil/water will flow to a receiver header (Figure 2-5) for collection prior to being pumped to the surface facilities. Each well head connection will have fire safe valves which automatically fail shut in the event of a fire thereby preventing crude oil and related hydrocarbons from feeding a fire.

The receiver header, a proprietary design, will allow monitoring of the flow rate of any or all of the well heads through manually actuated ball valves and flow meters installed in-line. Up to 50-well head connections may be connected and monitored at an individual receiver header. The receiver headers are approximately 12-feet tall and have a central pressure vessel 3-feet in diameter, constructed to AMSE Class 900 standards and are capable of withstanding up to 1440-psig pressure. Working pressure is expected to be no more than 810-psig. A photo of this unit is found as Photo 2-3.

Each well head connection will have a pneumatically actuated, fire-safe, fail-safe (fail close) valve that requires instrument air to maintain in the "OPEN" position. The well head connections will be tied to sensors that will automatically close this control valve in the event of a high temperature and/or a high carbon monoxide (CO) concentration alarm – indicative of fire. By closing this valve, it is expected to mitigate the potential of providing additional fuel to a fire in the drill stations that would cause the flex hose line to melt.

From the receiver headers, the oil/water will be pumped through a manifold system to the surface facilities. There are two pumps per station, providing redundancy in the event of failure, with the backup pump automatically actuated by the control system. Depending upon design considerations booster pumps, located along the tunnel (drift), may also be installed. The station pumps may be operated in parallel in order to increase flow rate. Pump sizing is approximately 600-gpm per pump. The oil/water stream will be pumped to surface in 4-inch steel pipe.

In each drill station a sump pump will be installed at the lowest point in the event of equipment failure and spills. The sump pump discharge will be connected back into the fluid handling system and pumped to the surface. In addition, there will be sump pumps located as needed

along the tunnel. Any tunnel water will be collected and pumped to the surface for collection in the produced water tanks via this system.

The drill stations will be physically separated from the tunnel by a 2-hour fire barrier consisting of a combination of 90-minute UL Listed roll-up doors and a standard Uniform Building Code (UBC) 2-hour steel-stud and drywall fire wall.

The instrument air system serving the control valves will be installed in the Electrical Room (located on the surface) and consists of two compressors, an air dryer and storage tank (per Specification 221514 of the standard RWP design specifications).

2.1.5 Service Facility and Tank Battery

2.1.5.1 Service Facility

The Service Facility is located on 4 acres adjacent to and east of the shaft and Oil Camp Road. This area will provide support to the shaft and tunnel construction, and the drilling and production operations. Buildings to be constructed include a pole barn for equipment storage and a shop. Three temporary trailers will be on site and serve as an office, change room and break area. The change room and break area trailers are expected to be removed upon completion of development and construction/reclamation activities. The production tank battery and water injection plant will also be located at the Service Facility, see Figure 1-3.

This site will also include a Natrona County and WDEQ approved septic system; a third party will provide trash pick-up. The water supply system currently in use at the Camp will be used to supply water needs for the operations. Potable water will be trucked to the site and stored in a designated and marked tank. An additional water supply well may be permitted through the WSEO and drilled in the Service Facility. The area will be fenced and lighted for safety and security.

Topsoil will be stripped, stockpiled, and stabilized for use during site reclamation. Interim reclamation will be minimal due to the amount of equipment located on this site.

Permanent facilities will be painted an appropriate color selected from the standard list for minimum visual intrusion such as Carlsbad Canyon or Desert Brown except for equipment required to be painted a contrasting color for safety.



Photo 2-3 Underground Produced Fluid Manifold

2.1.5.2. Tank Battery

Once the oil/water piping exits the shaft opening the piping will be changed to 4 inch flexible steel pipe buried approximately 4-feet deep from the shaft to the service facility. The Service Facility layout is illustrated in Figure 1-3 and the flow diagram of the surface facilities is found on Figure 2-5. The piping will be routed to an 8 X 45 foot free water knockout (FWK). Water, oil/water and methane from the FWK will be routed to an 8 X 45 foot heater treater. From the heater treater the separated crude oil and water will be routed to the tank battery. There will be approximately 6-400 bbl welded steel oil storage tanks on site. From the tanks, the crude oil will be trucked to market in Casper. Initially, produced water will be stored in 2-500 bbl welded steel tanks prior to injection into the Tensleep or Sundance formations. As production rates increase,

additional oil and water storage capacity will be added in the Service Area. Produced gas will be flared, vented to atmosphere or recovered for on site fuel if volumes are adequate.

Permanent facilities will be painted an appropriate color selected from the standard list or minimum visual intrusion such as Carlsbad Canyon or Desert Brown except for equipment required to be painted a contrasting color for safety.

2.1.5.3 Water Injection

Four injection wells will be required to dispose of the anticipated 20,000 bbl of water produced daily at peak production. One well (Federal 8) in the field is currently permitted and operating as a water disposal well completed in the Sundance Formation at a depth of 1530 feet. Three new wells will be permitted through WOGCC and BLM for disposal into the Tensleep at a depth of approximately 2600 feet. These wells will be located at the Service Facility, Shaft Area and at the location of existing Federal 9 oil well. The injection well locations were selected to take advantage of areas of previous and planned disturbance in an effort to further minimize the total amount of surface disturbance and scattering of facilities throughout the field, see Figure 1-2. These 5 ½ inch diameter wells will be drilled using a conventional surface rig supported by a gel based pit mud system; drilling mud will be allowed to dry and the pits backfilled and buried in place as allowed by BLM and WOGCC rules. An Application for Permit to Drill (APD) for each water disposal well will be submitted for approval to the CFO.

A water injection plant, comprised of a manifold header and injection pump, will be constructed adjacent to the water storage tanks at the tank battery located in the Service Facility. Six inch steel water injection lines will be installed in the same corridor as the production pipeline and in the access road borrow ditches to the injection wells. The existing electrical system will be modified to provide electricity to injection pumps at each well site.

2.1.6 Mine Ventilation

2.1.6.1 Mining Operations Ventilation

During construction, the working face of the tunnel will be ventilated by a temporary fan and duct system, per standard industry practice and MSHA requirements.

2.1.6.2 Vent Shaft

Less than 0.5 acres of disturbance will occur at the vent raise which will be located northwest of the shaft area and adjacent to the existing field road. Construction activities will be short term, and upgrades to the existing access road will not be required. The six foot diameter vent shaft will be drilled to approximately 1400 feet with a “blind bore” drilling rig. A 20 foot square pad and reserve pit will be constructed at this site. Mud for this boring will be water and native mud which will be left on site to dry prior to burial in place.

2.1.6.3 Ventilation System

The ventilation system will draw fresh outside air from the surface at the vent shaft and exhausting it out the main shaft. A surface ventilation house, located at the vent raise, will contain a 100,000 cubic feet per minute (cfm) capacity ventilation system. The surface mounted fans will force air via the 6 foot diameter vertical shaft to the main tunnel. Ventilation air to each drill station will be provided by MSHA permissible auxiliary fans, typically one per station, forcing up to 10,000-cfm of fresh air to each station. Each drill station will have a 4,000-cfm capacity auxiliary fan. The ducting providing fresh air to the mine will be constructed with a “weak wall” as required by MSHA in order to dissipate the energy incurred from a shockwave migrating to the surface in order to minimize fan system damage.

The fans at the vent raise will be muffled and surrounded with noise attenuating barriers to reduce noise. Unmuffled the fans will produce 85 to 95 dBA noise levels, attenuation mitigation should reduce that by approximately 35 to 40%. The vent raise area will be fenced to prevent unauthorized entry and access by wildlife. The vent end will be directed away from public roadways and raptor nests. Reclamation of surface disturbance will take place upon completion of site work. Permanent facilities will be painted an appropriate color selected from the standard list for minimum visual intrusion such as Carlsbad Canyon or Desert Brown except for equipment required to be painted a contrasting color for safety. An example of ventilation system surface equipment is provided in Photo 2-4.

2.1.6.4 Vent Shaft Escapeway

The ventilation raise also serves as the second MSHA and State required escape way. The ventilation house will contain a rescue hoist or "cage" which can be lowered into the shaft to the tunnel via an electric hoist located on the surface. A backup diesel power generator will be maintained in the ventilation house in the event of power failure.



Photo 2-4 Ventilation System Surface Equipment Example

2.1.7 Electrical Power

2.1.7.1 Electrical Service

The Poison Spider Oil Field has electrical service to the existing operations. This will be reduced during the reclamation phase of the Proposed Action as existing well sites are plugged, abandoned and reclaimed. Power will be needed at the vent raise, the injection wells, the Service Facility and the shaft. High voltage power will be brought to the shaft area electrical transformer to provide power for the shaft drilling unit and the roadheader.

2.1.7.2 Power Generation

A 52 kW backup diesel power generator will be housed on site to provide emergency power for lighting and the vent raise in the event of a power failure. The generator will have a dedicated 100 gallon fuel tank located outside the generator building.

Until high voltage power can be extended to the shaft area from the existing electrical service, power for the shaft drilling unit and the roadheader will be supplied by two diesel fueled 1-mW, 4160-V/60-hz/3-phase portable electric power generator sets.

Both generators will be fitted with emissions control equipment as required by the WDEQ/AQD. Fuel for the generators will be stored on site. All generator fuel storage tanks will be set within secondary containment and be covered by the Poison Spider SPCC plan.

2.1.7.3 Power Lines

The existing overhead power lines will be taken out of service as the reclamation of existing disturbance progresses. At the same time power lines will be installed and re-routed to accommodate the new field features including the Service Facility, injection wells, vent raise and shaft area. The overhead electrical distribution power line will be constructed and installed using standard utility construction equipment. No new surface disturbance in the form of blading or grading is anticipated. All new electrical poles will have Raptor protection and a roosting deterrent designed into the structure, consistent with Avian Power Line Interaction Committee (APLIC) standards (APLIC 1996).

2.1.8 Flowlines

Produced fluids (crude oil and water) will be carried in 4 inch steel lines from the drilling stations via a manifold system through the tunnel to the shaft. Oil will be pumped from the tunnel level up the shaft to the surface and on to the Service Facility for separation and management. The line from the shaft to the service facility will be buried below frost depth.

Produced water will be transported in 6 inch steel lines to the injection wells.

All flowlines will parallel the access road or be contained within the shaft and service area footprints and will be buried below frost depth.

2.1.9 Waste Management and Fuel Storage

All oil, produced water and fuel storage will be set in secondary containment and be managed pursuant to a Spill Prevention Control and Countermeasure Plan (SPCC) plan.

Reserve pit cuttings and fluids will either be managed on site or hauled to commercial disposal as required by BLM and WOGCC regulations. Shafts will be drilled with a native mud which will be left on site to dry prior to burial. Mud and cuttings associated with the well bore drilling project will be managed through a closed system for maximum recycling and water conservation. Mud and cuttings from the injection well drilling program will be recycled to the extent possible and otherwise allowed to dry prior to burial on site.

The service facility will have a Natrona County and WDEQ approved septic system and periodic trash pick-up. No burning of domestic trash/refuse will be allowed. Other open burning will be

conducted as allowed in the WDEQ/AQD Chapter 10 regulations. Scrap will be taken to a commercial facility and recycled.

Petroleum products and produced fluids spills (crude oil and water) will be cleaned up in accordance with BLM, DEQ, WOGCC, and EPA regulations. Petroleum contaminated soils will be managed on site to the extent possible.

Vehicle and equipment maintenance fluids and wastes will be managed through third party contractors or on-site in accordance with WDEQ regulations.

2.1.10 Transportation

2.1.10.1 Transportation of Crude Oil

It is expected that crude oil will continue to be transported via tanker truck as is the current practice. The crude oil is hauled to market in Casper. Access to the project area is from Casper, west on Poison Spider Road (Natrona County Road 201).

2.1.10.2 Traffic Estimates and Work Force Loading

Estimated traffic requirements for field development operations are shown in Table 2-1. The TRIP TYPE column lists the various service and supply vehicles that will travel to and from production facilities. The ROUND TRIP FREQUENCY column lists the number of external trips (to and from the project area) and internal trips (within the project area). Drilling and production activity levels may vary over time due to weather and other factors. Following completion of tunnel construction, drilling, and a commissioning period for production, the site and facilities will be monitored and managed remotely; field activity will thus be dramatically reduced as illustrated in the "DURING OPERATION" column. Aside from tanker traffic, the only travel in and out of the site will be for maintenance and repair.

RWP will work with the Natrona County Road and Bridge Department regarding road maintenance.

Table 2-1. Traffic Estimates During Development and Operations

TRIP TYPE	ROUND TRIP FREQUENCY	
	DURING CONSTRUCTION	DURING OPERATION
Project Superintendent	1/day	1/week
Mining Crews/Mechanics	2/day	None
Engineers	3/week	1/week
Testing and operations	2/day	1/day
Supply delivery	3/week	1/month
Oil Tankers	1/week	8/day
Fuel trucks	1 every other day	1/week
BLM I&E Personnel	1/month	1/month
Reclamation Crews	2/day	None
Waste Management Contractor	1/ week	1/week

2.1.11 Reclamation

The RWP Proposed Action for the existing PSF includes three levels of reclamation:

- Reclamation of existing surface damage
- Interim reclamation of new disturbance, and
- Final reclamation of underground access operating areas upon field depletion.

A detailed Reclamation Plan (Appendix A) has been created to facilitate the reclamation of the field. The various aspects of the field reclamation include:

- Reclamation of existing oil field disturbance including non producing wells, abandoned operational areas and unneeded roads,
- Demolition and/or removal of the camp housing,
- Reclamation of areas impacted by past produced water and oil spills,
- Removal of debris and equipment,
- Re-contouring and stabilization of the remaining spoil stock piles to reduce the visual intrusion on the area,
- Plug and abandon and reclaim producing wells once underground development is in place,
- And finally, removal of the RWP infrastructure, closure of the tunnel and shaft and surface reclamation of the shaft and service areas, vent shaft and injection well locations.

The goal of this approach to enhancing the production in the field is to reduce the existing surface disturbance from 31.37 acres scattered across the project area to 17.0 acres short term disturbance in two concentrated areas. See Figure 1-2 for an overview map of the reclamation plan concept.

Reclamation will occur in areas where surface disturbing activities have been completed. The opportunity for interim reclamation at the shaft area could involve reclamation of approximately 4 acres after underground development is completed and the reserve pit is dry; however, reclamation at the Service Facility will be minimal given the small size of the operating area and the anticipated activity at each site. Topsoil stock piles will be seeded and stabilized. The access road barrow ditch, pipeline corridor, injection pipelines, and well sites will be reseeded in the first available planting season following completion of construction activities. Once tunnel construction has been completed and the material needed for other field reclamation tasks has been removed, the remaining spoil will be re-contoured to blend with the surrounding topography, spread with top soil salvaged prior to construction, and reseeded. Erosion control measures will be installed before and after construction in conformance with a Storm Water Pollution Prevention Plan (SWPPP) granted pursuant to the WDEQ/WQD general permit for construction activities greater than five acres. The disturbed areas will be seeded with a certified weed-free seed mix approved by the BLM. Interim reclamation of new disturbance will be completed in the first appropriate growing season. Reclamation of previous disturbance is anticipated to take three to five years to complete.

Following cessation of underground production, production boreholes will be permanently plugged and abandoned. Pipelines will be purged of all combustible products and retired in place or removed, based on BLM approval conditions. All above ground facilities will be removed, and any unsalvageable materials will be disposed of at authorized off-site facilities. Roads will be reclaimed or left in place based on BLM preference. The ventilation raise will be

backfilled with stockpiled spoil, a cement plug and additional soil to ground surface to prevent access and inflow-outflow of water.

The stockpiled spoil from tunnel excavation will be used to backfill the shaft, this will be followed by a cement plug installed near the surface which will be covered by additional soil material.

Water injection wells will be plugged and abandoned per WOGCC and BLM regulations and the locations reclaimed. All disturbed sites will be re-graded, covered with previously salvaged topsoil, and re-seeded. Compacted areas will be thoroughly ripped to a depth of 12 to 18 inches before topsoil is replaced. Remaining spoil will be re-contoured and stabilized as described above. Final reclamation will be completed approximately two to three years following the end of oil production and facility dismantling.

All reclaimed areas will be monitored for success or lack thereof. Two growing seasons after reclamation treatment, all areas with less than 20% success will be evaluated considering soil fertility, seed mix, precipitation rates, etc. These areas will be retreated as appropriate.

In conformance to the WDEQ Storm Water program regulations, monitoring and maintenance of the erosion control BMPs will continue until 70% of pre-construction vegetation has been achieved on disturbed areas.

An Integrated Pest Management Plan will be implemented to manage invasive/noxious weeds in the project area. These management strategies will be incorporated into the pre construction planning and design process for all surface disturbances and will consider all methods available for treatment - chemical, mechanical, cultural, and biological. To the extent practical, RWP will minimize removal of native vegetation during construction. Roads and other disturbed areas will be monitored throughout the LOP to insure that invasive/ noxious weeds are identified and treated. RWP will coordinate these weed control efforts with the BLM and Natrona County Weed and Pest District. RWP will also ensure that pesticide applicators are qualified and appropriately licensed.

2.1.12 Work Force and Timing

Work at the project site is anticipated to occur on a year-round basis. Shaft and tunnel construction should take 12-18 months; drilling will continue for one to two years. Once surface facility construction is completed, one to two years into the project, site activity will generally be limited to the service facility or underground at the shaft with minor amounts of traffic between the two.

During shaft drilling five man crews will work 24 hours a day, with crew changes three times per day. The crew will expand to 10 persons while installing and cementing the shaft liner in place. Tunnel construction requires one crew of 4 to 5 persons and would be changed out two times daily. During well drilling one additional 4-person crew will be changed out twice daily. A two-person maintenance crew will be changed out once a day or as needed.

Construction of the surface facilities will require a variable work force depending on the project phase. Once construction and drilling operations are complete a two-person crew will be on site 24 hours a day. Office, change room and lounge trailers are located at the Service Facility in the event field operators or crews are stranded at the site due to weather.

A variable numbers of reclamation/demolition crews will work at the site for the first three to five years.

2.1.13 Summary of Disturbances

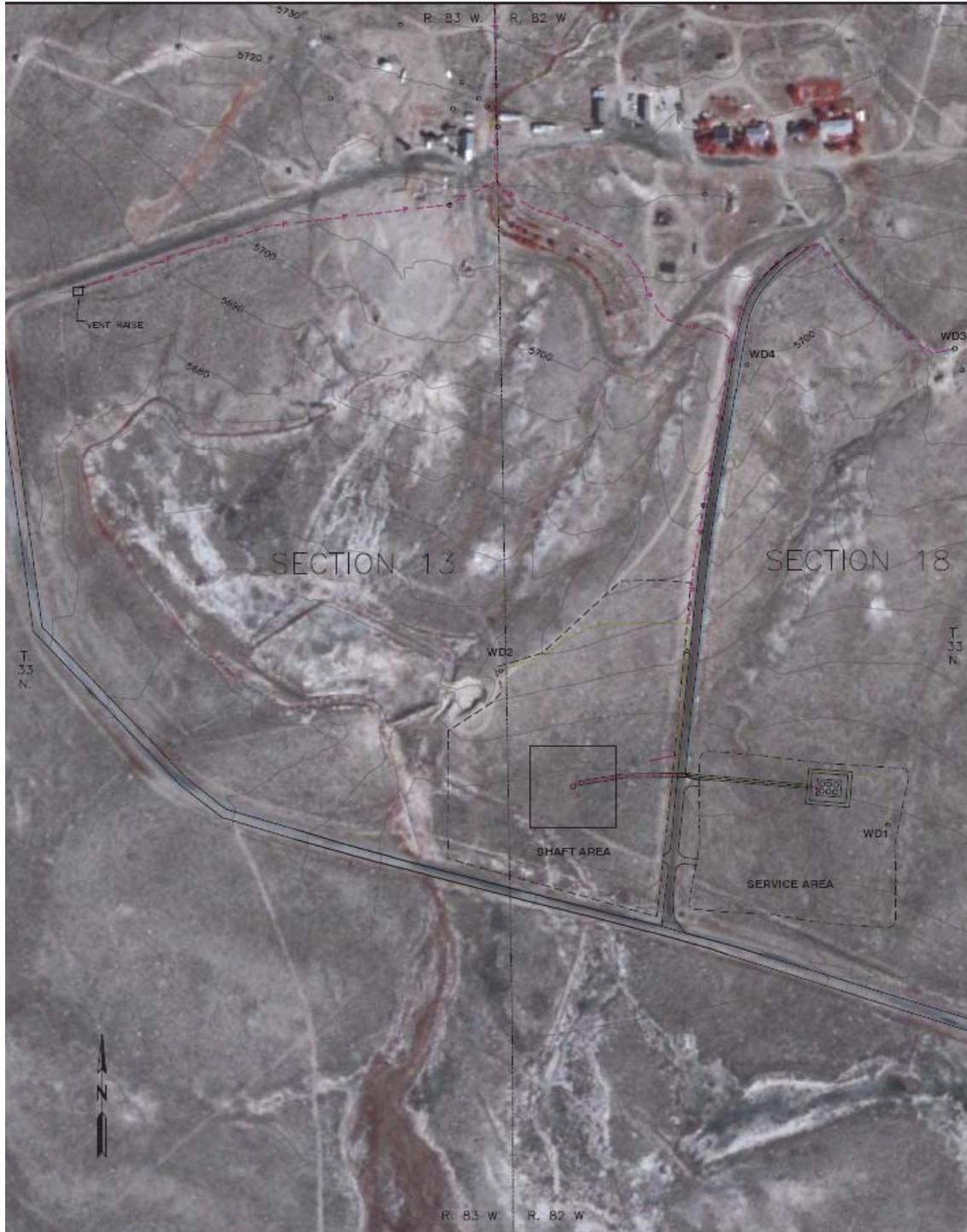
Table 2-2 depicts a summary of areas anticipated to be disturbed by the Proposed Action in the short and long term. Table 2-3 indicates the areas of previous disturbance RWP proposes to reclaim and the time frame in which reclamation will be accomplished. Over the long term the operational disturbance in the field will be limited to that illustrated on Figure 2-6.

Table 2-2 Acreage Summary of Proposed Disturbances Areas

Location	Short Term Disturbance (acres)	Long Term Disturbance (acres)
Shaft Area	7.5	3.5
Pipeline Corridors	0.6	0
Service Facility	4.0	4.0
Road (Oil Camp)	0.6	0.6
Vent Shaft and Access Road	1.0	0.3
Injection Wells WD-3 and WD-4 (pads, access roads, and pipelines)	0.2	0.2
Oil Camp Stockpiles	3.1	
Total disturbance	17.0	8.6

Table 2-3 Acreage Summary Previously Disturbed Areas

Location (see Figure 1-2)	Short Term Disturbance (acres)	Reclamation Time Frame
Poison Spider Camp	16.96	2009-2010
Well Pads	1.12	2009--2010
Well Pad Roads	4.81	2009-2010
Impacted Slope	8.48	2007-2008
Total disturbance	31.37	-0-



LEGEND

○	EXISTING POWER POLE
○	PROPOSED POWER POLE
☆	PROPOSED POWER DROP
WD1 ○	PROPOSED WATER DISPOSAL WELL
—	PROPOSED OVERHEAD POWER
—	PROPOSED WATER DISCHARGE LINE
—	PROPOSED PRODUCED FLUIDS
—	PROPOSED CORRIDOR (WATER, ELEC)
—	PROPOSED CORRIDOR (WATER, ELEC, OIL)

ROCK WELL PETROLEUM, INC.
 POISON SPIDER PROJECT
MAP 5
PROPOSED
INFRASTRUCTURE

Figure 2-6 Long Term Operational Areas

2.1.14 Applicant Committed Environmental Protection Measures

The following additional mitigating measures are part of the Proposed Action Alternative and will be implemented by RWP if this alternative were selected. As a result of inspections or monitoring, BLM can impose additional conditions of approval if needed to mitigate potential impacts identified during the analysis process.

1. While there are no greater sage-grouse leks within 2 miles of the project area additional mitigation for sage grouse nesting, brood rearing and winter habitats is incorporated into the project by the application of roosting deterrents on power lines installed for the project. In addition roosting deterrents will be installed to the extent possible on the equipment in the Service Facility.
2. Construction and drilling timing stipulation for raptor nests: No surface use Feb. 1 to July 31 on lands mapped in the CFO GIS database. Active raptor nests have been identified within a 0.5 mile radius of the project area. A relocation of operations option is not feasible as the shaft location cannot be moved. Any construction during the raptor protection period would occur pending BLM approval.
3. Crews will be trained in the appropriate treatment of wildlife and applicable Wyoming Game and Fish regulations.
4. An Integrated Pest Management Plan will be implemented to manage invasive/noxious weeds in the project area. RWP will coordinate these weed control efforts with the BLM and Natrona County Weed and Pest District.
5. RWP will work with the Natrona County Road and Bridge Department regarding road maintenance.
6. RWP will reclaim previously disturbed areas of the existing Poison Spider Field including plugging and abandonment of existing wells.
7. Permanent facilities will be painted an appropriate color selected from the standard list for minimum visual intrusion such as Carlsbad Canyon or Desert Brown except for equipment required to be painted a contrasting color for safety.
8. The fans at the vent raise will be muffled and surrounded with noise attenuating barriers to further reduce noise.
9. All equipment capable of emitting regulated pollutants will be permitted as required by WDEQ/AQD.
10. All non-transportation related oil containing equipment will be covered by an appropriate SPPC plan as required by US EPA.
11. All operations will conform with the applicable WDEQ Water Quality and Solid Waste Division regulations.
12. The federal Mine Safety and Health Administration (MSHA) has regulatory authority for safety of all activities at the Poison Spider facility. RWP likewise will be accountable

for compliance with all standards of the State of Wyoming's Division of Mine Safety and Inspections.

2.2 No Action Alternative

BLM will not approve the Poison Spider Oil Field Underground Access Oil Recovery Facility project. The field will continue to be produced as it is currently and the current low production efficiencies will be maintained. None of the infrastructure associated with the underground access development will be constructed. No enhanced reclamation plan that includes reclaiming existing disturbance in the field would be pursued.

2.3 Alternatives Considered But

The following scenarios were analyzed in the Environmental Assessment. Both will result in more surface disturbance over the life of the field when compared to the Proposed Action.

2.3.1 Continued Operation of the Current Field Infrastructure

This alternative will continue production of the Poison Spider Field as it is currently produced with no additional producing wells completed. This alternative would maintain the current level of surface disturbance over the life of the field and would result in the field being declared uneconomic to produce in the relatively near term, possibly resulting in significant amounts of unrecoverable reserves being left in place.

2.3.2 Enhancing Production in the Field with Conventional In-Fill Drilling

This alternative will require drilling additional conventional wells in the field on 2.5 acre spacing in an effort to enhance production rates and reduce the unrecoverable oil left in place. This option will not be as efficient as the Proposed Action relative to recovering the oil currently remaining in place. Additional water disposal wells (injection) wells will be required to dispose of the increased water production in the field from the additional wells. This alternative will result in more surface disturbance than the Proposed Action or Alternative 2.3.1.

The following assumptions were used when comparing scenarios. Table 2-3 compares the surface disturbances for the three development scenarios.

Impacts common to all scenarios:

- Access from Poison Spider Road to Oil Camp Road
- Use the existing injection well

Current Operations:

- 13 producing wells
- One injection well
- One tank battery at the existing location
- Maintain the existing housing, shop and tank battery areas

In-Fill Drilling:

- 128 wells over 320 acres at 1.5 acres/well initially, reduced to 0.5 acres/well long term,

- 10 miles of collector roads with pipe lines, 15 ft wide initially reduced to 10 ft long term,
- One tank battery at the Service Facility location
- 2.5 acre spacing, and
- 4 injection wells

Table 2-4 Poison Spider Field Production Development Scenarios Impacts (in acres)

Scenario	Access Short Term (ST)	Access Long Term (LOP)	Well Sites Short Term (ST)	Well Sites Long Term (LOP)	Service Facility/ Tank Battery	Other Facilities	Total surface disturbance	Extent of disturbance in lease area
Proposed Action*	1.6	0.9	1.5	1.5	4.0	3.5 (shaft)	17.0 (ST) 8.6 (LOP)	8.6
Current Operations*	N/A	4.81	N/A	1.12	2.5	14.36 (camp and shops)	N/A (ST) 31.37 (LOP)	240
In-Fill** Drilling	18	12	192.0	64.0	4.0	N/A	214.0 (ST) 80.0 (LOP)	320

* Proposed Action and Current Operations disturbance numbers from Figure 1-2.

** In-Fill drilling will disturb 320 acres of the 560 acre lease and will be reduced in the long term to defined well sites, access roads and pipelines and a stand alone Service Facility. Much of the previous disturbance areas will be Impacted by the in-fill drilling activity.

3.0 Affected Environment

3.1 Location, Setting and Historical Use

The Poison Spider Field (PSF) Underground Access Oil Recovery Facility project (UAORF) project lies in the Wind River geologic basin west of Casper, Wyoming in Natrona County (see Map 1-1). Access to the project is from Poison Spider Road, Natrona County Road 201, at Oil Camp Road which accesses the existing field operating unit. Area topography is generally rolling, open prairie shrub and grasslands cut by Poison Spider Creek south of the project area. The elevation of the project area is approximately 5700 feet above sea level.

The PSF is located on the west flank of the Casper Arch which separates the Wind River structural basin from the Powder River structural basin. Drainages in the project area flow into Poison Spider Creek which is part of the North Platte River drainage system. The area proposed for underground development is mainly used for crude oil production, livestock grazing, wildlife habitat and recreational hunting. The surface of the project area is federally owned and is managed by the BLM CFO. The federal oil and gas lease, WYC-037870, was granted in 1935. The leased area and the subsurface field structure are illustrated in Figure 3-1.

The PSF area has been the site of oil exploration and production since the discovery well was drilled in October 1917, in NW¼NW¼, Section 12, T. 33 N., R. 83 W., Natrona County. The field comprises a greater area than the RWP lease and has produced from the Crow Mountain, Tensleep, Sundance and Muddy formations. Seventy-six federal wells have been drilled in the PSF area, 34 of which have been plugged and abandoned. Only two fee (privately owned lease) wells have been drilled in the area, both have been plugged (WOGCC web site). Fourteen Sundance wells are currently completed in the PSF operated by RWP, some of which have been producing since 1923. Two additional wells are producing from the Sundance in Sections 1 and 2 in the northern portion of the field operated by Arnell Oil Company. To date the field has produced 4,405,819 barrels of oil, 65000 mcf of gas and 21,929,298 barrels of water. Wells drilled in the PSF are shown on Figure 3-1.

Other oil fields in the general area include (BLM 1981 and WOGCC web page):

Burnt Wagon	Sec 19-T32N-R84W	discovered 1976
South Casper Creek	T33N-R83W	discovered 1919
Iron Creek	Sec 11-T32N-R82W	discovered 1917
Oil Mountain	Sec 35-T32N-R85W	discovered 1945
West Poison Spider	T33-R84W	discovered 1948
Poison Spider Creek	T31-R84W	discovered 1958

3.2 Critical Elements of the Human Environment

Critical elements of the human environment as defined by the BLM (1988, 1999), their status in the PSF area, and their potential to be affected by the Proposed Action are presented in Table 3-1. A review of the Proposed Action has determined that seven of the 14 critical elements of the human environment are not present in the project area, are not affected by the Proposed Action or alternatives and therefore are not discussed further. Seven of the critical elements are present in the proposed area, may potentially be affected by the Proposed Action or alternatives, and are discussed in detail in this EA.

Since the purpose of the Proposed Action is to enhance production from an existing oil field

Table 3-1 Critical Elements of the Human Environment¹

Critical Element	Status	Analyzed in Detail in this EA
Air quality	Potentially affected	Yes
Areas of critical environmental concern	Not present	No
Cultural resources	Potentially affected	Yes
Environmental justice related concerns	Not present	No
Farmlands (prime or unique)	Not present	No
Floodplains	Not present	No
Invasive, no-native species (noxious weeds)	Potentially affected	Yes
Native American religious concerns	Potentially affected	Yes
Threatened and endangered species	Potentially affected	Yes
Wastes (hazardous and solid)	Potentially affected	Yes
Water quality	Potentially affected	Yes
Wetlands/riparian areas	Not present	No
Wild and scenic rivers	Not present	No
Wilderness (wilderness study areas and wilderness areas)	Not present	No

¹ From the BLM NEPA Handbook H-1790-1 (BLM 1988, 1999)

Table 3-2 Non-Critical Elements

Non-Critical Element	NA or Not Present	Applicable or Present, No Impact	Applicable & Present and Brought Forward for Analysis
Access and transportation		X	X
Cadastral survey	X		
Fire management	X		
Forest management	X		
Geology and minerals		X	X
Hydrology/water rights		X	X
Law enforcement	X		
Noise		X	X
Paleontology		X	
Rangeland management		X	
Realty authorizations		X	
Recreation		X	X
Socio-economics		X	X
Visual resources		X	X
Wild horses	X		

3.3 Physical Resources

3.3.1 Air Quality

Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) are health-based criteria for the maximum acceptable concentrations of specific air pollutants at locations to which the public has access. Although specific air quality monitoring data is not available for the project area, air quality in the project area is considered good and designated as attainment for all criteria pollutants. Air pollutants for which ambient air quality standards exist include carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter less than 10 microns in effective diameter (PM₁₀), particulate matter less than 2.5 microns in effective diameter (PM_{2.5}), and sulfur dioxide (SO₂). The WAAQS, NAAQS, and Prevention of Significant Deterioration (PSD) Class I and II Increments are shown in Table 3-3 below.

Table 3-3 Wyoming and National Air Quality Standards and PSD Increments

Air Pollutant	Averaging Time Period	WAAQS S ($\mu\text{g}/\text{m}^3$) ¹	NAAQS ($\mu\text{g}/\text{m}^3$) ²	PSD Class I Increment	PSD Class II Increment
PM ₁₀	24-hour	150	150	8	30
	Annual	50	50	4	17
PM _{2.5}	24-hour	65	65	ns	ns
	Annual	15	15	ns	ns
Ozone	1-hour	235	235	ns	ns
NO ₂	Annual	100	100	2.5	25
SO ₂	3-hour	1,300	1,300	25	512
	24-hour	260	365	5	91
	Annual	60	80	2	20
CO	1-hour	40,000	40,000	ns	ns
	8-hour	10,000	10,000	ns	ns

¹ WAAQS = Wyoming Ambient Air Quality Standards (adapted from WDEQ/AQD [2000b])

² NAAQS = National Ambient Air Quality Standard (adapted from 40 CFR 50.4-50.12).

3.3.2 Geology and Minerals

3.3.2.1 Geology

The proposed area of development is located on the west flank of the Casper Arch and on the northeast thrust-faulted rim of the Wind River structural basin. The rock outcrops in the project area are Cretaceous in age and range from about 110 to 125 million years old. As the Wind River Basin was formed by compression during continental drift, the basin center was down warped and the edges were uplifted. This compression formed a northwest to southeast anticlinal fold on which PSF is located. The Lower Cretaceous Frontier basal shale is exposed in the center of the anticline and the Frontier Sandstones form a topographic rim around the field.

Table 3-4 Geologic Surface Formations within the PSF Area (from youngest to oldest in age)

Formation	Thickness	Rock Type
Cody Shale	5350 feet	Gray soft shale
Frontier Formation	750 feet	Gray to white sandstones and gray shales

In the project area, the primary geological formations of interest are the Lower Cretaceous Muddy Sandstone, the Jurassic Sundance (locally known as the “Crow Mountain Sand” or more properly known as the Canyon Springs Sand) and the Pennsylvanian Tensleep Sandstone. The

Muddy Sandstone averages 10 feet in thickness. The Muddy Sandstone produces from one well in the field area but is productive in other wells in adjacent leasehold. The Sundance averages 65 feet in thickness and has produced over 24 million barrels of oil from the entire field. The Tensleep Sandstone pay zone ranges in thickness from 10 to 60 feet. Currently the Tensleep does not produce in the PSF and has had relatively little production in the field.

The tunnel beneath the Jurassic Sundance will be located in the Popo Agie Shale of the Triassic Chugwater Group. Holes will be drilled upward from the tunnel through the Popo Agie into the Sundance reservoir to drain the oil by gravity flow.

Sandstones in the Cody Shale and the Frontier Formation are not prospective in the project area but may be traversed or intersected by the surface and tunnel activity.

3.3.2.2 Minerals

The oil and gas resources in the project unit area are approximately 100% Federal. There are no gravel pits in the project area. Waste shale from tunnel development will be stockpiled and used for field reclamation.

3.3.3 Soils

In general there are two soil types in the lease area of the Proposed Action, specifically soil types 132 (Bowbac-Hiland) and 301 (Vonalee-Hiland), (NRCS 1997).

The Bowbac-Hiland, a fine sandy loam, is found on slopes from 3 to 10 percent supporting areas of native vegetation comprised mainly of grasses, forbs, and shrubs. The annual precipitation is 10 to 14 inches. This unit is 40 percent Bowbac fine sandy loam and 40 percent Hiland fine sandy loam. The Bowbac soils are on hill crests and hillsides with 3 to 20 percent slopes, and the Hiland soils are on alluvial fans and foot slopes with 3 to 6 percent slopes. Included in this unit is Forkwood loam on nearly level alluvial fans and in swales. Also included is Terro sandy loam on hillsides and small areas of rock outcrop. The Bowbac soils are moderately deep and well drained. They form in slopewash alluvium and residuum derived dominantly from sandstone. Soft sandstone is at a depth of 37 inches. In some areas the surface layer is loam. Permeability of the Bowbac soils is moderate. Available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium and the hazard of water erosion is moderate. The hazard of wind erosion is severe.

The Hiland soils are very deep and well drained. They formed in slopewash alluvium derived dominantly from sandstone and are up to 60 inches deep. In some areas the surface layer is loam. Permeability of the Hiland soils is moderate. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow and the hazard of water erosion is slight. The hazard of wind erosion is severe.

This soil map unit is used mainly for livestock grazing and wildlife habitat. A few areas are used for irrigated hay and pasture. The potential plant community for this unit is mainly western wheatgrass, needleandthread, bluebunch wheatgrass, and big sagebrush. As the range condition deteriorates, big sage brush and blue grama increase in abundance. As the range condition further deteriorates annuals invade. The Bowbac soils are poorly suited for livestock watering ponds because of the depth to bed rock and the seepage potential. The Hiland soils are poorly suited to livestock watering pond because of the seepage potential.

The Vonalee-Hiland complex occurs on 3 to 15 percent slopes on stable dunes and supports

native vegetation comprised of mainly grasses, forbs, and shrubs. This unit is 45 percent Vonalee loamy sand and 40 percent Hiland sandy loam. The Vonalee soils are found on convex slopes of 6 to 15 percent, and the Hiland soils are on concave slopes of 3 to 6 percent. Included in this unit are Orpha loamy sand and on stable dunes and Forkwood sandy loam in valleys and narrow drainageways. Also included are some small areas of Bowbac sandy loam.

The Vonalee soils are very deep and well drained. They formed in eolian deposits derived dominantly from sandstone to a depth of 60 inches or more. Permeability of the Vonalee soils is moderately rapid. Available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium and the hazard of water erosion is moderate. The hazard of wind erosion is severe.

The Hiland soils are very deep and well drained. They formed in alluvium and eolian deposits derived dominantly from sandstone to a depth of 60 inches or more. Permeability of the Hiland soils is moderate. Available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow and the hazard of water erosion is slight. The hazard of wind erosion is severe.

This soil map unit is used mainly for livestock grazing and habitat. The potential plant community on the Vonalee soils is mainly needleandthread, thickspike wheatgrass, threadleaf sedge, Indian ricegrass, and silver sagebrush. As the range condition deteriorates silver sagebrush and rabbitbrush increase in abundance. As the range condition further deteriorates annual forbs and cheatgrass invade. The potential plant community on the Hiland soil is mainly western wheatgrass, needlandthread, blubunch wheatgrass, mutton bluegrass, and big sagebrush. As the range condition deteriorates, big sagebrush and blue grama increase in abundance. As the range condition further deteriorates, annuals invade. This unit is poorly suited to livestock watering ponds because of the seepage potential.

3.3.4 Water Resources

Poison Spider Oil Field boundary lies 1800 feet north of Poison Spider Creek. Poison Spider Creek is a tributary of the North Platte River and a class 3B water of the state (WDEQ 2001). There are no natural tributaries to Poison Spider Creek from the project area. Historically, produced water was discharged from the tank battery in the north central portion of the lease via a man-made canal and a discharge pond located just north of Poison Spider Road. This pond was designed to overflow or discharge water through a culvert under the road and down to Poison Spider Creek. The canal system carried produced water from the treater discharge directly through the culvert for discharge to Poison Spider Creek. The WDEQ issued discharge permit (Permit Number WY0001694) remains in effect but is no longer used. The canal, pond and culvert remain in place. The pond has re-vegetated but probably acts as a detention basin following significant precipitation events. Produced water is now managed by injection back into the Sundance formation from a single WOGCC and BLM permitted injection well (Well #8).

There is one water well identified in the Wyoming State Engineers Office Water Rights Inventory (WSEO 2006) in the four sections surrounding the project area. The information available on this well is provided below.

Name: USDI, BLM, Arnell Oil Company
Priority #: P33913W
Location: NWSE Sec 12-T33N-R83W
Priority Date: 06/01/1976

Amount: 10 gpm
Depth: 740 ft
Static level: 730 ft.

A second water well is located in the NWNW Sec 18-T33N-R82W, near the Oil Camp houses. This well serves the PSF camp and is not registered with the Wyoming State Engineers Office. Information regarding the well is limited to file notes (S. Monninger, pers com. 2006). The well may date from the 1930's and was drilled to a depth of approximately 789 feet. The well is screened from 572 to 729 feet and produces an estimated 10 gpm. This water is not suitable for human consumption but is used for non-consumptive purposes at the camp houses and shops.

The oil producing formation in the field is the Lower Sundance Canyon Springs Sand (also known as the Crow Mountain Sand). This formation is a gravity drained geologic trap not a water drive formation therefore water from this geologic structure is not connected to the surface and North Platte drainage system. Removal of water from the Sundance or injection of water into the Sundance will not affect the North Platte River hydrology (G. George, pers com. 2006). Injection of water produced from the Sundance and injected into the Tensleep would possibly augment the water resource contributing to the North Platte River drainage system as the Tensleep is hydraulically connected to the surface within the basin.

3.3.5 Noise

No site specific noise data are available for the project area but BLM assumes ambient noise levels within the Platte River Resource area to be 30 to 40 dBA (BLM 1981). The common measure of noise in the United States is the A-weighted sound pressure level that measures noise in A-weighted decibels (dBA). Median noise levels for the proposed project area likely range from 20 to 40 dBA in the morning and evening and from 50 to 60 dBA in the afternoon when wind speeds are typically greatest. These levels correspond to noise levels of a soft whisper (30 dBA), a library (40 dBA), a quiet office (50 dBA), a small town (40 - 50 dBA), and a normal conversation (60 dBA). Traffic along the interstate typically averages noise levels greater than 70 dBA (Wyle Laboratories 1971).

Currently the most common noise sources within the project area would include traffic along Poison Spider Road, livestock grazing operations, the wind and occasional well workover operations. Noise sensitive areas would include private residences and occupied raptor nests. Natrona County does not have noise restriction regulations for commercial businesses.

Four occupied residences are located within 2 miles of the Proposed Action (see map 3-1).

- 1) Two occupied residences are located at the Poison Spider Camp (NWNW Sec 18),
- 2) One residence approximately $\frac{3}{4}$ miles to the NW in SWNE of Sec 12, and
- 3) One residence approximately 2 miles NW in SE Sec 5

The residences in Sections 12 and 18 are located within and are affiliated with the north and south portions of the Poison Spider Oil Field. There are no other places of business or public buildings within one mile of the proposed area of activity that could be impacted by noise from the Proposed Action.

3.4 Biological Resources

3.4.1 Vegetation including Invasive Non-native Species

The PSF underground development project area occurs in the Wyoming Big Sagebrush land cover type, according to the Wyoming Natural Diversity Database (WYNDD 2004) and the Wyoming Gap Analysis (Analysis, Wyoming Gap, 2006). The project area is at an elevation of approximately 5500 feet and receives 12 to 14 inches of precipitation per year (USDA, NRCS).

The Wyoming big sagebrush grasslands community consists of several grasses, including *Koeleria cristata* (June grass), *Agropyron smithii* (western wheat grass), and *Bouteloua gracilis* (blue grama) and shrubs such as Wyoming big sagebrush, skunkbrush and rabbitbrush.

The area is cut by Poison Spider Creek, to the south. Poison Spider Creek is perennial in the area as a result of oil field produced water discharges. Isolated areas of wetlands habitat have developed in association with these discharges. The creek is ephemeral above and below the areas influenced by the produced water. Further to the south and east Poison Spider becomes perennial prior to entering the North Platte River. While no formal wetlands inventories have been conducted in the area (National Wetlands Inventory, US Fish and Wildlife Service 1997) isolated pockets of wetlands habitat exist in association with the oil field discharges. No wetlands habitat exists within the project area.

No site specific surveys have been conducted for non-native or invasive species; however it is possible that the more common invasive species are present.

3.4.2 Wildlife Resources

The project area provides habitat for a wide variety of wildlife. Discussions of these species are presented below.

3.4.2.1 Big Game

Mule Deer (*Odocoileus hemionus*) are common in the project area which is classified as WGFD herd unit area 758 and hunt area 89. There are no critical seasonal habitats for mule deer identified in the PSF area. The nearest crucial habitat for mule deer is identified north and west of the Poison Spider Road. The RWP PSF lease comprises approximately 0.0066% of the mule deer herd unit area (Wyoming Game and Fish 2005a).

Mule deer hunting is popular in the areas west of Casper with a hunter success rate of approximately 64% in 2003. Prolonged drought has affected forage production and therefore the mule deer population in the herd area. The population is currently estimated at 3,862 animals or 70% of the herd objective (Wyoming Game and Fish 2005a).

Pronghorn (*Antilocapra americana*) are also a common species in the Poison Spider project area. The Proposed Action is located in WGFD herd unit 745 and hunt areas 71 and 72. The entire Poison Spider project area is in yearlong pronghorn habitat, no crucial seasonal habitats are identified in the project area. The RWP PSF lease comprises approximately 0.00088% of the antelope herd unit area (Wyoming Game and Fish 2005b).

Pronghorn hunt areas 71 and 72 are very popular with Casper residents. County Road 210, the boundary between the two hunt areas, cuts through the lease area. Hunter success in 2004 was 92%. Game and Fish Department production data indicates that the habitat is in very poor condition due to extended drought conditions. The population is currently estimated at 12,334 animals or 3% above the herd objective (Wyoming Game and Fish 2005b).

3.4.2.2 Other Mammals

Other mammals in the project area include badger, bobcat, coyote, white tailed jack rabbit, deer mouse, desert cottontail, Wyoming ground squirrel, striped skunk, northern pocket gopher and numerous others. Game and Fish sensitive mammal species or BLM mammal species of concern that may exist in the project area include white tailed prairie dogs, Wyoming pocket gopher and swift fox (Wyoming Game and Fish 2002), but no white tailed prairie dogs have been identified in the project area.

3.4.2.3 Raptors

The Poison Spider project area also contains potential nesting habitat for a variety of raptor species including the golden eagle, ferruginous hawk, Red Tailed Hawk and Merlin (WYNDD 2006, BLM 2006, Wyoming Game and Fish 2004). BLM maps indicate three raptor nests within the Project Area and another 6 in the surrounding area (BLM 2006). The three occupied nests within a one mile radius of the project including Golden Eagles and Red Tailed Hawk.

3.4.2.4 Migratory and Non-Migratory Birds

Bird species distributions as listed in the Atlas of Birds, Mammals, Amphibians and Reptiles (Wyoming Game and Fish 2004) for lat/long 19 and as provided by Wyoming Natural Diversity Database for T33N-82W and T33N-R83W (WYNDD 2006) for are indicated in Table 3-10. Only those species that have been classified by WGF D (2004) as confirmed breeders, with circumstantial evidence of breeding or that have been observed at any time within the general area are included on the list. Most of these birds are ground or shrub nesters. Migratory water fowl and shore birds use the produced water discharge ponds west of the project area. No surveys have been conducted in the project area for migratory or non-migratory avian species.

3.4.2.5 Upland Game Birds

Greater sage-grouse and possibly mourning doves are the only upland game birds known from the area. Greater sage-grouse is a BLM sensitive species and is discussed later in the document.

3.4.2.6. Amphibians, Reptiles and Fish

No site specific surveys have been conducted for amphibians, reptiles or fish in the project area. Fish species have been identified in the perennial/wetland areas of Poison Spider Creek that are maintained by oil field discharges. There is a possibility of the occurrence of northern leopard frog, tiger salamander and Great Basin Spade foot toad in the isolated waters fed by oil field discharges in Poison Spider Creek. The PSF project area does not contain any areas of permanent water or wetlands, therefore fish species or water dependent amphibians are not expected to be present. Various reptiles are possible in the area including rattlesnakes, garter snakes, bull snakes, short horned lizards and others (BLM 2005c and WYNDD 2006).

3.4.3 Threatened, Endangered, Proposed and Candidate Species

Threatened, endangered, proposed and candidate species that could occur in the project area include the black-footed ferret, the bald eagle and Ute ladies'-tresses; the five species found downstream in the North Platte River that could be impacted by water depletion are also listed. Table 3-5 provides information regarding the potential of occurrence for listed species in the project area. No threatened or endangered plant species occur in the project area (WYNDD 2004). The information provided below is compiled from a variety of sources including, the Wyoming Game and Fish Atlas of Mammals, Amphibians and Reptiles in Wyoming (2004) and the US Fish and Wildlife Service (USFWS 2006).

Black-footed ferret (*Mustela nigripes*)

The U.S. Fish and Wildlife Service listed black-footed ferrets as endangered in 1967 under a precursor to the Endangered Species Act of 1973. Black-footed ferrets were probably never abundant. Ferrets were once found throughout the Great Plains, from Texas to southern Saskatchewan, Canada. Their range extended from the Rocky Mountains east through the Dakotas and south through Nebraska, Kansas, Oklahoma, Texas, New Mexico, and Arizona. Where prairie dogs were found, so were black-footed ferrets. Typical wild ferret behavior revolves around prairie dog towns. The reintroduction of black-footed ferrets into the wild began in 1991 with releases of ferrets in the Shirley Basin, Wyoming. Reintroduced black-footed ferrets have been designated "non-essential experimental" populations under the Endangered Species Act (USFWS 2006).

The Shirley Basin Non-essential experimental population is the nearest black-footed ferret reintroduction site to the project area. No white-tailed or black-tailed prairie dogs are known in the PSF project area. Further, WYNDD records do not include any black-footed ferret sightings in the area (WYNDD 2006). It is therefore considered unlikely that this species occurs in the project area.

Table 3-5 Federally Listed Threatened (T) and Endangered (E) Species and Their Potential Occurrence within the Poison Spider Project Area

Scientific Name	Common Name	Federal Status	Potential of Occurrence within Poison Spider area
Mammals			
<i>Mustela nigripes</i>	Black-footed ferret	E, EXPN	Not likely
<i>Zapus hudsonius preblei</i>	Preble's meadow jumping mouse	T	Not likely
Birds			
<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	Occasional
<i>Numenius borealis</i>	Eskimo Curlew	E	Not likely
<i>Charadrius melodus</i>	Piping Plover	T	Not likely
<i>Sterna antillarum</i>	Interior Least Tern	E	Not likely
Plants			
<i>Gaura neomexicana</i> var. <i>coloradensis</i>	Colorado Butterfly plant	T	Not likely
<i>Spiranthes diluvialis</i>	Ute ladies'-tresses	T	Not likely
<i>Plantanthera praeclara</i>	Western prairie fringed orchid	T	Not likely
<i>Penstemon haydenii</i>	Blowout Penstemon	E	Not likely

Fish			
Scaphirhynchus albus	Pallid sturgeon	E	Not likely

Report generated by the USFWS, Division of Endangered Species on 01/06/2006 and WYNDD 2006

Preble's meadow jumping mouse (*Zapus hudsonius preblei*)

The Preble's meadow jumping mouse is a small rodent with large hind feet adapted for jumping, a long bi-colored tail, and a distinct dark stripe down the middle of its back and is bordered on either side by gray to orange-brown fur. In late summer, the mice gorge themselves on a diet of seeds, fruits, and insects to prepare for hibernation; they sleep in an underground burrow from September to May. This shy, largely nocturnal mouse lives primarily in heavily vegetated, shrub-dominated riparian (streamside) habitats and immediately adjacent upland habitats along the foothills of southeastern Wyoming south to Colorado Springs along the eastern edge of the Front Range of Colorado. The P MJM range includes Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Elbert, Jefferson, Larimer, and Weld counties in Colorado; and Albany, Laramie, Platte, Goshen, and Converse counties in Wyoming. This habitat loss and fragmentation led to Federal listing of the mouse as threatened on May 13, 1998 (USFWS 2006). In 2005 the USFWS issued a notice of intent to delist this subspecies. Suitable Preble's habitat may occur immediately adjacent to some sections of Poison Spider Creek but suitable habitat does not exist in the project area. WYNDD records do not include any sightings of the Preble's meadow jumping mouse in the project area (WYNDD 2006), therefore it is not considered likely that this species occurs in the project area.

Bald Eagle (*Haliaeetus leucocephalus*)

The Bald eagle was once listed as endangered but was down listed to threatened in 1995; in 1999 it was proposed for de-listing. This large bird requires cliffs, large trees or sheltered canyons associated with a concentrated food source for nesting and roosting areas. The bald eagle is commonly seen in central Wyoming and is expected to be an occasional visitor to the project area using the area to forage for carrion in the winter and fall (USFWS 2006).

The project area does not contain habitat features conducive to nesting and roosting. No Bald Eagle nests were identified within a one mile radius of the project area. Known bald eagle winter concentration areas exist in the Platte River Resource Area at Pine Mountain, along the North Platte River and at the Jackson Canyon ACEC (BLM 1984).

Colorado Butterfly plant (*Gaura neomexicana var. coloradensis*)

The Colorado butterfly plant is a rare short-lived perennial herb and is listed as threatened. The only known populations of the Colorado Butterfly plant are primarily on private land within a small area in southeastern Wyoming, western Nebraska, and north-central Colorado where critical habitat has been designated. With less than 50,000 reproducing individuals, only 10 of the 14 current populations are considered stable or increasing. The plant is found in moist areas of floodplains and stands 2-3 feet tall with one or a few reddish, fuzzy stems and white flowers that turn pink or red with age. Only a few flowers are open at one time and these are located below the rounded buds and above the mature fruits. Non-flowering plants consist of a stemless, basal rosette of oblong, hairless leaves 1-7 inches long (USFWS 2006).

WYNDD records do not indicate that the species is known to be present in the project areas (WYNDD 2005). In addition, based on initial surveys for habitat suitable for the Colorado Butterfly plant does not exist, therefore it is not likely that the plant is present in the Poison Spider project area.

Ute ladies'-tresses (*Spiranthes diluvialis*)

Ute-ladies'-tresses orchid is a perennial, terrestrial orchid with stems 18 to 20 inches tall, arising from tuberously thickened roots. The flowering stalk consists of few to many small white or ivory flowers clustered into a spike arrangement at the top of the stem. It blooms, generally, from late July through August (Fertig 2000).

Populations of Ute ladies'-tresses orchids are known from three broad general areas of the interior western United States -- near the base of the eastern slope of the Rocky Mountains in southwestern Wyoming and adjacent Nebraska and north-central and central Colorado; in the upper Colorado River basin, particularly in the Uinta Basin; and in the Bonneville Basin along the Wasatch Front and westward in the eastern Great Basin, in north-central and western Utah, extreme eastern Nevada, and southeastern Idaho. The orchid also has been discovered in southwestern Montana and in the Okanogan area and along the Columbia River in north-central Washington. The orchid occurs along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. It typically occurs in stable wetland and seepy areas associated with old landscape features within historical floodplains of major rivers. It also is found in wetland and seepy areas near freshwater lakes or springs (USFWS 2006).

WYNDD records do not indicate that the species is known to be present in the project areas (WYNDD 2006). In addition, initial surveys located no suitable habitat for the Ute Ladies'-tresses orchid, it is therefore unlikely that the species exists in the project area.

Blowout Penstemon (*Penstemon haydenii*)

Blowout penstemon is a perennial herb with one to many upright stems. Stems are usually less than 12 inches tall and have greenish-blue, waxy, linear leaves. The flowers are leafy whorls of milky-blue to pale lavender flowers (rarely pink or white). The plant flowers from mid June - early July.

Blowout penstemon is restricted to sparsely vegetated, early successional, shifting sand with crater-like blowout depressions created by wind erosion. In Wyoming, blowout penstemon is found primarily on the rim and lee slopes of blowouts, or the rim and steep facies of inherently unstable slough slopes. The sand deposits are situated at the base of mountains or ridges as topographic barriers to wind-born sand deposits. Wyoming populations occur at elevations of 5860-7440 feet. The rims, gentle lee slopes, and the steep slough slope facies are zones of continuous sand deposition and erosion activity. Blowout penstemon is found in sparsely vegetated pioneer communities often with less than 5% vegetative cover.

The Blowout penstemon is a regional endemic of the Nebraska Sandhills, and the northeastern end of the Great Divide Basin in Carbon County, Wyoming. It is known from 3 occurrences in Wyoming including multiple dunes or dune complexes. This species was initially discovered in Wyoming by Frank Blomquist in 1996. The population is estimated at approximately 7800 plants, in 14 separate blowouts. Population trends appear to have been stable or increasing in the recent drought years. They may fluctuate in response to moisture conditions.

All known occurrences in Wyoming are on federal (BLM Rawlins Field Office) or state of Wyoming lands managed for multiple use. Threats are low under current management, but this species is potentially vulnerable to habitat loss from sand mining, water development, and ORV use, and to direct effects of over-collection (WYNDD 2005b). It is not likely that this species will

be impacted by the Proposed Action as there is no sand dune habitat within the project area.

North Platte River Species

The USFWS has identified five species that may exist in the various river habitats along the North Platte River as requiring protection under the Endangered Species Act. These species include the threatened Piping plover, the endangered Interior least tern, endangered Eskimo curlew, the endangered Pallid sturgeon and the threatened Western prairie fringed orchid (USFWS 2006). These species could be impacted by surface water depletions to the North Platte River system. While the Poison Spider project is located in the North Platte River drainage the Sundance formation which is the target reservoir is not hydraulically connected to the North Platte River system as it is a contained gravity drive reservoir (G. George 2006 pers com.). Produced water withdrawn from the Sundance will not influence the North Platte River. Produced water injected into the Tensleep for disposal may positively enhance the North Platte River system. Therefore it is not likely that these species would be negatively affected by the Poison Spider project.

3.4.4 BLM Sensitive Species

BLM sensitive species are those species that may warrant future designation as proposed threatened or endangered species but available data are not sufficient for USFWS to make such a designation. Tables 3-6 to 3-9 are compiled from Wyoming Natural Diversity Data Base of the various species in T33N-R82W and T33N-R83W, Natrona County (WYNDD 2004, 2006). The tables reflect only those species that appear on the Wyoming Game and Fish and BLM sensitive species lists. The potential for these species to occur in the Poison Spider project area are noted in the column heading "Likely to Occur". The potential for occurrence is based on the WYNDD report and the habitat requirements of the species.

Of the BLM sensitive species identified in the following tables that could potentially occur in the project area, four species are more likely to occur than the others. These are species of management concern to the BLM.

White-Tailed Prairie Dog (*Cynomys leucurus*)

White-tailed prairie dogs occur at elevations ranging from 4,265 feet to 7,546 feet in Wyoming. A majority of white-tailed prairie dog habitat occurs in semi-arid to arid areas with mixed stands of shrubs and grass. These habitats occur in areas that have high evaporation rates and low precipitation rates. White-tailed prairie dogs require well drained, deep soils for development of burrows. Soils commonly found on white-tailed prairie dog colonies are derived from sandstone or shale parent rocks and are described as clay-loam, silty clay or sandy loam. Topography of inhabited areas is flat to gently rolling with slopes of less than 30% (Seglund, et al. 2004). In July 2002, a coalition of conservation groups petitioned the FWS to list the white-tailed prairie dog as a threatened or endangered species under the ESA. The white-tailed prairie dog occurs in Colorado, Montana, Utah, and Wyoming. In November 2004, the FWS determined that the petition did not contain sufficient evidence to warrant a full status review for the white-tailed prairie dog (BLM 2005).

No white-tailed prairie dog towns are indicated on the Game and Fish and BLM maps for the project area; surveys of the area indicated they are not present in the project area.

Greater Sage Grouse (*Centrocercus urophasianus*)

Sage-grouse are a large upland game bird considered a "landscape species", annually using widespread areas of sagebrush habitats. Sage-grouse are common throughout Wyoming

because sage-grouse habitat remains relatively intact compared to other states. Sagebrush and sagebrush habitats are essential for sage-grouse survival. Suitable habitat consists of plant communities dominated by sagebrush and a diverse native grass and forb (flowering herbaceous plants) understory. The composition of shrubs, grass and forb varies with the subspecies of sagebrush, the condition of the habitat at any given location, and range site potential. Seasonal habitats must occur in a patchwork or mosaic across the landscape. Both quantity and quality of the sagebrush environment determines suitability for and productivity of sage-grouse (WGFD 2003).

There are no known sage-grouse leks in the project area. BLM (Jim Wright 2006 b. pers com) and Wyoming Game and Fish (2006) maps indicate there are numerous sage-grouse leks in the general area; the following leks are identified in the townships surrounding the project area:

Iron Creek 1, 2 and 3	Sec 12, 13 and 14-T32N-R 83W
Oregon Trail 1	Sec 25-T32N-T83W
Austin Creek	Sec 4-T32N-R84W
Square Top Butte 1	Sec 18-T34N-R84W
Square Top Butte 3	Sec 25-T34N-R84W
South Fork 1	Sec 30-T34N-R84W
Emigrant 3	Sec 25-T34N-R83W
Emigrant 1 and 2	Sec 35 and 17-T34N-R82W

Game and Fish personnel have been checking the leks for status and level of activity have stated the sage grouse numbers are up substantially over previous years. BLM wildlife personnel believe appropriate habitat in the area is used for nesting and early brood rearing (Jim Wright, Pers com 2006b).

Mountain Plover (*Charadrius montanus*)

Mountain plover are known from shortgrass or mixed grass prairie, and are also found in short grass-sagebrush plains, great basin foothills grasslands and sagebrush grasslands. They are often associated with prairie dog towns, feeding on insects, especially grasshoppers. Mountain plover nests are on the ground and are somewhat exposed (WGFD 2004). The mountain plover was proposed for listing as a threatened species in 1999. In September 2003 the Service withdrew the listing, because new information indicated that the threats to the species included in the proposed listing were not as significant as earlier believed.

Field visits to the area by BLM Wildlife Biologists have concluded that no suitable mountain plover nesting habitat is present within the project area.

Ferruginous hawk (*Buteo regalis*)

Ferruginous hawks reside in basin prairie shrublands, the eastern Great Plains, great basin foothills and mountain foothills grasslands. They are found on rock outcrops and in cottonwood riparian areas. Nests are found in rock outcrops, on the ground or a bank, or in a cottonwood tree. They feed mostly on small mammals. Winter populations are generally smaller than those found during other seasons (WGFD 2004).

Nine raptor nests have been documented within the vicinity of the project area. Surveys conducted by the BLM during the 2006 nesting season indicate that two of these nests were occupied with ferruginous hawks. The project lies within 1/2 mile of these ferruginous hawk nests.

Table 3-6 - Sensitive MAMMALS Documented or Potentially in Request Area

Common Name	Scientific Name	Habitat Notes	Likely to Occur
Western small-footed myotis	<i>Myotis ciliolabrum</i> [<i>Myotis leibii</i>]	Found in montane forests, sage steppes, and shortgrass prairie. Roosts: caves, mines	Y
Long-legged myotis	<i>Myotis volans</i>	Found in conifer and deciduous forests. Roosts include tree and rock crevices, snages and buildings.	Y
Long-eared myotis	<i>Myotis evotis</i>	Found in conifer forests, especially ponderosa pine. Forage over water holes and possible openings in conifer forest. Roosts: caves, buildings, mines.	Y
Spotted bat	<i>Euderma maculatum</i>	Cliff roosting, generally near perennial water in a variety of habitats (including desert, shrub-steppe, and evergreen forest).	Y
Townsend's big-eared bat	<i>Corynorhinus townsendii</i> [<i>Plecotus townsendii</i>]	Hibernates and day-roosts in caves and mines and will use buildings as day roosts. Typical habitat includes desert shrublands, pinyon-juniper woodlands, and dry conifer forests, generally near riparian or wetland areas.	Y
White-tailed prairie dog (Large towns only)	<i>Cynomys leucurus</i>	Found in grassland and shrub-grass communities, often with loose, sandy soils. Colonies are usually not as large or dense as black-tailed prairie dog colonies.	N
Wyoming pocket gopher	<i>Thomomys clusius</i> [<i>Thomomys talpoides</i>]	Dry upland areas (ridgetops, etc.) characterized by loose, gravel-like soil. Endemic to Wyoming, they are often observed near Bidger's Pass.	Y
Olive-backed pocket mouse	<i>Perognathus fasciatus</i>	Dry habitats ranging from gravelly soils to sandy areas of short grass prairies to sand dunes.	Y
Swift fox	<i>Vulpes velox</i>	Swift foxes occupy shortgrass prairie, but can be found in sage-grasslands. They are particularly found in sparsely vegetated areas such as prairie dog towns.	Y

Table 3-7 - Sensitive BIRDS Documented or Potentially in Request Area

Common Name	Scientific Name	Habitat Notes	Likely to Occur
American bittern	<i>Botaurus lentiginosus</i>	Marshes and vegetated shorelines, esp. cattails and bulrushes	N
Black-crowned night-heron	<i>Nycticorax nycticorax</i>	Marshes and wooded streams	N
Northern goshawk	<i>Accipiter gentilis</i>	Open montane conifer forest or aspen	N
Ferruginous hawk	<i>Buteo regalis</i>	Open grasslands and shrublands	Y
Greater sage grouse	<i>Centrocercus urophasianus</i>	Sagebrush basins and foothills, generally close to water	Y
Mountain plover	<i>Charadrius montanus</i>	Sparse shortgrass or mixed grass prairie. Also in short-sagebrush plains. Often associated with prairie dog towns.	N
Long-billed curlew	<i>Numenius americanus</i>	Meadows, pastures, shorelines, and marshes	N
Burrowing owl	<i>Athene cunicularia</i> [<i>Speotyto cunicularia</i>]	Plains and basins, often associated with prairie dog towns	N
Lewis' woodpecker	<i>Melanerpes lewis</i>	Open, mature ponderosa pine forest and recently burned forest	N
Loggerhead shrike	<i>Lanius ludovicianus</i>	Open country with scattered trees and shrubs	Y
Sage thrasher	<i>Oreoscoptes montanus</i>	Tall sagebrush and greasewood	Y
Sage sparrow	<i>Amphispiza belli</i>	Medium to tall sagebrush shrubland	Y
Brewer's sparrow	<i>Spizella breweri</i>	Sagebrush foothills and medium-height sagebrush in basins. Also, mountain mahogany hills.	Y
McCown's longspur	<i>Calcarius mccownii</i>	Sparsely vegetated shortgrass prairie	Y

Table 3-8 - Sensitive REPTILES Documented or Potentially in Request Area			
Common Name	Scientific Name	Habitat Notes	Likely to Occur
Tiger salamander	<i>Ambystoma tigrinum</i>	Tiger salamanders can be found in fairly moist environments ranging from rodent burrows to window wells to burrows in sand dunes. Larvae found in intermittent streams, ponds, and lakes.	N
Great Basin spadefoot toad	<i>Spea intermontana</i> [<i>Scaphiopus intermontanus</i>]	Great Basin spadefoot toads inhabit sagebrush communities at lower elevations. Wyoming occurrences are mostly in the Wyoming Basin and the Green River Valley.	N
Northern leopard frog	<i>Rana pipiens</i>	Found near permanent water in areas up to about 9,000 feet. Lower elevation sites are usually swampy cattail marshes and higher ones tend to be beaver ponds.	N

Table 3-9 - Sensitive FISH Documented or Potentially in Request Area			
Common Name	Scientific Name	Habitat Notes	Likely to Occur
Western silvery minnow	<i>Hybognathus argyritis</i> [<i>Hybognathus nuchalis</i>]	The western silvery minnow generally inhabits larger rivers, perhaps slow-flowing and silty bottomed. In Wyoming it seems to occur in the Powder and Little Missouri River drainages, and has likely been extirpated from the Big Horn River by construction.	N
Hornyhead chub	<i>Nocomis biguttatus</i>	Found in clear, gravel-bottomed streams. It has been collected in the Sweetwater River and in the North Platte River drainage including the tributaries of the Laramie River, but is now very rare in Wyoming.	N
Suckermouth minnow	<i>Phenacobius mirabilis</i>	Found in clear water riffles with sand or gravel substrate, but sometimes in lakes. Occurs in Wyoming in the tributaries of the North Platte River and perhaps the South Platte River.	N
Flannelmouth sucker	<i>Catostomus latipinnis</i>	Found mostly in large rivers, but also in smaller streams and occasionally in lakes. It is common in Muddy Creek in Carbon County, in Burnt Lake near Pinedale and in Flaming Gorge Reservoir.	N
Yellowstone cutthroat trout (Native populations)	<i>Oncorhynchus clarki bouvieri</i>	Historically Yellowstone cutthroat trout lived in lakes, rivers and streams of the Yellowstone River drainage (including Yellowstone Lake). Also found in the Snake, Tongue, Bighorn, and Clarks Fork Drainages.	N

Wyoming plant species of potential concern (WYNDD 2006) in the project area are limited to *Cryptantha erecta* (erect cryptantha). *Cryptantha erecta* is a regional endemic of northeast Utah, five counties of southwest and south central Wyoming, and adjacent Colorado. In Wyoming, it is known from four main areas: (1) the Flaming Gorge-Rock Springs uplifts; (2) Green Mountain-Ferris Mountains; (3) Rattlesnake Mountains; and (4) foothills of the Uinta

Mountains. It occupies dry, open places, often on barren clay, typically in pinyon-juniper, but extending up to spruce-fir, at elevations of 5750-10,200 feet.

There is one **Wyoming plant species of concern** that may have habitat in the proposed project area, though not known from immediately adjoining townships, *Oxytropis besseyi* var. *obnapiformis* (Maybell locoweed).

Oxytropis besseyi var. *obnapiformis* is a regional endemic of northeastern Utah, southwestern Wyoming, and northwestern Colorado. In Wyoming, it is known from the Green River Basin, Sweetwater River Plateau, and North Platte River Valley in Fremont, Natrona, Sweetwater, and Uinta counties. Wyoming populations are found on dry sandy, silty, chalky, or redbed clay slopes, hills, and ridges in sparsely vegetated cushion plant communities at 5600-7100 feet.

In addition, there are two other **Wyoming plant species of potential concern** that may have habitat in the proposed project area: *Astragalus nelsonianus* (Nelson's milkvetch), and *Oenopsis wardii* (Ward's goldenweed).

Astragalus nelsonianus is a BLM sensitive species almost entirely restricted to three counties of Wyoming, with one occurrence in Colorado. It occupies alkaline, often seleniferous, clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders. Known occurrences are found primarily in sparsely vegetated sagebrush and cushion plant communities at elevations of 5200-7600 feet.

Oenopsis wardii is almost entirely restricted to the Laramie and Shirley Basins and the Casper Arch region in Albany, Carbon, and Natrona counties, Wyoming; plus one occurrence in Colorado. It occupies selenium-rich shale-clay slopes, barren plains, and disturbed roadsides at elevations of 5460-7200 feet. Known occurrences are found primarily in areas with low vegetative cover (20-50%) and little competition from other plants in settings dominated by Gardner's saltbush, bluebunch wheatgrass and contracted Indian ricegrass or birdfoot sagebrush and Gardner's saltbush.

3.5 Human Resources

3.5.1 Cultural

Cultural resources are the non-renewable physical remains of past human activity and are protected under Section 106 of the National Historic Preservation Act of 1966 (as amended) and the Archeological Resources Protection Act of 1979 (as amended). Archaeological investigations in the North Platte River Valley basin indicate that human activity has occurred across the landscape over the past 12,000 years, beginning during the Paleo-Indian period and continuing to the present (Frison 1991).

Two Class III intensive cultural resources surveys were conducted west of Casper on the 560 acres surrounding the RWP UAOR project. Twenty-two cultural localities are in the project area. Four previously recorded sites were investigated, six new sites were identified and 12 isolates were recorded. All but one of the sites were evaluated as not significant, and no further work or attention is recommended. Native American consultation was recommended for three stone circle sites and a rock cairn site.

3.5.2 North American Religious Concerns

In accordance with the *American Indian Religious Freedom Act* and BLM Manual 8160-1

Handbook (BLM 1979), numerous Native American groups including but not limited to Crow, Shoshone, Comanche, Arapaho, Cheyenne, and Sioux have utilized the PSF area. Tribes and/or individuals were sent certified letters requesting their comments concerning any religious or cultural areas within or near the project area.

Most of the cultural resources identified within the project area do not appear likely to have significance as Native American sacred sites or to qualify as traditional cultural properties (TCPs). However, seven stone circles and two rock cairns have been identified that could have religious or cultural significance to Native Americans. Only representatives of Native American tribes can determine the significance of Native American sacred sites or TCPs, and to this date no such determinations have been made.

3.5.3 Land Use

3.5.3.1 Landownership and General Use

The Poison Spider project area of approximately 560 acres is 100% BLM managed surface. The project activity and surface disturbance is planned within the existing Poison Spider Oil Field. No project activity is proposed on lands that have not been previously impacted by development activity in the past. The area is leased for livestock grazing. Some areas of the producing field are fenced to preclude entry by livestock. Other land uses in the project area include wildlife habitat and limited recreation (big game and sage grouse hunting).

3.5.3.2 Livestock Grazing

The PSF project area has been used for livestock grazing (sheep and cattle) since at least 1907 when the area was homesteaded. The BLM grazing allotment averages approximately 7.5 acres per AUM (animal unit month) (BLM 1981) and is leased by Diamond Ring (F.L. Ranch).

3.5.3.3 Recreation

Non developed recreation in the area includes big game hunting for antelope, and mule deer and game bird hunting for greater sage-grouse. Access into the area is uncontrolled though it is unlikely that hunters actually hunt within the field area due to the proximity of the homes and field facilities. Poison Spider is a popular hunt area for Casper residents.

3.5.3.4 Mineral Development

Mineral ownership in the PSF project area is 100% federal and is managed by the BLM. The project area has been an active oil field since 1917 and has produced 4,405,819 barrels of oil, 65000 mcf of gas and 21,929,298 barrels of water from the Sundance formation. Figure 3-1 indicates the wells that have been drilled in the project area to date.

3.5.4 Visual Resources

The Bureau of Land Management has mapped the Poison Spider project area as VRM Class III (BLM 1981). The objective of this classification is "changes in the basic elements (form, line, color or texture) may be evident in the characteristic landscape". The project area is an existing oil field and man camp which has been in operations since 1917. Other established oil fields lie to the north and west of the site. The City of Casper is approximately 20 miles to the east and Poison Spider Road provides access to numerous ranches and residential housing areas in addition to Poison Spider School. Other evidence of man's activities in the area include electrical power along Poison Spider Road, pipeline corridors with markers, dry hole well markers and reclaimed well pads.



Photo 3-1: View from the shaft area to the south and Poison Spider Road



Photo 3-2: Looking north from Poison Spider Road to the existing operational area

3.5.5 Socioeconomics

The population of Natrona County in 2004 was estimated at 69,010 a 3.7% increase from 2000, during the same period the state of Wyoming experienced an increase of 2.6% or an estimated population of 506,529. The 2005 Natrona County labor force was 40,355 with 39,064 persons employed full and part time, the unemployment rate is 3.2 % (USDOC 2005). The median household income in Natrona County in 2000 was \$38,388 (Wyoming DOE 2005). The cost of living index for the second quarter of 2005 in Natrona county was 98 when compared with the Wyoming average of 100 (WEAD 2005).

The median value of owner occupied housing units in Natrona county was \$84,600 in 2000 (USDOC 2005), housing prices increased 9.4% from the second quarter of 2004 to the second quarter of 2005 (WEAD 2006). Housing for field personnel is currently provided in the existing man camp. Personnel for project development and field reclamation activities will likely reside in Casper which is located approximately 20 miles to the east.

Forty percent of the assessed property tax in Natrona County was paid by the oil and gas extraction industry. In Natrona County stripper oil accounted for 1,986,997 sales units in 2004, more than twice the crude oil production, with a taxable value of \$77,836,420 (WDOR 2005).

3.5.6 Health, Safety, and Transportation

Health and safety risks arising from the project that may affect the general public or those working on the project include oil and gas occupational hazards, occupational hazards associated with mining operations, the operation of vehicles on improved and unimproved roads, winter driving and working conditions, hunting related firearms accidents, collisions with livestock and big game, natural hazards associated with arid grasslands and wild fires.

The only direct access to the project area is via Poison Spider Road (County Road 201) from Casper or from the Waltman area to the northwest. CR 201 is commonly used by recreationalists, hunters and local land owners. Poison Spider is an improved paved road that is maintained by the Natrona County Road and Bridge Department. The pavement ends immediately to the west of the project area. Anticipated road usage is shown in Table 2-1. The main access roads into the field area are crowned and ditched dirt that have been coated/sealed with unsealable crude oil over time. These roads are in passable condition.

There is one crude oil pipeline in the general area but no pipeline connection to the PSF. Crude oil is presently hauled by tanker truck to Casper.

3.5.7 Wastes (Solid and Hazardous)

Due to the age of the field and the existence of the man camp it is expected that domestic and industrial wastes have been buried within the field area. At least one septic system is in operation, possibly two. Older abandoned systems may be present in the Camp area. Reserve pits from earlier oil exploration activities are likely buried adjacent to each well as is the industry standard. Reserve pit wastes are classified by the Environmental Protection Agency as exempt non-hazardous and are not regulated in the Resource Conservation and Recovery Act (40 CFR 261.4). The disposal of these materials is currently regulated by the Wyoming Oil and Gas Conservation Commission and the Bureau of Land Management.

4.0 Environmental Consequences

4.1 Introduction

The purpose of this chapter is to discuss and disclose the potential environmental consequences of the Proposed Action, Proposed Alternatives and the No Action Alternative. An Environmental Impact is defined as a change in the quality or quantity of a given resource due to a modification in the existing environment resulting from project-related activities. Impacts may be beneficial or adverse, may be primary (direct) or secondary (indirect) as a result of an action and they may be permanent and long-term or temporary and of short duration. Impacts may vary in degree from a slight discernable change to a total change in the environment. This impact assessment assumes the successful implementation of all construction and reclamation measures described in:

1. the Plan of Development (POD),
2. the Applicant Committed Environmental Protection Measures (ACEPM-Chapter 2.1.14),
3. the Surface Use Plan (SUP),
4. the Reclamation Plan (Appendix A),
5. all other applicable BLM stipulations.

This analysis compares the impacts of three alternatives, the Proposed Action (enhanced production at undefined spacing using underground access and a commitment to reclaim all existing surface disturbance), the No Action Alternative (continued current operations), and Alternative A (enhanced production at 2.5 acres spacing).

Cumulative impacts result from the incremental impacts of an action added to other past, present and reasonably foreseeable future actions, regardless of the party or parties responsible for such actions. Cumulative impacts may result from individually minor, but collectively significant, actions occurring over a period of time (40 CFR 1508.7).

Residual impacts are unavoidable impacts resulting from the Proposed Action after application of appropriate mitigation (BLM 1988).

The Poison Spider project area has been the site of various human related activities since the early 1900's, including homesteading, oil exploration and production and agricultural operations (livestock grazing). Evidence of man's activity is quite evident in the project area. Past disturbances to the area include construction and operation of numerous well sites and oil fields, crude oil production operations, geophysical exploration, homestead construction and occupancy, and the construction of roads to serve outlying ranches, as well as infrastructure such as gas pipelines, electrical lines, fences and telephone lines. Other oil fields in the general area include (BLM 1981 and WOGCC web page):

Burnt Wagon	Sec 19-T32N-R84W	discovered 1976
South Casper Creek	T33N-R83W	discovered 1919
Iron Creek	Sec 11-T32N-R82W	discovered 1917
Oil Mountain	Sec 35-T32N-R85W	discovered 1945
West Poison Spider	T33-R84W	discovered 1948
Poison Spider Creek	T31-R84W	discovered 1958

The project area is in an active crude oil field. There are no reasonably foreseeable future actions other than the proposed action within the general project area that would contribute to any cumulative impacts. If RWP is successful, it is possible that the UAORF process might be initiated in some of the surrounding fields.

The Proposed Action would result in approximately 17.0 acres of initial surface disturbance from new construction and 31.37 acres of disturbance as a result of the reclamation of areas previously disturbed by oil production activities, for a total short term disturbance of approximately 48.5 acres. The long-term or LOP surface disturbance resulting from shaft and service areas, two outside injection wells, one vent shaft and access roads will be approximately 8.6 acres.

The No Action Alternative would result in the continuation of the current level of production with the possibility of additional wells being permitted in the future. There would be no commitment of enhanced reclamation of areas previously disturbed by field operations or the elimination of camp housing. The current operational area and camp housing encompasses approximately 23 acres with previously disturbed spill sites and shut-in well locations approaching 8.6 acres for a total LOP disturbance area of approximately 31.37 acres.

Alternative A, infill drilling on 2.5 acres spacing to enhance the rate of production from the field, would result in a ST disturbance of 214 acres and a LOP disturbance of 80 acres.

Cumulative Impacts in the project area include the production on the northern portion of the Poison Spider field area. This area has also been authorized by WOGCC to enhance development by implementing 2.5 acres spacing. Down spacing in the northern portion of the field could result in approximately 410 acres of new LOP disturbance. Down spacing or in-fill development throughout the Poison Spider Oil field would result in LOP Cumulative Impacts of approximately 490 acres, not including the current level of disturbance in the northern portion of the field.

Cumulative impacts resulting from the Proposed Action would result in a net reduction of surface disturbance relative to the current condition of 22.7 acres.

The impact analysis assumes all mitigation measures included in the POD, the reclamation plan and the SUP in the APD are fully and successfully implemented as well as all ACEPM listed in Chapter 2 of this EA.

4.2 Physical Resources

4.2.1 Air Quality

Air quality impacts are limited by state and federal regulations, standards and implementation plans prepared and approved under the Clean Air Act and State of Wyoming law. The BLM cannot authorize an activity that does not conform to all applicable local, state and federal air quality laws. The rules, regulations and laws include the Wyoming Ambient Air Quality Standards (WAAQS) and the National Ambient Air Quality Standards (NAAQS) as well as the Prevention of Significant Deterioration (PSD) Class I and Class II increments, as shown in Table 3-3.

4.2.1.1 Proposed Action

Pollutants of concern associated with the Proposed Action are regulated by the WDEQ/AQD and include nitrogen oxides (NO_x), sulfur dioxide (SO₂), carbon monoxide (CO), volatile organic compounds (VOC), hazardous air pollutants (HAPs), total suspended particulate (TSP), particulates less than 10 microns in diameter (PM₁₀), and particulates less than 2.5 microns in diameter (PM_{2.5}). All of these compounds will be generated at some point during the life of the project as a result of shaft drilling, earth moving, oil treating and storage, fuel combustion, fuel storage, and electrical power generation. A permit from the WDEQ/AQD will be required and an application must be made on forms provided by the WDEQ/AQD and accompanied by site information, plans, descriptions, specifications, and drawings showing the design of the source, the nature and amount of the emissions, and the manner in which it will be operated and controlled. The resulting permit assures that the proposed facility will utilize the Best Available Control Technology (BACT) for controlling emissions, will not prevent the attainment or maintenance of any ambient air quality standard, and will comply with all rules and regulations of the WDEQ/AQD.

It is anticipated the electricity for the shaft drilling rig will initially be supplied from a diesel powered portable electric power generator set. This power source will be operated for approximately two months until commercial power becomes available at the project site. The electric power generator will be required to meet BACT for the criteria pollutants listed above, as determined by the WDEQ/AQD. BACT determinations will depend on the size of the equipment and type of fuel necessary for the project.

Emissions from diesel combustion will also be generated by equipment (loaders, haul trucks, etc.) operating in the underground tunnel and on the surface; however, these mobile emissions sources do not require WDEQ/AQD permits to operate. It is anticipated that drilling and construction operations will be completed within 36 months.

There will be a surface facility at the Poison Spider site used to treat the produced crude oil. Equipment associated with the surface facility will consist of a water knockout, heater treater, several tanks used for the storage of crude oil and produced water, and a standby diesel generator to be used in the event of power failures. Maximum production at the site is expected in October 2008 when 20,000 BWP and 2,000 BOPD will be produced. The primary emissions from the surface facility will be VOC generated from the water knockout, heater treater, and storage tanks. VOC emissions generated from the heater treater will be used as fuel for the heater treater burner and any excess gas will be flared in compliance with the WDEQ/AQD permit and with BLM approval. If required by BACT, emissions from the water knockout and storage tanks will also be flared. Emissions from the standby generator are expected to be negligible due to minimal operation. The crude oil produced from the Sundance formation is low in VOCs and results in negligible amounts of associated natural gas at current production rates.

Particulate emissions, also known as fugitive dust, are anticipated during most phases of activity including shaft and service area construction, initial shaft drilling, topsoil and spoil stockpiling, reclamation and access road re-construction. The generation of fugitive dust is dependent on climatic conditions such as wind, temperature, soil moisture, etc. As described in the Proposed Action, the project proponent will be responsible for controlling dust on the project access road and operational areas.

Not all equipment specifications have been determined and emission rates are not yet known as production operations are not anticipated for at least two years. Equipment needs will be determined by the results of well bore development following shaft and tunnel construction. As stated above, all appropriate WDEQ/AQD permits will be obtained prior to the installation of equipment at the site.

4.2.1.2 No Action Alternative

Under the No Action Alternative impacts to the air quality resource would remain at existing levels. Any increase in emissions from diesel combustion as a result of occasional workover or drilling operations would be negligible as would particulate emissions from any field maintenance activities.

4.2.1.3 Alternative A

The area of surface soil disturbance associated with Alternative A is 9.5 times greater than that of the Proposed Action and would result in potentially greater particulate emissions. The temporary generator for high voltage electricity needed for shaft drilling would not be required for this alternative, so the emissions from that equipment would not be realized. An additional 128 wells would be drilled from the surface resulting in significantly greater diesel fuel emissions compared to the Proposed Action. Drilling rig emissions are considered mobile sources and do not require a WDEQ/AQD permit. Assuming one rig drilling year round, drilling and construction related disturbances would continue for a period of 18.5 years. VOC emissions from crude oil production would be comparable to the Proposed Action and greater than the No Action Alternative.

4.2.1.4 Mitigation and Monitoring

It is recommended that BACT and other applicable and appropriate emission reductions measures be implemented in accordance with the Wyoming Air Quality standards and regulations. It is also recommended that dust abatement be applied to materials handling activities such as stockpiling of spoil material from tunnel construction, and on the access road as needed to control particulate emissions, wind erosion control should be implemented on reclaimed areas. These mitigation measures and the mitigation measures included in the POD, the reclamation plan, and the SUP and the ACEPM in the APD are adequate to reduce the potential for adverse impact to the wind quality in the project area.

4.2.1.5 Residual Impacts

There would be an increase in emissions compared to the current level as a result of the Proposed Action. However these impacts will be within the State permitted levels; the majority of particulate and diesel emissions would be localized and temporary (less than 3 years).

4.2.1.6 Cumulative Impacts

Minimal cumulative impacts to the air quality would be expected as a result of implementation of the Proposed Action.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

If in-fill drilling as proposed in Alternative A were to occur on both the north and south portions of the Poison Spider field area, significant diesel and particulate emissions over

a long period of time (from 16 to 32 years) could be realized.

4.2.2 Geology and Minerals

4.2.2.1 Proposed Action, Direct and Indirect Impacts

The Poison Spider Field Project will impact the geological resources in two ways. First the tunnel area, service area and access road will be constructed on the formations listed in Table 3-4. The second impact will be specifically on the Muddy Sandstone, the Sundance "Crow Mountain" or Canyon Springs and the Tensleep Sandstone when the oil, gas and water are withdrawn from the porosity in the sandstones.

The surface disturbance impacts to the various affected geologic units will be mitigated through the implementation of an aggressive reclamation plan (Appendix A) and the implementation of the BMP's required by the DEQ/WQD General Permit for Storm Water Discharges Associated with Large Construction Operations.

The withdrawal of the oil and gas from the prospective pay sands is the objective of this project. While this activity will impact the productive sandstones, the impact is not considered to be negative or adverse. Poison Spider Field has been producing since 1917. Current oil field practices and regulations are protective of surface geology. When the project is concluded, the tunnel and the holes drilled up through the Popo Agie Shale into the Sundance Sandstone will be plugged according to the requirements of the Wyoming Oil and Gas Conservation Commission.

4.2.2.2 No Action Alternative and Alternative A

All the alternatives including the No Action Alternative will affect the geology of the area by producing crude oil from the Sundance and injecting water into the Sundance and/or Tensleep formations. All alternatives would impact the surface, Alternative A significantly more so than the Proposed Action or the No Action Alternative. None of the alternatives would affect the subsurface formations with the exception of the Sundance and the Tensleep, as the wells would be cased from the surface to the producing or injection zones.

4.2.2.3 Mitigation and Monitoring

The withdrawal of oil and gas from the Sundance is the objective of this project. While this activity will impact the future production of the Sundance formation the impact is not considered to be negative or adverse. When the project is concluded, the shaft and all bore holes and injection wells will be plugged and abandoned pursuant to the requirement of the Wyoming Oil and Gas Conservation Commission rules and regulations.

4.2.2.4 Residual Impacts

There would be the removal of crude oil and water from the Sundance. A portion of that fluid would be replaced by the injection of some of the produced water back into the Sundance. The majority of the produced water would be injected into the Tensleep. All alternatives will impact the surface; none of the alternatives would affect the subsurface formations with the exception of the Sundance and the Tensleep, as the boreholes and wells would be cased from the surface to the producing or injection zones.

4.2.2.5 Cumulative Impacts

There would be no cumulative impact to the geologic features in the area with the

exception of the removal of crude oil and water from the Surface and the enhanced volume of water placed into the Tensleep.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.2.3 Soils

4.2.3.1 Proposed Action, Direct and Indirect Impacts

Exposure and compaction of the surface soil in the area to be occupied by surface facilities and construction of impermeable structures (buildings, concrete pads) would decrease infiltration capacity and increase surface runoff, wind and water erosion, and off-site sedimentation. Operating areas would be graded and surfaced with gravel. Access road re-construction would be as directed in the BLM Gold Book, to provide all-weather access and minimize erosion and rutting.

The Proposed Action includes the reclamation of existing surface disturbances and dismantling of the unnecessary structures within three years of project commencement. The Proposed Action would result in approximately 177.0 acres of initial surface disturbance from new construction and 31.37 acres of disturbance as a result of the reclamation of areas previously disturbed by oil production activities, for a total short term disturbance of approximately 48.5 acres. The long-term or LOP surface disturbance resulting from shaft and service areas, two outside injection wells, one vent shaft and access roads will be approximately 8.6 acres.

Impacts to the soil resource would be mitigated by protecting stockpiled soils from erosion, and by the re-vegetation of replaced soils as rapidly as possible following construction and reclamation activities.

A Construction Storm Water Pollution Prevention Plan would be prepared and implemented as required by the WDEQ/Water Quality Division rules and regulations to control off site transport of sediment due to wind and water erosion.

4.2.3.2 No Action Alternative

Under the No Action Alternative no additional surface disturbance associated with this project would take place. The access road erosion would continue over time depending on weather and use. Existing surface disturbance would remain at 31.37 acres.

4.2.3.3 Alternative A

This alternative would result in the disturbance of 214 acres in the short term and 80 acres LOP. Reclamation of previously disturbed areas and dismantling of unneeded facilities would occur during the 18 year development process.

4.2.3.4 Mitigation and Monitoring

The mitigation measures included in the POD, the reclamation plan, and the SUP and the ACEPM in the APD are adequate to reduce the potential for adverse impact to the soil resource in the project area.

4.2.3.5 Residual Impacts

The implementation of the Proposed Action would result in a long term reduction in surface disturbance relative to the other alternatives and an overall reduction of

approximately 23 acres compared to the No Action Alternative. Implementation of the reclamation plan would result in the enhancement of the surface soils and the overall vegetative productivity of the project area.

4.2.3.6 Cumulative Impacts

There are no other activities planned in the project area with the exception of the continued use of the oil field directly to the north. If the entire Poison Spider Oil field, including the area to the north of the Proposed Action, was developed at the WOGCC approved 2.5 acre spacing, approximately 490 acres of soil disturbance would occur during the development phase which could last 18 years, depending on drilling intensity.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.2.4 Water Resources

4.2.4.1 Proposed Action, Direct and Indirect Impacts

Under the Proposed Action water will be produced in conjunction with the crude oil from the Sundance. Currently the oil water ratio is 1:10, this is not expected to change. At full production it is anticipated that 20,000 barrels of water per day would be produced and re-injected. Produced water will be re-injected into the Sundance from well Federal #8 or into the Tensleep from three new wells to be completed in the field (see Figure 1-2).

The Sundance is a confined, gravity drive oil reservoir that is not connected hydraulically to the North Platte River system therefore the removal of water from this formation would not impact the volume of water in the river. The injection of Sundance water into the Tensleep, a water drive reservoir, would possibly augment the water available to the North Platte River.

Exposure and compaction of the surface soil in the area to be occupied by surface facilities and construction of impermeable structures (buildings, concrete pads) would decrease infiltration capacity and increase surface runoff, erosion, and off-site sedimentation. Conversely, the demolition and reclamation of unneeded surface facilities and the reclamation of previously disturbed areas as detailed in Appendix A would result in increased infiltration and decreased surface runoff, erosion and sedimentation. The area to be covered by impermeable structures (less than 6 acres) represents a small fraction of the surface area available for recharge of the Poison Spider Creek system.

The shaft will be drilled using native mud (i. e. waste and soil), standard drilling additives may be added if needed. The spent mud will be rotated to a lined reserve pit; water from the pit will be recycled to the extent possible with make up water added as depth is reached. The reserve pit will be allowed to dry and would be backfilled in compliance with WOGCC and BLM regulations.

Spoil material from tunnel excavation will be transported to the surface on the "skip" and stockpiled for use in the reclamation project. It is anticipated that the majority of the spoil material would be used, resulting in no stockpiles of material in the long term. Adequate material for shaft closure will be stockpiled, re-contoured and re-vegetated and held in reserve for sealing the shaft once the project is complete. If adequate material for shaft closure is not available due to the volume of material need to implement the reclamation

plan, additional suitable material would be brought to the site when needed.

Two existing water wells provide domestic use water to Poison Spider camp and the Arnell operations, immediately to the north. These wells are completed at approximately 730 feet. These wells would not be impacted by the installation of the shaft as the shaft will be grouted with cement through the water and hydrocarbon bearing zones as well as being cased and cemented once total depth is reached. Any unidentified springs in the area would likewise be protected.

Natural drainage systems do not occur in the project area and the manmade canal and pond system will not be used by RWP for water disposal. Shallow subsurface water was not identified in the area. The opportunity for releases of hydrocarbon or other industrial wastes to impact ground water is negligible due to the depth of the fresh water zone at approximately 730 feet. The production facilities will be closed piping and tankage systems minimizing the potential for spills. System piping will be monitored for potential leaks. Earthen berms or equivalent structures would be constructed around the shaft and service area oil and fuel storage equipment to provide secondary containment as described in the site Spill Prevention Control and Countermeasure (SPCC) Plan. In accordance with the WDEQ/WQD Construction Storm Water Pollution Protection Plan (SWPPP) General Permit additional containment or BMP's would be constructed to preclude and control storm water runoff that may contain operational pollutants.

To further prevent potential degradation of shallow groundwater all boreholes and wells would be constructed (cased and cemented) and abandoned in accordance with WOGCC and BLM rules. These construction requirements mitigate the risk of groundwater contamination from either the surface or from the Sundance which, at approximately 1400 feet bgs may be under sufficient pressure to flow up an open borehole, allowing possibly lesser quality water to flow into shallow, higher quality zones. All produced fluids will be collected from the wells in a closed piping and manifold system and transported via piping above ground for processing at the service area.

4.2.4.2 No Action Alternative

Under this alternative, water resources within the Poison Spider Field area would remain as described in Chapter 3 (Affected Environment). Water resources in the area would continue to be affected by existing oil production operations, livestock and wildlife use and land management decisions.

4.2.4.3 Alternative A

Under this alternative development and production operations would impact the entire 560 acre lease area, resulting in decrease in filtration capacity and increased surface runoff, erosion, and off-site sedimentation. In addition the increase in flowlines from wells to production facilities would result in a greater potential for releases of crude oil as a result of pipeline failure. As with the Proposed Action, all well bores would be cased and cemented as required by WOGCC and BLM regulations, protecting shallow ground water resources. System piping would be monitored and secondary containment structures would be installed as required by USEPA SPCC regulations. WDEQ Storm water BMP's would be implemented to minimize the opportunity for contaminated storm water run-off

4.2.4.4 Mitigation and Monitoring

The mitigation measures included in the POD, the reclamation plan, and the SUP and

the ACEPM in the APD are adequate to reduce the potential for adverse impact to the soil resource in the project area.

4.2.4.5 Residual Impacts

Residual impacts resulting from the Proposed Action are limited to the addition of produced water to the Tensleep and possible increases to the volume of water reaching the North Platte River.

4.2.4.6 Cumulative Impacts

There are no other known planned developments within the project area that would impact ground and surface water resources. Surface water resources would continue to be impacted by the few known existing uses which are currently limited to stock and wildlife water. Cumulative disturbance in the project area of 490 acres from the Proposed Action would consist of short term disturbance of approximately 48.5 acres, including the new development and the aggressive field reclamation plan. The long-term or LOP surface disturbance resulting from shaft and service areas, two outside injection wells, one vent shaft and access roads will be approximately 8.6 acres.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the proposed Action.

4.2.5 Noise

4.2.5.1 Proposed Action, Direct and Indirect Actions

Surface construction of the facility areas and improvement of the access roads as well as initiation of the shaft would have an audible noise level of 90 to 95 dB(A) compared to a background level of 30 to 50 dB(A). This noise level could disrupt the activity of wildlife and livestock in the immediate construction area but these would be short term events.

- Noise associated with ongoing production drilling and well completion activities would be muffled by the tunnel and shaft structure.
- The shaft area would have increased noise levels when compared with background primarily as a result of a temporary high voltage electrical generator. The generator would be muffled for safety and aesthetics. This generator will be replaced in the near term by permanent electrical service.
- Oil processing equipment (heater treater, free water knock-out and crude oil stock tanks) typically do not generate noise.
- Rigs used for the drilling of three injection wells will generate engine noise as well as equipment impact noise. These are short term events.
- The tunnel and shaft vents have large blower systems and create significant noise when left uncontrolled. Vent blowers would be muffled and placed behind noise attenuation screening to further reduce noise levels. The vent raise fan is expected to be approximately 100,000 and will be powered by 50 to 60 HP electric motors. The anticipated unmuffled noise level is 85 to 94 dBA; noise attenuating housing will be installed to reduce ambient noise. Fencing will be set approximately 20 feet from the vent end to preclude human and wildlife encroachment. The vent end will be directed away from public roadways and raptor nests. The increase in short and long term noise may be noticeable to persons using Poison Spider Road, as well as wildlife and livestock in the area.

4.2.5.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied and no increase in project related noise would take place, with the exception of occasional noise related to work over operations and general field maintenance actions. Noise levels in the project area would also continue to be influenced as they are now by weather and occasional vehicle passage.

4.2.5.3 Alternative A

This alternative would result in the construction and drilling of a significant number of wells from the surface. As indicated above, this alternative would take up to 18 years to achieve full development. During the development period construction of well sites and the drilling and completion of wells would be continuous unless timing restrictions are placed by BLM to protect nesting raptors. In the event timing stipulations are implemented the disturbance period would be up to 35 years.

4.2.5.4 Mitigation and Monitoring

As discussed in Section 4.2.6.1 tunnel vents and temporary generators would be muffled to minimize audible equipment noise. No other mitigation measures are necessarily to reduce the potential for adverse impact from noise in the project area.

4.2.5.5 Residual Impacts

Implementation of the Proposed Action would result in life of project increases in noise levels; short term noise levels will be reduced significantly following completion of the shaft drilling and site reclamation activities. Once the project is depleted and production operations have been abandoned and reclaimed noise generating equipment will be removed from the area leaving no residual impact.

4.2.5.6 Cumulative Impacts

There are no other known planned developments within the project area that would increase background noise levels. Ambient noise would continue to be impacted by traffic along Poison Spider Road, continued oil production operations, livestock grazing and the wind. Noise sensitive areas would include occupied raptor nests. The aerial extent of noise propagation from the Proposed Action is unknown due to the lack of information on the residual or uncontrolled noise generated by the tunnel vents.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.3 Biological Resources

4.3.1 Vegetation including Invasive Non-native Species

4.3.1.1 Proposed Action, Direct and Indirect Impacts

As discussed in Chapter 3, vegetation in the Poison Spider project area is classified as Wyoming Big Sagebrush grasslands (WGISC 2006).

Disturbances to the vegetation within the PSF would result from the preparation of the shaft and service facilities. Two new injection wells will be drilled within the shaft and service areas, one will be drilled from the location of the existing Federal 9 well location, the fourth (Federal 8) is already in place and in operation. The selected well locations

eliminate the need for additional surface disturbance. The reclamation operation may disturb some existing vegetation. The duration of the impact would be dependent on the time required to re-establish native vegetation to pre-disturbance levels. Of the 560 acres within the PSF approximately 48.4 acres or 8.7% would be impacted for the construction of new facilities and the reclamation plan which would result in vegetation removal or disturbance. The shaft and service areas, the two outside injection wells and the vent shaft would result in approximately 1.5% of the lease surface area being impacted by long term or LOP vegetative removal.

The reclamation project described in Appendix A would entail the demolition and removal of unnecessary structures and the reclamation of 31.37 acres made up of 13 existing well sites, old oil and produced water spills, access roads, housing sites, tank battery and shop areas. The reclamation effort would commence once the Proposed Action is approved, with completion planned within three years. Once the field has been drained using the underground access procedure the production equipment and facilities would be removed, the shaft would be sealed with material stockpiled or brought in for that purpose and the remaining 8.6 acres of disturbance reclaimed. Material needed for final site reclamation will be augmented with nutrients as needed; re-soiled areas will re-vegetated with the appropriate native plants (see Appendix A).

As there are no unique vegetative communities, T&E or BLM sensitive plant species known within the PSF project area the loss of individual plants is not considered significant. The existing plant communities are common and wide spread.

The only intermittent drainage in the area is Poison Spider Creek, 1800 feet to the south of the lease boundary. Poison Spider Creek is a tributary to the North Platte River, located approximately 15 miles to the south and east. While no formal wetlands inventories have been conducted in the area portions of Poison Spider Creek have been identified as potential Palustrine (freshwater) wetlands in the National Wetlands Inventory (USFWS1997). Over time isolated wetlands have developed in association with the WDEQ/WQD WYPDES permitted produced water discharges to the creek. None of these wetlands are within the project area or associated with the operation of the Poison Spider Oil field. The Proposed Action would not require the construction of any creek crossings or potential impacts to wetlands vegetation; in addition there would be no impacts to riparian vegetation as none exists within the project area.

There would be the potential for the introduction of invasive non-native plant species into the areas of the project undergoing surface disturbance and reclamation. Invasive non-native species have become a rangeland concern in Wyoming. The more common invasive species include Canadian thistle, musk thistle, cheat grass, Russian knapweed and halogeton. While the project area has not been surveyed for invasive species some are expected to be present. The project proponent would coordinate with the Natrona County Weed and Pest and the BLM regarding weed control activities. Weed management is part of the Reclamation Plan found in Appendix A, this effort to prevent the establishment of non-desirable species would result in a negligible impact on the vegetation resource.

4.3.1.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied and little or no new project related disturbance would take place. Vegetative communities would continue to be impacted as they are now by weather, livestock and wildlife grazing and

continued oil production operations.

4.3.1.3 Alternative A

Alternative A would result in a greater number surface disturbance acres as well as the reclamation of some previous disturbance areas over the life of the project.

Approximately 14% of the 560 acres lease would be disturbed by the development described in Alternative A in the long term. Construction, development and reclamation would continue for approximately 18 years under this alternative. As with the Proposed Action no wetlands, riparian areas, sensitive or T&E species would be impacted by these alternatives. Active weed management would be necessary for the duration of the project. Reclamation of approximately 80 acres would be required once the field was depleted.

4.3.1.3 Mitigation and Monitoring

The mitigation measures included in the POD, the reclamation plan, and the SUP and the ACEPM in the APD are adequate to reduce the potential for adverse impact to the vegetation resource in the project area.

4.3.1.4 Residual Impacts

The Proposed Action would result in the loss of 48.5 acres of vegetation in the short term as a result of the disturbance caused by the construction of the new facilities and the reclamation of the existing disturbance. Life of project disturbance will be approximately 8.6 acres. It is anticipated it could take 20 or more years for vegetation to achieve pre-disturbance levels and successional diversity following completion of reclamation activities.

4.3.1.5 Cumulative Impacts

Vegetation in the PS field area would continue to be impacted by ongoing livestock grazing activities and oil field operations. There are no other known or anticipated surface disturbing activities occurring or expected to occur within the project area. Invasive species would be controlled, and reclamation would occur as directed by the federal land manager.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.3.2 Wildlife Resources

The Poison Spider area provides habitat for many species of game and non-game wildlife including pronghorn, mule deer, greater sage-grouse, various raptors, predators and furbearers as well as reptiles, amphibians and a variety of migratory and non-migratory birds.

4.3.2.1 Proposed Action, Direct and Indirect Impacts

The Proposed Action could result in the displacement of wildlife species due to habitat loss, mortality due to vehicle collision or construction related activities, and increased mortality due to poaching and harassment. The project area has been an active oil field since 1917 and lies adjacent to Poison Spider Road. The area has been disturbed by these activities and wildlife has been displaced or has habituated to the activity. These impacts would be minimized to some extent by the minimal long term footprint of the

Proposed Action, implementation of the Reclamation Plan and the numerous other mitigation measures discussed in Chapter 2.

Big Game

As discussed in Chapter 3, the Poison Spider oil field is contained within year long and winter year long habitats for mule deer and pronghorn. There are no crucial winter habitats identified in the area. The project area comprises approximately 0.00066% of the mule deer and 0.0088% of the pronghorn WGFD herd management units. The greatest potential impact on big game species would be the displacement of individual animals from preferred habitats as a result of the increased human presence and associated noise. It is unlikely that the project area is the preferred habitat for either species though antelope are commonly seen within the production area. It is likely that the reclamation project will benefit big game species in the long term as the operations are concentrated into the area adjacent to Poison Spider Road, the housing and other existing structures are eliminated and the native vegetation is reestablished across the lease. The extent of displacement is unknown and each species and each individual responds differently to human activity. It is generally accepted that displacement occurs and the extent of it is dependent on many variables including the species, the vegetative or topographic cover available to the individual, the predictability of the human action and time of year. Mule deer and pronghorn are known to habituate to human activity and associated noise, pronghorn more so than mule deer. The avoidance distances would likely be reduced approximately three years into the project when noise levels have dropped, construction activities have ceased and routine operational regimes are established.

An additional impact on big game species includes the potential for increased mortality as a result of collisions and the opportunity for poaching or harassment. The mitigation of site worker education would aid in reducing the potential for some of these impacts. Poison Spider Road is the primary access to the hunting and recreational areas west of Casper, and receives a considerable volume of traffic. Crude oil tank trucks use this road to access the numerous oil fields not connected to pipeline. Wildlife mortality as a result of collision with private and commercial vehicles is common. The area is relatively close to Casper, is very popular with hunters (WG&F 2006b) and is uncontrolled access public land, these factors make poaching and wildlife harassment an unfortunate reality.

It is not expected that wildlife will use portions of the field associated with concentrated operations activity such as the service or shaft areas. It is anticipated that once the demolition and reclamation operations have taken place and human activity associated with the ongoing project has become predictable displacement of wildlife will return to the unused areas of the field. The succession of vegetation in the reclaimed areas will provide habitat for wildlife and will take approximately 20 years to reach the climax community. At that time the area would again be fully utilized by big game species. In the long term the area of activity will be reduced to approximately 8.6 acres, most of which is adjacent to the road, leaving approximately 551.4 acres of the 560 acre lease as available habitat.

Despite the continued displacement from habitat immediately adjacent to the operational areas the impacts to big game species from the project are expected to be low.

Small Mammals

Impacts to small mammals from the Proposed Action would include direct mortality as a result of construction operations and vehicle collisions. Most small mammals have small home ranges and are tolerant of human activity making them more likely to experience mortality as a result of project related activities. The shaft and service areas would no longer provide habitat for some species such as coyotes but would continue to be used by others such as cottontailed rabbits and rodents. Project related impacts to small mammals, rodents and lagomorphs, would likely be masked by their reproductive rates, impacts of weather and the occurrence of disease. RWP's commitment to aggressively reclaim previously disturbed areas and the small footprint of the Proposed Action minimizes the impact to small mammals.

Raptors

As indicated in Chapter 3 the project area is proximal to potential and active nesting habitat for a variety of raptor species including golden eagle, ferruginous hawk, Swainson's hawk, red tailed hawk and prairie falcon (Wyoming Game and Fish 2004). BLM has identified four raptor nests within a one mile radius of the area of project disturbance; two of these nests are to the southwest and two are to the northeast (BLM 2006a) of the shaft and service areas. BLM season buffer zone stipulations are based on the species, current land uses, as well as natural visual and sound barriers (BLM 1984).

It is possible that the nests located approximately 1/3 mile to the southwest of the shaft and service areas would be deserted. Project impacts on raptors would be negligible given the mitigations in place including the commitment to implement the best management practices for raptor proofing improved and new electrical poles as per the Avian Power Line Interaction Committee (APLIC 1996) standards and the availability of nesting habitat in the Poison Spider area.

Upland Game Birds and Other Migratory Birds

New surface disturbance in the PSF would result in the short term removal of approximately 17.0 additional acres of Wyoming Big Sage brush grasslands vegetation. The Wyoming Big Sagebrush grasslands provides nesting habitat, security cover and food for the numerous bird species listed in Table 3-7 that may be residents or casual users of the area. The reclamation of approximately 31.37 acres of existing disturbance will, over time, restore area vegetation and reduced the long term habitat loss to the 8.6 acres associated with the Proposed Action. It will take approximately 20 years for vegetation to achieve pre-disturbance character. The succession of vegetation in the reclaimed areas will provide a variety of habitats over that time period. In addition to habitat loss, increased mortality would result from vehicle collisions. Seasonal behaviors such as breeding and brood rearing that occur in the islands of remaining habitat within the lease area may be indirectly impacted by the project activity levels. Given the small area to be disturbed within the vegetation type, however, the impact on birds is considered negligible.

The Greater Sage-Grouse, a BLM sensitive species, is known to use the project area seasonally; this species is discussed later in this chapter.

Amphibians, Reptiles and Fish

Potential impacts could occur to amphibians and reptiles as a result of project related surface disturbing activities impacting their habitats, displacing individuals or mortality.

These impacts would be proportional to the amount of appropriate habitat affected; given the lack of suitable habitat in the project area fish are not present, and amphibian species will be limited to those that may occur proximal to the housing areas where cool and damp micro-habitats may exist. Reptiles may be impacted by habitat disturbance and direct mortality due to vehicle collision and construction activity. Due to the lack of wetlands or other suitable habitat impacts to amphibians and reptiles is considered negligible.

4.3.2.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied and no project related disturbance would take place. Wildlife populations would continue at current levels with fluctuations due to natural causes such as weather, disease and other natural perturbations.

4.3.2.3 Alternative A

This alternative would result in greater impacts to wildlife as 214 acres of habitat would be taken out of service in the short term and would remain severely fragmented in the long term by well locations, access roads and power lines. The application of BLM spring timing stipulations to mitigate impacts to nesting raptors would double the time needed to fully develop the field from 16 years to 32 years. It is possible that the implementation of these timing stipulations would have no positive effect on raptors due to the concentrated and continual activity in the field area. Interim reclamation of the area would take place over the development life of the project followed by final reclamation of the area when production declines made operations uneconomic. In the long term disruptive activities would occur across the entire lease area for the life of the project.

4.3.2.4 Mitigation and Monitoring

The mitigation measures included in the POD, the reclamation plan, and the SUP and the ACEPM in the APD are adequate to reduce the potential for adverse impact to the vegetation resource in the project area.

4.3.2.5 Residual Impacts

The Proposed Action would result in the long term loss of approximately 8.6 acres of habitat. Implementation of the Reclamation Plan would initially affect the areas of past and present operations in the field and result in the replacement of almost 23 acres of habitat. Some species such as mule deer and pronghorn would be temporarily displaced by the additional and different activity at the site. Over the LOP some increased wildlife mortality would occur, most commonly in small mammals, reptiles and birds.

4.3.2.6 Cumulative Impacts

Cumulative impacts to wildlife resources are expected to occur in direct proportion to the current availability of the required habitat and the loss of that habitat. Given the level of disturbance resulting from current and adjacent field operations, recreation and livestock grazing additional displacement of wildlife by the Proposed Action will be minimal. The reclamation of existing disturbance and the concentration of activity into an area adjacent to Poison Spider Road would result in an overall net improvement to wildlife habitat. When the oil resource is depleted and facilities are removed, the remaining 8.6 acres of disturbance will be reclaimed, to achieve pre-disturbance condition. There is no anticipation of significant cumulative impacts to wildlife species in the analysis area.

The cumulative impact analysis area for the big game species is the appropriate WGFD herd unit. The herd units for mule deer and pronghorn are extremely large (approximately 1000 square miles) and contain numerous disturbance features including the western rural expansion of the City of Casper, numerous oil and gas fields including those listed in Section 3-1 of this document, many ranching operations, a few small towns, etc. It is likely that displacement of these species has already occurred in the project area and that the increased disturbance from the proposed action is cumulatively insignificant.

The cumulative impacts analysis area for small mammals, raptors, upland game birds, migratory birds, amphibians, reptiles and fish is the PS project area. Impacts to all these species would be low to negligible and would decline as project disturbance is reclaimed.

4.3.3 Threatened, Endangered, Proposed and Candidate Species

Threatened, endangered, proposed and candidate (TEPC) species that could possibly occur in the PSF include the black-footed ferret, bald eagle, Preble's meadow jumping mouse, Colorado butterfly plant, blowout penstemon, Ute ladies'-tresses; the five species found in the North Platte River that could be impacted by water depletions are also identified in Table 3-5.

4.3.3.1 Proposed Action, Direct and Indirect Impacts

Based on a survey of the project area for suitable habitat it was determined that the likelihood of impacting any of these species is minimal. Suitable habitat for the black-footed ferret, Preble's meadow jumping mouse, Colorado butterfly plant, blowout penstemon and Ute ladies'-tresses does not occur in the project area.

The five North Platte species would not be impacted by the project as the Sundance formation is not hydraulically connected in the subsurface to the North Platte River therefore removal of water from this zone would not reduce the volume of subsurface water potentially recharging the river system. Injection of water into the Tensleep formation would result in a net addition to the water resource in that formation which may be hydraulically connected to the North Platte River.

The bald eagle may be an occasional visitor to the project area while foraging or migrating, but this activity would be intermittent and of short duration. Roosting and nesting habitat is present in the project area; summer foraging habitat (open water) is not available, winter foraging opportunities are present. To minimize the opportunity to impact raptors, including the bald eagle, utility pole installations and upgrades will include raptor proofing as provided in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996 (APLIC 1996). Once construction has been completed the opportunity for bald eagles to habituate to project activities exists as human activity will be repetitive and limited to the area of the shaft and service areas, access road and injection wells.

4.3.3.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied and no additional project related disturbance would take place. Threatened and endangered, proposed and candidate species that occur in the project area would continue at current levels with

fluctuations due to natural causes such as weather, disease and other natural perturbations and the continuation of oil production operations.

4.3.3.3 Alternative A

This alternative would result in similar impacts to TEPC species as would the Proposed Action, with the exception of potential impacts to the Bald Eagle. This species would likely learn to avoid the project area due to the level and duration of development activity.

4.3.3.4 Mitigation and Monitoring

No additional mitigation beyond those measures included in the APD SUP and ACEPM and as discussed in Section 4.3.3.1 are recommended.

4.3.3.5 Residual Impacts

The Proposed Action would result in the short term loss of approximately 17.0 acres of habitat from new disturbance and 31.37 acres of reclaimed area from previous disturbance. The LOP disturbance is estimated at 8.6 acres. Individual bald eagles may be temporarily displaced from foraging in the area of operations during periods of construction and reclamation. No other TEPC species are anticipated in the project area.

4.3.3.6 Cumulative Impacts

Cumulative impacts to threatened, endangered, proposed and candidate species would be limited to the effects of the operations on bald eagles. These impacts would occur in direct proportion to the current availability of the required habitat and the loss of that habitat and would be limited to those areas where suitable habitat would be removed. Due to the existing level of disturbance the project area does not provide high quality foraging habitat. The pre-existing disturbance Reclamation Plan would be implemented within the first three years of the Proposed Action and would take up to 20 years to achieve pre-disturbance condition. When the oil resource is depleted and facilities are removed, the remaining 8.6 acres of disturbance will be reclaimed, to achieve pre-disturbance condition. There are no other activities planned in the area with the exception of the continuation of oil production at existing fields. There is no anticipation of significant cumulative impacts to TEPC wildlife species in the analysis area.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.3.4 BLM Sensitive Species

BLM sensitive species that may occur in the Poison Spider field area are discussed in Section 3.4.4 and identified in Tables 3-6 to 3-9. The tables reflect only those species that appear on the Wyoming Game and Fish and BLM sensitive species lists. The potential for these species to occur in the PSFA are noted in the column heading "Likely to Occur". The potential for occurrence is based on the WYNDD report (WYNDD 2006) and the habitat requirements of the species.

4.3.4.1 Proposed Action, Direct and Indirect Impacts

The impacts to most BLM sensitive species as a result of the Poison Spider project would be in direct proportion to the amount of habitat that would be disturbed. The Proposed Action would result in the loss of a total of approximately 48.5 acres of

disturbance in the short term and 8.6 acres of LOP habitat loss or approximately 8.7% and 1.5%, respectively, of the PSF lease area. In the short term, disturbed area habitat would change substantially resulting in approximately 20 years of vegetative succession to achieve the current condition. The proximity of the shaft and service areas to the reclaimed areas would likely result in displacement of more sensitive species from the reclaimed areas until shaft drilling and facilities construction operations were completed. During construction most species are sufficiently mobile that they would leave the area of activity, some individuals of less mobile species would be killed by vehicle or equipment collision or be temporarily displaced from their preferred habitats. Given the expanse of the habitat type these impacts would be limited to few individuals and would not adversely affect the populations as a whole.

White-tailed prairie dogs were not identified in the project area during field surveys in 2006.

Greater sage-grouse leks identified in the BLM and Wyoming Game and Fish databases (see Section 3.4.4) are located more than three miles from the project area. Surveys in the spring of 2006 did not identify any potential leks in the project area. BLM (Jim Wright 2006b, pers com) and third party surveys of the area identified suitable nesting and brood rearing habitat in the project area as well as evidence of its use by greater sage-grouse. The extent to which the grouse use these habitats is unknown.

BLM timing restrictions and avoidance areas protect breeding habitat as well as nesting and brood rearing habitats associated with identified leks. The avoidance of disturbance of good quality sagebrush habitats protects the habitat from destruction. Enforcement of speed limits and employee training minimizes the opportunity for vehicle and equipment collision and the installation of perching deterrent devices on utility poles and production facilities minimizes the opportunity for raptor perching.

Ferruginous hawk active nesting locations were identified by BLM biologists within a ½ mile radius of the project (Jim Wright 2006a, pers. com.). While it is possible that the Proposed Action would affect nesting Ferruginous hawks, the birds may not be impacted due to habituation to human activities. BLM will consider the topography and prey habitat surrounding the active nest site in determining the setback distance of from ¼ to ½ mile (BLM 1984).

4.3.4.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied and no additional project related disturbance would take place. BLM sensitive species populations would continue at current levels with fluctuations due to natural causes such as weather, disease and other natural perturbations as well as potential disturbance resulting from occasional field development and maintenance operations.

4.3.4.3 Alternative A

Approximately 214 acres or 38% of the 560 acre lease would be disturbed by this alternative in the short term, and would impact less mobile sensitive species inhabiting the area. The project area would no longer provide foraging opportunities for Ferruginous hawks. Disturbance would continue year round for 16 years or would cease for the raptor breeding season but continue for upwards of 32 years. This stipulation may not benefit Ferruginous hawk due to the level and duration of activity related to field development activities. Greater sage-grouse nesting and brood rearing habitat in the

field would be eliminated.

4.3.4.4 Mitigation and Monitoring

No mitigation in addition to the mitigation measures included in the APD SUP and ACEPM are necessary to reduce the potential for adverse direct or indirect impact to the sensitive species in the project area.

4.3.4.5 Residual Impacts

The Proposed Action would result in the short term loss of approximately 48.5 acres of habitat in the short term and 8.6 acres LOP. Some species such as nesting or brood rearing greater sage-grouse would possibly be displaced by the project activity. Mitigation, as described above, should reduce the opportunity for project related sage-grouse mortality.

4.3.4.6 Cumulative Impacts

Cumulative impacts to wildlife resources are expected to occur in direct proportion to the current availability of the required habitat and the loss of that habitat. The cumulative loss of habitat as a result of implementing the Proposed Action would total approximately 48.5 acres in the short term and 8.6 acres LOP, or approximately 8.7% and 1.5%, respectively, of the PSF lease area. In the short term, disturbed area habitat would change substantially resulting in a approximately 20 years of vegetative succession to achieve the current condition. The short term disturbance would be reclaimed as the Reclamation Plan is implemented and upon completion of construction activities. It would take up to 20 years to achieve pre-disturbance condition. When the oil resource is depleted and facilities are removed, all remaining disturbed areas (approximately 8.6 acres) would be reclaimed, to achieve pre-disturbance condition. There is no anticipation of significant cumulative impacts to BLM sensitive species in the analysis area.

The cumulative impact analysis area for BLM sensitive species is the Poison Spider project area with the exception of the greater sage-grouse for which the analysis area is a 2 mile radius from each sage-grouse lek and ½ mile for the Ferruginous Hawk. The Poison Spider field area is generally characterized by scattered mature oil fields, livestock grazing operations, hunting and casual recreational activity. It is likely that displacement of these species has already occurred proximal to the oil fields and Poison Spider and Powder River roads. It is expected that sage-grouse are impacted by upland game bird hunting (Wyoming Game and Fish 2006b). Traffic on area roads has likely caused disturbance to Ferruginous hawks and vehicle collisions with greater sage grouse. The increased disturbance from the Poison Spider project on these populations is cumulatively insignificant.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.4 Human Resources

4.4.1 Cultural / North American Religious Concerns

Cultural resources, including archaeological and historical sites, on lands subject to federal authority are protected by various laws and regulations commencing with the American Antiquities Act of 1906. Specific directives concerning Cultural Resource Management can be found in Archaeological and Historical Preservation: Secretary of

the Interior's Standards and Guidelines (Federal Register 1983) and BLM Manual Section 8100. Prior to the initiation of any federal action, cultural resources must be inventoried and evaluated to determine their eligibility for inclusion in the National Register of Historic Places (NRHP). This evaluation is a comprehensive screening process to determine significance and is designed to protect only the most significant sites. NRHP criteria (36 CFR 60.4) for determining eligibility define four (4) criteria of significance based upon "the quality of significance in American history, architecture, archaeology, and culture present in districts, sites, buildings, structures, and objects of state and local importance that possess in their location, design, setting, materials, workmanship, feeling, and association; and that:

- Are associated with events that have made a significant contribution to the broad patterns of our society; or
- Are associated with the lives of persons significant in our past; or
- Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Have yielded, or may be likely to yield, information important in the prehistory or history".

Cultural properties are generally not eligible for inclusion in the NRHP if they lack diagnostic artifacts, subsurface remains, or structural features. Furthermore, sites that cannot be placed in a temporal context or shown to be related to other sites are usually not eligible and therefore are not formally protected.

Guidelines for determining adverse impacts to any site currently on, or eligible for, the NRHP have been developed by the Advisory Council on Historic Preservation [36 CFR 800.9 (b)(1), (2), (3)]. These adverse impacts could be in the form of direct, indirect, or cumulative impacts to cultural resources.

Determining the potential effect(s) of any impact depends upon the level of information available. Should the occasion arise where an unavoidable impact to cultural resources either on, or eligible for nomination to the NRHP was identified, the proponent would be required to develop a mitigation plan designed to minimize disturbance to the site. This mitigation plan would be developed in consultation with both the State Historic Preservation Officer (SHPO) and the appropriate surface Management Agency (SMA).

Commencement of construction activities would not proceed until the mitigation plan had been approved by both the SHPO and SMA and subsequently implemented.

4.4.1.1 Proposed Action, Direct and Indirect Impacts

As described in Chapter 3, a Class III intensive cultural resource survey was conducted on 560 acres surrounding a UAOR project area. Twenty-two cultural localities were found in the project area, of which all but one were found to not be significant, and no further work or attention is recommended. The historic depression site (possibly the original oilfield camp), the West Poison Spider Oilfield Camp, and the historic road are within planned impact areas, but they are not considered significant. Thus, no further work is recommended in any area as long as the significant location is avoided.

4.4.1.2 No Action Alternative

The site identified as significant is located outside areas that have been or could reasonably be developed within the existing production scenario in the Poison Spider Oil Field. If additional development was planned avoidance or additional archeological work would be recommended for the prehistoric campsites. No further work is recommended in any area as long as the eligible site is avoided.

4.4.1.3 Alternative A

The single significant site is located outside the area that have been or could reasonably be developed within the Alternative A development scenario for the Poison Spider Oil Field. If the Alternative A development scenario was proposed, avoidance or additional archeological work would be recommended for the significant prehistoric campsite. No further work is recommended in any area as providing the eligible site is avoided.

4.4.1.4 Mitigation and Monitoring

No additional monitoring or mitigation is recommended.

4.4.1.5 Residual Impacts

None of the alternatives analyzed would result in any residual impacts to identified cultural resources. However, some loss of undiscovered cultural resources or artifacts could occur.

4.4.1.6 Cumulative Impacts

The Cumulative Impacts Analysis Area for Cultural Resources is the 560 acres leasehold. The entire area has been surveyed and avoidance recommended for the one site identified as significant. If the site cannot be avoided it would be mitigated in accordance with SHPO and BLM recommendations.

4.4.2 Native American Religious Concerns

4.4.2.1 Proposed Action, Direct and Indirect Impacts

No sites of religious concern to Native Americans are known to occur within the PS UAOR project area. Stone circle and rock cairn sites were identified within the 560 acre lease boundary but are located outside the project development area. Consultation has been initiated with the potentially affected tribes.

4.4.2.2 No Action Alternative

Under the No Action Alternative continued oil production would continue in the areas currently being produced. Changes could occur in the operating configuration of the Poison Spider Field but it is unlikely that the operations would take place near the identified cultural sites. If operations were proposed for the areas where the potential religious features are located their presence would be taken into consideration by the BLM and address accordingly.

4.4.2.3 Alternative A

Under Alternative A oil production would continue in the areas currently developed with additional development in outlying areas. It is not likely that these changes in the operating configuration of the Poison Spider would take place near the identified cultural sites. If operations were proposed for the areas where the potential religious features are located their presence would be taken in to consideration by the BLM and address accordingly.

4.4.2.4 Mitigation and Monitoring

As the proposed action will not impact the cultural site areas, no additional monitoring or mitigation is recommended.

4.4.2.5 Residual Impacts

No residual impacts to Native American religious sites are anticipated.

4.4.2.6 Cumulative Impacts

Cumulative impacts to Native American religious sites would not likely occur as no sites of religious concern to Native Americans are known to occur within the area of the Proposed Action. If concerns are expressed by the Tribes during consultation, changes to the Proposed Action would be considered.

4.4.3 Land Use (Landownership and General Use / Livestock Grazing / Recreation/ Mineral Development)

The Poison Spider lease area of approximately 560 acres is 10.0% BLM managed surface and minerals.

4.4.3.1 Proposed Action, Direct and Indirect Impacts

The Proposed Action is designed to take advantage of areas of previous field development activities. The access roads to the injection wells and the vent shaft are already in place, the existing injection well will be used and a new injection well will be completed at the site of an existing well (Federal 9), water injection lines will be installed in the bar ditch of the existing roads. The shaft area had at one time been disturbed but native vegetation has been re-established; the service area will be constructed on land that appears to be previously undisturbed. Access to the area is from Poisons Spider Road (Co. Rd. 201) and Powder River Road (Co Rd. 210). Access into the field area is not controlled.

Use of the area by livestock would be impacted by the reduction in available forage as a result of the implementation of the Proposed Action. The surrounding area is rated at 7.5 acres per AUM (animal unit month), the interior of the field likely supports cattle at a much lower rate due to the amount of area impacted by past oil and produced water spills, the housing and other structures, such as the tank battery and shop buildings. This area likely supports approximately 71.5 AUMs at the current time, not considering drought conditions. RWP plans to implement the Reclamation Plan which will affect approximately 31.37 acres of previously disturbed area; the shaft and service areas and vent shaft would impact 9 acres of previously undisturbed area resulting in the short term loss of 2.7 AUMs and would result in the LOP net gain of 2.0 AUMs compared to today. The total area impacted by LOP oil field development from the Proposed Action would be approximately 8.6 acres compared to the 31.37 acres affected today. Reductions in the available AUMs are assumed in the BLM land use planning process (BLM 1981).

Non-developed recreation in the general vicinity of the Poison Spider oil field includes big game and upland game bird hunting. Access into the area via Poison Spider and Powder River roads is uncontrolled and provides recreational opportunities to many residents of Casper and Natrona County. Access to the area hunting and recreational opportunities would not be impacted by the Proposed Action. Hunting opportunities in close proximity of the shaft may be impacted during shaft drilling by noise and activity.

Mineral ownership in the project area would not be impacted by the Proposed Action. No sand and gravel operations will take place or be impacted by the Proposed Action.

4.4.3.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied and no project related disturbance would take place. Federal minerals will not be recovered and revenues from these minerals will not be realized by the State of Wyoming and the federal government. There would be no impacts to non-developed recreation and the livestock AUMs and wildlife forage will not be reduced nor would the forage be enhanced by implementation of the Reclamation Plan.

4.4.3.3 Alternative A

Under Alternative A the AUMs available in the field area would be reduced from the current level of 71.5 to approximately 44 AUMs in the short term and 61 in the long term. Minerals would be recovered at a much slower rate but would be recovered over a period of 20 to 60 years depending on the rate of development. Non-developed recreation would not be impacted by the development activity as the field area does not currently provide hunting opportunities due to the housing and field activities.

4.4.3.4 Mitigation and Monitoring

Noise abatement as discussed in Section 4.2.5 is important to the maintenance of the rural atmosphere appreciated by hunters as well as maintaining the habitat of wildlife such as greater sage-grouse. Reclamation of project disturbances and noxious weed control, as described in Section 4.3.1, reduce the short and long term reduction of forage available for wildlife and livestock.

4.4.3.5 Residual Impacts

Once the resource is depleted, equipment removed and the surface is fully reclaimed forage for wildlife and wildlife will be fully recovered. Minerals developed and produced are removed and will not return. The rural feeling of the area will also be restored and enhanced by the removal of housing and unnecessary structures.

4.4.3.6 Cumulative Impacts

The cumulative impact analysis area for land use resources, with the exception of the mineral resource, is the Spiders Field area. Current land uses in the JDPA will not be affected beyond those impacts discussed in section 4.4.2.1 with the exception of the availability of forage AUMs. There is no anticipation of significant cumulative impacts to current land uses in the analysis area unless the field area to the north is developed at 2.5 acres spacing, as authorized by the WOGCC (2006a). Minerals are impacted by the continued development, production and sale of oil from the Sundance formation throughout the Platte River Resource Area. It is anticipated that this is a significant impact but one that was anticipated in the development of the RMP and as a result of mineral leasing by BLM.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.4.4 Visual Resources

The Bureau of Land Management has mapped the Poison Spider field area as VRM Class IV (BLM 1981, BLM 2006c). The objective of this classification is to “provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However every effort should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements.”

4.4.4.1 Proposed Action, Direct and Indirect Impacts

The proposed project is expected to meet the BLM VRM objective. The entire field area is visible to anyone traveling on area roads due to the rolling and open topography and the sagebrush grasslands vegetation. The shaft and service areas would be adjacent to Poison Spider Road, the vent shaft is just east of Powder River Road, the reclamation areas and the two individual water injection wells, while in the interior of the field would also be visible. Photographs of the proposed development and LOP surface equipment are found in Chapter 2, photographs of the area are found in Chapter 3.

Visually remarkable features of the Proposed Action include:

- Shaft Area features:
 - Cuttings pit
 - Cuttings pit spoil and top soil stock piles
 - Spoils pile from tunnel excavation
 - Miscellaneous equipment including closed drilling mud system for underground operations, equipment storage and bulk fuel tanks
 - Drilling mechanism for shaft construction
 - Shaft headframe
- Service Facility features:
 - Office and employee change room trailers
 - Storage and shop building
 - Pole barn
- Reclamation Area features:
 - Stockpiles of spoil and topsoil at the demolished housing area
 - 31.37 acres of reclaimed area with associated storm water control BMP's

Shaft drilling equipment would be highly visible throughout that stage of the operation; once drilling was completed the equipment would be removed from the site. The spoil stock pile at the Camp Area could be as much as 53 feet tall while the top soil pile and the Shaft Area spoil pile could be as high as 24 feet at various times in the project. Material will be removed from the tunnel and either moved directly to the Camp Area spoil pile area or will be stockpiled at the shaft area for use. These piles will expand and contract as the Reclamation Plan is implemented. These piles would be completely consumed in the reclamation process with the exception of 8,700 cubic yards of material which would be stockpiled in the Shaft Area for the eventual closure of the shaft and vent raise. This LOP stock pile would be contoured and reseeded for stability and to reduce visual intrusion. Drilling cuttings pit would be allowed to dry following completion of all drilling operations then backfilled in compliance with WOGCC and BLM requirements, this area would then be reseeded. The portable equipment storage buildings in the Shaft Area would be removed when no longer needed as would the generators and closed drilling mud system. These highly visible features would cease

to exist approximately three years into the project.

Remaining at the Shaft Area would be the fuel tankage as well as the shaft headframe. The headframe, see Photo 2-2, would be approximately 80 feet tall and would be present through the life of the project. The Service Area would also be a life of project feature, though the portable crew trailers would be removed from the site once underground development work was completed, all remaining aboveground facilities not requiring safety coloration will be painted with appropriate non-reflective standard environmental colors (Carrlsbad Canyon or Desert Brown, or other specified standard environmental colors) as determined by the Authorizing Officer.

Three years into the project the shaft and service areas will continue to be highly visible from Poison Spider Road but the stock piles and numerous pieces of temporary and portable equipment will have been removed, the reclamation plan would have been fully implemented and the housing and outbuildings would have been removed reducing the operational area to the 8.6 acres associated with the Proposed Action.

The extension of electrical power from the current tank battery area to the service and shaft areas would be with wooden poles to conform to the BLM Poison Spider corridor requirement.

Once the resource is depleted and operations cease all equipment and structures, including the headframe, would be removed and the disturbed areas re-contoured and re-vegetated as described in the Reclamation Plan.

4.4.4.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied and no new project related disturbance or visual intrusions on the natural landscape would take place.

4.4.4.3 Alternative A

This alternative would result in the addition of 192 wells with pumping units spread across 2/3 of the 560 acres leased area. Roads, pipelines and power lines would connect these wells to the service area tank battery. These wells would be drilled over the next 16 to 32 years, reclamation of unneeded disturbed areas would take place over that same time frame. It would be expected that some wells would be depleted prior to the completion of full field development and would be plugged over the same time periods.

4.4.4.4 Mitigation and Monitoring

The mitigation measures included in the POD, the reclamation plan, and the SUP and the ACEPM in the APD are adequate to reduce the potential for adverse impact to the visual resource in the project area.

4.4.4.5 Residual Impacts

The Proposed Action would not result in permanent changes to the existing landscape. Implementation of the Reclamation Plan would facilitate the return of the pre-existing vegetative community.

4.4.4.6 Cumulative Impacts

The cumulative impact analysis area for visual resources is the general vicinity of the

Poison Spider project area. There are numerous man made disturbances in the project area including other mature oil field, range improvements, roads, pipelines, power lines, and residences. Oil and gas production facilities are a common part of the landscape of western Natrona County though the occurrence of headframe is unique. Some long term impacts are expected from the project but they are considered consistent with the VRM IV classification.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.4.5 Socioeconomics

4.4.5.1 Proposed Action, Direct and Indirect Impacts

The Proposed Action would provide continued and improved employment opportunities for some residents of Natrona County. Tax revenues to Natrona County would increase with the development of non-stripped crude oil production and the increase in the local tax base. Benefits would accrue to the state and federal governments from the sale of crude oil. Impacts on local government services would be minimal as the anticipated workforce is relatively small. The stability of the workforce through the development and production phases of the project benefits the local governments by not contributing to the perception or reality of boom and bust oil and gas development cycles and maintaining the stability of families.

The Proposed Action would have a minor impact on the BLM grazing lessee as a result of the short term reduction of AUMs. LOP impacts to the lessee would result in a net increase of 2.0 AUMs relative to the current condition.

4.4.5.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied and no additional project related crude oil development would take place. Additional Federal minerals would not be recovered and revenues from these un-recovered minerals would not be realized by the federal and state governments, nor would additional tax revenues be realized by local governments.

4.4.5.3 Alternative A

Alternative A would achieve similar production rates as the Proposed Action but would take 16 to 32 years to reach those volumes. Benefit to state and federal governments would be deferred. Impacts to the grazing lessee would be the loss of 27 of the 71.5 AUMs currently realized on the lease.

4.4.5.4 Mitigation and Monitoring

No additional mitigation or monitoring is recommended.

4.4.5.5 Residual Impacts

The Proposed Action would contribute economic benefit to all levels of government and some individuals.

4.4.5.6 Cumulative Impacts

The underground access crude oil development project at Poison Spider would contribute to the overall economic stability of the City of Casper, Natrona County, the State of Wyoming and the nation by providing well paying stable jobs, spending,

additional tax revenue, and mineral royalties. The current infrastructure of the county would be capable of absorbing the relatively small employee base needed for the project. The overall impact of the project on socioeconomics is positive.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.4.6 Health, Safety, and Transportation

Health and safety risks arising from the project that may affect the general public or those working on the project include oil and gas occupational hazards, occupational hazards associated with mining operations, the operation of vehicles on improved and unimproved roads, winter driving and working conditions, hunting related firearms accidents, collisions with livestock and big game, natural hazards associated with wild fires. Of these, transportation issues would create the greatest public concern.

4.4.6.1 Proposed Action, Direct and Indirect Impacts

Health and safety risks to personnel would be mitigated through the implementation of compliance programs consistent with applicable MSHA and OSHA standards. As reflected in Chapters 2 and 3, Poison Spider Road (County Road 201) is the only direct route from Casper to the project area. This route is commonly used by the owners of the seasonal/recreational properties west of the project area; it is used by casual recreationalists, hunters, area ranchers and crude oil hauling trucks. Poison Spider is a poor quality, narrow, paved road that is maintained by the Natrona County Road and Bridge Department.

The Proposed Action includes cooperating with the Natrona County Road and Bridge Department to provide safe year round access for crude hauling trucks, mining equipment and crews. As indicated in Table 2-1, it is anticipated that during construction and development operations 9 passenger vehicles, supply trucks and semi-tractors per day will be accessing the project area from Poison Spider Road. This number will remain the same during production but will change from mainly crew and supply vehicles to primarily crude haulers.

The Poison Spider Field is not connected to pipeline; crude oil has traditionally been hauled to Casper markets in tanker trucks. At the anticipated production rate of 2000 BOPD 8 tanker trucks would be needed daily. A 6 inch diameter crude line (BLM permit number W88682) is located approximately one mile west of the field. A pipeline connection to the project area may be economically viable at the anticipated production rates. A right-of-way for such a pipeline would typically be issued in the name of the pipeline company. A right-of-way across BLM managed surface would be required and the pipeline would be constructed, used, maintained, and terminated in conformance with the pipeline company's application/plan of development. The right-of-way would be monitored for construction, use, and reclamation. A separate environmental assessment would be conducted for a pipeline construction permit.

4.4.6.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied and no additional project related health or safety impacts would be realized. There would be no increase in road usage, vehicle collisions or road surface wear.

4.4.6.3 Alternative A

Alternative A would result in slightly higher road usage than the current condition as only one drilling rig would be in operation at any one time. An occasional work over rig could also be in operation as well as a small production operations staff. Crude oil production would increase up slowly as new in-fill wells are drilled and completed resulting in a slow increase in the number of tanker trucks on the road.

4.4.6.4 Mitigation and Monitoring

Investigate the possibility of a crude oil pipeline connection as described in 4.4.5.1, above.

4.4.6.5 Residual Impacts

Project related health and safety policies would be implemented but some accidents to personnel would occur. Due to the increased level of truck traffic on Poison Spider Road there is an opportunity for increased risk of traffic accidents and collisions with wildlife and livestock. Proper licensing and awareness training of equipment operators would mitigate and minimize these impacts to some extent.

4.4.6.6 Cumulative Impacts

Cumulative impacts resulting from implementation of the Proposed Action include the following considerations. Increased vehicle traffic especially crude haul trucks on Poison Spider Road would increase as would the opportunity for vehicle and wildlife collisions. Occupational hazards associated with mining and oil and gas development and operations, the risks of operation of vehicles on narrow, poor condition paved roads and poor winter conditions could also contribute to the cumulative impacts of the project on health, safety and transportation.

A successful project might lead to more UAORF projects in surrounding fields-if there is no additional development resulting from a successful project, the cumulative impact would be essentially the same as that anticipated and analyzed for the Proposed Action.

4.4.7 Wastes (Solid and Hazardous)

There are no known solid or hazardous waste sites within the Poison Spider Field area but it is expected that a solid waste disposal sites are present due to the age of the field and the presence of the camp housing area. Reserve pits from earlier oil exploration activities are likely buried adjacent to each active or plug and abandonment well marker, this is an accepted and common industry practice. At least one septic system is in operation, others may also be present.

4.4.7.1 Proposed Action, Direct and Indirect Impacts

Under the Proposed Action RWP would generate limited quantities of solid (non-hazardous) waste and hazardous waste. No hazardous wastes would be disposed of in the project area. All wastes would be managed in compliance with the applicable and appropriate state and federal regulations. Any release of a hazardous material would be managed and reported as required within CE RCLA. Such reports would be made to WDEQ/WQD or SHWD, the EPA and/or the WOGCC. The applicable agency spill response and clean-up standards would apply.

Drilling fluids from shaft drilling would be managed in a lined pit located within the shaft area. The mud in this system would be native material comprised of soil and water, standard drilling additives may be used if determined to be necessary.

Spoil from tunnel excavation will be managed as described in the Reclamation Plan (Appendix A). This material will be brought up the shaft on the skip and either loaded for transportation to the Camp area stock pile or will be stock piled in the shaft area. The majority of this material will be used for reclamation of previously disturbed areas or will be maintained in a long term stock pile for final closure of the shaft and vent raise. If water is encountered during tunnel excavation it would be gathered in a sump and pumped to the cuttings pit on the surface for use in the borehole drilling project.

Drilling fluids from the subsurface bore hole drilling operation will be pumped to a closed mud system located on the surface. Cleaned, recycled mud will be pumped back down the shaft for continued use. The closed system technology significantly reduces the volume of water and mud required for well drilling activities and the volume of material to be disposed. Cuttings will be managed in compliance with the WOGCC and BLM requirements and may be buried on site.

Produced water will be injected into the Tensleep and Sundance formations under permits from BLM and WOGCC.

Domestic refuse and non-hazardous construction debris will be removed from the project area and disposed of in a WDEQ approved waste disposal facility. Equipment maintenance fluids and wastes such as used oil, antifreeze, and used oil filters will be managed as required by WDEQ and related EPA rules and regulations. Any waste disposal sites that may be discovered as a result of implementation of the Reclamation Plan would be removed and managed appropriately.

Solid wastes will not be disposed of on site. Permitted third party recyclers may also be used. Sewage will be managed using contract portable toilets and WDEQ approved and installed septic systems constructed on site. All hazardous and non-hazardous wastes will be managed in accordance with applicable state and federal rules and regulations. The overall impact from waste management associated with the project would be minimal.

The BLM required Hazardous Materials Inventory for the Proposed Action is located in Appendix D.

4.4.7.2 No Action Alternative

Under the No Action Alternative the Proposed Action would be denied. Wastes consistent with continued operations would continue to be generated and disposed of as according to RWP policies, the applicable state and federal regulations as discussed above and BLM approval. Wastes previously disposed of within the project area, if any, would remain at existing levels.

4.4.7.3 Alternative A

Alternative A would generate drilling fluid at each of the 192 well sites, either closed or standard mud systems would be used. Transferring mud from well site to well site to reduce mud product, water usage and waste disposal costs would be anticipated in an area of concentrated activity. Considerable non-hazardous waste in the form of trash, rig and vehicle maintenance fluids and human wastes would be generated in the course of constructing well sites, drilling wells and laying gathering lines. All these materials would be managed according to the applicable state and federal regulations and as

approved by BL M. Produced water would continue to be injected or may be surface discharged under a WDEQ/WQD WYPDES permit. Existing waste disposal sites in the field would remain as they are unless uncovered and managed during construction operations.

4.4.7.4 Mitigation and Monitoring

No additional mitigation or monitoring is recommended beyond that described above.

4.4.7.5 Residual Impacts

Some environmental damage would occur as a result of the release of hazardous materials such as crude oil within the project area. Such impacts would likely be minor and the spill response and clean-up timely and appropriate as required by state and federal regulations. Implementation of the RWP Reclamation Plan would result in removal and management of any waste disposal sites that may be discovered.

4.4.7.6 Cumulative Impacts

The Proposed Action would result in a net reduction of wastes buried in the current Poison Spider oil field. Drilling cuttings would continue to be buried on site. RWP may generate waste materials that would require registration as a small quantity hazardous waste generator and implement the appropriate waste management procedures. The cumulative impact of waste generation and management by RWP will have a negligible impact on the project area.

5.0 Consultation and Coordination

5.1 Background

The Poison Spider Underground-Access Oil Recovery Facility project EA was prepared by an independent contractor with guidance, participation and independent review and evaluation by the Bureau of Land Management Casper Field Office. A list of document preparers and reviewers is presented in this chapter.

5.2 Public Participation

In accordance with NEPA and Council of Environmental Quality (CEQ) regulations, the CFO did not initiate public scoping on this project as it is entirely contained within a producing oil field and constitutes an enhanced oil recovery project. All project related NOS/APD submittals are posted for public review for 30 days. The EA and the FONSI/DR for the project will also be available for review in the CFO.

Internal BLM scoping identified the issues and concerns associated with the proposed action. The issues raised include degraded ground water hydrology, impacts to wildlife, transportation, and other issues discussed more fully in this Environmental Assessment.

5.3 Agencies, Organizations and Individuals Contacted

Appropriate state and federal agencies were contacted via the BLM Interdisciplinary Team members and the independent contractor. The contacted agencies include:
United States Fish and Wildlife Service
Wyoming Game and Fish Department
Wyoming Oil and Gas Conservation Commission

5.4 List of Preparers

Table 5.1 lists the BLM personnel associated with the preparation and review of the document. Table 5.2 lists the third party consulting companies and personnel responsible for preparing this Environmental Assessment.

Table 5.1 Interdisciplinary Team for the BLM

Name	Area of Expertise
Chris Arthur	Cultural and Historic Resources
Jim Bauer	Physical Science, Surface Resources and O&G Permitting
Shan Grey	Wildlife Biologist
Ken McMurrugh	Project Coordination, surface resources and O&G permitting
Patrick Moore	Assistant Field Manager – Minerals and Lands
Bruce Parker	Range Management
Mike Phillips	Range Management
Jim Wright,	Wildlife Biologist

Table 5.2 List of Document Preparers

Name	Area of Expertise
Taylor Environmental Consulting LLC	
Renee C. Taylor	Project manager, wildlife, document preparation
Gene R. George Associates	
Gene George	Geology and Minerals
Greer Services	
John Greer	Cultural Resources
Mavis Greer	Cultural Resources
Cirrus Consulting LLC	
Walter Konkle	Air Quality

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7.0 Glossary

abandon: To cease producing oil or gas from a well when it becomes unprofitable. An exploration well may be abandoned after it has been proven nonproductive. Usually, some of the casing is removed and salvaged, and one or more cement plugs placed in the borehole to prevent migration of fluids between formations.

affected environment: The biological, physical, and socioeconomic environment that will or may be changed by actions proposed and the relationship of people to that environment.

allotment: An area of land where one or more permittees graze their livestock. Generally consists of public land but may include parcels of private or State lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of several pastures or be only one pasture.

alluvium: General term for debris deposited by streams on river beds, floodplains, and alluvial fans, especially deposits brought down during a flood. Applies to stream deposits of recent time. Does not include below water sediments of seas and lakes.

alternative: A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis or expressed in goals and objectives. One of several policies, plans, or projects proposed for decision making.

ambient: The environment as it exists at the point of measurement and against which changes or impacts are measured.

ambient air quality: The state of the atmosphere at ground-level as defined by the range of measured and/or predicted ambient concentrations of all significant pollutants for a 11 averaging periods of interest.

ambient concentration: The mass of a pollutant in a given volume of air. It is typically measured as micrograms of pollutant per cubic meter of air.

ambient standards: The absolute maximum level of a pollutant allowed to protect either public health (primary) or welfare (secondary).

animal unit month (AUM): The amount of forage necessary for the sustenance of one cow/calf pair for 1 month.

anticline: An arched, inverted-trough configuration of folded and stratified rock layers.
Application for Permit to Drill (APD): The Department of Interior application permit form to authorize oil and gas drilling activities on federal land.

artesian: Groundwater with sufficient pressure to flow without pumping.

back: The ceiling of the tunnel.

background concentration: The existing levels of air pollutant concentration in a given region. In general, it includes natural and existing emission sources, but not future emission sources.

basin: A closed geologic structure in which the beds dip toward the center; the youngest rocks are at the center of a basin and are partly or completely ringed by progressively older rocks.

Best Available Control Technology (BACT): The best available air pollution control technology for a given emission source, considering environmental benefits, economic and energy costs, as defined by the applicable air quality regulatory authority.

big game: Those species of large mammals normally managed as a sport hunting resource.

borehole: A circular hole made by boring; especially a deep hole of small diameter, such as an oil well or a water well.

Bureau of Land Management (BLM): The Department of Interior agency responsible for managing most Federal Government subsurface minerals. It has surface management responsibility for Federal lands designated under the Federal Land Policy and Management Act of 1976.

casing: Steel pipe or pipe-like structure placed in an oil or gas well to prevent the hole from collapsing.

completion: The activities and methods to prepare a well for production. Includes installation of equipment for production from an oil or gas well.

Condition of Approval (COA): Conditions or provisions (requirements) under which an Application for a Permit to Drill or a Sundry Notice is approved.

contrast: The effect of a striking difference in the form, line, color, or texture of the landscape features within the area being viewed.

corridor: A strip of land, usually a few to many times the width of a right-of-way through which one or more facilities (e.g. pipelines, roads, power lines) may be located.

Council on Environmental Quality (CEQ): An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

criteria pollutants: Air pollutants for which the EPA has established State and National Ambient Air Quality Standards. These include particulate matter (PM₁₀), nitrogen oxides (NO_x), sulfur dioxide (SO₂), carbon monoxide (CO), and volatile organic compounds (VOC).

crucial range: Any particular seasonal range or habitat component that has been documented as the determining factor in a population's ability to maintain itself at a certain level over the long-term.

cultural resources: The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) and the conceptual content or context (as a setting for legendary, historic, or prehistoric events, such as a sacred area of native peoples, etc.) of an area of prehistoric or historic occupation.

cumulative impact: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taken place over a period of time (40 CFR 1508.7).

decibel: A unit of measurement of noise intensity. The measurements are based on the energy of the sound waves and units are logarithmic. Changes of 5 decibels or more are normally discernible to the human ear.

discharge: Produced water being released from the project area under a Wyoming Department of Environmental Quality discharge permit (WYPDES). Generally, measured by the volume of water flowing past a point per unit time, commonly expressed as cubic feet per second (cfs), gallons per minute (gpm), or million gallons per day (mgd).

dispersion: The spreading out of pollutants. Generally, used to show how much an air pollutant will spread from a particular point.

displacement: As applied to wildlife, forced shifts in the patterns of wildlife use, either in location or timing of use.

disturbance: An event that changes the local environment by removing organisms or opening up an area, facilitating colonization by new, often different, organisms.

disturbed area: Area where natural vegetation and soils have been removed or disrupted.

diversity: The distribution and abundance of different plant and animal communities and species within the area covered by a Land and Resource Management Plan.

drainage: Natural channel through which water flows some time of the year. Natural and artificial means for effecting discharge of water as by a system of surface and subsurface passages.

drill bit: The cutting device used to drill a well. It is typically made of hardened steel, and may have industrial grade diamond components.

drilling mud: The circulating fluid used to bring cuttings out of the well bore, cool the drill bit, and provide hole stability and pressure control. Drilling mud includes a number of additives to maintain the mud at desired viscosities and weights. Some additives that may be used are caustic, toxic, or acidic.

drill rig: The mast, draw works, and attendant surface equipment of a drilling workover unit.

ecosystem: An interacting system of organisms considered together with their environment for example, marsh, watershed, and stream ecosystems.

effects: These include: a) Direct effects, which are caused by the action and occur at the same time and place; b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. In direct effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural

systems, including ecosystems. Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.

Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial (40 CFR 1508.8).

emission factor: An empirically derived mathematical relationship between pollutant emission rate and some characteristic of the source such as volume, area, mass, or process output.

endangered species (animal): Any animal species in danger of extinction throughout all or a significant portion of its range. This definition excludes species of insects that the Secretary of the Interior determines to be pests and whose protection under the Endangered Species Act of 1973 would present an overwhelming and overriding risk to man.

endangered species (plant): Species of plants in danger of extinction throughout all or a significant portion of their ranges. Existence may be endangered because of the destruction, drastic change, or severe curtailment of habitat, or because of over exploitation, disease, predation, or even unknown reasons. Plant taxa from very limited areas (e.g. the type localities only), or from restricted fragile habitats usually are considered endangered.

environment: The aggregate of physical, biological, economic, and social factors affecting organisms in an area.

environmental assessment (EA): An investigation of a proposed action and alternatives to that action and their direct, indirect, and cumulative environmental impacts; the process which provides the necessary information for reaching an informed decision and the information needed for determining whether a proposed action may have significant environmental effects and determining the type of environmental documents required.

environmental impact statement (EIS): An analysis of alternative actions and their predictable environmental effects, including physical, biological, economic, and social consequences and their interactions; short- and long-term effects; direct, indirect, and cumulative effects.

ephemeral drainage: A drainage area or a stream that has no base flow. Water flows for a short time each year but only in direct response to rainfall or snowmelt events.

ephemeral stream: A stream that flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice and which has a channel bottom that is always above the local water table.

emission: Air pollution discharge into the atmosphere, usually specified by mass per unit time.

erosion: The removal, detachment, and entrainment of earth materials by weathering, dissolution, abrasion, and corrosion, later to be transported by moving water, wind, gravity, or glaciers.

escapeway: A vent shaft with escape mechanism, hoist or cage.

federal lands: All lands and interests in lands owned by the U.S. that are subject to the mineral leasing laws, including mineral resources or mineral estates reserved to the U.S. in the conveyance of a surface or non-mineral estate.

footprint: The actual surface area physically disturbed by oil and gas operations and ancillary facilities.

forage: Vegetation of all forms available for animal consumption.

forb: A broad-leaved flowering herb other than grass.

formation (Geologic): A rocky body distinguishable from other rock bodies and useful for mapping or description. Formations may be combined into groups or subdivided into members.

fugitive dust: Airborne particles emitted from any source other than through a controllable stack or vent.

game species: Animals commonly hunted for food or sport.

groundwater: Water contained in the pore spaces of consolidated and unconsolidated surface material.

grout curtain: Shotcrete sprayed on the raw soil wall of the drilled shaft.

habitat: A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

habitat type: The aggregate of all areas that support or can support the same primary vegetation at climax.

hazardous waste: (A) Any substance designated pursuant to section 311(b)(2)(A) of the Federal Water Pollution Control Act. (B) Any element, compound, mixture, solution, or substance designated pursuant to section 102 of this Act. (C) Any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress). (D) Any toxic pollutant listed under section 307(a) of the Federal Water Pollution Control Act. (E) Any hazardous air pollutant listed under section 112 of the Clean Air Act. (F) Any imminently hazardous chemical substance or mixture with respect to which the Administrator has taken action pursuant to section 7 of the Toxic Substances Control Act. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).

headframe: The structure that supports the skip and is positioned over the shaft.

herbaceous: The plant strata which contain soft, not woody, stemmed plants that die to the ground in winter.

hydrology: A science that deals with the properties, distribution, and circulation of surface and subsurface water.

impact: The results of an action on the environment; the impact may be primary (direct) or secondary (indirect); the term impact is synonymous with effect according to 40 CFR 1508.8.

infiltration: The movement of water or some other liquid into the soil or rock through pores or other openings.

infrastructure: The basic framework or underlying foundation of a community including road networks, electric and gas distribution, water and sanitation services, and facilities.

Injection well: A well into which produced water from other wells is placed into an underground formation for disposal.

interdisciplinary team (IDT): A group selected to work within the NEPA process in scoping, analysis, and document preparation. The purpose of the team is to integrate its collective knowledge of the physical, biological, economic, and social sciences and the environmental design arts into the environmental analysis process. Interaction among team members often provides insight that otherwise would not be apparent.

lead agency: The agency or agencies preparing or having taken primary responsibility for preparing the environmental impact statement (40 CFR 1508.16).

lease: (1) A legal document that conveys to an operator the right to drill for oil and gas. (2) The tract of land on which a lease has been obtained, where producing wells and production equipment are located.

lek: An assembly area for communal courtship display, usually in reference to greater sage-grouse or other grouse.

lithic scatter: A surface scatter of cultural artifacts and debris that consists entirely of lithic (i.e., stone) tools and chipped stone debris. This is a common prehistoric site type that is contrasted to a cultural material scatter, which contains other or additional artifact types such as pottery or bone artifacts, to a camp which contains habitation features, such as hearths, storage features or occupation features, or to other site types that contain different artifacts or features.

loam: A mixture of sand, silt, and clay containing between 7 and 27 percent clay, 28 to 50 percent silt and less than 50 percent sand.

methane (CH₄): The simplest hydrocarbon; natural gas is nearly pure methane.

mitigate: To lessen the severity.

mitigation: Avoiding the impact altogether by not taking a certain action or parts of an action; minimizing impacts by limiting the degree of magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and/or compensating for the impact by replacing or providing substitute resources or environments.

modeling: A mathematical or physical representation of an observable situation. In air pollution control, models afford the ability to predict pollutant distribution or dispersion from identified sources for specified weather conditions.

monitor: To systematically and repeatedly watch, observe, or measure environmental conditions in order to track changes.

National Ambient Air Quality Standards (NAAQS): The allowable concentrations of air pollutants in the air specified by the Federal government. The air quality standards are divided into primary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public health) and secondary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public welfare from any unknown or expected adverse effects of air pollutants).

National Environmental Policy Act (NEPA): The federal law established in 1969, which went into effect on January 1, 1970, that (1) established a national policy for the environment, (2) requires federal agencies to become aware of the environmental ramifications of their proposed actions, (3) requires full disclosure to the public of proposed federal actions and a mechanism for public input into the federal decision-making process, and (4) requires federal agencies to prepare an environmental impact statement for every major action that would significantly affect the quality of the human environment.

National Register of Historic Places: A list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture.

native species: Plants that originated in the area in which they are found, i.e., they naturally occur in that area.

natural gas: Those hydrocarbons, other than oil and other than natural gas liquids separated from natural gas, that occur naturally in the gaseous phase in the reservoir and are produced and recovered at the wellhead in gaseous form. Natural gas includes coal bed methane gas.

No Action Alternative: The management direction, activities, outputs, and effects that are likely to exist in the future if the current plan would continue unchanged.

noxious weeds: Officially designated undesirable or invading weedy species generally introduced into an area due to human activity.

ozone: A molecule containing three oxygen atoms (O₃) produced by passage of an electrical spark through air or oxygen (O₂).

paleontology: The science that deals with the history and evolution of life on earth.

particulate matter: A particle of soil or liquid matter (e.g., soot, dust, aerosols, fumes and mist).

perennial stream: A stream or reach of a stream that flows throughout the year.

permeability: Extent that a substance is open to passage or penetration, especially by fluids.

permittee (grazing): A person who has livestock grazing privileges on an allotment or allotments within the resource area.

preferred alternative: The alternative identified in the EIS as the action favored by the agency.

prevailing wind: The most frequent compass direction from which the wind blows.

prevention of significant deterioration of air quality (PSD): A classification established to preserve, protect, and enhance the air quality in National Wilderness Preservation System areas in existence prior to August 1977 and other areas of National significance, while ensuring economic growth can occur in a manner consistent with the preservation of existing clean air resources. Specific emission limitations and other measures, by class, are detailed in the Clean Air Act (42 U.S.C. 1875 et 15q.).

produced water: Formation water pumped during the development of a gas well.

PSD increments: The maximum allowable increase in pollutant concentrations permitted over baseline conditions as specified in the EPA Prevention of Significant Deterioration (PSD) regulations (40 CFR Part 52.21). The regulations apply only to an area currently attaining NAAQS/WAAQS. Most National Parks and Wilderness areas are Class I Areas, where almost no future pollution increase is permitted. Most other areas are Class II Areas, where moderate increases in pollution levels are allowed.

public land: Lands or interests in lands owned by the United States and administered by the Secretary of Interior through the Bureau of Land Management, without regard to how the United States acquired ownership.

range: Land producing native forage for animal consumption and lands that are revegetated naturally or artificially to provide forage cover that is managed like native vegetation, which are amenable to certain range management principles or practices.

raptor: Living on prey; a group of carnivorous birds consisting of hawks, eagles, falcons, kites, vultures, and owls.

reclamation: rehabilitation of a disturbed area to make it acceptable for designated uses. This normally involves regrading, replacement of topsoil, revegetation and other work necessary to restore it for use.

record of decision (ROD): A decision document for an Environmental Impact Statement or Supplemental EIS that publicly and officially discloses the responsible official's decision regarding the actions proposed in the EIS and their implementation.

reserve pit: (1) Usually an excavated pit that may be lined with plastic, that holds drill cuttings and waste mud. (2) Term for the pit which holds the drilling mud.

reserves: Identified resources of mineral-bearing rock from which the mineral can be extracted profitably with existing technology and under present economic conditions.

revegetation: The re-establishment and development of self-sustaining plant cover. On disturbed sites, human assistance will speed natural processes by seed bed preparation, reseeding and mulching.

ribs: The tunnel walls.

right-of-way (ROW): The legal right for use, occupancy, or access a cross land or water areas for a specified purpose or purposes.

riparian: Land areas which are directly influenced by water. They usually have visible vegetative or physical characteristics showing this water influence. Stream sides, lake borders, or marshes are typical of riparian areas.

runoff: That part of precipitation that appears in surface streams. Precipitation that is not retained on the site where it falls and is not absorbed by the soil.

scatter (archeological): Random evidence of prior disturbance that is distributed about an area rather than concentrated in a single location.

scoping: An early and open process for determining the scope of issues to be addressed in an EIS and for identifying the significant issues related to a proposed action. Scoping may involve public meetings, field interviews with representatives of agencies and interest groups, discussions with resource specialists and managers, and written comments in response to news releases, direct mailings, and articles about the proposed action and scoping meetings.

sediment: Soil or mineral transported by moving water, wind, gravity, or glaciers, and deposited in streams or other bodies of water, or on land.

sedimentation: The formation of rock from fragments of pre-existing rocks (e.g. sandstone) or by precipitation from solution (e.g. limestone).

sensitive species: Those species of plants or animals that have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species under the Endangered Species Act. This also includes species that are on an official state list or are recognized by the Land Manager as needing special management to prevent their being placed on federal or state lists.

shaft: A large diameter hole drilled to access the tunnel.

shotcrete: Sprayed cement, generally used to coat the inside of the tunnel or to temporarily seal over water and hydrocarbon zones.

shut in: To close the valves on a well so it ceases production.

significant impact: A meaningful standard to which an action may impact the environment. The impact may be beneficial, adverse, direct, indirect, or cumulative, and may have short-term or long-term effects.

skip: The device used to raise and lower equipment, supplies and people through the shaft to the tunnel.

soil: Loose, unconsolidated surface material comprising topsoil and subsoil.

species: (1) The classification level of biological nomenclature which categorized each group of related organisms potentially capable of interbreeding; (2) the accepted level of classification to differentiate one specific type of organism from another.

species of concern: Species of concern include federally listed threatened or endangered species, species proposed for listing, BLM sensitive species, and species considered rare or important by the Wyoming Natural Diversity Database (WYNDD).

spp.: An abbreviation for the plural of species.

spud: Begin drilling a well.

stipulation: A legal requirement, specifically a requirement that is part of the terms of a mineral lease. Some stipulations are standard on all federal leases. Other stipulations may be applied to the lease at the discretion of the surface management agency to protect valuable surface resources.

threatened and endangered species: Any species, plant or animal, which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Threatened species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.

topography: The features of the earth, including relief, vegetation, and waters.

topsoil: The uppermost layers of naturally occurring soils suitable for use as a plant growth medium.

total dissolved solids (TDS): Total amount of dissolved material, organic or inorganic, contained in a sample of water.

usable water: Defined by Onshore Oil and Gas Order No. 2 as groundwater with a TDS of 10,000 ppm or less encountered at any depth.

vegetation: All of the plants growing in and characterizing a specific area or region; the combination of different plant communities found there.

vegetation type: A plant community with visually distinguishable characteristics, named for the apparent dominant species.

viewshed: Landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor.

visibility: A measurement of the maximum distance to which large objects may be viewed. Fixed reference objects such as mountains, hills, towers, or buildings are normally used to estimate visibility.

visual resource: The composite of basic terrain, geologic features, water features, vegetation patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for viewers.

Visual Resource Management (VRM): A system of visual management used by the BLM. The program has a dual purpose, to manage the quality of the visual environment and to reduce the visual impact of development activities while maintaining effectiveness in all Bureau resource

programs. VRM also identifies scenic areas that warrant protection through special management attention. The system uses five classes for categorizing visual resources.

Class 1 - Natural ecological changes and very limited management activity are allowed. Any contrasts created within the characteristic landscape must not attract attention. This classification is applied to wilderness areas, wild and scenic rivers, and other similar situations.

Class 2 - Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. Contrasts are seen, but must not attract attention.

Class 3 - Contrasts to the basic elements caused by a management activity are evident, but should remain subordinate to the existing landscape.

Class 4 - Any contrast attracts attention and is a dominant feature of the landscape in terms of scale, but it should repeat the form, line, color and texture of the characteristic landscape.

Class 5 - The classification is applied to areas where the natural character of the landscape has been disturbed to a point where rehabilitation is needed to bring it up to one of the four other classifications. The classification also applies to areas where unacceptable cultural modification has lowered scenic quality; it is often used as an interim classification until objectives of another class can be reached.

water bar: A ridge made across a hill to divert water to one side.

waters of the United States: A jurisdictional term from Section 404 of the Clean Water Act referring to water bodies such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce.

well bore: A drilled hole or well.

well head: The equipment used to maintain surface control of a well. It is composed of the casing head, tubing head and a series of valves and fittings.

well pad: Relatively flat work area that contains equipment and facilities used for oil/gas production.

well site: Relatively flat work area that contains equipment and facilities used for well drilling and well completion activities.

wetlands: Areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

wind rose: Any one of a class of diagrams designed to illustrate the distribution of wind direction experienced at a given location over a given period of time. Wind roses may also give information concerning distribution of wind speed, stability, or other meteorological parameters.

winter range: The place where migratory (and sometimes non-migratory) animals congregate during the winter season.

workover: Well maintenance activities that require onsite mobilization of a drill rig to repair the well bore equipment (casing, tubing, rods, or pumps) or the wellhead. In some cases, a workover may involve development activities to improve production from the target formation.

1.0 POISON SPIDER RECLAMATION PLAN

Rockwell Petroleum (RWP) proposes to develop underground access oil production in the Poison Spider Oil Field while reclaiming the existing surface disturbance and production areas. Poison Spider Oil Field is 100% federally owned minerals and surface managed by the Bureau of Land Management. This plan is a discussion of the reclamation of the project area including the proposed new disturbances required to facilitate the underground access development and the reclamation of the existing surface disturbances in the Poison Spider Oil Field.

1.1 Reclamation Requirements

BLM's reclamation requirements include the following primary goals:

- Recontour the land surface and implement other soil conservation and water management techniques to minimize erosion and sedimentation in order to protect surface and ground water resources;
- Revegetate disturbed areas to establish self-perpetuating native plant communities capable of supporting existing and future land uses; and
- Minimize visual contrasts.

BLM Reclamation Standards are the tool to assess whether or not reclamation practices at Poison Spider have been successful. These standards include:

- No contaminated materials will be left at or near the surface, and all such buried materials would be encapsulated in impermeable material and covered with at least 4 feet of soil material;
- The subsurface would be stabilized, and holes would be plugged and no indications of subsidence, slumping and/or significant downward movement of surface soil materials would be visible;
- Reclaimed areas would be free of trash, debris and other solid wastes;
- Reclaimed areas would be free of rills or gullies, perceptible soil movement, head cutting in drainages, or slope instability on or adjacent to reclaimed areas;
- Soil surfaces would have adequate surface roughness to reduce runoff and to capture rainfall and snowmelt;
- Vegetative canopy cover, production, and species diversity would approximate the surrounding undisturbed areas. Vegetation will help stabilize the site, support post-disturbance land uses, and would be self-sustaining. Revegetated areas would be as free as practicable from noxious, non-native, and invasive species;

- The reclaimed landscape would approximate the visual quality of adjacent areas with regard to line, form, texture, contour, color, and orientation of major landscape features and would support pre-disturbance land uses.

1.2 Areas of Disturbance

The Poison Spider Field encompasses 560 acres of which 31.5 acres have been previously disturbed. Disturbed areas include the Poison Spider Camp (Oil Camp), 15 well sites with associated drill pads, production and produced water discharge pits, production tank battery, shop, an area previously impacted by oil spills, and access roads. Proposed new disturbances will encompass approximately 12.3 acres that will include the underground access area (Shaft Area) and the Service Area as depicted on Figure 1-3 of the Environmental Assessment.

Underground access will be accomplished by boring a vertical shaft then excavating approximately 7,000 feet of horizontal tunnel(s) beneath the pay zones. The Shaft Area, encompassing 7.5 acres, will contain the shaft and headframe (support structure for the underground hoist conveyance), cuttings pit, equipment lay-down area, equipment storage area (ready line), hard line lay-down and storage area, spoils stockpile, topsoil stockpile, fuel storage, portable light plant, temporary power generation plant, a pad mount transformer, a temporary exhaust fan, spare parts storage, and a water disposal well (WD2). The Service Area, encompassing approximately 4 acres, will contain a shop/office building, parking area, change room/dry, a crude oil and produced water tank battery, a produced water injection plant, a water disposal well (WD1) and other infrastructure. A short pipeline corridor, approximately 900 feet long by 10 feet wide (200' X 10' or 0.05 acres of new disturbance) will connect the Shaft Area to the tank battery located in the Service Area.

The Oil Camp Road will be widened from the current 20 foot usable width to a 36 foot width to accommodate equipment hauling spoils material and topsoil to stockpiles located in the Oil Camp area. The usable width of the road will be 30 feet with the additional 6 feet used for drainage ditches. A total of 0.6 acres (16' X 1700') of new disturbance will be required for the upgrade of the Oil Camp Road.

A pipeline corridor for water lines leading to the injection wells WD3 and WD4 will also parallel the road. Total temporary disturbance associated with the pipeline corridor will be approximately 0.4 acres (10' X 1700') with reclamation completed concurrently with pipeline installation.

Designated existing roads, located within the previously disturbed Oil Camp, will be maintained in order to access the vent raise and the injection wells (WD3 and WD4). These roads have a usable width of approximately 10 feet and will be reclaimed at the end of the project. There will be no new disturbance associated with these roads.

The vent raise will also be located in a previously disturbed area near the junction of the western entrance of the Oil Camp Road and Poison Spider Road. The vent raise will be adjacent to the road so new disturbances will be minimal; however, a small portion of the west road (100') will not be reclaimed until the end of the project in order to access the vent raise.

Stockpiles for salvaged topsoil and material excavated from the underground development (spoils) will be located within the Shaft Area as well as within the Oil Camp. The topsoil stockpile located within the Oil Camp area will be used to store all topsoil salvaged from the Shaft Area, Service Area, and the widened Oil Camp Road. Spoils material excavated from the underground development and the cuttings pit will be placed in stockpiles located within the Shaft Area and the Oil Camp (3.1 acres) and will be used to reclaim well pads, drill roads, and the Oil Camp area itself. The Oil Camp spoils stockpile will be constructed towards the end of tunnel development or when the Shaft Area stockpile has reached its design capacity. A total of 10,200 cy of topsoil will be salvaged with a total stockpile capacity of approximately 12,700 cy. Spoils excavated from the underground development, the cuttings pit, and the vent raise will total approximately 75,000 cy. The total spoils stockpile capacity will be approximately 113,200 cy. Material derived from the shaft boring will be pumped as a slurry to the cutting pit where it will remain. This material does not factor into the materials balance.

Figure 1-2 of the EA depicts the proposed new disturbance areas as well as the areas previously disturbed. Table 1 summarizes the proposed new disturbance areas as well as the acreages and timetable for reclamation of these areas.

**Table 1
Proposed Disturbances**

Location	Long Term Disturbance Areas (acres)	Long-Term Reclamation Timeframe	Short Term Disturbance Areas (acres)	Short-Term Reclamation Timeframe
Shaft Area	3.5	End of Project (2027)	4.0*	Stabilize & Seed @ End of UG Development
Topsoil Stockpile		End of Project (2027)		Interim Reclamation – 1 st Year
Spoils Stockpile – Including Cuttings Pit Material**		End of Project (2008-2027)		Stabilize & Seed - Utilize Throughout Life-of-Project
Cuttings Pit Stockpile		End of Project (2027)		Interim Reclamation – 1 st Year
Pipeline Corridors		End of Project (2027)	0.6 (2500 ft X 10 ft)	Interim Reclamation – 1 st Year
Service Area	4.0	End of Project (2027)	4.0	
Road (Oil Camp)	0.6	End of Project (2027)	0.6	
Oil Camp Stockpiles (Spoils & Topsoil)		2007-2027	3.1	Stabilize & Seed - Utilize Throughout Life-of-Project
Vent Raise & Road	0.3	End of Project (2027)	1.0	
Injection well sites	0.2		0.2	
Total	8.6		13.5	

*Approximation of reclaimed Shaft Area after underground development is completed.

** Material stockpiled from the tunnel excavation will be utilized as growth medium and backfill throughout the life of the project.

2.0 RECLAMATION OF PROPOSED DISTURBANCES

Reclamation for most of the proposed project areas will not occur until the end of the project; however, portions of the Shaft Area will be reclaimed once full oil production begins in about year 3. Additionally, some interim reclamation will occur in order to stabilize select cut slopes, fill slopes, pipeline corridors, and stockpiles. A Wyoming Department of Environmental Quality Construction Storm Water Pollution Prevention Permit (WDEQ SWPPP) will be obtained for the project and the appropriate BMP's (Best Management Practices) implemented throughout the life of the project and continued until final stabilization has been achieved.

2.1 Site Preparation

Site preparation will involve grading the Shaft Area and Service Area to the desired final elevation and configuration. Prior to that, topsoil will be salvaged and separately stockpiled. Additional topsoil material will be salvaged (approximately 500 cy) prior to widening the Oil Camp Road. Vegetation will be salvaged and stockpiled with the topsoil to incorporate native seeds and organic matter into the soil. The total volume of topsoil salvaged will not be known until construction operations begin, but it is anticipated that a minimum 6 inches of topsoil will be salvaged which equates to approximately 10,200 cy of material over the 12.3 acres of new disturbance. The salvaged topsoil will be stockpiled separately and signed accordingly.

2.2 Shaft Area

Reclamation of the Shaft area will occur at the end of the project, although some reclamation may be completed within the Shaft Area (~ 4 acres) at the end of underground development and may include the area immediately surrounding the shaft, portions of the lay-down area, and areas around the cutting pit. The cuttings pit, utilized during the shaft boring, will remain to be used during production drilling for recycling water then reclaimed at the end of the project. The spoil stockpile will be graded to a nominal 2:1 slope for stability purposes then seeded with an approved interim seed mixture. To further protect the stockpile, erosion control BMPs will be installed that may include mulch and/or erosion control matting over the seeded areas and sediment control fence or weed-free straw bales along the toe of each stockpile. The erosion control BMPs would be installed in accordance with the WDEQ SWPPP.

It is anticipated that the spoil material from the underground excavation (approximately 43,600 cy) will be utilized as backfill and growth medium. The material will be used for backfilling the shaft at the end of the project, backfilling along cut slopes within the Shaft Area and Service Area, and as growth medium for reclamation of the Shaft Area, Service Area, and the previously disturbed areas within and around the Oil Camp. Spoils material will be added to the stockpiles and removed throughout the development period to be used for interim and final reclamation in designated areas. Although the stockpiles will be constantly changing in size, RWP will maintain them with 2:1 sideslopes for stability and will apply an interim seed mix and erosion control BMPs whenever possible. At the end of the project, any remaining spoil material left in the stockpile will be re-contoured, amended as required, and seeded with the appropriate seed mix. Erosion

control BMPs will be installed as necessary. Prior to use as a growth medium, RWP will determine the agronomic and physical characteristics of the spoil material and amend the material as necessary to achieve the desired soil chemistry.

At the end of the project, the shaft, measuring 12.5 feet in diameter and 1600 feet deep, will be plugged using the spoils material. Reclamation of the shaft will involve backfilling the raise to within 20 feet of the surface then installing a concrete plug from the top of the backfill to the surface. Backfilling will require approximately 7,300 cy of material. All surface facilities associated with the shaft will be removed.

The lined cuttings pit will be reclaimed first by dewatering either by removing or by evaporation, any liquids and slurry material remaining in the pit. Prior to backfilling the pit, the liner may be perforated, depending on BLM preferences, to allow for natural infiltration of precipitation. A minimum of 20,000 cy of spoil material will be placed into the pit in such a way (slightly mounded) as to approximate original contour, to allow for settling, and to achieve positive drainage off the mound to prevent standing water. The liner will remain buried.

The Shaft Area will be scarified to a depth of 1-2 feet to improve aeration, water infiltration, and root penetration. Topsoil plus whatever required amount (if any) of amended spoil material or other appropriate growth medium will be placed over the area to a minimum depth of 6-inches of topsoil mixture then seeded using a BLM approved seed mix. Mulch will be applied to the seeded areas and other erosion control BMPs will be installed as necessary.

All structures associated with shaft and tunnel excavation, and oil production will be removed with construction materials buried on-site with BLM approval, disposed of in an appropriate off-site disposal facility, or reused on future projects.

2.3 Service Area

Reclamation of the Service Area, which encompasses 4.0 acres, will occur at the end of the project, although some interim reclamation will be completed. Topsoil salvaged from the service area will be placed in the stockpiles located in the portal area.

At the end of the project, the service area will be scarified to a depth of 1-2 feet to improve aeration, water infiltration, and root penetration. The stockpiled topsoil plus whatever required amount (if any) of amended spoil material or other appropriate growth medium will be placed over the area to a minimum depth of 6-inches of topsoil mixture then seeded using a BLM approved seed mix. Mulch will be applied to the seeded areas and other erosion control BMPs will be installed as necessary.

All buildings, tank batteries, and associated facilities will be removed with construction materials buried on-site with BLM approval, disposed of in an appropriate off-site disposal facility, or reused on future projects.

2.4 Roads

The Oil Camp Road will be widened and improved to be utilized as a haulage road to build the proposed stockpiles located within the Oil Camp area and to access the vent raise and injection wells via previously existing roads within the camp area. The access roads and the vent raise will be reclaimed at the end of the project with the roads reclaimed in the same manner as the well pad roads described below.

Reclamation of the Oil Camp Road would involve pulling up any surplus material along the sides of the road into the road bed. Prior to salvaging any surplus material or placing amended growth medium on the road, the “blacktop” comprising the surface of the road will be excavated and used as backfill for the portal culvert. Any storm water culverts or other solid materials would be removed from the site. Drainage crossings would be restored to approximate the original channel configuration including the channel banks, bottom, and gradient. The road bed would be ripped to a depth of 1-2 feet then covered with a minimum depth of 6-inches of topsoil or other growth medium. The road bed and side slopes would be seeded with an appropriate and approved seed mixture, fertilized if necessary, and mulched. Erosion control matting would be placed where necessary.

2.5 Pipeline Corridors

The surface disturbance created by the installation of the pipelines, both for produced liquids and produced water will be reclaimed immediately after the pipeline installations are completed. The produced liquids pipeline corridor will encompass an area approximately 900 feet long by 10 feet wide all within the Portal Area and Service Area with the exception of approximately 200 ft where it crosses the Oil Camp Road. The produced water pipeline corridor will encompass an area of approximately 2300 feet long by 10 feet wide between the Service Area (water separation equipment) and injection wells WD3 and WD4. The pipeline to injection well WD1 will be completely within the Service Area and the pipeline to WD2 will be located within the same corridor as the produced liquids pipeline.

Topsoil will be removed to a depth of approximately 6 inches and rolled to the side separate from the material removed from the pipeline trench. The pipe will be bedded with sand and backfilled with the removed soil to approximate the original contour. Soil will be mounded over the trench to accommodate future settling. Once installation is complete the topsoil will be re-spread and seeded with a BLM approved seed mixture. When the project is over the pipeline will be purged, all connections cut off below ground level, capped, and abandoned in place.

2.6 Vent Raise

A vent raise, located at the west end of Oil Camp Road and within the previously disturbed area, will be constructed to supply ventilation to the mine as well as provide an emergency escapeway from the mine. The vent raise will be 6 feet in diameter and 1400

feet deep. Reclamation of the vent raise will involve backfilling the raise to within 10 feet of the surface then installing a concrete plug from the top of the backfill to the surface. Backfilling will require approximately 1400 cy of material.

3.0 RECLAMATION OF PRE-EXISTING DISTURBANCES

Reclamation of some of the previously existing disturbed areas will commence within 1 year of initiating the tunnel excavation. Producing oil well sites will not be abandoned until the underground oil recovery operation is in full production, approximately 2-3 years after commencing tunnel construction. A vent raise and three proposed new injection wells and the existing injection well will be maintained and used throughout the life of the project. Figure 1-2 of the EA depicts previously disturbed areas and Table 2 lists the previously disturbed areas, their acreages and a timetable for reclamation.

**Table 2
Previously Disturbed Areas**

Location	Disturbance Area (acres)	Reclamation Timeframe
Poison Spider Camp	16.83	2009-2010
Well Pads	1.12	2009-2010
Well Pad Roads	4.94	2009-2010
Impacted Slope	8.48	2007-2008
Total	31.51	

3.1 Wells & Well Pads

There are currently 15 well sites 13 of which will be reclaimed. These sites encompass approximately 1.12 acres, within the Poison Spider field with one well already abandoned (Figure 1-2). All wells will be abandoned in accordance with BLM and Wyoming Oil and Gas Conservation Commission (WOGCC) regulations. Underground pipelines would be purged, cut off below ground, capped and abandoned in place. All surface facilities (pumping units) would be removed and either reused or recycled. Pit reclamation will be completed in accordance with the WOGCC guidelines for production pits and as approved by BLM. Reclamation could include removal and disposal of liquids followed by backfilling or in place solidification. Contaminated soil associated with historic field operations will be tested and managed pursuant to WOGCC regulations and BLM approval.

Well pads will be reclaimed by re-contouring the area to blend with pre-existing topography. The compacted well pad areas would be scarified to a depth of 1-2 feet to improve aeration, water infiltration, and root penetration. Amended growth medium or topsoil, if available, would be placed over the area to a depth of 6-inches. The area would

be seeded with the appropriate BLM approved seed mixture, fertilized if necessary, and mulched. Erosion control matting will be placed where necessary.

3.2 Well Pad Roads

Reclamation of the well pad access roads, which includes approximately 4.94 acres of disturbance, would involve pulling up any surplus material along the sides of the road into the road bed. Prior to salvaging any surplus material or placing amended growth medium on the road, the “blacktop” comprising the surface of some sections of road will be excavated and used as backfill or buried pending BLM approval. Any culverts or other solid materials would be removed from the site. Drainage crossings would be restored to approximate the original channel configuration including the channel banks, bottom, and gradient. The road bed would be ripped to a depth of 1-2 feet then covered with a minimum depth of 6-inches of amended growth medium. The road bed and side slopes would be seeded with an appropriate and approved seed mixture, fertilized if necessary, and mulched. Erosion control matting will be placed where necessary.

Roads accessing the vent raise and the injection wells will be reclaimed in the same manner at the end of the project.

3.3 Poison Spider Camp

The area designated as the Poison Spider Camp, encompassing approximately 16.83 acres, will be reclaimed by removing all houses, out buildings, tank batteries and other miscellaneous structures. Buildings will be demolished (or removed intact) with all the materials removed to an approved disposal site. Concrete foundations will be broken-up and removed to an approved off-site disposal facility or buried on-site. BLM approval would be obtained prior to any burial of material. Disturbed areas within the camp would be reclaimed by scarifying the areas to a depth of 1-2 feet then covered with a minimum depth of 6-inches of amended growth medium obtained from the spoils and topsoil stockpiles located in the Oil Camp. The areas would be seeded with an appropriate and approved seed mixture, fertilized if necessary, and mulched. Erosion control matting would be placed where necessary.

The area immediately adjacent to the vent raise will be reclaimed in a similar manner at the end of the project.

3.4 Impacted Slope

The slope immediately below the Oil Camp to the southwest has areas of disturbance as well as areas that have been impacted by previous oil spills. The disturbed and impacted slope encompasses approximately 8.48 acres.

RWP will reclaim the disturbed portions of the slope in a similar fashion as the other disturbed areas. The areas will be scarified then topsoil or amended growth medium will be placed to a minimum depth of 6-inches, then seeded with a BLM approved seed mixture, then mulch or erosion control matting will be installed.

For the oil impacted areas, RWP will determine the depth and lateral extent of the Petroleum Contaminated Soil (PCS). Although the overall scope of this remedial investigation has not been fully developed, conceptually it would involve the utilization of a truck-mounted Geoprobe that would collect “push” samples of the soil for analysis. It is anticipated that when the extent of the PCS has been delineated, RWP would submit the appropriate Notice of Intent (NOI) to the BLM and WOGCC detailing proposed clean-up activities. PCS may be treated in place or excavated for ex-situ treatment. Any excavated areas would be backfilled with the spoil material and the area would be reclaimed similar to the other disturbed areas.

4.0 MATERIALS BALANCE

Salvaged Topsoil (6” salvage depth)

Shaft Area (7.5 acres) – 6,050 cy

Shop/Office Area (4.0 acres) – 3,200 cy

Oil Camp Road (0.6 acres) – 500 cy @ 6” salvage depth

Pipeline Corridors (2500’ X 10’ X 0.5’) – 463 cy @ 6” salvage depth

Previously Disturbed Area (31.3 acres) – assume no salvageable growth medium

Spoil Material from Tunnel Excavation (12’ X 14’ X 7,000’) – 43,600 cy

Shaft (12.5’ diameter X 1600’) – 7,300 cy (withheld in Cuttings Pit; not included in Total)

Cuttings Pit (200’ X 200’ X 20’ with 1:1 sideslopes) – 30,000 cy

Vent Raise (6’ diameter X 1400’) – 1,500 cy

SALVAGED OR EXCAVATED TOTAL – 85,300 cy

Material Required for Backfill

Shaft Backfill – 7,300 cy

Cuttings Pit – 20,000 cy**

Vent Raise – 1,500 cy

Cut Slopes – 5000 cy

Material Required for Reclamation (6” reclamation cover)*

Shaft Area (7.5 acres) – 6,050 cy (includes cut slopes)

Service Area (4.0 acres) – 3,200 cy

Previously Disturbed Areas (31.5 acres) - 25,300 cy

BACKFILL & RECLAMATION TOTAL – 68,350 cy

* soil volumes do not factor in swell

** Material from the shaft boring and on-going production drilling will fill the pit to approximately 1/3 by the end of production.

There is an estimated **16,950 cy** of surplus material that is primarily spoil material; however, should any of the spoil material not be suitable as amended growth medium, material can be obtained from a small borrow pit located immediately west of the existing tank battery. Soil suitability analyses will be conducted on this material and the appropriate soil amendments will be incorporated.

5.0 REVEGETATION

5.1 Growth Medium Suitability

RWP will utilize the spoil material as a growth medium pending suitability and fertility determinations. The suitability criteria, as presented on Table 3, will indicate the amount and types of amendments required for the spoil material. In addition, samples will be collected to determine what the best mix of fertilizer would be for a given soil type.

**Table 3
Soil Suitability Criteria**

Parameter	Criteria*
USDA Texture	Loam or Sandy Loam
Organic Matter	>3.0%
pH	5.5-8.5
Conductivity	<4 ms/cm
Cation Exchange Capacity	>10
Sodium Adsorption Ratio	<12
Saturation Percentage	25-85%
Boron	<5 ppm
Nitrogen	
Phosphate	
Potassium (K20)	
Field Capacity	High
Wilting Point	Low

* Environmental Protection Agency Established Criteria (1998)

5.2 Seeding

Based on site-specific information supplied by the BLM, there are four main soil types and seed mixes for the Poison Spider area. They are loamy, saline upland, saline lowland, and sandy type soils. Depending on the soil types, which RWP will determine in the portal area, the shop/office/tank battery area and the previously disturbed areas, the following seed mixes and rates will be applied, and the application procedures will be followed as described by BLM guidance.

Loamy:

Seed mixture:

Slender wheatgrass	2 lbs PLS/acre
Thickspike wheatgrass	2 lbs PLS/acre
Western wheatgrass	2 lbs PLS/acre
Bottlebrush squirreltail	1 lbs PLS/acre
Sandberg bluegrass	1 lbs PLS/acre
American vetch	2 lbs PLS/acre
Hairy vetch	1 lbs PLS/acre
Blue flax	1 lbs PLS/acre
Purple prairie clover	0.5 lbs PLS/acre
Scarlet globemallow	0.5 lbs PLS/acre

Sandy:

Seed mixture:

Slender wheatgrass	2 lbs PLS/acre
Thickspike wheatgrass	2 lbs PLS/acre
Western wheatgrass	2 lbs PLS/acre
Indian ricegrass	1 lbs PLS/acre
American vetch	2 lbs PLS/acre
Hairy vetch	1 lbs PLS/acre
Blue flax	2 lbs PLS/acre
Purple prairie clover	0.5 lbs PLS/acre
Scarlet globemallow	0.5 lbs PLS/acre

Saline Upland, Saline Lowland & Imperious Clay Range Sites:

Seed mixture:

Western wheatgrass	2 lbs PLS/acre
Indian ricegrass	2 lbs PLS/acre
Needle-and-thread	2 lbs PLS/acre
Bottlebrush squirreltail	2 lbs PLS/acre
Slender wheatgrass	2 lbs PLS/acre
American vetch	2 lbs PLS/acre
Gardner saltbush	1 lbs PLS/acre

Should any of the above prescribed seed species be unavailable at the time of seeding operation the BLM Authorized Officer shall be contacted to allow for the approval of a change in seed mixture.

The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS) per acre. There shall be NO primary or secondary noxious weed seed in the seed mixture. The seed mixture must be certified weed free and the mixture will be no more than 0.5 percent by weight free of other weeds which includes cheat grass. Seed shall be tested and the viability testing of seed shall be done in accordance with State law and within 9 months prior to purchase. Commercial seed shall be either certified or registered seed. The seed mixture container shall be tagged in accordance with State law and available for inspection by the authorized officer.

Fall seeding must be completed after September 1 and prior to ground frost. Spring seeding must be completed after the frost has left the ground and prior to May 15.

Seed shall be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture shall be evenly and uniformly planted over the disturbed area at a depth not greater than one-half inch. Smaller/heavier seeds have a tendency to drop to the bottom of the drill and are planted first; the holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed shall be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer.

5.3 Mulch

Mulching will be applied to all reclaimed and seeded areas using certified weed-free hay or straw at a rate of approximately 2 tons/acre. Mulch would be crimped into the soil 2 to 4 inches. Crimping will be done on the contour. On steeper slopes (greater than 4%) erosion control matting would be installed.

5.4 Erosion Control

In addition to erosion control BMPs such as installation of matting on select seeded areas, other erosion control BMPs will be installed as necessary. BMPs may include water bars, silt fence, or energy dissipators on the steeper slopes or drainages. Installation of BMPs would be in accordance with the WDEQ SWPPP and BLM specifications.

5.5 Weed Control

RWP will be responsible for the control of non-native, invasive, and noxious weeds during the life of the project and during post-reclamation. Weed control may include cultural controls such as use of weed-free mulch, physical controls such as mowing, or chemical controls or the use of herbicides. If herbicides are used, a Pesticide Use

Proposal (PUP) would be submitted to the BLM for approval and any applicator will have a Commercial Pesticide Applicator License. Weed control activities will be coordinated with the Natrona County Weed and Pest office.

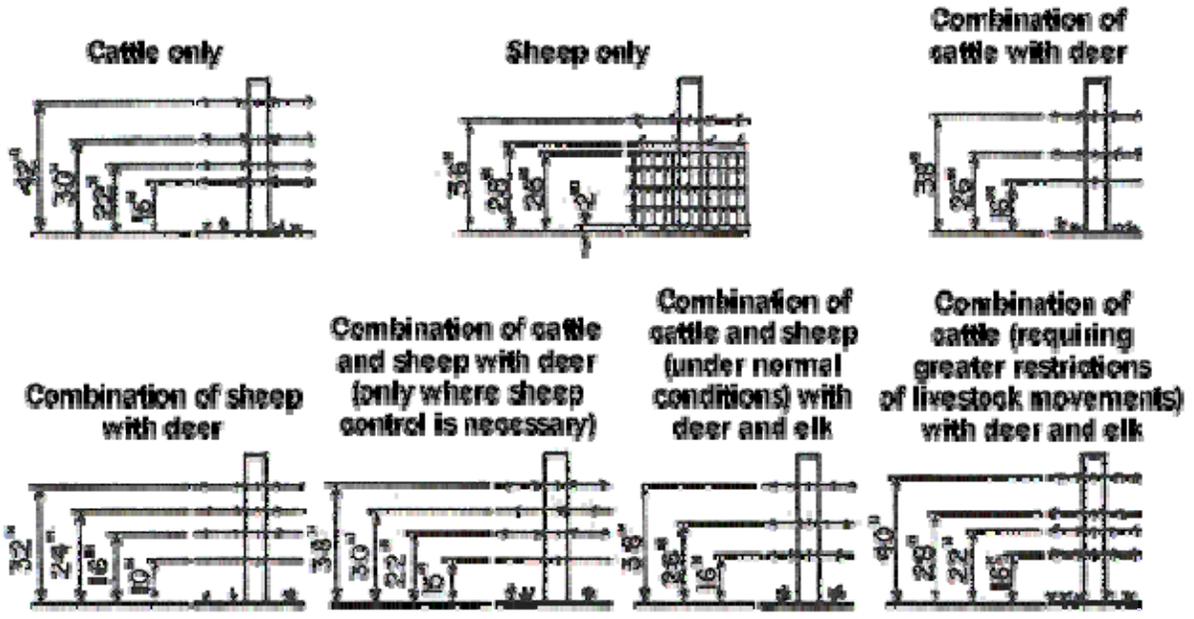
5.6 Fencing

A “Sheep Only” fence, as depicted in the following illustration, will be installed around the perimeter of the portal area and the office/shop area. The Sheep Only fence will prevent antelope from entering the work areas.

Wire Spacing Standards for Wildlife

Compatible Livestock Fences

The illustration below is a modified version of Illustration 2 from the Bureau of Land Management Fencing Manual Handbook H-1741-1, 1989. The illustration depicts wire spacing standards to be used for livestock fences in areas occupied by deer and elk. The illustration is not to scale.



5.7 Reclamation Monitoring

Interim and final reclamation will be monitored on an annual basis and would include visual inspections for vegetation establishment, soil stability, the effectiveness of erosion control BMPs, and weed control.

Rock Well Petroleum

Poison Spider Field

EMERGENCY PLAN

Updated: June 1, 2006

This document is prepared pursuant to MSHA Standard 57.11053 that requires a property to review and update the Mine Escape and Evacuation Plan periodically. This plan is provided to the Secretary through his authorized representative.

This document is written to satisfy the requirement and does not necessarily explain or exhibit in detail all we have on hand.

Standard 57.11053 Escape and evacuation plans.

A specific escape and evacuation plan and revisions thereof suitable to the conditions and mining system of the mine and showing assigned responsibilities of all key personnel in the event of an emergency shall be developed by the operator and sent out in written form. Within 45 calendar days after promulgation of this standard a copy of the plan and revisions thereof shall be available to the Secretary or his authorized representative. Also, copies of the plan and revisions thereof shall be posted at locations convenient to all persons on the surface and underground. Such a plan shall be updated as necessary and shall be reviewed jointly by the operator and the Secretary or his authorized representative at least once every six months from the date of the last review. The plan shall include:

- Mine maps or diagrams showing directions of principal air flow, location of escape routes and locations of existing telephones, primary fans, primary fan controls, fire doors, ventilation doors and refuge chambers. Appropriate portions of such maps or diagrams shall be posted at all shaft stations and in underground shops, lunchrooms and elsewhere in working areas where persons congregate;
- Procedures to show how the miners will be notified of emergency;
- An escape plan for each working area in the mine to include instructions showing how each working area should be evacuated. Each such plan shall be posted at appropriate shaft stations and elsewhere in working areas where persons congregate;
- A fire fighting plan;
- Surface procedure to follow in an emergency, including the notification of proper authorities, preparing rescue equipment, and other equipment which may be used in rescue and recovery operations; and
- A statement of the availability of emergency communication and transportation facilities, emergency power and ventilation and location of rescue personnel and equipment.

UNDERGROUND MINE EMERGENCY PLAN INDEX

- 1. Mine Emergency Plan**
- 2. General Fire Policy**
- 3. Evacuation Procedure**
- 4. Classification and Location of Breathing Apparatus**
- 5. Underground Fire Fighting Equipment and Their Locations**
- 6. Mine Rescue Personnel**
- 7. Emergency Power**

I. UNDERGROUND MINE EMERGENCY PLAN

Since emergencies are unpredictable, it is necessary to establish procedures for handling them. The Shift Foreman or his designate is assigned full authority and responsibility for the safety and welfare of the work force on his shift. In addition the Shift Foreman or his designate is responsible for the protection of the mine, including mechanical, electrical, and surface department employees, as well as all visitors and employees of contractors.

When a fire is reported or if smoke is detected, it must be investigated at once. As soon as accurate information is available, the Shift Foreman or his designate must be notified of the exact location of the fire, its size, and type of fire and how it affects the ventilation system.

If it is necessary to evacuate the mine, the established evacuation procedure will be followed. As this is being done, the Shift Foreman or his designate will direct the evacuation and fire fighting efforts until key management personal arrive on site to relieve him/her from these duties. If required, a command center will be decided upon at this time.

An emergency logbook is to be started by the Shift Foreman or his designate. Entries will be made in the logbook recording all times, dates, locations, and personnel involved in the emergency, evacuation, and fire fighting operation.

During the initial stages of the emergency operations, all the necessary staff personnel will be organized to insure that all equipment and materials are made available when needed. This includes Mechanical, Electrical, and Operations Departments.

The Shift Foreman or his designate will establish security at the main gate and only allow authorized personnel on site.

II. GENERAL MINE FIRE POLICY—SECTION A

The General Mine Fire Policy serves as a guide to familiarize mine supervision and underground employees with the MINE FIRE PREVENTION PROGRAM, including:

- The methods of evacuation to be used in the event of a mine fire.
- The procedures to be used in the event of an underground fire.
- The fire-fighting capabilities available.

When a fire occurs, prompt, definite action must be taken;

IF SMOKE IS DETECTED, IT MUST BE INVESTIGATED AT ONCE. AS SOON AS ACCURATE INFORMATION IS AVAILABLE, THE SHIFT FOREMAN “or his designate” MUST BE NOTIFIED OF THE EXACT LOCATION OF THE FIRE, FURNISHED BRIEF DETAILS AS TO THE SIZE AND TYPE OF FIRE AND ITS OBSERVED EFFECT ON THE VENTILATION SYSTEM.

Most fires investigated will be minor. The most common have been caused by:

- Pump motors that have caught fire.
- Failure to extinguish sparks or molten metal resulting when cutting with an oxygen/acetylene torch.
- Electrical fires at switch boxes.
- Electrical shorts on mobile equipment

If a fire is to be safely extinguished utilizing available employees and facilities, it must be done immediately, and reported to the person in charge. If the fire cannot be extinguished with available facilities, accurate information must be immediately given to the person in charge so that properly supervised people and equipment can be sent. At all times, common sense must prevail in determining if the magnitude of the fire is too great to extinguish alone.

With all electrical fires, a qualified member of the mine electrical crew must de-energize the source of power. It is very dangerous for any person not thoroughly familiar with the mines electrical transmission system to break an electrical circuit under load; therefore, this may only be done by authorized personnel.

FIRE PREVENTION AND CONTROL

Prevention is the first and most important objective in managing fire. In addition, a procedure to be followed in the event of a fire must be utilized and planned. The greatest immediate danger of an underground fire is not from the fire itself, but from the smoke. Smoke can quickly contaminate and poison the mine ventilation system on the exhaust side of the fire and could potentially poison the mine ventilation system on the intake side of the mine.

FIRE PREVENTION

FIRE RISK ASSESSMENTS DETERMINE THE TYPE OF FIRE FIGHTING EQUIPMENT REQUIRED FOR WORK AREAS, SHOPS, ELECTRICAL SUBSTATIONS, FUEL/OIL STORAGE AND EXPLOSIVES STORAGE AREAS.

Fire Prevention—Education and Training

- **When inducting newly hired employees, the importance of our FIRE PREVENTION program must be emphasized. Newly hired employees must be instructed that fires must not be built underground. The unauthorized use of fire fighting equipment will not be tolerated.**
- **Periodic discussions by safety personnel and supervision will be held to discuss fire prevention.**
- **ALL employees, regardless of work jurisdiction, are responsible for maintaining a constant vigil and correcting or reporting any potential fire hazard.**
- **SMOKING, MATCHES, LIGHTERS ARE NOT ALLOWED FROM THE SURFACE AT THE START OF THE DECLINE, TO ALL AREAS UNDERGROUND.**
- **SMOKING IS NOT ALLOWED NEAR EXPLOSIVES MAGAZINES, FUEL/OIL STORAGE AREAS, OR WHERE PROHIBITED BY POSTED SIGNS.**

Fire Prevention—Housekeeping

The maintenance of a high standard of cleanliness is the prerequisite of fire prevention. To allow an accumulation of trash and scrap is dangerous, and a regularly scheduled disposal of all debris is necessary. Blocking passageways with materials or debris creates an unnecessary obstacle and hazard, and reflects on the efficiency of the operation.

Below is a list of practices that must be observed when working at the mine. These practices provide for legal compliance as well as a minimum standard of control:

- **Lunch papers, rags and other refuse shall be placed in covered trash containers.**
- **Oily waste, rags and other materials subject to spontaneous combustion shall be placed in tightly covered metal containers until they are properly disposed of.**
- **Muck cars, or headings shall not be used for disposal of trash. Empty explosive boxes, cartons, and sacks should be left at the face and blasted with the round. DO NOT throw empty explosive containers in the dumpsters or trash cans. We do not want these containers to end up in a public landfill.**

Fire Prevention—Portal

Fire extinguishers and trashcans will be made available.

WHEN EXPLOSIVES ARE BROUGHT TO THE PORTAL THEY MUST BE DELIVERED INTO THE MINE IN A TIMELY MANNER.

ALL TRASH WILL BE STORED IN PROPER CONTAINERS WITH TIGHT FITTING LIDS. TRASH MUST BE REMOVED FROM THE MINE DAILY.

Fire Prevention—Tool rooms

Tool rooms shall be equipped with an adequate number of fire extinguishers, covered trash cans, and visible signs warning of fire hazards.

It is the responsibility of employees to eliminate any fire hazards in the tool room area. This is accomplished by keeping the tool room and vicinity neat and clean.

- Oxygen cylinders shall not be stored in proximity to oil or grease.
- Oxygen/acetylene cylinders shall be stored and secured in an upright position with the valve-protecting cap in place.
- Oil stations shall be encased with sheet metal sides or other fire barriers to protect against fire propagation.
- Sand around oil drums shall be changed when it becomes oil saturated.
- Areas around oil drums shall be kept clean.
- Drip pans shall be used under spigots of oil drums.
- Spilled grease and other lubricants shall not be allowed to accumulate where they will create fire hazards.
- “No Smoking” and “No Open Flame” signs shall be placed at all oil storage stations and oxygen/acetylene cylinders.

Fire Prevention—Shops

All shops are provided with fire extinguishers, covered trash cans, and visible warning signs. Shops shall comply with 57.4761. Shop employees are expected to know the location and proper use of fire-fighting equipment and to replace any missing equipment or installation that is not up to standards. Shop employees are responsible for keeping the shop and immediate area clean and free from potential fire hazard.

- The use of flammable solvents is prohibited for cleaning.
- Flammable spray cans must be stored in flame rated flammable storage cabinets.
- The quantity of lubricating oils and grease stored underground should be kept at a minimum consistent with the operation.
- Liquid lubricants or solvents will not be stored or used over flowing ditch water.

- The use of a burning torch or welding near flammable/combustible liquids is prohibited and in the mine if methane is detected at .5% or higher.
- Drips pans shall be placed under spigots of oil drums. Sand around oil drums shall be changed when necessary.
- Oily rags must be kept in tightly covered metal containers until they are disposed of.
- Grease pits shall be kept clean and free of grease or oil.
- All electric equipment shall be grounded.
- All maintenance shops shall be of fire-resistant construction.
- Required fire doors will be maintained to meet MSHA specifications.

Fire Prevention—Salvage Areas

The following precautions will be taken to minimize the fire hazard.

- When the water line is removed or salvaged the necessary distance, a tee with a fire/water drop shall be placed on the end of the pipe not salvaged and tested for a good flow of water. Test by opening and closing water valve and determine for adequate water supply.

Fire Prevention—Explosive Magazine Areas

- Electrical wires shall not be installed in the magazines. Permissible cap lamps will supply the necessary illumination.
- Empty explosive containers should be blasted with the round and not allowed to accumulate within 25 feet or inside the magazines.
- Magazines shall be kept clean, free of wood, scrap, paper, blasting string, etc.
- Magazines shall be labeled properly and the surface area of the magazine will be free of rubbish, grass, and any other combustibles for 25 feet in all directions.

Fire Prevention—Electrical Equipment and Installation

The greatest majority of electrical fires occur at switches, electric motors or similar installations. Support for such electrical installations must be made fire-resistant. Fire extinguishers should be placed in the vicinity of all major electrical installations. Fire extinguishers shall be positioned upwind of electrical gear. All rectifier, transformer and battery charging stations must be of fire-resistant construction.

Fire Prevention—Welding or Burning Underground

When there is to be welding or burning underground, it shall be the responsibility of the person in charge of the job to document the location, duration, and to request additional aid if necessary. It shall be the responsibility of the person in charge to provide the safest possible conditions under which burning and welding may be carried out. The person in charge shall specify the fire protection measures required for each operation and see that the regulations are consistently observed/followed.

All persons must be properly trained and qualified before using burning equipment. **All** persons engaged in the installation or repair that requires the use of welding or burning equipment underground will observe and take the following precautions to provide protection against a fire:

The area shall be checked for safe working conditions.

- All combustible material is to be removed from the immediate area. The area must be thoroughly wet down before work begins and after the work is finished. A water hose shall be available and the water valve turned on during the burning operation. In areas where there is no water line, water pails or extinguishers shall be provided and used.
- Fireguards must be maintained, if necessary.
- Monitoring for CH₄ (methane) will be done prior to and continuously while burning or welding underground.
- The oxygen/acetylene cylinders shall be free of grease, the gauges protected and the cylinders secured in an upright position during use.
- Valves on oxygen/acetylene cylinders shall be kept closed when they are not being used, even though empty. Supervision shall inspect the area upon completion of the burning or welding operation and arrange for any periodic inspection necessary for the remainder of the shift.

Burning equipment shall be safety checked before operating.

- Any dirt or grit that may have accumulated in the cylinder valve outlet must be blown out.
- The threads must not be crossed (miss-threaded) and the regulator inlet (male connector) must be firmly in place in the outlet (female connector) of the cylinder valves. The threads on the regulator nuts differ to prevent attaching the wrong regulator to the cylinder.
- A check-valve/flash arrest shall be used on each gauge to prevent a fire flashback.

- Hoses must be properly attached to the outlet nipples. Both hoses are distinctly marked to prevent miss-identification.
- Grit and dirt must not remain in the hose. Hose must be blown out before the torch is attached.
- A direct flame or electric arc should not be permitted to come into contact with any part of the compressed gas cylinder or hoses. Sparks or hot slag should not be allowed to fall upon the cylinders or hoses. Remember—acetylene gas is flammable and oxygen will greatly intensify the flame.
- Cutting heads are hot after use and should not be placed in contact with combustibles.
- Burning torches and hoses must be removed away from the immediate area of any welding being done with an electric arc.

FIRE CONTROL

Fire Control—Ventilation Doors and Bulkheads

- Doors to contain fire, smoke or gas in a drill station will be maintained to prevent uncontrolled escape of oil, gas, or fire.
- Additional ventilation control doors may be strategically located to enable areas of the mine to be isolated in an emergency.
 - * If a ventilation control door normally stands open, it must remain open unless authorization to close is given by the manager in charge of the mine or the person responsible for the mine emergency command. Changes will only be directed following the recommendation of the project engineer responsible for the vent circuit. All changes must be recorded on the appropriate maps.
- The safety department periodically will inspect all fire doors. Malfunctions identified are reported and corrected.

Fire Control—Fire Extinguishers

- All fire extinguishers shall be rated for Class A, B, & C fires at least 5lb in size.
- Extinguishers shall be maintained on all diesel equipment, welders, in shops, underground pump stations, transformer stations, mine entrances, and all company owned or leased passenger vehicles. Spare extinguishers are maintained in the mine office bullpen.
- All operators shall inspect the fire extinguisher on their equipment daily before starting to operate the equipment, ensure they are in a ready state, and make note on the operator's checklist.
- Fire extinguishers are not to be used for any other purpose than extinguishing fires.

Fire Control—Water Lines and Hoses

- Fire hoses are not to be used for any other purpose than fire fighting.
- Fire drops will be inspected, cleaned and lubricated as needed.

Fire Control—Escapeways

Emergency Ventilation Maps will be posted in underground shops, lunchrooms, and other areas where employees gather. 57.11053 (a) The map attached to the evacuation section of the “Mine Fire Procedure” designates main routes of travel, direction of principal airflow, location of fire-fighting installations and ventilation doors. Escapeway between the working level to surface shall be equipped to permit the passage of a person wearing a self-contained, oxygen-breathing apparatus. Escapeway signs will be posted on surface and underground. Escapeways will be inspected monthly to ensure they are in good condition and means of travel are properly maintained and secured.

Location of the surface escapeway will be made available to all personnel.

ASSIGNMENTS IN CASE OF FIRE

Assignments in Case of Fire—Duties of the Mine Manager or designate

- Ascertain level and location of fire.
- Order and oversee the evacuation of the mine.
- Order the introduction of the mine stench.
- Designate responsibilities according to the “Shift Foreman Check List.”
- The Shift Foreman will alert and assemble the mine rescue team.
- The Shift Foreman will make notifications as outlined on the Emergency Response Plan.

Assignments in Case of Fire—Mine Manager or designate Check List

- Notify all personnel of the location of the fire
- Initiate the activation of wintergreen (stench) into the mine ventilation
- Ensure compressor is operating
- Begin notifications as outlined on the Emergency Response Plan

RWP POISON SPIDER

Emergency Numbers

Mark See – CEO

Home: 307-673-5033 Home:
Mobile: 307-752-4667
Bus: 307-673-5777 Bus:

Joe McPhie – VP Operations

Home: 307-765-2344 Home:
Mobile: 307-763-0128
Bus: 307-673-1777 Bus:

Robert Ferri – VP Development

Home: 307-587-3128 Home:
Mobile: 307-272-7400
Bus: 307-673-1777 Bus:

James Wieser – Safety Manager

Home: 406-633-2631 Home:
Mobile: 406-697-1993
Work: 307-765-4370 Work:

Paul Nichols – Maint. Manager

Home: 307-266-1825 Home:
Mobile: 775-340-0283
Work: 307-266-1825 Work:

Steve Monninger – Env. Manager

Home: 307-237-2195 Home:
Mobile: 406-223-0559
Work: 307-266-1825 Work:

John Hoak - COO

307-672-1713
Mobile: 406-581-7140
307-673-1777

Steve Sandoval – Project Mgr.

307-673-1848
Mobile: 307-752-3396
307-673-1777

Paul Carlson – Devel. Mgr.

307-673-4970
Mobile: 307-752-4546
307-673-1777

Johnie Brake – Mining Manager

307-765-2269
Mobile: 307-763-0202
307-765-4370

Ben Thomas – Const. Manager

406-266-2710
Mobile: 406-266-2710
307-765-4370

Justus Deen – Gen. Man. Mining

406-222-9767
Mobile: 307-620-1879
307-765-4370

Local Numbers

Emergency: 911

Fire: (Casper Non-Emergency 307-235-8278)

Ambulance: 911

Police: (Casper Non-Emergency 307-235-8278)

Life Flight: 307- 577-2214

MSHA Green River: 307- 875- 6300

State Mine Inspector: 307- 362- 5222

Wyoming Gas Co.: 1- 800-799- 6427

BLM:

DEQ:

OSHA Denver, Colo. 720-264-6550 – 800-321-OSHA

EMERGENCY PERSONNEL

The Mine Manager or designate will assign the following emergency personnel:

- Emergency Log Recorder
- Evacuation Coordinator
- Surface Communication Coordinator
- Mine Rescue

Assignments in Case of Fire—Mine Manager or designate

- Conduct orderly evacuation.
- Establish contact with all personnel.
- Direct assigned employees until relieved of the responsibility.
- Direct all employees under their supervision to brass-out immediately upon reaching the surface and meet at a designated area (Dry room) for further instructions.

Assignments in Case of Fire—Emergency Log (assigned by person in charge)

The emergency log recorder will:

- Document all available information concerning the origin, nature and conduct of the emergency operation.
- Note all information provided to the person in charge and the orders given to others.
- Record the progress of the evacuation as well as the best-known information on the location of each person.
- Record orders to, and observations of, the rescue and fire fighting crews.
- Record the time workers are relieved.
- Record notices given to authorities.
- Note the arrival time of authorities.

Assignments in Case of Fire---Mine Manager or designate

- Notify Jim Wieser/Johnie Brake to activate Mine Rescue Personnel if needed and coordinate mine rescue activities.
- Extinguish or contain the mine fire where such action would influence the safe evacuation or rescue of personnel.
- When all personnel are safe, extinguish or contain the mine fire.
- Observe all procedures for safe rescue or fire fighting operations.

Assignments in Case of Fire—Mine Manager or designate

When notified of a fire which requires evacuation:

- As directed, call out Mine Rescue and Senior Management. Log all persons contacted and status.
- Record the name and number of all persons leaving the property.
- Prevent the entry of any person onto the property who does not have direct connection with the emergency in progress.
- Persons who should be allowed in the gate include:
 - * Company officials
 - * Members of the Mine Rescue crew
 - * Federal/State Mine Inspectors
 - * Company managers
 - * Anyone designated by Company officials

Assignments in Case of Fire—Shift Electrician

When notified of a fire that requires evacuation, remain in phone contact in case emergency power repairs/shutdown are needed.

Assignments in Case of Fire—Onsite Personnel

- Notify underground employees of the fire, its location and initiate the evacuation. The wintergreen (stench) will be manually released into the portal by trained personnel. (Surface Mechanics)
- Continue to announce the fire and evacuation on the mine phone until all persons are accounted for and the evacuation is complete.
- Maintain control of equipment traffic leaving the mine.
- Maintain a record of information pertaining to the evacuation or refuge of mine personnel.
- Verify operation of surface compressor.
- Monitor status of Main surface fan.

Assignments in case of fire---Surface Mechanic

Upon notification of an underground fire, the Mechanic will:

- If so instructed, release the wintergreen stench into the mine ventilation system by using the following procedure:

Release the stench manually into the mine Portal.

- If so instructed, monitor surface main fan and compressor.
- Remain in phone contact in case further assistance is needed.

ALL COMMUNICATIONS WILL BE STRICTLY LIMITED TO INSTRUCTIONS TO EMPLOYEES, SUPERVISION, AND PERSONNEL WHO ARE DIRECTLY INVOLVED WITH THE EMERGENCY.

ALL SURFACE EMPLOYEES, ELECTRICIANS, ENGINEERS AND MECHANICS WILL REMAIN AT THEIR DUTY STATION UNTIL RELIEVED OR INSTRUCTED OTHERWISE BY THE PERSON IN CHARGE.

III. EVACUATION PROCEDURE

Evacuation plans are designed to get employees into fresh, uncontaminated incoming air, if possible, or provide the route of least contamination to evacuate the mine via the fresh air route. Evacuation plans are outlined for the working level or directed by appropriate supervision. Escape Maps are updated and distributed through out the mine when changes are made.

When a decision is made to evacuate all or part of the mine, the Mine Manager, or his designee, will relay instructions via the mine communication system and/or by messenger.

Introduction of the wintergreen stench into the ventilation intake is a signal that the entire mine is to be evacuated. There is to be no delay in carrying out the order to evacuate the mine. All evacuation will be done in an orderly manner. Underground personnel shall call the surface from the nearest mine phone to receive instructions as to the extent of the emergency and escape routes to take.

All air currents through the mine are to be maintained as near normal as possible until all employees are accounted for. **FANS WILL NOT BE STOPPED EXCEPT BY A DIRECT ORDER FROM THE PERSON IN CHARGE OF THE MINE. FANS WILL**

NOT BE REVERSED EXCEPT BY A DIRECT ORDER FROM THE PERSON IN CHARGE OF THE MINE. Fire control doors will not be blocked by equipment.

The Shift Foreman or his designee will initiate the evacuation procedure. The Shift Foreman or his designee will announce the evacuation over mine phones. This order will be repeated periodically until all mine personnel are accounted for.

IV. CLASSIFICATION AND LOCATION OF BREATHING APPARATUS

CLASSIFICATION

1. **Self Rescuers**

All employees, contractors and visitors to the underground are required to have training and to carry a W-65 self-rescuer attached to their safety belt at all times. It is a small apparatus that contains a chemical that will convert carbon monoxide into carbon dioxide. It will function for 1 hour in 1% CO. It must not be used for any other purpose other than to pass through contaminated air. Once in place our refuge chamber will contain 12 Draeger SCSRs, surface compressed air supply, and compressed air bottles inside the refuge chamber.

2. **Draeger BG4 - 4 Hr. Oxygen Breathing Apparatus**

This apparatus contains an oxygen cylinder that supplies oxygen to the wearer. The cylinder is pressurized with a 4-hr. supply of oxygen. This apparatus is self-contained and no outside air is required for operation.

(Only active members of the mine rescue teams are permitted to use the self-contained breathing apparatus.)

MINE RESCUE EQUIPMENT AND PERSONNEL LOCATION

Greybull Petroleum MineSite
Greybull, Wyoming

Jim Wieser – Mine Rescue – Trainer/Coordinator
Work – 307-765-4370
Cell – 406-697-1993
Home – 406-633-2631

Johnie Brake – Trainer/Coordinator
Work- 307-765-4370
Cell – 307-763-0202
Home – 307-765-2269

Poison Spider Environmental Assessment
Appendix C
Emergency Plan
June 2006

16 trained Mine Rescue Team Members
12 Draeger BG4 AP/CP Closed Circuit Breathing Apparatus

V MINE RESCUE PERSONNEL

John Blasey 406-749-0121 - Helmet

Johnie Brake 307-765-2269 -
Trainer/Helmet/Benchman

David Brunz 406-640-1189 - Helmet

Lee Campbell 406-328-4332 - Helmet

Greg Christensen 406-480-9717 - Helmet

Paul Nichols – 775-340-0283 - Benchman

Kass Kinghorn 406-591-6826 - Helmet

Gerald Krenning 406-668-9062 - Helmet

Jim Langston 307-765-2206 - Helmet

Russell Laubach 406-848-7283 - Helmet

Alan Longley 406-328-4721 - Helmet

Rick Sandoval 509-680-2367 - Helmet

Robert Scott 406-328-7276 - Helmet

Robb VanPelt 406-328-4214 - Helmet

Jeff Wiltse 406-848-7572 - Helmet

John Zugaza 406-328-6238 - Helmet

Jim Wieser 406-633-2631 -
Trainer/Helmet/Benchman

VI. UNDERGROUND/SURFACE FIRE FIGHTING EQUIPMENT AND THEIR LOCATIONS

Handheld fire extinguishers are located on all mobile equipment, fuel storage areas, transformers, compressed gas storage, shop area, and mine office building. Water hoses are available on the mine water supply system.

VII. EMERGENCY POWER

Power is supplied to the mine by Pacific Power. In the event of normal electrical power interruption, a portable diesel generator will be used for backup.

The Basic Ventilation Pattern for the Mine Is:

The main ventilation fan is a Howden Buffalo 125hp fan located on the surface pulling return air out of the mine through 42” metal ducting. Main fan controls are located on the surface at the fan.

VIII. ESCAPE PLAN FOR EACH WORKING AREA

Primary escape way is the single tunnel being driven from the surface. Secondary escape will be from a borehole to the surface at the end of the excavation.

Refuge Chambers will be utilized during development to the secondary escape borehole to the surface.

During an emergency mine evacuation, all mine personnel “after brassing out” will report to the mine manager or his designee and remain congregated in the bullpen and main office area of the mine.

LOCAL EMERGENCY PLANNING COMMITTEE

Follow spill response matrix

County	Name	Address and Phone # (307)
Natrona	Lt. Stewart Anderson	Natrona Co. EMA Hall of Justice 201 N. David, 2nd Flr. Casper, WY 82601 235-9205 Fax: 235-9252

Rock Well Petroleum, Inc. Spill Matrix						
Note: Any release that is "discharged" into an impervious secondary containment structure and that is completely contained and that can be recovered with no discharge to environmental media, may not be subject to external telephonic notification requirements (Note 1: DOT requirements and volatile characteristics of material).						
Immediately Report Spills For Any Substance Listed Below If There Is A Threat To Groundwater Or Surface Water						
If No Threat To Groundwater Or Surface Water Immediately Report Spills In Accordance With Reportable Quantities As Listed Below						
NON-DOT (NON-TRANSPORTATION) TELEPHONIC REPORTING REQUIREMENTS						
Chemical	Reporting Quantity (RQ)	NRC 1-800-424-8802	SERC/WEMA (Note 1) 1-307-777-4900 (8-5) 1-307-777-4321 (24hours)	WDEQ Water Quality 1-307-777-7781 (24hours)	WOGCC 1-307-234-7147 (8-5) 1-307-472-7401 (after hrs)	LEPC County List
Natural Gas Condensate (Notes 2, 3, & 4)	10 bbls	X	X	X	X	X (if released off-site)
Antifreeze Coolant	5000# (539 gals.)	X	X	X	X	X (if released off-site)
Natural Gas	Any Release	X	X	X	X	X
Lube Oil (Notes 2, 3, & 4)	10 bbls	X	X	X	X	X (if released off-site)
Used Oil (Notes 2, 3, & 4)	10 bbls	X	X	X	X	X (if released off-site)
Wastewater & Oil (Notes 2, 3, & 4)	10 bbls	X	X	X	X	X (if released off-site)
Methanol	5000# (759 gals.)	X	X	X	X	X
Ambitol	5000# (539 gals.)	X	X	X	X	X (if released off-site)
Gasoline	10 bbls	X	X	X	X	X (if released off-site)
Triethylene Glycol	5000# (539 gals.)	X	X	X	X	X (if released off-site)
Produced Water (Notes 2, 3, & 4)	10 bbls	X	X	X	X	X (if released off-site)
Diethanolamine	100# (11 gals.)	X	X	X	X	X (if released off-site)
Gasoline - Unleaded (Notes 2, 3, & 4)	10 bbls	X	X	X	X	X (if released off-site)
Methanol-Diethylamine-Isopropanol	100# (11 gals.)	X	X	X	X	X
Butane	Any Release	X	X	X	X	X
Amine	100# (11 gals.)	X	X	X	X	X (if released off-site)
LP Gas	Any Release	X	X	X	X	X
Propane	Any Release	X	X	X	X	X
Benzene	10# (1.4 gals.)	X	X	X	X	X
Toluene	1000# (138 gals.)	X	X	X	X	X
Ethylene Glycol	5000# (539 gals.)	X	X	X	X	X
Corrosive Materials	100# (5 gals.)	X	X	X	X	X
Xylene	100# (14 gals.)	X	X	X	X	X
Water Pollution	Any Sheen	X	X	X	X	X (if released off-site)
Any Other Chemical	If Reportable Quantity - Refer to: http://yosemite.epa.gov/oswer/ceppoweb.nsf/vwResourceByFilename/ol.xls?File/ol.xls					
Reportable spills require written notice to the WEMA (SERC), WDEQ, and appropriate LEPC within 7 calendar days. WOGCC would be notified if spill consisted of crude oil products, condensate, produced water, or other natural gas liquids.						
Note 1: Pursuant to Chapter 4 or Wyoming Water Quality Rules and Regulations, the following spills are reportable to the DEQ: 1) Releases of "oil" and "hazardous substances" which enter waters of the state; 2) Releases that are determined to be a threat to enter waters of the state and are considered a "hazardous substance" or an amount greater than 10 BBLs of any combination of crude oil/petroleum condensate/produced water or 25 gallons of refined crude oil products; and 3) suspected releases from regulated storage tanks. Non-reportable spill events must be contained, removed, and collected materials properly disposed.						
Note 2: Wyoming Oil and Gas Conservation Commission (WOGCC) Rule Chapter 4, Section 3 requires notification to the WOGCC of all accidents (other than personal injuries and deaths) or fires of major consequence as well as spills greater than 10 BBLs of any combination of crude oil/petroleum condensate/produced water within 24 hours.						
Note 3: CERCLA petroleum exclusion from RQ reporting requirements - EPA interprets CERCLA section 101(14) to exclude crude oil and fractions of crude oil - including the hazardous substances, such as benzene, that are indigenous in those petroleum substances - from the definition of hazardous substance subject to RQ reporting requirements. The definition of hazardous substance also excludes natural gas, natural gas liquids, liquified natural gas, and synthetic gas usable for fuel. Reporting to the NRC is not required for materials under the CERCLA exemption unless a sheen is released to surface waters.						
Note 4: Wyoming Public Service Commission, Pipeline Safety (307/777-7427) must be called if a pipeline (WPSC jurisdiction) release of natural gas or fire causes property damage of \$50,000 or more, death or injury, or other DOT criteria (WPSC Procedural & Special Regulations, Rule Chapter II, Section 232). Also, telephonic notice of "damage to property of others amounting to more than \$2,000" is required for intrastate pipeline incidents from "utilities" other than Gas or Rail Carriers (intrastate common carriers are defined as "utilities" in Rule Chapter 11, Section 202).						
Note 5: Inform the Environmental Department in Casper of any spills or if there are any questions (1-307-266-1825 or 1-406-223-0559).						
DOT (TRANSPORTATION) TELEPHONIC REPORTING REQUIREMENTS						
49 CFR 191 (Gas Pipeline Releases) - Any release of any toxic, corrosive or flammable gas is telephonically reportable to the NRC when death or injuries requiring hospitalization occur (Note 7), there is a fire or explosion (Note 8), there is a release to water, or in the judgement of the operator. WPSC requires telephonic notice (within 2 hours or earliest possible moment) of pipeline incidents including those incidents that result in property damage greater than \$50,000.						
Note 6: Notify OSHA Region 8 (303/844-1600) within 8 hours of an accident resulting in a death or hospitalization of 3 or more persons.						
Note 7: The local fire department must be called for any release of Natural Gas in conjunction with Pipeline Safety Requirements and for all incidents which result in fire or explosion.						

Hazardous Materials Inventory

Hazardous and Extremely Hazardous Materials Potentially Utilized or Produced During
Construction, Drilling, Production, and Reclamation Operations by Rock Well Petroleum
at the Poison Spider Oil Field

Material or Product Name	Hazardous Ingredients	CAS #	RCRA #	Reportable Quantity
Potassium Chloride	Potassium Chloride	7447-40-7	~~	~~
Federal Granular	Silica, crystalline, quartz	14808-60-7	~~	~~
	Silica, crystalline, Cristobalite	14464-46-1	~~	~~
	Silica, crystalline, Tridymite	15468-32-3	~~	~~
	Gypsum	13397-24-5	~~	~~
	Bentonite	1302-78-9	~~	~~
Magnafrac Plus	Ammonium Nitrate	6484-52-2	~~	~~
	Sodium Nitrate	7631-99-4	~~	100lbs
	Aluminum	7429-90-5	~~	~~
Crude Oil, Sour	Crude Oil (Petroleum)	08002-05-9	~~	~~
	Hydrogen Sulfide	07783-06-4	U135	100lbs
	Ethyl Benzene	100-41-4	~~	~~
	Benzene	71-43-2	~~	~~
76 Marok (all Grades)	Solvent Refined Distillate, Heavy Naphthenic ..C20-50	64741-96-4	~~	~~
Draegersorb 400	Calcium hydroxide	1305-62-0	~~	~~
	Water 12-20	7732-18-5	~~	~~
	Sodium hydroxide	1310-73-2	~~	1000lbs
Oxygen, Compressed gas	Oxygen	7782-44-7	~~	~~
Cast Booster	Pentaerythritol Tetranitrate	78-11-5	~~	~~
	Trinitrotoluene	118-96-7	~~	~~
	RDX	121-82-4	~~	~~
	HMX	2691-41-0	~~	~~
	Aluminum	7429-90-5	~~	~~
Hammer ES	Vegetable Based Oil	68956-68-3	~~	~~
Platinum PAC	Carboxymethylcellulose sodium salt	9004-32-4	~~	~~
Poly Plus	Anionic polyacrylamide	None Given	~~	~~
	Petroleum distillates, hydrotreated light	64742-47-8	~~	~~

Ringfree	Water	7732-18-5	~~	~~
	Acrylic polymer	None Given	~~	~~
Lokset Resin Cartridge All H	Calcium Carbonate	471-34-1	~~	~~
	Polyester Resin	None Given	~~	~~
	Styrene Monomer	100-42-5	~~	~~
	Diethylene Glycol	57-55-6	~~	~~
	Benzoyl Peroxide	94-36-0	~~	~~
Case Drilling Detergent	Proprietary Ingredients	None Given	~~	~~
	Isopropyl alcohol	67-63-0	~~	~~
Conductivity Standard Solutions	Potassium Chloride	7447-40-7	~~	~~
	Water, Deionized	7732-18-5	~~	~~
Chevron 1000 THF	Highly refined mineral oil (C15 - C50)	Mixture	~~	~~
	Zinc alkyl dithiophosphate	68649-42-3	~~	~~
Chevron RPM Universal Gear Lubricant	Highly refined mineral oil (C15-C50)	Mixture	~~	~~
Dyno Split	Ammonium Nitrate	6484-52-5	~~	~~
	Sodium Nitrate	7631-99-4	~~	~~
	Sodium Perchlorate	7601-89-0	~~	~~
	Aluminum	7429-90-5	~~	~~
	Hexamethylene Tetramine (HMT)	100-97-0	~~	~~
	Nitric Acid	7697-37-0	~~	1000lbs
Acetone, 99+96	Acetone	67-64-1	U002	5000lbs
	Formaldehyde	0-01-1	U122	100lbs
Ultra Clorox Regular Bleach	Sodium hydroxide	1310-73-2	~~	100lbs
	Sodium hypochlorite	7681-52-9	~~	100lbs
Windex Concentrate	Ammonia	1336-21-6	~~	100lbs
	2-Butoxyethanol	111-76-2	~~	~~
	Water	7732-18-5	~~	~~
Quaker State HD SAE Motor Oil, all Grades	HYDROTREATED HEAVY PARAFFINIC PETROLEUM DISTILLATES	64742-54-7	~~	~~
	SOLVENT-DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-65-0	~~	~~

	DETERGENT/INHIBITOR SYSTEM	None Given	~~	~~
	POUR POINT DEPRESSANT	None Given	~~	~~
WD-40 Aerosol	Aliphatic Petroleum Distillates	8052-41-3	~~	~~
	Petroleum Base Oil	64742-65-0	~~	~~
	LVP Hydrocarbon Fluid	64742-47-8	~~	~~
	Carbon Dioxide	124-38-9	~~	~~
	Non-hazardous Ingredients	None Given	~~	~~
Acetone	Acetone	67-64-1	U002	5000lbs
D-Gel, Dyno Split, Extra Gelatin	Nitroglycerin (NG)	55-63-0	P081	10lbs
	Ethylene Glycol Dinitrate (EGDN)	628-96-6	~~	~~
	Nitrocellulose	9004-70-0	~~	~~
	Ammonium Nitrate	6484-52-2	~~	~~
	Sodium Nitrate	7631-99-4	~~	100lbs
	Sulfur	7704-34-9	~~	~~
Dyno, Powermite	Ammonium Nitrate	6484-52-2	~~	~~
	Sodium Nitrate	7631-99-4	~~	100lbs
	Aluminum	7429-90-5	~~	~~
	Mineral Oil (mist)	64742-35-4	~~	~~
ANFO, Dyno mix	Ammonium Nitrate	6484-52-2	~~	~~
	Fuel Oil	68476-34-6	~~	~~
	Guar Gum (Nuisance Dust)	9000-30-0	~~	~~
Tanner Gas and freeze-ban	Methanol	67-56-1	U154	5000lbs
	Aliphatic Ester	None Given	~~	~~
	Hea-Hipa Borate	None Given	~~	~~
	Amino Alcohol	None Given	~~	~~
	Colorant	None Given	~~	~~
Chevron DELO 400	Highly refined mineral oil (C15 - C50)	Mixture	~~	~~
	Zinc dialkyldithiophosphate	68649-42-3	~~	~~
Chevron Drive Train Fluid HD	Highly refined mineral oil (C15 - C50)	Mixture	~~	~~
	Zinc alkyl dithiophosphate	68649-42-3	~~	~~
Chevron RPM® Automotive LC Grease EP	DISTILLATES, SOLVENT DEWAXED HEAVY PARAFFINIC	64742650	~~	~~
	RESIDUAL OILS SOLVENT REFINED DISTILLATES, SOLVENT-REFINED HEAVY PARAFFINIC	64742014	~~	~~
	ZINC ALKYL DITHIOPHOSPHATE	64741884	~~	~~
		68649423	~~	~~

Chevron RPM® Universal Gear Lubricant	Highly refined mineral oil (C15 - C50)	Mixture	~~	~~
	Non-hazardous additive blend in refined oil	Mixture	~~	~~
Chevron 1000 THF	Highly refined mineral oil (C15 - C50)	Mixture	~~	~~
	Zinc alkyl dithiophosphate	68649-42-3	~~	~~
2 DIESEL FUEL	Diesel Fuel, No. 2	68476-34-6	~~	~~
A-0600	Iron oxide (45-50%)	1309-38-2	~~	~~
	Styrene/acrylate copolymer (40-50%)	25767-47-9	~~	~~
	Polyolefin (1-10%)	9003-07-0	~~	~~
WINDEX CONCENTRATE	2-Butoxyethanol	111-76-2	~~	~~
	Water	7732-18-5	~~	~~
Regular Unleaded Gasoline (Conventional, CARB and RFG)	Gasoline (Conventional, CARB and RFG)	Mixture	~~	~~
	Miscellaneous Hydrocarbons	Mixture	~~	~~
	Xylene, mixed isomers	1330-20-7	U239	100lbs
	Toluene	108-88-3	U220	1000lbs
	1,2,4-Trimethyl Benzene (Pseudocumene)	95-63-6	~~	~~
	Styrene	100-42-5	~~	1000lbs
	Benzene	71-43-2	U019	10lbs
	Ethyl Benzene	100-41-4	U038	10lbs
	Hexane	110-54-3	~~	5000lbs
	Cyclohexane	110-82-7	U056	1000lbs
	Naphthalene	91-20-3	U165	100lbs
	Methyl Tert-Butyl Ether (MTBE)	1634-04-4	~~	1000lbs
	Ethyl Tert-Butyl Ether (ETBE)	637-92-3	~~	~~
	Tert-Amyl Methyl Ether (TAME)	994-05-8	~~	~~
Diisopropyl Ether (DIPE)	108-20-3	~~	~~	
KRYLON® PAINT ALL® Fast Dry Enamel	Propane	74-98-6	~~	~~
	Butane	106-97-8	~~	~~
	Ethylbenzene	100-41-4	~~	1000lbs
	Xylene.	1330-20-7	U239	100lbs
	Acetone.	67-64-1	U002	5000lbs
	Talc	14807-96-6	~~	~~
	Calcium Carbonate.	471-34-1	~~	~~
	Titanium Dioxide.	13463-67-7	~~	~~

Super Glue Instant Adhesive	Carbon Black.	1333-86-4	~~	~~
	Ethyl cyanoacrylate	7085-85-0	~~	~~
Toner	Poly (methyl methacrylate)	9011-14-7	~~	~~
	HYDROQUINONE	123-31-9	~~	100lbs
	Bisphenol A propylene oxide fumarate polymer (85-90%)	39382-25-7	~~	~~
	Carbon black (10-15%)	1333-86-4	~~	~~
QUAKER STATE HD SAE MOTOR OIL - ALL GRADES	Polyolefin (<5%)	9003-07-0	~~	~~
	HYDROTREATED HEAVY PARAFFINIC PETROLEUM DISTILLATES	64742-54-7	~~	~~
	SOLVENT-DEWAXED HEAVY PARAFFINIC DISTILLATE	64742-65-0	~~	~~
	DETERGENT/INHIBITOR SYSTEM	Mixture	~~	~~
	POUR POINT DEPRESSANT	Mixture	~~	~~
White Out Water Based Correction Fluid				
	Ethylene Glycol	107-21-1	~~	5000lbs