Puma Deep Prospect Area Gas Development Project

BLM

Wyoming State Office – Rock Springs Field Office

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

NATIONAL SYSTEM OF PUBLIC LANDS

June 2009

The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WY/PL-09/027+1310

WY-040-EA09-130

PUMA DEEP PROSPECT AREA GAS DEVELOPMENT PROJECT

WY-040-EA09-130

Prepared for

Bureau of Land Management
Rock Springs Field Office

June 2009

	Page
TABLE OF CONTENTS	**i**
ACRONYMS AND ABBREVIATIONS	vii
CHAPTER 1 - PURPOSE OF AND NEED FOR THE ACTION	
1.0 INTRODUCTION	**1-1**
1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION	**1-3**
1.2 DECISIONS TO BE MADE	**1-3**
1.3 SCOPING AND PUBLIC INVOLVEMENT AND ISSUES	**1-3**
1.4 SUPPLEMENTAL AUTHORITIES TO BE CONSIDERED	**1-4**
1.5 PERMITTING REQUIREMENTS	**1-5**
CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES	
2.0 INTRODUCTION	**2-1**
2.1 DESCRIPTION OF PROPOSED ACTION	**2-1**
2.1.1 PRE-CONSTRUCTION ACTIVITIES	2-4
2.1.2 CONSTRUCTION AND DRILLING	2-5
2.1.2.1 WELL PAD CONSTRUCTION	2-5
2.1.2.2 ROAD CONSTRUCTION AND TRANSPORTATION	2-6
2.1.2.3 DRILLING OPERATION	2-7
2.1.3 WELL COMPLETION	2-8
2.1.4 PRODUCED FLUIDS MANAGEMENT	2-8
2.1.5 OPERATIONS AND MAINTENANCE	2-9
2.1.6 ANCILLARY FACILITIES	2-9
2.1.7 WORKFORCE AND TRAFFIC	2-9
2.1.8 RECLAMATION AND ABANDONMENT	2-10
2.1.9 OTHER DESIGN FEATURES	2-11
2.1.9.1 AIR QUALITY	2-11
2.1.9.2 SOILS	2-12
2.1.9.3 WATER RESOURCES	2-12
2.1.9.4 NOISE	2-13
2.1.9.5 TRANSPORTATION	2-13
2.1.9.6 HEALTH AND SAFETY	2-14
2.1.9.7 VEGETATION / WETLANDS / NOXIOUS WEEDS	2-15
2.1.9.8 WILDLIFE AND FISHERIES	2-15
2.1.9.9 CULTURAL AND HISTORIC RESOURCES	2-16
2.1.9.10 SOCIOECONOMICS	2-16
2.2 DESCRIPTION OF ALTERNATIVES ANALYZED IN DETAIL	**2-16**
2.2.1 NO ACTION ALTERNATIVE	2-17
2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL	**2-17**
CHAPTER 3 – AFFECTED ENVIRONMENT	
3.0 INTRODUCTION	**3-1**
3.1 GEOLOGY/MINERALS/PALEONTOLOGY	**3-1**
3.1.1 PHYSIOGRAPHY, TOPOGRAPHY, AND LANDFORMS	3-1
3.1.2 SURFICIAL GEOLOGY	3-1
3.1.3 BEDROCK GEOLOGY	3-1
3.1.4 STRUCTURE	3-1
3.1.5 SUBSURFACE STRATIGRAPHY	3-2
3.1.6 MINERALS	3-2
3.1.7 PALEONTOLOGY	3-5
3.2 CLIMATE	**3-5**
3.3 AIR QUALITY	**3-7**

TABLE OF CONTENTS (continued)

3.4 SOILS **3-12**
3.5 WATER RESOURCES **3-14**
3.5.1 SURFACE WATER 3-14
3.5.2 WATERS OF THE U.S. 3-14
3.5.3 GROUNDWATER 3-16
3.6 VEGETATION, SPECIAL STATUS PLANT SPECIES, WETLANDS NOXIOUS WEEDS **3-16**
3.6.1 VEGETATION COVER TYPES 3-16
3.6.2 THREATENED AND ENDANGERED PLANT SPECIES 3-17
3.6.3 CANDIDATE AND BLM SENSITIVE PLANT SPECIES 3-17
3.6.4 WETLANDS 3-19
3.6.5 NOXIOUS WEEDS/INVASIVE SPECIES 3-20
3.7 RANGE RESOURCES AND OTHER LAND USES **3-20**
3.8 WILDLIFE/SPECIAL STATUS ANIMAL SPECIES **3-20**
3.8.1 GAME SPECIES 3-21
3.8.2 UPLAND GAME BIRDS 3-29
3.8.3 RAPTORS 3-32
3.8.4 THREATENED AND ENDANGERED SPECIES 3-32
3.8.5 BLM SENSITIVE SPECIES 3-35
3.8.6 MIGRATORY BIRDS 3-37
3.9 WILD HORSES **3-38**
3.10 RECREATION **3-38**
3.11 VISUAL RESOURCES **3-38**
3.12 CULTURAL RESOURCES **3-38**
3.13 SOCIOECONOMICS **3-39**
3.14 TRANSPORTATION **3-40**
3.15 HEALTH AND SAFETY **3-40**
3.15.1 OCCUPATIONAL HEALTH AND SAFETY 3-41
3.15.2 OTHER RISKS AND HAZARDS 3-41
3.16 HAZARDOUS MATERIALS / WASTE MANAGEMENT **3-41**
3.17 NOISE **3-43**

CHAPTER 4 - ENVIRONMENTAL EFFECTS
4.0 INTRODUCTION **4-1**
4.1 GEOLOGY/MINERALS/PALEONTOLOGY **4-1**
4.1.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-1
4.1.1.1 MITIGATION AND RESIDUAL EFFECTS 4-2
4.1.2 NO ACTION 4-4
4.2 AIR QUALITY **4-4**
4.2.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-5
4.2.1.1 MITIGATION AND RESIDUAL EFFECTS 4-10
4.2.2 NO ACTION 4-10
4.3 SOILS **4-10**
4.3.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-10
4.3.1.1 MITIGATION AND RESIDUAL EFFECTS 4-11
4.3.2 NO ACTION 4-11
4.4 WATER RESOURCES **4-11**
4.4.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-11
4.4.1.1 MITIGATION AND RESIDUAL EFFECTS 4-12
4.4.2 NO ACTION 4-12

TABLE OF CONTENTS (continued)

4.5 VEGETATION, SPECIAL STATUS PLANT SPECIES, WETLANDS, NOXIOUS WEEDS **4-12**
4.5.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-12
4.5.1.1 MITIGATION AND RESIDUAL EFFECTS 4-13
4.5.2 NO ACTION 4-13
4.6 RANGE RESOURCES AND OTHER LAND USES **4-14**
4.6.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-14
4.6.1.1 MITIGATION AND RESIDUAL EFFECTS 4-14
4.6.2 NO ACTION 4-14
4.7 WILDLIFE/SPECIAL STATUS SPECIES **4-15**
4.7.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-15
4.7.1.1 BIG GAME 4-16
4.7.1.1.1 MITIGATION AND RESIDUAL EFFECTS 4-16
4.7.1.2 UPLAND GAME BIRDS 4-16
4.7.1.2.1 MITIGATION AND RESIDUAL EFFECTS 4-17
4.7.1.3 RAPTORS 4-18
4.7.1.3.1 MITIGATION AND RESIDUAL EFFECTS 4-18
4.7.1.4 THREATENED AND ENDANGERED SPECIES 4-19
4.7.1.4.1 MITIGATION AND RESIDUAL EFFECTS 4-19
4.7.1.5 BLM SENSITIVE SPECIES 4-20
4.7.1.5.1 MITIGATION AND RESIDUAL EFFECTS 4-20
4.7.1.6 MIGRATORY BIRDS 4-20
4.7.1.6.1 MITIGATION AND RESIDUAL EFFECTS 4-21
4.7.2 NO ACTION 4-21
4.8 RECREATION **4-21**
4.8.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-21
4.8.1.1 MITIGATION AND RESIDUAL EFFECTS 4-22
4.8.2 NO ACTION 4-22
4.9 VISUAL RESOURCES **4-22**
4.9.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-22
4.9.1.1 MITIGATION AND RESIDUAL EFFECTS 4-23
4.9.2 NO ACTION 4-23
4.10 CULTURAL RESOURCES **4-23**
4.10.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-23
4.10.1.1 MITIGATION AND RESIDUAL EFFECTS 4-23
4.10.2 NO ACTION 4-24
4.11 SOCIOECONOMICS **4-24**
4.11.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-24
4.11.1.1 MITIGATION AND RESIDUAL EFFECTS 4-25
4.11.2 NO ACTION 4-25
4.12 TRANSPORATION **4-25**
4.12.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-25
4.12.1.1 MITIGATION AND RESIDUAL EFFECTS 4-26
4.12.2 NO ACTION 4-26
4.13 HEALTH AND SAFETY **4-26**
4.13.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-26
4.13.1.1 MITIGATION AND RESIDUAL EFFECTS 4-27
4.13.2 NO ACTION 4-27
4.14 HAZARDOUS MATERIALS **4-27**
4.14.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-27
4.14.1.1 MITIGATION AND RESIDUAL EFFECTS 4-28
4.14.2 NO ACTION 4-28

TABLE OF CONTENTS (continued)

4.15 NOISE **4-28**
4.15.1 PROPOSED ACTION DIRECT AND INDIRECT EFFECTS 4-28
4.15.1.1 MITIGATION AND RESIDUAL EFFECTS 4-30
4.15.2 NO ACTION 4-30
4.16 CUMULATIVE EFFECTS **4-30**

CHAPTER 5 – TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED
5.0 PUBLIC PARTICIPATION **5-1**
5.1 CONSULTATIONS AND COORDINATION **5-1**

CHAPTER 6 – LIST OF PREPARERS **6-1**

CHAPTER 7– REFERENCES **7-1**

LIST OF APPENDICES

APPENDIX A MASTER SURFACE USE OPERATIONS and DRILLING PLAN
APPENDIX B HAZARDOUS MATERIALS INVENTORY
APPENDIX C ROCK SPRINGS FIELD OFFICE SUMMARY OF SPECIAL STATUS SPECIES
APPENDIX D BLM STANDARD STIPULATIONS, BEST MANAGEMENT PRACTICES AND MITIGATION REQUIREMENTS
APPENDIX E PUMA DEEP SCOPING NOTICE

LIST OF FIGURES

Figure 1-1 Project Location

Figure 2-1 Puma Deep Prospect Area and Development Plans

Figure 3-1 Bedrock Found Within Project Area and Vicinity
Figure 3-2 Surface Geology Found Within Project Area and Vicinity
Figure 3-3 Mean Annual Total Nitrogen Deposition near Pinedale, Wyoming
Figure 3-4 Mean Annual Total Sulfur Deposition near Pinedale, Wyoming
Figure 3-5 Soils in Project Area and Vicinity
Figure 3-6 Affected Watersheds
Figure 3-7 Riparian, Wetland, and Vegetation Types Found in Project Area and Vicinity
Figure 3-8 Antelope Herd Unit in Relation to the Project Area
Figure 3-9 Mule Deer Herd Unit in Relation to the Project Area
Figure 3-10 Elk Herd Unit in Relation to the Project Area
Figure 3-11 Moose Herd Unit in Relation to the Project Area
Figure 3-12 Sage-grouse, Raptor Nests in the Vicinity of the Project Area
Figure 3-13 Population of Grouse Leks Graph Taken from WGFD 2006 Sage-grouse Job Completion Report
Figure 3-14 White-Tailed Prairie Dog Colonies in the project area

LIST OF TABLES

Table 1-1 Supplemental Authorities To Be Considered
Table 1-2 Major Federal, State, and Local Permits, Approvals, and Authorizing Actions Applicable to Oil and Gas Development in Sweetwater County, Wyoming

Table 2-1 Puma Deep Prospect Project Lease Information
Table 2-2 Puma Deep Unit Project Surface Disturbance Summary
Table 2-3 Puma Deep Project Traffic Estimates
Table 2-4 Puma Deep Project Proposed Seed Mix

Table 3-1 Geological Formations
Table 3-2 Mean Monthly Temperature Ranges and Total Precipitation Amounts
Table 3-3 Wind Direction Frequency Distribution, Granger, Wyoming, 2001-2005
Table 3-4 Wind Speed Distribution, Granger, Wyoming, 2001-2005
Table 3-5 Atmospheric Stability Class Distribution, 2001-2005
Table 3-6 Monitored Air Pollutant Background Concentrations and Wyoming and National Ambient Air Quality Standards
Table 3-7 Threatened and Endangered Species Possible in Project Area

Table 4-1 Drilling Rig Emissions
Table 4-2 Total Construction Emissions per Well Developed.
Table 4-3 Typical Controlled vs. Uncontrolled Production Facility Emissions
Table 4-4 Total Production Emissions per Year per Well
Table 4-5 Maximum Modeled Concentration Impacts from Puma Project Sources Compared to the WAAQS and NAAQS
Table 4-6 Long-term Modeled MLE and MEI Cancer Risk Analyses
Table 4-7 HAP Concentration Comparisons with Acute RELs

Table 4-8 HAP Concentration Comparisons with Non-Carcinogenic RFCs
Table 4-9 Cumulative Effects Analysis

Table 6-1 Third Party Interdisciplinary Team Members
Table 6-2 BLM Interdisciplinary Team Members

LIST OF ABBREVIATIONS AND ACRONYMS USED IN THIS DOCUMENT

ACOE	Army Corps of Engineers
APD	Application for Permit to Drill
AQD	Air Quality Division
AQRV	Air Quality Related Values
AUM	Animal Unit Month
BACT	Best Available Control Technology
BBL	Barrels(s)
BLM	Bureau of Land Management
BMP	Best Management Practices
BOP	Blowout Preventer
BWPD	Barrels of Water per Day
CASTNET	Clean Air Status and Trends Network
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon monoxide
CR	Country Roads
dBA	Decibels
dv	Deciview
EA	Environmental Assessment
EIS	Environmental Impact Study
EPA	Environmental Protection Agency
˚F	Degrees Fahrenheit
FLAG	Federal Land Managers' Air Quality Related Values Workgroup
FLPMA	Federal Land Policy Management Act
FWS	United States Fish and Wildlife Service
H_2S	Hydrogen Sulfide
HAP	Hazardous Air Pollutant
IM	Internal Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
KSLA	Known Sodium Leasing Area
LOC	Levels of concern
LOP	Life of Project
LT	Long Term
mg/L	Milligrams per liter
MLA	Mineral Leasing Act
MSDS	Materials Safety Data Sheet
MSUOP	Master Surface Use Operations Plan
N	Total nitrogen
NAAQS	National Ambient Air Quality Standard
NADP	National Acid Deposition Program
NEPA	National Environmental Policy Act
NH_4	Ammonium
NO_2	Nitrogen dioxide
NO_3	Nitrate

ABBREVIATIONS AND ACRONYMS (continued)

HNO_3	Nitric acid
NO_x	Nitrogen oxide
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
ns	No Standard
NTN	National Trends Network
NWI	National Wetland Inventory
O_3	Ozone
OSHA	Occupational Safety and Health Administration
PFYC	Potential Fossil Yield Classification
PM_{10}	Particulate Matter <10 microns in diameter
PM_{25}	Particulate Matter <2.5 microns in diameter
PSD	Prevention of Significant Deterioration
RELs	Reference Exposure Levels
RMP	Resource Management Plan
RSFO	Rock Springs Field Office
S	Total sulfur
SHWD	Solid and Hazardous Waste Division
SO_2	Sulfur dioxide
SO_4	Sulfate
SPCC	Spill Prevention and Control Countermeasure
ST	Short Term
SUP	Surface Use Plan
SVR	Standard visual range
SWPPP	Storm Water Pollution Protection Plan
T&E	Threatened or Endangered
TEPC	Threatened, Endangered, Proposed and Candidate
TSP	Total Suspended Particulate
U. S.	United States
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compounds
VRM	Visual Resource Management
WAAQS	Wyoming Ambient Air Quality Systems
WAQSR	Wyoming Air Quality Standards and Regulations
WDEQ	Wyoming Department of Environmental Quality
WOGCC	Wyoming Oil and Gas Conservation Commission
WSEO	Wyoming State Engineers Office
WYNDD	Wyoming Natural Diversity Data Base

CHAPTER 1 - PURPOSE OF AND NEED FOR THE ACTION

1.0 INTRODUCTION

Proposed Action Title/Type

A project description for the Puma Deep Prospect natural gas development project was received by the Rock Springs Field Office (RSFO) on February 28, 2008. Davis Petroleum Corporation (Davis) proposes to drill an additional 10 wells in the 9,600-acre Puma Deep Prospect Area (PDPA) located 17 miles east of Mountain View, Wyoming, in Sweetwater County (Figure 1-1), for a total of 15 wells. There are currently five wells completed in or producing from the Upper Cretaceous age Frontier and Muddy Formations in the project area. Access to the project is by established county and upgraded oil field roads.

Davis proposes to produce natural gas from the Frontier/Muddy Formations in the Puma Deep Project Area using conventional deep gas development techniques. The area would be developed on 160-acre spacing or up to 4 wells per square mile. BLM Rock Springs Field Office has permitted five wells in the field, which have been drilled. Ten additional wells have been proposed; these wells will average 13,800 feet in depth, taking 60 days from spud to completion, of which 30 to 45 days are required for drilling operations. Each well pad will be connected to the surface transportation and gas gathering systems. An average well site will be approximately 9.8 acres in size including associated access road and pipeline disturbance. This disturbance will be reduced to approximately 3.6 acres following well completion operations; each well site will be less than 1.0 acre following interim reclamation efforts. Access roads constructed to serve the wells will be upgraded, culverts installed and graveled as is the main field access road. Upon implementation, the Proposed Action will be completed in approximately 5 years. The actual number of wells drilled per year will depend on natural gas price and on the success of the initial wells. The productive life of the project is estimated to be 30 years.

The PDPA contains 9,440 federal surface acres of which 8,800 are federal mineral estate and 640 are State of Wyoming leases. There are also 160 private surface and mineral acres in the project area. Within the lease boundary, the proposed action will involve approximately 127 acres of new short-term surface disturbance (1.33% of the project area) and approximately 46.8 acres (less than 1% of the PDPA) of long-term surface disturbance. Approval and implementation of the proposed PDPA project will result in the production of an estimated 37.5 BCF of natural gas reserves that otherwise would not be produced at this time.

Location of Proposed Action

The Puma Deep Project is located in the following sections or portions of sections of Sweetwater County, Wyoming:

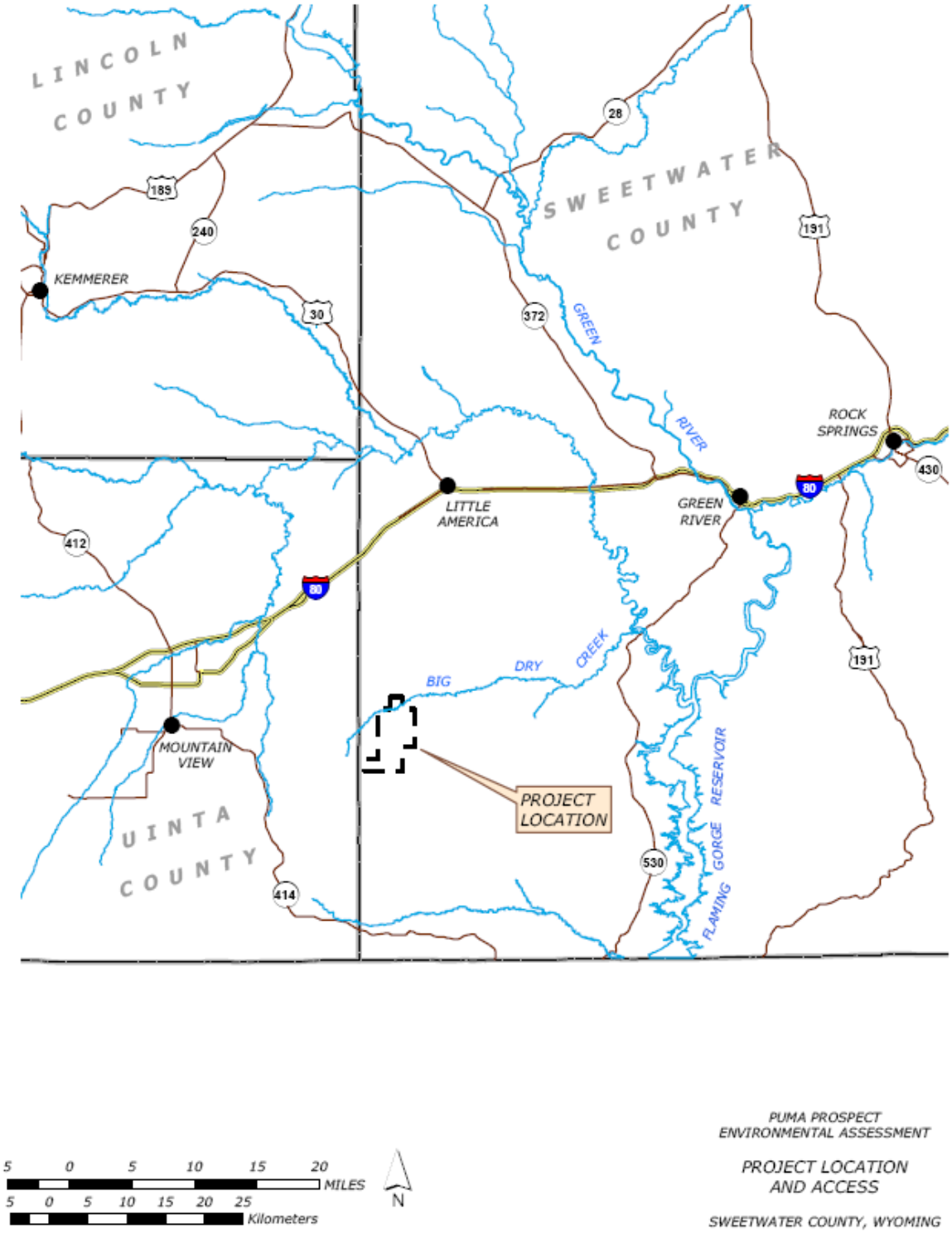
T15 N-R112 W Sections 12, 13, 14, 23, 24, 25, 26, 35, 36;
T14 N-R112 W Sections 1, 2, 3;
T15 N-R111 W Sections 18, 19, 30.

Conformance with Land Use Plan

The Puma Deep Prospect proposed action is in conformance with the Green River Resource Management Plan (GRRMP), Record of Decision, August 8, 1997. Management objectives for the management of oil and gas resources are to provide for leasing, exploration, and development

of oil and gas, while protecting other values. In accordance with 43 CFR 1610.5, the Proposed Action has been reviewed and has been found to be in conformance with the GRRMP.

Figure 1-1. Project Location



A tiered approach to environmental review is used by the BLM in actions involving the leasing, exploration, and development of mineral resources. Initial environmental review occurs during BLM land use planning, during which the appropriateness of leasing and stipulations for development are identified with public input. Accordingly, the federal minerals within the RSFO area that have been leased to the various participating parties carry a contractual commitment to allow for the mineral development in accordance with the terms and conditions of the respective leases. During exploration, site-specific Environmental Assessments (EAs) are prepared to ensure that unnecessary and undue impacts to surface and subsurface resource values do not occur. This EA serves as site-specific analysis for 10 additional development wells; however, further analysis may be required if there is a change in circumstances. This EA tiers to and incorporates the GRRMP and Draft (1992) and Final EIS (1996) and Record of Decision (1997). The Proposed Action is within the intent, scope, and meaning of the GRRMP.

1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose is to meet the national mineral leasing policies and the regulations which recognize the right of the lease holders to develop federal mineral resources to meet continuing public needs so long as undue unnecessary environmental degradation in not incurred. The need of this action is to develop existing federal oil and gas leases.

1.2 DECISIONS TO BE MADE

There are two decisions to be made. First, determine whether impacts are significant in accordance with 40 CFR 1508.27 or not. If impacts are determined to be significant, proceed with a Notice of Intent. If impacts are not determined to be significant, reach a Finding of No Significant Impact (FONSI). The second decision will be to determine whether or not to authorize the proposed action or an alternative analyzed in detail.

1.3 SCOPING AND PUBLIC INVOLVEMENT AND ISSUES

In accordance with NEPA and CEQ regulations 40 CFR 1501.7, an early and open process for determining the scope of issues to be addressed is required and for identifying the significant issues related to a proposal. In compliance with this procedural requirement, the BLM, RSFO released a scoping notice on May 19, 2008 for a 30-day review period. Six comment letters were received. The internal BLM review process and public scoping led to the identification of the following land and resource management issues and concerns potentially associated with the Proposed Action:

- Cherokee Trail
- Impacts to cultural resources, Native American Religious Concerns
- Paleontological resources
- BLM desires to pursue establishment of Public Water Reserves in this area
- Impacts of noise on wildlife and recreation
- Impacts on resources from road layout and transportation planning
- Impacts on wetlands and riparian areas
- Impact to ephemeral and intermittent drainages from erosion from disturbed sites
- Conformance with LUP/Leases
- Control of invasive, non-native species (weeds)
- Protection of special status wildlife and plant species including endangered, threatened, candidate, proposed, and BLM sensitive species including bald eagle, Mountain plover, black-footed ferrets, sage-grouse (core area considerations), pygmy rabbit, white-tailed

prairie dog, and burrowing owl Ute-ladies' tresses; midget faded rattlesnake and spade foot toad
- Potential for depletion of Colorado River water
- Potential effects on small and big game species, raptors and migratory birds
- Impacts to air quality
- Impacts to recreation including hunters, open spaces
- Impacts on grazing lessees and private land owners
- Impacts to social/economic values
- Transportation planning
- Application and acquisition of appropriate permits
- Reclamation
- Cumulative impacts
- Use of alternative technologies, particularly multi pad or phased development.

1.4 SUPPLEMENTAL AUTHORITIES TO BE CONSIDERED

The NEPA is only one of many authorities that contain procedural requirements that pertain to treatment of elements of the environment when the BLM is considering a Federal action. The following list (Table 1-1) includes some of the other authorities that may apply to BLM actions.

Table 1-1. Supplemental Authorities to be Considered

Element Authority	Manual	Section
Air Quality	The Clean Air Act as amended (42 USC 7401 et seq.)	7300
Cultural Resources	National Historic Preservation Act, as amended (16 USC470)	8100
Fish Habitat	Magnuson-Stevens Act Provision: Essential Fish Habitat (EFH): Final Rule (50 CFR Part 600; 67 FR 2376, January 17, 2002).	NA
Forests and Rangelands	Healthy Forests Restoration Act of 2003 (P.L. 108-148)	NA
Migratory Birds	Migratory Bird Treaty Act of 1918, as amended (16 USC 703 et seq.)	NA
Native American Religious Concerns	American Indian Religious Freedom Act of 1978 (42 USC 1996)	8100
Threatened or Endangered Species	Endangered Species Act of 1983, as amended (16 USC 1531)	6840
Wastes, Hazardous or Solid	Resource Conservation and Recovery Act of 1976 (43 USC 6901 et seq.) Comprehensive Environmental Repose Compensation, and Liability Act of 1980, as amended (43 USC 9615)	9180/9183
Water Quality	Drinking–Ground Safe Drinking Water Act, as amended (43 USC 300f et seq.) Clean Water Act of 1977 (33 USC 1251 et seq.)	7240/9184
Wild and Scenic Rivers	Wild and Scenic Rivers Act, as amended (16 USC 1271)	8014
Wilderness	Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.); Wilderness Act of 1964 (16 USC 1131et seq.)	8500
Environmental Justice	E.O. 12898, "Environmental Justice" February 11, 1994	NA
Floodplains	E.O. 11988, as amended, Floodplain Management, 5/24/77	7260

Element Authority	Manual	Section
Migratory Birds	E.O. 131186, "Responsibilities of Federal Agencies to Protect Migratory Birds" January 10, 2001	NA
Wetlands-Riparian Zones	E.O. 11990 Protection of Wetlands 5/24/77	6740

1.5 PERMITTING REQUIREMENTS

Some of the federal, state, county, and local actions required to implement the PDPA project are listed in Table 1-2. The Proposed Action is in conformance with the *State of Wyoming Land Use Plan* (Wyoming State Land Use Commission 1979) and the Sweetwater County Land Use Plan (Sweetwater County Board of Commissioners [SCBC] 1996) and complies with all other relevant federal, state, and local laws. Table 1.1 provides an overview of laws applicable to oil and gas development and an overview of the key regulatory requirements that would govern oil and gas project implementation. Additional approvals, permits, and authorizing actions may be necessary.

Table 1-2. Major Federal, State, and Local Permits, Approvals, and Authorizing Actions Applicable to Oil and Gas Development in Sweetwater County, Wyoming

Agency	Permit, Approval, or Action	Authority
U.S. Fish and Wildlife Service (USFWS)	Coordination, consultation and impact review federally listed threatened and endangered (T&E) species	Fish and Wildlife Coordination Act (16 U.S.C. 661-666c); Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1536); bald eagle Protection Act (16 U.S.C. 668-668dd)
	Migratory bird impact coordination	Migratory Bird Treaty Act (16 U.S.C. 704)
U.S. Environmental Protection Agency (EPA)	Spill Prevention Control and Countermeasures (SPCC) Plans	Oil Pollution Prevention, as amended (40 CFR 112)
	Regulate hazardous waste treatment, storage, and/or disposal	Resource Conservation and Recover Act of 1976, as amended (42 U.S.C. 6901 et req.)
U.S. Department of Energy (DOE)	Regulate interstate pipeline product Transportation	Various sections of the U.S.C.
	Rights-of-way (ROW) grants and temporary use permits for pipelines and central tank battery on BLM-managed land	Mineral Leasing Act of 1920, as amended (30 U.S.C. 185); Onshore Oil and Gas Unit Agreements: Unproven Areas, as amended (43 CFR 3180)
	ROW grants for access roads on BLM managed land	Federal Land Policy and Management Act (43 U.S.C. 1761-1771); Right-of-Way, Principles and Procedures, as amended (43 CFR 2800)
	Authorization for flaring and venting of natural gas on BLM-managed land	Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.); Requirements for Operating Rights Owners and Operators, as amended (43 CFR 3162)
	Plugging and abandonment of a well on BLM-managed land	Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.); Requirements for Operating Rights Owners and Operators, as amended (43 CFR 3162)

Agency	Permit, Approval, or Action	Authority
	Antiquities and cultural resource permits on BLM-managed land	Antiquities Act of 1906, as amended (16 U.S.C. 431-433); Archaeological Resources Protection Act of 1979, as amended (16 U.S.C. 470aa-47011); Preservation of American Antiquities, as amended (43 CFR 3)
	Approval to dispose of produced water on BLM-managed land	Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.); Special Provisions, as amended (43 CFR 3164); Onshore Oil and Gas Order No. 7 as amended (58 Federal Register 47,354)
Sweetwater County	Mineral extraction permits	County Code
	Construction/use permits	County Code and Zoning Resolution
	Conditional use permits	County Code and Zoning Resolution
	Road use agreements/oversize trip permits	County Code
	County road crossing/access permits	County Code / Engineering Department
	H_2S contingency plan	County Health Department
	Small wastewater permits	County Health Department
	Hazardous material recordation and Storage	County Code
	Zone changes	Zoning Resolution
	Filing fees	County Code
	Noxious weed control	County Code
U.S. Department of Transportation (DOT)	Control pipeline maintenance and Operation	Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports, and Safety Related Condition Reports, as amended (49 CFR 191); and Transportation of Natural and Other Gas by Pipeline: Minimum Safety Standards, as amended (49 CFR 192)
Wyoming Department of Environmental Quality, Water Quality Division (WDEQ/WQD)	Permits to construct settling ponds and waste water systems, including ground water injection and disposal wells	Wyoming Environmental Quality Act, Article 3, Water Quality, as amended (Wyoming Statute [W.S.] 35-11-301 through 35-11-311)
	Regulate disposal of drilling fluids from abandoned reserve pits	Wyoming Environmental Quality Act, Article 3, Water Quality, as amended (W.W. 35-11-301 through 35-11-311)
	NPDES permits for discharging waste water and storm water runoff	WDEQ-WQD Rules and Regulations, Chapter 18; Wyoming Environmental Quality Act, Article 3, Water Quality, as amended (W.S. 35-11-301 through 35-11-311); Section 405 of the Federal Water Pollution Control Act (Clean Water Act) (codified at 33 U.S.C. 1345); EPA administered (40 CFR 122); State Program Requirements (40 CFR 123); EPA Water Program Procedures for Decision-making, as amended (40 CFR 124)
	Administrative approval for discharge of hydrostatic test water	Wyoming Environmental Quality Act, Article 3, Water Quality, as amended (W.S. 35-11-301 through 35-11-311)

Agency	Permit, Approval, or Action	Authority
Wyoming Department of Environmental Quality, Air Quality Division (WDEQ/ADQ)	Permits to construct and permits to operate	Clean Air Act, as amended (42 U.S.C. 7401 et seq.); Wyoming Environmental Quality Act, Article 2, Air Quality, as amended (W.S. 35-11-201 through 35-11-212)
Wyoming Department of Environmental Quality, Land Quality Division (WDEQ/LQD)	Mine permits, impoundments, and drill hole plugging on state lands	Wyoming Environmental Quality Act, Article 4, Land Quality, as amended (W.S. 35-11-401 through 35-11-437)
Wyoming Department of Environmental Quality, Solid Waste Division (WDEQ/SWD)	Construction fill permits and industrial waste facility permits for solid waste and disposal during construction and operations	Wyoming Environmental Quality Act, Article 5, Solid Waste Management, as amended (W.S. 35-11-501 through 35-11-520)
Wyoming Department of Transportation (WDOT)	Permits for oversize, over length, and overweight loads	Chapters 17 and 20 of the Wyoming Highway Department Rules and Regulations
	Access permits to state highways	Chapter 13 of the Wyoming Highway Department Rules and Regulations
Wyoming Oil and Gas Conservation Commission (WOGCC)/Wyoming Board of Land Commissioners/Land and Farm Loan Office	Approval of oil and gas leases, ROWs for long-term or permanent off-lease/off-unit roads and pipelines, temporary use permits, and development on state lands	Public Utilities, W.S. 37-1-101 et seq.
	Permit to drill, deepen or plug back (APD process)	WOGCC Regulation, Chapter 3, Operational and Drilling Rules, Section 2 Location of Wells
	Permit to use earthen pit (reserve pit)	WOGCC Regulations, Chapter 4, Environmental Rules, Including Underground Injection Control Program Rules for Enhanced Recovery and Disposal Projects, Section 1, Pollution and Surface Damage (Forms 14A and 14B)
	Authorization for flaring or venting of gas	WOGCC Regulations, Chapter 3, Operational and Drilling Rules, Section 45 Authorization for Flaring or Venting of Gas
	Permit for Class II underground injection wells	Underground Injection Control Program: Criteria and Standards, as amended (40 CFR 146); State Underground Injection Control Programs, State-administered program- Class II Wells, as amended (40 CFR 147,2551)
	Well plugging and abandonment	WOGCC Regulations, Chapter 3, Section 14, Reporting (Form 4) Section 15, Plugging of Wells, Stratigraphic Toxic, Core, or Other Exploratory Holes (Form 4)
	Change in depletion plans	Wyoming Oil and Gas Act, as amended (W.S. 30-5-110)
Wyoming State Engineer's Office (WSEO)	Permits to appropriate ground water (use, storage, wells, dewatering)	W.S. 41-3-938, as amended (Form U.W. 5)
Wyoming State Historic Preservation Office (SHPO)	Cultural resource protection, programmatic agreements, consultation	Section 106 of National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et req.) and advisory Council Regulations on Protection of Historic and Cultural Properties, as amended (36 CFR 800)

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

2.0 INTRODUCTION – Alternatives Analyzed

The Proposed Action includes continued operation of the existing PDPA wells while the proposed wells are being developed. Water will be obtained from a water supply well located in C SW Sec 20 T15N-R111W. Water is transported from this well via temporary surface pipeline to temporary tankage located near the center of the north half of the same section. Water is then hauled by truck to the use point. In addition approximately 1.75 miles of pipeline will be installed to complete the gas gathering system, as illustrated on Figure 2-1. All areas not needed for production, access road bar ditches and the pipeline right-of-way (ROW) will be reclaimed as quickly as possible following completion of construction and well development activities.

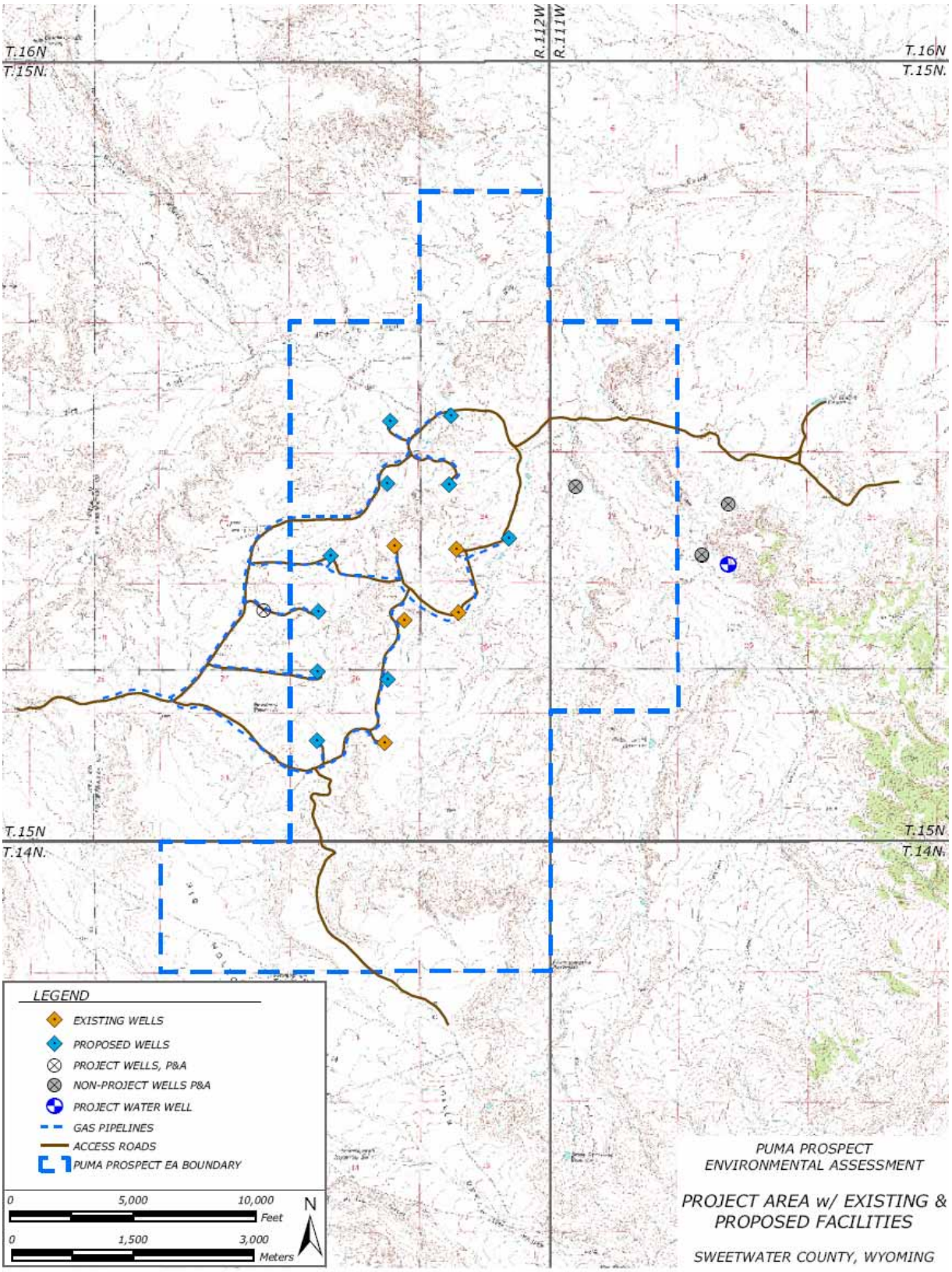
In addition to the Proposed Action, this EA analyzes the No Action Alternative in detail. Additionally, several alternatives were considered but not considered in detail. Rationale for dropping these other alternatives is presented in section 2.3.

2.1 DESCRIPTION OF PROPOSED ACTION

The Proposed Action is within the administrative boundary of the BLM Rock Springs Field Office and is located in the south-western part of Sweetwater County, Wyoming, east of the town of Mountain View. Access to the area is by Interstate Highway 80 and State Highway 414. Figure 2-1, the Proposed Action Map, and Table 2-1 provide information on existing and proposed wells and leases involved. Management actions for the area allow for surface disturbing activities, mineral exploration and development subject to the guidelines found under the GRRMP, Minerals section. Management objectives and actions for mineral development are to allow for mineral exploration and development. Approval and implementation of the proposed PDPA project will result in the production of an estimated 37.5 BCF of natural gas reserves that otherwise would not be produced at this time.

The PDPA leases contain "Lease Notice No. 1" which provides that "the authorized officer may require reasonable measures to minimize adverse impacts to other resources values, land uses, and users not addressing lease stipulations at the time operations are proposed. Such reasonable measures may include, but are not limited to, modification of siting or design of facilities, timing of operations, and specification of interim and final reclamation measures, which may require relocation proposed operations up to 200 meters, but not off the leasehold and prohibiting surface disturbance activities for up to 60 days." Special values may include, (1) Slopes in excess of 25 percent, (2) Within 500 feet of surface water and/or riparian areas, (3) Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur, (4) Within 500 feet of Interstate highways or 200 feet or other existing rights-of-way (i.e. U.S. and state highways, roads, railroads, pipelines, powerlines), (5) within ¼ mile of occupied dwellings and (6) Material sites. The Lease Notice goes on to state that "The intent of this notice is to inform interested parties that when one or more of the above conditions exist, surface disturbing activities will be prohibited unless or until the permittee or the

Figure 2-1. Puma Deep Prospect Area and Development Plans



designated representative and the surface management agency arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development and become a condition for approval when authorizing the action." In addition, some of the leases within the project area are encumbered with timing limitation stipulations for sage-grouse or raptor nesting habitat protection and big game crucial wintering areas.

The lease holders propose drilling ten additional development wells to the Frontier/Muddy Formations, five wells have already been permitted in the analysis area. Production facilities, access roads and gas gathering lines necessary to produce these wells would also be installed in addition to those already in place. These wells would be drilled on 160-acre spacing as approved by the Wyoming Oil and Gas Conservation Commission (WOGCC) within the Puma Deep Unit. Well development is expected to take five years while the life-of-project (LOP) is expected to be 30 years. All applicable permits would be acquired for the project. Development activities beyond that analyzed in this document would require additional analysis.

Produced natural gas is transported from the area via a field gathering system that connects with the Questar gas transmission system. Hydrocarbon liquids (condensate/light oil) is sold and trucked from the project area to a sales point located off I-80. Produced water is also transported by truck and disposed of through commercial injection wells permitted by WOGCC and the Wyoming Department of Environmental Quality (DEQ). The Proposed Action would also require upgrading existing roads or the construction of new access roads, gas gathering pipelines (most would be buried adjacent to the access roads) and related production facilities (well pads, condensate and produced water tanks, and dehydrators as well as glycol and methanol storage tanks). The project area, defined as the sections directly affected by the Proposed Action and enclosed by lease boundaries, encompasses approximately 9,600 acres.

Table 2-1. Puma Deep Prospect Project Lease Information

Lease number / Well names	Wells	Lease Notice No. 1	Sage-grouse lek or nesting *	Raptor nesting **	Big game crucial winter ***
WYW 151342	No wells proposed		X		
WYW 151344	No wells proposed			X	X
WYW 152241	No wells proposed			X	
WYW 152256	No wells proposed	X			
WYW 152257	No wells proposed	X			
WYW 152258	No wells proposed	X			
WYW 152265	*PD 14 SE, PD 13 SW*	X	X	X	
WYW 152266	*PD 35 NW, PD 35 NE*	X		X	
WYW 152268	*PD 23NE, PD 24NW, PD #3, PD #2, PD#1, PD #6, PD 26 NW, PD #5, PD #4, PD 26 SW, PD 26SE*			X	

* TLS Feb 1 to Jul 31; as mapped in RSFO or KFO GIS; CSU w/in ¼ mi of SG lek; as mapped in KFO GIS

** TLS Feb 1 to Jul 31; as mapped in RSFO GIS
*** TLS Nov 15 to Apr 30; as mapped in RSFO GIS

2.1.1 Pre-Construction Activities

Davis would follow the procedures outlined below to gain approval from BLM RSFO for the proposed activities. Development activities also would be approved prior to construction through applicable permit procedures including the filing with the State of Wyoming for appropriate permits for each proposed well. BLM and the Wyoming State Engineers Office (SEO) have already approved the use of the Leo #1 water supply well; the BLM and WOGCC have also approved the drilling of 5 wells in the field, including Puma #1, #2, #4, #35NE and #5. Any other applicable permits would be obtained as necessary prior to construction.

Prior to the start of construction activities, Davis would submit and obtain approval of federal Application to Permit to Drill (APD), and any necessary right-of-way applications for each well, a complete APD package includes a Drilling Plan and Multi-Point Surface Use and Operations Plan. BLM applies site specific Conditions of Approval and Operating Standards to individual APDs prior to permit approval. All activities will be conducted in compliance with the general project level Drilling Prognosis and Multi-Point Surface Use and Operations Plan (MSUOP) found in Appendix A of this EA and the project map Figure 1.2. Approval of all planned operations would be obtained in accordance with the authority prescribed in Onshore Oil and Gas Order No. 1 (Approval of Operations on Onshore Federal and Indian Oil and Gas Leases).

The proposed facilities (Figure 2-1) have been staked by Davis and inspected by an interdisciplinary team and/or an official from the BLM to ensure consistency with the approved RMP and oil and gas lease stipulations.

Legal locations for the drilled (**bolded**) and proposed Puma Deep Unit project wells are as follows:

Puma Deep Unit #1	**NESW**	**Sec 24 – T15N – R 112W**
Puma Deep Unit #2	**NWSE**	**Sec 23 – T15N – R 112W**
Puma Deep Unit #3	NESW	Sec 23 – T15N – R 112W
Puma Deep Unit #4	**NENW**	**Sec 25 – T15N – R 112W**
Puma Deep Unit #5	**SENE**	**Sec 26 – T15N – R 112W**
Puma Deep Unit #6	NESE	Sec 24 – T15N – R 112W
Puma Deep Unit 14 SE	CSE	Sec 14 – T15N – R 112W
Puma Deep Unit 13 SW	CSW	Sec 13 – T15N – R 112W
Puma Deep Unit 35 NW	CNW	Sec 35 – T15N – R 112W
Puma Deep Unit 35 NE	**CNE**	**Sec 35 – T15N – R 112W**
Puma Deep Unit 23NE	CNE	Sec 23 – T15N – R 112W
Puma Deep Unit 24NW	CNW	Sec 24 – T15N – R 112W
Puma Deep Unit 26 NW	CNW	Sec 26 – T15N – R 112W
Puma Deep Unit 26 SW	SW	Sec 26– T15N – R 112W
Puma Deep Unit 26SE	CSE	Sec 26 – T15N – R 112W

Table 2-2 provides information on initial and life-of-project surface disturbance.

Table 2-2. Puma Deep Unit Project Surface Disturbance Summary

Examples Proposed Locations	Well-Site Disturbance Short Term/LOP (acres)	Access Road Disturbance Short Term/LOP (acres)	Pipeline Corridor Disturbance Short Term/LOP (acres)	Total Acreage Disturbance Short Term/LOP (acres)
Puma Deep Unit #1 SW 24-15-112	3.086 / 1.612	5.91 / 2.182	3.82 / 0	12.816 / 3.794
Puma Deep Unit #2 SE 23-15-112	4.108 / 2.458	3.553 / 0.909	1.430 / 0	9.091 / 3.367
Puma Deep Unit #4 NW 25-15-112	4.108 / 3.345	0.367 / 0.275	0.734 / 0	5.209 / 3.367
Puma Deep Unit #35NE NE 35-15-112	3.953 / 2.226	6.276 / 3.238	4.707 / 0	14.936 / 5.364
Puma Deep Unit #5 NE 26-15-112	4.108 / 2.226	1.073 / 0.715	1.788 / 0	6.969 / 2.093
Average disturbance per well	3.8 / 2.4	3.4 / 1.46	2.5 / 0	9.8 / 3.6
Total Disturbance for 10 proposed unit wells	38 / 24	34 / 14.6	25 / 0	98 / 36

2.1.2 Construction and Drilling

Following is a general discussion of proposed construction techniques to be used by Davis Petroleum when implementing the Proposed Action. These construction techniques would be generally applicable to drill sites, pipelines, and access roads within the project area, but may vary in detail between the individual well sites. Roads and pipelines on BLM-administered public lands constructed in association with the Proposed Action would require BLM right-of-way authorizations and/or Sundry Notices which could include additional mitigation to further minimize environmental impacts. Approved permits to drill (APDs) also include site specific mitigation measures.

2.1.2.1 Well Pad Construction

Well pads would be prepared by clearing an area approximately 315 feet by 400 feet (approximately 3 acres) for each well but may be as large as 4 acres depending on site topography and individual drilling rig requirements. Well locations would be cleared of vegetation and topsoil (6 to 12 inches), which would be stockpiled for use in site reclamation. The well location would be leveled using standard cut-and-fill construction techniques. Once drilling operations are complete and if production ensues, well pads would be reduced to the area needed for production operations and the remainder reclaimed resulting in an average life-of-project disturbance of approximately 2.5 acres per well. For the purpose of analysis, maximum disturbance is assumed to be 4 acres; however, it is Davis' practice to keep surface disturbance to a minimum. See Appendix A, for a typical well site layout. Should testing prove unsuccessful, the entire well pad and access road would be reclaimed and seeded with BLM specified native species.

Components of the well pad include an earthen reserve pit lined with 12–mil reinforced poly to contain drilling fluids, cuttings, and water produced during drilling and completion operations. Venting of any gas produced would be over an unlined flare pit. Flare pits are unlined as they serve as backdrop to any flaring necessary for safety during the operations. All pits would be constructed in accordance with BLM requirements. The reserve pits would be approximately 210 feet long by 100 feet wide and 10 feet deep; depending on site specific constraints. The reserve pit would be fenced on three non-working sides during drilling, and the fourth side at the time the rig is removed. Reserve pits could be open for up to 90 days to allow for evaporation of pit fluids; enhanced evaporation methods may be necessary to meet this time frame; in the alternative fluids may be recycled to other drilling locations or hauled to DEQ approved disposal facilities. During the time the pit is open and the rig off location, the pit would be fenced on all four sides to prohibit wildlife or livestock from entering the pit.

2.1.2.2 Road Construction and Transportation

Davis proposes to use existing crowned and ditched roads to and within the project area and to construct new roads along existing two tracks, where feasible. Establishment or construction of new roads in the Project Area would total approximately 4.5 miles. If drilling is productive, all access roads to the well sites would remain in place for well-servicing activities (i.e. maintenance, improvements, etc.) for the life of the well. Reclamation would be completed on portions of the well pads and access roads that are no longer needed following drilling/development activities.

The project map (Figure 2-1) indicates existing and proposed road locations. Due to the size and weight of vehicles expected to regularly travel roads in the project area, all roads will be crowned and ditched, with a 14 to 16 foot driving surface and a 40-foot initial disturbance width. Culverts and low water crossings would be installed where necessary and approved in well specific APDs. Once a well is determined to be productive gravel, surfacing would be installed where needed. See Table 2-2 for details on disturbance. Details of the proposed road construction and transportation plan can be found in Appendix A, Master Surface Use Operations Plan (MSUOP).

Proposed roads would be established as follows:

- Use of existing Collector Roads (multi-purpose, upgraded roads)
- Construction of Resource Roads to access well roads
- Development of Special Purpose roads to access one or more wells

An estimate of workforce and traffic for the Proposed Action is found in Table 2-3. Traffic would include:

- Equipment needed for road and well site construction activities
- Drilling rigs and associated equipment
- Water trucks for drilling
- Traffic associated with well completion activities
- Construction traffic associated with interim well site, road and pipeline reclamation operations
- Traffic associated with occasional workover activities
- Haul truck traffic associated with condensate and produced water hauling

- Light truck traffic would include the use of pickup trucks to visit each well daily

Davis would prohibit travel during periods when severe rutting (creation of ruts in excess of 4" deep) or resource damage might occur. Snow removal equipment would be equipped with shoes to keep the blade six (6) inches above the natural ground surface. Locations of snow stockpiles, if needed, would be designated in advance by the Authorized Officer.

The locations of the proposed roads have been placed to maximize transportation efficiency and reduce redundancy. Roads would be closed and reclaimed by Davis when they are no longer required for operations, unless otherwise directed by the BLM.

2.1.2.3 Drilling Operation

Drilling of the exploratory and development wells would utilize a conventional drilling rig. Equipment and materials needed to support drilling operations would be trucked to the well site. Water used for drilling and dust control would come from the approved Leo #1 water well located in Section 20-T15N-R111W and/or from the Town of Mountain View. Approximately 3 to 4-acre feet of water are needed for drilling and completion of each well with additional water as needed for dust control. The actual water volume used in drilling operations would be dependent upon the depth of the well and any losses that might occur during drilling. Water is hauled by truck from a remote holding tank to the site where needed. An overland temporary pipeline is also being considered. Refer to Appendix A for specific details on the drilling procedures.

Drilling mud would consist of fresh water, native clays, and bentonite gel. As hole conditions dictate, small amounts of polymer additives and/or potassium chloride salts may be added for hole cleaning and clay stabilization.

Depending on the depth of the target formation (Frontier/Muddy), each producing well would be drilled to a depth of approximately 13,800 feet or deeper. All wells would be cased and cemented as required by WOGCC and BLM regulations.

The well control system would be designed to meet the conditions likely to be encountered in the hole and would be in conformance with BLM and State of Wyoming requirements.

The drilling operation for a Frontier/Muddy natural gas well normally requires approximately 35 days and up to fourteen people at a time, including personnel for logging and cementing activities. A well completion program would be initiated to stimulate production of gas and to determine gas and water production characteristics in preparation for production of gas from a drilled, cased, and cemented well. Completion equipment would be transported to the well site and used to complete each well. Completion operations are expected to average approximately 12 to 15 days per well. Natural gas would be vented over the unlined emergency/flare pit for a short period of time during testing. If determined to be productive, wells would be shut-in until pipelines and other production facilities are constructed and any applicable permits are obtained.

No use of materials or chemicals considered hazardous under Superfund Amendment and

Reauthorization Act of 1986 as amended or the Resource Conservation and Recovery Act or extremely hazardous wastes as defined in 40 CFR 355 are proposed. Hazardous Materials that may be utilized during project development and production operations are identified in Appendix B.

2.1.3 Well Completion

Well construction methods isolate aquifers and hydrocarbon containing formations with surface and production casing and cement to prevent condensate, gas and/or water movement from formation to formation and isolate the production zones. Completion operations stimulate well bores through fracturing, perforating, acidizing or other activities appropriate to the reservoir characteristics. All well casing and cementing operations on these wells would be conducted in compliance with applicable rules and guidance and with BLM Onshore Oil and Gas Order No. 2.

Currently, the installation of artificial lift systems is not anticipated as the natural reservoir pressure is adequate to lift produced gas, water and condensate to the surface. If artificial lift is needed in the future, BLM approval would be required.

Venting or flaring at oil and gas facilities is regulated by three agencies, the Wyoming Department of Environmental Quality (WDEQ), the Wyoming Oil and Gas Conservation Commission (WOGCC) and the BLM. Each agency regulates these activities with a slightly different objective. The WDEQ is concerned about the emission of regulated pollutants, the WOGCC is concerned about waste of the natural gas resource while BLM is concerned that the venting is legitimate for the operation of the well and royalties are being accounted for. All parties are concerned about safety of the public with regard to the venting of H2S gas. No H2S gas has been encountered in the development of the Puma Deep Project.

In general, venting natural gas from a wellhead does not release any regulated pollutants. Natural gas is approximately 87% methane (CH4), 9% ethane (C2H6), with remaining fractions of carbon dioxide (CO2), free nitrogen (N2) and other heavier hydrocarbons. Therefore, in general, no notification is required for the WDEQ for venting gas from a wellhead. However, flaring operation (combustion of the gas) does release regulated pollutants. Flaring is necessary for purging the well following completion or workover. The WDEQ policy is to require verbal notification within 24 hours of the beginning of the episode. The WOGCC requires a retroactive notice of venting or flaring operations that persist for a period exceeding 15 days. This notice requests an authorization to continue flaring or venting. BLM Notice to Lessees (NTL) 4A spells out what operating scenarios venting or flaring is authorized and requires only subsequent notification of the event versus occasions when prior notice to the agency is required. Operators are required to comply with all three regulatory standards.

No gas compression facilities are proposed at this time.

2.1.4 Produced Fluids Management

Small and variable volumes of produced water are expected from the wells proposed in the Puma Deep project area. Currently, project area wells are producing 1.5 to 8 barrels of water per day (BWPD). The volume of water produced is dependent on the position of the individual well in

the reservoir. Produced water is separated from the gas and condensate via a three phase on-site separator and dehydrator. Water is routed from the separation equipment to on-site tankage as is the separated condensate. No surface discharge of water or on-site produced water disposal pits are proposed. Reserve pits, in accordance with BLM and WOGCC rules and regulations are used only for drilling and completion operations. Produced water from the project area is currently hauled via tanker truck to a third party; WDEQ approved and permitted disposal facility. No injection wells have been permitted or proposed in the PA.

Condensate is stored in on-site tankage until sufficient volumes have been collected at which time it is hauled to a sales point located along I-80. Separation equipment and tankage is situated within steel containment dikes and covered by a Spill Protection Countermeasure and Control (SPCC) Plan as appropriate. Gathering systems for the produced water or condensate are not proposed due to the limited volumes of fluids produced by the wells, the limited number of wells anticipated in the field and the distance between wells and possible collection sites (a.k.a. centralized tank batteries).

During completion and testing, any gas flow would be vented or flared over the un-lined emergency pit in accordance with BLM and WOGCC rules and regulations. Testing would also include an evaluation of the formation for fracture stimulation design purposes.

2.1.5 Operations and Maintenance

All operations would be conducted in accordance with industry standards for safe and efficient operation. All project roads and wells would be inspected periodically by Davis and the BLM and maintained by Davis to minimize any resource damage or loss and ensure safe operating conditions.

2.1.6 Ancillary Facilities

No ancillary facilities, such as field office, equipment yard, etc., are proposed.

2.1.7 Workforce and Traffic

The expected traffic levels associated with the Proposed Action are addressed in Table 2-3 which provides a conceptual representation of types and maximum frequencies of typical traffic that could be expected during ‘round-the-clock’ drilling. The ‘Trip Type’ column lists the various service and supply vehicles associated with this type of activity and tends to demonstrate a maximum activity level. The ‘Round-Trip Frequency’ column includes the number of trips, both external (i.e., to/from each project area) and internal (within each project area). Production related traffic, once drilling has been completed, is significantly reduced.

Table 2-3. Puma Deep Project Traffic Estimates

Proposed Action Traffic – General Estimates

Trip Type	Round-Trip Frequency
DRILLING (1 RIG, 2 CREWS/RIG)	**EXTERNAL (TO/FROM PROJECT AREA)**
Rig supervisor	1/day
Rig crews	2 vehicles/day/per drilling well
Engineers	2/week
Mechanics	1/week/per drilling well
Supply delivery	2/week/per drilling well
Water truck	10 to 15 loads/week
Mud trucks	1/week/per drilling well
Rig move	10 trucks/well
Drill bit/tool delivery	2/week
COMPLETION	
Small truck mounted rig/crew	1/day/per completing well
Cement crew	3 trucks/2 trips/per completing well
Consultant	1/day
MISCELLANEOUS FIELD DEVELOPMENT	
Gathering systems construction	8/day
Other field development	3/day
Testing and operations	2/day
PRODUCTION	
Haul Trucks (water/condensate)	2/mo.
Well maintenance (pumper)	3/wk.
Workover rig	1/10 yr.
Field maintenance / misc.	4/mo.

2.1.8 Reclamation and Abandonment

The seed mixes for reclamation would be recommended by the RSFO for each well site. Table 2-4 details the mix used to this point in the project area. Seeding rates are assumed for drill seeding. Seeding rates would be doubled if seed is broadcast. Standard success criteria would be based on attainment of total vegetation cover. Standard success criteria would be based on attainment of 50% of pre-disturbance cover in three years and 80% of pre-disturbance cover in five years. The identified seed mix could be modified or added to by the BLM, as needed or required to meet the RSFO objectives for reclamation.

In the event drilling is non-productive at any given site, all disturbed areas associated with that site, including the well site and access road, would be reclaimed to approximate the pre-construction landform. Following construction, all areas not occupied by Proposed Action features would be reclaimed in the next growing season, or as directed by the agency. Remaining disturbed areas would be reclaimed following abandonment of project components. Stockpiled topsoil would be used as part of the seedbed preparation. Reclamation and site stabilization techniques would be applied as specified in the MSUOP (see Appendix A). Clean-up/housekeeping would be ongoing throughout the project life.

Table 2-4. Puma Deep Project Proposed Seed Mix

Species	Variety	Drill Seeding Rate (lbs. per acre pure live seed)
Winterfat		2.0
Thickspike Wheatgrass	Critana	5.0
Indian Rice Grass		3.0
Squirreltail Bottlebrush		2.0
Sandberg bluegrass		6.0
Gardners Saltbush		2.0
Lupine or Blue flax		½ or ¼
Total		20.25 or 20.50

Any mulch applied to areas with high soil erosion potential or where use is otherwise indicated would be free from mold and noxious weed seeds. Site preparation may include ripping or chiseling to break up compacted soils, increase water penetration, promote root growth, and control erosion.

Implementation of the Proposed Action would result in surface disturbance. Estimates of the extent of that disturbance are found in Table 2-2. During the project development phase turn-outs, passing and gas gathering system construction could result in full use of a 90-foot right-of-way on the right-of-way in various portions of the project. However, use of the full right of way would be rare and limited to the construction phase. Road driving surface is limited to 18 feet with the exception of occasional safety turn-outs. Reclamation would be necessary on the pipeline ROW and 32 feet of the access road right of way. For the analysis, a 90-foot wide area of short-term disturbance was assumed for the roads and adjacent pipelines with a 72-foot reclamation width resulting in an 18-foot wide LOP disturbance.

2.1.9 Other Design Features

The Wyoming BLM has adopted a standard set of guidelines and post-lease COAs that apply to all surface-disturbing activities on federal lands and minerals in Wyoming (Appendix D, BLM Standard Stipulations, Best Management Practices and Mitigation Requirements applicable to the Puma Deep Project Area). These mitigation guidelines address a wide variety of environmental concerns. Upon request by the applicant, an exception to a lease stipulation or a COA may be granted by the BLM, following on-site review to determine if the exception is warranted.

2.1.9.1 Air Quality

1. Adhere to all applicable local, state, and federal air quality regulations and standards, permit requirements (including preconstruction, testing, and operating permits), motorized equipment and other regulations, as required by the State of Wyoming, Department of Environmental Quality, Air Quality Division (WDEQ-AQD).

2. Will not allow burning garbage or refuse at well locations or other facilities. Any flaring would be conducted under the permitting provisions of Section 13 of the Wyoming Air Quality Standards and Regulations.

2.1.9.2 Soils

1. Implement established BLM road standards and practices to minimize offsite impacts and provide for the safety of operations.

2. Locate pipelines immediately adjacent to roads to avoid creating separate areas of disturbance and to reduce the total area of disturbance.

3. Frozen soils will not be used as construction material.

4. Minimize construction activities in areas of steep slopes; no construction on slopes >25%.

5. Design cut slopes in a manner that will allow retention of topsoil, use of surface treatment such as mulch, run-off control BMPs and subsequent revegetation.

6. Six to 12 inches of topsoil will be salvaged from all disturbed areas.

7. Where possible, minimize disturbance to vegetated cuts and fills on existing improved roads.

8. Install runoff and erosion control measures such as water bars, berms, and interceptor ditches as needed.

9. Install culverts or low water crossings for ephemeral and intermittent drainage crossings.

10. Upon completion of surface disturbing activities not specifically required for production operations, restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and other facilities sites; replace up to six inches of topsoil or suitable plant growth material over all disturbed surfaces; apply fertilizer as appropriate; seed; and mulch.

2.1.9.3 Water Resources

Other mitigation measures listed in the Soils and Vegetation and Wetlands sections of this EA would also apply to Water Resources.

1. Limit construction of all drainage crossings to no-flow periods or low-flow periods.

2. Minimize the area of disturbance within drainage channel environments.

3. Prohibit construction of well sites and other non-linear features within 500 feet of surface water and/or riparian areas and within 100 feet of the inner gorge of ephemeral channels. Possible exceptions to this will be granted by the BLM for linear features based on an environmental analysis and site-specific mitigation plans.

4. Construct channel crossings by pipelines such that the pipe is buried a minimum of four feet below the channel bottom.

5. Case wells during drilling and case and cement all wells in accordance with Onshore Order No. 2 to protect all high quality water aquifers. High quality water aquifers are aquifers with known water quality of 10,000 TDS or less. Include well casing and welding of sufficient integrity to contain all fluids under high pressure during drilling and well completion. Wells will adhere to the appropriate BLM and WOGCC cementing policies.

6. Construct the reserve pits in cut rather than fill materials. Compact and stabilize fill material, as needed. Inspect the subsoil material of the pit to be constructed in order to assess soil stability and permeability and determine whether liner bedding material is required. The reserve pit will be lined with reinforced hydrocarbon resistant, synthetic liner at least 12 mils in thickness with a bursting strength of 175 x 175 pounds per inch (ASTMD 75179) or according to stipulation.

7. Maintain one foot of freeboard on all reserve pits to minimize the risk of overflowing. Shut down drilling operations until the problem is corrected if leakage is found outside the pit.

8. Extract hydrostatic test water used in conjunction with pipeline testing and all water used during construction activities from sources having sufficient quantities and appropriation permits approved by the State of Wyoming.

9. No crossings or encroachments of waters of the U.S., as defined by the U.S. Army Corps of Engineers (COE), are planned in association with this project. In the event that wetlands or other waters in the project area might be impacted, appropriate permits would be obtained and consultations under Section 404 of the Clean Water Act would occur.

10. Any changes in the produced water disposal method or location must have written approval from the BLM before the changes take place.

2.1.9.4 Noise

1. Muffle and maintain all motorized equipment according to manufacturers' specifications.

2. In any area of operations (drill site, etc.) where noise levels may exceed federal OSHA safe limits, Davis will adhere with the applicable and appropriate OSHA rules and regulations.

2.1.9.5 Transportation

1. Existing roads will be used whenever possible. Standards for road design will be consistent with BLM guidance (United States Department of the Interior and United States Department of Agriculture. 2006. Surface Operating Standards and Guidelines for

Oil and gas Exploration and Development. BLM/WO/ST-06/021_3071. Bureau of Land Management. Denver, Colorado. 84 pp.).

2. Roads not required for routine operation and maintenance of producing wells and ancillary facilities will be reclaimed and revegetated.
3. Areas with important resource values, steep slopes, and fragile soils will be avoided.

4. Davis will be responsible for preventive and corrective maintenance of roads in the project area throughout the duration of the Proposed Action. This may include shallow grading, cleaning ditches and drainage facilities, dust abatement, noxious weed control, or other requirements as directed by the BLM or the Sweetwater County Road and Bridge Department.

5. Except in emergency situations, access will be limited to drier conditions to prevent severe rutting (creation of ruts in excess of 4" deep) of the road surface. Culverts will be installed where needed to allow drainage in all draws and natural drainage areas. Onsite reviews will be conducted with BLM personnel for approval of proposed access prior to any construction.

2.1.9.6 Health and Safety

Measures listed under Air Quality and Water Quality also apply to Health and Safety.

1. Sanitation facilities installed on the drill sites will be approved by the WDEQ and authorized officer.

2. To minimize undue exposure to hazardous situations, the operator will comply with all existing applicable rules and regulations (i.e., Onshore Orders, OSHA requirements, etc.) that will preclude the public from entering hazardous areas and place warning signs alerting the public of truck traffic, if required by the BLM.

3. Haul all garbage and rubbish from the drill site to a state-approved sanitary landfill for disposal. Collect and store any garbage or refuse materials on location prior to transport in containers approved by the BLM.

4. Spill Prevention Control and Countermeasure Plans will be written and implemented as appropriate, in accordance with 40 CFR 112.

5. Spills of oil, gas, or any other potentially hazardous substance will be reported immediately to the BLM and WDEQ, and will be mitigated immediately, as appropriate, through cleanup or removal to an approved disposal site.

6. The project is within the Special Sodium Drilling Area B, which requires cementing of the long string to the surface and notification of trona mine operators in the area of proposed drilling activities.

2.1.9.7 Vegetation/Wetlands/Noxious Weeds

Other mitigation measures listed under Soils and Water Resources will also apply to vegetation and wetlands.

1. File noxious weed monitoring forms with the BLM and implement, if necessary, a weed control and eradication program.

2. On BLM-administered public lands, an approved Pesticide Use Proposal will be obtained before the application of herbicides or other pesticides for the control of noxious weeds.

3. Disturbed areas will be seeded and stabilized in accordance with BLM-approved reclamation guidelines.

4. Evaluate all project facility sites for occurrence and distribution of waters of the U.S., special aquatic sites, and jurisdictional wetlands. All project facilities will be located out of these sensitive areas. If complete avoidance is not possible, minimize impacts through modification and minor relocations.

2.1.9.8 Wildlife and Fisheries

1. During reclamation, establish a variety of forage species that will return the land to a condition approximate or equal to that which existed prior to disturbance.

2. Prohibit unnecessary off-site activities of operational personnel in the vicinity of the drill sites. Inform all project employees of applicable wildlife laws and penalties associated with unlawful take and harassment.

3. Minimize surface disturbance.

4. No construction is planned in big game crucial winter range at any time. No crucial winter range is identified in the project area.

5. Conduct a raptor survey within 1 mile of the project activity areas prior to construction, if activities will be conducted between February 1 and July 31. No permanent aboveground structures will be constructed within 825 feet of an active raptor nest (NSO).

6. Surface-disturbing activities will be seasonally restricted from February 1 through July 31 within a 0.5-mile radius of all active raptor nests, except for ferruginous hawk nests, which will have a 1.0-mile seasonal buffer. Active nests are described as any active within the past 3 years. Such restriction will not apply to routine maintenance activities. When an “active” raptor nest is within ½ to 1 mile (depending on species and line of sight) of a proposed well site, restrict construction during the critical nesting season for that species. For listed and BLM sensitive species the distance should be increased to within one mile of a proposed well site. See Chapters 3 and 4 for details. No aboveground

structures or roads are allowed to be constructed within 825 feet of any raptor nest (Wyoming BLM State Guidelines).

7. Protection for breeding greater sage-grouse will include No Surface Occupancy within 0.25 mile of a lek. Construction of facilities, including low profile facilities, or performance of temporary disruptive activities will be avoided where possible; but exceptions may be requested from the authorizing officer, in accordance with the GRRMP ROD which defers to the Kemmerer Resource Management Plan regarding leks in the KFO.

   Protection for greater sage-grouse nesting habitat within appropriate distances from leks will include avoidance of such habitat and/or restriction of seasonal activities within those areas. Such restrictions may apply to suitable nesting habitat up to two (2) miles from the lek from February 1 through July 31 and for winter concentration areas from November 15 to April 30.

8. If threatened, endangered, candidate, or proposed species are discovered at any time during construction, all construction activities will halt, and the BLM will be immediately notified. Work will not resume until a Notice to Proceed is issued by the BLM.

9. Avoid disturbance of white-tailed prairie dog colonies, to the extent possible.

2.1.9.9 Cultural and Historic Resources

Davis has completed Class III cultural inventories of all locations and access road/pipeline right-of-ways that will have surface disturbance associated with the Proposed Action.

1. If cultural or paleontological resources are discovered at any time during construction, all construction activities will halt and the BLM will be immediately notified. Work will not resume until a Notice to Proceed is issued by the BLM.

2.1.9.10 Socioeconomics

1. Implement hiring policies that will encourage the use of local or regional workers who will not have to relocate to the area.

2. Coordinate project activities with ranching operations to minimize conflicts involving livestock movement or other ranch operations. Establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.

2.2 DESCRIPTION OF ALTERNATIVES ANALYZED IN DETAIL

Two alternatives are evaluated in detail in this EA. The Proposed Action (PA) is discussed in Section 2.1. The Proposed Action involves permitting and drilling 10 additional production wells and associated infrastructure over nine federal mineral leases which compose the defined project area within the Puma Deep Unit area; five wells have already been permitted and drilled in the

project area. The No Action Alternative is discussed in Section 2.2.1. Other alternatives were considered but eliminated from detailed analysis in accordance with 40 CFR 1502.14. These alternatives and rationale for eliminating them from detailed analysis are discussed in Section 2.3.

2.2.1 No Action Alternative

Under this alternative (and for the purpose of this analysis) the No Action Alternative means the additional wells and associated infrastructure anticipated in the Proposed Action would be denied. If any future activity were proposed on these leases, it would be subject to RMP conformance review including best management practices and standard operating procedures, and NEPA requirements in effect at the time.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

In accordance with 40 CFR 1502.14(a), the BLM is required to consider reasonable alternatives. The following alternatives were considered by the BLM but found to be unreasonable for reasons provided. Thus, these alternatives were eliminated from detailed study.

Multi-well Pad Development: Multi-well pad drilling refers to directionally drilling numerous wells from a single location thereby reducing the total number of well pad locations and access roads necessary to develop the resource. Directional drilling is generally used to gain access to a part of an oil and/or gas reservoir that is not directly below the surface well location or the lease is encumbered with a No Surface Occupancy stipulation. It is also generally used in areas where surface locations are expensive or prohibitive. The greater the number of wells drilled per pad the larger the pad becomes due to safety and rig lay out constraints. Multi-well pad drilling is done in areas where the geology and reservoir characteristics allow. These characteristics include adequate reservoir pressure to transport the hydrocarbon (oil or gas) to the surface without artificial lift, the geology is conducive to directional drilling (without significant folding and faulting) and the resource production potential makes the additional expense of directional drilling economical. Directional drilling and completions are accomplished at a significantly greater cost than the drilling and completion of vertical wells.

One comment letter requested the BLM consider multiple well pad drilling as an alternative. Requiring multi-well pad directional drilling at Puma Deep would render the Davis project uneconomical given the far distances needed to get from a surface location to the WOGCC subsurface spacing location (at least a ¼ mile horizontal reach), the relatively low gas production anticipated, the tight gas reservoir, and the complexity of the geology. In addition, the topography and cultural resource issues in the area limit the possible size of drilling pad locations. Due to these factors, a multi-well pad directional program was found to be unreasonable.

Phased or Paced Development: Phased development was also suggested as an alternative development scenario for the Puma Deep project. Phased development, limiting the number of acres disturbed and reclaimed to the predevelopment habitat function before new development disturbance could occur. A total of 18 wells (13 new wells proposed) are anticipated in the project area, the elimination or phasing of 66 to 50% of the wells would delay recovery of the

resource for 25 to 30 years and allow for the development and production of only 6 to 9 wells at any one time, thus, rendering the project uneconomic. Given the relatively low impact of the development (minimal number of wells and 160-acre spacing), the isolation of the project area and the lack of monetary return, a phased development alternative was not analyzed.

CHAPTER 3 - AFFECTED ENVIRONMENT

3.0 INTRODUCTION

This chapter describes the existing conditions of the affected environment for the proposed Puma Deep Prospect project area (project area, analysis area). See Chapter 2 for details of the proposed project components and the area involved. The Supplemental Authorities identified in Chapter 1 will be addressed as appropriate in the following discussion of the Affected Environment. The project area is located outside special status plant species areas, big game crucial winter range and parturition areas, select cultural resource sites and historic trails, and areas of critical environmental concern (ACEC). Figure 2-1 shows the area involved in the project and project component locations.

3.1 GEOLOGY/MINERALS/PALEONTOLOGY

3.1.1 Physiography, Topography, and Landforms

The Puma Deep project area (PA) is located in the Bridger Basin, which is in the southwestern portion of the larger Greater Green River Basin (Love & Christiansen, 1985).

The PA major drainage is Big Dry Creek, a tributary to the Blacks Fork River. Cattail Draw drains the eastern part of the PA and Butcher Draw cuts the western part PA. Both are tributaries to Big Dry Creek. These drainages form the basin which is bounded on the south by Big Hollow Bench. The Bench is formed by alluvial fans of the Bridger Formation. There are eolian (wind-blown) sand deposits located in the central part of the PA.

3.1.2. Surficial Geology

The surficial geology in the project area is shown on maps by Case et al., 1998 (Figure 3-1). These deposits are primarily slopewash and alluvial in nature as Big Dry Creek dissects the PA. Eolian or sand dune deposits are located in the north central part of the PA. Landslide deposits are noted 1.5 to 2 miles southeast of the PA.

3.1.3 Bedrock Geology

Figure 3-1 indicates the Bedrock Geology as found in Love and Christiansen, 1985. The PA is covered by the Tertiary Bishop Conglomerate which was derived from the rising Uinta Mountains to the south. Large boulders and cobbles in the Bridger Conglomerate can cause problems for construction and shallow drilling.

3.1.4 Structure

There are no active or mapped faults on the PA according to the Wyoming Geological Survey website Geological Hazards Section map. Only one earthquake has been recorded north of the PA since 1877 according to the Wyoming Geological Survey. The PA lies on the east flank of

the Moxa Arch which bounds the western edge of the Green River Basin. The basin formed during the Laramide Orogeny as the U.S. Plate overrode the Pacific Plate. West of the Moxa Arch is the Wyoming Overthrust province where multiple sheet-thrust faults occur. Regional dip of the bedrock is to the east.

3.1.5 Subsurface Stratigraphy

The following subsurface stratigraphy was found in the records of the first two oil and gas wells drilled in the PA (WOGCC accessed November 4, 2008). The wells show the following subsurface formations:

Table 3-1. Geological Formations

Formation	Depth	Description
BISHOP CONGLOMERATE	SURFACE	
FORT UNION	6,200’	Fluvial sandstone and shales
MESAVERDE	8,800	Nearshore sands at top grading down into coals and continental sands and shales
HILLIARD SHALE	10,200’	Dark marine shale
FRONTIER SANDSTONE	13,350’	Marine sandstone and deltaic sands
MOWRY SHALE	13,550’	Dark siliceous, brittle marine shale
MUDDY SANDSTONE	13,850’	Nearshore sandstones
SKULL CREEK SHALE	13,900’	Dark marine fissle shale
DAKOTA SANDSTONE	13,950’	Nearshore to deltaic sandstones

The wells in the area have been completed for oil and gas production in the Frontier, Muddy and Dakota Sandstones.

3.1.6 Minerals

A review of the Wyoming Geological Survey Mines and Minerals Map shows that the PA lies within the Known Sodium Lease Area (KSLA); but, according to Leigh, 1991, this area is deep and probably within the area also containing halite, which suggests that it would not be mined. The Industrial Minerals and Construction Materials Map of Wyoming, 2004, shows that the PA is west of the mineable trona-bed area. The Metallic and Industrial Minerals Map of Wyoming, 1985, shows a mineralized surface area in the central parts of T15N, R111and 112W. This area is in the Bridger Formation and contains pyrope, garnet, chrome diopside, and agate. These are indicator minerals of possible gemstones. However, no mines or gravel pits are shown in this area on the Industrial Minerals and Construction Materials Map of Wyoming. The mineral estate in the PDPA is 91.6% federal, 1.6% private and 6.6% state while 98.4% of the surface is managed by the Bureau of Land Management (BLM).

Figure 3-1. Bedrock Found Within Project Area and Vicinity

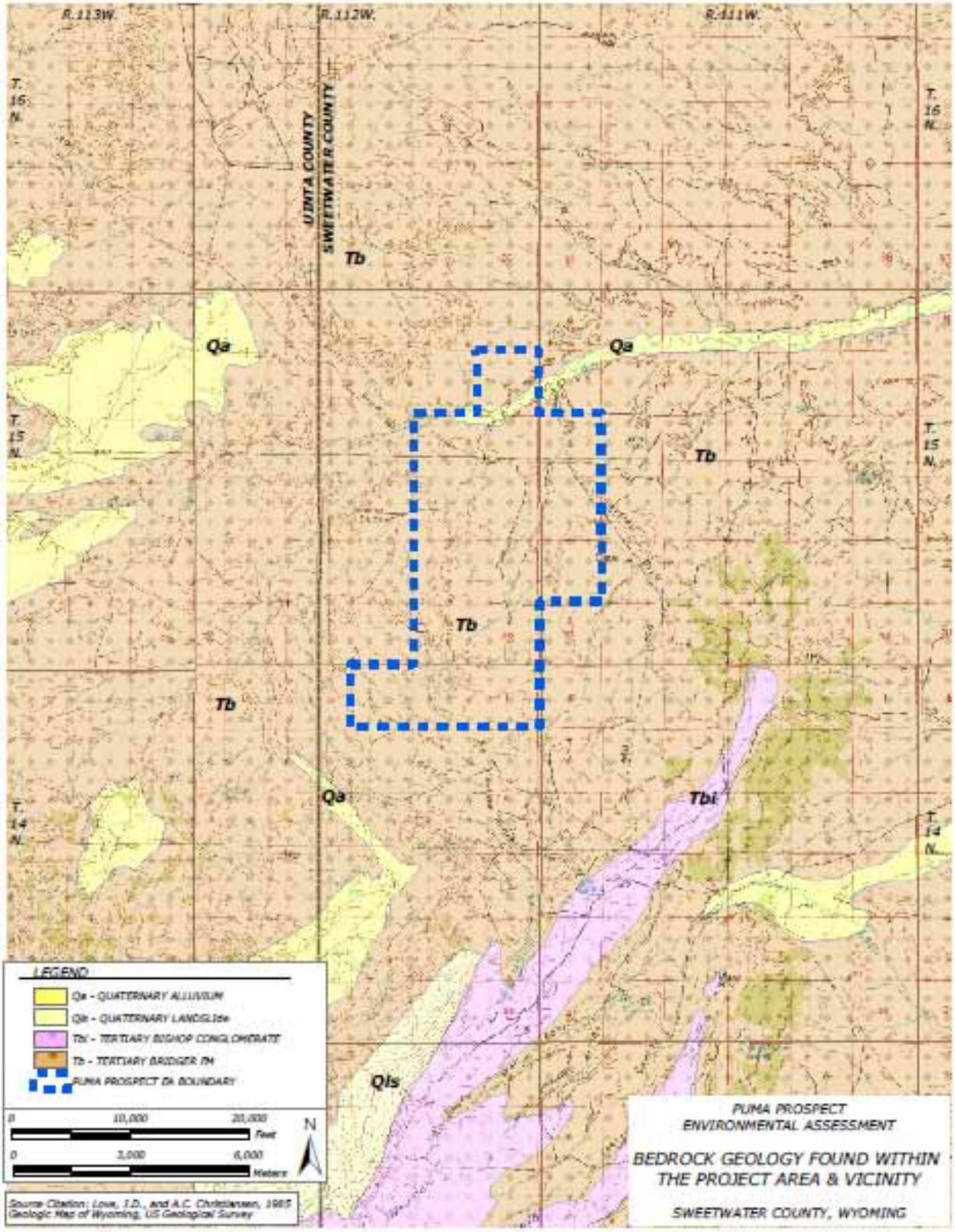
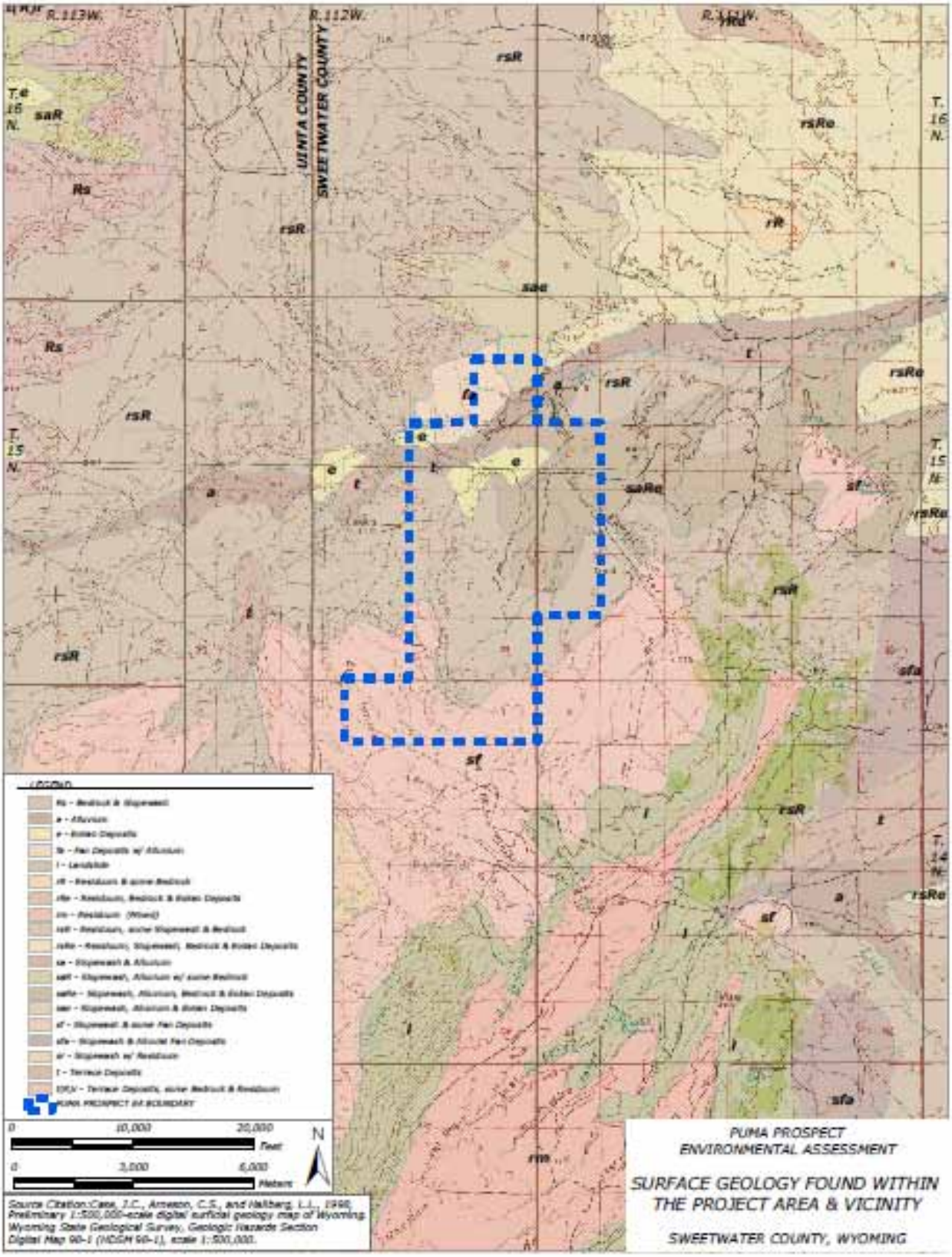


Figure 3-2. Surface Geology Found Within Project Area and Vicinity



3.1.7 Paleontology

In October, 2007, the new Potential Fossil Yield Classification (PFYC) System replaced the Condition Classification System from Handbook H-8270-1 and is used for all paleontological surveys. Vertebrate fossils, or scientifically significant invertebrate or plant fossils, and their relative abundance, together with their sensitivity to adverse impacts, are classified based on the geologic units in which there are preserved. Class 1 (very low) indicates geologic units very unlikely to contain recognizable fossil remains, with the scale ranging up to Class 5 (very high) which indicates highly-fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils.

It should be noted that many fossils, though common and unimpressive in and of themselves, can be important paleo-environmental, depositional, and chronostratigraphic indicators.

The entire proposed "Puma Deep Prospect Area" has extensive surficial exposures of, or is underlain by, bedrock in the Bridger Formation. This formation is considered to be a Class 4 and Class 5 for fossil sensitivity depending on which individual member the outcrop belongs to. Quaternary deposits inside the project area are generally less than 50 centimeters deep with the bedrock units of the Bridger Formation lying directly underneath.

A review of previously documented paleontological localities within the Puma Deep Prospect Area was completed in October, 2008. This review identified 17 paleontological localities within the Bridger Formation. These contained a variety of vertebrates (fish, reptiles, and mammals) along with invertebrates and plant fossils.

Because the entire project area has a high potential for producing fossil material, on-site paleontological surveys should be conducted before any ground-disturbing activities occur (pipelines, roads, well sites, staging areas, storage yards, compressor stations, etc.) in accordance with BLM Instruction Memorandum No. 2009-011. An on-site observation of the proposed areas undergoing surficial disturbance is necessary because judgments made from topographic maps alone are often unreliable. Areas of low relief on topographic maps have the potential to be erosional surfaces with the possibility of bearing fossil materials rather than surfaces covered by unconsolidated sediment or soils.

3.2 CLIMATE

The PDPA is located in a semiarid (dry and cold), mid-continental climate regime. The area is typified by dry, windy conditions with limited rainfall and long, cold winters. The nearest meteorological measurements were collected at Mountain View, Wyoming (1966-2008), west of the project area at an elevation of 6,800 feet amsl (WRCC 2009). Because of the wide variation in elevation and topography within the study area, site-specific climatic conditions vary considerably.

The annual average total precipitation at Mountain View, Wyoming is 9.37 inches. An average of 42.7 inches of snow falls during the year. The region has cool temperatures, with average temperatures (in degrees Fahrenheit [˚F]) ranging from a low of 11.5˚F in January to a high of

80.7˚F in July. Extreme temperatures have ranged from -33˚F (1989) to 94˚F (2002). The frost free period generally occurs from early June to late August (Table 3-2).

Table 3-2. Mean Monthly Temperature Ranges and Total Precipitation Amounts

Month	Average Temperature Range (˚F)	Total Precipitation (inches)
January	12-32	0.47
February	13-35	0.39
March	20-44	0.52
April	26-53	0.92
May	34-64	1.18
June	42-73	1.02
July	48-81	0.95
August	46-79	0.90
September	38-70	1.02
October	29-58	0.96
November	19-42	0.60
December	12-33	0.46
ANNUAL	41.8 (mean)	9.37 (mean)

Source: WRCC 2009

The closest comprehensive wind measurements are collected at a meteorological monitoring station located at an industrial facility approximately 22 miles north-northeast of the PDPA near Granger, WY. Table 3-3 provides the wind direction distribution at that site in a tabular format for the five year period of 2001-2005. The annual mean wind speed over this period is 8.0 miles per hour (mph).

Table 3-3. Wind Direction Frequency Distribution, Granger, Wyoming, 2001-2005

Wind Direction	Frequency (%)
N	5.0
NNE	5.6
NE	3.0
ENE	3.3
E	3.4
ESE	3.1
SE	3.6
SSE	4.4
S	4.8
SSW	4.2
SW	5.0
WSW	10.2
W	18.0
WNW	13.5
NW	7.2
NNW	5.8

The frequency and strength of winds greatly affect the transport and dispersion of air pollutants. Table 3-4 shows the frequency distribution of wind speeds in the PDPA, and Table 3-5 shows the atmospheric stability class. The atmospheric stability class is the measure of atmospheric turbulence, which directly affects pollutant dispersion. The stability classes are divided into six categories designated "A" (unstable) through "F" (very stable). The "D" (neutral) stability class occurs nearly half of the time.

Unstable conditions are associated with good dispersion (about 14.1%), neutral conditions with fair dispersion (58.1%), and poor dispersion with stable conditions (27.8%). Because of the strong winds in the region, the potential for atmospheric dispersion is relatively high, although nighttime cooling enhances stable air, inhibiting air pollutant mixing and transport.

Wind energy will not be discussed in this analysis as the National Renewable Energy Laboratory maps indicate potential for wind energy development in the area is marginal.

Table 3-4. Wind Speed Distribution, Granger, Wyoming, 2001-2005

Wind Speed (mph)	Frequency (%)
0 – 4.0	28.3
4.0 – 7.5	23.0
7.5 – 12.1	20.1
12.1 – 19.0	17.5
19.0 – 24.7	7.1
Greater than 24.7	4.1

Table 3-5. Atmospheric Stability Class Distribution, 2001-2005

Stability Class[1]	Frequency (%)
A	6.9
B	7.2
C	10.9
D	47.2
E	17.1
F	10.7
[1] A = unstable; D = neutral; F = very stable	

3.3 AIR QUALITY

The Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) are health-based standards which define the maximum concentration of air pollutants allowed at all locations to which the public has access.

Data are given for EPA criteria pollutants carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns in effective diameter (PM_{10}), particulate matter less than 2.5 microns in effective diameter ($PM_{2.5}$), and sulfur dioxide (SO_2). Air quality monitoring has been conducted at the WDEQ-AQD Murphy Ridge site since January 2007 for CO, NO_2, O_3,

PM_{10}, and SO_2. Although $PM_{2.5}$ is not currently monitored at this site, regional monitoring results are reported here from the Pinedale, WY monitoring site.

The monitored concentrations described above are considered ambient air background concentrations, and are used as an indicator of existing conditions in the region. These concentrations are assumed to include emissions from industrial sources in operation and from mobile, urban, biogenic and other non-industrial emissions sources. They are considered by WDEQ-AQD to be the most representative of background conditions within the PDPA. Monitored concentrations for all pollutants are compared to the WAAQS and NAAQS in Table 3-6. The PDPA is designated as attainment for all criteria pollutants.

Federal air quality regulations adopted and enforced by WDEQ-AQD limit incremental emission increases to specific levels defined by the classification of air quality in an area. The Prevention of Significant Deterioration (PSD) Program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict. The project area and surrounding areas are classified as PSD Class II. The only mandatory Federal PSD Class I areas within 100 miles of the project is the Bridger Wilderness Area, approximately 95 miles NNE of the project area. The Dinosaur National Monument is classified by the State of Colorado as a Class I Area for SO_2, and is located 67 miles from the project area. These sensitive areas have the potential to be impacted by project and cumulative sources.

Table 3-6. Monitored Air Pollutant Background Concentrations and Wyoming and National Ambient Air Quality Standards (µg/m3)

Pollutant	Monitoring Site	Averaging Time	Measured Background Concentration	Wyoming and National Ambient Air Quality Standards	Incremental Increase Above Legal Baseline	
					PSD Class I	PSD Class II
Carbon Monoxide (CO)	Murphy Ridge[1]	1-hour[3]	1863	40,000	n/a	n/a
		8-hour[3]	1746	10,000	n/a	n/a
Nitrogen Dioxide (NO_2)	Murphy Ridge[1]	Annual	6	100	2.5	25
Ozone (O_3)	Murphy Ridge[1]	8-hour[4]	140	157	n/a	n/a
Particulate matter (PM_{10})	Murphy Ridge[1]	24-hour[5]	62	150	8	30
		Annual	12	50(WAAQS)	4	17
Particulate matter ($PM_{2.5}$)	Pinedale[2]	24-hour[6]	13	35	n/a	n/a
		Annual	6	15	n/a	n/a
Sulfur Dioxide (SO_2)	Murphy Ridge[1]	3-hour[3]	19	1,300	25	512
		24-hour[3]	16	365(NAAQS) 260(WAAQS)	5	91
		Annual	3	80(NAAQS) 60(WAAQS)	2	20

[1] Background data collected near Murphy Ridge, Wyoming during 2007, WDEQ.

[2] Background data collected in Pinedale, Wyoming during 2007.
[3] Highest monitored value.
[4] Highest, fourth highest monitored value.
[5] Highest, second highest monitored value.
[6] 98th percentile monitored value.

The WDEQ-AQD, under its EPA-approved State Implementation Plan, is the primary air quality regulatory agency responsible for determining potential impacts once detailed industrial development plans have been made, and those development plans are subject to applicable air quality laws, regulations, standards, control measures, and management practices. Therefore, the WDEQ-AQD has the ultimate responsibility for reviewing and permitting the project prior to its operation. Unlike the conceptual 'reasonable, but conservative' engineering designs used in NEPA analyses, any WDEQ-AQD air quality preconstruction permitting demonstrations required would be based on very site-specific, detailed engineering values, which would be assessed in the permit application review. Any facility developed under the proposed action which meets the requirements set forth under Wyoming Air Quality Standards and Regulations (WAQSR) Chapter 6 will be subject to the WDEQ-AQD permitting and compliance processes.

All NEPA analysis comparisons to the PSD Class I and II Increments are intended to evaluate a threshold of concern, and do not represent a regulatory PSD increment consumption analysis. The determination of PSD increment consumption is an air-quality regulatory agency responsibility. Such an analysis would be conducted as part of the New Source Review process for a major source, as would an evaluation of potential impacts to Air Quality Related Values (AQRV) such as visibility, aquatic ecosystems, flora, fauna, etc. performed under the direction of the WDEQ-AQD in consultation with federal land managers, or would be conducted to determine minor source increment consumption.

The 1977 Clean Air Act amendments established visibility as an AQRV that Federal land managers must consider. The 1990 Clean Air Act amendments contain a goal of improving visibility within PSD Class I areas. The Regional Haze Rule finalized in 1999 requires the states, in coordination with federal agencies and other interested parties, to develop and implement air quality protection plans to reduce the pollution that causes visibility impairment.

Visibility impairment is measured in terms of change in light extinction or change in deciview (dv). Potential changes to regional haze are calculated in terms of perceptible "just noticeable change in visibility" when compared to background conditions. A dv change of 1.0 or 2.0 (equivalent to a 10 percent and 20 percent change in extinction) represents a small but perceptible change in visibility. The BLM considers a 1.0 dv change to be a significance threshold for visibility impairment, although there are no applicable local, state, tribal, or federal regulatory visibility standards. Other federal agencies use a 0.5 dv change as a screening threshold for significance.

Visual range, referred to as standard visual range (SVR), is the farthest distance at which an observer can just see a black object viewed against the horizon sky; the larger the SVR, the cleaner the air. Visibility conditions can be measured in SVR. Visibility for the region is considered very good, with an average SVR of over 200 km (VIEWS 2008).

Continuous visibility-related optical background data have been collected as part of the Interagency Monitoring of Protected Visual Environments (IMPROVE) program at the Bridger Wilderness Area site. Bridger Wilderness Area data from 1994 to 2003 indicate no significant trend is observed for aerosol light extinction coefficients in 20% worst days. The nitrate extinction increased significantly in the worst days and in middle 60% days. Significant decrease trend is found for aerosol light extinction coefficients in 20% best days, which is caused mainly by decreases in sulfate, nitrate, and coarse mass light extinction.

Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited on terrestrial and aquatic ecosystems, and it is reported as the mass of material deposited on an area per year (kg/ha-yr). Air pollutants are deposited by wet deposition (precipitation) and dry deposition (gravitational settling of pollutants). The chemical components of wet deposition include sulfate (SO_4), nitrate (NO_3), and ammonium (NH_4); the chemical components of dry deposition include SO_4, SO_2, NO_3, NH_4, and nitric acid (HNO_3).

The National Acid Deposition Program (NADP) and the National Trends Network (NTN) station monitors wet atmospheric deposition and the Clean Air Status and Trends Network (CASTNET) station monitors dry atmospheric deposition at a site near Pinedale, WY. Figures 3-3 and 3-4 show the total annual background deposition (wet and dry) reported as total nitrogen (N) and total sulfur (S) deposition for these sites for the monitoring period of record through 2007.

Total deposition levels of concern (LOC) have been established for several of the sensitive areas surrounding the PDPA, including the Bridger Wilderness Area. The “red line” LOC represents an estimate of the total pollutant loadings that each sensitive area can tolerate. If an analysis done under the Federal Land Managers’ Air Quality Related Values Workgroup (FLAG) guidelines indicates loading above these values, it may be suggested that the land manager recommend a reduction of emissions from new sources unless data are available to indicate that no AQRVs in the PSD Class I area are likely to be adversely affected. The “green line” LOC represents the total pollution loadings (current plus proposed new source contribution) below which a land manager can recommend a permit be issued for a new source, unless data are available that indicate otherwise. Cumulative impacts plus background are compared to these LOCs. The Bridger Wilderness sulfur deposition red line LOC is 20 kg/ha-yr and sulfur deposition green line LOC is 5 kg/ha-yr. The Bridger Wilderness nitrogen deposition red line LOC is 10 kg/ha-yr and nitrogen deposition green line LOC is 3-5 kg/ha-yr. The Bridger Wilderness LOCs are shown on Figures 3-3 and 3-4 for comparison with reported deposition values from the Pinedale stations.

Figure 3-3. Mean Annual Total Nitrogen Deposition near Pinedale, Wyoming

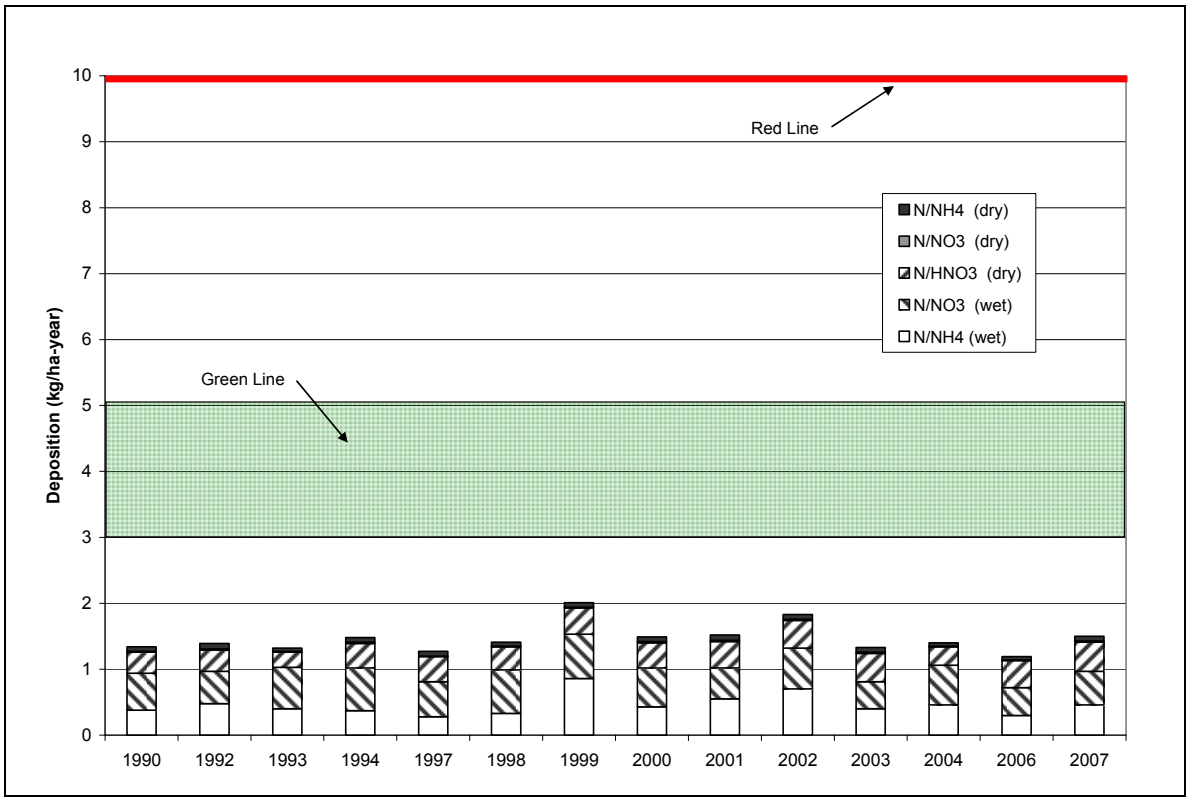
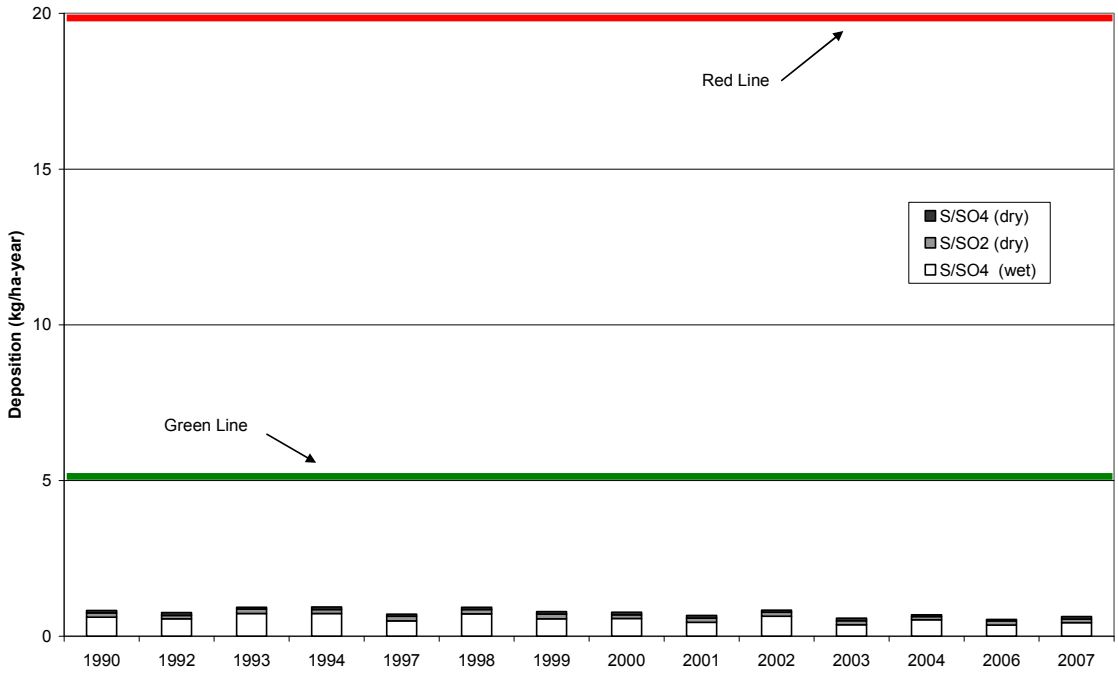


Figure 3-4. Mean Annual Total Sulfur Deposition near Pinedale, Wyoming



3.4 SOILS

Soils in the project area generally have poorly developed structure and, therefore, have relatively weak internal cohesion. The primary soil association in the project area is the Teagulf-Huguston-Haterton. The soils of this association are deep to very shallow, well-drained soils, which occur on rolling to moderately steep upland plains, which are dissected by ravines, short escarpments and draws. Teagulf soils are present on undulating upland plains. They are moderately deep, fine sandy loams that have a high calcium carbonate layer in the subsoil and are underlain by sandstone or shale. Huguston soils are present on rolling upland plains but are also present on short escarpments, rocky ravines and breaks. These are shallow, fine sandy loams that are underlain by soft sandstone. Haterton soils are also found in escarpments, rocky ravines and breaks. These are shallow loam soils and are underlain by shale rather than sandstone (http://soildatamart.nrcs.usda.gov/Survey.aspx?State=WY; accessed October 6, 2008 (see Figure 3-5).

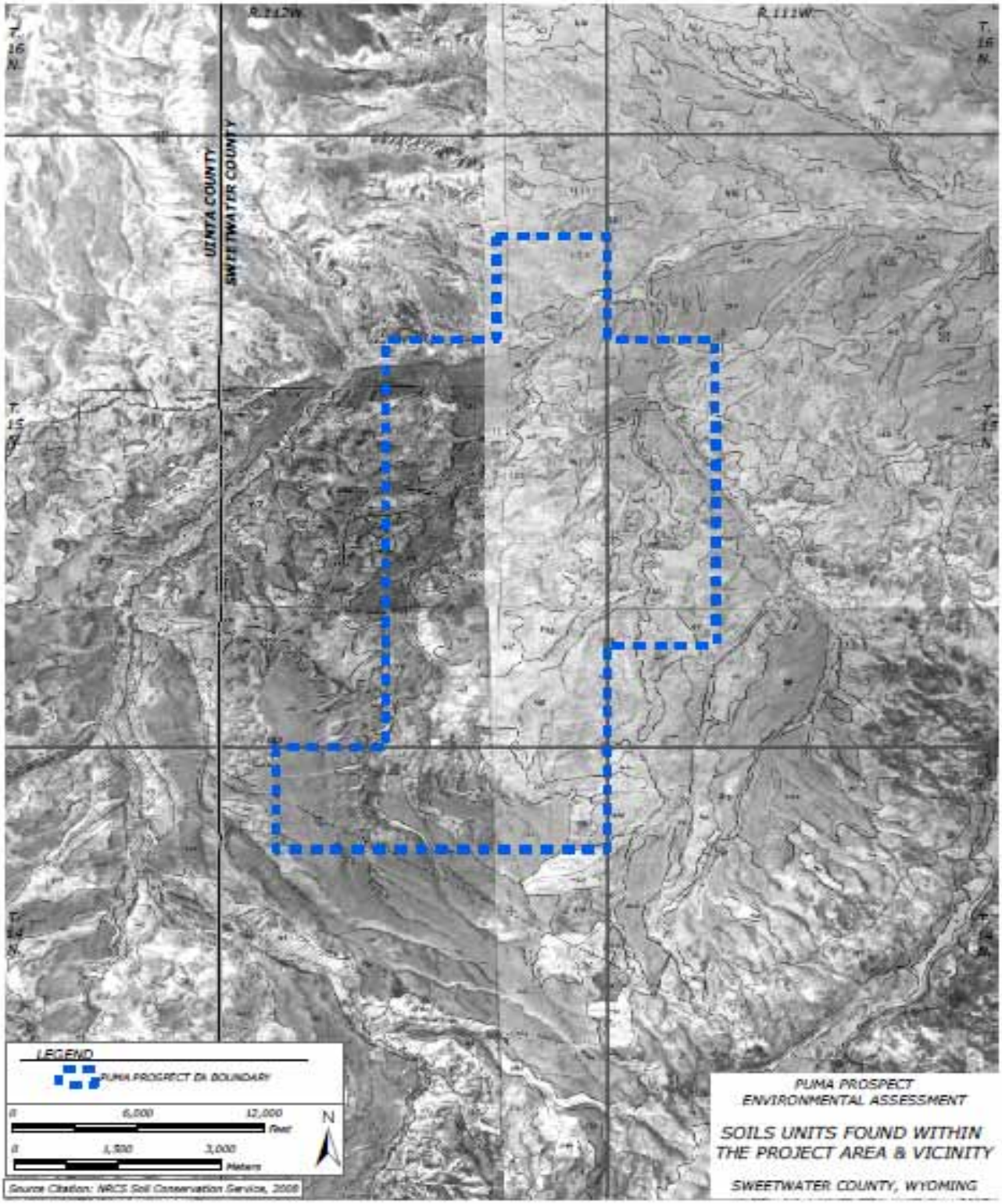
Throughout the project area are areas of sandy loam and sandy clay loam soils with hard sandstone bedrock, generally at depths of 20 to 40 inches below the surface. These soils have high concentrations of carbonates, usually within 12 to 18 inches of the surface. Because of their sandy surface texture, they are susceptible to wind erosion. These soils are found on the gently rolling residual uplands dominated by sagebrush.

The uplands are bisected by intermittent drainages. Soils on the alluvial fans and terraces associated with this drainage are generally silt loam and clay loam greater than 60 inches to bedrock although some shale bedrock may be found closer to the surface along the fringes. These soils are strongly calcareous and highly saline. Because of the high clay content, these soils have a high shrink swell capacity. Vegetation is dominated by salt tolerant species, including Gardener saltbush, greasewood, Indian ricegrass, and *Poa* species.

The hill slopes between the drainages and the uplands are dominated by sandy loam and loam soils with bedrock generally around 20 inches or less. The sandstone bedrock is generally at depths of 20 to 40 inches below the surface. The upper slopes to the east have bedrock closer to the surface. These soils are calcareous and moderately saline. Vegetation is dominated by Gardner saltbush and sagebrush.

A number of stabilized or dormant dune complexes of various types and sizes are present in the surrounding area. These dunes have been stabilized, relatively recently, by low grasses and shrubs. Most of the sand within the dunes is fine-grained and moderately well sorted and is probably derived from Bridger, Mesaverde, or Foxhills formation sandstones.

Figure 3-5. Soils in Project Area and Vicinity



3.5 WATER RESOURCES

3.5.1 Surface Water

The proposed project is located within the Upper Green-Flaming Gorge Reservoir (14040106) watershed (see Figure 3-6). The surface water resources in this portion of the basin include numerous intermittent and ephemeral drainages that feed into Big Dry Creek and ultimately into the Green River at Flaming Gorge Reservoir. Water is also available as a point resource in the form of seeps and springs; however, these are rare. Reservoirs are scattered along the un-named tributaries of Cattail Creek and Big Dry Creek that run though the project area. These ephemeral water bodies are dry for much of the year and flow or contain water only during runoff periods. The Upper Green River watershed is part of the Colorado River System, land use management within the Green River watershed is subject to the Colorado River Salinity Control Act.

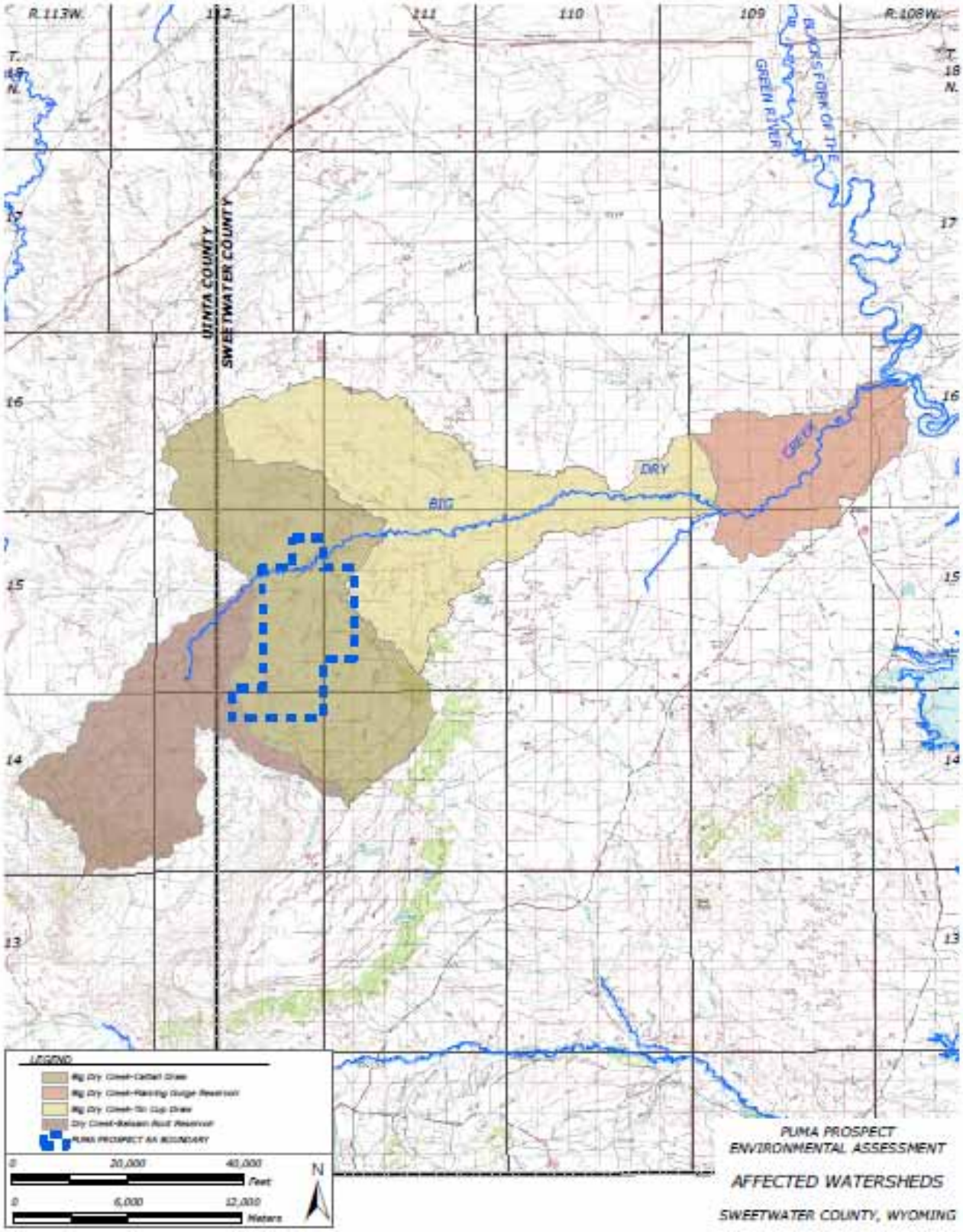
Data regarding quality and quantity of surface water within the project areas are unavailable. However, given the alkaline nature of the surface and subsurface geology and general character of water in the area, surface waters could be expected to be more alkaline than fresh. The volumes of typical flows are unknown. The WDEQ classifies Wyoming streams according to quality and degree of protection. The water bodies within this watershed are categorized as Class 4B waters, intermittent and ephemeral stream channels that have been determined to lack the hydrologic potential to normally support and sustain aquatic life pursuant to the provisions of Section 33(b)(ii) of these regulations. In general, 4B streams are characterized by only infrequent wetland occurrences or impoundments within or adjacent to the stream channel over its entire length. Such characteristics are the primary indicator used in identifying Class 4B waters (WDEQ Water Quality Rules and Regulations Chapter 1, web accessed Sept. 19, 2008; http://soswy.state.wy.us/Rules/RULES/6547.pdf).

3.5.2 Waters of the U.S.

Channels that carry surface flows and show signs of active water movement are generally considered “waters of the U.S.” Similarly, all open bodies of water (except ponds and lakes created on upland sites and used exclusively for agricultural and industrial activities or aesthetic amenities) are considered “waters of the U.S.” (EPA, 33 CFR 328.3(a)). The EPA and the Army Corps of Engineers (COE) regulate such areas. COE regulates the placement of dredged and fill material into wetlands and other “waters of the U.S.” as authorized primarily by Section 404 of the Clean Water Act (33 U.S.C. 1344). The term “waters of the U.S.” has been broadly defined by statue, regulation, and judicial interpretation to include all waters that were, are, or could be used in interstate commerce, such as rivers, streams (including ephemeral streams), reservoirs, and lakes, as well as wetlands adjacent to those areas.

Based on the information provided by the U.S. Army Corps of Engineers (ACOE) in similar hydrologic areas, it has been determined that any wetlands or other waters in the project area are isolated and are no longer considered to be “waters of the U.S.” under Section 404 of the Clean Water Act. As BLM standards for protection of riparian areas provides setback protection to potential wetlands and waters, “Waters of the U.S.” will not be discussed further in this document.

Figure 3-6. Affected Watersheds



3.5.3 Groundwater

The project area is located in the Green River Basin groundwater region described by Heath (1984). Groundwater resources include deep and shallow, confined and unconfined aquifers. Site-specific groundwater data for the project area are limited. Existing information comes primarily from the WOGCC oil and gas well records, Wyoming State Engineers Office (WSEO) water-well records, and the U.S. Geological Service (USGS). Groundwater in the area is found in the Green River and Wasatch formations above 2000 feet in depth. The Leo #1 water supply well is 1995 feet total depth. No other water wells in the project area are found in the records. Livestock water is found in the manmade reservoirs scattered along the ephemeral drainages of the area. Water from this well is pumped through temporary surface pipe to temporary storage tanks from which it is transported by truck to the point of use. Where physically possible, a temporary surface pipeline may be used to transport water to the point of use to mitigate the impact of hauling by truck. Davis is the only user of this well. The Leo #1 water quality is classified as suitable for livestock use.

Water depletions to the Colorado River watershed may jeopardize the existence of one or more federally listed threatened or endangered species and adversely modify designated critical habitats. In 1988, the USFWS developed an agreement that federal agency actions resulting in water depletions to the upper Colorado River basin greater than 100 acre-feet annually require Section 7 consultation and can be offset by a one-time contribution made by the water project, which goes to Recovery Program efforts (USFWS 2001). There is no charge for existing depletions or for new depletions of less than 100 acre-feet of water. Under this agreement, as long as sufficient progress is being made toward endangered fish recovery, the USFWS will issue favorable biological opinions (BOs) on water depletions of fewer than 3,000 acre-feet of water (USFWS 2001). When reviewing projects that deplete more than 3,000 acre-feet of water per year, the USFWS determines on a case-by-case basis the recovery actions that are needed to warrant a favorable BO (DOI KFO RMP 2008). Groundwater use relative to depletions to the Colorado River has been considered by the BLM and was determined not to be significant; Colorado River depletions will not be discussed further in this analysis.

3.6 VEGETATION, SPECIAL STATUS PLANT SPECIES, WETLANDS NOXIOUS WEEDS

3.6.1 Vegetation Cover Types

The project area is located within the Upper Green River Basin of the Wyoming Basin a part of the Great Basin, within the Intermountain Semi-desert Region (accessed October 6, 2008 ftp://ftp.epa.gov/wed/ecoregions/wy/wy_eco_lg.pdf). Shrubs growing in these areas include saltbush, greasewood, sagebrush, and rabbitbrush. Other common plant species include: gray horsebrush, spiney hopsage, and Indian rice grass. Observed plants in the project area included several species of sagebrush, Mormon tea, rabbitbrush, greasewood, pricklypear cactus, low grasses, upland sedges, and weedy forbs. See Figure 3-7 for land cover of the project area, as available from the USGS National Gap Analysis Program. The GRRMP identifies the vegetation as a mosaic of low-density sagebrush communities, open ground and open sand.

Temperate deserts of continental regions have low rainfall and strong temperature contrasts between summer and winter. In the intermountain region of the Western United States between the Pacific coast and Rocky Mountains, the temperate desert has characteristics of a sagebrush (Artemisia) semidesert, with a very pronounced drought season and a short humid season. Most precipitation falls in winter, despite a peak in May. Aridity increases markedly in the rain shadow of the Pacific mountain ranges. Even at intermediate elevations, winters are long and cold, with temperatures falling below 32°F (0°C).

These deserts differ from those at lower latitudes chiefly in their far greater annual temperature range and much lower winter temperatures. The dry climates in the middle latitudes receive part of their precipitation as snow.

Temperate desert climates support the sparse xerophytic shrub vegetation typical of semidesert. Soils of the temperate desert are Aridisols low in humus and high in calcium carbonate. Poorly drained areas develop saline soils, and dry lake beds are covered with salt deposits (http://www.fs.fed.us/land/ecosysmgmt/index.html accessed October 6, 2008; Description of the Ecoregions of the United States Compiled by Robert G. Bailey, March 1995).

3.6.2 Threatened and Endangered Plant Species

The U.S. Fish and Wildlife Service identified one plant species as having potential habitat in the general area. The Ute Ladies'-tresses (*Spiranthes diluvialis*), a threatened plant has been found along Platte River drainages below Alcova, Cheyenne, and Niobrara drainages. This plant inhabits moist soils and sub-irrigated wet meadows of drainages below 7000 feet. Generally, this habitat does not exist in the project area except in very isolated patches along Cattail Draw and Big Dry Creek. Given the habitat requirements of Ute ladies'-tresses, the uncertain water regimes and grazing along Big Dry Creek this plant is not expected in the area. Further, if Ute Ladies'-tresses were to occur in the PDPA it will be protected through the application of the BLM 500- foot riparian area buffer. In addition, the Blowout Penstemon, an endangered plant, has been found along the Killpecker Sand Dunes near Rawlins. Some sand dune soils exist in the project area. Neither plant is known from the project area (WYNDD Database September 2008); suitable habitats are generally not available. These species will not be given further consideration in this document.

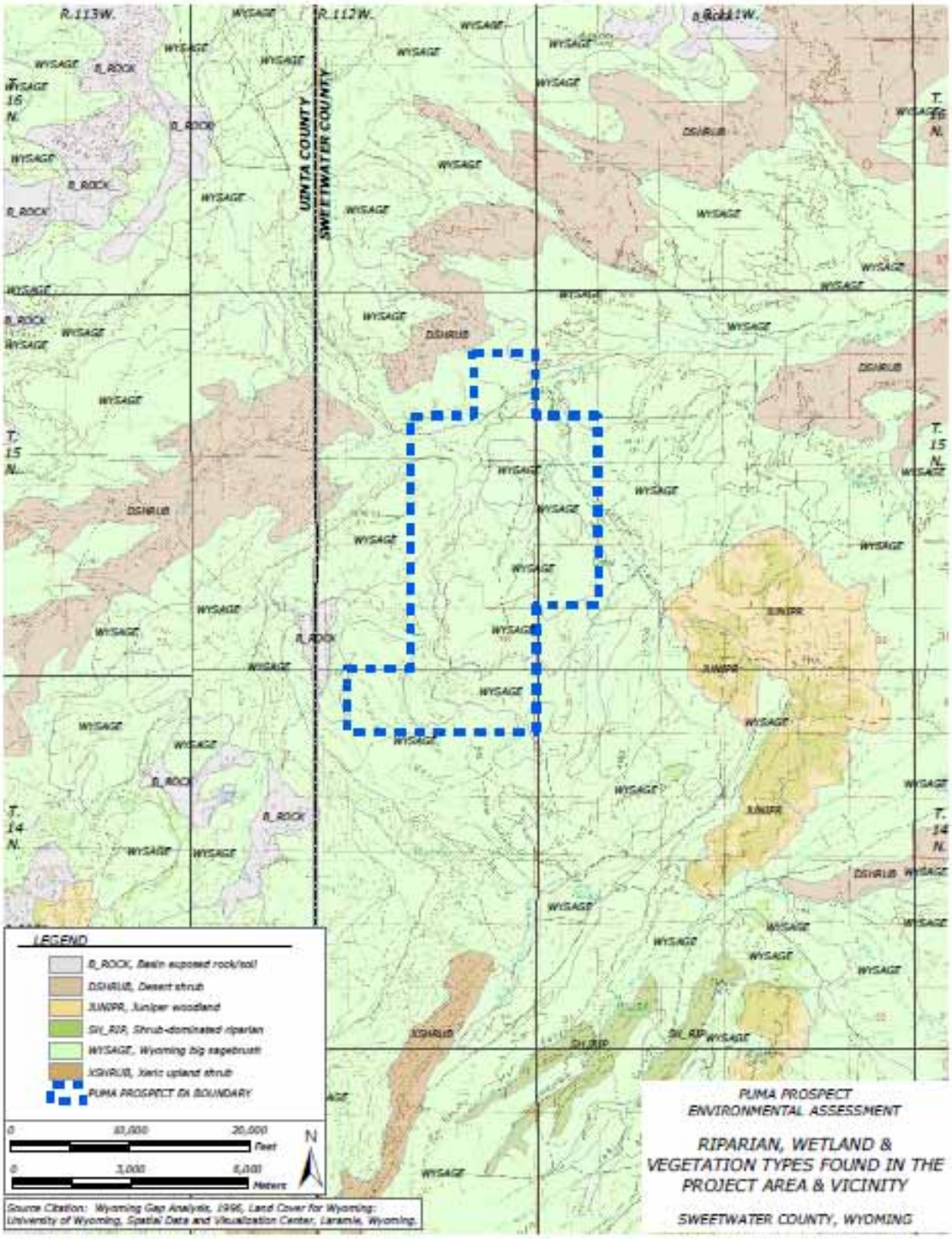
3.6.3 Candidate and BLM Sensitive Plant Species

The BLM State Director has designated several plant species found in Sweetwater County as sensitive. Sensitive species with potential for habitat in the project area include large-fruited bladderpod (*Lesquerella macrocarpa*), Nelson's milkvetch (*Astragalus nelsonianus*), persistent sepal yellowcress (*Rorippa calycina*) and Cedar Rim Thistle (*Cirsium aridium)*.

The **large-fruited bladderpod** (*Lesquerella macrocarpa*) is endemic to the western rim of the Great Divide Basin in Fremont and Sweetwater Counties. Other populations have been identified in Lincoln and Sublette counties in high rim and butte topography. Total population size is estimated at approximately 52,000 plants in 1994 covering an area of 2,079 acres (Fertig 1995). Large-fruited bladderpod occurs in gypsum-clay hills and benches, clay flats, and barren hills at

elevations between 7,200 and 7,700 feet. This plant is usually absent from rocky soils and areas dominated by sagebrush or high cover of grasses. Nine populations are known in the state of Wyoming. This species has not been identified in the project area but potential habitat does exist. The nearest known population is located in southeastern Lincoln County.

Figure 3-7. Riparian, Wetland, and Vegetation Types Found in Project Area and Vicinity



Nelson's milkvetch (*Astragalus nelsonianus,* syn. *Astragalus pectinatus* var. *platyphyllus*) is also endemic to southwest and central Wyoming, northeast Utah, and northwest Colorado. In Wyoming, it is known from the Wind River, Green River, Washakie, southern Powder River, and Great Divide basins, Owl Creek Mountains, and the Rock Springs Uplift in Fremont, Natrona, and Sweetwater counties. In Wyoming, it occurs on alkaline, often seleniferous, clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders. Known occurrences are found primarily in sparsely vegetated sagebrush, juniper, and cushion plant communities at elevations of 5,200-7,600 feet. It is known from 24 records in Wyoming. The species is not known in the project area but suitable habitat is present.
(Accessed October 24, 2008:
http://www.fs.fed.us/r2/projects/scp/evalrationale/evaluations/dicots/astragalusnelsonianus.pdf)

Persistent sepal yellowcress (*Rorippa calycina*), another endemic, is a member of the mustard family (*Brassicaceae*). This species has been documented in south-central Montana, western North Dakota, central Wyoming, and on the arctic coast of Canada's Northwest Territories. The species is found along moist sandy to muddy banks of streams, stock ponds, and reservoirs near the high-water line at 3,660 to 6,800 feet. Populations tend to be found in semi-disturbed openings in small inlets or bays. The nearest known population is found to the northeast, in Fremont County. No potential habitat for this plant exists in the project area.

Cedar Rim Thistle (*Cirsium aridium)* is found on barren, chalky hills, gravelly slopes, and fine textured, sandy-shaley draws at elevation of 6,700 to 7,200 ft. The nearest known populations of this plant are found to the north in Sublette and Fremont counties (Accessed October 24, 2008: http://www.npwrc.usgs.gov/resource/plants/wyplant/).

Opal Phlox (*Phlox opalensis)* is another endemic to SW Wyoming (Lincoln, Sweetwater, and Uinta counties) found on clay slopes and ridges at elevations form 6,700 to 6,900 ft. According to the Wyoming Natural Diversity Database, this G3/S3 species has been identified in the Puma Deep project area (WYNDD 2008).

Gibben's Beardtongue (*Penstemon gibbensii) is e*ndemic to SC Wyoming (Carbon and Sweetwater counties), NE Utah and NW Colorado and is found on sparsely vegetated shale or sandy-clay slopes at elevations between 5,500 and 7,700 feet. Surrounding vegetation is pinyon-juniper woodland, sagebrush or greasewood-saltbush. The nearest known population is found in southeast Sweetwater County.
(Accessed October 24, 2008: http://www.cnhp.colostate.edu/rareplants/cover.html)

These sensitive species or their habitat are not known to occur within the project area or the 2-mile buffer area, these species will not be addressed further in this analysis.

3.6.4 Wetlands

The U.S. Fish and Wildlife Service National Wetland Inventory (NWI) Maps identify no wetland areas within the project area boundary. Very few small, isolated and localized patches of wetlands vegetation do occur in the project area but are not proximal to any planned development or infrastructure. If development were proposed in close proximity to a wetland area it would be provided protection through the application of a 500 foot setback.

Accessed October 14, 2008: (http://wetlandsfws.er.usgs.gov/imf/imf.jsp?site=NWI_CONUS)

Because no wetlands are identified in the FWS mapping and no project related activity is planned proximal to identified isolated wetland areas no direct, indirect or cumulative impacts are expected, wetlands are not discussed further in this analysis.

3.6.5 Noxious Weeds/Invasive Species

Although the project area is vulnerable to infestations of invasive/noxious weeds, as is any area within the RSFO area, infestations of invasive/noxious weeds are relatively minimal within the project area at present. However, any newly disturbed surface would be susceptible to introduction of invasive or noxious weeds. Infestations proximal to the project area include populations of Black henbane (*Hyoscyamus niger*), Kochia (*Kochia scoparia*), and Halogeton (*Halogeton glomeratus*).

3.7 RANGE RESOURCES AND OTHER LAND USES

The project is located in what was formerly known as the Henry's Fork Allotment (#04012), which was dissolved in 1999. The resulting allotments were Sage Creek Mountain #03200 and Cedar Mountain Allotment #03201. The ridge top of Cedar Mountain is the approximate eastern boundary of the Sage Creek Mountain Allotment.

Sage Creek Mountain Allotment consists of four pastures with an established rotation. Two of the northern three pastures are grazed in the spring and summer with cattle and horses. The remaining northern pasture is grazed in the fall with sheep. The last pasture, which encompasses most of Cedar Mountain, is grazed every fall with cattle and horses. The Puma project is located in Pasture 2, which is grazed in the spring, or summer with cattle and horses or grazed in the fall with sheep.

In 1999, a standards assessment was performed and the public lands within the allotment were found not to be in compliance with Wyoming standards for rangeland health. As a result of the assessment, a new grazing plan was implemented in order to make progress toward meeting the standards for healthy rangelands. The allotment size is 107,302 acres and has 9,940 active AUMs utilized by sheep, cattle and horses.

This allotment is quite diverse and includes a variety of other uses including oil and gas production, recreation and existing rights-of-way (e.g., roads, pipelines) associated with on-going mineral-related activity in and adjacent to the project area.

3.8 WILDLIFE/SPECIAL STATUS ANIMAL SPECIES

The project area includes sagebrush/saltbush steppe and greasewood wildlife habitats. The Green River Basin is within Intermountain semi-desert eco-region, a high altitude prairie which is characterized by low annual precipitation, short summers and long winters, and generally sparse vegetation. Shrubs growing in these areas include saltbush, greasewood, sagebrush, and rabbitbrush. Other common plant species include gray horsebrush, winterfat, and Indian

ricegrass. Observed plants in the project area include Wyoming big sage, spiny hopsage, Gardner saltbush, rabbitbrush, greasewood, prickly pear cactus, grasses, and forbs. Other species of plants which may occur within the project are discussed in Section 3.6 of this document.

Many species of birds, mammals, amphibians, and reptiles may be found within the Green River Basin. The most common large game animals found in the study area today are pronghorn antelope, mule deer, and elk. Other mammals include coyote, fox, skunk, badger, White-tailed prairie dog, whitetail jackrabbit, and a number of small rodents. The area also contains Greater Sage-grouse. Raptors found in the area include ferruginous hawk, golden eagle, prairie falcon, and burrowing owl.

Reptiles found in the study area include Northern sagebrush lizard, short-horned lizard, and Great Basin gopher snakes. Tiger salamanders and the leopard frog may be found in the geographic area, but are not expected to occur in the project area. The proposed development is not expected to impact the common species found in the project area; therefore, they are not considered in this analysis. Those species considered in this document include Threatened, Endangered or proposed for listing status, big game species, raptors, and BLM sensitive species.

Information regarding the occurrence of species included in this analysis was obtained from several sources. Greater sage-grouse lek locations, seasonal big game range designations, raptor nest locations, and locations for threatened and endangered species were obtained from the Wyoming Game and Fish Department (WGFD) Wildlife Observation System, the BLM GIS database, the Wyoming Natural Diversity Database (WYNDD), and field surveys. Management of wildlife is Wyoming is split between the Wyoming Game and Fish Department (WGFD), which is responsible for species management, and the land manager, who has responsibility for the habitat. In the PDPA, which is mostly on public land, BLM is the primary land manager.

3.8.1 Game Species

Two big game species, pronghorn antelope (*Antilocapra americana*), and mule deer (*Odocoileus hemionus*) commonly occur in the project area during all or parts of the year. The PDPA falls within defined herd management areas for elk and moose. Several categories of range use define habitat utilization. Winter ranges are used by substantial numbers of animals only during the winter months (December through April). Winter/year-long ranges are occupied throughout the year, but during winter these ranges are used by additional animals that migrate from other seasonal ranges. Crucial big game range (e.g., crucial winter/year-long range) describes any seasonal range or habitat component that has been documented as a determining factor in a population's ability to maintain itself at a specified level over the long term. Crucial winter ranges are typically used eight out of 10 winters. No crucial winter range overlaps with the project area.

Pronghorn Antelope

During late winter and early spring, antelope are seen using most habitats of the Puma Deep project area. As summer arrives, many of the antelope migrate south to the foot of Cedar Mountain and Sage Creek Mountain where more dependable sources of water are available.

Through the summer, scattered antelope are present within a couple of miles of livestock ponds and reservoirs. By this time Big Dry Creek and its tributaries, including Cattail Draw, have generally dried up leaving antelope to compete with livestock on the six remaining intact stock ponds in and adjacent to the project. By the September hunting season, most of the pronghorn have left the area to more roadless habitats of the Henry's Fork.

The project area is within the Uinta/Cedar Mountain Antelope Herd Unit (411). The herd unit contains 1,444,258 acres of which 223,869 acres are crucial winter/yearlong ranges (Figure 3-8). No crucial winter range for antelope occurs in the Puma Deep project area or vicinity.

The Uinta/Cedar Mountain Herd Unit includes WGFD Hunt Area 95. The area is described as beginning where the Flaming Gorge Reservoir crosses the Wyoming-Utah state line; northerly along said road to Wyoming Highway 414 at the town of Lonetree; northerly along said highway to Interstate Highway 80; easterly along said highway to the Green River; southerly down said river to Flaming Gorge Reservoir; southerly along the east shore of Flaming Gorge Reservoir to the Wyoming-Utah state line. Hunter success rates in the area for 2001 through 2007 averaged 89.5%. The 2006 hunting season resulted in a harvest of 299 animals in the unit with a 90.1% hunter success. Hunting season generally runs from September 10 through October 14, annually. The population objective for the Herd Unit is 10,000 animals with an estimated actual population of 9,200. The years 2005 through 2007 have been characterized as drier than average and, certainly, the past three have brought drought conditions to the area. Generally, drought conditions have existed in the area since 2000.

Preferred pronghorn habitat may be characterized by sagebrush/rabbit-brush plant communities with an open view. An important factor affecting antelope population is weather. Severe winters with deep, crusted snow, and sub-zero temperatures may result in high mortality. Drought conditions often result in high fawn mortality (WGFD website accessed September 26, 2008 http://gf.state.wy.us/wildlife/jobcompletionreports/Region%204%20-%20GR%20-%20aa411%20Pronghorn.pdf).

Mule Deer

The project area is within the Uinta/Cedar Mountain Antelope Herd Unit (423). The herd unit takes in more than 1,731,935 acres of which 248,227 acres are crucial winter range and another 825,506 acres make up winter/yearlong range (Figure 3-9). Habitats in Herd Unit Area 423 range from coniferous forests to desert scrub and include cultivated hay meadows. No crucial winter range has been designated for the Puma Deep area; designated "crucial" winter ranges for mule deer are located southeast and southwest of the project. The southern tier of townships in the PDPA, or approximately 1,920 acres, lies within the identified winter yearlong seasonal use range for mule deer.

The Puma Deep project area provides little escape cover or desirable forage for mule deer and as a result they are relatively uncommon during summer and fall. Depending on severity of winter conditions and snow accumulations, small groups of deer migrate from Cedar Mountain into the Puma Deep area from early winter and generally remain there until mid-April. As spring approaches these herds break up into individuals or groups of three or four as they move back

toward Cedar Mountain and south for better forage, cover and more reliable water. Some individuals remain along Cattail Draw and juniper ridges to the east, tall sagebrush swales along Big Hollow Bench and along Big Dry Creek. During summer, deer are seldom seen, but their tracks and pellets are found at water holes, reservoirs and where preferred shrubs are found. For the most part this is a migratory herd that summers in Utah and winters in Wyoming.

According to the WGFD 2006 Job Completion Report, the Bridger Valley, which broadly includes the Puma Deep project, contains a significant amount of public lands, has easy access due to the road system and has poor habitat condition which has been exacerbated by drought. The combination of these factors has led to a population below objective. The population objective for the herd unit is 20,000; the model estimate for the 2007 population was approximately 19,000 individuals.

The Puma project area lies within hunt area 132. Area 132 is described as beginning where the Flaming Gorge Reservoir crosses the Wyoming–Utah state line; westerly along said line to the Meeks Cabin Dam Road (Uinta Co Rd 271); northerly along said road to Uinta Co Rd 204; westerly along said road to Uinta Co Rd 207; northerly along said road to Uinta County Road 202; northeasterly along said road to Interstate Highway 80; easterly along said highway to the Green River; southerly down the east bank of said river to Flaming Gorge Reservoir; southerly along the east shore of said reservoir to the Wyoming–Utah state line. Hunter success rates in the area for 2006 averaged 34.6%. Overall harvest numbers in the herd area were variable over those years, ranging from 1,490 individuals in 2002 to approximately 1,000 in 2006. The majority of hunting pressure in hunt area 132 likely occurs west of Hwy. 414 (Accessed September 26, 2008 http://gf.state.wy.us/wildlife/jobcompletionreports/Region%204%20-%20GR%20-%20b%20Mule%20Deer.pdf.)

Elk

The project area is located within the Uinta/Cedar Mountain Herd Unit (423), Hunt Areas 106 and 107. This herd unit occupies the area south of I-80, bordered by the Utah state line on the west and south and by the Green River/Flaming Gorge on the east. The herd unit contains 1,444,351 acres of which 60,921 acres are crucial winter/crucial winter yearlong range. No WGFD identified seasonal elk habitat occurs within the project area (Figure 3-10). Elk in this herd unit move between Wyoming and Utah leaving data inconsistent and unreliable. The herd unit population was estimated at 750 in 2006 and had a population objective of 600 head for 2007. Herd management on the Wyoming side is directed at controlling wintering elk damage to stored hay on private lands in the Bridger Valley (WGFD JCR 2006). Elk are very rarely seen within the PDPA. There are some older reports of elk observed on Big Hollow Bench during past winters but these observations are uncommon.

The herd unit compromises hunt areas 106 and 107, the Puma project lies in hunt area 107. It is likely that the majority of hunting occurs on the west side of Hwy. 414. Hunter success in 2006 was approximately 34%. (Accessed September 29, 2008 http://gf.state.wy.us/wildlife/jobcompletionreports/Region%204%20-%20GR%20-%20c%20Elk.pdf)

Moose

The Puma project lies in the Uinta Moose Herd Unit (415). This area comprises approximately one million acres of which 95,358 acres are identified as crucial winter yearlong range (Figure 3-11). A portion of this winter range lies south of the project area along the Utah border. The Uinta Herd Unit is an interstate herd that winters in Wyoming. The 2006 WGFD Job Completion Report for this herd identified eight consecutive years of drought as a major cause of the poor condition of the herd stating that poor body condition, poor calf recruitment and lower winter survival have resulted in the reduced population numbers." Population estimates for 2007 are 925, slightly higher than the 900 head population objective. As with the other big game herd units described in this document, the area is generally described as south of I-80, west of Flaming Gorge Reservoir, and north and east of the Utah–Wyoming border. A pair of moose migrated from the Ham's Fork River, crossed I-80 near Little America and migrated south across the Puma Deep project in 1993. They continued south between Sage Creek Mountain and Cedar Mountain, ending up on the Henry's Fork River. Their occurrence in the PDPA would be considered casual or rare.

The Puma project lies within hunt area 35, it is likely that moose hunting is unknown within the project area and that hunting success occurs to the south and west. Hunter success in hunt area 35 was 87% in 2006 (Accessed September 29, 2008 http://gf.state.wy.us/wildlife/jobcompletionreports/Region%204%20-%20GR%20-%20d%20Moose.pdf).

Small Game Species

The cottontail rabbit is the only species of "small game" occurring within the project area. The species which is found in the project area is the Desert cottontail (*Sylvilagus audubonii*) (Cerovski et al. 2004). Usually seen during early morning and late afternoon, they are generally inactive during mid-day. As with most cottontails, they occupy tall vegetation, rock outcrops and where escape cover may be found.

Figure 3-8. Antelope Herd Unit in Relation to the Project Area

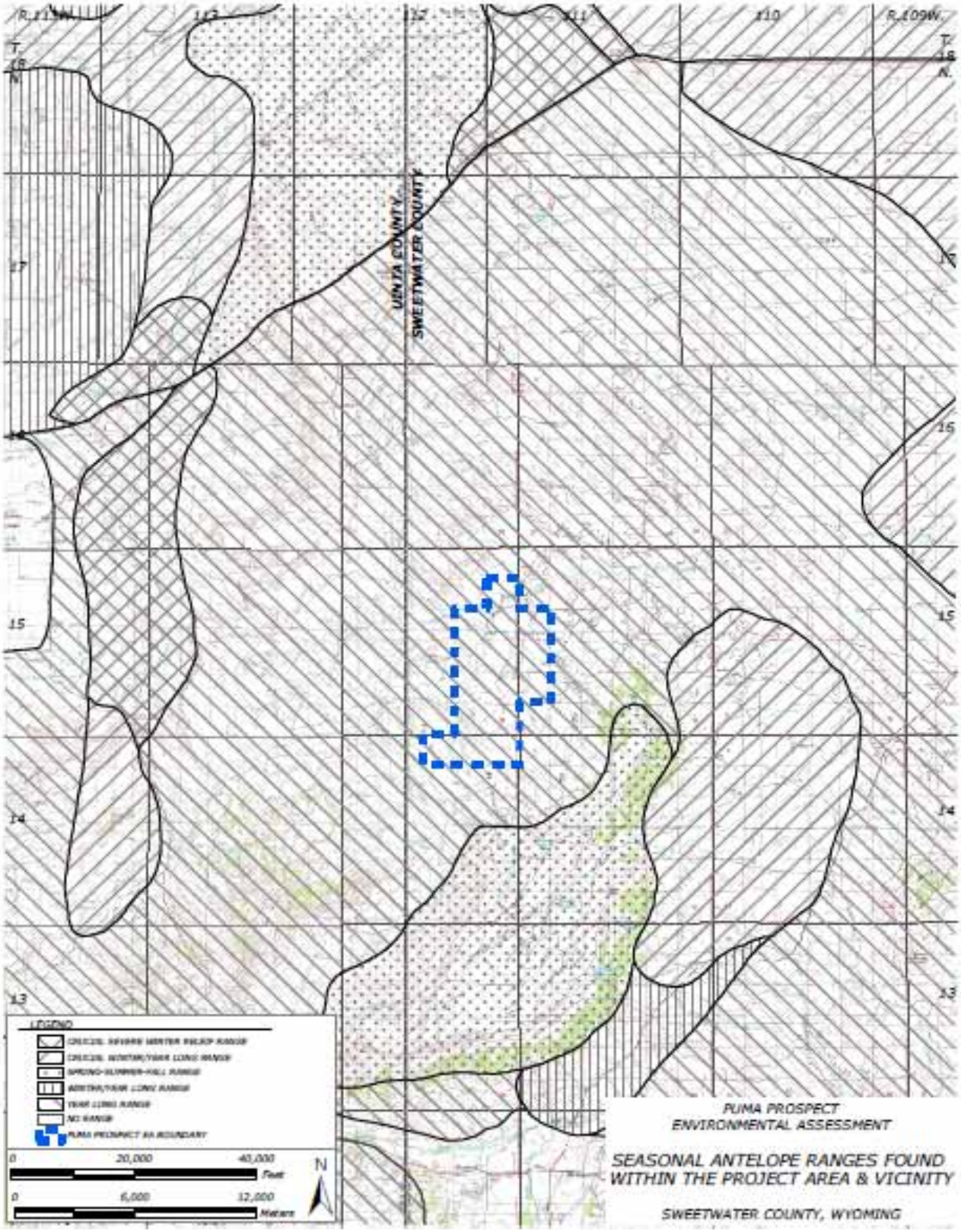


Figure 3-9. Mule Deer Herd Unit in Relation to the Project Area

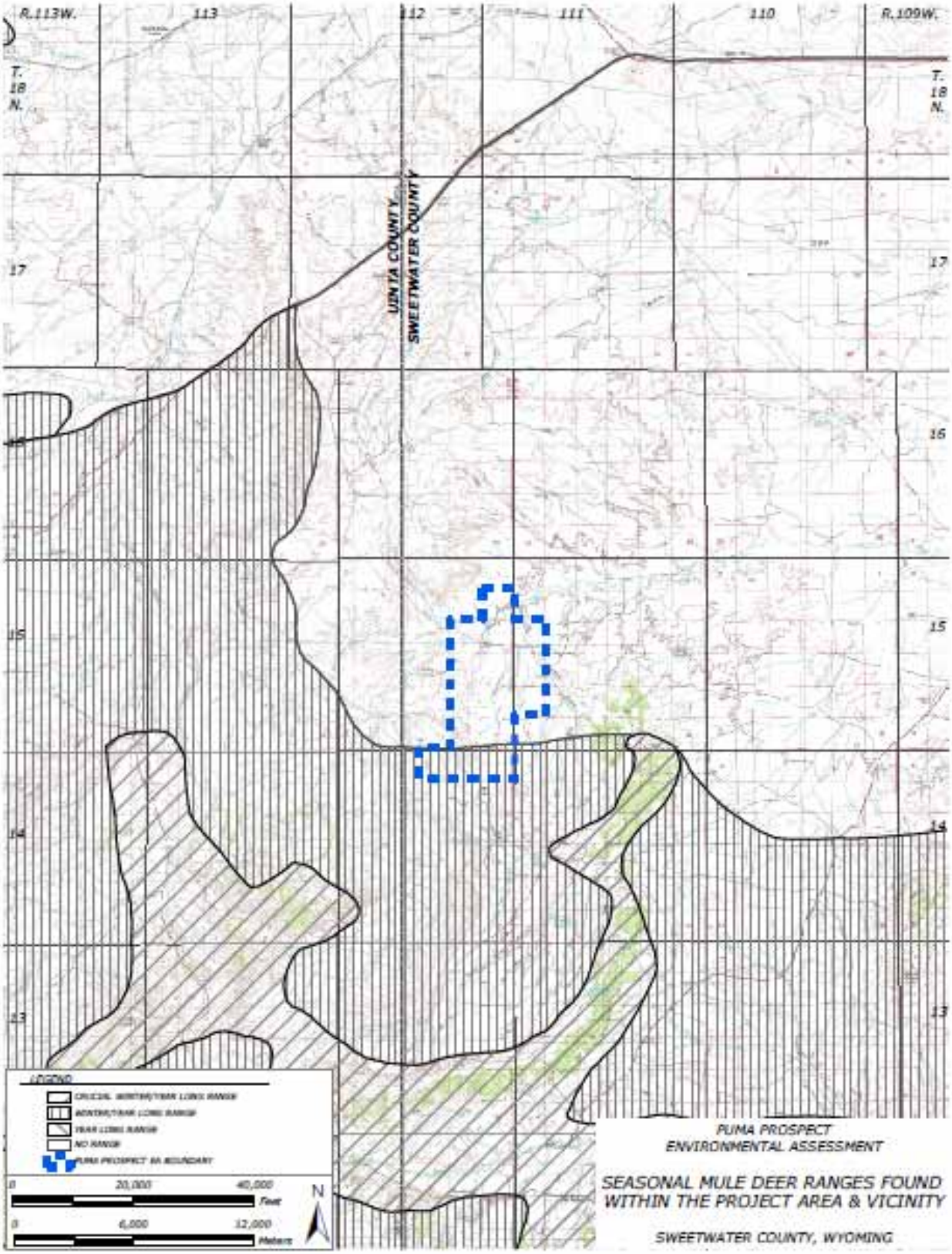


Figure 3-10. Elk Herd Unit in Relation to the Project Area

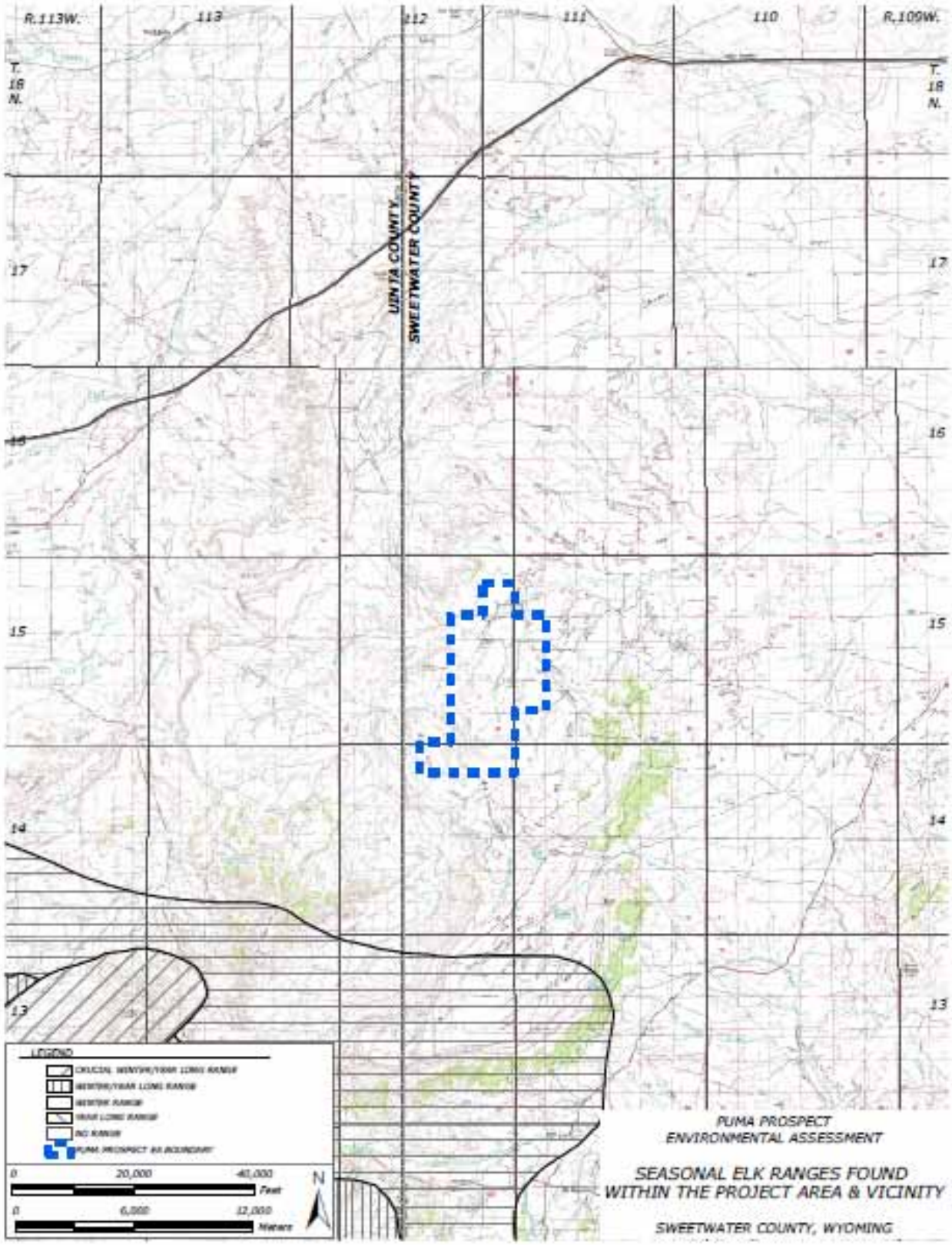
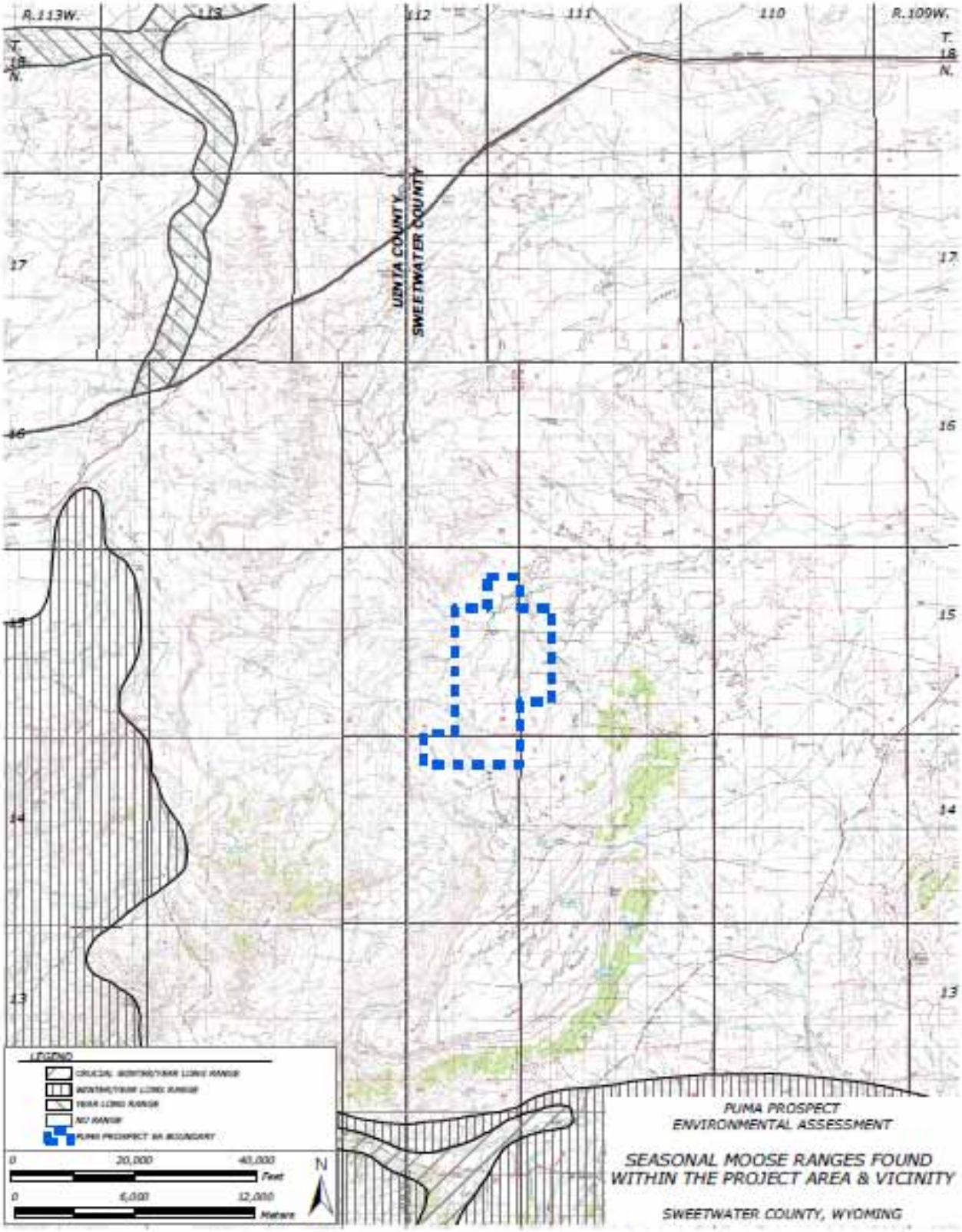


Figure 3-11. Moose Herd Unit in Relation to the Project Area



3.8.2 UPLAND GAME BIRDS

Greater Sage-Grouse

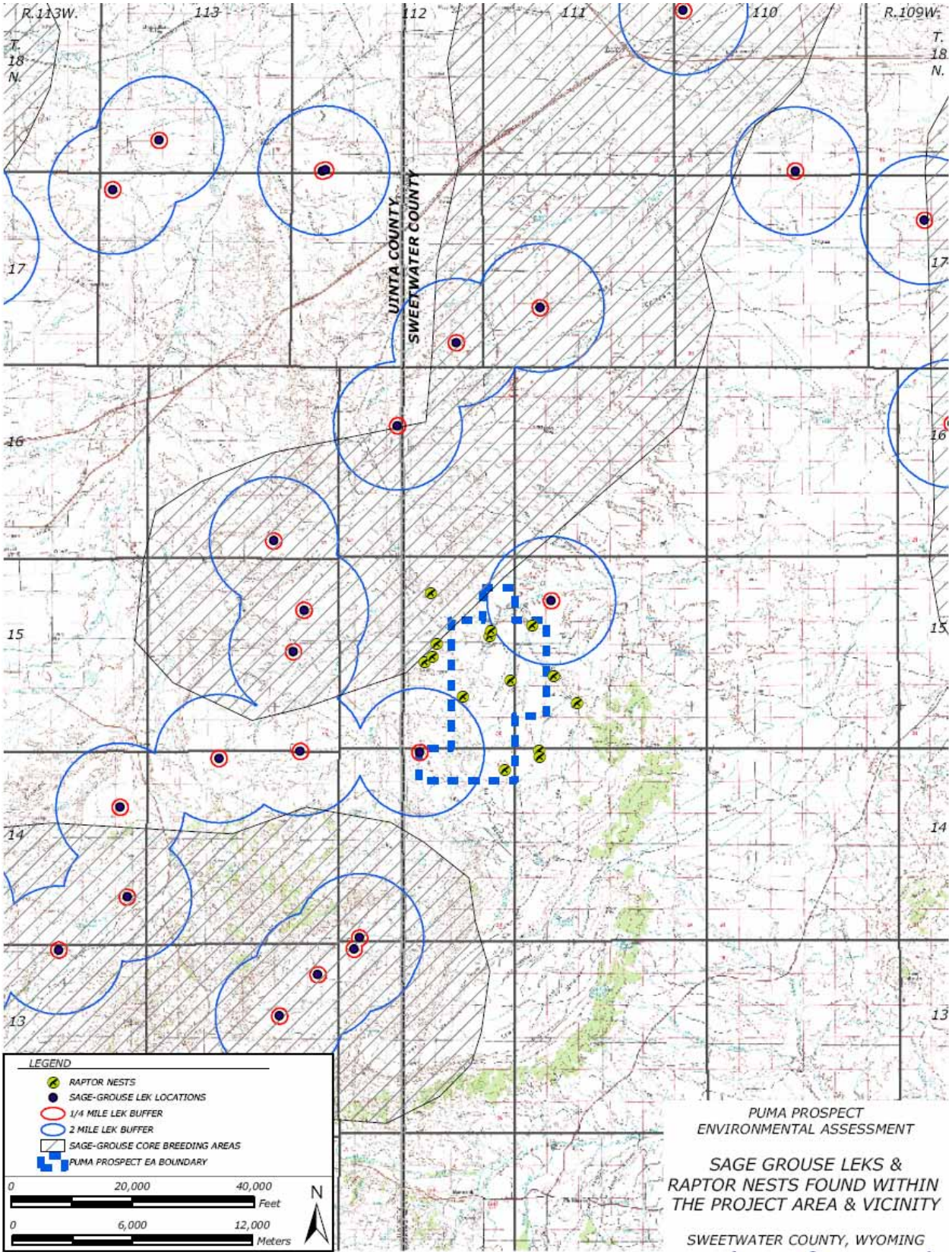
The Greater sage-grouse (*Centrocercus urophasianus*) is an important upland game bird in Wyoming. The project area is within suitable grouse habitat for breeding, nesting, brood-rearing, and winter occupation. According to WGFD, RSFO and KFO records, one lek (Cattail) is located within two miles of the project area; seven leks are known within five miles of the project area, a new lek may have been identified in the NWNW Sec 3-T14N-R112W. Figure 3-12 provides the locations of these strutting grounds and the BLM draft Kemmerer RMP mitigation radii.

Biologists from state and federal agencies have been monitoring sage-grouse strutting ground activity in this area for many years. A single active sage-grouse strutting ground was found to exist within the Puma Deep project area in 2008. This lek has been active since its discovery in 2006. A satellite lek is suspected to occur about 1.3 miles south of the active strutting ground on Big Hollow Bench. Other historic leks were monitored several times during 2008 and one location, several miles south of the project was found active. Flocks of sage-grouse do winter within the Puma Deep, though no annually recurring wintering use has been identified for greater sage-grouse.

Declining populations of greater sage-grouse in recent years led to a petition to the Fish and Wildlife Service to list the species as Threatened or Endangered. The Service extensively reviewed distribution, populations, trends and annual harvests throughout its range and in 2004 issued a Not Warranted for listing decision for the species. The FWS is currently under a court order to re-evaluate the status of the Greater Sage-grouse; this 12-Month Status Review was initiated in 2008, a decision is expected later in 2009.

In 2003, the State of Wyoming Game and Fish Commission adopted the Statewide Sage-grouse Conservation Plan which led to the creation of eight local working groups tasked with the development of locally focused conservation strategies. The Southwest Local Working Group generated a conservation plan which was adopted by the WGF Commission in 2007. Also, in 2007, the Governor of Wyoming (Dave Freudenthal) commissioned a diverse group to further address sage-grouse conservation in the state, the Implementation Team. This group generated conservation recommendations for the Governor's consideration. The first recommendation was to generate sage-grouse seasonal habitat maps to be used in project planning; the second was to identify core population areas in which to focus enhanced conservation efforts. The Puma Deep project area, including the Cattail lek, falls outside the core sage-grouse population areas identified by the State of Wyoming, as indicated in Figure 3-12. Figure 3-13 illustrates the overall male lek attendance for the Southwest Local Working Group sage-grouse conservation area.

Figure 3-12. Sage-grouse, Raptor Nests in the Vicinity of the Project Area

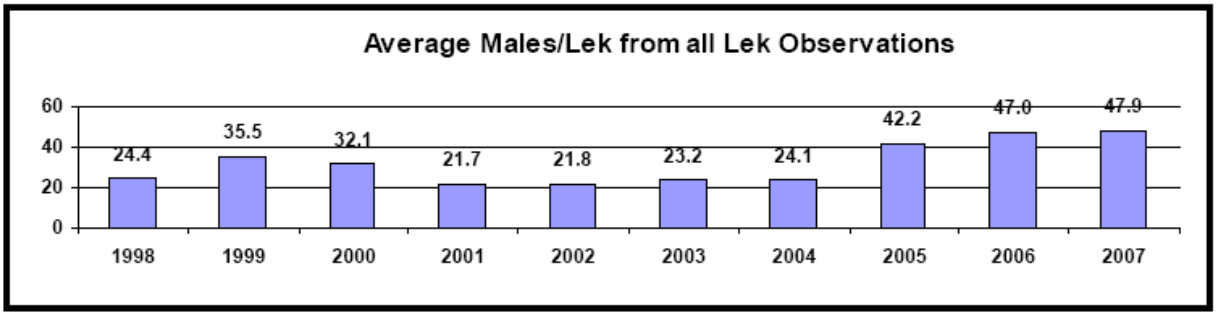


According to the WGFD 2006 Sage-grouse Job Completion Report (JCR), "Some of the highest densities of sage-grouse in North America are found in the sagebrush habitats of Southwest Wyoming. Occupied habitat is fairly contiguous throughout much of the area. More fragmented habitats occur in areas of greater human development such as near major highways, large-scale cultivated areas, and high density natural gas development. Naturally fragmented habitat occurs near forested areas, badland, sand dunes and some salt desert shrub habitats." The Puma Deep project area fits the description of "naturally fragmented habitat" provided above.

Greater sage-grouse are still hunted in Wyoming due to the robust and stable population. Hunting in the area has increased over the last ten years with 5, 019 birds being taken by almost 2000 hunters during the 2006 season. In 2008 the hunting season opened September 20, closing September 30 with a daily limit of 2 birds and a possession limit of 4 birds (Job Completion Report accessed October 16, 2008: http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/pdf/2006sgjcrsbyregion/2006%20Southwest%20JCR.pdf).

Again from the 2006 JCR, "Results of this and prior monitoring suggest sage-grouse populations in the Green River Region were at their lowest levels ever recorded in the mid-1990s. Grouse numbers then responded to increased precipitation during the late 1990's with some individual leks seeing threefold-increases in the number of males counted between 1997 and 1999. The return of drought conditions in the early 2000's led to decreases in chick production and survival and, therefore, population declines; although the population did not decline to mid-1990's level. Timely precipitation in 2004-05 increased chick survival and later lek attendance; however, observations at leks in 2007 suggest that the rate of growth may have leveled off, and drought conditions will have negative impacts if they persist into 2008." These, apparently drought driven population fluctuations, are illustrated in Figure 3-13 taken from the 2006 JCR.

Figure 3-13. Population of Grouse Leks Graph Taken from WGFD 2006 Sage-grouse Job Completion Report



Mourning dove

Relatively good water distribution within the project area has benefited mourning dove populations. This migratory species is commonly seen on fences, sagebrush and around ponds from mid-April through early September. In 2008, mourning doves remained in the PDPA until early October. In southwest Wyoming the species is usually associated with taller sagebrush communities and greasewood habitats. The species is not well distributed in and around the

project area. More commonly they may be found adjacent to Big Dry Creek, Cattail Draw and on and along Big Hollow Bench. Higher concentrations of dove are known to occur east and south of the PDPA.

3.8.3 Raptors

Eleven species of raptors are known to occur in and around the project area during various seasons of the year. Of these, six species are known to have nested here in the past five years. Active nests or nesting habitat has been identified for golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), ferruginous hawk (*Buteo regalis*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*) and great-horned owl (*Bubo virginianus*). Raptors of casual occurrence include the Northern harrier (*Circus cyaneus*), burrowing owl (*Athene cunicularia*) and rough-legged hawk (*Buteo lagopus*). Other raptor species such as the sharp-shinned hawk (*Accipiter striatus)*a forest species and short-eared owl (*Asio flammeus*) a wetland/forest species, may be seen here during spring and/or fall migration.

Observations by consulting biologists in and around the project area during the spring and early summer of 2008 revealed Prairie Falcon, Ferruginous Hawk and Golden Eagles nesting in or near the project area. The most common species observed in and around the Puma Deep project during summer include golden eagle, American kestrel, red-tailed hawk, great-horned owl and northern harrier (see Figure 3-12). Several prairie dog colonies, ground squirrel colonies and badger holes occur within the project and should provide ample opportunity for burrowing owl nesting. No burrowing owls were seen during 2007 or 2008 within the project area.

3.8.4 Threatened and Endangered Species

The U.S. Fish and Wildlife Service suggests that this analysis examine the habitat for five federally designated threatened, endangered, proposed or candidate plant and wildlife species which may occur in the project area. The status of all potentially affected, federally designated species, is summarized below (Table 3-7), as it pertains to the PDPA.

Table 3-7. Threatened and Endangered Species Possible in Project Area

Species	Status *	Habitat	Status in Project Area / Comments
Bald eagle	**T**	Found statewide	No suitable nesting/roosting habitat. No effect determination
Black-footed ferret	**E**	Prairie dog colonies	Five known in project. Under 200 acres in complex. Not likely to adversely effect determination.
Ute Ladies' tresses	**T**	Perennial streams	No perennial streams, wetlands with riparian habitat. No effect determination.
Colorado River Species	**E**	Perennial tributaries	No perennial streams to the Green River. No effect determination.

*** T** - threatened, **E** - endangered, **P** – proposed for listing

Bald eagles (*Haliaeetus leucocephalus*) winter along the Henry's Fork River but has been documented in the Puma Deep project area. Bald eagles prefer habitat near water and cliffs or large trees for nesting. No such habitat exists in the area. No winter roosts have been identified for this species on Cedar Mountain, Sage Creek Mountain, or within the vicinity of the proposed project. No sightings of the bald eagle (*Haliaeetus leucocephalus*) have been documented in or adjacent to the project area (WYNDD 2008). This species will not be given further consideration in this analysis.

Black-footed Ferret and Associated White-tailed Prairie Dog Colonies

The black-footed ferret (*Mustela nigripes*) has the potential to exist in the general area. White-tailed prairie dog (*Cynomys leucurus*) colonies provide habitat for black-footed ferrets. The project area contains six white-tailed prairie dog towns of which only two meet the density requirements to provide habitat for the black-footed ferret. These six small colonies are scattered along the northeastern edge and southeastern quarter of the project area and total approximately 284 acres. The largest of these colonies is 92 acres; the smallest is 1.3 acres (Figure 3-14). Based on prairie dog colony acreage, density and colony distribution, black-footed ferrets are unlikely to occur in the project area. Proposed field development activities plan to avoid disturbance within prairie dog colonies which would result in a "not likely to adversely effect" determination.

Searches for black-footed ferrets have not been conducted within this complex. *The Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act* (USFWS 1989) defines potential black-footed ferret habitat as any white-tailed prairie dog colony or complex greater than 200 acres in size and meet or exceed a hole density of 20 burrows per hectare (8 burrows per acre). Based on the USFWS letter entitled *Removal of Black-footed Ferret Survey Recommendation Across Much of Wyoming*, many white-tailed prairie dog colonies or complexes are considered to be "block cleared" by the USFWS. The majority of white-tailed prairie dog colonies in the project area are not considered to be blocked cleared by the USFWS (USFWS 2004).

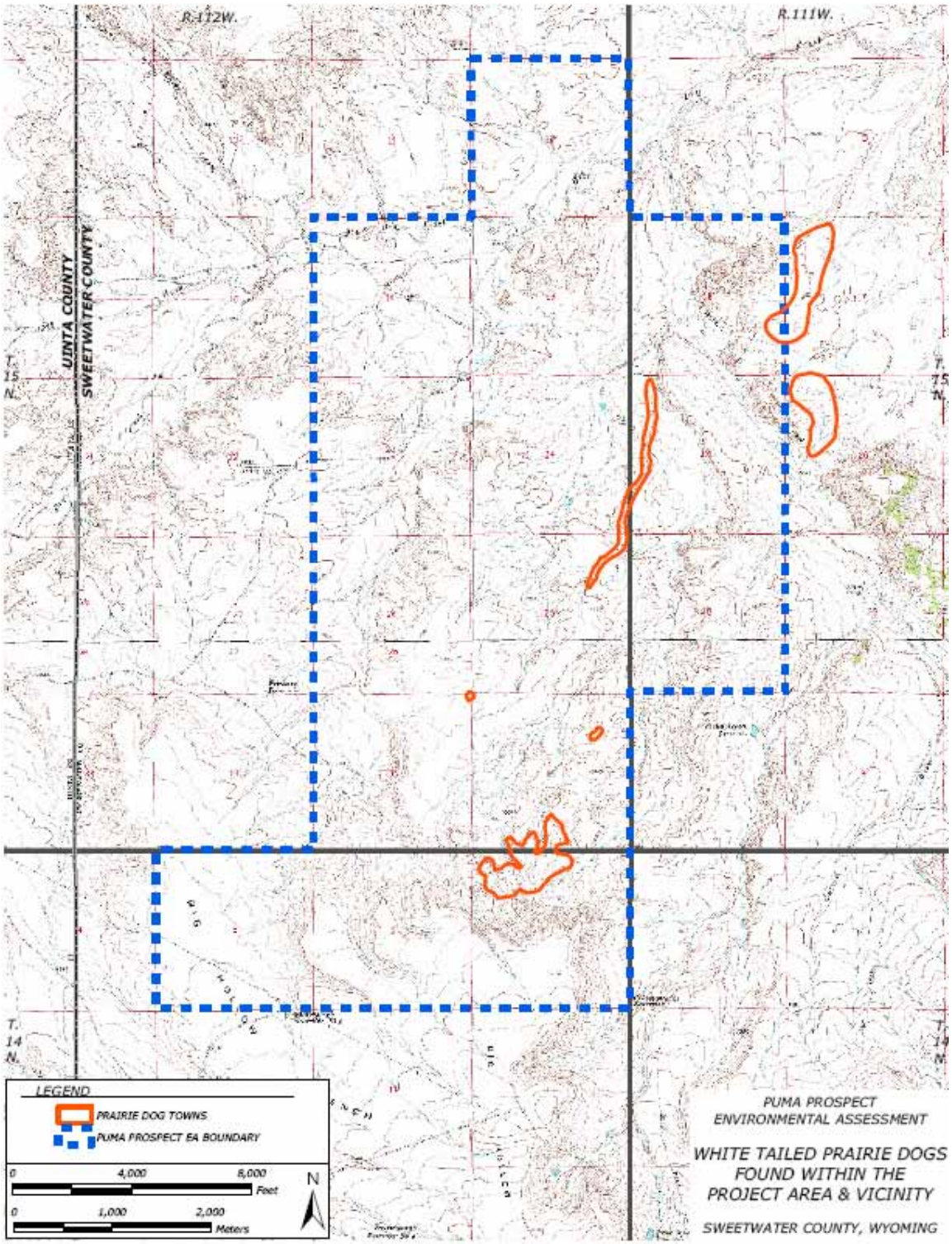
No black-footed ferret sightings are known in or near the project area as identified in the Final EIS for the GRRMP, Appendix 14-1, Table 2 (BLM 1996) and the WYNDD project area search (WYNDD 2008). Researchers have concluded, through archaeological and historical evidence, that this species has never been abundant throughout its range.

Colorado River Fishes / Water Depletions to the Colorado River System

The U.S. Fish and Wildlife Service identified certain fish species as potentially affected by water depletions in the Colorado River System including the endangered bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*) and the razorback sucker (*Xyrauchen texanus*). The Endangered fish species associated with the Colorado River were once found in the Green River and its tributaries with perennial water. Many of the species became extirpated in Wyoming after Flaming Gorge Dam was completed and the gates on the dam were closed in 1964. The listed fish species require permanent water and specialized habitats for reproduction. While the Puma Deep project area satisfies none of these habitat

requirements it is located in the Green River Basin and will use ground water for development purposes.

Figure 3-14. White-Tailed Prairie Dog Colonies in the project area



3.8.5 BLM Sensitive Species

Thirteen special-concern species of wildlife occur or potentially occur in the project area. They are the pygmy rabbit, white-tailed prairie dog, swift fox, Wyoming pocket gopher, ferruginous hawk, Greater sage-grouse, burrowing owl, mountain plover, sage thrasher, loggerhead shrike, Brewer's sparrow, sage sparrow, and Great Basin spadefoot toad. The WGFD has also expressed concern regarding the midget faded rattlesnake an NSS2 species.

The analysis area contains or has potential habitat for the following species:
Pygmy Rabbit (*Brachylagus idahoensis*) digs its own burrows and is typically distributed in dense sagebrush. According to the WGFD, pygmy rabbit populations are restricted in distribution. Suitable pygmy rabbit habitat can be found in areas with deeper soils characterized by distinctly taller patches of sagebrush. Topography plays a very important role in soil deposition and therefore rabbit distribution, specifically old riverbeds, alluvial fans, and the base of hills where soils have slumped. Patches of appropriate habitat may exist in patches along Cattail and Big Dry Creeks but are not within the areas targeted for development. During 2008 wildlife surveys no individuals were sighted in the project area, but tracks, burrows and droppings of this rabbit may have been found along Cattail Draw. Other potential pygmy rabbit habitats within the Puma Deep may also be occupied and general surveys for this species should be conducted prior to surface disturbance.

The Fish and Wildlife Service determined in January, 2008 that the pygmy rabbit may warrant protection under the Endangered Species Act; the Service will now undertake a more thorough status review of the species.

White-Tailed Prairie Dog (*Cynomys leucurus*) is a species which typically lives in towns or colonies established in short grass and sage steppe habitat. Six small colonies were located in and adjacent to the PDPA in 2008, the smallest of these was 1.3 acres in size the largest approximately 92 acres (Figure 3-14). Refer to the Section 3.8.4, Black-footed Ferrets, for a discussion of this species. Project maps indicate that the WTPD colonies would be avoided if project development continued.

Swift Fox (*Vulpes velox*) is a housecat size fox usually found in short grass prairie. It prefers to build its dens near ridge tops situated with broad views. Their prey includes ground squirrels, mice, birds, eggs, and a variety of small prey. Swift fox has the potential to occupy the project area.

Wyoming Pocket Gopher (*Thomomys clusius*) is restricted to a portion of southcentral Wyoming (Clark and Stromberg 1987, WYNDD 2008), probably extending slightly into northern Colorado. Very little is known regarding Wyoming pocket gophers; much of their life history is assumed similar to that of the northern pocket gopher (*T. talpoides*). Wyoming pocket gophers are small, with fur that has a distinctive yellow cast, and may prefer to occupy dry and gravelly ridge tops, as opposed to the valley bottoms with deeper soils that are typically associated with *T. talpoides* (Clark and Stromberg 1987). Due to soil type constraints, the Wyoming pocket gopher is not likely in the Puma Deep project area, further, the WYNDD December 2008 Draft Model of Possible *Thomomys clusius* Distribution indicates a "marginal

probability" that the species might be present in the PDPA. Accessed October 24, 2008: http://www.uwyo.edu/wynddsupport/docs/Reports/SpeciesAssessments/Wyoming%20Pocket%20Gopher%20-%20Final%20(Jun%202005).pdf

Ferruginous Hawks (*Buteo regalis*) are raptors found in sagebrush, juniper, and cliff habitats. This species is a common desert dweller which nests on anything from a windmill, juniper tree, barren hilltop, or artificial nest structure. They presently nest in various locations within and surrounding the Puma Deep project area. A one-mile radius from the nest is protected from human activity during the nesting and fledgling rearing season (GRRMP identifies the period as falling between February 1 and July 31). This buffer was established because nests are usually placed where the bird has a wide vista. In southwestern Wyoming, hatchlings are usually off the nest by the first of July.

Greater Sage-Grouse are a common shrub steppe inhabitant and a popular game species. See Section 3.8.2 for a detailed discussion of this species.

Burrowing Owl (*Athene cunicularia*) is most often associated with prairie dog colonies where they live in abandoned burrows. They are also found nesting in ground squirrel or badger holes and along roadways. No burrowing owls were sighted in suitable habitats within the project area during project wildlife surveys conducted in 2008; WYNDD records indicate sightings of this owl within the project area (WYNDD 2008).

Mountain Plover (*Charadrius montanus*) are small birds similar to killdeer that inhabit short-grass prairie and shrub-steppe landscapes; they are found on cultivated farms, prairie dog towns, and habitats of sparse sagebrush. These birds are ground nesters; nest sites in shrub-steppe environments are often located in the area of prairie dog towns. These birds are rarely found near water. Positive indicators for mountain plovers include near-level terrain, prairie dogs, bare ground, cactus, cattle, widely spaced plants, and horned larks.

No mountain plovers were observed in suitable habitat during project wildlife surveys conducted in 2008; however, prairie dog towns and other suitable habitat exist in the project area. The species may use the area for nesting and brood rearing. Some portions of the project area are considered suitable mountain plover habitat.

Sage Thrashers (*Oreoscoptes montanus*) are common migratory sagebrush obligate passerines. About the size of a robin, this mottled brown bird prefers sagebrush and greasewood communities for nesting and breeding. They commonly feed on seeds and berries, especially buffaloberry, currant, and chokecherry. The species was observed on several occasions within the project area during spring 2008.

Loggerhead Shrike (*Lanius ludovicianus*) may be found on the project area from early spring until they migrate south to Mexico and Central America in the fall. This black and white bird is slightly smaller than a robin and is often classified with raptors. Their prey includes songbirds, grasshoppers, crickets, beetles and even small mice. This species often impales their prey on cactus thorns, barbed wire, or greasewood thorns. The species was observed once in Section 25, T15N, R112W in tall sagebrush during 2008 wildlife surveys.

Brewer's Sparrow (*Spizella breweri*) and the **Sage Sparrow** (*Amphispiza bellineata*) are both sagebrush obligate species and are listed in the WYNDD as occurring in the project area. Both nest on or near the ground and feed on seeds and small insects (WYNDD 2008). The Brewer's sparrow is commonly seen in the project area.

Great Basin Spadefoot Toad (*Spea intermontana*) is a small toad-like frog that has a spade-like growth on its hind feet to dig a burrow in sand or mud. This family of amphibians is distinguished from true toads by their cat-like eyes and teeth in the upper mouth. Like other amphibians, they must live near a water body, even if the water is seasonal, for successful reproduction. The Great Basin spadefoot toad may occur in the ephemeral wetlands in the project area following heavy rain or on the margins of the areas stock ponds. The species was not observed during the project wildlife surveys conducted in 2008.

Midget Faded Rattlesnake (*Crotalus viridis concolor)* is an NSS 2, or rare, species found in rock outcrops in sagebrush desert communities. Their range is restricted to the lower Green River Valley from the cities of Green River and Rock Springs south to the Utah-Wyoming state line. Little is known about the breeding and food habits of this species, but they are probably similar to those of the Prairie Rattlesnake (Wyoming Wildlife Atlas 2004). The Prairie Rattlesnake bears live young, with litters ranging from 4 to 21. They feed on ground squirrels, prairie dogs, chipmunks, cottontail rabbits, other rodents, frogs, toads, lizards, snakes, birds. This species over winters in large aggregations in deep underground crevices, prairie dog burrows, or other abandoned mammal burrows.

A summary of the sensitivity status and rank of special status species is found in Appendix C (Wildlife and Plants in the Rock Springs Field Office).

3.8.6 Migratory Birds

A large number of neotropical and migratory bird species occupy this low density sagebrush community. Birds which typically frequent portions of the project area during summer include raven, sage sparrow, horned lark, western bluebird, loggerhead shrike, sage thrasher, McCowen's longspur, and vesper sparrow. Many of the migratory bird species which nest here are common through mid-July, then as this high desert becomes dry and warm, they move to springs, seeps, and more permanent waters, where there is protection from the heat and wind.

Migratory species, including waterfowl, shorebirds, wading birds and raptor species, frequent stock ponds, ephemeral lakes, cliffs and other habitats within the Puma Deep project. Casual winter species include snow bunting, horned lark, and grey-crowned rosy finch. They may be seen here as winter flocks picking gravel from 2-track trails and roadsides and feeding on plant seed heads which show above the wind-swept snow. The Migratory Bird Treaty Act provides federal protection for these migratory avian species.

3.9 WILD HORSES

The project area is not located within any of the BLM designated Wild Horse Herd Management Areas; this resource will not be discussed further in this analysis.

3.10 RECREATION

Recreational activities occurring in or near the project area include hunting, off-highway vehicle use, and some camping (generally associated with hunting). No developed recreational sites, facilities, or special recreational management areas exist within or near the project area. The geographic area attracts hunters for big and small game seasons and trapping of furbearers. The area may also attract very limited numbers of visitors engaged in rock collecting, camping, hiking, wildlife observation, and/or outdoor photography. Data on recreational use are extremely limited, it is expected that overall use levels are generally low and likely associated with area residents.

3.11 VISUAL RESOURCES

The GRRMP describes and designates scenic quality classifications for the Field Office area, including the project area. The project area is characterized primarily by highly erodible soils and multi-colored, horizontally layered sedimentary bedrock. These conditions have generated the formation of the colorful badlands landscape common throughout most of the Wyoming Basin Province. Between these badland areas, the land form is primarily low rolling or flat-topped hills. Within the project area, there are areas of stabilized sand dunes and unvegetated bentonite erosional features. Small drainages, such as Cattail Creek dissect the landscape. Bluffs, such as that found east of Cattail Creek, create elevational diversity on the landscape. The sky/land interface is an important aspect of all distant views. Reddish brown and buff colors of the badland formations add contrast and dominate in areas of steeper topography. Evidence of cultural modification in the project area includes improved and unimproved roads, fences, power lines, water catchments; i.e., stock ponds and oil and gas production facilities.

The project area occurs within a Class IV area for visual resource management. Under this classification, changes or modification in the basic elements (form, line, color, or texture) caused by a management activity may be evident and somewhat dominant on the landscape. No areas with important scenic and visual values were identified, the Puma Deep project area (GRRMP 1996).

3.12 CULTURAL RESOURCES

Cultural resources in the proposed project area consist of sites associated with prehistoric and historic time periods. The prehistoric period extends from approximately 12,000 years before present time (B.P.) through 350 B.P. when European cultural items began to arrive in the Red Desert. The area was inhabited by small, mobile groups of hunters and gatherers. Prehistoric cultural remains include scattered lithic debris, stone tools, grinding slabs, evidence of camp sites and occasional burials and house pits.

Historic use of the southern Green River Basin was mainly confined to pastoral activities and mineral extraction. The overall lack of water limited the development of homesteads or ranching. Evidence of sheep herding is scattered across the landscape in the study area. The Cherokee Trail bisects the northern portion of the project area.

Class I and III inventories for the proposed undertaking have been completed. Previously, conducted Class III inventories have covered 130 acres of the study area. The previous inventories included 13 well pads and combined access roads and pipelines, one pipeline, three seismic projects, two monitors and open trench inspection, one fence, one site testing, and one site damage assessment. A total of thirty-five sites have been documented, including four lithic scatters, 27 open camps, one area of historic debris, one milling site, the Blacks Fork Lithic Landscape and the Cherokee Trail.

Native American Tribes, including the Northern Ute, Northern Arapahoe, Eastern Shoshone, and Shoshone-Bannock, have had tribal territories located in the general area of the proposed undertaking.

3.13 SOCIOECONOMICS

The geographic area of analysis for potential socioeconomic effects is Sweetwater County and the eastern portion of Uinta County, Wyoming, and the communities of Rock Springs, Evanston and the Bridger Valley/Mountain View. Socioeconomic conditions characterized for the assessment include employment and earnings. Both Sweetwater and Uinta Counties have natural resource-based economies. The major cities, Evanston and Rock Springs, where most of the oil and gas service companies are based, have already assimilated industry families, infrastructure and facilities. Smaller service companies are located in the Bridger Valley communities, including Mountain View and Lyman. The oil and gas sector has been present in the Bridger Valley since the 1970's and plays an important role in the stability of these communities. This project would generate a few new long-term employment opportunities, but would provide short -term opportunities and add to the long-term stability of existing contractors.

Support for oil and gas development in affected counties is mixed. Nearby residents who are economically tied to the energy industry generally support development. Opposition comes from those whose economic interests and lifestyles may be affected, such as grazing allotment permittees, hunting outfitters and those who value the land solely for recreation and wildlife habitat purposes and/or believe that certain areas should be left in an undeveloped state.

Executive Order (EO) 12898, "Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations" was published in the Federal Register (59 FR 7629 on February 11, 1994). EO 12898 requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations (defined as those living below the poverty level). The EO makes clear that its provisions apply fully to American Indian populations and Indian tribes, specifically to affects on tribal lands, treaty rights, trust responsibilities, and the health and environment of Indian communities.

Communities within affected counties, entities with interests in the area, and individuals with ties to the area all may have concerns about additional natural gas development within the project area. Communities potentially impacted by the presence or absence of the proposed development have been identified above in this section. Environmental Justice concerns are usually directly associated with impacts on the natural and physical environment, but these impacts are likely to be interrelated to social and economic impacts as well.

Taxes and Revenues paid by the minerals industry account for a substantial share of revenues to the state and to local governments in Wyoming. Produced minerals are taxed as county property (ad valorem) tax on production, and state severance tax. Producers pay ad valorem taxes on plants, refineries, mining and wellhead equipment, pipelines, and other facilities used in the mineral production and transportation operations. For federally owned minerals, the federal government receives a share of the revenues from the mineral production, or annual rentals are paid on mineral leases that are not producing. The same is true for minerals owned by the state government. Additionally, the state receives a share of federal royalty payments for federal minerals through a federal revenue-sharing provision.

A severance tax is imposed on the present and continuing privilege of removing, extracting, severing, or producing any mineral in Wyoming. Severance taxes are distributed according to Wyoming Statute (WS) 39-14-801. The Permanent Wyoming Mineral Trust Fund (PWMTF) is a fund that holds 25% of all severance taxes currently received by the state, functioning like a savings account for the state. Natural gas alone contributed more than $34.7 million (46.8%) to the PWMTF (BLM 2007, Moxa Draft EIS).

A mineral royalty is the amount of money the owner of the mineral resource receives as a payment or royalty from the mineral producer. Wyoming receives a base royalty of 16.7% of the value of production from state-owned minerals. The federal government receives a royalty of 12.5% of the value of production for minerals produced on federal lands. Fifty percent of federal mineral royalties are returned to the state, a portion of which is then distributed to counties and cities. Unlike severance taxes, royalties are based on the value of production and byproducts. Federal royalties are distributed by the State of Wyoming according to WS 9-4-601.

3.14 TRANSPORTATION

The regional transportation system serving the project area is well established and includes Interstate Highway 80, State Highway 414 and the BLM roads which access the project area. Improved and unimproved BLM roads also serve local traffic on federal land.

3.15 HEALTH AND SAFETY

Existing health and safety concerns in and adjacent to the project area include occupational hazards associated with natural gas exploration and operations; risk associated with vehicular travel on improved and unimproved roads; and low probability events such as landslides, flash floods, and range fires.

3.15.1 Occupational Health and Safety

Health and safety risks arising from current oil and gas operations in the Puma Deep project area could affect the general public and persons working in the oil and gas industry. These risks include oil and gas occupational hazards, the operation of vehicles on improved and unimproved roads, natural gas pipeline operations, winter driving and working conditions, hunting related firearms accidents, collisions with livestock and big game, and natural hazards associated with wild fires, flash floods or winter blizzards.

Health and safety concerns within the existing Puma Deep field are primarily the occupational hazards associated with the oil and gas development and production activities. Operators and service companies working within the field are governed by the State of Wyoming Department of Employment Workers Occupational Health and Safety program. WOSHA has adopted the federal OSHA general construction program rules and regulations and has special rules for oil and gas well drilling, well servicing and well special servicing operations.

The project workforce can be divided into two groups: those associated with drilling and completion activities and those involved in production operations. Drilling services employment categories had a non-fatal accident rate of 6.8 per 100 employees in 2004 compared to the operations support category non-fatal accident rate of 2.7 in the same year (U.S. Department of Labor, OSHA, June 25, 2007; http://www.osha.gov/dep/industry_profiles/p_profile-138.html). Due to the high level of accidents (greater than 3 LWDII [lost work day injuries and illness]) experienced in these occupations, Oil and Gas Well Drilling is one of the OSHA target industries in a cooperative effort between OSHA and industry partners to reduce accident and fatality rates. By comparison the LWDII rate associated with natural gas production and distribution was 1.0 in 2004 (http://www.bls.gov/iif/oshwc/osh/os/osnr0023.txt) while all private industry work places reported a LWDII injury rate of 4.8 per 100 employees in 2004.

Natural gas gathering and transmission operations currently take place in and around the project area. Most natural gas transmission and gathering pipeline operations are regulated by the federal Office of Pipeline Safety (OPS). In 2006 there were 141 natural gas transmission line accidents reported nationwide, resulting in 3 fatalities and 4 injuries (http://ops.dot.gov/stats/TRAN_SUM.HTM). The OPS regulations require stringent system maintenance programs, emergency response planning, risk management planning, and individual personnel O&M training for each natural gas pipeline system.

3.15.2 Other Risks and Hazards

Potential for firearm-related accidents would occur primarily during hunting season. No data were available to estimate or discuss likelihood of risk for gas field workers to be injured by hunters. Risk of fire in the project area could occur but is expected to have a low potential.

3.16 HAZARDOUS MATERIALS / WASTE MANAGEMENT

There are no known hazardous waste sites within the analysis area. There are a number of permitted solid or hazardous waste sites in southwestern Wyoming identified in the Wyoming

Department of Environmental Quality Solid and Hazardous Waste Division database (http://deq.state.wy.us/shwd/downloads/Facility%20Query%20for%20web%20page_11_3_06.xls). These range from historic landfills located in small towns to active disposal facilities for specific gas field operational areas.

Reserve pits from oil and gas exploration and development activities are buried adjacent to each existing and plugged well as is the industry standard. These 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 regulated by the Wyoming Oil and Gas Conservation Commission and the Bureau of Land Management.

The management of non-exempt hazardous and non-hazardous (solid) wastes is regulated under the Resource Conservation and Recovery Act (RCRA) (40 CFR Part 260-268) while the management of releases of hazardous materials into the environment is regulated under Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA) (40 CFR Part 300-374). Generally, oil and gas exploration (i.e. reserve pits), production and gas gathering and processing wastes and releases of hazardous materials into the environment are considered to the RCRA exempt and are variously regulated by the Wyoming Department of Environmental Quality, the Wyoming Oil and Gas Conservation Commission and the Bureau of Land Management. Buried materials may also be present in association with historic homestead locations. Non-hazardous solid wastes generated from operations are generally hauled to municipal landfills in Evanston and Rock Springs.

Areas that are particularly vulnerable to the release of hazardous materials include wetlands, water bodies, areas of shallow ground water and areas where wildlife and humans could be directly impacted. To enhance protection of these vulnerable areas companies must comply with the applicable provisions of Spill Prevention Countermeasure and Control (SPCC) regulations of EPA found at 40 CFR 112. These regulations require secondary containment for mobile and non-mobile equipment that contains oil in volumes greater than 1,320 gallons that could impact navigable waters of the United States in the event the material was released. This rule applies to drilling operations and production activities within the project area.

Sanitary wastes are disposed in portable toilets for long-term construction, drilling and completion operations; these wastes are hauled to municipal sewage treatment plants for disposal.

Produced water within the project area is currently managed through the use of commercially permitted evaporation ponds and injection/disposal wells. These facilities have been permitted by the Wyoming Oil and Gas Commission, the Wyoming Department of Environmental Quality and the BLM. The specific permitting mechanism depends on facility ownership, source of produced water and location.

Hazardous materials are used in drilling, field development, construction, completion and production operations. BLM Instructional Memoranda (WY IM 1994-081, WY IB 1997-011 and WY-94-059) require that NEPA documents list and describe any hazardous or extremely

hazardous materials that would be produced, used, stored, transported or disposed of as a result of a proposed project; this compilation can be found in Appendix B.

Davis Petroleum Corporation has a responsibility to comply with the state and federal regulations applicable to their operations. Documents regarding spill response planning, Community Right-to-Know reports, SPCC Plans, etc., are maintained by Davis.

3.17 NOISE

The project area is located in an unpopulated rural setting having modest sound disturbances. The principal sound source within the project area is the wind. Jet aircraft overflights at high altitudes, localized vehicular traffic on county, BLM and two-track roads in the project area and nearby drilling and natural gas production activities also cause sound disturbances within the analysis area.

The EPA has established a 55 A-weighted decibels (dBA) standard for acceptable environmental noise. Noise levels greater than 55 dBA may disturb local residents and recreators and could displace area wildlife. The degree of disturbance depends on the receptor's distance from the source, noise intensity and duration, as well as the sensitivity of the receptor. 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 (BLM 2005).

Noise related to ongoing energy development activities may exceed 70 dBA within close proximity to the equipment or operation in question. BLM measured various aspects of development operations in the Jonah Field in western Wyoming and found flaring activities to be the loudest source of noise followed by drilling operations and compression. At 0.25 miles from the activity, noise was reduced to below the 55dBA level (BLM 2006). Mitigation measures such as flowback separators on high intensity flaring operations aid in reducing noise to acceptable levels. No site specific noise data are available for the project area; but it is assumed that ambient noise levels within the area to be 30 to 40 dBA. The project area is subject to frequent strong winds which may add 5 to 10 dBA to normal ambient levels. Locally higher noise levels may be experienced proximal to operating drilling and completion operations.

Noise sensitive areas would include greater sage-grouse habitats used during breeding and nesting seasons and occupied raptor nests. No noise standards have been established by the State of Wyoming or the affected counties.

CHAPTER 4 - ENVIRONMENTAL EFFECTS

4.0 INTRODUCTION

This chapter provides an analysis of the potential environmental consequences that could result from implementation of the proposed Puma Deep Project for development of federal minerals associated with 13 additional conventional natural gas well locations, access roads and associated facilities. Two alternatives including the Proposed Action and the No Action (denial of Proposed Action) are analyzed. The Supplemental Authorities identified in Chapter 1 will be addressed as appropriate in the following discussion of the Environmental Effects.

Impact significance criteria are presented for each affected resource. The criteria are based on current regulatory standards, scientific and environmental documentation, or professional judgment.

Measures proposed by the applicant that would avoid or reduce impacts have been identified in Chapter 2, Section 2.1.9. The following impact assessment takes these measures into consideration. Any additional opportunities to mitigate impacts, beyond the practices committed to in Chapter 2, are presented in this chapter under the mitigation summary for each resource. Such measures are designed to further reduce or avoid unnecessary or undue impacts. BMPs and mitigation measures are developed based on BLM requirements and on compensation for potential impacts to the natural and physical or the relationship between people and that environment. All proposed BMPs and mitigation measures for resources are presented in Appendix D of the EA.

The analysis of the potential environmental consequences addresses the direct, indirect, cumulative and residual effects as a result of implementing the Alternatives. The cumulative analysis area for the Puma Deep project includes the reasonably foreseeable development of an additional 1,861 infill wells and associated facilities proposed in the Moxa natural gas development area. The proposed Puma Deep project lies immediately to the southeast and within the general cumulative impact assessment area for the various resources of concern addressed in the Moxa NEPA analysis. Residual effects are those impacts, if any, that remain after the application of the listed mitigation measures.

4.1 GEOLOGY/MINERALS/PALEONTOLOGY

No standards have been identified for determining the significance threshold for geology or minerals. Damage, destruction, or improper collection of scientifically important paleotonological resources could be considered significant if not properly mitigated or indirectly lost or destroyed due to private collection or vandalism.

4.1.1 Proposed Action Direct and Indirect Effects

The Proposed Action in the Puma PA is not expected to cause any direct or cumulative impacts to the geology, minerals or paleontology of the area. As discussed in Chapter 3, landslide deposits do not occur within the PA nor are earthquakes or seismic activity known to be a threat.

The oil and gas drilling is expected to result in commercial production from very deep wells at over 13,000 feet. The additional wells would lead to the depletion of the oil and gas resources. While depletion of the oil and gas resource might occur, this would lead to an economic benefit as opposed to an environmental impact. Highly successful development drilling could lead to additional development and surface disturbance. Additional NEPA analysis would be required for development beyond that proposed and analyzed here.

The entire Puma Deep project area has a high potential for producing fossil material. Construction excavation associated with the development of access roads, well pads, or reserve pits located on well pads could result in uncovering scientifically important fossils which would be an adverse impact if mitigation were not applied. On-site paleontological surveys would be conducted, in compliance with IM 2009-0011, before any ground-disturbing activities occur (pipelines, roads, well sites, staging areas, storage yards, compressor stations, etc.). An on-site observation of the proposed areas undergoing surficial disturbance is necessary because judgments made from topographic maps alone are often unreliable. Areas of low relief on topographic maps have the potential to be erosional surfaces with the possibility of bearing fossil materials rather than surfaces covered by unconsolidated sediment or soils. After the paleontological surveys are completed, reports with recommendations for the project area would be submitted to the local and state BLM offices for review.

Surface disturbing federal actions on public and split-estate lands may cause direct adverse impacts to paleontological resources through the damage or destruction of fossils or the disturbance of the stratigraphic context in which they are located. Indirect adverse impacts may be created from increased accessibility to fossils leading to looting or vandalism activities. Land tenure adjustments may result in the loss of significant paleontological resources to the public if fossils pass from public ownership.

4.1.1.1 Mitigation and Residual Effects

Implementation of the committed practices found in Chapter 2 and other standard mitigation and lease requirements should avoid or reduce impacts to the geology and mineral resources of the area. The development advocated in the proposed action and the associated facilities would cause surface disturbance but state and federal rules and regulations covering drilling, testing and completion procedures and production would avoid or reduce any effects on the surface and subsurface geology.

Ultimately, the oil and gas wells and ancillary facilities will be removed, plugged and the surface restored according to state and federal requirements. The well and rights-of-ways are covered by restoration bonds held by the jurisdictional agency which assures reclamation of any disturbance to the surface or the subsurface.

The Puma PA lies outside of the Wyoming Oil and Gas Conservation Commission's Special Sodium Drilling Area. These requirements would protect the trona beds for any future development. Prior to any oil and gas drilling, a title search would be made to determine if any mineral claims are in place. If claims are discovered, the jurisdictional agencies would require

additional analysis and permitting to protect any surface minerals. There are no known economic mineral deposits within the PA. BLM requires the implementation of trona specific cementing procedures in the Special Sodium Drilling area.

With the mitigation required in IM 2009-011 and as outlined below, all known or any unknown paleontological resources uncovered during construction, would be protected and any potential impacts minimized.

1. In Potential Fossil Yield Classification (PFYC) Class I & II areas.
   The permittee shall immediately notify the BLM Authorized Officer of any paleontological resources discovered as a result of operations under this authorization. The permittee shall suspend all activities in the vicinity of such discovery until notified to proceed by the Authorized Officer and shall protect the discovery from damage or looting. The permittee may not be required to suspend all operations if activities can be adjusted to avoid further impacts to a discovered locality or be continued elsewhere. The Authorized Officer will evaluate, or will have evaluated, such discoveries as soon as possible, but not later than 10 working days after being notified. Appropriate measures to mitigate adverse effects to significant paleontological resources will be determined by the Authorized Officer after consulting with the operator. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (1) following the Authorized Officer's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (2) following the Authorized Officer's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

2. In PFYC Class III, IV, & V areas.
   A pre-surface disturbance paleontological field study must be conducted by a BLM permitted paleontologist. A written report of the findings by the paleontologist must be submitted to the BLM Authorized Officer with recommendations for mitigation or avoidance. Authorization for an activity to proceed cannot be given by a consulting paleontologist. Performance of the survey, either by a consulting paleontologist or BLM staff, or submission of the report DOES NOT constitute approval for the activity to proceed. The BLM must review the report, including adequacy of the field methods and findings. The Authorized Officer must approve the findings and determine the need for monitoring prior to approval to proceed. See IM-2009-011 and attachments for more information.

3. The proponent would be responsible for the cost of any mitigation required by the Authorized Officer. The Authorized Officer would 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 would be allowed to resume operations.

Residual effects to the paleontological resources could occur even if mitigation measures are applied. These effects would not rise to the level of significance.

4.1.2 No Action

Selecting the No Action Alternative would prevent any additional impacts to the surface and subsurface geology in the project area. The prevention would, however, create an economic impact by the loss of the use of the oil and gas resource, as well as the loss of the tax revenues to the governments and the wages to the oil field workers and sales of equipment and services to local businesses. Denial of the Proposed Action would not preclude new proposals for other oil and gas developments in the area.

4.2 AIR QUALITY

Standards for healthy public rangelands require management actions or use authorizations to comply with all federal and state air quality laws, rules, regulations, and standards. Impacts which exceed this standard could be considered significant.

Air pollutant emissions would occur during well development and well production, and these emissions would impact air quality in the project area. Pollutants emitted would include particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOC), sulfur dioxide (SO_2), and hazardous air pollutants (HAPs) including formaldehyde. Emissions would occur temporarily during well development, and over the LOP during well production operations.

The emission of these pollutants and their air quality impacts are limited by regulations, standards, and implementation plans established under Wyoming Air Quality Standards and Regulations (WAQSR). Under FLPMA and the Clean Air Act, the BLM cannot conduct or authorize any activity that does not conform to all applicable local, state, tribal, or federal air quality laws, statutes, regulations, standards, or implementation plans. As such, significant impacts to air quality from project-related activities would result if it is demonstrated that:

- National Ambient Air Quality Standards (NAAQS) or Wyoming Ambient Air Quality Standards (WAAQS) would be exceeded; or
- Class I or Class II PSD Increments would be exceeded; or
- Air Quality Related Values (AQRVs) would be impacted beyond acceptable levels.

All NEPA analysis comparisons to PSD Class I or Class II increments are intended to evaluate a threshold of concern, and do not represent a regulatory PSD increment consumption analysis. The determination of PSD increment consumption is an air quality regulatory agency responsibility. Such an analysis would be conducted to determine minor source increment consumption or, for major sources, as part of the New Source Review process. The New Source Review process would include an evaluation of potential impacts to AQRV such as visibility, aquatic ecosystems, flora, fauna, etc., performed under the direction of federal land managers.

4.2.1 Proposed Action Direct and Indirect Effects

Emission sources would occur as part of well development and well production. Well development emission sources include vehicle traffic, well pad and road construction, and well drilling and completion activity. These well development sources would temporarily elevate pollutant levels but impacts would be localized and would occur only for the duration of the activities. Fugitive dust emissions (PM_{10} and $PM_{2.5}$) and small quantities of vehicle exhaust emissions (NO_x, CO, VOC, PM_{10}, $PM_{2.5}$) would result from work crews commuting to and from the work site and from the transportation and operation of equipment to construct the wells pad, access road, and infrastructure. Fugitive dust emissions would also occur from construction of the well pads, access roads, and pipelines, and total surface disturbance of 9.7-acres per well.

Diesel-fired drilling engines would emit primarily NO_x, CO, SO_2, VOCs, PM_{10} and $PM_{2.5}$ as shown in Table 4-1, with emissions calculated based on manufacturer's emissions data, total engine size of 3,000 hp, an operating load factor of 0.42, and drilling duration of 45 days per well. The project is planning green completions. Any flaring required during well development would be temporary and performed in compliance with WAQSR.

Total construction emissions per well are shown in Table 4-2.

Table 4-1. Drilling Rig Emissions

Pollutant	Manufacturer Emission Factor (g/hp-hr)	Drilling Engine Emission Rate (tons/well)
NO_x	4.45	6.68
CO	0.10	0.15
SO_2	0.13	0.20
VOCs	0.04	0.06
PM_{10}	0.028	0.04
$PM_{2.5}$[1]	0.028	0.04

[1] $PM_{2.5}$ assumed equivalent to PM_{10} for drilling engines.

Table 4-2. Total Construction Emissions per Well Developed.

Activity	Tons/Well Developed					
	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$	VOCs
Well Pad Construction				0.11	0.03	
Access Road Construction				0.05	0.01	
Pipeline Construction				0.04	0.01	
Wind Erosion				0.51	0.20	
Well Pad/Access Road Construction Traffic				0.21	0.03	
Pipeline Construction Traffic				0.06	0.01	
Construction Heavy Equipment Tailpipe Emissions	0.19	0.23	<0.01	0.01	0.01	0.03
Drilling Traffic				0.30	0.05	
Drilling Haul Truck Tailpipe	0.03	0.03	<0.01			0.01
Drilling Engines	6.68	0.15	0.20	0.04	0.04	0.06

Activity	Tons/Well Developed					
	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$	VOCs
Frac Engines	0.71	0.41	0.02	0.02	0.02	0.05
Completion Traffic				0.12	0.02	
Completion Haul Truck Tailpipe	<0.01	0.01	<0.01			<0.01
Total Construction Emissions per Well Developed	**7.61**	**0.83**	**0.22**	**1.47**	**0.43**	**0.15**

During field production, vehicle traffic and well maintenance activities would result in emissions of fugitive dust and vehicle exhaust emissions. Vehicle traffic to and from each well in the Project Area during field production would average 18 vehicle trips per month. No diesel combustion equipment would be required at well sites during production because electricity is provided by solar panels. Each well site would be equipped with a TEG dehydrator, 3-phase separator, and tanks for storage of produced water, condensate, methanol, fluids, and glycol.

Well site production equipment is subject to WDEQ-AQD's O&G production facility BACT guidance. Due to the uncertainty of knowing whether or not these proposed sites would require controls under the BACT guidance, Table 4-3 shows emissions from a typical controlled well in the area compared with a typical uncontrolled well. The gas collection system is a closed system, and gas separated from produced water is returned to the gathering system. Gas releases would be limited to any pressure release required during a well workover, required every 10 years. Total production emissions per well per year are shown in Table 4-4, using the greater of the controlled/uncontrolled production facility emissions as a conservative estimate for each well.

Table 4-3. Typical Controlled vs. Uncontrolled Production Facility Emissions

Pollutant	Typical Controlled Emissions (tpy/well)	Typical Uncontrolled Emissions (tpy/well)
VOCs	6.87	8.33
n-Hexane	0.0005	0.005
Benzene	0.08	0.90
Toluene	0.23	2.68
Ethylbenzene	0.008	0.10
Xylenes	0.10	1.16
HAPs - Total	0.43	4.84
NO_x	0.29	0.22
CO	0.24	0.19
SO_2	0.00	0.00

Table 4-4. Total Production Emissions per Year per Well

Activity	Tons/Year/Well Developed						
	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$	VOCs	HAPs
Production Traffic				0.45	0.07		
Liquids Gathering Traffic				<0.01	<0.01		
Tanker Traffic Tailpipe	<0.01	<0.01	<0.01				
Wind Erosion				0.04	0.01		
Production Facility	0.29	0.24				8.33	4.84
Total Production Emissions per Well Developed	**0.29**	**0.24**	**<0.01**	**0.49**	**0.08**	**8.33**	**4.84**

Pollutant impacts were assessed from the phases of well construction or field production that produce the highest emissions. Drilling rig engines are the single largest source of NO_x and SO_2 emissions and during the well development phase. To pad estimate pollutant impacts from a typical drill rig operating in the project area, EPA's SCREEN3 model was run to estimate maximum near-field concentrations of NO_2, and SO_2 from the drill rig engines. Emissions and stack parameters for the drill rig were based on manufacturer's data and best engineering estimates. The maximum predicted annual near-field concentrations of NO_2 are below the WAAQS and NAAQS. Estimated short-term and annual average concentrations of SO_2 are below the applicable WAAQS and NAAQS. Frac engines operating during the well development phase are the largest source of CO emissions. SCREEN3 was used to estimate maximum CO concentrations for a typical frac setup. All predicted CO concentrations are in compliance with the applicable WAAQS and NAAQS. The largest source of particulate matter emissions for the project is construction of a typical well pad. Emissions for a typical well pad construction scenario were modeled using SCREEN3. Concentrations of PM_{10} as well as $PM_{2.5}$ are below all applicable WAAQS and NAAQS. Results of the modeling analysis compared with applicable ambient air quality standards are summarized in Table 4-5 below.

All the maximum emission scenarios analyzed occur during the construction phase of well development. Air pollutant concentration impacts from well development would be temporary and would occur in isolation, with no other sites in the area under concurrent development.

All project sources that would be subject to a PSD increment consumption analysis would have impacts below the applicable PSD Class II increments.

Air pollutant concentration impacts from well production sources would be small due to the limited site visit requirements, lack of need for power generation, no proposed compression, and limited number of other emissions sources at the Project Area. Production emissions include mainly VOCs and HAPS, originating mostly from the wellsite production equipment.

Table 4-5. Maximum Modeled Concentration Impacts from Puma Project Sources Compared to the WAAQS and NAAQS

Pollutant/Averaging Time	Direct Modeled Concentration (µg/m^3)	Background Concentration (µg/m^3)	Total Concentration (µg/m^3)	WAAQS/NAAQS (µg/m^3)
Nitrogen Dioxide (NO_2)				
Annual	20.6	6	26.6	100
Carbon Monoxide (CO)				
1-hour	387.7	1,863	2,251	40,000
8-hour	271.4	1,746	2,017	10,000
Sulfur Dioxide (SO_2)				
3-hour	9.2	19.0	28.2	1300
24-hour	4.1	16.0	20.1	260/365
Annual	0.8	3.0	3.8	60/80
PM_{10}				
24-hour	69.1	62.0	131.1	150
Annual	13.3	12.0	25.3	50
$PM_{2.5}$				
24-hour	18.2	13.0	31.2	35
Annual	3.5	6.0	9.5	15

Modeling was performed using the SCREEN3 model to estimate the maximum annual benzene impacts at a nearby residence (estimated at 1 km) that could occur from potential source emissions generated by the Proposed Action. Long-term exposures to emissions of benzene, a suspected carcinogen, were evaluated based on estimates of the increased latent cancer risk over a 70-year lifetime. This analysis presents the potential incremental risk from benzene and does not represent a total risk analysis. The cancer risks were calculated using the maximum predicted annual benzene concentration and EPA's chronic inhalation unit risk factors (URF) for carcinogenic constituents (EPA 2005). Estimated cancer risks were evaluated based on the Superfund National Oil and Hazardous Substances Pollution Contingency Plan (EPA 1990), where a cancer risk range of 1×10^{-6} to 1×10^{-4} is generally acceptable. Two estimates of cancer risk are presented: 1) a most likely exposure (MLE) scenario; and 2) a maximum exposed individual (MEI) scenario. The estimated cancer risks are adjusted to account for duration of exposure and time spent at home.

The adjustment for the MLE scenario is assumed to be nine years, which corresponds to the mean duration that a family remains at a residence (EPA 1993). This duration corresponds to an adjustment factor of 9/70 = 0.13. The duration of exposure for the MEI scenario is assumed to be 30 years (i.e., the life of the project), corresponding to an adjustment factor of 30/70 = 0.429. A second adjustment is made for time spent at home versus time spent elsewhere. For the MLE scenario, the at-home time fraction is 0.64 (EPA 1993) and it is assumed that during the rest of the day the individual would remain in an area where annual HAP concentrations would be one-quarter as large as the maximum annual average concentration. Therefore, the final MLE adjustment factor is (0.13) x [(0.64 x 1.0) + (0.36 x 0.25)] = 0.0939. The MEI scenario assumes that the individual is at home 100 percent of the time, for a final MEI adjustment factor of (0.429 x 1.0) = 0.429.

The cancer risk is computed by multiplying the maximum predicted annual concentration by the URF and by the overall exposure adjustment factor. The modeled long-term risk from benzene is shown in Table 4-6. Under both the MLE and MEI scenarios, the estimated cancer risk associated with long-term exposure to benzene is within the generally acceptable range.

Table 4-6. Long-term Modeled MLE and MEI Cancer Risk Analyses

Analysis[1]	Modeled Annual Benzene Concentration (µg/m^3)	Unit Risk Factor[2] 1/(µg/m^3)[3]	Exposure Adjustment Factor	Cancer Risk
MLE	1.104	7.8×10^{-6}	0.094	0.81×10^{-6}
MEI	1.104	7.8×10^{-6}	0.429	3.69×10^{-6}

[1] MLE=most likely exposure; MEI=maximally exposed individual.
[2] EPA Air Toxics Database, Table 1 (EPA, 2007b).
[3] Annual Average Concentration.

Potential maximum acute (short-term; 1-hour) HAP concentrations were compared with the acute Reference Exposure Levels (RELs) (EPA, 2007a). RELs are defined as concentrations at or below which no adverse health effects are expected. RELs are not available for ethylbenzene and n-hexane; instead, the available Immediately Dangerous to Life or Health divided by 10 (IDLH/10) values were used. The IDLH values are determined by the National Institute for Occupational Safety and Health (NIOSH) and were obtained from EPA's Air Toxics Database (EPA, 2007a). Results of this analysis can be found in Table 4-7.

Table 4-7. HAP Concentration Comparisons with Acute RELs

HAP	Modeled 1-hour Concentration (µg/m^3)	REL (µg/m^3)
Benzene	137.6	1,300[1]
Toluene	393.5	37,000[1]
Ethylbenzene	14.4	350,000[2]
Xylenes	176.8	22,000[1]
n-Hexane	0.8	390,000[2]

[1] EPA Air Toxics Database, Table 2 (EPA, 2007a).
[2] No REL available for these HAPs. Values shown are from Immediately Dangerous to life or Health (IDLH/10), EPA Air Toxics Database, Table 2 (EPA, 2007a).

Potential long-term (annual) HAP concentrations were compared to non-carcinogenic Reference Concentrations for Chronic Inhalation (RfCs) (EPA, 2007b). An RfC is defined by EPA as the daily inhalation concentration at which no long-term adverse health effects are expected. Results of this analysis can be found in Table 4-8.

Table 4-8. HAP Concentration Comparisons with Non-Carcinogenic RFCs

HAP	Modeled Annual Concentration	Non-Carcinogenic RfC[1]
	(µg/m^3)	(µg/m^3)
Benzene	1.1	30
Toluene	3.2	5,000
Ethylbenzene	0.1	1,000
Xylenes	1.4	100
n-Hexane	0.01	700

[1] EPA Air Toxics Database, Table 1 (EPA, 2007b).

4.2.1.1 Mitigation and Residual Effects

See Chapter 2 and Appendix D for committed practices to protect air quality.

The WDEQ-AQD requested the addition of the mitigation found below to assure appropriate state permits are acquired for any temporary or permanent equipment used in association with this project. With application of this measure, state requirements for permitting for emissions would be met.

- The proponent would seek appropriate permits and follow state protocol for approval of all on-site temporary or permanent equipment used in association with this project from the Wyoming Department of Environmental Quality, Air Quality Division.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as emissions would be generated and released into the environment.

4.2.2 No Action

Under the No Action Alternative the well sites and access roads would not be constructed, and no drilling would occur. As a result, no air emissions would be generated and no impacts to air quality would occur from this development. The area would be in compliance with all ambient air quality standards and PSD increments, and AQRVs would not be affected.

4.3 SOILS

The Wyoming Standards for healthy Rangelands (http://www.blm.gov/wy/st/en/programs/grazing/standards_and_guidelines/standards.html) require soils to be stable and allow for water infiltration to provide for optimal plant growth and minimal surface runoff. Impacts which exceed this standard could be considered significant.

4.3.1 Proposed Action Direct and Indirect Effects

Soil productivity would be impacted at and immediately downstream of locations where well sites, facilities, and access roads are constructed. An estimated maximum of 98 acres would be affected by new surface-disturbing activities. Stockpiled topsoil and other disturbed areas,

particularly on sandy soils, could be subject to wind erosion and runoff during storm events until stabilized by a vegetative cover. Precaution should be taken when working in the eolian sand deposits as destabilization and wind erosion could occur. Practices that Davis has committed to, as detailed in Chapter 2, and existing regulatory requirements would help conserve soil resources through best management practices for erosion control and revegetation in disturbed areas.

4.3.1.1 Mitigation and Residual Effects

See Chapter 2 and Appendix D for applicant committed practices. The implementation of these measures and other standard mitigation and lease requirements should avoid or reduce impacts to the soils in the project area and watershed.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as soils would be dislodged during construction and operations activities.

4.3.2 No Action

No effects on soils would be expected beyond the current situation.

4.4 WATER RESOURCES

The Wyoming Standards for Healthy Rangelands require actions to comply with Wyoming State water quality standards and to avoid conditions that would hinder the progress of riparian areas towards obtaining or maintaining a minimal state of Proper Functioning Condition[1]. Impacts which exceed this standard could be considered significant.

4.4.1 Proposed Action Direct and Indirect Effects

With the use of proper well pad construction techniques and drilling practices, and with the implementation of Best Management Practices (BMPs) and applicant committed practices, these standards would be met and no adverse effect on groundwater aquifers or surface water resource quality would be anticipated under the Proposed Action.

Groundwater would be removed from the Leo #1 to provide water for drilling and dust control. It is estimated that 3 to 4 acre-feet of fresh water would be needed per well drilled. This volume would be reduced by recycling drilling fluids between wells to the extent possible. Produced water would be from the producing formations (Frontier/Muddy). Water produced from ~13,000

[1] **Proper Functioning Condition** - Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation.

feet is not considered an impact to surface water or a depletion risk for the Colorado River. There would be no impacts to existing water wells.

Surface water resources would be protected through the implementation of Best Management Practices and regulatory requirements. Produced water volumes are very low, Davis would implement BMPs and committed practices including SPCC planning to ensure spills of produced water and hydrocarbon do not occur; therefore, no impact from spills is anticipated. Construction activities would occur over a five-year period. Construction impacts would likely be relatively constant with at least two wells being drilled and two wells being reclaimed each year until all fifteen have been completed or plugged. The level of disturbance would decrease in time due to the stabilization, reclamation, and revegetation efforts that would occur on two- thirds of the anticipated disturbance. The Proposed Action would result in 98 acres of initial disturbance and 36 acres of life-of-project disturbance. Construction disturbance would not be uniformly distributed across the project area, but rather, construction activities would be concentrated within and around the wells. Storm water best management practices would be applied as required in the project Storm Water Prevention Plan. Surface waters would be protected further by the application of BLM setbacks for riparian areas and ephemeral drainages. As a result of these activities, surface runoff impacts are not anticipated.

4.4.1.1 Mitigation and Residual Effects

See Chapter 2 and Appendix D for committed practices. Additional mitigation for ground water resources has been identified. The implementation of these measures and other standard mitigation and lease requirements should avoid or reduce impacts to the water resources of the project area. Residual effects would not occur if mitigation measures were implemented as discussed above.

4.4.2 No Action

No additional effects on water resources would be expected to occur beyond the current situation.

4.5 VEGETATION, SPECIAL STATUS PLANT SPECIES, WETLANDS, NOXIOUS WEEDS

Standards for healthy public rangelands require upland vegetation to consist of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance. Impacts which exceed this standard could be considered significant.

4.5.1 Proposed Action Direct and Indirect Effects

Implementation of the project would result in the loss of natural vegetation in terms of cover and species composition in areas where well sites, facilities, and access roads would be constructed. An estimated 98 acres would be affected by initial surface-disturbing activities during drilling and testing. To avoid permanent loss of species diversity and vegetative cover, topsoil would be stockpiled, and reclaimed areas would be seeded with site-specific mixes during appropriate

planting periods, according to the committed practices detailed in Chapter 2. Life-of-project disturbance would be approximately 36 acres.

Indirect effects would include increased potential for weed invasion, exposure of soils to accelerated erosion, loss of habitats, and changes in visual aesthetics. Use of committed practices described in Chapter 2 during construction, operation, and reclamation activities would minimize effects on vegetation resources. Weed monitoring would occur during drilling, production, and reclamation activities. Weeds found would be eradicated following county control and BLM-approved procedures. To further reduce potential impacts from invasive species, equipment should be washed prior to entering the project area. Properly reclaimed areas free of weed species would not cause loss of habitat or change visual aesthetics.

The Wyoming big sagebrush, greasewood, and saltbush cover types that would be disturbed under the project are commonly found across southwest Wyoming. The short-term or long-term loss in acreage described above would not impact the overall abundance and quality of these habitats.

In general, the duration of effects on vegetation in the project area would depend on the time required for natural succession to return disturbed areas to pre-disturbance conditions of diversity (species diversity and structural diversity). Reestablishment of pre-disturbance conditions would be influenced by climatic (growing season, temperature, and precipitation patterns) and edaphic (physical, chemical, and biological soil conditions) factors. This would include the amount and quality of topsoil salvaged, stockpiled, and spread over disturbed areas. If reseeding cannot be completed in the fall, seeding should take place in the early spring. Application of this measure would help assure proper revegetation.

BLM has made a no-effect determination for federally listed threatened or endangered plant species as their habitat is not known to occur in the project area. Through the application of the BLM stipulations to avoid riparian areas by 500 feet, wetlands are not expected to be impacted; no affect to Ute Ladies'-Tresses would be anticipated, if they were to exist in the area.

4.5.1.1 Mitigation and Residual Effects

See committed practices in Chapter 2 and Appendix D.

- All equipment would be washed prior to entering the project area in order to prevent or minimize the spread of invasive species.
- If seeding in the fall cannot be accomplished, seeding would be done in the early spring prior to April 15.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as vegetation would be disturbed during construction and operations activities resulting in the opportunity for the introduction of invasive species.

4.5.2 No Action

Under the No Action Alternative, the development of the Proposed Action would not occur. No additional effects on vegetation resources or wetlands would be expected to occur beyond the current situation.

4.6 RANGE RESOURCES AND OTHER LAND USES

Standards for healthy public rangelands require upland vegetation to consist of plant communities appropriate to the site which are resilient, diverse, and able to recover from natural and human disturbance. Impacts which exceed this standard could be considered significant.

4.6.1 Proposed Action Direct and Indirect Effects

Anticipated effects on range resources associated with the project are limited to a minimal loss of forage, an increased potential for vehicle/livestock collisions, and an increased potential for the spread of noxious and invasive weeds (discussed above under Vegetation/Wetlands/Noxious Weeds). The project would not be likely to result in noticeable effects on range resources. The area of disturbance (98 acres) represents approximately 4 to 11 AUMs.

Livestock grazing activities would continue during the implementation of the project. Forage in the project area would be reduced slightly during drilling and field development and restored as soon as practical thereafter, except for areas used for road corridors and well facilities, which would remain disturbed throughout the productive life of the project. The increased traffic associated with project activity could correspondingly increase the potential for vehicle/livestock accidents during that period; however, roadways are limited and the grazing area expansive, resulting in decreased likelihood of collisions.

No impacts to other land uses are anticipated as the overall area can easily accommodate ongoing land use activity. As long as Davis restricts operations to their right-of-way, no impact to existing pipelines is expected although holders of existing rights-of-way should be notified when activity is planned within or adjacent to the existing facilities, in accordance with One Call Of Wyoming requirements. Davis would continue to use certain roads having rights-of-way held by themselves and other operators. Davis would continue to be responsible for preventive and corrective maintenance of roads in the project area.

4.6.1.1 Mitigation and Residual Effects

- The proponent should be required to notify holders of existing rights-of-way or other permits (i.e., grazing) of planned construction, operations, or maintenance activities.
- For the purpose of determining joint maintenance responsibilities, the proponent would make road use plans known to all other authorized users of the road. Any road rights-of-way would include a standard stipulation for joint road maintenance agreement.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as forage would be reduced in construction and operations areas.

4.6.2 No Action

Under the No Action, the development of the Proposed Action would not occur. No additional effects on range resources would be expected to occur beyond the current situation.

4.7 WILDLIFE/SPECIAL STATUS SPECIES

Standards for healthy public rangelands require that such lands are capable of sustaining viable populations and a diversity of native animal species appropriate to that habitat. Those habitats that support threatened, endangered species, species of special concern, or sensitive species would be maintained or enhanced. Impacts which exceed this standard could be considered significant.

4.7.1 Proposed Action Direct and Indirect Effects

The effects on wildlife of the proposed project would include displacement of wildlife, loss or temporary disturbance of wildlife habitats, an increase in the potential for collisions between wildlife and motor vehicles, and an increase in the potential for illegal kill, harassment and disturbance of wildlife due to increased human presence and improved vehicle access. The magnitude of impacts to wildlife resources would depend on a number of factors including the type and duration of disturbance, the species of wildlife present, time of year, and successful implementation of avoidance and mitigation practices. An estimated 98 acres would be affected by new surface-disturbing project activities under the Proposed Action which would potentially affect wildlife. Reclamation following project activities is expected to return most habitats to pre-disturbance conditions over the long term.

During construction, it is expected that some resident species will avoid active project areas. Disturbances from human activity and traffic would reduce wildlife use of habitats immediately adjacent to these areas by species sensitive to indirect human disturbance (noise and visual disturbance). Wildlife use of these areas would be lowest during the construction phase when human activities are more extensive and localized. Disturbance would decline during the production phase of operations and some animals may become acclimated to equipment, facilities, and infrequent human presence, and may reoccupy habitats near disturbed areas.

The direct disturbance of wildlife habitat in the project area likely would reduce habitat availability and effectiveness for a variety of small mammals, birds, reptiles, amphibians, and their predators. An increase in mortality from increased vehicle use of roads in the project area would also be expected.

Due to the relatively high reproduction potential of some of these species and the relatively small amount of habitat disturbed, small mammal and songbird populations should quickly rebound to pre-disturbance levels following reclamation of utility corridors, unused portions of roads, well pads, and wells that prove to be unproductive. No long-term effects on populations of common small mammals and songbirds are expected. Amphibians are not expected to be impacted due to a lack of activity that would occur to riparian/wetland areas from the proposed project. The lack of mobility of reptiles is anticipated to reduce the interaction between the project activities and these species.

4.7.1.1 Big Game

Effects on big game species would include direct loss of habitat and forage, and increased disturbance from activities associated with the project. Disturbance of big game species during the parturition period and on winter range can increase stress and may influence species distribution and productivity (Hayden-Wing 1980, Morgantini and Hudson 1980). No crucial big game winter range or parturition areas have been identified in the project area.

There is some potential for an increase in poaching and harassment of big game, particularly during winter. Big game would be expected to demonstrate some avoidance of the area for the life of the project due to an increase in human presence, although some individuals may habituate to the human activity.

Effects on big game are expected to be minimal, as the project area represents less than one percent of pronghorn antelope (migration would not be impeded since no fencing is proposed other than around the reserve pits which is designed to keep animals out), mule deer, elk or moose winter or year-long range. Any snow removal could impede big game movement if berms were too high or if there were no breaks in the berms. Application of the mitigative measure found below should prevent this potential impact. No long-term habitat loss is expected once reclamation is complete, as big game species are expected to return to the area.

4.7.1.1.1 Mitigation and Residual Effects

See committed practices found in Chapter 2 and Appendix D.

- Any snow removal would be done in a manner that would not preclude movement by big game (i.e., no tall berms or regularly spaced breaks in the berms).
- Access to the project area during winter shall avoid crossing through big game winter range unless rights-of way are acquired and speed limits are posted.
- Well locations may be fenced to protect reclamation from overgrazing and bedding by livestock.
- Reserve pits and other facilities posing a potential for big game mortality or injury will be fenced.
- All field employees and contractors will undergo training regarding wildlife sensitivity and regulations similar to the Pinedale Working with Wildlife program.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as displacement is expected and accidental mortalities may occur.

4.7.1.2 Upland Game Birds

Effects to greater sage-grouse could include direct loss of habitat and forage, and increased disturbance from project related activities. Disturbance of sage-grouse during the nesting and brood rearing period and on winter concentration areas can increase stress and may influence species distribution. There may also be a potential for increased poaching and harassment or increased predation from raptors using facilities for perching. Greater sage-grouse would be expected to demonstrate avoidance of the area for the life of the project depending upon the level

of human activity and where it occurs in relation to suitable habitat. Noise and human disturbance in the project may lead to lek abandonment and reduced nesting.

Two leks identified in the WGFD sage-grouse database are located within five miles of the project area; Cattail lek is 0.5 miles to the northeast and Upper Dry Wash 2 is located four miles to the west. Within five miles of the project, only one historic lek was found to be active in 2008. The Dry Creek #4 lek is located four miles south of the Project. An un-named BLM identified lek, not carried in the WGFD database, is located in the NWNW Sec 3 T14N R112W; this lek is in the southwest corner of project area and approximately 1.0 miles southwest of the nearest proposed well site (Puma Deep Unit No. 35NW). The nearest proposed well to the Cattail lek is approximately two miles to the southwest, the Puma Deep Unit No. 13SW.

The Puma Deep project area exhibits habitat characteristics which are not considered high quality sage-grouse habitats. The area is predominantly characterized by sand dunes, badlands, and salt desert shrubs. This is further illustrated by the scattering of leks and their associated nesting habitat well outside the project area. Some areas of suitable sage-grouse nesting, brood rearing and late brood rearing habitat occur within the project area. The amount of habitat disturbance anticipated from the proposed project should be minimal in proportion to that which is suitable. Sage-grouse can be impacted by other activities associated with natural gas development, including increased human activity, increased traffic, and predation by birds of prey.

The Governor's Sage-grouse Core Area concept provides high levels of seasonal habitat protection to leks within the identified Core Areas and increased mitigation flexibility relative to non-Core Area leks and associated seasonal habitats. The Puma Deep project area falls to the south of the nearest identified Core Area as indicated on Map 3-12.

4.7.1.2.1 Mitigation and Residual Effects

The project would be conducted with adherence to committed practices as detailed in Chapter 2 and Appendix D.

Application of the mitigation measures found below would further reduce potential impacts.

- The GRRMP contains mitigating practices that protect the breeding, nesting and brood rearing activities of the greater sage-grouse from February 1 to July 31. "No surface occupancy" stipulations apply within a 1/4 mile buffer around active leks.
- The leases specific to this project refer to the Kemmerer Resource Area RMP stipulations for sage-grouse habitats proximal to that BLM management area. The KRA RMP (BLM 1986) provides lek and nesting/early brood rearing habitat protection from February 1 to July 31, annually.
- Road use would be limited within 1/4 mile of an active lek between 6:00 pm and 9:00 am February 1 through May 15.
- Construction of structures that could be used for raptor perches would be avoided or mitigated to prevent raptor perching. Exceptions may be granted if the activity would occur in unsuitable sage-grouse nesting habitat.
- Reserve pits shall be fenced to prevent sage-grouse entry and potential mortality.

- Avoid impacting suitable nesting sagebrush habitats within three miles of the Cattail and newly identified leks.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as displacement is expected and accidental mortalities may occur.

4.7.1.3 Raptors

The principal potential effects of implementing the proposal on raptor species would be nest abandonment and/or reproductive failure caused by project-related activities and increased public access, and small, temporary reductions in prey populations for raptors. Five active raptor nests were located within the project area and another five within one mile. Seven of these are golden eagle nests, two ferruginous hawk (*Buteo regalis*) and one each kestrel (*Falco sparverius*), Prairie Falcon (*Falco mexicanus*). Four historic or inactive nests were also located during the 2008 project wildlife surveys. Some of these nests are adjacent to existing roads and trails, while others are in remote valleys and badlands. Some nest abandonment may occur as a result of access road construction, pipeline construction, well location activities and increased human presence. No effects on other breeding raptors are expected, provided avoidance and mitigation measures are followed.

There is a reasonable potential that burrowing owls may inhabit suitable prairie dog, ground squirrel or badger burrows within the project area, although no burrowing owls were identified during the 2008 surveys. Burrowing owls and their habitat may be adversely impacted through access to prairie dog colonies and subsequent sport shooting. Some habitat loss would occur if roadways, pipelines or wells are situated to cross or be placed within prairie dog colonies. Project plans include avoidance of white tailed-prairie dog towns which would provide protection for these owls.

Bald Eagle
Since neither habitat, nor potential habitat exists within two miles of the project, the Proposed Action would have no effect on bald eagles. No mitigation is required. No cumulative effects are expected with the implementation of committed practices and mitigations.

4.7.1.3.1 Mitigation and Residual Effects

The project would be conducted with adherence to committed practices as detailed in Chapter 2 and Appendix D.

- To protect active raptor nests, activities or surface use will not be allowed within 0.5 miles of the nest from February 1 to July 31, annually; except for Ferruginous hawks for which the avoidance boundary will be 1.0 miles.
- No above ground structures or roads are allowed to be constructed within 825 feet of any raptor nest.
- Produced water facilities will be netted or otherwise protected to prevent incidental mortality to kestrels.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as displacement is expected and accidental mortalities may occur.

4.7.1.4 Threatened and Endangered Species

Black-footed Ferret and Associated White-tailed Prairie Dog Colonies
White-tailed prairie dog colonies provide essential habitat for black-footed ferrets. Ferrets depend almost exclusively on prairie dogs for food, and they depend upon prairie dog burrows for shelter, parturition, and raising young (Hillman and Clark 1980). Prairie dog towns or complexes must be greater than 200 acres and have a burrow density greater than or equal to 8 burrows/acres in order to be considered suitable for black-footed ferrets (Biggins, et al. 1989). Suitable habitat is found in the general area; however, the BLM has made a no effect determination for this action and the FWS concurred.

Prairie dogs could be subject to predation by raptors if facilities are used for perching. Anti-perching devices would mitigate this potential impact. Placing pipelines adjacent to access roads would reduce the disturbance to white-tailed prairie dog towns as does laying a surface water line from the Leo #1 to above ground tankage during the drilling season. Road maintenance could result in disturbance to prairie dog towns if it were to occur outside of previously disturbed areas. Keeping disturbance within the permit boundary would protect the identified white-tailed prairie dog towns. White-tailed prairie dogs towns are also indicative of potential habitat for numerous other species including mountain plover and burrowing owl. Any mitigation applied to white-tailed prairie dog towns benefits numerous others. Pipeline corridors near existing towns have been known to encourage the spread of the species by creating available habitat. Most identified white-tailed prairie dog habitat is located outside of the project area to the northeast. Traffic in this area is confined to existing BLM and two-track roads with additional protection being provided by the laying of surface water line from the Leo #1 water well to the portable holding tanks adjacent to the main project road. Other areas with identified white-tailed prairie dog activity are located near existing wells (Puma Deep Unit No. 4 and Puma Deep Unit No. 35NE). Activity associated with these wells is limited to the well pad disturbance area, access road and adjacent pipeline corridor.

Bald Eagle
Since neither habitat, nor potential habitat exists within two miles of the project, the Proposed Action would have no effect on bald eagles. No mitigation is required.

4.7.1.4.1 Mitigation and Residual Effects

The project would be conducted with adherence to committed practices as detailed in Chapter 2 and Appendix D.

Adoption of the following measures would further reduce potential impacts.

- Well sites will be located to avoid active white-tailed prairie dog towns, as feasible.
- Pipelines should follow roads or travel ways to avoid disturbance to existing prairie dog towns.
- Construction of structures that could be used for raptor perches should be avoided or mitigated to prevent raptor perching.

- If WTPD colonies cannot be avoided, BFF surveys will be conducted prior to construction activities occurring.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as accidental mortalities may occur.

4.7.1.5 BLM Sensitive Species

Direct and indirect effects on BLM sensitive species could occur due to impact with vehicles, loss of habitat or displacement due to project activities. Due to the relatively small size of the project area, the limited development, spacing (4 wells per section), the inherent mobility of these species and the abundance of potentially suitable habitats nearby, there should be no noticeable adverse effects from the proposed development. Project activities would be conducted in accordance with committed measures outlined in this document.

4.7.1.5.1 Mitigation and Residual Effects

The project would be conducted with adherence to committed practices as detailed in Chapter 2 and Appendix D for mitigation for protection of the greater sage-grouse, raptors and white-tailed prairie dog towns.

Adoption of the following measures would further reduce potential impacts.

- Restricting the well access roads to those currently proposed should avoid known white-tailed prairie dogs colonies and the species that can be found there.
- Constrain road maintenance activities to the approved ROWs to avoid impacting existing white-tailed prairie dog colonies.
- Davis would adopt a policy restricting firearms and dogs at work locations.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as displacement is expected and accidental mortalities may occur.

4.7.1.6 Migratory Birds

Migratory bird species nesting in the area may suffer habitat loss through shrub removal or could collide with vehicle traffic. The proposed activity may benefit some species of birds which feed on weed seeds (i.e., Horned Larks). Seasonal restrictions stipulated for raptor protection should minimize adverse impacts to those species while stipulations related to white-tailed prairie dog colonies should provide protection for mountain plover. These stipulations constraining construction and those applicable to sage-grouse should also benefit migratory bird species which use the project area.

4.7.1.6.1 Mitigation and Residual Effects

To further prevent impacts to migratory birds, the following measure could be adopted.

- All tankage will be closed topped or netted to preclude entry by migratory birds. Any netting would have a weave sufficiently small enough to prevent small migratory birds from tanks. Bird caps will be applied to equipment stacks.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as displacement is expected and accidental mortalities may occur.

4.7.2 No Action

Under the No Action Alternative, the development of additional wells in the Puma Deep field would not occur. No additional effects on wildlife resources would be expected to occur beyond the current situation.

4.8 RECREATION

Any impact that would eliminate recreational opportunities in the project area could be considered significant.

4.8.1 Proposed Action Direct and Indirect Effects

Due to the abundance of nearby similar recreational opportunities for hunting, camping, and off highway vehicle use, no noticeable effects on recreational experiences are expected under the project. Impact to the recreation use of the project area would involve a temporary displacement of some hunters, particularly if construction and drilling activities were to occur during hunting season.

Some hunters perceive these activities as displacing game species and creating an environment that detracts from the hunting experience. The proposed drilling schedule could limit displacement to five hunting seasons. Hunters could easily relocate to other areas outside the project area.

Undisturbed landscapes, isolation, and solitude are often important to recreationists. Project-related disturbances that adversely impact the characteristic landscape could also contribute to a decline in the recreation experience for these users. The recreation experience for those continuing to use the area could be less satisfying than use under the pre-disturbance conditions described in Chapter 3.

The effects described above would diminish substantially once drilling and construction are completed. However, they would persist at reduced levels. Overall effects on the recreation resource would be minimal due to the short-term nature of drilling and construction activities, and low density operations.

4.8.1.1 Mitigation and Residual Effects

No mitigation is identified beyond those measures identified in Appendix D. Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as displacement of recreationalists may occur.

4.8.2 No Action

Under the No Action Alternative, the development of additional wells in the Puma Deep field would not occur. No additional effects on recreation resources would be expected to occur beyond the current situation.

4.9 VISUAL RESOURCES

Impacts would not result in a change to the existing visual classification (Class IV) which allows changes or modification in the basic elements (form, line, color, or texture) caused by a management activity; these may be evident and somewhat dominant on the landscape.

4.9.1 Proposed Action Direct and Indirect Effects

As noted in Chapter 3, Affected Environment, the project area is not pristine. Developed roads and two-track roads exist throughout the area, and are used by ranchers, recreationists and mineral developers. No effects on the existing visual resource management class (Class IV) are expected under the Proposed Action.

Short-term impacts to the visual resource associated with construction and drilling in the project area would include contrasts in line, form, color, and texture associated with drilling rigs, construction equipment, service trailers, and the general industrial character of drilling and testing activities.

Additional impacts could occur from fugitive dust produced by construction activities. Thus, impacts to the Class IV viewshed would occur and considered necessary and due. Use of low contrast, non-reflective paint and natural colors on structures would reduce the visual impacts to the extent possible and be in accordance with the GRRMP management actions for the project area. BLM approved colors would be used on any temporary (i.e., tanks) or permanent structures (i.e., wellhead covers) in accordance with the GRRMP.

Additional fixed facilities such as access roads (improved and unimproved roads and overland routes) would be required to service production facilities. Roads would create additional contrasts in line, color and texture to those described above. Even with appropriate mitigation, the level of contrast could diminish the experience of some motorists and recreationists in the immediate area.

4.9.1.1 Mitigation and Residual Effects

No additional mitigation is identified beyond those measures identified in Appendix D. Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as the features associated with construction, drilling and production activities will be visible.

4.9.2 No Action

Under the No Action Alternative, the development of the Proposed Action would not occur. No additional effects on recreation resources would be expected to occur beyond the current situation.

4.10 CULTURAL RESOURCES

If actions were to adversely affect a National Register eligible property and could not be mitigated, resulting in an adverse effect determination, the impact could be considered significant.

4.10.1 Proposed Action Direct and Indirect Effects

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may occur by:

- Physically altering, damaging, or destroying all or part of a resource.
- Altering characteristics of the surrounding environment that contribute to the resource's significance.
- Introducing visual or audible elements that are out of character with the property or alter its setting.
- Neglecting the resource to the extent that it deteriorates or is destroyed.

Direct impacts can be assessed by identifying the types and locations of proposed activities and determining the exact location of cultural resources that could be affected. Indirect impacts could result from the effects of project-induced changes to land use patterns. For example, the creation of new roads increases public access to the area which could result in possible illegal collection of cultural resources.

4.10.1.1 Mitigation and Residual Effects

Application of the mitigation measures identified below would minimize potential impacts to cultural resources.

- Individual cultural clearances would be approved prior to approving well APDs.
- Selected surface or vegetative disturbing activities associated with individual actions should be monitored by a professional archaeologist.
- If at any time during construction, maintenance, or use of the project area, previously unanticipated or unknown cultural resources are discovered, all activities would be suspended in the area of discovery. Continued operation would be conducted in such

a fashion as to permit no further damage to the discovered cultural resource. Protective measures would be implemented in consultation with BLM and the Wyoming State Historic Preservation Office. Work would not resume in the area of discovery until a written Notice to Proceed is issued by BLM authorized officer.

- Mitigation of effects to cultural resources would be determined through consultation between the BLM and the Wyoming State Historic Preservation Officer and affected Tribes as appropriate. Protective measures may be required to preserve significant cultural resources outside the direct impact zones as well.

Residual effects to the cultural resources could occur even if mitigation measures are applied. These effects would not rise to the level of significance.

4.10.2 No Action

Under the no Action Alternative, the development of the Proposed Action would not occur. There are no direct or indirect impacts to cultural resources from this alternative.

4.11 SOCIOECONOMICS

Impacts that result in a major increase to the population base of Sweetwater or Uinta Counties or major increases in needed social services could be considered significant.

4.11.1 Proposed Action Direct and Indirect Effects

The project could enhance local and regional economic conditions and could result in the generation of local, state, and federal government tax and royalty revenues should production prove successful and ensue. Tax revenues to Sweetwater County would increase with the development of natural gas production and the increase in the local tax base. Benefits would accrue to the state and federal governments from the sale of natural gas.

The relatively small, short-term drilling and testing operations workforce would not generate noticeable population effects or demand for temporary housing or local government services. Should a work camp be required, it would be authorized as separate action since exact location is unknown at this time.

The proposal to further develop the Puma deep field would involve capital investment. Development and operation of the project would require goods and services from a variety of local and regional contractors and vendors, from the oil and gas service industry and from other industries. Expenditures by the proponent for these goods and services, coupled with employee and contractor spending, would generate economic effects for Sweetwater and Uinta Counties, and for Wyoming in the form of taxes collected.

It is reasonable to assume that the direct and indirect economic benefits of the project would be positive.

4.11.1.1 Mitigation and Residual Effects

See Chapter 2 and Appendix D for committed practices.

- Any work camps would be authorized separately.

Residual effects to the socioeconomic condition of the area could occur even if mitigation measures are applied. These effects would not rise to the level of significance.

4.11.2 No Action

Under the No Action Alternative the Proposed Action would be denied and no additional project related natural gas 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. No additional socioeconomic effects would be expected to occur beyond the current situation.

4.12 TRANSPORTATION

Impacts that result in major changes to traffic patterns on highways or county roads or cause severe damage to permitted roads or adjacent resources could be considered significant.

4.12.1 Proposed Action Direct and Indirect Effects

The project would generate increases in traffic volumes on highways and county and management roads providing access to and within the project area. These increases would result from the movement of project-related workers, equipment and materials to and from the project area to perform drilling, field development, well service, field operations, and reclamation activities.

Table 2-3 shows the estimated average number of trips associated with various well field activities. According to information provided by Davis, drill rigs, water trucks, and other items of heavy equipment would be transported to the project area and remain within the project area until drilling is completed annually, with an estimated 5 wells drilled per year. Drilling and completion crews and other personnel would commute to the area daily for shift changes and as needed to complete specific activities. Based on these plans and the estimates contained in the table, the project would generate between 5 and 10 round trips per day during drilling and completion operations. After the drilling and completion activities are completed and production ensues, Proposed Action-related traffic would average three trips per week, with slightly higher peak periods when maintenance activities are performed on wells.

Given the relatively small increment of traffic and the relatively short duration of the drilling and completion phase, it is unlikely that the project would result in a measurable increase in accident rates on highways or county roads.

To avoid resource damage and inability to access the field when necessary, project roads will be constructed to the appropriate BLM Gold Book standard (see Appendix A, Mater Drilling Plan).

4.12.1.1 Mitigation and Residual Effects

Implementation of applicant committed mitigation found in Chapter 2 should be adequate to avoid resource impacts. Residual effects to the flow of traffic and the transportation system in the area could occur even if mitigation measures are applied. These effects would not rise to the level of significance.

4.12.2 No Action

Under the No Action Alternative, the development of the Proposed Action would not occur. No additional transportation effects would be expected to occur beyond the current situation.

4.13 HEALTH AND SAFETY

Impacts due to intentional violation of standards or regulations pertaining to worker safety could be considered significant.

4.13.1 Proposed Action Direct and Indirect Effects

Health and safety impacts of the project would include a relatively low risk to project workers from industrial accidents, and natural disasters. There would be a slight increase in risk of traffic accidents during drilling and field development operations as well as occupational risks inherent to the oil and gas drilling industry.

Occupational Hazards
Health and safety concerns associated with the Proposed Action are similar to those described in Chapter 3. Implementation of the Proposed Action would likely result in an increased risk to the work force due to the increased number of personnel in the field, the increase in heavy equipment and drilling operations and the resultant increase in vehicle traffic. Compliance with the State of Wyoming Department of Employment Workers Occupational Health and Safety program rules and regulations for construction and oil and gas well drilling, well servicing and well special servicing operations will aid in reducing project related occupational hazards. In addition, the BLM considers safety issues during the APD review process (Operating Order #1) and reminds the operator of their occupational health and safety responsibilities in 43 CFR Ch. II, 3162.5-3. Compliance with the OSHA standards works to reduce the opportunity for occupational injuries.

Compliance with WOGCC underground power certification regulations reduced the opportunity for faulty electrical installations on well sites. In addition, the extremely rural nature of the area and land ownership patterns do not encourage or support residential development, this further reduces the opportunity for the public to be affected by underground electrical hazards.

Other Risks and Hazards
The risks to public health and safety are not expected to increase under the Proposed Action.

Highway safety impacts are discussed under Transportation section. Sanitation impacts would be avoided or reduced by the implementation of the mitigation measures outlined in Chapter 2.

4.13.1.1 Mitigation and Residual Effects

See mitigation sections for Soils and Water Resources for suggested mitigation for special purpose roads. No additional mitigation is identified beyond those measures found in Appendix D. Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as construction, drilling and production activities would take place.

4.13.2 No Action

Under the No Action Alternative, the development of the Proposed Action would not occur. No additional effects on public health or safety would be expected to occur beyond the current situation.

4.14 HAZARDOUS MATERIALS

Intentional violation of any Federal or State regulation pertaining to the use, storage, transportation or disposal could be considered significant.

4.14.1 Proposed Action Direct and Indirect Effects

Drilling, field development, and production activities require use of a variety of chemicals and other materials, some of which would be classified as hazardous. Davis and its contractors would handle materials used for drilling, completion and production operations as described in Chapter 2, Appendix B and Appendix D. Thus, any impacts would be expected to be minor, especially if proper handling and use of such materials on the well site occurs as required in the various applicable regulations. Placement of well locations away from drainages, proper cementing operations, properly designed reserve pits and on-site storage areas would keep any accidental spills or leaks localized. Prompt clean up would prevent further contamination of soils, surface or ground water. Project operations would comply with all relevant federal and state laws regarding hazardous wastes or materials and with directives identified in the SPCC plan.

A Hazardous Materials disclosure is provided as Appendix B. This list of materials was developed pursuant to BLM Instruction Memoranda Numbers WO-93-344 and WY-94-059, which require that all NEPA documents list and describe any hazardous or extremely hazardous materials that would be produced, used, stored, transported, or disposed of as a result of a proposed project.

Potential impacts associated with hazardous materials include human contact, inhalation or ingestion, and the effects of exposure, spills, or accidental fires on soils, surface water, groundwater resources, and wildlife. The risk of human contact would be limited predominately to Puma Deep operator and contractor employees.

4.14.1.1 Mitigation and Residual Effects

- A Hazard Communication Program, SPCC Plans, and other mitigation measures described in Chapter 2 would reduce the risk of human contact, spills and accidental fires, and provide protocols and employee training to deal with these events should they occur.

Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as the activities associated with construction, drilling and production activities would occur.

4.14.2 No Action

Under the No Action Alternative, potential for spills or leaks would not change from the existing condition as additional drilling activity would be denied. However, selection of this alternative would not prevent future drilling proposals or the potential for spills or leaks from other activities (e.g., recreational vehicle use, on-going oil and gas activities).

4.15 NOISE

Significance criteria for project related noise includes long-term activities that would exceed federal 55 dBA maximum standard for noise at either human- or animal- sensitive locations. No threshold for noise has been identified by the State of Wyoming.

4.15.1 Proposed Action Direct and Indirect Effects

Noise associated with construction and natural gas production operations can create a disturbance that affects human safety (at extreme levels) or comfort as well as modify animal behavior.

Determining activities that exceed the maximum standards is not a simple issue since perception of sound varies with intensity and pitch of the source, air density, humidity, wind direction, screening / focusing by topography or vegetation, and distance to the observer. Frequent strong winds will add to ambient noise levels. The EPA guideline of 55 dBA is extremely conservative and represents a level at which an activity will have no effect on receptors in the environment; the sounds will not be noticeable to the human ear.

The direct impact of the Proposed Action is the drilling, completion and production of an additional 10 wells. Davis anticipates drilling up to 5 wells per year with one rig running at any one time for the next 5 years. In addition to drilling and completing the wells, the associated infrastructure will be constructed including access roads and gas pipelines, as well as the reclamation of disturbed areas.

Construction and drilling operations would take place at each well site resulting in an increase in noise when compared to the natural background condition of 30 to 50 dBA. Construction, drilling and completion activities related to the drilling of conventional wells may last from 30 to

60 days. Equipment and operational noise is generated during these activities from a variety of sources including engines, equipment impact and well flaring.

It has been determined that drilling and flaring operations produce the loudest project related noise. At Jonah (BLM 2006) noise from drilling operations was measured as 77.5 dBA on-site and 50.1 dBA at 0.25 miles. Based on this information, drilling operations should not exceed the significance threshold for impacting sage-grouse leks, a sensitive receptor, as long as the 0.25 mile lek protection buffer is observed. Flaring operations at Jonah were measured at 97.9 dBA on-site and 66.3 dBA at 0.25 miles. The use of flowback separators decreased flaring noise to 63.7 dBA on-site. As a result of this information, it appears that flaring operations may exceed the significance criteria on an occasional basis; due to the differences between the Jonah and Puma Deep gas resources, monitoring should be conducted to determine site specific impacts.

During the production phase of field operations, noise sources are generally less intense or of very short duration. These activities include occasional well workovers, routine site visitation by company personnel ("pumpers" and technicians) and road maintenance equipment. Holloran (2005) suggests that heavily traveled main haul roads located within 3 miles of greater sage-grouse leks may negatively impact male lek attendance. While Holloran (2005) does not provide information regarding the vehicle type, anecdotal information (Holloran pers. com. 2003) pointed to the steady stream of big diesel semi-rigs, such as water and fuel tankers, completion equipment haul trucks, and drilling equipment, as the traffic generating the noise and resultant disturbance impacts to sage-grouse. Production volumes anticipated for the Puma Deep project are relatively low, as are the corresponding number of trucks transporting produced fluids, condensate and water.

At various times and at specific locations within the project area, noise levels associated with drilling, field development and operations activities will temporarily exceed the EPA established threshold of 55 dBA, averaged over 24 hours. Noise generated from these activities can be of an intensity and frequency that causes harm to human receptors. Field development and production related noise impacts would affect site workers who are subject to state and federal Occupational Health and Safety (OSHA) standards. OSHA mitigation standards for noise limits exposure as follows: an 8-hour time-weighted average of 85 decibels or a dose of fifty percent are referred to as OSHA action levels [29 CFR 1910.95(c)(2)]. Occupational exposure to noise levels in excess of 85 dBA requires monitoring and mitigation, preferably by engineering means, to protect workers. Non-site worker impacts would be limited due to the lack of residential occupation and concentrated recreational activity within the development area. Scattered activities, such as livestock operations and recreational activities, including hunting, may be exposed to noise as they move past development activities and operating equipment. Noise can also modify animal behavior and habitat use patterns, such as the use of critical winter habitats or sage-grouse leks.

Operational noise will be lessened with the implementation of remote telemetry which can significantly reduce the number of site visits needed by operations personnel. A survey conducted in the Moxa field area (BLM 2007) found that the use of telemetry (remote monitoring of wells) could reduce field visits by 50%. The use of solar electricity or natural gas as a fuel for on-site power generation, as opposed to the use of diesel fuel, also reduces noise levels. Over time natural gas wells may require artificial lift systems to facilitate production

resulting in the need to install gas lift, plunger lift, down hole pumps or other technology which could generate noise. Depending on the fluid volumes produced, the installation of produced water and condensate gathering systems to transport these fluids to centralized facilities for disposal or sale could substantially reduce production related noise compared to tanker truck transportation.

Noise from field development and production activities can also be dampened or reduced relative to receptors with the use of mechanical muffler systems, the use of vegetative, constructed or topographic screening, distance and consideration of the direction of the noise source from the receptor. These considerations serve to lessen the impact of noise on workers, residences and sensitive wildlife species. Noise is also affected by environmental factors, such as humidity, wind speed and direction, and air density. Consideration of the prevailing wind direction, when siting noise generating operations also serves to lessen the impact of noise on sensitive receptors.

Construction-related effects would be short term. Noise levels in excess of the 55 dBA standard (EPA standard) would occur during construction and drilling operations.

Given the low human population densities in the project area, construction and development operations under the alternatives would be sufficiently distant from residences that none would likely be affected by construction or development operations. Overall noise produced by construction and support services equipment during peak activity periods would be moderate because of its dispersed and short-term nature.

4.15.1.1 Mitigation and Residual Effects

See committed practices detailed in Chapter 2 and Appendix D. Residual effects, while not reaching the level of significance, would occur even if mitigation measures were implemented as the activities associated with construction, drilling and production activities would generate noise.

4.15.2 No Action

Under the No Action Alternative, the Proposed Action would not advance and noise impacts would continue as associated with the existing well production.

4.16 CUMULATIVE EFFECTS

Cumulative effects are those that would result from the incremental impacts of the proposed project added to past, present, and reasonably foreseeable development (RFD) scenario. In this analysis, the RFD is defined as the proposed Moxa Arch Area In-fill Gas Development Project. Cumulative effects assessment areas (CEAAs) vary among resources and are generally based on relevant landscape, resource, project, and/or jurisdictional boundaries. The CEAA for individual resources affected by this action is found below (Table 4-9). The analysis assumes that the Puma Proposed Action and the Moxa Arch Area In-fill Gas Development Project EIS are approved and fully implemented. All development proposed on public lands is subject to compliance with NEPA including cumulative impact assessment.

Past actions on or in the vicinity of the project area that continue today and have influences on the area include on-going natural gas exploration and development, livestock grazing, recreation, and use by wildlife.

Table 4-9. Cumulative Effects Analysis

Resource	Cumulative Effects Assessment Area	Number of Acres of Disturbance or Activity Level (existing disturbance and Moxa Arch RFD)	Potential Cumulative Effects relative to Puma Deep Project (Puma PA)
Air Quality	Regional air shed including portions of Wyoming, northern Colorado, and northeastern Utah.	The contribution from these activities to cumulative ambient air concentrations and AQRVs, including regional haze and N deposition, at the distant PSD Class I Bridger Wilderness Area and Colorado PSD Class I Dinosaur National Monument would be negligible.	Emissions within the federal and state thresholds.
Paleontological Resources	Paleontological Resources: project area + 2 miles; 41,236 acres.	Approximately 313.6 acres of roads, well locations, and pipelines.	Mitigation (pre-construction field surveys) to prevent destruction or damage to the resource.
Soils/Vegetation/Invasive Species	Project Area + 2 mile buffer; 41,236 acres.	Approximately 313.6 acres disturbed.	Proposed Action of 10 additional wells, initially disturbing 98 acres. No effect determination for Ute ladies' tresses (listed plant species). Mitigation (stabilization, reclamation) required where soils are disturbed. Seeding with native species. Mitigation to prevent invasive species invasion/weed treatments required.

Resource	Cumulative Effects Assessment Area	Number of Acres of Disturbance or Activity Level (existing disturbance and Moxa Arch RFD)	Potential Cumulative Effects relative to Puma Deep Project (Puma PA)
Surface Water Resources	Affected watersheds Big Dry Creek (109,974 acres), within the Green River watershed.	Estimated acres of existing disturbance in the Big Dry Creek watershed (520 acres) associated with the 5 existing Puma wells, 7 P&A'd wells and 20 proposed wells in the Moxa infill project area.	Surface water not impacted by approximately 98 acres of additional disturbance from PA. Mitigation (avoidance/ protection) required for all activities on public land.
Ground Water Resources	General Cumulative Impact Assessment Area for the Moxa infill project and other industrial and agricultural uses within the Big Dry watershed that are removing water from the Green River and Wasatch formations.	3 to 4 acre feet of ground water removed for each of the 52 wells assuming the worst case of no recycling of drilling water and all required water being removed from the ground water source, 208 acre-feet of water removed.	Proposed Action would remove 40-acre feet of ground water from the Green River/Wasatch formations. Proposed Action consumption of water is small compared to existing water supplies. Mitigation is required to prevent ground water contamination.
Noise	Project Area + 2 mile buffer; 41,236 acres.	5 producing wells and 20 proposed Moxa in-fill wells.	The Proposed Action would not add to the existing level of noise (drilling is a temporary activity and would not occur all at once - testing /production results in minor increases to existing background noise levels).
Land Use/Range Resources	Sage Creek Mountain Allotment - 107,302 total acres; 9,940 AUMs.	196 acres disturbed or 18 AUMs.	Proposed Action would add 98 acres of disturbance or 9 AUMs.
Pronghorn Antelope	Herd Unit 411 Crucial Winter/yearlong; 223867acres.		No suitable habitat occurs in the project area; Proposed Action would add no acres of disturbance to crucial winter/yearlong pronghorn habitat.

Resource	Cumulative Effects Assessment Area	Number of Acres of Disturbance or Activity Level (existing disturbance and Moxa Arch RFD)	Potential Cumulative Effects relative to Puma Deep Project (Puma PA)
Mule Deer	Herd Unit 423 winter/yearlong; 749,545 acres.	Approximately 125 RDF and existing wells outside the Puma Deep project area and within the CIAA within the winter/yearlong habitat or approximately 1,225 acres of disturbance.	Suitable habitat occurs in the southern tier of the Puma Deep project area where no activity is planned.
Elk	Crucial winter/yearlong; 20,908.2 acres.		No suitable habitat occurs in the project area; Proposed Action would add no acres of disturbance to crucial winter/yearlong elk habitat.
	Winter and winter/yearlong; 364,921 acres.		No suitable habitat occurs in the project area; Proposed Action would add no acres of disturbance to Winter and winter/yearlong elk habitat.
Sage-grouse	Project area + 2 mile buffer within the Uinta Upland Game Bird Management Area 5 – 41,236 acres.	Two of the existing PD wells are located within 2 miles of the nearest lek (approximately 20 acres of disturbance); 5 existing PD wells, or approx. 50 acres of disturbance, are within 3 miles of a lek. Numerous Moxa RFD wells are within 2 miles of a lek and within State of Wyoming identified core sage-grouse population areas. 1275 existing PD and Moxa wells and RFD wells are within Management Area 5 (12,495 acres of disturbance).	10 wells (98 acres of disturbance) are located in marginal potential nesting habitat; none are located within State identified core population areas. Stipulations apply; RFD and Puma Deep proposals handled on a case-by-case basis. Mitigation would apply; None of the PD or PA wells are located within State designated Core Areas.

Resource	Cumulative Effects Assessment Area	Number of Acres of Disturbance or Activity Level (existing disturbance and Moxa Arch RFD)	Potential Cumulative Effects relative to Puma Deep Project (Puma PA)
Raptors	Puma Deep project area + 1 mile buffer; 23,316 acres.	5 existing PD and 2 proposed RFD wells are located within 1 mile of active FH nests or 0.5 miles of other raptor nests located within the CIAA; approximately 70 acres of disturbance.	Proposed Action would add 10 wells within 1 mile of raptor nests or 98 acres of disturbance. 7 wells are proposed within 0.5 miles of active FH nests; or 68.6 acres of disturbance. Timing stipulations would apply to all wells.
T&E	Black-footed ferret (within white-tailed prairie dog habitat), bald eagle, water depletions of the Colorado River Basin.	PD and RFD well proposals are handled on a case-by-case basis	Proposed Action - No effect determination for black-footed ferret, bald eagle and water depletions.
Socioeconomics	Sweetwater & Uinta Counties.		Continued employment Opportunities within the Bridger Valley; minor enhancement to local and state revenues; add to national energy supply.
Cultural	Project area; 9,567 acres.	Existing wells and roads resulting in approximately 117.6 acres of disturbance.	Proposed Action – no adverse effect determination.
Recreation	Project area + surrounding Area.	Mainly hunting related activities, some ORV use.	Some temporary displacement of hunters and recreationists during periods of drilling and construction. There may be reduced levels of satisfaction with the recreational experience but more vehicle access.

Resource	Cumulative Effects Assessment Area	Number of Acres of Disturbance or Activity Level (existing disturbance and Moxa Arch RFD)	Potential Cumulative Effects relative to Puma Deep Project (Puma PA)
Visual Resources	Project area + 10 mile section of access road leading to the project area; area within the Class IV VRM.	Existing and proposed oil and gas activity, roads, pipelines, and other intrusions.	The area is not pristine. Existing, proposed, and RFD would add to the visual impact. However, all activity would be mitigated (i.e. placement, painted). Large areas of unobstructed views remain.

Air Quality

Cumulative air quality impacts are defined as incremental impacts from any one alternative combined with impacts from other existing or proposed air emission sources in the region. Air pollutant emissions over the LOP would occur from routine vehicle traffic and production facility emissions. The contribution from these activities to cumulative ambient air concentrations and AQRVs, including regional haze and N deposition, at the distant PSD Class I Bridger Wilderness Area and Colorado PSD Class I Dinosaur National Monument would be negligible.

Under the No Action Alternative, additional well sites and access roads would not be constructed and no additional drilling would occur. No air emissions would be generated, and no contribution to cumulative NO_2 concentrations and AQRVs impacts, including visibility degradation (regional haze) and N deposition at the PSD Class I Bridger Wilderness Area or Colorado PSD Class I Dinosaur National Monument would occur.

Topography, Soils, Surface Water, and Vegetation

Past, proposed, and reasonably foreseeable actions would require restoration of disturbed areas to pre-disturbance conditions on public lands. Topographic alterations from natural gas exploration generally affect a very small portion of the total land surface.

The project area lies within a portion of the Bridger Basin portion of the Greater Green River Basin. Existing facilities found in the Bridger Basin include the communities of the Bridger Valley, the UPRR, Interstate 80, state highways, county roads, and numerous upgraded roads and two track trails, well pads, pipelines[2], powerlines, etc. All of these developments affect surface water quality to a small degree - run off from gravel and two-track roads probably contribute most to any surface water impacts. However, storm water runoff control plans are required by federal, state, or county entities so cumulative impacts to surface water quality are expected to be

[2] All pipelines are reclaimed

within acceptable levels. Standard stipulations and site-specific construction and reclamation procedures are required on federal lands to maintain surface drainage patterns. Procedures require implementation of reclamation including re-grading and re-contouring disturbed areas to approximate original conditions, re-establishing appropriate vegetative cover, protecting soils from erosion, and stabilizing reclaimed landscapes. These precautions minimize cumulative impacts to topography, soils, surface water, and vegetation. Weed control would be implemented as necessary.

Geologic Hazards, Ground Water, Noise and Odors, Land Use, Range, Health/Safety, Transportation, and Hazardous Materials

Cumulative impacts from geologic hazards and to ground water, noise and odor, hazardous materials, transportation, health/safety, landownership, and land use are within the thresholds identified in the discussion of impacts for this project and the general cumulative impact assessment area which includes a portion of the Moxa gas field (see cumulative impact discussion for each resource).

Minerals and Socioeconomics

The proposed project could result in a greater volume of natural gas available for transmission and consumption; gas development in the Puma Deep project area would not interfere with the potential recovery of other minerals. Natural gas production is considered a primary industry that is important to the economic well-being of Sweetwater and Uinta Counties, the State of Wyoming (increased revenues) and the U.S. (energy availability).

Cultural Resources

Disturbance and/or loss of unidentified sites or artifacts may add to the cumulative loss of information about our heritage in the project area and throughout the region, if these resources are not identified, inventoried, and/or appropriately protected or mitigated. However, such losses are not expected since mitigation measures as identified for the proposal would be implemented. Any potential future development projects with federal involvement would require the same level of analysis and protection. In the absence of cultural resource clearances and/or other federally mandated cultural resource protection measures on private lands, increased impacts to cultural resources may occur.

Paleontology

With the application of appropriate mitigation, cumulative impacts similar to those of cultural resources are anticipated for paleontological resources. The likelihood of disturbing paleontological resources would remain low. In addition, natural erosion and illegal collection would continue at current levels.

Wildlife

Impacts to big game species would be as described for the Proposed Action yet increased due to other on-going activities, including development and production activities occurring within the adjacent Moxa Arch natural gas field. Most other mammal and bird populations would similarly be affected primarily by natural forces, especially the weather. Project developments (e.g., wells, roads, and gas injection pipelines) could impact management of greater sage-grouse and raptor habitat. However, protection of greater sage-grouse leks and nesting habitat and raptor nests on public land is strictly enforced and would be applied on future projects to ensure existing populations are maintained. The proposed project may contribute some additional impacts (e.g., habitat loss and increased human presence) to the cumulative effects on prairie dog habitat (including that which may support black-footed ferrets and other species such as the burrowing owl and mountain plover) from livestock grazing, oil and gas, recreational use, and vehicle traffic through habitat loss and increased access. Coordination and consultation with the FWS is conducted on a case-by-case basis. Application of mitigation measures, such as avoidance, in accordance with FWS guidelines should minimize impacts to these species.

Visual Resources and Recreation

As mentioned, the viewshed is not pristine. However, large areas of unobstructed views occur in the area. Additional impacts to visual resources from future proposals could further alter the viewshed (i.e., well locations, roads, gas and water lines, gas pipelines, and presence of dust), if not properly mitigated. Recreation is likely to continue at the same rate, although some recreationists may not like the development and avoid the immediate area. Large areas of unobstructed views and open space remain.

CHAPTER 5 - TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED

5.0 PUBLIC PARTICIPATION

A scoping notice was prepared and submitted to the public by the BLM on May 19, 2008, requesting comments on the proposed Puma Deep Prospect Project. Individuals and entities on the direct mailing list included Federal, state, and local officials and agencies, Native American Tribes, public land users and groups, groups expressing an interest in public lands, and the media. Refer to Appendix E for a copy of the scoping notice including the mailing list.

The scoping period ended on June 19, 2008. During preparation of the EA, the BLM has communicated with, and received or solicited input from various federal, state, county, and local agencies, elected representatives, environmental and citizens groups, industries, and individuals potentially concerned with issues regarding the Proposed Action. The contacts made are summarized in the following sections. Issues identified during public scoping are listed in Section 1.3 of Chapter 1.

5.1 CONSULTATIONS AND COORDINATION

An environmental analysis is prepared when a federal government agency considers approving an action within its jurisdiction that may impact the human environment. An environmental analysis aids federal decision makers by presenting information on the physical, biological, and social environment of a proposed project and its alternatives. The first step in conducting an environmental analysis that meets the requirements of NEPA is to determine the scope of the project, the range of action alternatives, and the impacts to be included in the document.

The Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508) require an early scoping process to determine the issues related to the Proposed Action and alternatives that the analysis should address. The purpose of the scoping process is to identify important issues, concerns, and potential impacts that require analysis. The results of the scoping process are used to focus the analysis on the issues and concerns identified for the proposed project, so that alternatives or mitigation considered can be responsive to the issues and concerns. Alternatives that are not technically or economically feasible or responsive to the issues and concerns are not considered further in the analysis.

The environmental assessment documenting the NEPA analysis conducted for the Proposed Action was drafted by a third party contractor working under the direction of and in cooperation with the Bureau of Land Management (BLM), Rock Springs Field Office, Rock Springs, Wyoming.

CHAPTER 6 – LIST OF PREPARERS

The following tables (Table 6-1 and 6-2) identify the third party and the core BLM interdisciplinary team members principally involved in preparing this EA.

Table 6-1. Third Party Interdisciplinary Team Members

Name	Responsibility
Renee Taylor – Taylor Environmental Consulting	Project Lead, various disciplines
Jim Dunder	Wildlife Biology
Susan Connell – Carter Lake Consulting	Air Quality
Jim Zapert – Sage Environmental Consulting	Air Quality
Steve Sandau – Intermountain Paleo-Consulting	Paleontology
Jana Pastor – Western Archaeological Services	Archaeology
Gene R. George – Gene R. George and Associates	Geology and Minerals
Mark Knoll – Gene R. George and Associates	Cartography
Marty Shane – Gene R. George and Associates	Document Preparation

Table 6-2. BLM Interdisciplinary Team Members

Name	Responsibility
Rock Springs Field Office	
Samantha Thurston	Natural Resource Specialist
Carrie Nelson	Wildlife Biologist
Jeromy Caldwell	Wildlife Biologist
Dennis Doncaster	Hydrologist
Jim Glennon	Botanist
Penny Daniels	Archaeologist
Colleen Sievers	Archaeologist
Kathryn Lloyd	Planner
Trisha Cartmell	Petroleum Engineer
John MacDonald	AFM – Lands and Minerals/Soils
Carol Montgomery	Realty Specialist
Bernie Weynand	AFM – Resources
Adam Day	Paleontologist
Jonathan Sheeler	Rangeland Management Specialist
Jo Foster	Recreation Specialist
Teri Deakins	Environmental Protection Specialist
Doug Kile	GIS/GPS Specialist

CHAPTER 7 - REFERENCES

Bailey, Robert G. Compiled March 1995. Description of the Ecoregions of the United States; accessed October 6, 2008; http://www.fs.fed.us/land/ecosysmgmt/index.html

Biggins, D., B. Miller, B. Oakleaf, A. Farmer, R. Crete, and A. Dood. 1989. A System for Evaluating black-footed Ferret Habitat. Report prepared for The Interstate Coordinating Committee by The Reintroduction Site Group. 25 pages.

Black, C. C. and Dawson, M. R., 1966, A Review of Late Eocene Mammalian Faunas from North America: American Journal of Science, v. 264, p. 321-349

Blackstone, Jr. D.L., (1988). Traveler's guide to the geology of Wyoming. Geological Survey of Wyoming Bulletin 67, pg. 130.

Carroll, R.L., (1988). Vertebrate paleontology and evolution. W.H. Freeman and Company, New York, New York.

Case, J.C., Arneson, C.S. and Hallberg, L.L, 1998, Surficial Geology Map of Wyoming, Wyoming Geological Survey, Map 98-1.

Cerovski, A.O., M. Grenier, B. Oakleaf, L. Van Fleet, and S. Patla. 2004. Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming. Wyoming Game and Fish Department Nongame Program, Lander. 206pp.

Clark, Tim W.; Mark R. Stromberg. 1987. Mammals in Wyoming University of Kansas, Museum of Natural History, Lawrence, Kan.

Colorado Natural History Database: Accessed October 24, 2008 http://www.cnhp.colostate.edu/rareplants/cover.html

De Bruin, Rodney H., 2007, Oil and Gas Map of Wyoming, Wyoming Geological Survey, Map Series 55.

Environmental Protection Agency. 1990. National Oil and Hazardous Substances Contingency Plan. Final Rule, 40 CFR Part 300.

_____. 1993. Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure. Preliminary Review Draft.

_____. 2005. Prioritized Chronic Dose-Response Values for Screening Risk Assessments (2/28/05), Table 2. Office of Air Quality Planning and Standards (OAQPS). Technology Transfer Network Air Toxics Website. <http://www.epa.gov/ttn/atw/toxsource/summary.html>. Data accessed June, 2006.

_____. 2007a. Air Toxics Database, Table 2, Acute Dose-Response Values for Screening Risk Assessments (6/12/2007). Office of Air Quality Planning and Standards. Technology Transfer Network Air Toxics Website.

_____. 2007b. Air Toxics Database, Table 1, Prioritized Chronic Dose-Response Values (6/12/2007). Office of Air Quality Planning and Standards. Technology Transfer Network Air Toxics Website.

Fertig, W. 1995. Status report on Lesquerella macrocarpa in southwestern Wyoming. Unpublished report prepared for the BLM Wyoming State Office and the Rock Springs District by the Wyoming Natural Diversity Database, Laramie, Wyoming.

Grande, L., (1984). Paleontology of the Green River Formation, with a review of the fish fauna. Geological Survey of Wyoming Bulletin 63, second edition.

Grose, L. T., (1972). Geologic atlas of the Rocky Mountain region, Rocky Mountain Association of Geologists, Denver, Colorado.

Harris, Ray E., Hausel, W. Dan and Meyer, John E., 1985, Metallic and Industrial Minerals Map of Wyoming, Wyoming Geological Survey, Map Series 14.

Hausel, W. Dan, Glass. Bary B., Lageson, David R., Ver Ploeg, Alan J., and De Bruin, Rodney, H., 1979, Wyoming Mines and Minerals, Wyoming Geological Survey.

Heath, R.C. 1984. Groundwater Regions of the United States. U.S. Geological Survey Water-Supply Paper 2242. U.S. Government Printing Office, Washington, D.C. 78 pages.

Hillman, C.N. and T.W. Clark. 1980. Mustela nigripes. Mamm. Species No. 126. 3 pages.

Holloran, M.J. 2005. Greater sage-grouse (*Centrocercus urophasianus*) population response to natural gas field development in western Wyoming. Ph.D. dissertation, University of Wyoming, Laramie, Wyoming.

Karlstrom, K.E. and Houston, R.S., (1979). Contributions to geology, vol. 17, #2.

Kelly, R.L. 1999 Early Holocene Prehistory in the Intermontane West: Reinvestigation of the Pine Spring Site, Southwest Wyoming. University of Wyoming Technical Report No. 17a. Report submitted to the Bureau of Land Management, Green River Resource Area.

Lageson, D.R. and Spearing, D.R., (1988). Roadside geology of Wyoming. Mountain Press Publishing Company, Missoula, Montana.

Leigh R. Terry, 1991, Wyoming Trona: An Overview of the Geology and Economic Utilization, Wyoming Geological Association, Guidebook, Mineral Resources of Wyoming, p 103-120.

Love, J.D. and Christianson, A.C., (1985). Geological map of Wyoming: U.S. Geological Survey, scale 1: 500,000.

Petroleum Information Corporation (P.I.C.). 1985. Rocky Mountain region oil and gas production including basins, uplifts, and basement rocks. Petroleum Information Corporation, scale 1 inch = 24 miles.

Schomer, Paul D. 2005. Criteria for assessment of noise annoyance. Noise Control Engineering Journal 53(4), 2005 July-August.

Sharrock, F. 1966. Prehistoric Occupation Patterns in Southwest Wyoming and Cultural Relationships with the Great Basin and Plains Culture Areas. University of Utah Anthropological Papers 77. Salt Lake City, University of Utah Press.

U.S. Department of Agriculture Forest Service region 2 sensitive Species - Accessed October 24, 2008: http://www.fs.fed.us/r2/projects/scp/evalrationale/evaluations/dicots/astragalusnelsonianus.pdf

U.S. Department of Agriculture Soil Conservation Service - accessed October 6, 2008: http://soildatamart.nrcs.usda.gov/Survey.aspx?State=WY

U.S. Department of Interior Bureau of Land Management. 1986. Kemmerer Resource Area Resource Management Plan. Kemmerer Field Office. Kemmerer, Wyoming.

U.S. Department of Interior Bureau of Land Management. 1997. Green River Resource Management Plan. Rock Springs Field Office. Rock Springs, Wyoming.

U.S. Department of Interior Bureau of Land Management. January 2003. WY-070-02-065. Final environmental impact statement and proposed plan amendment for the Powder River Basin Oil and Gas Project. Buffalo, Wyoming.

U.S. Department of Interior Bureau of Land Management. 2005. Finding of No Significant Impact, Decision Record and Environmental Assessment for the ASU Year-Round Drilling Demonstration Project Sublette County, Wyoming. Pinedale Field Office. Pinedale, Wyoming. WY-100-EA05 254. November.

U.S. Department of Interior Bureau of Land Management 2006. Final Environmental Impact Statement for the Jonah Infill Drilling Project, Sublette County, Wyoming. Pinedale, WY: U.S. Department of the Interior, Bureau of Land Management, Pinedale Field Office.

U.S. Department of Interior Bureau of Land Management. October 2007. Kemmerer Field Office. Moxa Arch Area Infill Gas Development Project Draft Environmental Impact Statement.

U.S. Department of Interior Bureau of Land Management. 2008. Kemmerer Resource Area Draft EIS and RMP.

U.S. Department of Interior Fish and Wildlife Service. 2001 Colorado River Water Depletions

U.S. Department of Interior Fish and Wildlife Service. National Wetland Inventory (NWI) Accessed October 14, 2008: (http://wetlandsfws.er.usgs.gov/imf/imf.jsp?site=NWI_CONUS)

U.S. Fish and Wildlife Service. 2004. Removal of Black-footed Ferret Survey Recommendation Across Much of Wyoming. Letter from Brian Kelly, Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming. February 3, 2004.

U.S. Department of Interior and U.S. Department of Agriculture. 2006. Surface operating standards and guidelines for oil and gas exploration and development. BLM/WO/ST-06/012+3071. Bureau of Land Management. Denver, Colorado. 84 pp.

U.S. Department of Labor, OSHA, June 25, 2007; http://www.osha.gov/dep/industry_profiles/p_profile-138.html and http://www.bls.gov/iif/oshwc/osh/os/osnr0023.txt

U.S. Environmental Protection Agency. Ecoregions – accessed October 6, 2008: ftp://ftp.epa.gov/wed/ecoregions/wy/wy_eco_lg.pdf

U.S. Geological Survey. Northern Prairie Wildlife Research Center - Accessed October 24, 2008: http://www.npwrc.usgs.gov/resource/plants/wyplant/

U.S. Geological Survey. National Gap Analysis Program. Accessed 2008 http://www.sdvc.uwyo.edu/wbn/gap.html

U.S. Department of Transportation, Office of Pipeline Safety (OPS) (http://ops.dot.gov/stats/TRAN_SUM.HTM).

VIEWS 2008. Visibility Information Exchange Web System. Regional Haze Rule Summary Data. Means for Best, Middle, and Worst 20% Visibility Days. Online at http://vista.cira.colostate.edu/views/Web/IMPROVE/SummaryData.aspx. Accessed October 2008.

WRCC 2009. Western Regional Climate Center. Historical climate data for Mountain View, WY. Online at http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?wy6555. Accessed March 2009.

Wyoming Department of Environmental Quality Solid and Hazardous Waste Division database http://deq.state.wy.us/shwd/downloads/Facility%20Query%20for%20web%20page_11_3_06.xls

Wyoming Department of Environmental Quality. Water Quality Rules and Regulations Chapter 1, web accessed Sept. 19, 2008; http://soswy.state.wy.us/Rules/RULES/6547.pdf

Wyoming Game and Fish Department. Elk - Accessed September 29, 2008
http://gf.state.wy.us/wildlife/jobcompletionreports/Region%204%20-%20GR%20-%20c%20Elk.pdf

Wyoming Game and Fish Department. Greater Sage-grouse Job Completion Report 2006 accessed October 16, 2008:
http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/pdf/2006sgjcrsbyregion/2006%20Southwest%20JCR.pdf

Wyoming Game and Fish Department. Moose - Accessed September 29, 2008
http://gf.state.wy.us/wildlife/jobcompletionreports/Region%204%20-%20GR%20-%20d%20Moose.pdf

Wyoming Game and Fish Department. Mule Deer - Accessed September 26, 2008
http://gf.state.wy.us/wildlife/jobcompletionreports/Region%204%20-%20GR%20-%20b%20Mule%20Deer.pdf

Wyoming Game and Fish Department. Pronghorn - September 26, 2008
http://gf.state.wy.us/wildlife/jobcompletionreports/Region%204%20-%20GR%20-%20aa411%20Pronghorn.pdf

Wyoming Geological Survey, 2008, Website Geological Hazards, Active Fault Map.

Wyoming Natural Diversity Database. 2008. Data compilation for R. Taylor, completed September 19, 2008. Unpublished report. Wyoming Natural Diversity Database, University of Wyoming, Laramie, Wyoming.

Wyoming Natural Diversity Database. Accessed October 24, 2008:
http://www.uwyo.edu/wynddsupport/docs/Reports/SpeciesAssessments/Wyoming%20Pocket%20Gopher%20-%20Final%20(Jun%202005).pdf

APPENDIX A

DAVIS PETROLEUM CORPORATION

MASTER DRILLING PLAN
CONVENTIONAL NATURAL GAS WELLS IN THE
PUMA DEEP PROSPECT AREA
SWEETWATER COUNTY, WYOMING

DAVIS PETROLEUM CORPORATION

MASTER DRILLING PLAN
CONVENTIONAL NATURAL GAS WELLS IN THE
PUMA DEEP PROSPECT AREA
SWEETWATER COUNTY, WYOMING

1. DRILLING PROGNOSIS

The following information will be provided with each individual application:

- Ground elevation
- Estimated tops of important geologic markers
- Estimated depths at which the top and bottom of anticipated water, oil, gas or other mineral bearing formations are expected to be encountered

Any shallow water zones encountered will be adequately protected and reported. All potentially productive hydrocarbon zones will be cemented off.

2. PRESSURE CONTROL EQUIPMENT (SEE ATTACHED DIAGRAM)

The BOP and related pressure control equipment will be installed, tested, and maintained in compliance with the specifications and requirements of the Onshore Oil and Gas Order Number 2.

Blow Out Preventer (BOP) will be equipped as follows:

A. Type: Eleven (11) inch Double Gate Hydraulic BOP mounted on a 5,000 psi casinghead with an Eleven (11) inch Annular BOP above.
   a. One set of blind rams (above)
   b. One set of pipe rams (below)
   c. Appropriate fill, kill and choke lines will be 5,000 psi working pressure
B. Auxiliary Equipment
   a. Auxiliary Equipment to include upper and lower kelly chokes with handles, a floor safety valve with subs to fit all drill string connections in use, and a string float valve.
   b. Pit tank volume and flow line flow rate will be monitored electronically. A rotating head will be installed above the annular blow-out preventer to divert any hydrocarbons in the drilling mud away from the rig floor.
C. Pressure Rating: 5,000 psi WP
D. Testing Procedure:
   a. Annular BOP
      i. At a minimum, the annular BOP will be pressure tested to 50% of the rated working pressure of 5,000 psi for a period of ten (10) minutes or until provisions of the test are met, whichever is longer.
      ii. At a minimum, the above pressure test will be performed:

1. When the annular BOP is initially installed.
2. Whenever any seal subject to test pressure is broken.
3. Following related repairs; and
4. At thirty (30) day intervals.

b. Hydraulic Ram-Type BOP

i. At a minimum, the BOP, choke manifold, and related equipment will be pressure tested to the approved working pressure of the BOP stack of 5,000 psi. This pressure will be maintained for a period of at least ten (10) minutes or until the requirements of the test are met, whichever is longer:

ii. At a minimum, the above pressure test will be performed:

1. When the BOP is initially installed.
2. Whenever any seal subject to test pressure is broken.
3. Following related repairs; and
4. At thirty (30) day intervals

iii. In addition to the above, the pipe and blind rams will be activated each trip, but no more than once each day.

E. Choke Manifold Equipment:

a. All choke lines will be straight lines; turns will use tee blocks, or targeted running tees, and will be anchored to prevent whip and vibration. The manifold will have two (2) chokes, both remotely controlled from the rig floor and a pressure gauge.

F. Accumulator:

a. The accumulator will have sufficient capacity to open the hydraulically controlled choke line valve, if so equipped, close all rams plus the annular BOP, and retain a minimum of 200 psi above precharge on the closing manifold without the use of the closing unit pumps. The fluid reservoir capacity will be double the usable fluid volume of the accumulator system capacity, and the fluid level of the reservoir will be maintained to the manufacturer's recommendations.

G. Miscellaneous Information:

a. The choke manifold and BOP ram extension rods with hand wheels will be located outside the rig substructure. The hydraulic BOP closing unit will be located at least 25 feet from the well head, but readily accessible to the driller. Exact location and configuration of the hydraulic BOP closing unit will depend on the layout of the particular rig contracted to drill each well.

H. A flare line will be installed from the choke manifold to a flare pit, extending a minimum distance of 125 feet from the center of the drill hole to a separate flare pit.

3. PROPOSED CASING AND CEMENTING PROGRAM

The following casing and cementing program is typical but may vary by driller/operator and individual well location.

A. The proposed casing program will include new tubulars manufactured to API specifications.

Purpose	Hole Size	Csg. Dia	Wt/ft	Grade	Joint	Depth Set	Burst	Collapse
Cond.	24”	16”	---	---	Weld	0-40”*	---	---
Surface	12 ¼”	9 5/8”	36#	J-55	ST&C	0-3,600’**	3,520	2,020
Prod.	7 7/8”	4 ½”	13.5#	P-110	LT&C	0-14,270’	12,410	10,680

- Minimum setting depth; set conductor is competent rock

** Surface casing will be set in the Wasatch formation due to being in the KSLA (Known Sodium Leasing Area)

Production casing design factors: Burst 1.5 (clean hole)
Collapse 1.53 (10 ppg max mud weight)
Tension 1.87

a. The surface casing will have six (6) centralizers, one (1) in the middle of the shoe joint, and one (1) centralizer across each of the second and third collars, and every other collar thereafter.
b. Surface casing string will be pressure tested to 0.22 psi/ft of casing string length or 1,500 psi, whichever is greater, but not to exceed 70% of the internal yield strength of the casing; to be performed after installing BOP stack and prior to drilling out from under the casing shoe.
c. The actual casing design may change at the total depth once bottom hole conditions are known.

B. Cementing Program:

a. Conductor – 3 ¼ cubic yards of ready-mix concrete, if set at 40’ (25% excess)
b. Surface Casing – Lead with 696sx of “Premium Lite” cement+1%bwoc CaCl2+0.25% lbs/sack cello flake+8% bwoc Bentonite+0.01 gps FP-12L+123.7” fresh water (12.00 ppg, 2.26 cf/sack) (100% excess,) Tail in with 560sx of Class “G” cement containing 0.25 lbs/sack cello flake+0.2% bwoc CD-32+44.2% fresh water (15.8 ppg, 1.16 cf/sack) (1000 ft of cement above casing shoe) (100% excess. Cement brought to surface. Perform Class “G” cement + 2% bwoc CaCl2+44.4% fresh water “top job” through 1” pipe at surface as necessary if slurry falls back.
c. Production Casing - 1) If the invasion profile seen on the Induction Log is pronounced, then include a Cement Stage tool (4 1/2 P110) at 10000 feet in the 4 1/2 P110 13.5#/ft casing string and cement: STAGE 1-LEAD: (10000 - 12650) 265 sks 1:1:2 'Poz:type III:Gel' w/ 2% OGC-60, 1% SMS,

1.2% LTR, 0.3% CFR, 0.2% SPC-2, 1 pps PS Flake, 11.0 ppg, 2.77 cf/sk, STAGE 1-TAIL (12650-14270) 278 sks 1:1:2 'Poz:G:Gel' w/ 5% OGC-60, 10% Silica Flour, 1% CLF-2, 0.75% SMS, 0.7% LTR, 0.2% SPC-2, 2pps PS Flake, 13.5#/gal, 1.6 cu ft/sk, STAGE 2-LEAD (2000-9750) 813 sks 1:1:2 'Poz:Type III:Gel; w/ 2% OGC-60, 1% SMS, 1% LTR, 0.3% CFR, 0.2% SPC-2, 1/2 pps PS Flake, 11 ppg, 2.77 cu ft/sk, STAGE 2-TAIL (9750-10000) 50 sks 0:1:0 'G' w/ 0.56% CFR, 0.% CFL-2, 0.15% LTR, 0.2% SPC-2, 1/4 pps PS Flake to seal DV Tool, 15.8 ppg, 1.15 cuft/sk; both stages at 20% excess in open hole and 5% excess in surface casing (set at 3601 ft) OR

2) If the invasion profile seen on the Induction Log is NOT pronounced, then run continuous string of 4 1/2 P110 13.5#/ft casing and cement: LEAD - (2000-12650) 1084 sk 1:1:2 'Poz:Type III:Gel' w/ 2% OGC-60, 1% SMS, 1.2% LTR, 0.3% CFR, 0.2% SPC-2, 1 pps PS Flake, 11.0 ppg, 2.77 cf/sk; TAIL- (12650-14275) 278 sks 1:1:2 'Poz:G:Gel' w/ 5% OGC-60, 10% Silica Flour, 1% CLF-2, 0.75% SMS, 0.7% LTR, 0.2% SPC-2, 2pps PS Flake, 13.5#/gal, 1.6 cu ft/sk, with 20% excess in open hole and 5% excess in surface pipe (set at 3601 feet) 0.5% bwoc sodium met silicate+ 0.5 gals/100 sack FP-13L+ 187.3% fresh water. (12.00 ppg, 2.31 cf/sack). Estimated cement top of this cement slurry is 8,710 feet from surface. Tail Slurry: 175 sx Premium Lite II High Strength+0.9% bwoc R-3+0.3% bwoc CD-32 + 0.7% bwoc FL-52 + 20% bwoc silica flour + 0.3% bwoc BA-59+0.5 gals/100 sack FP-13L+107% fresh water (13 ppg, 2.21 cf/sack). Estimated top of this cement slurry is 12,710 feet from surface.

d. The above cement volumes are approximate and were calculated under the assumption that a gauge hole will be achieved. Actual cement volumes may vary and will be determined by running a caliper log in the drilled hole.
e. Waiting on cement (WOC) time will be adequate to achieve a minimum of 1000 psi compressive strength at the surface casing shoe prior to drilling out.

4. MUD PROGRAM (visual monitoring)

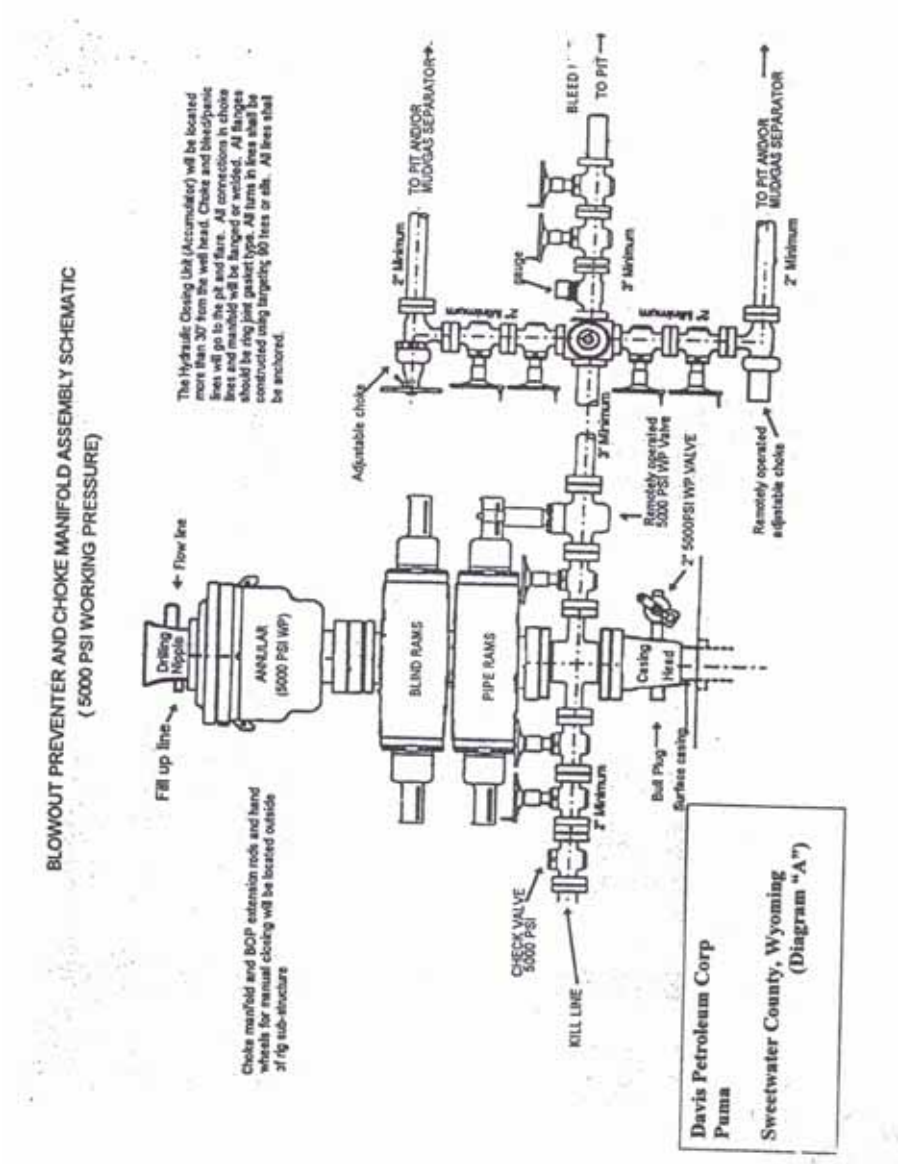
The following program is typical for the Project Area but may vary with operator/driller and individual well location.

Interval	Type	Weight (ppg)	Viscosity	Fluid Loss
0-3,500’	Fresh water, gel/lime sweeps	8.4-9	37-36	No control
	Set 9 5/8” surface casing at 3500’ +/-			
3,500’-9,000’	Water/lime/anco-drill	8.5-8.8	27-30	No control
9,000’-12,600’	LSND	8.8-9.5	32-38	10-15 cc’s

12,600'-14,270'	LSND/weighted Non-dispersed	9.5-11.5+	36-45	6-10 cc's

Sufficient mud materials to maintain mud properties, control lost circulation, contain a "gas kick", and rebuild an active mud system will be available at the well site during drilling operations.

5. TESTING, LOGGING, CORING, AND COMPLETION PROGRAM
   A. Logs: DIL-GR-SP-Caliper.....from TD to 0'
      FDC-CNL-GR……..from 14,270' to 7,500'
      BHC Sonic……from 14,270' to 5,000'
   B. Drill Stem Tests: possible DST in Frontier and Muddy
   C. Coring: None anticipated
   D. Evaluation program may change in the field at the discretion of the well-site geologist/supervisor with prior approvals acquired as necessary.
   E. Stimulation: No stimulation or fracture treatment has been formulated. The drill sites, as approved, will be of sufficient size to accommodate any proposed completion activities. The well completion prognosis will be developed after evaluation of the logs and DST information. A sundry notice, if necessary, will then be filed for approval of the completion program.
6. ABNORMAL CONDITIONS
   A. The anticipated maximum bottom hole pressure is 7,848 psi and maximum anticipated surface pressure is 4,709 psi.
   B. In general, no abnormal temperatures are anticipated.
   C. No hydrogen sulfide (H2S) is known to exist in any wells drilled to similar depths in the general area.
   D. The Puma Deep Unit is in the Known Sodium Leasing Area (KSLA).
7. DRILLING ACTIVITY
   A. Spud Date: Upon governmental approval and drilling rig availability.
   B. Duration:
      a. Drilling - approximately 35 days/well
      b. Completion – approximately 12 days/well
   C. Notification: The spud date will be orally reported to the Authorized Officer (AO) of the Bureau of Land Management (BLM) twenty-four (24) hours prior to spudding unless otherwise instructed in the site-specific conditions of approval for each well.


BLOWOUT PREVENTER AND CHOKE MANIFOLD ASSEMBLY SCHEMATIC
(5000 PSI WORKING PRESSURE)
The Hydraulic Closing Unit (Accumulator) will be located more than 30' from the well head. Choke and bleed/panic lines will go to the pit and flare. All connections in choke lines and manifold will be flanged or welded. All flanges should be ring joint gasket type. All turns in lines shall be constructed using targetting 90 tees or ells. All lines shall be anchored.
Choke manifold and BOP extension rods and hand wheels for manual closing will be located outside of rig sub-structure
Fill up line
Drilling Nipple
Flow line
ANNULAR (5000 PSI WP)
BLIND RAMS
PIPE RAMS
Casing Head
Bull Plug
Surface casing
CHECK VALVE 5000 PSI
KILL LINE
2" Minimum
Adjustable choke
TO PIT AND/OR MUDGAS SEPARATOR
2" Minimum
Remotely operated 5000 PSI WP Valve
2" 5000PSI WP VALVE
BLEED
TO PIT
gauge
2" Minimum
Remotely operated adjustable choke
TO PIT AND/OR MUDGAS SEPARATOR
2" Minimum
Davis Petroleum Corp
Puma
Sweetwater County, Wyoming
(Diagram "A")

DAVIS PETROLEUM CORPORATION

MASTER SURFACE USE AND OPERATIONS PLAN
CONVENTIONAL OIL AND GAS WELLS IN THE
PUMA DEEP PROJECT AREA
SWEETWATER COUNTY, WYOMING

MULTI-POINT SURFACE USE AND OPERATIONS PLAN – November 2008

1. WELL LOCATIONS
   A. The proposed well sites will be individually staked. A plat of each surveyed location, signed by a surveyor licensed in the State of Wyoming, will be attached to each individual Application for Permit to Drill or Reenter (APD).
2. EXISTING ACCESS ROADS
   A. The Project Area is approximately 50 miles South and West of Green River, Wyoming. More specifically, it is 17 miles east of Mountain View. A map of the general Project Area is provided in EXHIBIT A-1.
   B. Refer to the map labeled EXHIBIT A-2 for existing access roads.
   C. The existing access roads will be maintained in the same or better condition as existed prior to the commencement of operations, and said maintenance will continue until final abandonment and reclamation of the well location within the Project Area.
3. ACCESS ROADS TO BE CONSTRUCTED OR RECONSTRUCTED
   A. New access roads will be constructed in order to reach some of the well sites in the Project Area. Others will be accessed from existing roads. The proposed new roads are indicated on EXHIBIT A-2.
   B. All new roads will be constructed in accordance with design plans as prepared by qualified engineers and filed with the appropriate agency including BLM. Plans will address maximum grades, cuts and fills required, turnouts, locations and size of culverts and/or bridges.
   C. Typically, new access roads will be constructed with a fourteen (14) to sixteen (16) foot running surface, crowned and ditched with turnouts.
   D. The construction of roads will follow roading guidelines established for oil and gas exploration and development activities as referenced in the BLM/USFS publication: *Surface Operating Standards for Oil and Gas Exploration and Development,* Fourth Edition and/or BLM Manual Section 9113 concerning road construction standards on projects subject to Federal jurisdiction.
   E. Culverts will be installed prior to commencement of drilling operations as discussed during the on-site meeting and required by the engineering plans. Drainage to consist of wing ditches between the existing road and the well site to be installed prior to commencing drilling operations. Minimum diameter for culverts will be 18 inches.
   F. Major cuts and fills along the proposed new access routes will be few to none.
   G. Required low water crossings will be identified on new road construction plans; no bridges are known to be necessary.

H. Surface materials: Only soils of the well site and access road will be relied on for construction materials. Any surfacing materials required will be purchased from a properly authorized source within the general area of construction. If the well is determined to be productive, then the entire new constructed road will typically be surfaced with gravel.

4. LOCATION OF EXISTING WELLS
   A. All wells (water, injection, disposal, producing, abandoned, and drilling) located within the Project Area are identified on Exhibit A-2.
   B. Existing wells located within a 1-mile radius of individual well sites will be specifically identified in individual well APDs.
5. LOCATION OF EXISTING/PROPOSED PRODUCTION FACILITIES
   A. Existing facilities: There are five existing production facilities operated by Davis Petroleum Corp. in the area.
   B. New Facilities Contemplated: Production facilities will be planned and designed according to actual reservoir discovered and will be engineered upon completion of well tests. A Sundry Notice will be filed with BLM (or State agency) for approval prior to their construction.
      a. All production facilities, if constructed, will be located on the well site.
      b. All production facilities will be constructed with properly sized containment (typically steel dikes) around tankage, heater treaters, etc., and other equipment as required by Federal and State laws.
      c. Dikes for the production facilities will be constructed of steel or compacted subsoil. Dikes will be designed and constructed to hold the capacity of the largest tank and are independent of the back cut.
      d. The use of production pits is not anticipated. If production pits are used, netting will be placed over all open production pits to eliminate hazard to migratory birds or other wildlife. The mesh diameter will be no larger than one (1) inch.
      e. Production facilities, including dikes, production/water tanks, heater-treaters, gas separators, production/emergency pits will be placed on the cut portion of the well location and a minimum of 10 feet from the toe of the back cut.
      f. All above ground production equipment will be painted light reflective colors to minimize evaporation and waste of hydrocarbons. Above ground permanent structures will be painted to blend with the surrounding landscape.
      g. Any flow lines laid for production facilities will be buried.
6. LOCATION OF DRILLING WATER SUPPLY
   A. Drilling water will be obtained either from a water well within the Project Area (Leo#1) or from the municipal water supply for the town of Mountain View, Wyoming.
   B. The Leo #1 water well is located in the SW ¼, SW ¼ Section 20, Township 15 North, Range 111 West and holds State Engineers Permit U.W. 179423.
   C. Method of transportation
      a. Water will be transported by tank truck using existing roads.

b. On a case-by-case basis, poly-pipe may be used to transport water from the permitted water well to a drilling location. In this case, a backflow preventer will be installed on the piped water supply.

7. CONSTRUCTION MATERIALS
   A. Plans are to use only soil materials from the drilling location and new access roads.
   B. Any surfacing materials required will be obtained from a properly permitted source in the area (typically pit gravel).
   C. No construction materials will be taken from Federal or Indian Lands without prior approval from the appropriate Surface Management Agency.
8. WASTE DISPOSAL
   A. Cuttings and drilling fluids, including salts and chemicals, will be deposited in the reserve pit.
   B. Drilling fluid will be evaporated and then buried in the reserve pit when dry at the completion of operations.
   C. Reserve pit – typical construction will include a 12 mil (or more) polyethylene liner of sufficient size and quality to withstand normal wear and tear associated with the installation and pit use. The liner shall be chemically compatible with all substances intended for placement in the pit. The pit will be fenced stock-tight on three sides during drilling operations and on the fourth side at time of rig release. The pit shall remain fenced until backfilled. Reclaiming and backfilling of the pit will occur when drying conditions so allow. The evaporation time for the pit fluids may be expedited by the use of aeration equipment.
   D. Produced fluids will be placed in test tanks during completion work and removed when testing is completed. For protection of livestock and wildlife, all pits containing toxic liquids will be fenced and netted. The quality of the fluids may be determined by sample and analysis to determine the necessity of “bird-tight” netting.
   E. Sewage disposal facilities will be installed in accordance with State and Local regulations. Typical facilities will include portable, self-contained chemical toilets. The contents will be pumped and disposed in an approved sewage disposal facility upon completion of operations or as required. No sewage will be buried on location or put in a borehole.
   F. Garbage and other solid waste – All sites of operation will have totally enclosed portable trash cages. The cage contents will be disposed in an approved sanitary landfill and the cages removed from the site upon completion of operations. The reserve pit will not be utilized for trash disposal.
   G. Chemicals/Used Oils: Any chemicals or used motor oils will be placed in properly labeled, closed containers and disposed at an authorized disposal location. No such materials will be disposed of in the reserve pit or on the well site location.
   H. Hazardous materials – All hazardous substances and commercial preparations will be handled in an appropriate manner to minimize the potential for leaks and spills to the environment.

I. No materials specifically listed or characteristic of hazardous waste will be used in drilling, testing or completion of the wells. If such substances are inadvertently generated, they will be handled in accordance with Federal and State Laws.
J. Any spills of oil, gas, salt water or potentially hazardous substances will be stopped upon discovery, cleaned up immediately and contaminated materials will be removed to an approved disposal location.

9. ANCILLARY FACILITIES

No ancillary facilities are anticipated at this time.

10. WELL SITE LAYOUT

A. A total of 10 new wells are proposed to be drilled in the Project Area. A typical drilling location is described in this section and illustrated on EXHIBIT A-3.
B. Each well location will be staked as shown on the APD supplied plat.
C. All equipment and vehicles will be confined to the access roads and pad areas.
D. A minimum of six (6) inches of topsoil will be stripped from the location and stockpiled for future reclamation of the well site. If snow is present when construction begins, the operator will remove it before the soil is disturbed.
E. Top soil and spoil piles will be segregated.
F. The operator will not push soil materials and overburden over side-slopes or into drainages. All soils disturbed will be placed in an area where it can be retrieved.
G. Pads will be constructed with back slopes and fore slopes no steeper than 1.5:1.
H. If ground frost prevents the segregation and removal of the topsoil material from the less desirable subsoil material, cross-ripping to the depth of the topsoil material may be necessary.
I. The reserve pits will be oriented to minimize and prevent collection of surface water runoff. The reserve pit will be constructed with a minimum of one-half (1/2) the total depth below the original ground surface on the lowest point within the pit, see EXHIBIT A-4.
J. Reserve pits will be lined with an impervious 12 mil polyethylene liner. The liner will be resistant to hydrocarbons. If fractured rock is encountered during pit construction, the liner will not be installed directly on the sharp rocks. In such instances, the pit will be prepared with bedding material such as sand or clay soils. The bedding materials will be sufficient to prevent contact and subsequent puncture on exposed rock.
K. No trash, scrap pipe, etc., that could puncture the liner, will be placed in the reserve pit.
L. Erosion control measures will be addressed as required by the General Permit to Discharge Storm Water and described in the project's Storm Water Pollution Prevention Plan (SWPPP).
M. If in connection with construction operations, a lessee/operator, his contractor, subcontractors, or the employees of any of them, discover, encounter, or become aware of any objects or sites of cultural value on the affected area, such as historical or prehistorical ruins, graves or grave markers, fossils, or artifacts, the lessee/operator shall immediately suspend all operations in the vicinity of the cultural value and notify the BLM Authorized Officer of the findings. Operations my resume at the discovery site upon receipt of written instructions and authorizations by the Authorized Officer at the Bureau of Land Management.

11. PIPELINES AND FLOWLINES
    A. Transportation plans and right-of-way applications will be prepared and submitted for approval when total length and final locations are determined.
    B. Construction plans and methods for pipelines and flow lines will be industry standard and minimize environmental impacts. Such plans will be in compliance with terms and conditions as stipulated by the surface owner.
12. RECLAMATION OF SURFACES
    A. Upon release of the drilling rig from a well location, the cellar, mouse and rat holes will be filled, compacted and plugged immediately. Trash and debris will be gathered and removed. The fourth side of the reserve pit will be fenced and the pit will be allowed to dry before it is backfilled. No adverse materials will be left on site.
    B. Dry Hole
        a. An above-ground tubular metal dry hole marker will be erected over the drill hole location upon cessation of drilling and/or testing operations. The marker will be inscribed with the operator's name, well number, well location, and lease number. The monument must consist of a piece of pipe and not less than four (4) inches in diameter and ten (10) feet in length, of which four (4) feet shall be above the general ground level and the remainder imbedded in cement. The top of the pipe must be closed by a welded or screw cap, cement or other means.
        b. During reclamation of the site, the operator will push fill material into the cuts and up over the back slope to approximate the original topography. Topsoil will be distributed from the stockpile and spread evenly over the entire location. The location will then be reseeded with seed mixture described in this plan.
        c. Any required waterbars will be constructed at least one (1) foot deep, on the contour with approximately two (2) feet of drop per 100 feet of waterbar to insure drainage, and to extend into established vegetation. All waterbars will to be constructed with the berm on the downhill side to prevent soft material from silting in the trench.
    C. Productive Well
        a. The commencement of reclamation operations will begin immediately upon the removal of the drilling and/or well completion rig. Completion of the restoration will depend on the weather and drying time of the reserve pits. Evaporation of pit fluids may be expedited by the use of aeration equipment. Once the reserve pit is dry, those areas not required for production will be re-contoured to approximate the pre-disturbance landform and reseeded.
        b. After final grading and before placement of the topsoil, the entire surface of the reclaimed area will be thoroughly ripped 12" to 18" deep. The area will be uniformly covered with the depressions constructed perpendicular to the natural flow of water and/or prevailing wind.
        c. All reclaimed area will be drill seeded. Where drilling is impractical the seed may be broadcasted. Seed should be broadcasted at twice the rate listed in this Plan.

d. All disturbed areas (including the unused topsoil piles) not needed for production operations will be reseeded. Final seeding of the reclaimed areas will be done in the spring or fall depending on the completion time of the reclamation.
e. The seed mix to be used is as follows:

	Lbs/acre PLS
Winterfat	2
Rosana Western Wheatgrass	5
Critana Thickspike Wheatgrass	5
Indiana Rice grass	3
Total	**15**

f. Production facilities will be installed, including dikes, as stated in previous portion of this plan. Open production pits, if used, will be netted to eliminate any hazard to migratory birds or other wildlife. The netted mesh diameter shall be no larger than one inch.
g. All permanent aboveground structures that will remain longer than six months will be painted a color as required by the BLM except where Occupation Health and Safety Act Rules and Regulations requires special safety colors be employed.

13. SURFACE OWNERSHIP
    A. Surface ownership in the Project Area is ~92% federal and managed by the Bureau of Land Management, 6.6% State and 1.6% privately owned.
14. OTHER INFORMATION
    A. An environmental assessment (EA) of the Project Area is being prepared. The EA will address all known potential impacts of this project.
    B. A Class III cultural survey of the well sites and access and utility corridors within the Project Area has been or will be completed.
    C. Soil characteristic: Clay loam with some surface rock with gravel and silty residuums.
    D. Flora: Vegetation consists of rabbitbush, wheatgrass, sagebrush, cactus, and various bunch grasses and forbs.
    E. Fauna: Antelope, deer, badger, rabbit, coyote, raptors, and various rodents.
    F. Surface water: There are ponds known to be in the area but no large surface waters or perennial streams.
    G. There are no occupied dwellings within the Project Area.
    H. The operators will comply with all stipulations found in the oil and gas leases covering the wells applied for under this Plan.
15. TYPICAL OPERATOR CERTIFICATION

    I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access route proposed here; that I am familiar with the conditions which currently exist; and the statements made in this plan are, to the best of my knowledge, true and correct; and that the work associated with operations proposed herein will be performed by Davis Petroleum Corp. and its contractors and subcontractors in conformity with this plan and the terms and conditions

under which it is approved. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

_____ _____

Regulatory/Permit Specialist Date
Davis Petroleum Corp.

GENERAL NOTIFICATION REQUIREMENTS:

Specific contacts and phone numbers will be provided by the Rock Springs Field Office as an attachment to the approved permit.

The spud date will be orally reported to the Authorized Officer (AO) TWENTY-FOUR (24) HOURS PRIOR TO SPUDDING.

All wells, whether drilling, producing, suspended or abandoned shall be identified in accordance with 43 CFR 3162.6, which requires the name of the operator, lease number, well number and location of the well.

In accordance with *Onshore Oil & Gas Order No. 1,* all wells will be reported on MMS Form 3160- 6, *Monthly Report of Operations and Production,* starting with the month in which operations commence and continuing each month until the well is physically plugged and abandoned.

All undesirable events (fires, accidents, blowouts, spills, discharges) as specified in NTL-3A will be reported to the Rock Springs Field Office. Major events will be reported verbally within twenty-four (24) hours and will be followed with a written report within fifteen (15) days. 'Other than Major Events' will be reported in writing within fifteen (15) days. 'Minor Event' will be reported on the *Monthly Report of Operations and Production* (Form #3160-6).

No well abandonment operations will be commenced without the prior approval of the AO. In the case of newly-drilled dry holes or failures, and in emergency situations, oral approval will be obtained from the Area Petroleum Engineer.

A *Notice of Intent to Abandon* (Form #3160-5) will be filed with the AO within fifteen (15) days following the granting of oral approval to plug and abandon. Upon completion of approved plugging, a regulation marker will be erected in accordance with 43 CFR 3162.6. The following information will be permanently placed on the marker with a plate or cap, or beaded-on with a welding torch: Operator Name, Well Name and Number, Location by Quarter/Quarter, Section, Township, Range and Federal Lease Number.

A *Subsequent Report of Abandonment* (Form #3160.5) will be submitted within thirty (30) days following the actual plugging of the well bore. This report will indicate where plugs were placed and the current status of surface restoration operations. If surface restoration has not been completed at that time, a follow-up report on Form 3160-5 will be filed when all surface restoration work has been completed and the location is considered ready for final inspection.

Pursuant to NTL-4A, lessees and operators are authorized to vent/flare gas during initial well evaluation tests, not exceeding a period of thirty (30) days or the production of fifty (50) MMCF of gas, whichever occurs first. An application must be filed with the AO, and approval received, for any venting/flaring of gas beyond the initial thirty (30) days or otherwise authorized test period.

Not later than the *5th* business day after any well begins production on which royalty is due anywhere on a lease site or allocated to a lease site, or resumes production in the case of a well which has been off production for more than ninety (90) days, the operator shall notify the AO by letter or Sundry Notice of the date on which such production has begun or resumed.

The notification shall provide as a minimum, the following information:

- Operator name, address, telephone number
- Well name and number
- Well location, i.e. ¼, ¼, Section, Township, Range, P.M.
- Date well was placed in a producing status
- The nature of the well's production, i.e. crude oil, casing head gas, natural gas and entrained liquid hydrocarbons
- The OCS, Federal or Indian lease prefix and number on which the well is located. Otherwise, the non-Federal or non-Indian land category, i.e. state or private

In accordance with 43 CFR 3162.7-4(d), within sixty (60) days following construction of a new tank battery, a site facility diagram of the battery showing actual conditions and piping must be submitted to the AO. Facility diagrams shall be filed within sixty (60) days after existing facilities are modified.

Pursuant to *Onshore Oil & Gas Order No. 1,* lessees and operators have the responsibility to see that their exploration, development, production and construction operations are conducted in such a manner which conforms with applicable Federal laws and regulations and with State and local laws and regulations to the extent that such State and local laws are applicable to operations on Federal and Indian lands.

EXHIBIT A-1 Map of the general Puma Deep Project Area

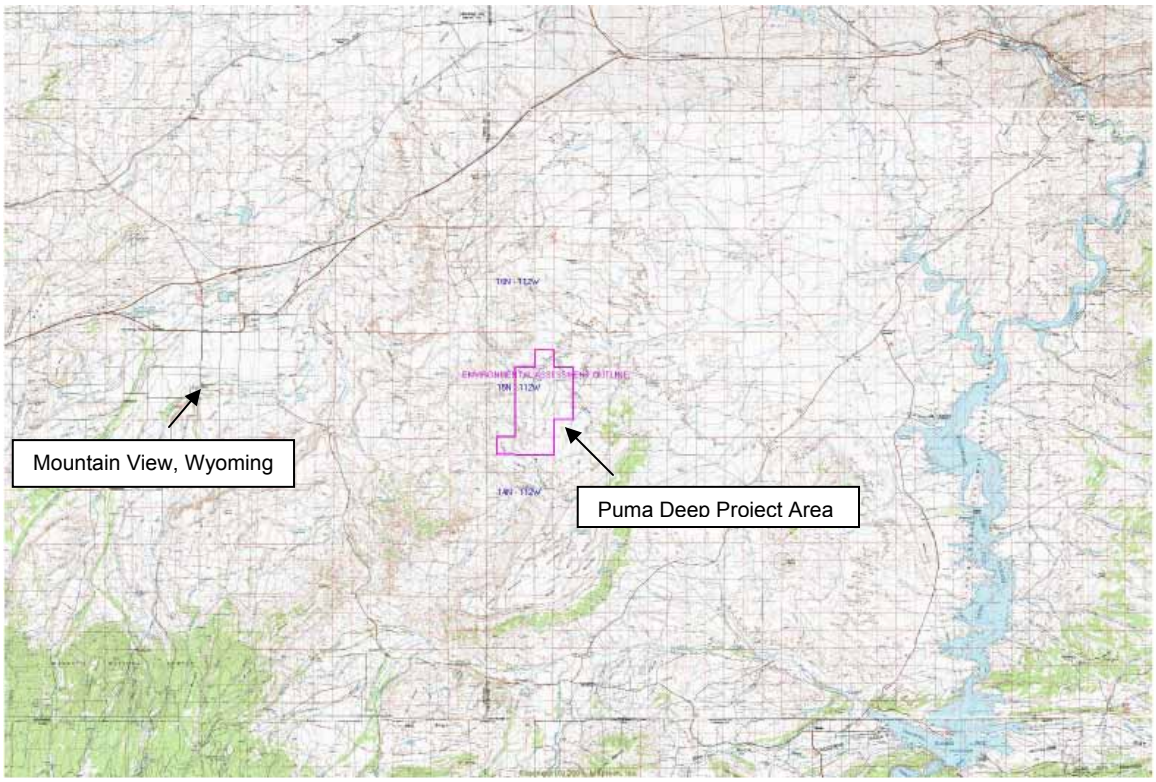


EXHIBIT A-2 All wells (water, injection, disposal, producing, abandoned, and drilling) located within the Puma Deep Project Area

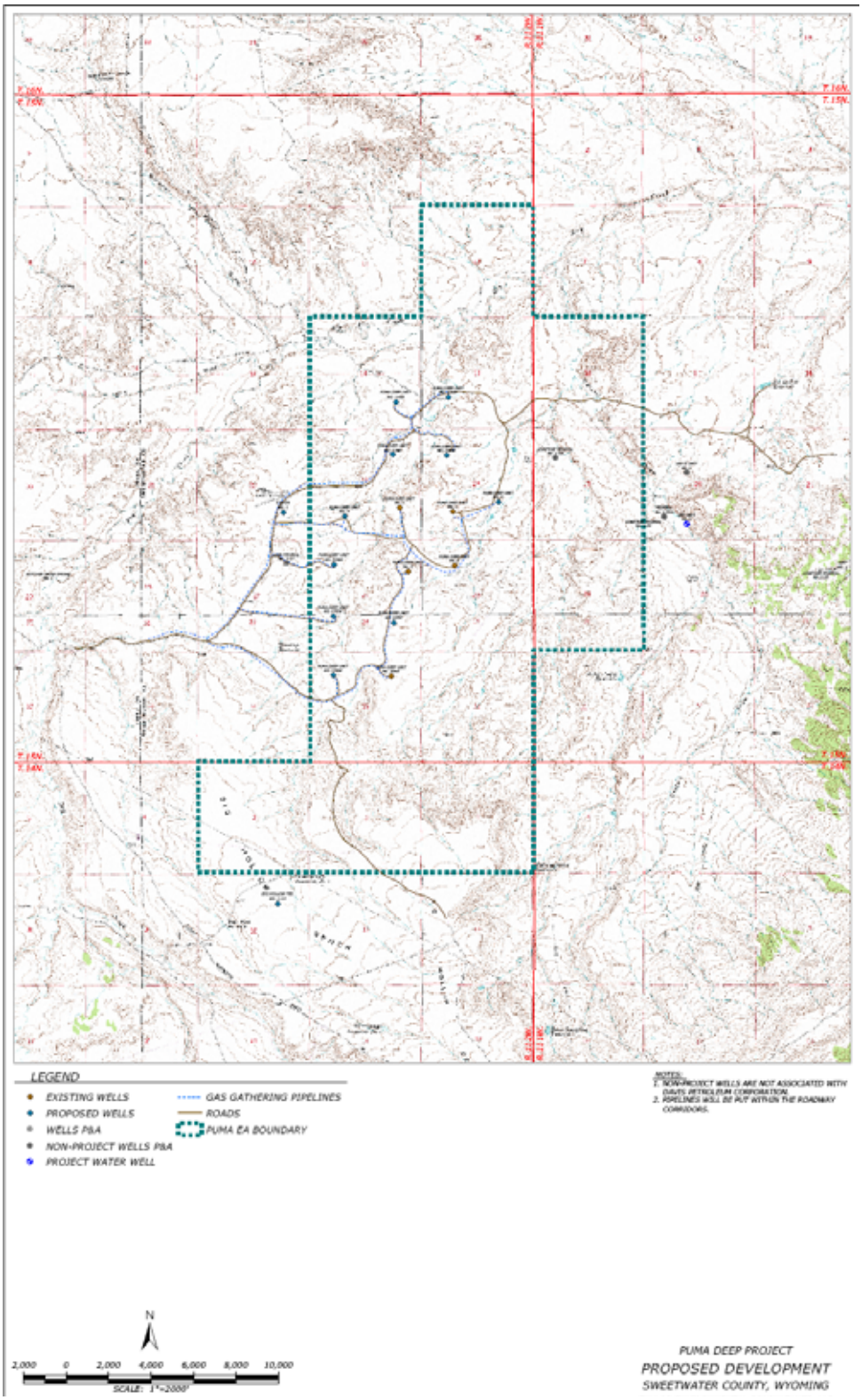


EXHIBIT A-3 Example of typical drilling location well site layout

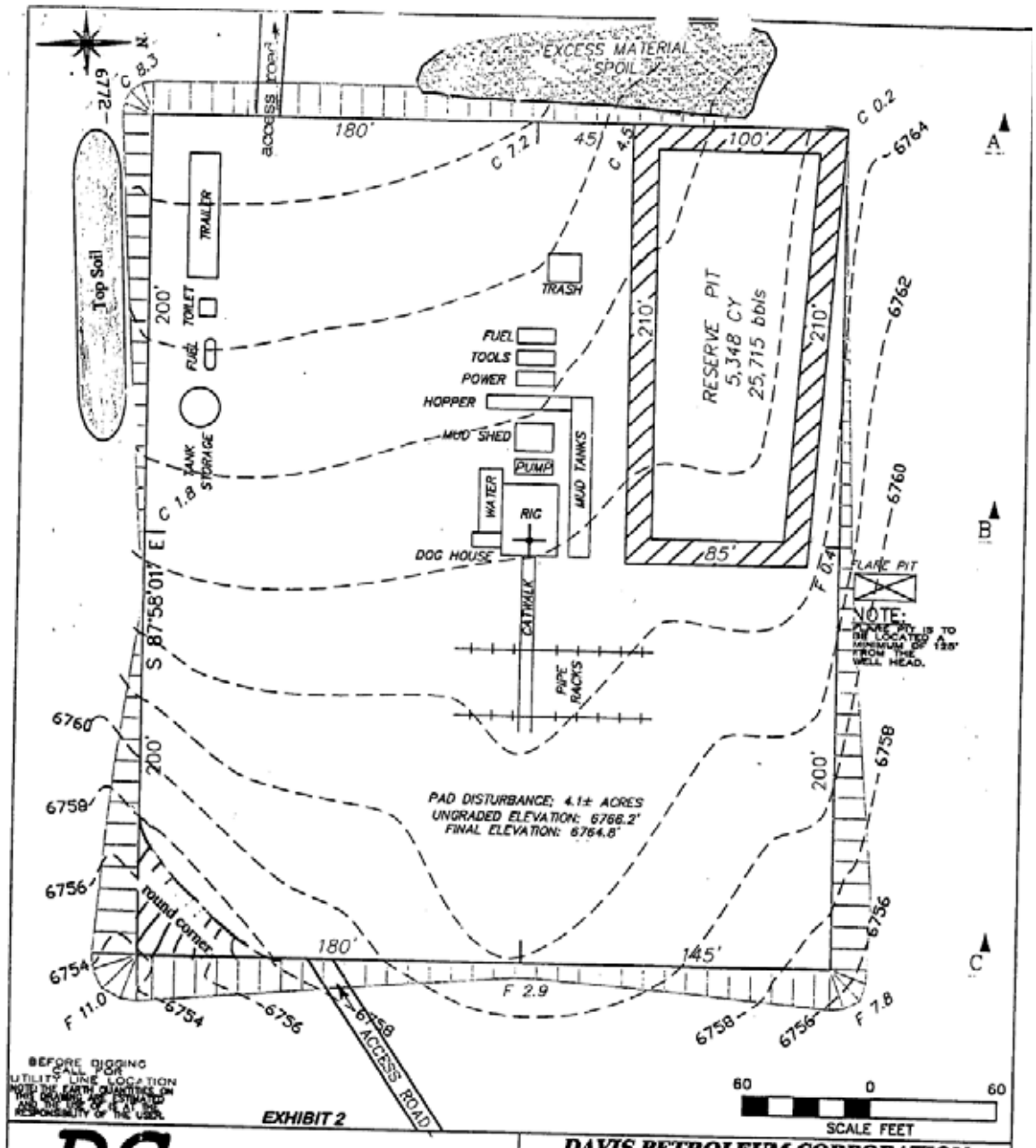
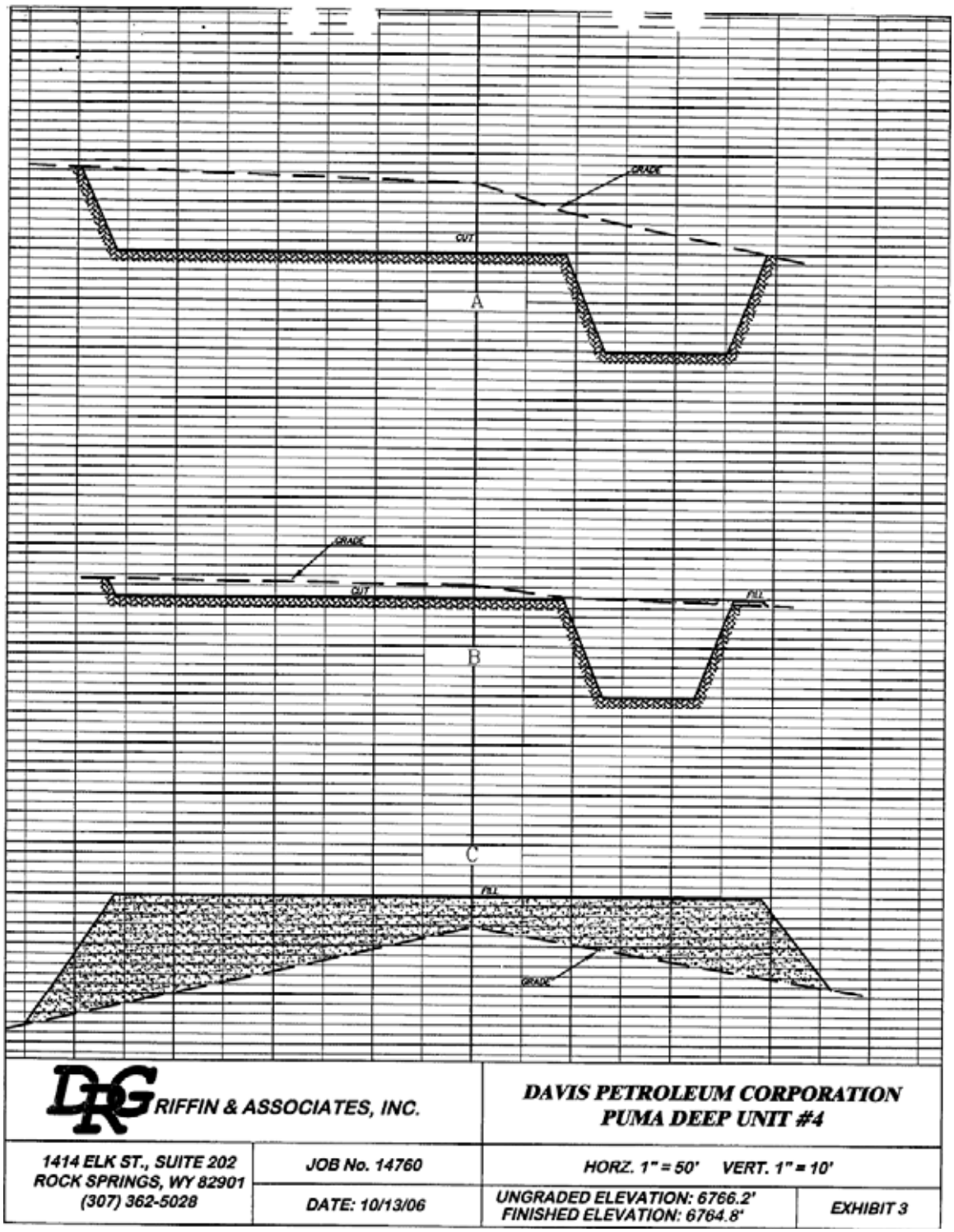


EXHIBIT A-4 Example of typical drilling location cross sections



APPENDIX B

Hazardous Materials Inventory

Hazardous Materials Management Summary

This table includes the types and quantities of hazardous and extremely hazardous materials that may be expected to be used, stored, transported or disposed within the Puma Deep Project Area. Specific materials on hand at any one time varies with contractors and activities.
* Reportable Quantity

Product	Hazardous Substances	CAS#	RCRA#	RQ*
409				
	Monoethanolamine	141-43-5		
	n-Alkyl (C12-16) Dimethylbenzyl Ammonium Chloride	68424-85-1		
	n-Propoxypropanol	1569-01-3		
Acfrac Ceramax E				
	Crystalline Silica, Quartz	14808-60-7		
	Mullite	1302-93-8		
	Phenol/Formaldehyde resin	9003-35-4		
Adhesive, Polyguard 600 Liquid				
	Methyl Ethyl Ketone	78-93-3	U159	5000Lbs
	Mineral Spirits	64742-88-7		
	Toluene	108-88-3	U109	10Lbs
Ajax, Oxygen Bleach Cleaner				
	Calcium Carbonate	471-34-1		
	Crystalline Silica	14808-60-7		
Amoco 300 Motor Oil SAE 30				
	MSDS Not Found			
Antifreeze 60/40 premix				
	Ethylene Glycol	107-21-1	None	5000Lbs
	Diethylene Glycol	111-46-6		
AntiSeize Special Lubricating Compound 18014				
	Aluminum (as dust or fume)	7429-90-5		
	Copper (as dust or fume)	7440-50-8	None	5000Lbs
	Graphite	7782-42-5		
	Petroleum Oil	64742-65-0		
BA-20 Buffering Agent	Acetic Acid	64-19-7	None	5000lbs
	Ammonium Acetate	631-61-8	None	5000lbs
BA-40L Buffering Agent	Potassium Carbonate	584-08-7		
Barite	Barium Sulfate	7727-43-7		
	Crystalline Silica, Quartz	14808-60-7		
Barite (Barium Sulfate, MI Bar)	MSDS Not Found			
Base, Belzone 1221 Super-E Metal	MSDS Not Found			
Battery Cleaner #80369	2-Butoxyethanol	111-76-2		
	Butane	106-97-8		
	Propane	74-98-6		
	Water	7732-18-5		
BC-140	Boric Acid	10043-35-3		
	Ethylene Glycol	107-21-1	None	5000Lbs
	Monoethanolamine	141-43-5		

BE-5 Microbiocide	2-Methyl-4-Isothiazoline-3-one	2682-20-4		
	5-Chloro-2-Methyl-4-Isothiazolin-3-one	26172-55-4		
	Crystalline Silica, Quartz	14808-60-7		
	Diatomaceous Earth	61790-53-2		
	Magnesium Chloride	7786-30-3		
	Magnesium Nitrate	10377-60-3		
	2-Bromo-2-nitro-1,3-propanediol	52-51-7		
Big D Deodorant Urinal Screens	MSDS Not Found	None		
Bleach	Sodium hydroxide	1310-73-2	None	1000Lbs
	Sodium hypochlorite	7681-52-9	None	100Lbs
Boothill Paraffinized Pellets	Bromadiolone	28772-56-7		
Borax Powdered Hand Soap	Sodium Borate Decahydrate (Borax)	1303-96-4		
	Sodium Soap	67701-11-5		
Bowl Cleaner, #2300	Hydrogen Chloride	7647-01-0	None	5000Lbs
	Quatenary Ammonium Chloride	111-76-2		
	Water	7732-18-5		
Brake Parts Cleaner II, Misty A-00734	Acetone	67-64-1	U002	5000Lbs
	Hexane	110-54-3		
Breakthrough (Washbay Pressure Washer Soap)	MSDS Not Found			
C9721A Toner	Copper Compund	Trade Secret		
	Styrene Acrylate Copolymer	Trade Secret		
	Wax	Trade Secret		
Calcium Chloride	Calcium Chloride	010043-52-4		
	Calcium Chloride	010043-52-4		
Calcium Chloride Solution	Calcium Chloride	010043-52-4		
Cal-Seal 60	Calcium Sulfate	None		
CarboHSP (Ceramic Proppant)	Corundum	1302-74-5		
	Mullite	1302-93-8		
Carbon Dioxide	Carbon Dioxide	124-38-9		
CarboProp	Corundum	1302-74-5		
	Mullite	1302-93-8		
CAT-3 Activator	EDTA/Copper Chelate	None		
CAT-3WB	EDTA/Copper Chelate	None		
	Methanol	67-56-1	U154	5000lbs
CAT-4	Diethylenetriamine	111-40-0		
CAT-4 (Amine)	MSDS Not Found			
Caustic Soda (Sodium Hydroxide)	Sodium hydroxide	1310-73-2	None	1000Lbs
Cedar Fiber (Shredded Cedar, Cellulose)	MSDS Not Found			
Cement- Class G	Crystalline Silica, Quartz	14808-60-7		
	Portland Cement	65997-15-1		
CFR-2 Red Label	Polyvinylpyrrolidone	9003-39-8		

(Cement Friction Reducer)				
	Sulfonated Organic Salt Condensate	None		
CFR-3 (Cement Friction Reducer)	Sodium Formate	141-53-7		
	Sulfonic Acid Salt	None		
Chevron Delco 400 SAE 30/40 Motor Oil	Highly Refined Mineral Oil	Mixture		
	Zinc Alkyl Dithiophosphate	68649-42-3		
Chevron HDAX Low Ash Gas Engine Oil SAE 40	Highly Refined Mineral Oil	Mixture		
Chevron Hydraulic Oil AW ISO 32	Highly Refined Mineral Oil	Mixture		
Chevron Rykon AW ISO 10	Highly Refined Mineral Oil	Mixture		
Chevron SRI Grease NLG2	Highly Refined Mineral Oil	Mixture		
CI-25 (Inhibitor-Acid)	MSDS Not Found			
CL-11 Crosslinker	Isopropanol	67-63-0		
	Titanium Complex	None		
CL-22 Crosslinker	Borate Salts	None		
	Diesel	68476-34-6		
	Methanol	64-56-1	U154	5000lbs
CL-22M Crosslinker	Diesel	68476-34-6		
	Ulexite	1319-33-1		
CL-23 Crosslinker	Ammonium Chloride	12125-02-9	None	5000lbs
CL-28M Crosslinker	Zirconium Complex	None		
CL-29 Crosslinker	Formic Acid	64-18-6	U123	5000Lbs
	Lactic Acid	10326-41-7		
	Tetraethylenepentamine	112-57-2		
	Zirconium Complex	None		
CL-31 Crosslinker	Potassium Hydroxide	1310-58-3	None	1000Lbs
	Potassium Metaborate	13709-94-9		
Cla-Sta XP Additive	Polyepichlorohydrin, trimethyl amine quatemized	51838-31-4		
Clayfix-II Material	Alkylated Quaternary Chloride	None		
Cleaner/Degreaser, Belzona 9111	MSDS Not Found			
Compressed Gas, 25% Methane, 21% O2, N2	Methane	74-82-8		
	Nitrogen	7727-37-9		
	Oxygen	7782-44-7		
Condensate	Mixture of aliphatic hydrocarbons of carbon number >=4	Mixture		
	Benzene	71-43-2		
	Hydrogen Sulfide	7783-06-4		
	Natural Gas	8006-14-2		
	n-Hexane	110-54-3		
D-Air 3000L	Alkenes	None		
	Silica, amorphous precipitated	67762-90-7		
DAP Weldwood	Aliphatic Petroleum Distillate	64742-89-8		

Contact Cement				
	Methyl Ethyl Ketone	78-93-3	U159	5000Lbs
	Toluene	108-88-3	U109	10Lbs
Degreaser, Heavy Duty (Aerosol #03095)	1,2-Butylene Oxide	106-88-7		
	Carbon Dioxide	124-38-9		
	Tetrachloroethylene (PERC)	127-18-4	U210	100Lbs
	Trichloroethylene (TCE)	79-01-6	U228	100Lbs
Delvac 1210 Motor Oil SAE 10W	Phosphorodithioic Acid, O, O-DI-C1-14-Alkyl Esters, Zinc Salt (2:1) ZDDP	68649-42-3		
Diacel LWL	Cellulose derivative	None		
Diesel Fuel	Diesel	68476-34-6		
Doc-3 Surfactant	Imidazoline	None		
	Isopropanol	67-63-0		
Dual Spacer	Aluminum Oxide	1344-28-1		
	Crystalline Silica, Quartz	14808-60-7		
	Diatomaceous Earth	61790-53-2		
	Silica, amorphous-diatomaceous Earth	68855-54-9		
Econolite Additive	Sodium Metasilicate, Anhydrous	6834-92-0		
Econoprop Proppant	Aluminum Silicate	1302-76-7		
	Crystalline Silica, Cristobalite	14464-46-1		
Electro Wash 2000	Ethanol	64-17-5		
	Ethyl Acetate	141-78-6	U112	5000Lbs
	Isopropanol	67-63-0		
	Naphtha	64741-66-8		
Enamel, Cote All (Yellow, Red, Neutral)	Crystalline Silica	14808-60-7		
	Ethyl Benzene	100-41-4	None	1000Lbs
	Mineral Spirits	64742-48-9		
Enamel, Engine Black #203	Butane	106-97-8		
	Carbon Black	1333-86-4		
	Dimethyl Ketone	67-64-1	U002	5000Lbs
	Ethyl 3-Ethoxypropionate	763-69-9		
	Ethyl Acetate	141-78-6	U112	5000Lbs
	Ethylbenzene	100-41-4	None	1000Lbs
	Methyl Ethyl Ketone	78-93-3	U159	5000Lbs
	Propane	74-98-6		
	Proprietary Resin	None		
	Xylene (W/ Anti-Static)	1330-20-7	U239	100Lbs
Enamel, Gloss Gray 610 Series 2	Alkyd Resin	None		
	Alkyd Resin Titanium Dioxide (total dust)	13463-67-7		
	Aluminum Oxides	1344-28-1		
	Amorphous Silica	7631-86-9		
	Mineral Spirits as Stoddard Solvent	8052-41-3		
Enamel, Gloss Protective Blue #7722830	1,2,4-Trimethylbenzene	95-63-6		

	Acetone	67-64-1	U002	5000Lbs
	Aliphatic Hydrocarbon	64742-89-8		
	Aromatic Hydrocarbon	64742-95-6		
	Aromatic Solvent	64742-95-6		
	Ethylbenzene	100-41-4	None	1000Lbs
	Ethylene Glycol Monobutyl Ether	111-76-2		
	Liquefied Petroleum Gas	68476-86-8		
	Magnesium Silicate	14807-96-6		
	N-Butyl Acetate	123-86-4	None	5000Lbs
	Pigment Black 7	1333-86-4		
	Pigment Red 122	980-26-7		
	Pigment Violet 32	12225-08-0		
	Propylene Carbonate	108-32-7		
	Stoddard Solvent	8052-41-3		
	Titanium Dioxide	13463-67-7		
	Toluene	108-88-3	U109	10Lbs
	Xylene	1330-20-7	U239	100Lbs
Enamel, Industrial Tough Coat, OSHA Blue # 1510				
	1-Methoxy-2-Propanol Acetate	108-65-6		
	Acetone	67-64-1	U002	5000Lbs
	Butane	106-97-8		
	Ethylbenzene	100-41-4	None	1000Lbs
	Methyl Ethyl Ketone	78-93-3	U159	5000Lbs
	Methyl Isobutyl Ketone	108-10-1	U161	5000Lbs
	Propane	74-98-6		
	Titanium Dioxide	13463-67-7		
	Xylene	1330-20-7	U239	100Lbs
Enamel, Industrial Tough Coat, OSHA Red #2116				
	1-Methoxy-2-Propanol Acetate	108-65-6		
	Acetone	67-64-1	U002	5000Lbs
	Butane	106-97-8		
	Ethylbenzene	100-41-4	None	1000Lbs
	Methyl Ethyl Ketone	78-93-3	U159	5000Lbs
	Methyl Isobutyl Ketone	108-10-1	U161	5000Lbs
	Propane	74-98-6		
	Xylene	1330-20-7	U239	100Lbs
Enamel, Industrial Yellow, 944300, 9444402, 944504				
	Calcium Aluminum Silicate	1332-58-7		
	Magnesium Silicate	14807-96-6		
	Pigment Black 7	1333-86-4		
	Pigment Orange 5	3468-63-1		
	Pigment Red 3	2425-85-6		
	Pigment Yellow 74	6358-31-2		
	Stoddard Solvent	8052-41-3		
	Titanium Dioxide	13463-67-7		
Enamel, Interior-Exterior (Tile Gray #71)				
	(As Nuisance Particulates)	1317-80-2		
	(As Nuisance Particulates)	37244-96-5		

	Carbon Black	1333-86-4		
	Sodium Potassium Aluminum Silicate	37244-96-5		
	Titanium Dioxide	1317-80-2		
Enamel, Metallic (Silver) 400				
	Acetone	67-64-1	U002	5000Lbs
	Aliphatic Hydrocarbon Solvent	64742-89-8		
	Ethylbenzene	100-41-4	None	1000Lbs
	Mineral Spirits	64742-88-7		
	Propane	74-98-6		
	Toluene	108-88-3	U109	10Lbs
	V. M. & P. Naphtha	64742-89-8		
	Xylene	1330-20-7	U239	100Lbs
Enamel, Premium Gloss Protective Blue #7727830				
	1,2,4-Trimethylbenzene	95-63-6		
	Acetone	67-64-1	U002	5000Lbs
	Aliphatic Hydrocarbon	64742-89-8		
	Aromatic Hydrocarbon	64742-95-6		
	Aromatic Solvent	64742-95-6		
	Ethylbenzene	100-41-4	None	1000Lbs
	Ethylene Glycol Monobutyl Ether	111-76-2		
	Liquefied Petroleum Gas	68476-86-8		
	Magnesium Silicate	14807-96-6		
	N-Butyl Acetate	123-86-4	None	5000Lbs
	Pigment Black 7	1333-86-4		
	Pigment Red 122	980-26-7		
	Pigment Violet 32	12225-08-0		
	Propylene Carbonate	108-32-7		
	Stoddard Solvent	8052-41-3		
	Titanium Dioxide	13463-67-7		
	Toluene	108-88-3	U109	10Lbs
	Xylene	1330-20-7	U239	100Lbs
Enamel, Premium Gloss Protective Blue # 7724830				
	1,2,4-Trimethylbenzene	95-63-6		
	Acetone	67-64-1	U002	5000Lbs
	Aliphatic Hydrocarbon	64742-89-8		
	Aromatic Hydrocarbon	64742-95-6		
	Aromatic Solvent	64742-95-6		
	Ethylbenzene	100-41-4	None	1000Lbs
	Ethylene Glycol Monobutyl Ether	111-76-2		
	Liquefied Petroleum Gas	68476-86-8		
	Magnesium Silicate	14807-96-6		
	N-Butyl Acetate	123-86-4	None	5000Lbs
	Pigment Black 7	1333-86-4		
	Pigment Red 122	980-26-7		
	Pigment Violet 32	12225-08-0		
	Propylene Carbonate	108-32-7		
	Stoddard Solvent	8052-41-3		
	Titanium Dioxide	13463-67-7		
	Toluene	108-88-3	U109	10Lbs

	Xylene	1330-20-7	U239	100Lbs
Enamel, Premium Gloss Protective Green #7738830	1,2,4-Trimethylbenzene	95-63-6		
	Acetone	67-64-1	U002	5000Lbs
	Aliphatic Hydrocarbon	64742-89-8		
	Aromatic Hydrocarbon	64742-95-6		
	Aromatic Solvent	64742-95-6		
	Ethylbenzene	100-41-4	None	1000Lbs
	Ethylene Glycol Monobutyl Ether	111-76-2		
	Liquefied Petroleum Gas	68476-86-8		
	Magnesium Silicate	14807-96-6		
	N-Butyl Acetate	123-86-4	None	5000Lbs
	Pigment Black 7	1333-86-4		
	Pigment Red 122	980-26-7		
	Pigment Violet 32	12225-08-0		
	Propylene Carbonate	108-32-7		
	Stoddard Solvent	8052-41-3		
	Titanium Dioxide	13463-67-7		
	Toluene	108-88-3	U109	10Lbs
	Xylene	1330-20-7	U239	100Lbs
Enamel, Premium Gloss Protective Red #7763830	1,2,4-Trimethylbenzene	95-63-6		
	Acetone	67-64-1	U002	5000Lbs
	Aliphatic Hydrocarbon	64742-89-8		
	Aromatic Hydrocarbon	64742-95-6		
	Aromatic Solvent	64742-95-6		
	Ethylbenzene	100-41-4	None	1000Lbs
	Ethylene Glycol Monobutyl Ether	111-76-2		
	Liquefied Petroleum Gas	68476-86-8		
	Magnesium Silicate	14807-96-6		
	N-Butyl Acetate	123-86-4	None	5000Lbs
	Pigment Black 7	1333-86-4		
	Pigment Red 122	980-26-7		
	Pigment Violet 32	12225-08-0		
	Propylene Carbonate	108-32-7		
	Stoddard Solvent	8052-41-3		
	Titanium Dioxide	13463-67-7		
	Toluene	108-88-3	U109	10Lbs
	Xylene	1330-20-7	U239	100Lbs
Enamel, Premium Orange #789882	MSDS Not Found			
Enamel, Super Tough Coat (Black 729-0604)	2-(2-Methoxyethoxy) -ethanol	111-77-3		
	Carbon Black	1333-86-4		
Enamel, Tan	Crystalline Silica	14808-60-7		
	Ethyl Benzene	100-41-4	None	1000Lbs
	Mineral Spirits	64742-48-9		
ES Coolant Blends	MSDS Not Found			

Ethylene Glycol Monobutyl Ether	Ethylene Glycol Monobutyl Ether	111-76-2		
FDP-S704-03	MSDS Not Found			
FDP-S714-04	MSDS Not Found			
FDP-S816-05	MSDS Not Found			
FE-1A Acidizing Composition	Acetic Acid	64-19-7	None	5000lbs
	Acetic Anhydride	108-24-7	None	5000lLbs
Ferchek A Reducing Agent	Citric Acid	77-92-9		
	Hydroxylamine Hydrochloride	5470-11-1		
	Silica, Amporphous-Fumed	7631-86-9		
Ferrotrol 300L (Iron Control)	MSDS Not Found			
Finish, Gloss White V2192833	Acetone	67-64-1	U002	5000Lbs
	Aliphatic Petroleum Distillate	64742-48-9		
	Ethylbenzene	100-41-4	None	1000Lbs
	Liquefied Petroleum Gas	68476-86-8		
	Magnesium Silicate	14807-96-6		
	Titanium Dioxide	13463-67-7		
	Toluene	108-88-3	U109	10Lbs
	Xylene	1330-20-7	U239	100Lbs
Finish, Safety Red V2164838	Acetone	67-64-1	U002	5000Lbs
	Ethylbenzene	100-41-4	None	1000Lbs
	Ethylene Glycol Monobutyl Ether	111-76-2		
	Liquefied Petroleum Gas	68476-86-8		
	N-Butyl Acetate	123-86-4	None	5000Lbs
	Xylene	1330-20-7	U239	100Lbs
Flocelle 3/8"	MSDS Not Found			
FMS375 Foamer Stick	MSDS Not Found			
FMW3032 Foamer	MSDS Not Found			
Foam Soap, Aero green	2-bromo-2-nitropropane-1, 3-diol	52-51-7		
	Citric Acid	77-92-9		
	Cocamidopropyl Betaine	61789-40-4		
	D&C Green No.5	4403-90-1		
	FD&C Yellow No.5	1934-21-0		
	Fragrance	None		
	PPG-24-Glycereth-24	9082-00-2		
	Propylene Glycol	57-55-6		
	Sadium Laureth Sulfate	68585-34-2		
	Tetrasodium EDTA	64-02-8		
	Triclosan	3380-34-5		
	Water	7732-18-5		
FR-26LC	Hydrotreated Light Petroleum Distillate	64742-47-8		
	Hydrotreated Light Petroleum Distillate	64742-47-8		
	9-Octadecenamide, n, n-bis-2(hydroxy-ethyl)-,(Z)	93-83-4		
	Acrylamide Copolymer	None		
	Hydrotreated Light Petroleum Distillate	64742-47-8		

FR-56	Hydrotreated Light Petroleum Distillate	64742-47-8		
Future Floor Finish	Diethylene Glycol Methyl Ether	111-90-0		
	Modified Acrylic Copolymer	None		
	Tributoxy Ethyl Phosphate	000078-51-3		
	Water	7732-18-5		
Gasoila WFP (Water Finding Paste)	Triethanolamine	102-71-6		
Gasoline Gauging Paste	All Ingredients Non Hazardous	None		
GBW-30 Breaker	Carbohydrates	None		
	Hemicellulase Enzyme	9012-54-8		
Gel-Sta L Stabilizer	Sodium Thiosulfate	7772-98-7		
Gel-Sta Stabilizer	Sodium Thiosulfate	7772-98-7		
Gilsonite Resin	Natural Asphalt	12002-43-6		
Glade Spin Fresh (Toilet Paper Rollers)	Sodium Silico Aluminate	None		
	Sodium Siulfate	None		
Gone, Carpet Spot Cleaner	Dipropylene Glycol Butyl Ether	29911-28-2		
	Linear Alkyl Benzene Sulfonic Acid	68584-22-5		
	Perfume, Coloring and Additives less than 1%	None		
	Soft Water	7732-18-5		
GP Forward General Purpose Cleaner	Alochol Ethoxylates	68439-46-3		
	Propylene Glycol Methyl Ether	107-98-2		
Grease, #105 Motor Assembly	Calcium Thickener	68309-87-5		
	Mineral Oil	64742-52-5		
	Zinc Oxide	1314-13-2		
Grease, Chevron Ultra Duty EP	Highly Refined Mineral Oil	Mixture		
	Zinc Dialkyldithiophosphate	68649-42-3		
Grease, Super Lube #2	Additives	PROPRIETARY		
	Lubricant Base Oil (Petroleum)	Various		
	Zinc Compounds	PROPRIETARY		
HAI-60 Acid Inhibitor	Potassium Iodide	7681-11-0		
HAI-85M Acid Inhibitor	Copper Iodide	7681-65-4		
	Dimethyl Formamide	68-12-2		
	Ehtyl Octynol	5877-42-9		
	Isopropanol	67-63-0		
	Propargyl Alcohol	107-19-7	P102	1000Lbs
	Quaternary Ammonium Salts	None		
Halad 322 Cement Additive	Cellulose derivative	None		
	Sodium hydroxide	1310-73-2	None	1000Lbs
	Sulfonic Acid Salt	None		
	Modified Acrylic Copolymer	None		
	Sodium Hydroxide	1310-73-2	None	1000Lbs
	Acrylic Resin	Mixture		

	Sodium hydroxide	1310-73-2	None	1000Lbs
	MSDS Not Found			
Halad 9 Cement Additive	MSDS Not Found			
Halliburton Super Flush Additive	Crystalline Silica, Quartz	14808-60-7		
	Silica, amorphous-diatomaceous Earth	68855-54-9		
	Sodium Bicarbonate	144-55-8		
	Sodium Metasilicate, Anhydrous	6834-92-0		
Halliburton Weld A Converter	Penetaethylenehexamine	4067-16-7		
	Tetraethylenepentamine	112-57-2		
	Triethanolamine	112-24-3		
Halliburton Weld A Resin	Aluminum	7429-90-5		
	Butyl Glycidyl Ether			
	Calcium Carbonate	471-34-1		
	Crystalline Silica, Quartz	14808-60-7		
	Epoxy Resin	None		
Hand Cleaner, Fast Orange 23108	D-Limonene	5989-27-5		
	Ethoxylated C11-C16 Alcohol	127036-24-2		
	Pumice	1332-09-8		
	Silica Quartz	14808-60-7		
	Water	7732-18-5		
HC-2	Inner Salt of Alhyl Amines	None		
	Sodium Chloride	7647-14-5		
Hi-Dense No. 4 Weight Additive	Aluminum Oxide	1344-28-1		
	Crystalline Silica, Quartz	14808-60-7		
	Iron Oxide	1309-37-1		
High Performance Lubricant Syn Film 32	MSDS Not Found			
HI-M-PACT 5458 Kinetic Hydrate Inhibitor	MSDS Not Found			
	MSDS Not Found			
Howco Gel (Bentonite)	Bentonite	1302-78-9		
	Crystalline Silica, Cristobalite	14464-46-1		
	Crystalline Silica, Quartz	14808-60-7		
	Crystalline Silica, Tridymite	15468-32-3		
Howco Suds Sticks	Polyethylene Glycol	25322-68-3		
	Sodium Chloride	7647-14-5		
Howco-Suds Foaming Agent	MSDS Not Found			
HPT-1	No-Hazardous Substances	None		
HR-12 Additive	Modified Lignosulfonate	None		
HR-5 Additive	Modified Lignosulfonate	None		
HT Breaker	Tert-Butyl Hydroperoxide	75-91-2		
Hydraulic Jack Oil #80054	Distillates (petroleum), Hydrotreated Naphthenic	64742-53-6		

	Polymethacrylate Dispersion	Mixture		
Hydrochloric Acid (HCl)	MSDS Not Found			
Hydroclear Super SAE 30 Oil	Additives	PROPRIETARY		
	Lubricant Base Oil (Petroleum)	Various		
	p-dodecylphenol	74499-35-7		
Hydrochloric Acid	Hydrocloric Acid	7647-01-0	None	5000Lbs
HYG-3	Fumaric Acid	110-17-8	None	5000Lbs
HyTemp I (Inhibitor-Intensifier)	MSDS Not Found			
Injectrol Component A	Sodium Silicate	1344-09-8		
Injectrol G	Sodium Acid Pyrophosphate	7758-16-9		
	Sodium Silicate	1344-09-8		
Isobutylene	Isobutene	115-11-7		
Isopropyl Alcohol	Isopropanol	67-63-0		
Jump Start Starting Fluid #05761	Carbon Dioxide	124-38-9		
	Diethyl Ether	60-29-7	U117	100Lbs
	Heptane	142-82-5		
	Upper Cylinder Lubricant	64741-89-5		
K-34	Sodium Bicarbonate	144-55-8		
K-35	Sodium Carbonate	497-19-8		
KCL Potassium Chloride	Potassium Chloride	7447-40-7		
KEM Hi-Temp (Heat Resistant Ctg.) 1500 #10, #14	1,2,4-Trimethylbenzene	95-63-6		
	1,3,5-Trimethylbenzene	108-67-8		
	Cumene	98-82-8	U109	10Lbs
	Ethylbenzene	100-41-4	None	1000Lbs
	Light Aromatic Hydrocarbons	64742-95-6		
	Mineral Spirits	64742-88-7		
	Xylene	1330-20-7	U239	100Lbs
Kopr Kote (Anti-Seize Lubricant)	Metallic Copper	744-050-8		
	Nonhazardous Blend	829-805-49		
	Petroleum Oil	64742-65-0		
Kwik Seal Additive	No-Hazardous Substances	Mixture		
Kwik-Seal (Blend nut hulls, wood fiber, cellophane)	MSDS Not Found			
Leak detector, SNOOP	Surfactant	Not Available		
	Water	7732-18-5		
Lemon Oil Polish	Aliphatic Petroleum Distillate	64742-06-9		
	Paraffinic Petroleum Distillate	64742-65-0		
LGC-35 CBM	Paraffinic Solvent	None		
	Polysaccharide	None		
LGC-8M	Guar Gum	9000-30-0		
LGC-V	Diesel	68476-34-6		

	Guar Gum Derivative	None		
LGC-VI	Diesel	68476-34-6		
	Guar Gum Derivative	None		
Lime (Calcium Hydroxide)	MSDS Not Found			
Liquid Wrench Lubricant #L312	Carbon Dioxide	124-38-9		
	Naphthenic Petroleum Distillate	64742-52-5		
	Tetrachloroethylene	127-18-4	U210	100Lbs
Long Life Multi-Purpose Lubricant #1603	MSDS Not Found			
Losurf-259 Surfactant	Heavy Aromatic Petroleum Naphtha	64742-94-5		
	Isopropanol	67-63-0		
Losurf-300 Nonionic Surfactant	Ethoxylated Nonylphenol	None		
Lubricant, Power 4-HD-PSP-200 Synthetic Blend	MSDS Not Found			
Lubricant, Power 5-TC-30 Synthetic Blend	MSDS Not Found			
Lysol Plus Bleach	Alkyl (C12-C16) Dimethyl Benzyl Ammonium Chlorides	68424-66-1		
	Alkyl (C12-C18) Dimethyl Benzyl Ammonium Chloride	68391-01-5		
Marvel Mystery Oil	Chlorinated Hydrocrabons	00095-50-1	U109	10Lbs
	Mineral Spirits	08052-41-3		
	Napthenic Hydrocarbons	64742-52-5		
Matrixflo II	Dimethyl Glutarate	1119-40-0		
MC PDX-4500 Foaming Agent	MSDS Not Found			
Methanol	Methanol	67-56-1	U154	5000lbs
	MSDS Not Found			
MF-1	Sodium Acid Pyrophosphate	7758-16-9		
MI Gel (Sodium Montmorillonite)	MSDS Not Found			
Microbond Expanding Additive	Calcium Hydroxide	1305-62-0		
Microbond HT Cement	Magnesium Oxide	1309-48-4		
MO-67	Sodium hydroxide	1310-73-2	None	1000Lbs
Modified Gauging Paste- Methonol	Methanol	67-56-1	U154	5000lbs
Modified Water Finding Paste M-3	All Ingredients Non Hazardous	None		
Morflo III Surfactant	1-Methoxy-2-Propanol	107-98-2		
	Dodecylbenzene Sulfonic Acid	27176-87-0	None	1000Lbs
Murphy's Oil Soap	None			
Musol A Solvent	Oxylated Alcohol	None		
Natural Gas	Ehtane	74-84-0		
	Methane	74-82-8		
	Propane	74-98-6		

	MSDS Not Found			
NE-118 (Non-Emulsifying Agent)	MSDS Not Found			
Nitrogen Liquefied	Nitrogen	7727-37-9		
Nitrogen, Gas	Nitrogen	7727-37-9		
No 327 Armor Plate w/Moly-D	MSDS Not Found			
No. 1 Thinner	Mineral Spirits as Stoddard Solvent	8052-41-3		
Non-Flammable 19% O2, 25% LEL Pentane, H2S, N2	Carbon Monoxide	630-08-0		
	Hydrogen Sulfide	7783-06-4	U135	100Lbs
	Methane	74-82-8		
	Nitrogen	7727-37-9		
	Oxygen	7782-44-7		
Optiflo-HTE	Crystalline Silica, Quartz	14808-60-7		
	Walnut Hulls	Mixture		
Optiflo-II Delayed Release Breaker	Ammonium Persulfate	7727-54-0		
	Crystalline Silica, Quartz	14808-60-7		
Optiflo-III Delayed Release Breaker	Ammonium Persulfate	7727-54-0		
	Crystalline Silica, Quartz	14808-60-7		
Optiflo-LT Delayed Release Breaker	Citric Acid	77-92-9		
	Polyvinylidene Chloride	9002-85-1		
Orange Hand Cleaner, LC 25108	Castor Oil	8001-79-4		
	D-Limonene	5989-27-5		
	Ethoxylated C11-C16 Alcohol	127036-24-2		
	Propylene Glycol	57-55-6		
	Pumice	1332-09-8		
	Silica Quartz	14808-60-7		
	Water	7732-18-5		
Pacemaker T-68	Distillates, Petroleum, Hydrotreated heavy paraffinic	64742-54-7		
	Distillates, Petroleum, Solvent-refined heavy paraffinic	64741-88-4		
	Proprietary Ingredients	Mixture		
Paint & Varnish Remover, Kwik All Purpose	Ethylene Glycol Monobutyl	111-76-2		
	Isopropanol	67-63-0		
	Methanol	67-56-1	U154	5000lbs
	Methylene Chloride	75-09-2	U080	1000Lbs
	Water	7732-18-5		
Paint Marking Orange V2344834, V2345828	Aromatic Hydrocarbon	64742-95-6		
	Hydrotreated Light Distillate	64742-47-8		
	Liquefied Petroleum Gas	68476-86-8		
	Magnesium Silicate	14807-96-6		
	Naphtha	8032-32-4		

	Polymer Anchored Green Dye Dispersion	Mixture		
	Toluene	108-88-3	U109	10Lbs
	Xylene	1330-20-7	U239	100Lbs
Paint, Interior-Exterior 1504	1-Butanol	71-36-3	U031	5000lbs
	1-Methoxy-2-Propanol Acetate	108-65-6		
	Acetone	67-64-1	U002	5000Lbs
	Butane	106-97-8		
	Ethylbenzene	100-41-4	None	1000Lbs
	Methyl Ethyl Ketone	78-93-3	U159	5000Lbs
	Methyl Isobutyl Ketone	108-10-1	U161	5000Lbs
	Propane	74-98-6		
	Titanium Dioxide	13463-67-7		
	Xylene	1330-20-7	U239	100Lbs
Paint, Interior-Exterior Black 1601	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Paint, Interior-Exterior Blue 3546	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Paint, Interior-Exterior Clear 1301	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Paint, Interior-Exterior Green 2001	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Paint, Interior-Exterior White 1501	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Paint, Interior-Exterior Yellow 1806	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Paint, Inverted Orange Marking Paint RDMI 1000	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Paint, Semi-Gloss House & Trim White 9500	Ethylene Glycol	107-21-1	None	5000Lbs
	Proprietary Additive	None		
	Proprietary Pigment	None		
Paint, Spray Green 2324	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Paint, Spray OSHA Orange 2410	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Paint, Spray OSHA Yellow 1813	See Sherwin Williams (krylon) Paint, Interior-Exterior 1504			
Para-Dichlorobenzene Urinal blockers	p-Dichlorobenzene (a,b,c,d,e,f)	106-46-7	U109	10Lbs
Parts Cleaning Fluid, Agitene	Aliphatic Petroleum Distillate	64742-88-7		
	DPM (Dipropylene Glycol Methyl Ether)	34590-94-8		
PEN-88	Oxylated Alcohol	None		
Pine Sol	Alkyl alcohol ethoxylates	127036-24-2		
	Isopropyl alcohol	67-63-0		
	Pine oil	8002-09-3		
	Sodium petroleum sulfonate	68608-26-4		
Pledge, Lemon Scent	Butane	106-97-8		

	Isobutane	75-28-5		
	Isoparaffinic Hydrocarbon Solvent	64741-66-8		
	Propane	74-98-6		
	Silicones	63148-62-9		
	Water	7732-18-5		
Porter Guard Fast Dry Enamel	(As Nuissance Particulates)	37244-96-5		
	(As Silica, Crystalline and Quartz)	14808-60-7		
	(As Talc contaning non-asbestos fibers)	12135-86-3		
	(As Talc contaning non-asbestos fibers)	14567-73-8		
	(As Zinc Compounds)	1314-13-2		
	Antigorite	12135-86-3		
	Aromatic Naphtha	64742-95-6		
	Mica	12001-26-2		
	Naphtha	8052-41-3		
	Quartz	14808-60-7		
	Sodium Potassium Aluminum Silicate	37244-96-5		
	Talc	14807-96-6		
	Termolite	None		
	Xylenes	1330-20-7	U239	100Lbs
	Zinc Oxide	1314-13-2		
Pozmix A	Crystalline Silica, Cristobalite	14464-46-1		
	Fly Ash	68131-74-8		
Primer #30753	Acetone	67-64-1	U002	5000Lbs
	Cyclohexanone	108-94-1	U057	5000Lbs
	Methyl Ethyl Ketone	78-93-3	U159	5000Lbs
	Tetrahydrofuran	109-99-9	U124	100lBS
Primer, Red V2169838	Acetone	67-64-1	U002	5000Lbs
	Basic Zinc Molybdate	61583-60-6		
	Ethylbenzene	100-41-4	None	1000Lbs
	Liquefied Petroleum Gas	68476-86-8		
	Magnesium Silicate	14807-96-6		
	N-Butyl Acetate	123-86-4	None	5000Lbs
	Stoddard Solvent	8052-41-3		
	Titanium Dioxide	13463-67-7		
	Xylene	1330-20-7	U239	100Lbs
	Zinc Phosphate	7779-90-0		
Primer, Sandable Gray 1318	2-Methyl-1-Propanol	78-83-1	U140	5000Lbs
	Acetone	67-64-1	U002	5000Lbs
	Butane	106-97-8		
	Calcium Carbonate	471-34-1		
	Propane	74-98-6		
	Talc	14807-96-6		
	Titanium Dioxide	13463-67-7		
	Toluene	108-8-3	U109	10Lbs
	V. M. & P. Naphtha	64742-89-8		
Primer/Sealer White 8520	Ethylbenzene	100-41-4	None	1000Lbs
	Mineral Spirits	64742-88-7		

	Mineral Spirits 140-Flash	64742-88-7		
	Talc	14807-96-6		
	Titanium Dioxide	13463-67-7		
	Xylene	1330-20-7	U239	100Lbs
Primer/Sealer, Interior Latex (White 728-9416)	Cristobalite	14464-46-1		
	Ethylene Glycol	107-21-1	None	5000Lbs
	Kaolin	1332-58-7		
	Quartz	14808-60-7		
	Titanium Dioxide	13463-67-7		
Produced Water	Produced water			
Propane	Propane	74-98-6		
PVC Cement 1200	Acrylic Resin	96-33-3		
	Amorphous fumed Silica (non-hazardous)	112945-52-5		
	Cyclohexanone	108-94-1	U057	5000Lbs
	Methyl Ethyl Ketone	78-93-3	U159	5000Lbs
	PVC Resin (Non-Hazardous)	9002-86-2		
	Tetrahydrofuran	109-99-9	U124	100lBS
PVC Solvent Cement	Acetone	67-64-1	U002	5000Lbs
	Cyclohexanone	108-94-1	U057	5000Lbs
	Methyl Ethyl Ketone	78-93-3	U159	5000Lbs
	PVC Resin (Non-Hazardous)	9002-86-2		
	Tetrahydrofuran	109-99-9	U124	100lBS
QD Contact Cleaner #02130	1,1-Difluoroethane (HFC-152a)	75-37-6		
	Hexane Isomers	Various		
	Methanol	67-56-1	U154	5000lbs
	n-Hexane	110-54-3		
	Synthetic Isoparaffinic Hydrocarbon	64741-66-8		
Raid	2-Phenethyl Propionate	None		
	Eugenol	None		
	Isoparaffinic Hydrocarbon Solvent	None		
	Propellant	None		
	Solvents	None		
Resolve	Isopropyl alcohol	67-63-0		
	Propylene Glycol Monomethyl Ether	107-98-2		
Reverse Demulsifier RBW0118D	MSDS Not Found			
Ro-Rep	MSDS Not Found			
Round-Up Weed Killer	Biocide			
	Glyphosate Isopropylamine salt	38641-94-0		
	Stabilizer			
	Surfactant			
	Water	7732-18-5		
Rush Safety Solvent	MSDS Not Found			
S-400 (Surfactant)	MSDS Not Found			
SAE 5AW-30 Motor Oil	Additives	PROPRIETARY		
	Lubricant Base Oil (Petroleum)	Various		

Salt, Oilfield Fine	Sodium Chloride	7647-14-5		
Salt, Ottawa	MSDS Not Found			
Sand- 40/60 Wedron Special Frac	Crystalline Silica, Quartz	14808-60-7		
Sand- Oklahoma No. 1- SSA-2	Crystalline Silica, Quartz	14808-60-7		
SandWedge NT	Heavy Aromatic Petroleum Naphtha	64742-94-5		
SCA-130 Inhibitor	Acetaidehyde	75-07-0		
	Aldol	107-89-1		
	Crotonaidehyde	123-73-9	U053	100lbs
Scotchrap Brand Pipe Primer	Benzene	71-43-2	U109	10Lbs
	Butyl rubber	9010-85-9		
	Calcium Zinc Resinate	68334-35-0		
	Carbon Black	1333-86-4		
	Ethyl Alcohol	64-17-5		
	Kaolinite	1318-74-7		
	Mica-Group Minerals	12001-26-2		
	Peperylene-2-Methyl-2-Butene Polymer	26813-14-9		
	Quartz Silica	14808-60-7		
	Solvent Naphtha (Petroleum), Light Aliphatic	64742-89-8		
	Toluene	108-88-3	U109	10Lbs
Scrubs, Rough Touch	Cocoamide DEA	68603-42-9		
	Ethoxylated Alcohols (C12-15 Pareth-7)	68131-39-5		
	Isoparaffinic Hydrocarbon	64742-47-8		
	Mineral Oil (mist)	8042-47-5		
	Oleic Acid	61790-12-3		
	Propylene Glycol	57-55-6		
	Pumice (dust)	1332-09-8		
	Triethanolamine	102-71-6		
	Water	7732-18-5		
Sealant, #5 Pipe Thread #25431	Diacetone Alcohol	123-42-2		
Sealant, #5 Pipe Thread Special #26431	Diethylene Glycol Methyl Ether	111-90-0		
Sealant, 736 RTV	Ethyltriacetoxysilane	17689-77-9		
	Methyltriacetoxysilane	4253-34-3		
SGA-1 Gelling Agent	Acetic Acid	64-19-7	None	5000lbs
SGA-HT Gelling Agent	Branched Ethoxylated Nonylphenol	68412-54-4		
	Hydrotreated Heavy Naphthenic Distillate	64742-52-5		
SI-16 WSP	MSDS Not Found			
Silica Flour-SSA-1	Crystalline Silica, Quartz	14808-60-7		
Silicalite-Compacted	Silica, Amporphous-Fumed	7631-86-9		
Silicone Ad Sealant, Red High Temp RTV	Acetic Acid	64-19-7	None	5000lbs
	Dimethyl polysiloxane	63148-62-9		
	Distillates (petroleum), hydrotreated middle	64742-46-7		

	Ethyltriacetoxysilane	17689-77-9		
	Methyltriacetoxysilane	4253-34-3		
	Poly(dimethylsiloxane), hydroxy terminated	70131-67-8		
	Silica, amorphous (fumed)	7631-86-9		
Silicone Sealant, RD Pro RTV	Dimethylsiloxane, hydroxy-terminated	70131-67-8		
	Ethyltriacetoxysilane	17689-77-9		
	Iron (III) Oxide	1309-37-1		
	Methyltriacetoxysilane	4253-34-3		
	Non-hazardous ingredients	None		
	Polydimethylsiloxane	63148-62-9		
	Silica (as amorphous silica, total dust)	7631-86-9		
	Titanium Dioxide	13463-67-7		
Silicone, High T RTV #81409	Acetic Acid	64-19-7	None	5000lbs
	Amorphous Silica	7631-86-9		
	Distillates (petroleum), Hydrotreated Middle	64742-46-7		
	Ethyltriacetoxysilane	17689-77-9		
	Iron Oxide	1309-37-1		
	Methyltriacetoxysilane	4253-34-3		
	Poly (Dimethylsiloxane), Hydroxy Terminated	70131-67-8		
	Polydimethylsiloxane	63148-62-9		
	Titanium Dioxide	13463-67-7		
Skid Tex for Paint	Pumice	1332-09-8		
	Quartz	14808-60-7		
Slick Willie- OF WSP	MSDS Not Found			
Snapback Spraybuff Liquid	Diethylene Glycol monoethyl Ether	111-90-0		
Snow & Ice Melt	Calcium Chloride	010043-52-4		
	Potassium Chloride	07447-40-7		
	Sodium Chloride	7647-14-5		
Soda Ash (Sodium Carbonate)	MSDS Not Found			
Sodium Bicarbonate	MSDS Not Found			
Sodium Persulfate	Sodium Persulfate	7775-27-1		
Solidifier, Belzona 1221Super-e Metal	MSDS Not Found			
Solidifier, Belzona 1321 Ceramic S-Metal (Blue/Gray)	MSDS Not Found			
Soltex (Sodium Asphalt Sulfonate)	MSDS Not Found			
SP Breaker	Sodium Persulfate	7775-27-1		
SP-101 (Sodium Polyacrylate)	MSDS Not Found			
Spartan Pine Cleaner	Pine Oil	8002-09-3		
	Potassium Cocoate	61789-30-8		
	Sodium Xylene Sulfonate	1300-72-7		
SSO-21	Diethylene Glycol	111-46-6		
SSO-21M	Ethoxylated Nonylphenol	None		

Winterized				
	Ethylene Glycol Monobutyl Ether	111-76-2		
	Methanol	67-56-1	U154	5000lbs
Stannic Chloride	Tin Chloride	7646-78-8		
Starting Fluid, SFR-11	Carbon Dioxide	124-38-9		
	Ethyl Ether	60-29-7	U117	100Lbs
	n-Heptane	142-82-5		
Stihl 2 Cycle Universal Engine Oil #07813198903	Additive Package	Mixture		
	Dye	Mixture		
	Petroleum Distillates, Hydrotreated Heavy Paraffnic	64742-54-7		
	Petroleum Distillates, Solvent Dewaxed Heavy Paraffinic	64742-65-0		
	Residual Oils (petroleum), Hydrotreated	64742-57-0		
	Residual Oils (petroleum), Solvent Dewaxed	64742-62-7		
	Stoddard Solvent	8052-41-3		
Strawberry Fragrance Master	MSDS Not Found			
Stride Floral	MSDS Not Found			
Sugar Cane Sucrose	Carbohydrates	None		
Super CBL Additive	Aluminum	7429-90-5		
Super HS Bauxite (20-40 Mesh)	Aluminum Oxide	1344-28-1		
	Aluminum Silicate	1302-76-7		
	Phenol/Formaldehyde resin	9003-35-4		
Super Prop Propant	Phenol/Formaldehyde resin	9003-35-4		
Terminator	Alkyloxypolyethyleneoxyethanol	84133-50-6		
	Blend of n-Alkyl Dimethyl Benzyl and	68424-85-1		
	Di-n-alky Dimethyl Ammonium Chlorides	68424-94-3		
	Perfume, Coloring and Additives less than 1%	None		
	Soft Water	7732-18-5		
	Tetrasodium Ethylenediammine Teraacetate	64-02-8		
TFE Seal/ Valve Lubricant	MSDS Not Found			
Thinner #641	MSDS Not Found			
Time Mist Air Freshener	Acetone	67-64-1	U002	5000Lbs
	C8-C9 Isoparaffnic Hydrocarbons	64742-48-9		
	Diethylene Glycol Methyl Ether	111-90-0		
	Perfume Oils-Supplier Trade Secret	None		
	Propane	74-98-6		
TLC-80	Aluminum Oxide	1344-28-1		
TLC-W3-Rock Salt	Crystalline Silica, Cristobalite	14464-46-1		
Toluene	Toluene	108-88-3	U109	10Lbs
Triethylene Glycol	MSDS Not Found			
Universal Solvent Blend	Acetone	67-64-1	U002	5000Lbs
	Ester EEP	763-69-9		
	n-Butane	106-97-8		

	Propane	74-98-6		
Unleaded Gasoline	Benzene	71-43-2	U109	10Lbs
	Gasoline	None		
US-40 (Solvent)	MSDS Not Found			
Valuprop Ceramic Propant	Aluminum Silicate	1302-76-7		
Valve Flush	None			
Vanish Drop Ins	Acid Blue #9	3844-45-9		
	Hydroxyethyl Cellulose	9004-62-0		
	Pine Oil	8002-09-3		
	Sodium Dodecylbenzene sulfonate	25155-30-0	None	1000Lbs
	Sodium Gluconate	527-07-1		
	Sodium Sulfate	7757-82-6		
	Sodium Tetraborate Pentahydrate	1330-43-4		
Versaprop (all mesh sizes)	Aluminum Oxide	None		
	Aluminum Silicate	None		
Versaset	Sodium Aluminate	1302-42-7		
Vicon NF Breaker	Chlorous Acid, Sodium Salt	7758-19-2		
	Sodium Chloride	7647-14-5		
Water Finding Paste	All Ingredients Non Hazardous	None		
WD 40 Aerosol	Aliphatic Petroleum Distillate	8052-41-3		
	Carbon Dioxide	124-38-9		
	LVP Hydrocarbon Fluid	64742-47-8		
	Non-hazardous ingredients	None		
	Petroleum Based Oil	64742-65-0		
WG-17 Gelling Agent	Cellulose derivative	None		
WG-31 Gelling Agent	Guar Gum	9000-30-0		
Windex, Blue	Ethylene Glycol n-hexyl ether	112-25-4		
	Isopropanol	67-63-0		
	Water	7732-18-5		
WLC-5 Fluid Loss Additive	Complex Carbohydrates	None		
Xylene	Ethyl Benzene	100-41-4	None	1000Lbs
	Xylene	1330-20-7	U239	100Lbs
ZoneSealant 2000	Isopropanol	67-63-0		
ZoneSealant 3000	Keratins, Hydrolyzates	69430-36-0		

APPENDIX C

Rock Springs Field Office Summary of Special Status Species

WILDLIFE AND PLANTS IN THE ROCK SPRINGS FIELD OFFICE

Biologist Jim Dunder Date September 12, 2008

Project Puma Deep Natural Gas Project

	SUITABLE HABITAT	STIPULATION DATE	STIPULATION APPLIES
Raptor Nest	YES	February 1 - July 31	YES
Crucial Big Game Winter Range	NO	November 15 - April 30	N/A
Designated Big Game Parturition Areas	NO	May 1 - June 30	N/A
Riparian Areas	YES	Year Round 500 feet from riparian/wetland areas	YES
Migratory Bird Treaty Act species	YES	Site specific to avoid a taking	YES

T&E SPECIES	MAY AFFECT	NO EFFECT	STIP APPLIES	STIPULATION OR ACTION	NOT LIKELY TO ADVERSELY AFFECT
Black-footed ferret (E) /prairie dog holes >8 holes/acre, >200 acres		X	NO	Move project from ferret habitat or survey to clear	X
Canada Lynx (T)		N/A	NO	Move project from habitat or survey to clear	
Ute Ladies-tresses (T)		X	NO	Move project from T&E plant location	NO SUITABLE HABITAT
Blowout Penstemon (E)		X	N/A	Move project from T&E plant location	
Colorado Fish (E) H2O depletions		N/A	NO	Formal consultation required	NO SUITABLE HABITAT
Platte River Species (E) H2O depletions		N/A	NO	Formal consultation required	NOT PLATTE RIVER DRAINAGE
Yellow-billed Cuckoo (C)		N/A	NO	Site specific stipulations to avoid a taking, or survey to clear	NO SUITABLE HABITAT

Sensitive Species Common Name	Habitat	Potential Habitat	Stipulation Dates	Comments
MAMMALS				
Grizzly Bear	Forests, Basin-prairie, meadows	NO		
Long-eared Myotis Bat	Conifer and deciduous forests, caves and mines	NO		
Fringed Myotis Bat	Conifer forests, woodland-chaparral, caves and mine	NO		
Spotted Bat	Cliffs over perennial water, basin-prairie shrub	NO		
Townsend's Big-eared bat	Forests, basin-prairie shrub, caves and	NO	N/A	Casual migrant

	mines			
Pygmy Rabbit	Dense sagebrush with sandy soils	YES	Site specific Stip.	Pygmy rabbits in several habitats across project
White-tailed Prairie Dog	Basin-prairie shrub, grasslands	YES	Site specfic Stip.	5 colonies identified within project.
Wyoming Pocket Gopher	Dry, gravelly, shallow-soil ridge tops rather than deeper soiled swales and valley bottoms	YES		Evidence of a few gopher mounds on project, unknown species.
Idaho Pocket Gopher	Dry, gravelly, shallow-soil ridge tops rather than deeper soiled swales and valley bottoms	NO		
Swift Fox	Grasslands	YES		Probably not on Project. Red Fox and Coyote are common residents
BIRDS				
Bald Eagle	Nests and winter roosts	NO	February 1 – July 31, See Programatic BA & BO	
Mountain Plover	Areas of flat topography and vegetation <6”	YES	April 10 - July 10	They are known to occupy habitats nearby.
White-faced Ibis	Marshes, wet meadows	NO		
Trumpeter Swan	Lakes, ponds, rivers with aquatic vegetation	NO		
Northern Goshawk	Old-growth conifer and deciduous forests	NO	Feb 1 - July 31	
Ferruginous Hawk	Basin-prairie shrub, grassland, rock outcrops	YES	March 15 - July 15	One active and several old historic nests.
Peregrine Falcon	Tall cliffs	NO	Feb 1 - July 31	
Greater Sage-grouse Breeding Habitat / Nesting	Sagebrush	YES	March 1 - July 15	One active strutting ground, two potential satellite leks.
Greater Sage-grouse Winter Habitat	Sagebrush	?	Nov 15 – March 15	No recurrent wintering use on habitat identified.
Long-billed Curlew	Grasslands, plains, foothills, wet meadows	NO		
Burrowing Owl	Prairie dog colonies, grasslands, basin-prairie shrub	YES	May 1 - Sept 1	Potential habitat in prairie dog colonies.
Sage Thrasher	Sagebrush	YES	Avoid Sagebrush habitats	Site specific Stip.
Loggerhead Shrike	Sagebrush	YES	Avoid Sagebrush habitats	Site specific stip.
Brewer’s Sparrow	Sagebrush	YES	Avoid Sagebrush habitats	Site specific stip.
Sage Sparrow	Sagebrush	YES	Avoid Sagebrush habitats	Site specific stip.
FISH				
Roundtail Chub	CO River drainage, mostly large rivers, also streams and lakes	NO		
Leatherside Chub	Bear, Snake and Green drainages, clear, cool streams and pools	NO		
Bluehead Sucker	Bear, Snake and Green drainages, all waters	NO		
Flannelmouth Sucker	CO River drainage, large rivers, streams and	NO		

	lakes		
Colorado River Cutthroat trout	CO River drainage, clear mountain streams	NO	Spring - early summer consult with WGFD
REPTILES			
Midget Faded Rattlesnake	Rock outcrops near Flaming Gorge Reservoir below 7,000 elevation	NO	Avoid potential den sites by 500' N-W & 100' S-E
AMPHIBIANS			
Northern Leopard Frog	Beaver ponds, permanent water in plains and foothills	NO	
Great Basin Spadefoot Toad	Spring seeps, permanent and temporary waters	?	
Boreal Toad (Northern R. M. population)	Pond margins, wet meadows, riparian areas	NO	
Spotted Frog	Ponds, sloughs, small streams	NO	

Sensitive Species Common Name	Habitat	Potential Habitat	Comments
PLANTS			
Meadow Pussytoes	Moist, hummocky meadows, seeps or springs surrounded by sage/grasslands 4,950 – 7,900'	NO	
Small Rock Cress	Cracks/Crevices in sparsely vegetated granite/pegmatite outcrops w/in sage/grasslands 8,000-8,100'	NO	
Mystery Wormwood	Clay flats & playas 6,500'	NO	
Nelson's Milkvetch	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely vegetated sagebrush, juniper, & cushion plant communities at 5,200-7,600'	?	
Precocious Milkvetch	Cushion plant communities on rocky, clay soils mixed with shale on summits & slopes of white shale hills 6,800-7,200'	NO	
Cedar Rim Thistle	Barren, chalky hills, graelly slopes, & fine textured, sandy-shaley draws 6,700-7,200'	NO	
Ownbey's Thistle	Sparsely vegetated shaley slopes in sage & juniper communities 6,440-8,400'	NO	
Wyoming Tansymustard	Sparsely vegetated sandy slopes at base of cliffs of volcanic breccias or sandstone 8,300-10,000'	?	
Large-fruited Bladderpod	Gypsum-clay hills& benches, clay flats, & barren hills 7,200-7,700'	NO	
Stemless Beardtongue	Cushion plant or Black sage grassland communities on semi-barren rocky ridges, knolls, & slopes at 5,900-8,200'	NO	
Beaver Rim Phlox	Sparsely vegetated slopes on sandstone, siltstone, or limestone substrates 6,000-7,400'	NO	
Tufted Twinpod	Sparsely vegetated shale slopes & ridges of Green River Formation 6,500-7,000'	NO	
Green River Greenthread	White shale slopes & ridges of Green River Formation 6,300'	NO	
Uinta Greenthread	Sparsely vegetated benches & ridges on course, cobbly soils of Bishop Conglomerate 8,200-8,900'	NO	
Cedar Mtn. Easter Daisy	Rocky slopes of Bishop Conglomerate 8,500'	NO	
Trelease's Racemose Milkvetch	Sparsely vegetated sagebrush communities on shale or limestone outcrops and barren clay slopes, 6,500-8,200'	NO	

APPENDIX D

BLM STANDARD STIPULATIONS, BEST MANAGEMENT PRACTICES AND MITIGATION REQUIREMENTS

APPENDIX D – BLM STANDARD STIPULATIONS, BEST MANAGEMENT PRACTICES AND MITIGATION REQUIREMENTS

1.0 INTRODUCTION

These guidelines will provide for consistency in determining requirements for avoiding and mitigating environmental impacts and resource and land use conflicts. Consistency does not mean that identical requirements would be applied to all similar types of activities that may cause similar types of impacts. Nor does it mean that the requirements or guidelines for a single land use activity would be identical in all areas.

The following elements are included in this Appendix:
1. BLM Standard Stipulations, as required in leases and the Green River Resource Area RMP. Some of the Puma Deep lease stipulations defer to the currently applicable Kemmerer Field Area RMP.
2. Best Management Practices (BMPs), as applied to resources.
3. Mitigation requirements, as applied to resources.

2.0 PURPOSE

The purposes of the “Wyoming BLM Mitigation Guidelines” are to (1) reserve for the BLM the right to modify the operations of all surface and other human presence disturbance activities as part of the statutory requirements for environmental protection, and (2) inform a potential lessee, permittee, or operator of the requirements that must be met when using BLM-administered public lands. These guidelines have been written in a format that will allow for (1) their direct use as stipulations, and (2) the addition of specific or specialized mitigation following the submission of a detailed plan of development or other project proposal and an environmental analysis. Those resource activities or programs currently lacking a standardized set of permit or operation stipulations can use the mitigation guidelines as stipulations or as conditions of approval, or as a baseline for developing specific stipulations for a given activity or program.

3.0 STANDARD STIPULATIONS

The "Wyoming BLM Standard Oil and Gas Lease Stipulations" were developed in 1986. During their implementation, it was recognized that various land uses, other than those related to oil and gas exploration and development, should be subject to similar kinds of environmental protection requirements. Using the Wyoming BLM standard oil and gas lease stipulations as a basis, development of the "Wyoming BLM Standard Mitigation Measures for Surface-Disturbing Activities" began.

The term "guidelines" better describes the intent and use of these mitigation standards than the terms "stipulations" or "measures." These guidelines are primarily for the purpose of attaining consistency in how requirements are determined for avoiding and mitigating environmental impacts and resource and land use conflicts. Consistency in this sense does not mean that identical requirements would be applied for all similar activities that may cause similar types of

impacts. Nor does it mean that the requirements or guidelines for a single activity would be identical in all areas.

Some of the seasonal restrictions in the standard oil and gas lease stipulations contain the statement, "This limitation does not apply to maintenance and operation of producing wells." This statement was included because the stipulations were developed specifically for application to oil and gas leases at the time of issuance, not for activities associated with producing wells. At lease issuance, the only action that can be generally contemplated is the possibility that exploratory drilling may occur somewhere on the lease area. Unfortunately, the provision has been interpreted by some people to mean that the seasonal restriction disappears at the operational stage (i.e., if a producing well is attained). It must be understood that at both the oil and gas exploration stage and the operation or development stages, additional site-specific environmental analyses are conducted and any needed restrictions or mitigations identified become part of the operational or development plan. For example, wells may continue to produce, but related activity may be limited. Thus, it is possible for such seasonal restrictions to continue in effect and be applicable to maintenance and operation of producing wells, if supported by the environmental analyses.

3.1 Big Game Winter Range

Crucial big game winter ranges will be closed from November 15 through April 30. Exceptions may be granted if field inspections reveal a lack of actual or potential wildlife use.

3.2 Raptor Nests

No activity or surface disturbance will be allowed for up to a 0.75 mile radius from active raptor nest sites from February 1 through July 31. A nest site will be considered active if it has been used within the past three years. Actual distances and dates will vary based on topography, species, season of use, and other pertinent factors.

3.3 Greater Sage-Grouse

No activity or surface disturbance will be allowed within 0.25 mile of a sage-grouse lek center from

February 1 through July 31, as mapped in the RSFO or KFO RMP's stipulations to protect breeding habitat, and March 1 through June 30, as mapped in the KFO and RSFO RMP's to protect nesting habitat. The authorized officer may grant exceptions which may include:

- Activities which do not disturb the surface may be allowed any time from June 1 through March 14.
- Activities which do not disturb the surface may be allowed from March 15 through May 31 from five hours after sunrise until two hours before sunset.

3.4 Riparian and Wetland Areas

No surface disturbance will be allowed within 500 feet of perennial streams or live water. Crossings of perennial streams will be minimized. When rehabilitation of a riparian area is required, the primary objective will be soil stabilization. The reestablishment of riparian vegetation will always be a key objective. The desired plant species composition after rehabilitation will depend on site-specific objectives.

3.5 Historic Trails

Generally, visual intrusion and surface disturbance will be restricted or prohibited within 1,320 feet from either side of a historic trail, or within the visual horizon of the trail, whichever is closer.

3.6 Threatened, Endangered, and Sensitive Species

Appropriate measures to protect all threatened, endangered, and sensitive plant and animal species will be applied to all actions and use authorizations. These measures could include avoidance, "no surface occupancy," "no surface disturbance," and seasonal restrictions.

The following stipulations to protect bald eagles and peregrine falcons and their habitat are in place:

- A "no surface occupancy" restriction will be applied to leases to protect bald eagle roosting areas. In addition, a 1 mile buffer zone around bald eagle winter roost sites will be closed from November 1 through April 1.
- If any active bald eagle or peregrine falcon nests are found, no activity or surface disturbance will be allowed for up to a 0.75 mile radius from an active nest from February 1 through August 15. A nest site will be considered active if it has been used within the past three years.

Actual distances and dates will vary based on topography, species, season of use, and other pertinent factors.

4.0 BEST MANAGEMENT PRACTICES

4.1 Operator-Committed BMPs

The Operator would adhere to all conditions included with their leases and to all federal and state laws and regulations. The Operator would also commit to performing the following BMPs, per the requirements in BLM IM No. 2007-021:

- Interim reclamation of well locations and access roads soon after the well is put into production.

  The goal of this BMP is to minimize long-term loss of habitat, forage, visual resources, soils, and to prevent the introduction of invasive species. Portions of well pads and roads that would not be used during production operations would be re-contoured, leaving only areas necessary for workovers and operations un-contoured. Salvaged top soils would be spread across all disturbed areas except those that are needed to accommodate year-round traffic and operations. Well locations, reclaimed roads, and gathering pipeline rights-of-way would be re-vegetated with a BLM-approved seed mixture. Where practical, road surfaces and turnarounds would also be re-vegetated. With low traffic roads, this would result in a hardpan, two-track road that is stable and requires less maintenance. To ensure continued energy production operations, the operator would be allowed to drive, park, and set up future workover and maintenance operations on newly re-vegetated areas. Where there is a moderate to high risk of wildfire, a small buffer area would be left around production

facilities or grass would be mowed prior to workover setup. Where future wells are anticipated to be drilled from the same well location within a year or two, approval to delay interim reclamation may be granted.

- Painting of all new facilities a color that best allows the facility to blend with the background, typically a vegetated background.

  The goal of this BMP is to minimize visual contrast by making production facilities less noticeable. Above-ground production facilities would be painted with colors that allow the facilities to blend into the background. The BLM and the Operator would identify the best colors to match the surrounding vegetation and soil types. The Operator may need to paint drill rig anchors and minor working tips and edges of production facilities that are subject to OSHA safety requirements a red, yellow, or orange color. The Operator would not be required to paint wooden structures, including distribution power poles. To minimize contrast, Operator would avoid lighter colors, white doors or roofs, galvanized silver electrical boxes and guardrails, and signs with white backgrounds.

- Design and construction of all new roads to a safe and appropriate standard "no higher than necessary" to accommodate their intended use.

  The goal of this BMP is to minimize long-term loss of habitat, vegetation, soil, and visual resources. All roads would be designed and constructed to an appropriate standard that is no higher than necessary to adequately accommodate their intended function. Design, construction, and maintenance activities would be consistent with national policies for safety and resource protection.

- Final reclamation and re-contouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography.

  The goal of this BMP is to restore the landform, vegetation, habitat, soil, and visual resources to the same conditions that occurred prior to well development. Topsoil will be stripped from areas that have not already been re-contoured and redistributed uniformly over all disturbed areas. BLM-approved fertilizers will be used when available to encourage rapid re-growth of BLM-approved seed mixtures. Revegetation could result in color contrast initially that will decrease as native plants and shrubs re-colonize. Nearly all roads would be re-contoured to ensure that they blend into the surrounding landscape.

- Burying of gas gathering pipelines in or adjacent to access roads and use of common rights-of-way and utility corridors.

  Burying gas gathering lines in or adjacent to the road or in common rights-of-way with existing surface disturbance decreases surface disturbance and visual resource impacts.

- Continue use of field automation.

Monitoring automated wells from a central office location would decrease the frequency of well visits. The decreased activity within the field would reduce traffic collisions and noise impacts to wildlife, including pronghorn, raptors and sage-grouse.

4.2 Additional BMPs

In addition, the following BMPs may be applied to reduce resource impacts:

- Installation of raptor perch avoidance.

  The goal of this BMP is to discourage raptor perching on tank batteries using proven anti-perching devices. This BMP would reduce potential predation of BLM sensitive species, including sage-grouse and prairie dogs.

- Installation of bird caps on process stacks and tight netting/closed tops on tankage.

  The goal of this BMP is to discourage migratory birds from becoming trapped in processing equipment. This BMP would reduce potential migratory bird mortality.

Table D-1 Consolidated Table of Application of BMPs and Mitigation Measures for Resources.

Resource	BMPs/Mitigation
Surface Geology	**BMPs/Mitigation** 1) No surface disturbance within 500 feet of perennial streams, live water, or riparian areas. 2) No surface disturbance on slopes exceeding 25% 3) Final reclamation recountouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography.
Geohazards	**BMPs/Mitigation** 1) No surface disturbance on slopes exceeding 25%.
Paleontology	**BMPs/Mitigation** 1) Authorizations for surface-disturbing activities will be conditioned to minimize adverse impacts to paleontological resources. 2) Operations that cause disturbance to the Green River Formation will require a survey by a BLM-approved paleontologist, and mitigation measures may be required, as appropriate. 3) Operations that cause disturbance to the Bridger Formation will require a survey by a BLM-approved paleontologist, and mitigation measures may be required, as appropriate. 4) In the event of discovery of fossil resources during project activities, operations must cease and the BLM must be notified. The BLM will then take appropriate actions, which may include a requirement for surveys and development of additional mitigation

	measures. 5) In addition to required mitigations, a worker education program relating to the importance of fossil resources and the illegality of unauthorized collecting, combined with strict enforcement provisions by the Operator, would reduce the potential for loss of important paleontological information.
Soils	**BMPs/Mitigation** 1) Avoidance of badland and steep slope (<25%) sensitive soils. 2) Where avoidance is not feasible, incorporate special soil stabilization and erosion control measures. 3) Avoidance of all areas within 500 feet of surface water and riparian areas. 4) Interim reclamation of well locations and access roads in the first available period within 1 year after the well is put into production.
Water	**BMPs/ Mitigation** 1) Avoidance of all areas within 500 feet of surface water and riparian areas. 2) Continuation of the cementing policy. 3) Collocating gathering lines with roads to reduce the project footprint and minimize disturbance to visual resources.
Noise	**BMPs/Mitigation** 1) Equip sources of noise with effective mufflers or noise suppression systems. 2) Monitor automated wells remotely to decrease traffic noise. 3) Reduce noise levels to 49 dBA or less, particularly during the bird nesting season (1 April through 30 June) to minimize the effects of continuous noise on bird populations. Constant noise generators should be located far enough away from sensitive habitats or muffled such that noise reaching those habitats is less than 49 dBA. 4) From 1 March through 15 May, anthropogenic sources of continuous or frequently intermittent noise should not exceed 10 dBA above natural, ambient noise measured at the perimeter of any occupied sage-grouse lek.
Vegetation/ Wetlands	**BMPs** 1) Interim reclamation of well locations and access roads in the first available period within 1 year after the well is put into production. 2) Use only native species for interim and final reclamation unless authorized by BLM. 3) Avoidance of all areas within 500 feet of surface water and riparian areas. 4) Follow the Wyoming BLM Standards for Healthy Rangelands.

	Mitigation 1) Treat halogeton infestations prior to surface disturbance or before reclamation to optimize the effectiveness of weed removal. General herbicides may be appropriate for removal of dense stands of halogeton. If weeds are not controlled in the first year of growth prior to weed seed production, a long-term source of weed seed will be present in reclaimed areas. 2) Any unavoidable impacts to wetlands would require mitigation (enhancement, restoration, or creation), as per the requirements of the Clean Water Act. Any mitigation would be developed on a site-specific basis.
Fisheries and Wildlife	**BMPs/Mitigation** 1) Installing raptor perch avoidance structures 2) Installation of bird caps on process stacks and tight netting/closed tops on tankage. 3) Burying gathering pipelines 4) Implement noise reduction/mitigation techniques (details in Noise section) 5) Monitor automated wells remotely to decrease traffic collisions and noise. 6) Collocate gathering pipelines in roads in sensitive wildlife habitats 7) Interim reclamation of well locations and access roads in the first available period within 1 year after the well is put into production. 8) Design and construction of all new roads to a safe and appropriate standard "no higher than necessary" to accommodate their intended use.
Livestock Grazing and Rangeland Health	**BMPs/Mitigation** 1) Interim reclamation of well locations and access roads in the first available period within 1 year after the well is put into production. 2) Follow rangeland health standards.
Cultural Resources	**BMPs/Mitigation** 1) Avoidance of ground disturbance at significant cultural/historical resource sites and highly sensitive archaeological locales 2) Archaeological excavation or HABS/HAER documentation of significant cultural/historical resource sites or site portions. 3) Native American sensitive/TCP and discovered site consultation 4) Cultural/historical resource treatment planning and/or Programmatic Agreements. **5)** No surface disturbance within 0.25 mile of historic trails or the visual horizon, whichever is closer. **6)** Paint all facilities a color that best allows the facility to blend with the background.

Visual	**BMPs/Mitigation** 1) Restrict visual intrusion within 0.25 mile of historic trails. 2) Screening facilities from view and avoiding placement of production facilities on hilltops and ridgelines. 3) Paint all facilities a color that best allows the facility to blend with the background. 4) Gravel of road color shall be similar to adjacent dominant soil colors.
Recreation	Same as wildlife and visual resources.
Human Health and Safety	**BMPs/Mitigation** The Operator should coordinate emergency response planning with the Uinta and Sweetwater Counties Emergency Management Agency and provide documentation regarding compliance with Federal Hazardous Material Regulations and the Uniform Fire Code.

APPENDIX E

Puma Deep Scoping Notice

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Rock Springs Field Office
280 Highway 191 North
Rock Springs, Wyoming 82901

TAKE PRIDE IN AMERICA

Puma Prospect
and Development Project EA
1310 (040)

Scoping Notice
Puma Prospect

Dear Reader:

The Bureau of Land Management (BLM) Rock Springs Field Office (RSFO) will be preparing an Environmental Assessment (EA) for the "Puma Prospect." Davis Petroleum Corp has indicated their intent to further drill and develop gas resources in the BLM Rock Springs Field Office within Sweetwater County, Wyoming. The project area is located throughout multiple sections within Tps. 14 and 15 N., Rs. 111 and 112 W., 6th Principal Meridian.

The enclosed document serves as notice of the beginning of the environmental analysis process to fulfill the requirements of the National Environmental Policy Act. The 30-day scoping period will begin on May 21, 2008, and end on June 19, 2008. If you are interested in participating in the process and have concerns, issues, or alternatives you would like to see addressed, we request you respond by supplying your written or e-mail comments to:

Address: Jeromy Caldwell, Project Lead
Puma Prospect
Bureau of Land Management
Rock Springs Field Office
280 Highway 191 North
Rock Springs, Wyoming 82901

E-mail: rock_springs_wymail@blm.gov
(Please add "Puma Prospect EA" in the subject line)

Written comments in response to this notice, including the names and addresses of respondents, will be available for public review at the RSFO during regular business hours (8:00 a.m. through 4:30 p.m.) Monday through Friday (except federal holidays) after the comment period closes. The BLM practice is to make comments, including names and home addresses of respondents, available for public review. Before including your address, phone number, and e-mail address, or other personal identifying information in your comment, be advised that your entire

comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so. All submissions from organizations and businesses, and from individuals identifying themselves as representatives of organizations and businesses, will be available for public inspection in their entirety.

If you have any questions regarding this project, your role or our responsibilities, please contact Jeromy Caldwell at (307) 352-0259 in Rock Springs, Wyoming.

Sincerely,

John MacDonald
Acting Field Manager

Enclosure: Scoping Notice

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Rock Springs Field Office
280 Highway 191 North
Rock Springs, Wyoming 82901

TAKE PRIDE IN AMERICA

SCOPING NOTICE
PUMA PROSPECT EA AREA – SWEETWATER COUNTY

Davis Petroleum Corp.

1.0 INTRODUCTION

Davis Petroleum Corp (Davis) proposes to drill oil and gas wells in the Puma Prospect EA Area (PPEA) to develop gas reserves in the Upper Cretaceous age Frontier and Muddy Formations.

2.0 DESCRIPTION OF AREA

The PPEA includes 9,600 acres located within the Bureau of Land Management (BLM) Rock Springs Field Office in Sweetwater County, Wyoming. See Figure 1 for a map of the area. The project area is approximately 17 miles east of Mountain View, Wyoming. Access to the project area is by established graded roads. Table 1 summarizes the surface and mineral ownership by category. Table 2 locates the project by township, range, and section.

Table 1: Ownership

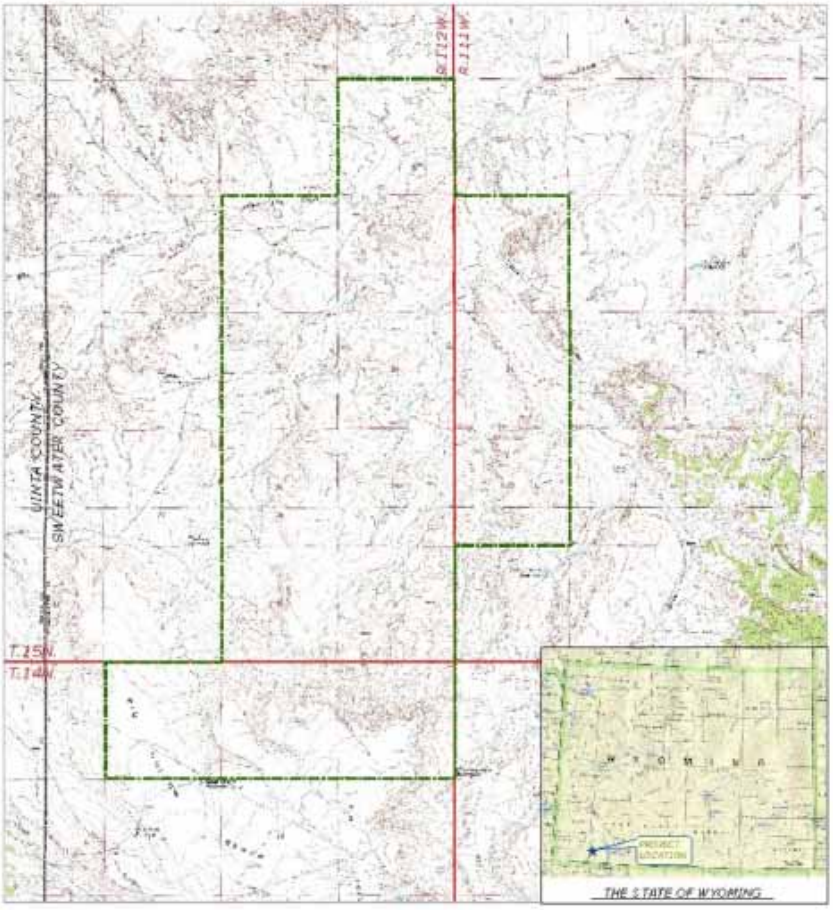
	Federal Acres	Private Acres	State Acres
Surface	9,440	160	0
Mineral	8,800	160	640

Table 2: Project Location in the Public Land Survey System

Township	Range	Section
15 North	112 West	12,13,14,23,24,25,26,35,36
15 North	111 West	18,19,30
14 North	112 West	1,2,3

2

Figure 1. Project Area



3.0 PROPOSED DRILLING

The Company proposes to drill 13 additional conventional wells in the PPEA over the next five years. The spacing will be 1 well per 160 acres.

3.1 TOTAL WELLS

Only conventional oil and gas wells are proposed (i.e., no coalbed natural gas wells are proposed). The Company proposes to drill 13 additional wells into the Frontier/Muddy Formations over the next five years. The actual number of wells drilled per year will depend on natural gas prices and on the success of the initial wells. The spacing will be 1 well per 160 acres.

3.2 DRILLING AND SURFACE DISTURBANCE

Two (2) gas wells are already producing from the Frontier/Muddy Formation in the PPEA. A buried 6-inch diameter steel pipeline has been laid to the west to transport the produced natural gas to a sales line. Said pipeline is 7.6 miles in length of which 2.12 miles are within the project area. The access roads constructed to serve the wells have been upgraded, culverts installed, and graveled. The existing main area access road traversed to the well site roads has been shaped and upgraded with numerous culverts installed and various portions graveled. The well sites have been reclaimed and reduced from drill site size to the smaller producing well site. The reclaimed areas have been reseeded with the recommended BLM seed mixture.

The 13 additional wells are expected to average 13,800 feet in depth. The average time from spud to completion is approximately 60 days, with drilling occurring for 30 to 45 days. Each well will have a drilling pad and associated road and pipeline right-of-way. If feasible and on a case-by-case basis, Davis may use a poly-pipe to transport water from a water well located in Sec. 20; T. 15 N., R. 111 W. to the drilling location. The total amount of water used from the water well will be approximately 3.4 acre-feet. Davis will also install a backflow preventer on the water well.

It is anticipated the short-term surface disturbance for these wells will average 9.8 acres. Thirteen wells averaging 9.8 acres per well would initially disturb 127 acres out of the 9600 acres in the PPEA or 1.33 percent of the area. The long-term surface disturbance (30 years) will be approximately 3.6 acres per well. Thirteen wells averaging 3.6 acres per well would be 46.8 acres, or less than 1 percent of the PPEA.

4.0 MANAGEMENT

The BLM encourages ongoing collaboration with resource management specialists to analyze actions on a case-by-case basis to identify mitigation needs to meet Resource Management Plan (RMP) objectives, provide for resource protection, and provide for logical development. Davis will use these strategies to accomplish the management objectives.

4.1 MANAGEMENT ACTIONS

Visual

Davis proposes to address visual resource objectives through such measures as using low-profile tanks, using natural topography to hide tank locations, painting tanks and facilities to blend with the surrounding landscape, and rapid interim reclamation as soon as drilling is completed.

Watershed

Davis proposes to address watershed objectives through typical soil, runoff, spill, and enhanced revegetation management practices as described in the WDEQ required Stormwater Pollution Prevention Plan. Soil effects will be mitigated by protection of stockpiled and replaced soils from erosion, and revegetation of replaced soils as rapidly as possible.

4

Cultural
Cultural resource surveys will be conducted as necessary for surface disturbing operations within the project area. Archaeological on ground surveys have been conducted and completed on many of the proposed well sites and access roads and the areas cleared. Copies of the reports have been provided to the BLM Rock Springs Field Office.

Wildlife
Davis proposes to address wildlife objectives through typical wildlife management practices. Traffic to the wells will be reduced where possible through use of remote telemetry well monitoring systems. Restrictions for protection of raptors, big game crucial winter range, and big game calving/fawning areas will apply. Table 3 lists the wildlife seasonal restrictions for all surface disturbing activities. Where practical, Davis will also implement innovative reclamation practices including reseeding to match pre-existing habitats as opposed to using one seed mixture for all disturbances.

Table 3: Wildlife Seasonal Restrictions in PPEA

Affected Areas	Restriction	Restricted Area
Big Game Crucial Winter Ranges	Nov. 15 - April 30	Antelope, elk, moose, and mule deer crucial winter ranges
Parturition Areas	May 1 - June 30	Designated parturition areas
Greater Sage-Grouse Leks	March 1 - May 15	Within one-quarter mile radius of lek
Sage-Grouse Nesting Areas	March 15 - July 15	Up to 2-mile radius of lek
Golden Eagle Nest	Feb. 1 - July 31	Within one-half mile radius
Swainson's Hawk Nest	Feb. 1 - July 31	Within one-half mile radius
Ferruginous Hawk Nest	Feb. 1 - July 31	Within one mile radius
Coopers Hawk Nest	Feb. 1 - July 31	Within one-half mile radius
Burrowing Owl Nest	April 10 – September 10	Within one-half mile radius
Merlin Nest	Feb. 1 - July 31	Within one-half mile radius
Other Raptors	Feb. 1 - July 31	Within one-half mile radius

5.0 PROJECT OPERATION

Improvements to the existing and construction of proposed new portions of access roads may involve intermittent stream crossings. Proposed crossings will be sited where the active channel is of minimal width bounded by low-angle slopes. Crossing structures, e.g., culverts or low-water crossings, will be sized to minimize restrictions to natural flow velocities, upstream sedimentation, and downstream scour. Dust generated by vehicle traffic on the access roads will be controlled by spraying the surface of the roads with water hauled by tank trucks.

Disturbance of highly erodible soils will be avoided where possible, and erosion control measures will be applied along the length of the access roads. Stormwater will be diverted from the well pad topsoil stockpiles using ditches, berms, water bars, or

sediment fences as needed to trap runoff and sediments on or near the location. These measures will prevent movement of disturbed and stockpiled soil into natural drainages to eliminate potential effects on the stream flow or sediment load to nearby surface water or other downstream drainages.

Intermittent and ephemeral surface water and shallow unconfined groundwater could be affected by leakage or spills of process fluids or lesser quality groundwater used for drilling, etc. Earth berms or equivalent structures will be constructed around all oil containing equipment to provide secondary containment, with additional containment to be constructed between the well and nearby surface water drainages as needed and described in the EPA required Spill Prevention Control and Countermeasure (SPCC) Plan. In addition, system piping will be monitored for potential leaks.

To prevent potential degradation of shallow groundwater or nearby surface water, all boreholes and wells will be properly cemented and abandoned in accordance with WOGCC and BLM rules and regulations. All produced fluids from the wells will be collected and held in onsite tankage. Produced fluids will be separated with water being trucked to commercial disposal. Condensate will be sold and transported by truck. Gas will be injected into the existing gas transportation pipeline. To the extent possible, gas gathering pipelines will be installed in or along the road rights-of-way. At this time, Davis does not anticipate the need for additional gas compression. The well(s) production operations will be monitored by telemetry thus reducing the amount of daily on-site and support visits.

Project operations will comply with Onshore Order No. 1 and specific conditions of approval for the approved well site Application for Permit to Drill (APD).

5.1 ECONOMIC IMPACT

The wells within the PPEA range in reserve estimates from 2,000 MMcf to 3,000 MMcf for a per-well average of 2,500 MMcf of natural gas. Drilling of these wells will be very sensitive to natural gas prices in Southwestern Wyoming.

Fifteen wells at two and one-half BCF per well, averaging $5.00 per MCF, could yield $23.4 million dollars to the United States of America, one-half of which is returned to the State of Wyoming. Wyoming would further benefit through severance and ad valorum taxes totaling 13% of gross sales or $19.5 million dollars. Drilling rigs, rig and roustabout crews, and construction would all provide employment and sales taxes to the Sweetwater County economy.

6.0 PRELIMINARY RESOURCE MANAGEMENT ISSUES, CONCERNS, AND OPPORTUNITIES

The following issues and concerns have been identified by an interdisciplinary team of resource specialists. The issues identified below are not meant to be all-inclusive, but rather a starting point for public input.

- Potential increased traffic and associated impacts on existing county, state, and BLM roads.
- Potential socio-economic impacts to local communities.
- Potential impacts to surface and groundwater resources.
- Potential impacts from emissions resulting from additional drilling and production activities.
- Potential impacts related to reclamation of disturbed areas and control of invasive plants.
- Potential conflicts with livestock management operations in the project area.
- Potential impacts to cultural, historical, and paleontological resources within the project area.
- Potential impacts to wildlife habitats and populations within the project area, including big game and raptors.
- Potential impacts to threatened, endangered, or candidate plant and animal species, including potential Colorado River depletions and effects on downstream listed fish species.
- Potential cumulative effects of drilling and development activities when combined with other ongoing and proposed developments on lands adjacent to the Puma Project area.
- Potential conflicts between mineral development activities and recreational opportunities.

7.0 INTERDISCIPLINARY TEAM

Based upon current understanding of issues, concerns, and opportunities, an interdisciplinary team (IDT) made up of resource specialists within the BLM Rock Springs Field Office has been identified. The following disciplines are represented on the IDT.

- Interdisciplinary Team Leader
- Air Quality Specialist
- Rangeland Management Specialist
- Archeologist
- Geologist
- Realty Specialist
- Outdoor Recreation Planner
- Hydrologist
- Petroleum Engineer
- Wildlife Biologist
- Fisheries Biologist
- Botanist
- Wild Horse Specialist
- Socioeconomic Specialist
- Public Affairs Specialist
- Natural Resources Specialist
- Planning and Environmental Coordinator
- Writer/Editor

7

8.0 PUBLIC INVOLVEMENT

8.1 PUBLIC INPUT

Public input is important in establishing the level and scope of the analysis necessary. The public is encouraged to participate throughout the environmental analysis process to help identify the level of analysis needed, alternatives to the proposed action, other issues or concerns that should be analyzed, mitigation opportunities, and any other comments or ideas to help ensure the completeness of the analysis process. It would best serve the needs of the BLM for a concentrated analysis if scoping comments are submitted by June 19, 2008, allowing a 30-day comment period.

Please submit your comments to:

Jeromy Caldwell, Natural Resource Specialist
Bureau of Land Management
Rock Springs Field Office
280 Highway 191 North
Rock Springs, Wyoming 82901
Or Email: rock_springs_wymail@blm.gov
(Please add "Puma Project EA" in the Subject line)

8.2 INITIAL MAILING LIST

The initial mailing distribution for this Scoping Notice includes the following agencies, organizations, media, and leaseholders.

Local Government
City of Rock Springs
Sweetwater County
Sweetwater County Conservation District
Sweetwater County Extension
Sweetwater County Weed and Pest

Educational Institutions, Universities, and Museums
Library-University of Wyoming
Sweetwater County Library
University of Wyoming American Studies Program
University of Wyoming Dept. of Anthropology
University of Wyoming Natural Diversity Database
University of Wyoming Renewable Resources
Western Wyoming Community College
Wyoming Association of Professional Archaeologists
Wyoming Association of Professional Historians

Environmental or Conservation Groups
American Lands Alliance
Animal Protection Institute of America
Biodiversity Conservation Alliance
Center for Native Ecosystems
Defenders of Wildlife
Earthjustice Legal Defense Fund
Environmental Defense Fund
Land and Water Fund for the Rockies
Mormon Trails Association

National Pony Express Association (NPEA)
National Wildlife Federation
People for the USA
People for the West
People for Wyoming
Predator Project
Public Lands Foundation
Rocky Mountain Elk Foundation
Sierra Club
Southwest Wyoming Mule Deer Foundation
The Alliance for Historic Wyoming
The Nature Conservancy
Theodore Roosevelt Conservation Partnership
The Wilderness Society
Trout Unlimited
Western Watersheds Project, Wyoming Office
Western Wyoming Mule Deer Foundation
Wildlife Management Institute
Wyoming Advocates for Animals
Wyoming Conservation Voters
Wyoming Outdoor Council
Wyoming People for the USA
Wyoming Wilderness Association
Wyoming Wildlife Federation

Federal Agencies
Federal Aviation Administration
Federal Energy Regulatory Commission
Office of Environmental Policy and Compliance
U.S. Army Corps of Engineers
U.S. Department of Agriculture
U.S. Department of Energy
U.S. EPA, Region 8
USDA Natural Resources Conservation Service
USDI Bureau of Reclamation
USDI Minerals Management Service
USDI National Park Service-Long Distance Trail Office
USDI Office of Surface Mining
USDI Office of the Regional Solicitor

Federal Elected Officials
U.S. Representative Barbara Cubin
U.S. Senator Mike Enzi
U.S. Senator John Barrasso

Trade Groups
Independent Petroleum Association of Mountain States
Southwest Wyoming Industrial Association
Southwest Wyoming Mineral Association
Petroleum Association of Wyoming
Public Lands Advocacy
Wyoming Business Alliance
Wyoming Mining Association

Media
Casper Star-Tribune
Rock Springs Daily Rocket-Miner
Green River Star

Other
Advisory Council on Historic Preservation
National Trust for Historic Preservation
Natural Resources Defense Council
Western Governors' Association
Western Wyoming Resource Conservation & Development
Wyoming Association of Municipalities
Public Land Users or User Groups
Oregon-California Trail Association
Rock Springs Grazing Association
Wyoming Farm Bureau Federation
Wyoming Public Lands Council
Wyoming Sportsman's Association
Wyoming State Grazing Board
Wyoming Stock Growers Association
Wyoming Wool Growers Association

State Agencies/Boards
Department of Agriculture

Department of Environmental Quality
Department of Game and Fish
Department of Revenue
Department of Transportation
Geological Survey
Oil and Gas Conservation Commission
Planning Office
State Engineer's Office
State Forestry Division
State Historic Preservation Office
State Lands and Investments
Wyoming Business Council
Wyoming Livestock Board
Wyoming Outfitters and Guides Association
Wyoming State Library
Wyoming State Museum

State Elected Officials
Governor Dave Freudenthal
Representative Stan Blake
Representative Bernadine Craft
Representative Kathy Davison
Representative Allen Jaggi
Representative Marty Martin
Representative Bill Thompson
Senator Stan Cooper
Senator John Hastert
Senator Rae Lyn Job

Tribes
Eastern Shoshone Tribe
Northern Arapaho Tribe
Northern Ute Tribe
Shoshone-Bannock Tribe