DECISION RECORD
FOR
Coleman Oil & Gas
Wilkinson POD
ENVIRONMENTAL ASSESSMENT –WY-070-EA11-34

DECISION:
BLM's decision is to approve Coleman Oil & Gas's Wilkinson POD Coal Bed Natural Gas (CBNG) POD Alternative B of the attached Environmental Assessment (EA). Alternative B is the Modified Proposed Action, and is the result of collaboration between the Bureau of Land Management and (Company Name). Alternative B has been analyzed in the attached EA and found to have no significant impacts on the human environment, beyond those described in the Powder River Basin Final Environmental Impact Statement (PRB FEIS) thus an EIS is not required.

Details of the approval are summarized below. The project description, including specific changes made at the onsites, and site-specific mitigation measures, is included in the attached EA, Section 2.2.

Well Sites:
The following 28 Applications for Permit to Drill (APDs) and associated infrastructure are authorized:
List of wells:

	Well Name	Well #	TWP	RNG	Sec	QTR	Lease #
1	WILKINSON FEDERAL	34-17	42N	72W	17	SWSE	WYW134204
2	WILKINSON FEDERAL	43-17	42N	72W	17	NESE	WYW134204
3	WILKINSON FEDERAL	21-17	42N	72W	17	NENW	WYW134204
4	WILKINSON FEDERAL	12-17	42N	72W	17	SWNW	WYW134204
5	WILKINSON FEDERAL	12-19	42N	72W	19	SWNW	WYW134204
6	WILKINSON FEDERAL	23-19	42N	72W	19	NESW	WYW136680
7	WILKINSON FEDERAL	21-19	42N	72W	19	NENW	WYW134204
8	WILKINSON FEDERAL	34-19	42N	72W	19	SWSE	WYW134204
9	WILKINSON FEDERAL	41-19	42N	72W	19	NENE	WYW134204
10	WILKINSON FEDERAL BRIDLE BIT R	41-30	42N	72W	30	NENE	WYW136680
11	WILKINSON FEDERAL BRIDLE BIT R	21-30	42N	72W	30	NENW	WYW143523
12	WILKINSON FEDERAL BRIDLE BIT R	12-30	42N	72W	30	SWNW	WYW143523
13	WILKINSON FEDERAL BRIDLE BIT R	23-30	42N	72W	30	NESW	WYW143523
14	WILKINSON FEDERAL LEAVITT	14-4	42N	72W	4	SWSW	WYW62351
15	WILKINSON FEDERAL LEAVITT	14-5	42N	72W	5	SWSW	WYW72039
16	WILKINSON FEDERAL LEAVITT	23-5	42N	72W	5	NESW	WYW72039
17	WILKINSON FEDERAL LEAVITT	34-6	42N	72W	6	SWSE	WYW72039
18	WILKINSON FEDERAL LEAVITT	43-6	42N	72W	6	NESE	WYW72039
19	WILKINSON FEDERAL LEAVITT	14-7	42N	72W	7	SWSW	WYW138125
20	WILKINSON FEDERAL LEAVITT	23-7	42N	72W	7	NESW	WYW138125
21	WILKINSON FEDERAL LEAVITT	21-7	42N	72W	7	NENW	WYW138125
22	WILKINSON FEDERAL LEAVITT	12-7	42N	72W	7	SWNW	WYW138125
23	WILKINSON FEDERAL LEAVITT	12-8	42N	72W	8	SWNW	WYW138125
24	WILKINSON FEDERAL LEAVITT	21-8	42N	72W	8	NENW	WYW138125

25	WILKINSON FEDERAL LEAVITT	21-9	42N	72W	9	NENW	WYW72039
26	WILKINSON FEDERAL LEAVITT	12-9	42N	72W	9	SWNW	WYW72039
27	WILKINSON FEDERAL LEAVITT	41-9	42N	72W	9	NENE	WYW62351
28	WILKINSON FEDERAL LEAVITT	32-9	42N	72W	9	SWNE	WYW62351

Water Management:
The following water management infrastructure was inspected and approved for use in association with this POD:

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)
1	5-1	SESE	5	42N	72W	0.8	1.2
2	5-2	SESE	5	42N	72W	2.7	4.0
3	7-1	NWNE	7	42N	72W	0.1	0.1
4	7-2	SWSE	7	42N	72W	0.3	0.3

Operator Committed Measures:
The operator has incorporated several measures to alleviate resource impacts into their Master Surface Use Plan (MSUP), submitted on 9/09/2010 and 10/14/2010. Refer to the MSUP page 1 through 16 for complete details of operator committed measures.

Site-specific Mitigation Measures:
Site-specific Conditions of Approval have been applied to this project, in addition to the programmatic and standard COAs identified in the PRB FEIS, to mitigate the site-specific impacts described in the Environmental Consequences section of the attached EA. For a complete description of all site-specific COA's associated with this approval, see section Appendix A in the attached EA.

COMPLIANCE WITH LAWS, REGULATIONS, LAND USE PLANS, AND POLICIES:
This approval is in compliance with all Federal laws, regulations, and policies. This includes, but is not limited to, the Federal Land Policy and Management Act, the National Historic Preservation Act, the Threatened and Endangered Species Act, the Migratory Bird Treaty Act, the Clean Water Act, the Clean Air Act, and the National Environmental Policy Act.

Approval of this alternative is in conformance with the *Powder River Basin Oil and Gas Project Environmental Impact Statement and Proposed Plan Amendment* (PRB FEIS), *Record of Decision and Resource Management Plan Amendments for the Powder River Basin Oil and Gas Project* (PRB FEIS ROD), and the Approved Resource Management Plan (RMP) for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office (BFO), (1985/2001).

This approval is subject to adherence with all of the operating plans, design features, and mitigation measures contained in the Master Surface Use Plan of Operations, Drilling Plan, Water Management Plan, and information in individual APDs. This approval is also subject to operator compliance with all mitigation and monitoring requirements contained within the Powder River Oil and Gas Project Final Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS) approved April 30, 2003.

RATIONALE:

The decision to authorize the selected alternative, as summarized above, is based on the following:

1. Mitigation measures were included to reduce environmental impacts below the level of significance (FONSI) while still meeting the project's purpose and need. Mitigation is discussed in the environmental consequences section 4 of the attached EA. For a complete description of all site-specific COA's associated with this approval, see Appendix A in the attached EA.

2. The selected alternative will not result in any undue or unnecessary environmental degradation.

3. The selected alternative will help stimulate local economies by maintaining workforce stability.

4. The Operator, in their POD, has committed to:
   - Comply with all applicable Federal, State, and Local laws and regulations (MSUP pg.13).
   - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits (MSUP pg.4).
   - Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD (MSUP pg.15).
   - Provide water analysis from a designated reference well in each coal zone.

5. The Operator has certified that a Surface Use Agreement has been reached with the Landowners (MSUP pg.11).

6. The selected alternative incorporates components of the Wyoming Governor's Sage Grouse Implementation Team's "core population area" strategy, the Governor's executive order, and local research to provide mitigation for sage-grouse, while meeting the purpose and need for the Wilkinson POD Project.

ADMINISTRATIVE REVIEW AND APPEAL: Under BLM regulations, this decision is subject to administrative review in accordance with 43 CFR 3165. Any request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this Decision Record is received or considered to have been received.

Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager: _____ Date: 11/12/10

FINDING OF NO SIGNIFICANT IMPACT
FOR
Coleman Oil & Gas
Wilkinson POD
ENVIRONMENTAL ASSESSMENT –WY-070-EA11-34

FINDING OF NO SIGNIFICANT IMPACT:
On the basis of the information contained in the EA, and all other information available to me, it is my determination that: (1) the implementation of Alternative B will not have significant environmental impacts beyond those already addressed in PRB EIS to which the EA is tiered; (2) Alternative B is in conformance with the Buffalo Field Office Resource Management Plan (1985, 2001); and (3) Alternative B does not constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary and will not be prepared.

This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR '1508.27), both with regard to the context and to the intensity of the impacts described in the EA.

CONTEXT:
Mineral development (coal, oil and gas, bentonite, and uranium) is a long-standing and common land use within the Powder River Basin. More than one fourth of the nation's coal production comes from the Powder River Basin. The PRB FEIS reasonably foreseeable development predicted and analyzed the development of 51,000 CBNG wells and 3,200 oil wells (PRB FEIS ROD pg. 2). The additional CBNG development described in Alternative B is insignificant within the national, regional, and local context.

INTENSITY:
The implementation of Alternative B will result in beneficial effects in the forms of energy and revenue production however; there will also be adverse effects to the environment (EA sec. 4). Design features and mitigation measures have been included within Alternative B to prevent significant adverse environmental effects (EA sec. 2.2).

The preferred alternative does not pose a significant risk to public health and safety. The geographic area of the POD does not contain unique characteristics identified within the 1985 RMP, 2003 PRB FEIS, or other legislative or regulatory processes.

Relevant scientific literature and professional expertise were used in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects are not highly controversial, highly uncertain, or involve unique or unknown risks.

CBNG development of the nature proposed with this POD and similar PODs was predicted and analyzed in the PRB FEIS; the selected alternative does not establish a precedent for future actions with significant effects.

There are no cultural or historical resources present that will be adversely affected by the selected alternative (EA sec. 4.2.5). No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected (EA sec. 4.2.2). The selected alternative will not have any anticipated effects that would threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment

Field Office Manager: _____ Date: 11/12/10

BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Coleman Oil & Gas
Wilkinson POD
COALBED NATURAL GAS PLAN OF DEVELOPMENT
WY-070-EA11-34

1. INTRODUCTION

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the Powder River Basin Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS), #WY-070-02-065 (approved April 30, 2003), pursuant to 40 CFR 1508.28 and 1502.21. This site-specific analysis tiers into and incorporates by reference the information and analysis contained in Coleman's adjoining Leavitt POD EA# WY-070-08-170 (approved September 19, 2008) and Stoddard POD EA# WY-070-07-010 (approved December 7, 2006).Wilkinson POD was described in the Leavitt POD EA as a reasonably foreseeable action within project area. All infrastructure is shared among the Wilkinson, Leavitt, and Stoddard PODs. The documents described above are available for review at the BLM Buffalo Field Office (BFO). This project environmental assessment (EA) addresses site-specific resources and impacts that were not covered within the PRB FEIS, Leavitt, and Stoddard POD EAs.

1.1. Background

Coleman Oil & Gas submitted the Wilkinson POD on November 6, 2008, to the BFO with 29 Federal APD's to develop and produce natural gas resources within coal bearing formations of the Powder River Basin (PRB). One well was dropped at the onsite and removed from the submittal by the operator on September 9, 2010.

Before the operator submitted the Wilkinson POD on November 6, 2008, a pre-planning site visit was conducted with the BLM on July 1, 2008. The purpose of the site visit was to review general POD-planning strategies in order to minimize potential impacts to wildlife and to identify in the field some potential site-specific wildlife resource conflicts. A number of changes were made to the proposal before submittal as a result of this pre-planning site visit.

Onsite visits were conducted on July 21 & 22, 2010, to evaluate the proposal and modify as necessary to alleviate environmental impacts. BLM sent a post-onsite deficiency on July 29, 2010. The project proposal and APDs were considered complete when BLM received the operator's response to the post onsite deficiencies on September 9, 2010 and October 14, 2010.

1.2. Purpose and Need for the Proposed Action

The purpose of the proposed action is to explore, develop and produce oil and gas reserves conducted under the rights granted by a Federal oil and gas lease, as required in 43 CFR 3160, all Onshore Orders, and The Mineral Leasing Act, as amended and supplemented, (30 U.S.C. 181 et seq.).

The need for the action is the requirement to obtain approval for the development of an Oil and Gas Lease through an Application for Permit to Drill (APD) on public lands managed by the Bureau of Land Management under Onshore Order No. 1, pursuant to the authority of the Mineral Leasing Act, as amended and supplemented, (30 U.S.C. 181 et seq.) and prescribed in 43 CFR Part 3160.

1.3. Decision to be Made

Decision to be Made: The BLM will decide whether or not to approve the proposed development of oil and gas resources on the federal leasehold, and if so, under what terms and conditions.

1.4. Conformance with Land Use Plan and Other Applicable Laws, Regulations, and Policies

The proposed action conforms to the terms and the conditions of the 1985 Buffalo RMP and the 2003 PRB FEIS & RMP Amendment. The proposed action is in compliance with all Federal laws, regulations, and policies. This includes, but is not limited to, the Federal Land Policy and Management Act (1976), the National Historic Preservation Act, the Endangered Species Act (1973), the Migratory Bird Treaty Act (1918), the Clean Water Act (1972), the Clean Air Act (1970), and the National Environmental Policy Act (1969).

1.5. Scoping and Issues

External scoping was not conducted for this EA. Extensive external scoping was conducted for the PRB FEIS and is discussed beginning on pg. 15 of the ROD and beginning on pg. 2-1 of the FEIS. This action is similar in scope to the numerous other CBNG PODs that BFO has analyzed; external scoping would be unlikely to identify new issues..

The BLM interdisciplinary team (ID team) conducted internal scoping by reviewing the proposed development and project location to identify potentially affected resource and land uses. Appendix B identifies those resources and land uses present and affected by the proposed action; those resources and land uses that are either not present, not affected, or were adequately covered by the PRB FEIS will not be discussed in this EA. The ID team identified significant issues for the affected resources to further focus the analysis. This EA addresses those site-specific impacts that were not disclosed within the PRB FEIS that would help in making a reasoned decision or may be related to a potentially significant effect. Issues for this project include:

- Soils and vegetation: site stability, reclamation potential, invasive species
- Wildlife: raptor productivity, mountain plover, and greater sage-grouse lek occupancy and persistency,
- Cultural: National Register eligible sites,
- Water: ground water depletion, quality and quantity of produced water.

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Two alternatives, A and B, were evaluated. A brief description of each alternative is included in the following sections. Programmatic Mitigation Measures, as determined in PRB FEIS Record of Decision apply to all alternatives, including the No Action Alternative (Alternative A), and are included in Appendix A. Standard Mitigation Measures, Operator-committed Mitigation Measures, and site-specific Conditions of Approval (COAs) would apply only to action alternatives (Alternative B) and also are included in Appendix A.

2.1. Alternative A - No Action

A No Action Alternative was considered in the PRB FEIS, Volume 1, pages 2-54 through 2-62. This alternative would consist of no new federal wells. An oil and gas lease grants the lessee the “right and privilege to drill for, mine, extract, remove, and dispose of all oil and gas deposits” in the lease lands, “subject to the terms and conditions incorporated in the lease.” Thus, under this alternative, the operator’s proposal would be denied.

2.2. Alternative B – Modified Proposed Action

Alternative B contains complete APDs and is based on the operator and BLM working to reduce environmental impacts. This alternative summarizes the POD as it was finally, after site visits, submitted to the BLM by Coleman Oil & Gas on 9/9/10 and 10/14/10.

Proposed Action Title: Coleman Oil & Gas's Wilkinson CBNG POD.

Proposed Well Information: There are 28 wells proposed within this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with 1well per location. Each well will produce from Wyodak coal seam at an average depth of 934 feet. Proposed well house dimensions are 6 ft wide x 6 ft length x 6 ft height. Well house color is Covert Green (18-0617 TPX) selected to blend with the surrounding vegetation. A list of proposed wells is included in Table 2.1.

Table 2.1 Proposed Wells – Alternative B

	Well Name	Well #	TWP	RNG	Sec	QTR	Lease #
1	WILKINSON FEDERAL	34-17	42N	72W	17	SWSE	WYW134204
2	WILKINSON FEDERAL	43-17	42N	72W	17	NESE	WYW134204
3	WILKINSON FEDERAL	21-17	42N	72W	17	NENW	WYW134204
4	WILKINSON FEDERAL	12-17	42N	72W	17	SWNW	WYW134204
5	WILKINSON FEDERAL	12-19	42N	72W	19	SWNW	WYW134204
6	WILKINSON FEDERAL	23-19	42N	72W	19	NESW	WYW136680
7	WILKINSON FEDERAL	21-19	42N	72W	19	NENW	WYW134204
8	WILKINSON FEDERAL	34-19	42N	72W	19	SWSE	WYW134204
9	WILKINSON FEDERAL	41-19	42N	72W	19	NENE	WYW134204
10	WILKINSON FEDERAL BRIDLE BIT R	41-30	42N	72W	30	NENE	WYW136680
11	WILKINSON FEDERAL BRIDLE BIT R	21-30	42N	72W	30	NENW	WYW143523
12	WILKINSON FEDERAL BRIDLE BIT R	12-30	42N	72W	30	SWNW	WYW143523
13	WILKINSON FEDERAL BRIDLE BIT R	23-30	42N	72W	30	NESW	WYW143523
14	WILKINSON FEDERAL LEAVITT	14-4	42N	72W	4	SWSW	WYW62351
15	WILKINSON FEDERAL LEAVITT	14-5	42N	72W	5	SWSW	WYW72039
16	WILKINSON FEDERAL LEAVITT	23-5	42N	72W	5	NESW	WYW72039
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23	WILKINSON FEDERAL LEAVITT	12-8	42N	72W	8	SWNW	WYW138125
24	WILKINSON FEDERAL LEAVITT	21-8	42N	72W	8	NENW	WYW138125
25	WILKINSON FEDERAL LEAVITT	21-9	42N	72W	9	NENW	WYW72039
26	WILKINSON FEDERAL LEAVITT	12-9	42N	72W	9	SWNW	WYW72039
27	WILKINSON FEDERAL LEAVITT	41-9	42N	72W	9	NENE	WYW62351
28	WILKINSON FEDERAL LEAVITT	32-9	42N	72W	9	SWNE	WYW62351

Water Management Proposal: Table 2.2 includes the water management infrastructures proposed for use in association with this POD.

Table 2.2 Proposed Water Management Facilities – Alternative B

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)
1	5-1	SESE	5	42N	72W	0.8	1.2
2	5-2	SESE	5	42N	72W	2.7	4.0
3	7-1	NWNE	7	42N	72W	0.1	0.1
4	7-2	SWSE	7	42N	72W	0.3	0.3

County: Campbell

Applicant: Coleman Oil & Gas

Surface Owners: Richard Leavitt Trust, Jerry Dilts Trust, Bridle Bit Ranch

Drilling and Construction:

- Wells will be drilled to the Wyodak coal zone to a depth of approximately 934 feet.

- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.

- Well metering shall be accomplished by telemetry and well visitation. Facilities will consist of a meter building to be located at each well. Metering would entail 3 visits per week to each well.

- A water management plan (WMP) that involves the combination of direct discharge to ephemeral tributaries of Spring and Porcupine Creeks, 4 existing reservoirs, and/or into playas. There are 17 existing and 2 new outfall structures that will be potentially utilized for the release of the produced water. Except for reservoirs 7-1 & 7-2 and outfalls WY0054186-011 & 012, the water management infrastructure was previously analyzed and approved under the Leavitt and Stoddard Federal POD EA's.

- A road network consisting of 9.51 miles of primitive road.

- There is no proposed overhead power. There is previously approved overhead power (Leavitt POD) within Sections 4 and 5 of the project area, provided by 3rd party contractor Precorp. A total of 8.87 miles of overhead power lines service Coleman's fee, federal, and state CBNG developments in the general area. In cases where permanent power is not provided before wells are drilled, approximately 4 natural gas powered generators will be utilized at existing power drops.

- A buried gas, water and power line network.

For a detailed description of design features, construction practices and water management strategies associated with the proposed action, refer to the Master Surface Use Plan (MSUP), Drilling Plan and WMP in the POD and individual APDs. Also see the subject POD for maps showing the proposed well locations and associated facilities described above. More information on CBNG well drilling, production and standard practices also is available in the PRB FEIS, Volume 1, pages 2-9 through 2-40 (January 2003).

Implementation of committed mitigation measures contained in the MSUP, Drilling Program and WMP, in addition to the Standard COAs contained in the PRB FEIS Record of Decision Appendix A, are incorporated and analyzed in this alternative.

2.3. Alternatives Considered but Not Analyzed in Detail

The original POD for the Wilkinson POD was submitted by Coleman Oil & Gas on November 6, 2008 with 29 Federal APDs. A series of discussions and onsite visits occurred between BLM and Coleman Oil & Gas based on the initial project POD:

As a result of these discussions, the following adjustments were made to the initially proposed project:

- A total of one well, the Wilkinson Federal 14-19, was dropped from the initially proposed project due to proximity to raptor nest and inability to place the well out of line-of-sight;
- 4 wells were relocated due to proximity to raptor nests or to place out of line-of-sight of the nests;

The above changes as documented in a revised project description provided Coleman Oil & Gas's response to BLM's deficiency letter, resulted in a refined proposed project, which is discussed in this document as Alternative B. The initial POD, the post-onsite deficiency letter, and the company's response to the deficiency letter are included in the Project Administrative Record, available for review at the BLM Buffalo Field Office.

2.4. Summary of Alternatives

A summary of the infrastructure currently existing within the POD area (Alternative A), and the infrastructure proposed by the operator after modifications made at the onsite (Alternative B), is shown in Table 2.3 below:

Table 2.3 Summary of Alternatives

Facility	Alternative A (No Action) Existing Number/ Acres/Miles	Alternative B (Modified Proposed) Proposed Number/ Acres/Miles
Total CBNG Wells	88 existing	28
Well Locations Nonconstructed Constructed Slotted	17.60 ac estimated	2.80 ac
Conventional Wells	4	0
Acres (Miles) of Template/ Spot Upgrade Roads No Corridor With Corridor	2.47 mi 10.47 ac estimated	0 0 0
Acres (Miles) of Engineered Roads No Corridor With Corridor	 0 0	 0 0

Facility	Alternative A (No Action) Existing Number/ Acres/Miles	Alternative B (Modified Proposed) Proposed Number/ Acres/Miles
Acres (Miles) of Primitive Roads No Corridor With Corridor	40.45 mi 98.06 ac estimated	 2.26 mi = 4.11 ac 7.25 mi = 30.76 ac
Miles of Pipeline No Corridor With Corridor		 2.11 mi = 8.97 ac 0.51 mi = 2.18 ac
Miles of Overhead Powerlines	8.87 = 16.12 ac estimated	0.0
Number of Impoundments On-channel Off-channel Lined Unlined	 4 = 5.6 ac 1	 0 0
Water Discharge Points	17= 2.38 ac	2 = 0.20 ac
TOTAL ACRES DISTURBANCE	**140.23 ac estimated**	**49.02 ac**

3. DESCRIPTION OF AFFECTED ENVIRONMENT

This section describes the environment that would be affected by implementation of the alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major issues. A screening of all resources and land uses potentially affected is included in Appendix B. Resources that would be unaffected, or not affected beyond the level analyzed within the PRB FEIS, are not discussed within the EA.

Applications to drill were received on November 6, 2008. Field inspections of the proposed Wilkinson POD CBNG project were conducted on July 21 & 22, 2010. Personnel attending the field inspections are identified in section 5 Consultation and Coordination.

3.1. Project Area Description

3.1.1. Geologic Features, Mineral Resources, Land Ownership

The topography throughout the project area is characterized by gently sloped draws rising to mixed sagebrush and grasslands uplands. The uplands abruptly develop into scoria buttes and sandstone outcrops within several areas. Ephemeral tributaries of Porcupine Creek and Spring Creek drain the northern and southern project areas, respectively. No perennial streams are located within the Wilkinson POD. Elevations within the project area range from 4,800 to 5,100 feet above sea level. The climate is semi-arid, averaging 12 to 14 inches of precipitation annually, more than 60% of which occurs between April and September. Conventional oil and gas production, as well as CBNG development exists around and within the proposed Wilkinson POD project; this, in conjunction with livestock grazing, are the major land uses within the general area. Land ownership is private surface with federal and private mineral rights.

3.2. Soils, Vegetation, and Ecological Sites

3.2.1. Soils

The Powder River Basin is composed of relatively young soils which have developed in alluvium and residuum derived from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams. Soils have surface and subsurface textures of silt loam and fine sandy loam. Soil depths vary from deep on lesser slopes to shallow and very shallow on steeper

slopes. Soils are generally productive, though varies with texture, slope and other characteristics. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges to 8+ inches in bottomland.

The map unit symbols for the identified soil map unit symbols found within the POD boundary are listed in Table 3.1 below. Ecological Site Descriptions are soil and vegetation community descriptions compiled by the Natural Resources Conservation Service (NRCS) for the purpose of resource identification, and providing management and reclamation recommendations.

Table 3.1 Soil Map Unit Types

Map Unit	Map Unit Name	Acres	Percent
111	Bidman-Parmleed loams, 0 to 6 percent slopes	291.5	18%
217	Theedle-Shingle loams, 3 to 30 percent slopes	246.8	15%
158	Hiland-Bowbac fine sandy loams, 6 to 15 percent slopes	209.2	13%
206	Samday-Shingle-Badland complex, 10 to 45 percent slopes	208.3	13%
208	Savageton-Silhouette clay loams, 0 to 6 percent slopes	102.3	6%
210	Shingle-Taluce complex, 3 to 30 percent slopes	84.9	5%
205	Samday-Savageton clay loams, 3 to 15 percent slopes	50.8	3%
227	Ulm clay loam, 0 to 6 percent slopes	45.8	3%
160	Hiland-Vonalee fine sandy loams, 6 to 15 percent slopes	44.4	3%

Soils within the project area were identified from the South Campbell County Survey Area, Wyoming (WY605).

The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. Pertinent information for analysis was obtained from the published soil survey and the National Soils Information System (NASIS) database for the area.

Approximately 556 acres (36 percent of the project area) have been identified as having low reclamation potential by utilizing Soil Survey Geographical Data (SSURGO). These areas of low reclamation potential were avoided when proposed well sites and infrastructure were planned.

3.2.2. Vegetation & Ecological Sites

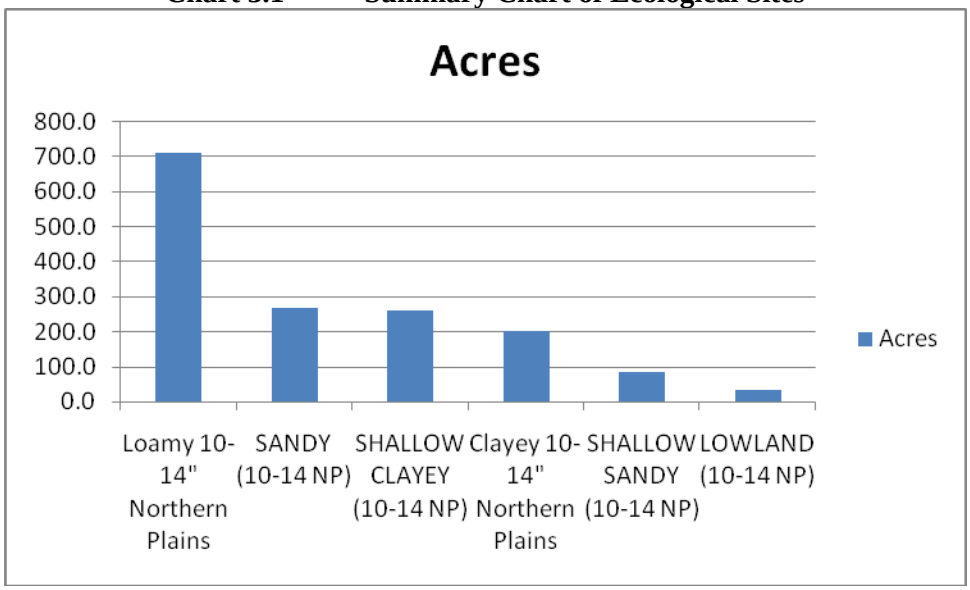
Ecological Site Descriptions (Table 3.1) are used to provide site and vegetation information needed for resource identification, management and reclamation recommendations. To determine the appropriate Ecological Sites for the area contained within this proposed action, BLM specialists analyzed data from onsite field reconnaissance and Natural Resources Conservation Service published soil survey soils information.

A summary of the ecological sites within the project area are listed in Table 3.2 along with the individual acreage and the percentage of the total area identified within the POD boundary.

Table 3.2 Summary of Ecological Sites

Ecological Site	Acres	Percent
Loamy 10-14" Northern Plains	712.2	46%
SANDY (10-14 NP)	269.0	17%
SHALLOW CLAYEY (10-14 NP	259.1	17%
Clayey 10-14" Northern Plains	200.2	13%
SHALLOW SANDY (10-14 NP)	84.9	5%
LOWLAND (10-14 NP)	34.5	2%

Chart 3.1 Summary Chart of Ecological Sites



Dominant Ecological Sites and Plant Communities identified in this POD and its infrastructure predominately Loamy with areas of Clayey and Sandy sites.

Loamy Sites occur on gently undulating to rolling land on landforms which include hill sides, alluvial fans, ridges and stream terraces, in the 10-14 inch precipitation zone. These soils are moderately deep to very deep (greater than 20" to bedrock), well drained soils that formed in alluvium and residuum derived from sandstone and shale. These soils have moderate permeability. The present plant community is a Mixed Sagebrush/Grass. Wyoming big sagebrush is a significant component of this Mixed Sagebrush/Grass plant community. Cool-season mid-grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Dominant grasses include bluebunch wheatgrass, rhizomatous wheatgrass, blue grama, and little bluestem. Other grasses occurring on the state include Cusick's and Sandberg bluegrass, and prairie junegrass.

Sandy Sites occur on nearly level to steep slopes on landforms which include alluvial fans, hillsides, plateaus, ridges, and stream terraces in the 10-14 inch precipitation zone. The soils of this site are moderately deep to very deep (greater than 20"to bedrock), well drained soils that formed in eolian deposits or residuum derived from unspecified sandstone. These soils have moderate, moderately rapid, or rapid permeability. The main soil limitations include low available water holding capacity, and high wind erosion potential. The present plant community is a Needleandthread/ Threadleaf sedge/ Fringed sage Plant Community. Cool-season mid-grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. The dominant understory grasses include needleandthread, threadleaf sedge, prairie junegrass, and fringed sagewort.

Clayey Sites occur on nearly level to steep slopes on landforms which include hill sides, alluvial fans and stream terraces in the 10-14"precipitation zone. The soils of this site are moderately deep to very deep (greater than 20" to bedrock), well-drained soils that formed in alluvium or alluvium over residuum derived calcareous shale. These soils have slow permeability. The bedrock is clay shale which is virtually impenetrable to plant roots. The present plant community is a Mixed Sagebrush/Grass. Wyoming big sagebrush is a significant component of this Mixed Sagebrush/Grass plant community. Big sagebrush is a significant component of this plant community. Cool-season grasses make up the majority of the

understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Dominant grasses include rhizomatous wheatgrasses, green needlegrass, blue grama, and prairie junegrass. Forbs include Louisiana sagewort (cudweed), plains wallflower, hairy goldaster, and scarlet globemallow. Fringed sagewort and plains pricklypear also occur.

3.2.2.1. Wetlands/Riparian

Wetlands within and near the POD area are found along Spring Creek reaches that are currently receiving CBNG discharge. Enhanced riparian vegetation is also present on the larger tributaries to Spring Creek and surrounding the two seep/springs within the POD boundary. Grasses are the prominent riparian vegetation. No cottonwood trees or large shrub type vegetation were observed within the drainages. There are approximately 140 acres of wetlands identified within the POD boundary as shown below in Table 3.3.

Table 3.3 Wetland Type and Acres Present in POD Boundary

WETLAND TYPE	ACRES
PEMC- Palustrine Emergent Seasonally Flooded	1.6
PABFh- Palustrine Aquatic Bed Semi-permanently Flooded	0.4
PEMA-Palustrine Emergent Temporarily Flooded	137.1
PUSCx-Palustrine Unconsolidated Shore Seasonally Flooded Excavated	0.4

3.2.2.2. Invasive Species

The Wyoming Energy Resource Information Clearinghouse (WERIC) web site (www.weric.info) identifies skeletonleaf bursage (*Ambrosia tonentosa* Nutt.) as a known state-listed noxious weed population in T42N R72W. The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices.

The following is a list of additional State and County Designated Noxious Weeds that were encountered within the Wilkinson POD:

- Canada thistle (*Cirsium arvense* L.)
- Scotch thistle (*Onopordum acanthium* L.)

The state-listed noxious weeds are listed in PRB FEIS Table 3-21 (p. 3-104) and the Weed Species of Concern are listed in Table 3-22 (p. 3-105).

3.3. Wildlife

Several resources were consulted to identify wildlife species that may occur in the proposed project area. Resources that were consulted include the wildlife database compiled and managed by the BLM Buffalo Field Office (BFO) wildlife biologists, the PRB FEIS, the Wyoming Game and Fish Department (WGFD) big game and sage-grouse maps, and the Wyoming Natural Diversity Database (WYNDD).

A habitat assessment and wildlife inventory surveys were performed by ARCADIS U.S. Inc. (ARCADIS 2008, 2009). Wildlife surveys for 2010 were not contracted by Coleman, and the most current information for analysis was not available to the BLM biologist prior to completing this assessment. ARCADIS performed surveys for bald eagles, mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests, and prairie dog colonies according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol either in 2008 or 2009, or both. Surveys were conducted for Ute ladies'-tresses orchid by ARCADIS for Coleman's Leavitt, SW Reno Flat, and Stoddard PODs in previous years which occur in the same area, therefore no surveys were conducted for the Wilkinson project. PRBIWG accepted protocol is available on the BLM Buffalo Field Office website (http://www.blm.gov/wy/st/en/field_offices/Buffalo.html).

A BLM biologist conducted field visits on 21 July and 22 July 2010. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project modification recommendations where wildlife issues arose.

WGFD is the agency responsible for management of wildlife populations in the state of Wyoming. WGFD has developed several guidance documents that BLM BFO wildlife staff relies upon in evaluating impacts to wildlife and wildlife habitats. WGFD documents used to analyze the proposed project under the current analysis are referenced in this section.

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (WGFD 2009a), WGFD developed impact thresholds to evaluate impacts to wildlife from oil and gas development. For species or habitats discussed in this EA where impact thresholds have been developed, those thresholds will be disclosed and discussed both in relation to the current conditions (Affected Environment) and in relation to reasonable foreseeable development, including development associated with the proposed project (Impacts Analysis). Moderate impacts occur when impairment of habitat function becomes discernable. High impacts occur when impairment of habitat function increases. Extreme impacts occur where habitat function is substantially impaired. Mitigation for each level of impact is discussed in the guidelines. Thresholds for impacts are generally determined by well densities.

3.3.1. Habitat Types

The project area is located approximately 10 miles south of Wright, Wyoming in sections 4-9, 17, 19, and 30 T42N R72W. Topography throughout the area is characterized by gentle to medium sloped draws rising to mixed sagebrush and grass uplands. Scoria buttes and sandstone outcrops are common in the several areas. The project area is drained by ephemeral tributaries to Porcupine Creek and Spring Creek, with no perennial streams occurring within the project area. Current uses within the project area include coal bed natural gas development and grazing.

Wyoming big sagebrush is the dominant shrub in the upland areas, occurring in sparse to moderately dense stands in a mosaic throughout the project area. Native grasses and forbs are mixed within the sagebrush understory. Ephemeral stream channels in the area are characterized by native grasses and forbs, with few scattered cottonwood trees occurring as well.

Habitat types for this area are similar to those discussed in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

3.3.2. Threatened, Endangered, Proposed, Candidate, and BLM Sensitive Species

3.3.2.1. Threatened and Endangered Species

Threatened, Endangered, Candidate and Proposed species that will be impacted beyond the level analyzed within the PRB FEIS are described below.

3.3.2.1.1. Black-footed ferret

The black-footed ferret is listed as Endangered under the ESA. The affected environment for black-footed ferrets is discussed in the PRB FEIS on pg. 3-175 Additional information regarding the affected environment for black-footed ferret is discussed here and in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

This nocturnal predator is closely associated with prairie dogs. The ferret depends almost entirely upon prairie dogs for food and uses old prairie dog burrows for dens. Current science indicates that a black-footed ferret population requires at least 1,000 acres, separated by no more than 1.5 km of black-tailed prairie dog colonies for survival (USFWS 1989).

Active reintroduction efforts have reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 2004, the WGFD identified six prairie dog complexes (Arvada, Sheridan, Pleasantdale, Four Corners, Linch, Kaycee, and, Thunder Basin National Grasslands) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Grenier et al. 2004).

Black-footed ferret habitat is not present within the Wilkinson project area. Black-tailed prairie dog colonies, totaling 216 acres in size, were identified within 0.25 miles of the project area. These colonies were reported by ARCADIS (2008) or were previously documented in the BLM prairie dog database and are located in SE1/4 S7 and W1/2 S4 T43N R72W. The town in Section 4 is within 1.5 km of another prairie dog colony, however the combined acreage is not equal to the 1000 acres necessary for ferret habitat requirements. The project area is located approximately 16 miles from the Ross prairie dog complex, a potential black-footed ferret reintroduction area identified by WGFD, and 20 miles from the Linch prairie dog complex, another potential reintroduction area. USFWS has determined that black-footed ferrets do not occur in Wyoming outside of the Shirley Basin, and the species has been block cleared for the rest of the state.

3.3.2.1.2. Blowout Penstemon

Blowout penstemon is listed as Endangered under the ESA. It is a regional endemic species with documented populations in the Sand Hills of west-central Nebraska and the northeastern Great Divide Basin of Carbon County, Wyoming. Suitable blowout penstemon habitat consists of sparsely vegetated, early successional, shifting sand dunes and blowout depressions created by wind. In Wyoming, the habitat is typically found on sandy aprons or the lower half of steep sandy slopes deposited at the base of granitic or sedimentary mountains or ridges. The Wilkinson project area does not contain areas with these characteristics, and blowout penstemon is not expected to occur.

3.3.2.1.3. Ute Ladies'-Tresses Orchid

The Ute ladies'-tresses orchid (ULT) is listed as Threatened under the ESA. The affected environment for ULT is discussed in the PRB FEIS on pg. 3-175. This species was analyzed in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010). Please refer to the Leavitt POD EA for a description of the affected environment. Ute ladies'-tresses presence or habitat surveys were not specifically conducted for the Wilkinson project. ARCADIS conducted ULT surveys along Spring Creek, West Prong Spring Creek, Porcupine Creek, and several springs within and adjacent to the Wilkinson POD boundary (ARCADIS 2008). Sparse patches of wetlands and meadows in these areas have been identified as potential ULT habitat, however, no orchids have ever been observed during surveys.

3.3.2.2. Proposed Species

3.3.2.2.1. Mountain Plover

The affected environment for mountain plover is discussed in the PRB FEIS on pg. 3-177 to 3-178. Additional information regarding the affected environment for mountain plover is discussed here and in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

At the time the PRB FEIS was written, the mountain plover was proposed for listing as a threatened species under the ESA. USFWS withdrew the proposal in 2003 but reinstated it again in 2010. USFWS will submit a final listing determination in 2011. Mountain plover is a WGFD Species of Greatest Conservation Need (SGCN), because population status and trends are unknown but are suspected to be stable, habitat is vulnerable without ongoing significant loss, and the species is sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a species with highest conservation priority, indicating they are clearly in need of conservation action. They are also listed by USFWS as a Bird of Conservation Concern (BCC) for Region 17, which includes the project area. BCCs are those species that represent USFWS's highest conservation priorities, outside of those that are already listed

under ESA. The goal of identifying BCCs is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions.

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Prairie dog colonies, several playas, and linear pipeline corridors containing bare ground on even terrain, located within the project area, all have the potential for plover use. The BLM identified the prairie dog town in Section 4 T42N R72W as potential habitat for plover. The town is located approximately 0.7 miles south of another prairie dog town where mountain plover nests have been previously documented. While the current grass cover in the playas and corridors is likely to preclude mountain plover from using these areas, disturbances such as intensive grazing, drought, or wildfire would make these areas suitable for mountain plover.

3.3.2.3. Candidate Species

3.3.2.3.1. Greater Sage-grouse

The affected environment for greater sage-grouse (sage-grouse) is discussed in the PRB FEIS (pg. 3-194 to 3-199). Additional information regarding the affected environment for sage-grouse is discussed here and in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

In 2010, USFWS determined that the sage-grouse was warranted for federal listing across its range, but the listing was precluded by other higher priority listing actions. Sage-grouse are listed as a WGFD SGCN because populations are declining, and they are experiencing ongoing significant loss of habitat. The Wyoming Bird Conservation Plan rates sage-grouse as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17. The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2008). Research suggests that these declines may be a result, in part, of CBNG development, as discussed in detail in USFWS (2010).

Sage-grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas. They depend upon substantial sagebrush stands for nesting and winter survival (BLM 2003).

Suitable sage-grouse habitat is present throughout the project area. Sparse to moderately dense stands of sagebrush are present throughout the project area. Riparian areas and draw bottoms along the tributaries of Porcupine and Spring Creeks contain a diverse mix of forbs that could support sage-grouse and their broods during summer and early fall. BLM records show four sage-grouse leks within four miles of the project area. The four-mile distance was recommended by the State wildlife agencies' ad hoc committee for consideration of oil and gas development effects to nesting habitat (WGFD 2008). The four lek sites are identified below (3.4). Data for 2010 was not available at the time this document was completed.

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (2009), WGFD categorized impacts to sage-grouse by number of well pad locations per square mile

within two miles of a lek and within identified nesting/brood-rearing habitats greater than two miles from a lek. Moderate impacts occur when well density is between one and two well pad locations per square mile or where there is less than 20 acres of disturbance per square mile. High impacts occur when well density is between two and three well pad locations per square mile or when there are between 20 and 60 acres of disturbance per square mile. Extreme impacts occur when well density exceeds three well pad locations per square mile or when there are greater than 60 acres of disturbance per square mile.

Table 3.4 Sage-grouse leks within 4 miles of the Wilkinson project area.

Lek Name	Legal Location	Distance from Project Area (mi)	Year: Peak Males	WGFD Category of Impact
Spring Creek	SWSW S6 T42N R72W	0.08	2009: 3 2008: 10 2007: 12 2006: 16 2005: 18	Extreme
160 Acre	NESE S15 T42N R73W	2.2	2009: 0 2008: 19 2007: 20 2006: 10	Moderate
Porcupine Creek	NWSE S23 T43N R73W	3.4	2009: 11 2008: 34 2006: 24 2005: 12	Extreme
59	NWSE S23 T42N R72W	2.7	2009: 0 2008: 0 2007: 0 2006: 0	Extreme

There are currently 620 wells (Wyoming Oil and Gas Conservation Commission [WOGCC] October 2010) within four miles of the four leks listed above, an area of 138 square miles. This amounts to a density of approximately 4.5 wells per square mile, which exceeds the effects threshold of one well pad per square mile described by the State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat.

3.3.3. BLM Sensitive Species

Wyoming BLM has prepared a list of sensitive species on which management efforts should be focused towards maintaining habitats under a multiple use mandate. The goals of the policy are to:

- Maintain vulnerable species and habitat components in functional BLM ecosystems
- Ensure sensitive species are considered in land management decisions
- Prevent a need for species listing under the ESA
- Prioritize needed conservation work with an emphasis on habitat

The authority for the sensitive species policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A. BLM Wyoming sensitive species that will be impacted beyond the level analyzed within the PRB FEIS are described below and in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

3.3.3.1. Northern Leopard Frog

The affected environment for northern leopard frog is discussed in the PRB FEIS on pg. 3-181. This is a

WGFD Species of Greatest Conservation Need (SGCN), with a rating of NSS4, indicating that the species is common (widely distributed throughout its native range and populations are stable) and habitat is stable.

Coal bed natural gas development has been occurring in the vicinity of the Wilkinson project area. Reservoirs in the area have been receiving water from the previously approved Leavitt and Stoddard PODs which may have created habitat and the species is suspected to occur.

3.3.3.2. Baird's Sparrow

The affected environment for Baird's sparrow is discussed in the PRB FEIS on pg. 3-188. In addition to being listed as a Wyoming BLM sensitive species, Baird's sparrows are listed by USFWS as a BCC for Region 17.

Baird's sparrow habitat exists in the project area and the species is suspected to occur.

3.3.3.3. Bald Eagle

The affected environment for bald eagles is described in the PRB FEIS on pg. 3-175. At the time the PRB FEIS was written, the bald eagle was listed as a threatened species under the ESA. Due to successful recovery efforts, it was removed from the ESA on 8 August 2007. The bald eagle remains under the protection of the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

In addition to being listed as a Wyoming BLM sensitive species, bald eagles are a WGFD SGCN with a NSS2 rating, due to populations being restricted in numbers and distribution, ongoing loss of habitat, and sensitivity to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region17.

The affected environment for bald eagles is discussed in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010). In addition, two adult bald eagles were observed perched in a cottonwood tree along Porcupine Creek in SENE Section 11 T42N R72W on 5 February 2008 (ARCADIS 2008). The location is over one mile from the POD boundary. Bald eagle roosting surveys were not conducted in the winters of 2008/2009 or 2009/2010. Although the visits may be infrequent, bald eagles are suspected to occur.

3.3.3.4. Brewer's Sparrow

The affected environment for Brewer's sparrow is discussed in the PRB FEIS on pg. 3-200. In addition to being listed as a BLM Wyoming sensitive species, Brewer's sparrows are a WGFD SGCN, with a rating of NSS4 because populations are declining, habitat is vulnerable with no ongoing loss, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Brewer's sparrow habitat is present in the project area and the species is suspected to occur.

3.3.3.5. Ferruginous Hawk

The affected environment for ferruginous hawk is discussed in the PRB FEIS on pg. 3-183. In addition to being listed as a Wyoming BLM sensitive species, ferruginous hawks are a WGFD SGCN, with a rating of NSS3 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, they are experiencing ongoing loss of habitat, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Of the 27 nests listed in the table under the raptors section of affected environment, 27 of the nests are located on the ground and likely to be ferruginous hawk nests.

Ferruginous hawks were observed in the project area by the BLM biologist on both days during the onsite visits. In addition, old eggshells were observed in nest 2494 and lagomorph remains and recent whitewash were present at nest 5232. In the raptor status table, located in affected environment for raptors (section 3.1.7), it shows that nests 885, 2990, 3899, and 5227 have all been active with ferruginous hawks at least once during the years 2006-2009. Raptor surveys for 2010 were not conducted for the project area.

3.3.3.6. Loggerhead Shrike

The affected environment for loggerhead shrike is discussed in the PRB FEIS on pg. 3-187. In addition to being listed as a Wyoming BLM sensitive species, loggerhead shrikes are listed by USFWS as a BCC for Region 17. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating they are in need of monitoring.

Loggerhead shrike habitat is present in the project area and the species is suspected to occur.

3.3.3.7. Long-billed Curlew

The affected environment for long-billed curlew is discussed in the PRB FEIS on pg. 3-184. In addition to being listed as a Wyoming BLM sensitive species, long-billed curlews are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, and habitat is vulnerable but not undergoing loss. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Long-billed curlew habitat is present in the project area and the species is suspected to occur.

3.3.3.8. Sage Thrasher

The affected environment for sage thrasher is discussed in the PRB FEIS on pg. 3-199 to 3-200. In addition to being listed as a Wyoming BLM sensitive species, sage thrashers are a WGFD SGCN, with a rating of NSS4, because populations are declining, habitat is vulnerable but not undergoing loss, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating the action and focus should be on monitoring and because Wyoming has a high percentage of and responsibility for the breeding population. They are also listed by USFWS as a BCC for Region 17.

Sage thrasher habitat is present in the project area and the species is suspected to occur.

3.3.3.9. Trumpeter Swan

The affected environment for trumpeter swan is discussed in the PRB FEIS on pg. 3-193. In addition to being listed as a Wyoming BLM sensitive species, trumpeter swans are a WGFD SGCN, with a rating of NSS2, because populations are restricted in numbers and distribution, they are experiencing ongoing and substantial loss of habitat, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action.

Coal bed natural gas development has been occurring in the vicinity of the Wilkinson project area. Reservoirs in the area have been receiving water from the previously approved Leavitt and Stoddard PODs which may have created migration habitat and the species is suspected to occur.

3.3.3.10. Western Burrowing Owl

The affected environment for western burrowing owl (burrowing owl) is discussed in the PRB FEIS on pg. 3-186 and in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010). In addition to

being listed as a Wyoming BLM sensitive species, burrowing owls are a WGFD SGCN, with a rating of NSS4 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, habitat is restricted or vulnerable without substantial recent or on-going loss, and it may be sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action, and they are also a USFWS BCC in Region 17.

No burrowing owl nests were observed by ARCADIS, nor were there any reported by other consultants in the BLM raptor nest database, but the black-tailed prairie dog colonies listed in Section 3.1.3.11 provide suitable habitat for burrowing owls.

3.3.3.11. Black-tailed Prairie Dog

The affected environment for black-tailed prairie dogs is discussed in the PRB FEIS (pg 3-179) and in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

Approximately 216 acres of black-tailed prairie dog towns occur within the vicinity of the project area, in Sections 4 and 7, T42N R72W. The town in Section 4 is within the POD boundary. During onsite visits in July, the vegetation in this town appeared to be approximately 4 inches in height, with sparse, low growing sagebrush. Cattle were also observed grazing in this town during the onsite.

3.3.3.12. Swift Fox

The affected environment for swift fox is discussed in the PRB FEIS on pg. 3-189 and in the Leavitt POD EA (WY-070-08-170). In addition to being listed as a BLM WY sensitive species, swift fox is also listed as a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected to be stable, and habitat is vulnerable but is not undergoing substantial loss.

ARCADIS submitted survey results for swift fox surveys in SE Section 7 T42N R72W in 2009 in compliance with the conditions of approval for the Leavitt POD (ARCADIS 2009). The survey results were negative. However, a BLM biologist noted the possible location of a den site near proposed well 12-7, located in NW Section 7. The prairie dog colonies in W1/2 Section 4 may also provide denning habitat to the swift fox, and were not included in surveys submitted to the BLM. The species is suspected to occur in the project area.

3.3.4. Big Game

The affected environment for pronghorn and mule deer is discussed in the PRB FEIS on pp. 3-117 to 3-122 and pp. 3-127 to 3-132, respectively.

Big game species expected to be within the Wilkinson project area include pronghorn antelope and mule deer. The WGFD has determined that the project area contains yearlong range for both pronghorn antelope and mule deer. Affected environment for pronghorn antelope and mule deer will be similar to that identified in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

3.3.5. Aquatic Species

The Powder River Basin ecosystem and fishery is discussed in further detail in the PRB FEIS (pp. 3-153 to 3-166).

3.3.6. Migratory Birds

The affected environment for migratory birds is discussed in the PRB FEIS (pp. 3-150 to 3-153) and the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

In addition to those mentioned in other sections of this document, the following species were observed

during onsite visits to the Wilkinson project area: Lapland larkspurs, lark bunting, horned lark, red-tailed hawk, and northern harrier.

3.3.7. Raptors

The affected environment for raptors is discussed in the PRB FEIS on pp. 3-141 to 3-148 and the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

Thirty-eight raptor nest sites were identified by ARCADIS (ARCADIS 2008 and 2009) and BLM within 0.5 miles of the project boundary. Of those, 11 were documented as gone, therefore leaving 27 nest sites. These are listed in the Table 3.5 below. Wildlife surveys were not conducted for the Wilkinson or Leavitt project areas in 2010, therefore 2009 is the most recent survey data for these raptor nests.

Table 3.5 Documented raptor nests within 0.5 miles of the Wilkinson project area.

BLM ID	UTMs	Legal	Substrate	Year	Condition	Status	Species
885	454996E 4824535N	S31 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Excellent	ACTI	FEHA
2484	455731E 4829029N	S18 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Good	INAC	n/a
2485	456438E 4829118N	S17 T42N R72W	GHS	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Remnants	INAC	n/a
2494	455268E 4830304N	S7 T42N R72W	CKB	2009	Poor	INAC	n/a
				2007	Good	INAC	n/a
				2004	Good	INAC	n/a
2495	456280E 4828469N	S17 T42N R72W	GHS	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Remnants	INAC	n/a
2496	456233E 4828267N	S17 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Poor	INAC	n/a
2497	456996E 4826130N	S29 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Good	INAC	n/a
2520	457062E 4826363N	S29 T42N R72W	CKB	2009	Poor	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Remnants	INAC	n/a
2991	459198E 4831847N	S4 T42N R72W	CKB	2009	Poor	INAC	n/a
				2007	Poor	INAC	n/a
				2006	Poor	INAC	n/a
2995	459564E 4831031N	S10 T42N R72W	ROK	2009	Poor	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Good	INAC	n/a
3899	456570E 4826406N	S29 T42N R72W	CKB	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Excellent	ACTI	FEHA

BLM ID	UTMs	Legal	Substrate	Year	Condition	Status	Species
4590	460090E 4831275N	S10 T42N R72W	GHS	2009	Fair	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Good	INAC	n/a
4591	456020E 4828470N	S18 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Poor	INAC	n/a
4816	456246E 4824809N	S32 T42N R72W	GHS	2009	Nest Gone	INAC	n/a
				2008	Nest Gone	DNLO	n/a
				2007	Good	INAC	n/a
5175	456136E 4828293N	S17 T42N R72W	GHS	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Poor	INAC	n/a
5225	456084E 4832759N	S6 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Good	INAC	n/a
				2007	Good	INAC	n/a
5226	455943E 4832862N	S6 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Good	INAC	n/a
				2007	Good	INAC	n/a
5227	455011E 4829578N	S18 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Excellent	ACTF	FEHA
5228	454646E 4826926N	S19 T42N R72W	ROC	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Remnants	INAC	n/a
5229	454576E 4826423N	S30 T42N R72W	GHS	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Remnants	INAC	n/a
5230	454294E 4826841N	S24 T42N R73W	GHS	2009	Fair	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Good	INAC	n/a
5231	454409E 4826889N	S24 T42N R73W	GHS	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Remnants	INAC	n/a
5232	454419E 4826297N	S25 T42N R73W	GHS	2009	Poor	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Remnants	INAC	n/a
5320	455979E 4832823N	S6 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Fair	INAC	n/a
6290	455560E 4832674N	S6 T42N R72W	GHS	2009	Good	INAC	n/a
				2008	Fair	INAC	n/a
6292	454706E 4826291N	S30 T42N R72W	GHS	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
6293	454069E 4825813N	S25 T42N R73W	GHS	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a

NOTES
Substrate: ABB = Abandoned burrow; CTL = Cottonwood – live; CTD = Cottonwood – Dead; CKB=Creek bottom; ERR = Erosion Remnant; GHS=Ground/Hillside; JUN = Juniper Tree;
MMS = Man Made Structures; ACB = Active Burrow; ROK = Rock Outcrop
Status: ACTF = Active/Failed; ACTI = Active; DNLO = Did Not Locate; INAC = Inactive; OCCU = Occupied;
Species: AMKE = American Kestrel; BUOW = Burrowing Owl; FEHA=Ferruginous Hawk; GOEA = Golden Eagle; GRHO = Great Horned Owl; RETA = Red-tailed Hawk;

3.3.8. Plains Sharp-tailed Grouse

The affected environment for plains sharp-tailed grouse is discussed in the PRB FEIS on pp. 3-148 to 3-150 and is similar to that described in the Leavitt POD EA (WY-070-08-170).

3.3.9. West Nile Virus

West Nile virus (WNv) is a mosquito-borne disease that can cause encephalitis or brain infection. Mosquitoes spread this virus after they feed on infected birds and then bite people, other birds, and animals. WNv is not spread by person-to-person contact, and there is no evidence that people can get the virus by handling infected animals.

Since its discovery in 1999 in New York, WNv has become firmly established and spread across the United States. Birds are the natural vector host and serve not only to amplify the virus, but to spread it. Though less than 1% of mosquitoes are infected with WNv, they still are very effective in transmitting the virus to humans, horses, and wildlife. *Culex tarsalis* appears to be the most common mosquito to vector, WNv.

The human health issues related to WNv are well documented and continue to escalate. Historic data collected by the CDC and published by the USGS at www.westnilemaps.usgs.gov are summarized in Table 3.6. Reported data from the Powder River Basin (PRB) includes Campbell, Sheridan and Johnson counties.

Table 3.6 Historical West Nile Virus Information

Year	Total WY Human Cases	Human Cases PRB	Equine Cases PRB	Bird Cases PRB
2001	0	0	0	0
2002	2	0	15	3
2003	392	85	46	25
2004	10	3	3	5
2005	12	4	6	3
2006	65	0	2	2
2007	155	22	Unk	1
2008	10	0	0	0
2009	10	1	1	No record

Source: Wyoming Department of Health, www.badskeeter.org/detections.html.

Human cases of WNv in Wyoming occur primarily in the late summer or early fall. There is some evidence that the incidence of WNv tapers off over several years after a peak following initial outbreak (Litzel and Mooney, personal conversations). If this is the case, occurrences in Wyoming are likely to increase over the next few years, followed by a gradual decline in the number of reported cases.

Although most of the attention has been focused on human health issues, WNv has had an impact on vertebrate wildlife populations. At a recent conference at the Smithsonian Environmental Research Center, scientists disclosed WNv had been detected in 157 bird species, horses, 16 other mammals, and

alligators (Marra et al 2003). In the eastern US, avian populations have incurred very high mortality, particularly crows, jays and related species. Raptor species also appear to be highly susceptible to WNv. During 2003, 36 raptors were documented to have died from WNv in Wyoming including golden eagle, red-tailed hawk, ferruginous hawk, American kestrel, Cooper's hawk, northern goshawk, great-horned owl, prairie falcon, and Swainson's hawk (Cornish et al. 2003). Actual mortality is likely to be greater.

Population impacts of WNv on raptors are unknown at present. The Wyoming State Vet Lab determined 22 sage-grouse in one study project (90% of the study birds), succumbed to WNv in the PRB in 2003. While birds infected with WNv have many of the same symptoms as infected humans, they appear to be more sensitive to the virus (Rinkes 2003).

Mosquitoes can potentially breed in any standing water that lasts more than four days. In the Powder River Basin, there is generally increased surface water availability associated with CBNG development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the Powder River Basin indicates WNv mosquito vectors were notably more abundant on a developed CBNG site than two similar undeveloped sites (Walker et al. 2003). Reducing the population of mosquitoes, especially species that are apparently involved with bird-to-bird transmission of WNv, such as *Culex tarsalis,* can help to reduce or eliminate the presence of virus in a given geographical area (APHIS 2002). The most important step any property owner can take to control such mosquito populations is to remove all potential man-made sources of standing water in which mosquitoes might breed (APHIS 2002).

The most common pesticide treatment is to place larvicidal briquettes in small standing water pools along drainages or every 100 feet along the shoreline of reservoirs and ponds. It is generally accepted that it is not necessary to place the briquettes in the main water body because wave action prevents this environment from being optimum mosquito breeding habitat. Follow-up treatment of adult mosquitoes with malathion may be needed every 3 to 4 days to control adults following application of larvicide (Mooney, personal conversation). These treatment methods seem to be effective when focused on specific target areas, especially near communities, however they have not been applied over large areas nor have they been used to treat a wide range of potential mosquito breeding habitat such as that associated with CBNG development.

The WDEQ and the Wyoming Department of Health sent a letter to CBNG operators on June 30, 2004. The letter encouraged people employed in occupations that require extended periods of outdoor labor, be provided educational material by their employers about WNv to reduce the risk of WNv transmission. The letter encouraged companies to contact either local Weed and Pest Districts or the Wyoming Department of Health for surface water treatment options.

3.4. Water Resources

The project area is within the Antelope Creek watershed. Proposed discharge points and impoundments are located in the Spring Creek drainage and in tributaries to Porcupine Creek. These two drainages are tributaries to Antelope Creek, which is a tributary to the Cheyenne River

The Wyoming Department of Environmental Quality (WDEQ) has assumed primacy from United States Environmental Protection Agency for maintaining the water quality in the waters of the state. The Wyoming State Engineer's Office (WSEO) has authority for regulating water rights issues and permitting impoundments for the containment of surface waters of the state. The Wyoming Oil and Gas Conservation Commission (WYOGCC) has authority for permitting and bonding off channel pits that are located over State and fee minerals.

3.4.1. Groundwater

The groundwater in this project area has historically been used for stock water or domestic purposes. A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 21 permitted water wells within 1 mile of Wilkinson Federal project area, which range from 100 to 855 feet in depth with permitted static water zones ranging from 60 to 200 feet depth at the time they were completed. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

WDEQ water quality parameters for groundwater classifications (Chapter 8 – Quality Standards for Wyoming Groundwater) define the following general limits for Total Dissolved Solids (TDS): 500 mg/l TDS for Drinking Water (Class I), 2000 mg/l for Agricultural Use (Class II) and 5000 mg/l for Livestock Use (Class III). For additional water quality limits for groundwater, please refer to the WDEQ web site.

The ROD includes a Monitoring, Mitigation and Reporting Plan (MMRP). The objective of the plan is to monitor those elements of the analysis where there was limited information available during the preparation of the EIS. The MMRP called for the use of adaptive management where changes could be made based on monitoring data collected during implementation.

Specifically relative to groundwater, the plan identified the following (PRB FEIS ROD page E-4):

- The effects of infiltrated waters on the water quality of existing shallow groundwater aquifers are not well documented at this time;
- Potential impacts will be highly variable depending upon local geologic and hydrologic conditions;
- It may be necessary to conduct investigations at representative sites around the basin to quantify these impacts;
- Provide site specific guidance on the placement and design of CBM impoundments, and
- Shallow groundwater wells would be installed and monitored where necessary.

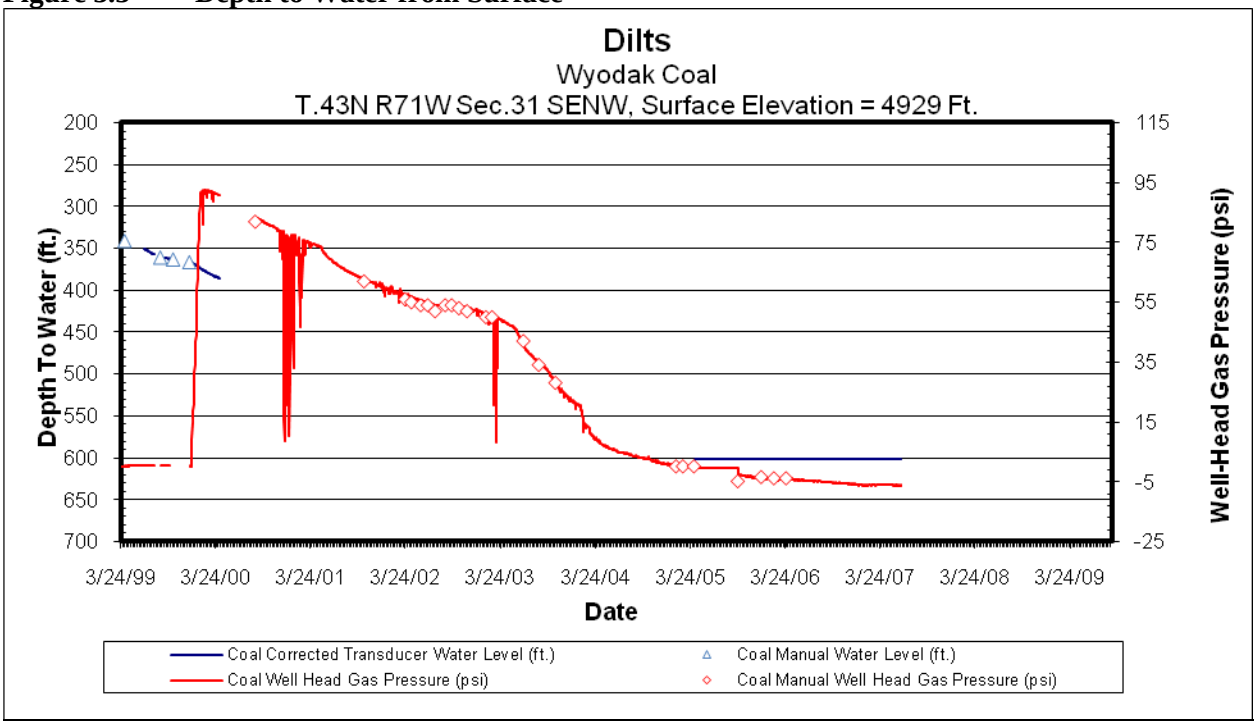
The production of CBNG necessitates the removal of some degree of the water saturation in the coal zones to temporarily reduce the hydraulic head in the coal. The Buffalo Field Office has been monitoring coal zone pressures as expressed in depth to water from surface since the early 1990s in the PRB (Figure 3.3).

Coleman has drilled and completed two other PODs, the Leavitt Federal and Stoddard Federal within close proximity of the Wilkinson Federal POD. Other fee and federal CBNG drilling operations have been developed in the general area. As a result, the target coal zone pressure may have been reduced through off set water production. The Dilts groundwater monitoring well was installed by Williams Production RMT Company as a part of the BLM deep groundwater monitoring program. The initial water level of the Wyodak coal seam, which is indicative of the pressure in the coal zone, was recorded at 341 feet below ground level on April 9, 1999. The most recent measurement, dated September 9, 2010 recorded the water level at 658 feet below ground level, for a decline of 317 feet since the well was completed. The water level indicates the water has dropped below the bottom of the well and the well is now standing dry. The well has been dry since November 7, 2007. The well is located in the NWSE Section 31 T43N R71W which is approximately four miles to the northeast of the closest proposed CBNG well in the Wilkinson POD.

This level of depressurization is within the potential predicted in the PRB FEIS which was determined through the Regional Groundwater Model for that document. For additional information, please refer to the PRB FEIS Chapter 4 Groundwater and the Wyoming State Geological Survey's Open File

Report 2009-10 titled "1993-2006 Coalbed Natural Gas (CBNG) Regional Groundwater Monitoring Report: Powder River Basin, Wyoming" which is available on their website at http://www.wsgs.uwyo.edu.

Figure 3.3 Depth to Water from Surface



3.4.2. Surface Water

The project area is within the Spring Creek and Porcupine Creek drainages which are tributary to Antelope Creek. Most of the stream channels in the area are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). Channels in the area range from well vegetated grassy swales without defined bed and banks to well formed channels with wide floodplains. There are some small tributaries to Spring Creek in the POD area that are incised and contain headcuts. There are also playas within the Wilkinson Federal POD boundaries that can collect surface water. In general, the topography is gentle and stream gradients have low to moderate slopes.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in µmhos/cm) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters "illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM produced water of varying chemical composition to surface drainages within the Project Area" (PRB FEIS page 3-48). For Antelope Creek, the EC ranges from 1,800 at Maximum monthly flow to 2,354 at Low monthly flow and the SAR ranges from 2.82 at Maximum monthly flow to 2.60 at Low monthly flow. These values were determined at the USGS station located at Teckla, WY (PRB FEIS page 3-49).

There are four existing reservoirs and two playas in or immediately adjacent to the Wilkinson Federal POD boundaries that are capturing surface runoff water. The location and size of the reservoirs 5-1, 5-2,

7-1 and 7-2 are shown in Table 2.2 above. Playa 21-8 is located in the NENW Sec 8 T42N R72W and Playa 33-17 is located in the NWSE Sec 17 T42N R72W. Both playas are approximately 9 acres in size. The property owner has developed water traps on the playas for stock watering by excavating out areas of approximately 20'W x 30'L and 3' to 4' deep.

The operator has identified two natural springs within ½ mile of this POD boundary. The Hardwater Spring is located in the NWNW Sec 18 T42N R72W, and the Maycock Spring is located in the NWNW Sec 28 T42N R72W. There is no flow at the Maycock Spring and is considered inactive by the operator. The flow at Hardwater Spring is intermittent. At the sampling date of 8-27-2010 there was no flow. The water sample analysis data provided by the operator shows the water quality at Hardwater Spring to have 4300 µmhos/ cm conductivity, 3150 mg/l TDS, with 1080 mg/l of Sodium. SAR was not a reported value in the analysis.

For more information regarding surface water, please refer to the PRB FEIS Chapter 3 Affected Environment pages 3-36 through 3-56.

3.5. Cultural Resources

Class III cultural resource inventory was performed for the Wilkinson POD prior to on-the-ground project work (BFO project no. 70090009). Pronghorn Archeological Services conducted a block class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) and the *Wyoming State Historic Preservation Office Format, Guidelines, and Standards for Class II and III Reports.* Seth Lambert, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The following resources are located in or near the project area.

Site Number	Site Type	National Register Eligibility
48CA2932	Prehistoric	NE
48CA5059	Prehistoric	NE
48CA6936	Historic	NE
48CA6937	Historic	NE
48CA6938	Historic	NE

3.6. Air Quality

Existing air quality throughout most of the Powder River Basin is in attainment with all ambient air quality standards. Although specific air quality monitoring is not conducted throughout most of the Powder River Basin, air quality conditions in rural areas are likely to be very good, as characterized by limited air pollution emission sources (few industrial facilities and residential emissions in the relatively small communities and isolated ranches) and good atmospheric dispersion conditions, resulting in relatively low air pollutant concentrations.

Existing air pollutant emission sources within the region include following:

- Exhaust emissions (primarily CO and nitrogen oxides [NO_X]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;
- NO_X, particulate matter, and other emissions from diesel trains; and
- SO_2 and NO_X from power plants.

For a complete description of the existing air quality conditions in the Powder River Basin, please refer to the PRB Final EIS Volume 1, Chapter 3, pages 3-291 through 3-299.

4. ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences of the proposed action, alternative B. The effects analysis addresses the direct and indirect effects of implementing the proposed action, the cumulative effects of the proposed action combined with reasonably foreseeable Federal and non-federal actions, identifies and analyzes mitigation measures (COAs), and discloses any residual effects remaining following mitigation.

4.1. Alternative A

The No Action Alternative was analyzed as Alternative 3 in the PRB FEIS, and is incorporated by reference into this EA. Information specific to resources for this alternative is included within the PRB Final EIS on pages listed in Table 4.1.

Table 4.1 Location of Discussion of the No Action Alternative in the PRB FEIS

Resource		Type of Effect	Page(s) of PRB FEIS
Project Area Description	Geologic Features and Mineral Resources	Direct and Indirect Effects	4-164 and 4-134
		Cumulative Effects	4-164 and 4-134
Soils, Vegetation, and Ecological Sites	Soils	Direct and Indirect Effects	4-150
		Cumulative Effects	4-152
	Vegetation	Direct and Indirect Effects	4-163
		Cumulative Effects	4-164
	Wetlands/Riparian	Direct and Indirect Effects	4-178
		Cumulative Effects	4-178
Wildlife	Sensitive Species - Greater Sage-Grouse	Direct and Indirect Effects	4-271
		Cumulative Effects	4-271
	Aquatic Species	Direct and Indirect Effects	4-246
		Cumulative Effects	4-249
	Migratory Birds	Direct and Indirect Effects	4-234
		Cumulative Effects	4-235
	Waterfowl	Direct and Indirect Effects	4-230
		Cumulative Effects	4-230
	Big Game	Direct and Indirect Effects	4-186
		Cumulative Effects	4-211
	Raptors	Direct and Indirect Effects	4-224
		Cumulative Effects	4-225
Water	Ground Water	Direct and Indirect Effects	4-63
		Cumulative Effects	4-69
	Surface Water	Direct and Indirect Effects	4-77
		Cumulative Effects	4-69
Economics and Recovery of CBNG Resources		Direct and Indirect Effects	4-362
		Cumulative Effects	4-370
Cultural Resources		Direct and Indirect Effects	4-286
Air Quality		Direct and Indirect Effects	4-386
		Cumulative Effects	4-386
Visual Resources		Direct and Indirect Effects	4-313
		Cumulative Effects	4-314

4.2. Alternative B

4.2.1. Soils, Vegetation, and Ecological Sites

4.2.1.1. Soils

4.2.1.1.1. Direct and Indirect Effects

The impacts listed below, singly or in combination, would increase the potential for valuable soil loss due to increased water and wind erosion, invasive plant establishment, and increased sedimentation and salt loads to the watershed system.

The effects to soils resulting from well pad, access roads and pipeline construction include:

- Mixing of horizons – occurs where construction on roads, pipelines or other activities take place. Mixing may result in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved to the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts or weathered materials may be relocated and have a negative impact on revegetation. This drastically disturbed site may change the ecological integrity of the site and the recommended seed mix.

- Loss of soil vegetation cover, biologic crusts, organic matter and productivity.

- Soil erosion would also affect soil health and productivity. Erosion rates are site specific and are dependent on soil, climate, topography and cover.

- Soil compaction – the collapse of soil pores results in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery.
- Alteration of surface run off characteristics.

- An important component of soils in Wyoming's semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (BLM 2003). They are adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily disturbed or destroyed by surface disturbances associated with construction activities.

Direct effects to vegetation would occur from ground disturbance caused by construction of well pads, compressor stations, ancillary facilities, associated pipelines and roads. Short term effects would occur where vegetated areas are disturbed but later reclaimed within 1 to 3 years of the initial disturbance. Long-term effects would occur where well pads, roads, water-handling facilities or other semi-permanent facilities would result in loss of vegetation and prevent reclamation for the life of the project.

Direct and indirect impacts include disturbance for the proposed action which will total 49.02 acres. The new disturbance includes 0.1 acre per non-constructed well location; 7.25 miles of proposed 2-track road with gas, water, and buried electric corridor 35 feet in width; 2.26 miles of proposed 2 track road with no corridor; and 0.28 acres for 2 water discharge points.

4.2.1.1.1. Cumulative Effects

The designation of the duration of disturbance is defined in the PRB FEIS (pg 4-1 and 4-151). Most soil

disturbances would be short term impacts with expedient interim reclamation and site stabilization, as committed to by the operator in their POD Surface Use Plan and as required by the BLM in COAs.

Geomorphic effects of roads and other surface disturbance range from chronic and long-term contributions of sediment into waters of the state to catastrophic effects associated with mass failures of road fill material during large storms. Roads can affect geomorphic processes primarily by: accelerating erosion from the road surface and prism itself through mass failures and surface erosion processes; directly affecting stream channel structure and geometry; altering surface flow paths, leading to diversion or extension of channels onto previously unchannelized portions of the landscape; and causing interactions among water, sediment, and debris at road-stream crossings.

These impacts, singly or in combination, could increase the potential for valuable soil loss due to increased water and wind erosion, invasive/noxious/poisonous plant spread, invasion and establishment, and increased sedimentation and salt loads to the watershed system.

4.2.1.1.2. Mitigation Measures

- Impacts to soils and vegetation from surface disturbance will be reduced by following the BLM applied mitigation. Specific mitigation includes completing all road segments including culverts and low water crossings before the drilling rig or other drilling equipment moves onto the well site.

- The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231). The Wyoming Reclamation Policy applies to all surface disturbing activities. Authorizations for surface disturbing actions are based upon the assumptions that an area can and ultimately will be successfully reclaimed. BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to an approved "Reference Site" or NRCS Ecological Site Transition State. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal.

- Compaction would be remediated by plowing or ripping.

4.2.1.1.3. Residual Effects

Residual Effects were also identified in the PRB FEIS at page 4-408 such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established.

4.2.1.1.4. Wetlands/Riparian

Wetlands within and near the POD area are found along Spring Creek reaches that are currently receiving CBNG discharge. Enhanced riparian vegetation is also present on the larger tributaries to Spring Creek and surrounding the two seep/spring areas.

4.2.1.1.4.1. Direct and Indirect Effects

There are no cottonwood stands observed on Spring Creek or the tributaries to Porcupine Creek, but they may exist downstream of the POD area. Because water flow rates are declining at downstream outfalls on Spring Creek, it is not likely that water produced from this POD will increase current or recent past flow rates on Spring Creek. Vegetation characteristics of the active channel bottoms could change as the vegetation changes from the native grass mixtures to water tolerant species typical of intermittent to perennial streams. The change to wetland vegetation will improve erosional stability of the channels, but this vegetation may be less desirable than current vegetation for livestock grazing.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. The addition of direct discharge into ephemeral and intermittent channels will have the same effect. Continuous high stream flows into wetlands and riparian areas would change the species composition. The shallow groundwater table would rise closer to the surface with increased and continuous stream flows augmented by produced water discharges. Vegetation in riparian areas, such as cottonwood trees, that cannot tolerate year-round inundated root zones would die and would not be replaced. Other plant species in riparian areas and wetland edges that favor inundated root zones would flourish, thus changing the plant community composition and the associated animal species. A rise in the shallow ground groundwater table would also influence the hydrology of wetlands by reducing or eliminating the seasonal drying periods that affect recruitment of plant species and species composition of benthic and water column invertebrates. These changes to the aquatic food web base would affect the higher trophic levels of fish and waterfowl abundance and species richness for wetlands and riparian areas." (PRB FEIS Page 4-175).

4.2.1.1.4.2. Cumulative Effects

Potential cumulative effects to the wetland and riparian areas are adequately covered in Chapter 4, pages 4-178 to 179 of the PRB FEIS.

4.2.1.1.4.3. Mitigation Measures

Mitigation measures that will help to protect the riparian and wetland habitat potentially affected by the activities described in this EA include, but are not limited to, the control of noxious weeds, adherence to the WPDES permit requirements for the water quality and quantity monitoring of the discharges tied to this POD development, road crossing maintenance, and enforcement of the COA's and BMP's associated with this CBNG development.

4.2.1.1.4.4. Residual Effects

There will be changes to wetland and riparian areas through alterations in volume, velocity, timing and quality of the stream flow due to direct discharge. Turbidity and solids loading in the streams would probably increase due to erosion of project disturbed areas and sediment transport to the associated drainages. These impacts would be mitigated by expediently stabilizing the disturbance and reducing the amount of sediment reaching the streams.

4.2.1.1.5. Invasive Species

4.2.1.1.5.1. Direct and Indirect Effects

The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, water management infrastructure, produced water discharge points and related facilities would present opportunities for weed invasion and spread.

4.2.1.1.5.2. Cumulative Effects

Produced CBNG water would likely continue to modify existing soil moisture and soil chemistry regimes in the areas of water release and storage. The activities related to the performance of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants such as salt cedar, Canada thistle and perennial pepperweed.

4.2.1.1.5.3. Mitigation Measures

The operator has committed to the control of noxious weeds and species of concern using the following measures identified in their Integrated Pest Management Plan (IPMP):

1. Control Methods include physical, biological, and chemical methods:

Physical methods include mowing during the first season of establishment, prior to seed formation, and hand pulling of weeds (for small or new infestations). Biological methods include the use of domestic animals, or approved biological agents. Chemical methods include the use of herbicides, done in accordance with the existing Surface Use Agreement with the private surface owner.

2. Preventive practices:

   Certified weed-free seed mixtures will be used for re-seeding, and vehicles and equipment will be washed before leaving areas of known noxious weed infestations.

3. Education:

   The company will provide periodic weed education and awareness programs for its employees and contractors through the county weed districts and federal agencies. Field employees and contractors will be notified of known noxious weeds or weeds of concern in the project area.

4.2.1.1.5.4. Residual Effects

Control efforts by the operator are limited to the surface disturbance associated the implementation of the project. Cheat grass and other invasive species that are present within non-physically disturbed areas of the project area are anticipated to continue to spread unless control efforts are expanded. Cheatgrass and to a lesser extent, Japanese brome (*B. □mericana*) are found in such high densities and numerous locations throughout NE Wyoming that a control program is not considered feasible at this time; these annual bromes would continue to be found within the project area.

4.2.2. Wildlife

4.2.2.1. Threatened, Endangered, Proposed and Candidate Species

4.2.2.1.1. Threatened and Endangered Species

Table 4.2 Summary of Threatened and Endangered Species Habitat and Project Effects

Common Name (scientific name)	Habitat	Project Effects	Rationale	Previous Analysis
Endangered				
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NE	Habitat not of sufficient area.	Leavitt POD EA WY-070-08-170
Blowout penstemon	Sparsely vegetated, shifting sand dunes	NE	Habitat not present	None
Threatened				
Ute ladies'-tresses orchid	Riparian areas with permanent water	NLAA	Potential habitat occurs in the project area, however, the project will not impact habitat.	Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010)
Proposed				
Mountain Plover	Short-grass prairie with slopes < 5%	NLJ	Habitat is present and will be affected. Human disturbances	Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010)

Common Name (scientific name)	Habitat	Project Effects	Rationale	Previous Analysis
Candidate				
Greater Sage-grouse	Basin-prairie shrub, mountain-foothill shrub	MIIH	Habitat is present and will be affected.	Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010)

Project Effects
LAA – Likely to adversely affect
NE – No Effect
NLAA – May Affect, not likely to adversely affect individuals or habitat.
NLJ – Not likely to jeopardize the continued existence of the species
MIIH – May impact individuals and habitat
NP – Habitat not present and species unlikely to occur within the project area.

4.2.2.1.1.1. Black-Footed Ferret

4.2.2.1.1.1.1. Direct and Indirect Effects

Impacts to black-footed ferret will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.1.1.1.2. Cumulative Effects

The cumulative effects to black-footed ferrets are discussed in the PRB FEIS (pg. 4-251). Cumulative impacts will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.1.1.1.3. Mitigation Measures

No mitigation measures are proposed with Alternative B.

4.2.2.1.1.1.4. Residual Effects

No residual effects are anticipated.

4.2.2.1.1.2. Blowout penstemon

4.2.2.1.1.2.1. Direct and Indirect Effects

Suitable habitat is not present within the project area. Implementation of the proposed coal bed natural gas project will have "*no effect*" on blowout penstemon.

4.2.2.1.1.2.2. Cumulative Effects

The proposed project will have no effect on blowout penstemon.

4.2.2.1.1.2.3. Mitigation Measures

No mitigation measures are proposed with Alternative B.

4.2.2.1.1.2.4. Residual Effects

No residual effects are anticipated.

4.2.2.1.1.3. Ute Ladies'-Tresses Orchid

4.2.2.1.1.3.1. Direct and Indirect Effects

Impacts to Ute ladies'-tresses orchid will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010). Potential habitat for ULT does exist within the Wilkinson

project boundary, however, infrastructure and activities will not impact habitat, so it is not likely to adversely affect the Ute ladies'-tresses orchid.

4.2.2.1.1.3.2. Cumulative Effects

Cumulative impacts to Ute ladies'-tresses orchid will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010) and the PRB FEIS.

4.2.2.1.1.3.3. Mitigation Measures

No mitigation measures are proposed with Alternative B.

4.2.2.1.1.3.4. Residual Effects

No residual effects are anticipated.

4.2.2.1.2. Proposed Species

4.2.2.1.2.1. Mountain Plover

4.2.2.1.2.1.1. Direct and Indirect Effects

Suitable mountain plover habitat is present within the project area. Development of the Wilkinson project may impact mountain plovers. Playas, linear pipeline corridors, and the black-tailed prairie dog colonies described in Section 3.1.3.11 (Black-tailed Prairie Dog) may provide suitable mountain plover habitat in some years, depending on precipitation and grazing pressure. The construction of Wilkinson federal well 14-4 and associated infrastructure will directly impact plover nesting habitat. Although the well location is near the edge of the prairie dog town in Section 4, it is likely that plover will avoid human disturbance in the area up to 0.25 miles from the well location, making the area unsuitable for the species. The EIS analyzed effects to plover based on well house designs of 4 feet or less. The Wilkinson project proposes well house heights of 6 feet. Overhead power previously approved and analyzed in the Leavitt POD EA (WY-070-08-170) bisects the prairie dog town and may also preclude plover use of the area. The power line will be constructed within approximately 300 feet of well 14-4. As of October 2010, the power line had not been constructed.

Mineral development has mixed effects on mountain plovers. Disturbed ground, such as buried pipeline corridors and roads, may be attractive to plovers, while human activities within one-quarter mile may be disruptive. Use of roads and pipeline corridors by mountain plovers may increase their vulnerability to vehicle collision. Limiting travel speed to 25mph provides drivers an opportunity to notice and avoid mountain plovers and allows mountain plovers sufficient time to escape from approaching vehicles. Even if a nesting plover flushes in time, the nest would likely still be destroyed. Overhead power lines provide perch sites for raptors that could result in increased mountain plover predation. CBNG infrastructure such as well houses and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes. Displaced mountain plovers may choose to nest in poor quality habitat when loss or alteration of their natural breeding habitat (predominantly prairie dog colonies) occurs, such as heavily grazed land, burned fields, fallow agriculture lands, roads, oil and gas well pads, and pipelines. These areas could become reproductive sinks. Adult mountain plovers may breed there, lay eggs and hatch chicks; however, the young may not reach fledging age due to the poor quality of the habitat. An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

4.2.2.1.2.1.2. Cumulative Effects

Cumulative impacts to mountain plover will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010), and are discussed in the PRB FEIS.

4.2.2.1.2.1.3. Mitigation Measures

To reduce impacts to nesting mountain plovers, BFO will require a 0.25 mile timing limitation on

surface-disturbing activities for potential nesting habitat during the nesting season.

4.2.2.1.2.1.4. Residual Effects

Even with timing limitations on surface-disturbing activities, mountain plovers may be displaced by other activities associated with development. Traffic and construction activities that are not prohibited by the timing limitations may degrade habitat quality sufficiently to render the area unsuitable for some mountain plovers. Timing limitations do nothing to mitigate habitat loss, therefore drilling and construction that takes place outside of nesting season will still result in habitat loss for this species. The timing limitation will result in some decrease in direct mortalities that would occur with increased drilling traffic during the breeding season. Mortalities associated with maintenance and non-surface-disturbing activities will still occur.

4.2.2.1.3. Candidate Species

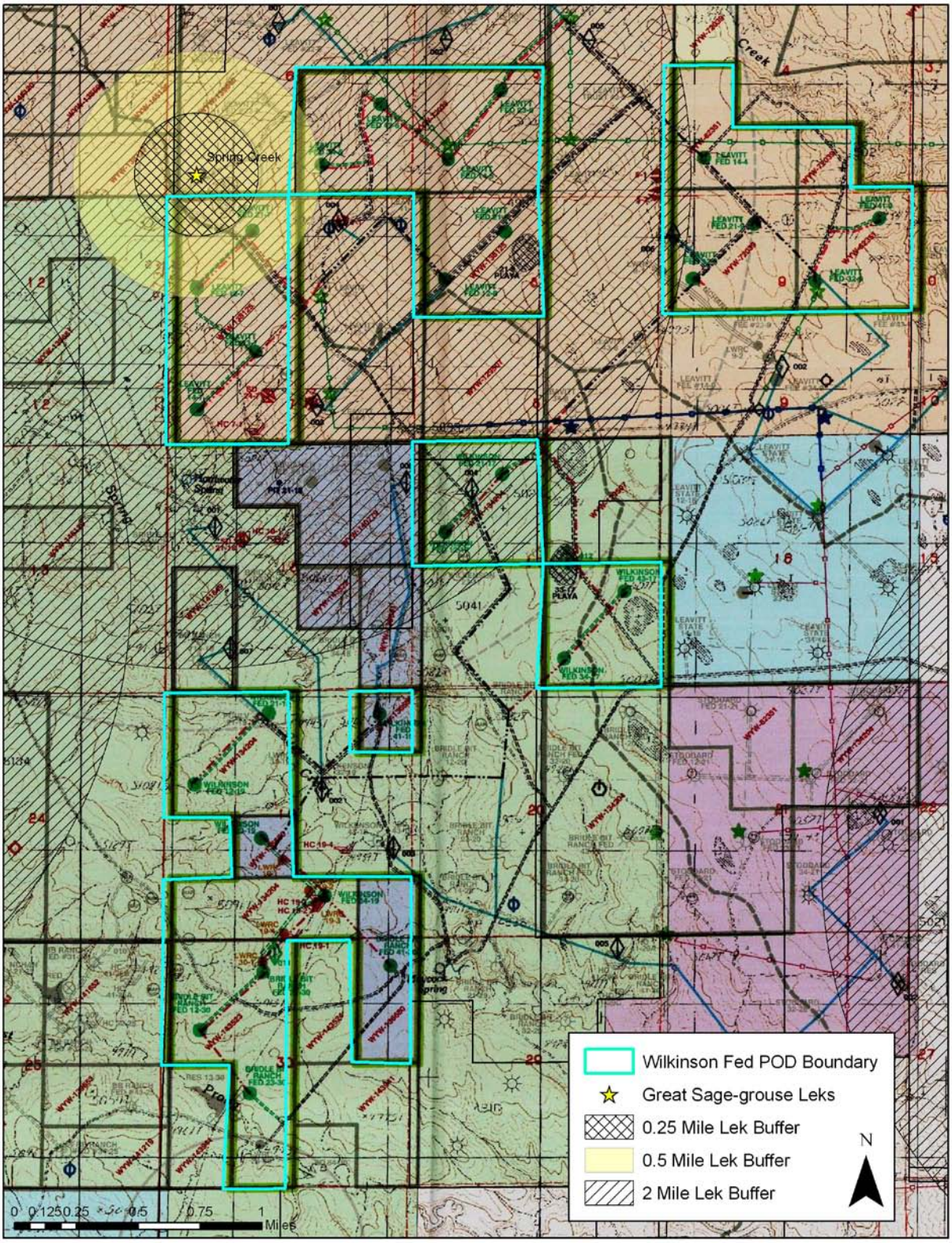
4.2.2.1.3.1. Greater Sage-grouse

4.2.2.1.3.1.1. Direct and Indirect Effects

Impacts to sage-grouse associated with energy development are discussed in detail in the *12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered* (USFWS 2010). Impacts to sage-grouse are generally a result of loss and fragmentation of sagebrush habitats associated with roads and infrastructure. Research indicates that sage-grouse hens also avoid nesting in developed areas.

Infrastructure occurring within 2 miles of occupied sage grouse leks is shown in Figure 4.1 below. Direct loss or impact on sagebrush is caused by construction of the following wells (including associated infrastructure): well 21-17, well 41-9, well 23-5, well 43-6, well 14-7, well 34-17, well 43-17, well 12-17, well 41-30. Wells 12-7, 21-7, 34-6, and their proposed associated infrastructure are located within 0.5 miles of the Spring Creek lek.

Figure 4.1 Proposed and existing infrastructure within 2 miles of documented sage-grouse leks within the Wilkinson project area.



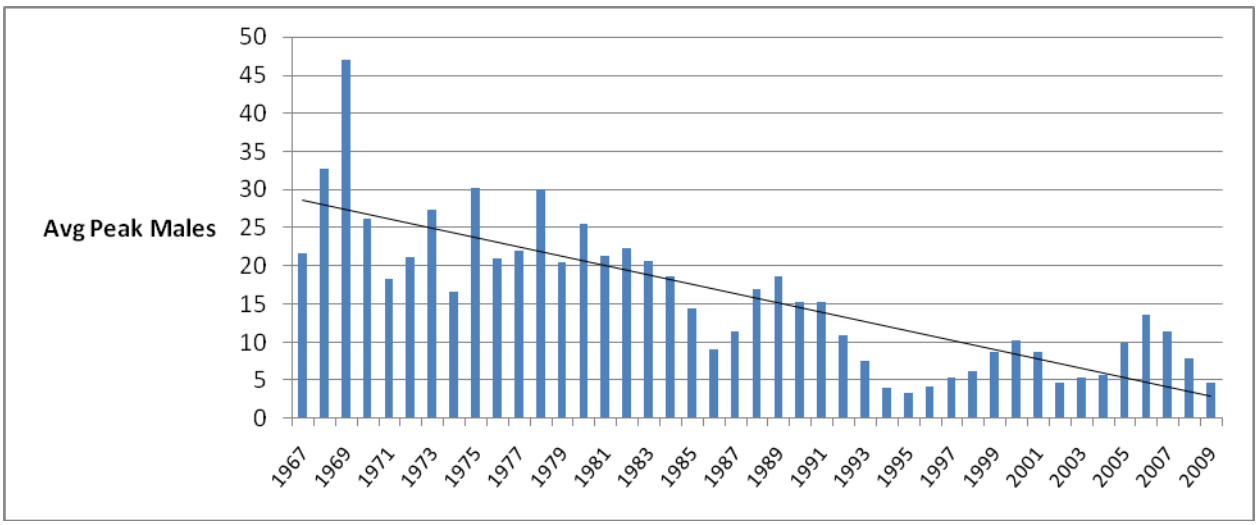
Impacts to greater sage-grouse will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.1.3.1.2. Cumulative Effects

Recent research suggests that the cumulative and synergistic effects of current and foreseeable CBNG development within the vicinity of the project area are likely to impact the local sage-grouse population, cause declines in lek attendance, and may result in local extirpation. The cumulative impact assessment area for this project encompasses the project area and the area that is encompassed by a four mile radius around the four sage-grouse leks that occur within four miles of the project boundary. Analysis of impacts up to four miles was recommended by the State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008).

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2008). Figure 4.2 illustrates a ten-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Research suggests that these declines may be a result, in part, of CBNG development, as discussed in detail in USFWS (2010).

Figure 4.2 Male sage-grouse lek attendance within northeastern Wyoming, 1967-2009.



Excluding the Wilkinson project, there are approximately 236 proposed wells (Automated Fluid Minerals Support System [AFMSS] October 2010) within the cumulative effects analysis area. With the addition of these wells, well density would increase to 6.2 wells per square mile. With approval of Alternative B (28 proposed well locations) well density would increases to 6.4 wells per square mile, well above the one well per square mile recommendation by the State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development.

Based on the summary of research describing the impacts of energy development on sage-grouse, efforts to reduce habitat loss and fragmentation are likely to be the most effective in ensuring long-term lek persistence. Design features specifically included in the proposed action under Alternative B to minimize impacts to sage-grouse include:

- Access to well 12-17 re-routed to avoid direct disturbance of sagebrush.
- Access to well 43-6 re-routed to avoid direct disturbance of sagebrush.
- Well 23-5 location moved to avoid direct disturbance of sagebrush.

The PRB FEIS (BLM 2003) states that "the synergistic effect of several impacts would likely result in a downward trend for the sage-grouse population, and may contribute to the array of cumulative effects that may lead to its federal listing. Local populations may be extirpated in areas of concentrated development, but viability across the Project Area (Powder River Basin) or the entire range of the species is not likely to be compromised (pg. 4-270)." Based on the impacts described in the Powder River Basin Oil and Gas Project FEIS and the findings of more recent research, the proposed action may contribute to a decline in male attendance at the four leks that occur within four miles of the project area, and, potentially, extirpation of the local grouse population.

4.2.2.1.3.1.3. Mitigation Measures

In order to reduce the likelihood that activities associated with noise, construction, and human disturbance, BLM will implement a timing limitation on all surface-disturbing activities within and adjacent to identified nesting habitat across the project area. Because nesting grouse have been shown to avoid infrastructure by up to 0.6 miles, the intent of this timing restriction is to decrease the likelihood that grouse will avoid these areas and increase habitat quality by reducing noise and human activities during the breeding season.

4.2.2.1.3.1.4. Residual Effects

A timing limitation does nothing to mitigate loss and fragmentation of habitat or changes in disease mechanisms. Suitability of the project area for sage-grouse will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with CBNG development.

4.2.2.2. Sensitive Species

BLM will take necessary actions to meet the policies set forth in sensitive species policy (BLM Manual 6840). BLM Manual 6840.22A states that "The BLM should obtain and use the best available information deemed necessary to evaluate the status of special status species in areas affected by land use plans or other proposed actions and to develop sound conservation practices. Implementation-level planning should consider all site-specific methods and procedures which are needed to bring the species and their habitats to the condition under which the provisions of the ESA are not necessary, current listings under special status species categories are no longer necessary, and future listings under special status species categories would not be necessary."

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-265. Impacts to sensitive species will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.1. Northern Leopard Frog

4.2.2.2.1.1. Direct and Indirect Effects

Impacts to northern leopard frog will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.1.2. Cumulative Effects

Refer to PRB FEIS sensitive species impacts discussion (pp. 4-257 to 4-265).

4.2.2.2.1.3. Mitigation Measures

None proposed.

4.2.2.2.1.4. Residual Effects

None identified.

4.2.2.2.2. Baird's Sparrow

4.2.2.2.2.1. Direct and Indirect Effects

Impacts to Baird's sparrows will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.2.2. Cumulative Effects

PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.2.2.2.3. Mitigation Measures

No additional mitigation beyond the seasonal restrictions for sage-grouse and raptor nests that will also provide protection to any nesting sparrows present.

4.2.2.2.2.4. Residual Effects

Aside from the direct loss of sagebrush cover, Baird's sparrows may nest in areas not covered by seasonal nesting protections for other species. These sparrows would be subject to disturbance and possible loss of nests during construction activities.

4.2.2.2.3. Bald Eagle

4.2.2.2.3.1. Direct and Indirect Effects

Impacts to bald eagles will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.3.2. Cumulative Effects

The cumulative effects for bald eagles associated with Alternative B are described in the PRB FEIS (pp. 4-251 to 4-253).

4.2.2.2.3.3. Mitigation Measures

No additional mitigation beyond the seasonal restrictions for raptor nests.

4.2.2.2.3.4. Residual Effects

None identified.

4.2.2.2.4. Brewer's Sparrow

4.2.2.2.4.1. Direct and Indirect Effects

Impacts to Brewer's sparrows will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.4.2. Cumulative Effects

PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.2.2.4.3. Mitigation Measures

No additional mitigation beyond the seasonal restrictions for sage-grouse and raptor nests that will also provide protection to any nesting sparrows present.

4.2.2.2.4.4. Residual Effects

Aside from the direct loss of sagebrush cover, Brewer's sparrows may nest in areas not covered by seasonal nesting protections for other species. These sparrows would be subject to disturbance and possible loss of nests during construction activities.

4.2.2.2.5. Ferruginous Hawk

4.2.2.2.5.1. Direct and Indirect Effects

Impacts to ferruginous hawks are discussed in the PRB FEIS on pg. 4-262. Additional information is provided here.

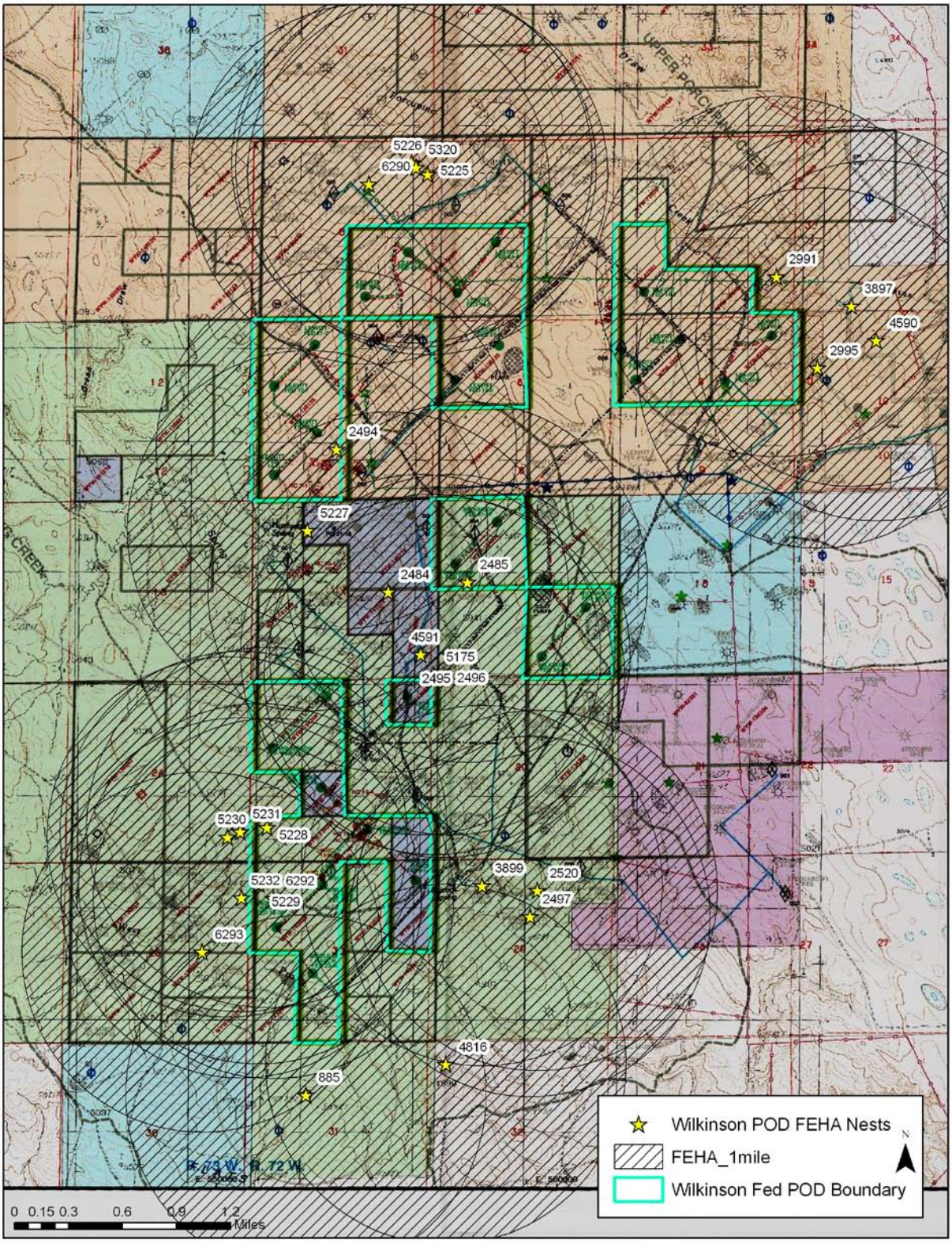
Research suggests that ferruginous hawks are sensitive to disturbance during the breeding season (Olendorff 1973, Gilmer and Stewart 1983, Schmutz 1984, White and Thurow 1985, Bechard et al. 1990).

Ferruginous hawks have been shown to select nest sites that avoid human habitation or disturbance (Lokemoen and Duebbert 1976, Schmutz 1984). Once a nest site has been selected, ferruginous hawks have been shown to abandon nest sites that are subject to disturbance (Snow 1974, White and Thurow 1985). When abandonment does occur, it tends to happen prior to hatching, so incubation represents a critically important time for reduced disturbance (Snow 1974, White and Thurow 1985). Sensitivity to disturbance may be inversely related to prey availability (White and Thurow 1985). Nests in proximity to disturbance have been shown to produce fewer young (Olendorff 1973, Blair 1978, White and Thurow 1985). Ferruginous hawks tend not to return to breed in territories where breeding attempts in previous year failed as a result of disturbance (White and Thurow 1985).

The operator was willing to work with the BLM biologist to mitigate impacts to nesting raptors by moving wells and infrastructure according to recommendations. At the onsite visits, relocation of some wells and infrastructure were considered and completed in order to reduce impacts to nesting ferruginous hawks. The location for Well 23-7 was moved to approximately 840 feet from and out of the line of sight of nest 2494. Access to this well was also re-routed away from and out of the line of sight of the nest. The location for Well 12-30 was moved away from nest 6292 in order to provide a greater spatial buffer. The operator decided to drop Well 14-19 from their POD because of its proximity to nests 5228, 5231, 5230, and 5232 and a lack of feasible alternate locations. The location for Well 41-19 was moved 95 feet to a location approximately 1337 feet from nest 5175. Wells and associated infrastructure within one mile of ferruginous hawk nests are shown in Figure 4.3.

USFWS Wyoming Ecoregional Services Field Office recommends that a one-mile seasonal buffer be implemented around ferruginous hawk nests, within which long-term land-use activities would be prohibited. They go on to state that these buffers can be modified based on local conditions, such as topography. Wells in the Wilkinson project were proposed within the USFWS recommended one-mile buffer, but all wells were attempted to be placed out of line-of-sight of the nests if possible, reducing the visual impact of activities at the wells on birds occupying any nests. In order to further mitigate impacts to nesting ferruginous hawks, Coleman has agreed to an operator committed measure of a one mile timing limitation on all documented ferruginous hawk nests. This will help to mitigate additional impacts that may occur during the construction phase due to inadequate spatial buffers for nests in the project area.

Figure 4.3 Infrastructure proposed within 1.0 miles of Ferruginous Hawk Nests within the Wilkinson Project Area.



4.2.2.2.5.2. Cumulative Effects

In addition to the federal development, there will be fee development associated with the project that will have similar impacts on ferruginous hawks as those discussed in the PRB FEIS. Even without federal development, the extent of fee development alone may surpass a threshold that makes the area unsuitable for ferruginous hawks through avoidance and degradation of habitat quality.

Activities associated with livestock grazing may disturb ferruginous hawks, but these activities are often transient in nature and occur at low enough frequencies that disturbance to breeding ferruginous hawk pairs is likely minimal. If ferruginous hawks rely on the abundant prairie dog colonies for prey, practices such as poisoning or shooting of prairie dogs or other intentional methods of extermination in order to increase forage for livestock can potentially affect ferruginous hawk productivity through a reduction in prey availability.

Because no raptor surveys were conducted in 2010, it is not possible to determine the relative value of certain nests or areas to ferruginous hawks, and it must be assumed that all areas around nests are equally important to the species. It is possible that ferruginous hawks have already abandoned the area because of current land use activities and that additional disturbance would not have any impact on the species, because the habitat has lost its value for breeding pairs.

4.2.2.2.5.3. Mitigation Measures

To reduce the risk of decreased productivity or nest failure, The Operator has committed to and the BFO will apply as a COA, a one mile radius timing limitation on surface disturbance during the breeding season around active ferruginous hawk nests. This radius is consistent with USFWS Ecological Services Field Office recommendations and affords greater protection to ferruginous hawks than other raptors, which are particularly sensitive to disturbance.

4.2.2.2.5.4. Residual Effects

Even with a timing limitation, ferruginous hawks may abandon nests due to alteration in foraging habitats associated with development or because of sensitivity to well or infrastructure placement. Even with timing limitations on surface-disturbing activities, ferruginous hawks may be displaced by other activities associated with development. Traffic and construction activities that are not prohibited by the timing limitations may degrade habitat quality sufficiently to render the area unsuitable for some ferruginous hawks. Timing limitations do nothing to mitigate habitat loss, therefore drilling and construction that takes place outside of nesting season will still result in habitat loss for this species. The timing limitation will result in some decrease in direct mortalities that would occur with increased drilling traffic during the breeding season. Mortalities associated with maintenance and non-surface-disturbing activities will still occur. Collisions with or electrocutions from powerlines will still occur. Harassment or displacement of nesting individuals will still occur during the production and abandonment phases of the project. Unoccupied nesting habitats will still be physically disturbed or destroyed. Disposal of water and resulting changes in water quality and quantity may still disturb, destroy, augment, or create suitable foraging habitats.

Preliminary analysis of data collected from consultants in the Powder River Basin (PBR) and incorporated into the BLM BFO Raptor database clearly illustrate that nests (ferruginous hawks in particular) have become active after three years of no activity. There are 273 known ferruginous hawk nests (many more are classified as unknown) that have been identified within the PBR. Of these, 158 have data for 4 or more years. And of the 158, 36 were inactive for 2 or more years, followed by an active year. Of those 36, 22 were inactive for 3 or more years, followed by an active year (about 14%). Based on this data, it is likely that failure to adequately protect raptor nests after the 3 year period of inactivity (BFO RMP 1985 and RMP Update 2001) could still result in the likelihood that take will occur. More research is needed to confirm these preliminary results.

4.2.2.2.6. Loggerhead Shrike

4.2.2.2.6.1. Direct and Indirect Effects

Impacts to loggerhead shrikes will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.6.2. Cumulative Effects

PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.2.2.6.3. Mitigation Measures

No additional mitigation beyond the seasonal restrictions for sage-grouse and raptor nests that will also provide protection to any nesting sparrows present.

4.2.2.2.6.4. Residual Effects

Aside from the direct loss of sagebrush cover, loggerhead shrikes may nest in areas not covered by seasonal nesting protections for other species. This species would be subject to disturbance and possible loss of nests during construction activities.

4.2.2.2.7. Long-billed Curlew

4.2.2.2.7.1. Direct and Indirect Effects

Impacts to long-billed curlews will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.7.2. Cumulative Effects

PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.2.2.7.3. Mitigation Measures

None proposed.

4.2.2.2.7.4. Residual Effects

None identified.

4.2.2.2.8. Sage Thrasher

4.2.2.2.8.1. Direct and Indirect Effects

Impacts to sage thrasher will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.8.2. Cumulative Effects

PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.2.2.8.3. Mitigation Measures

No additional mitigation beyond the seasonal restrictions for sage-grouse and raptor nests that will also provide protection to any nesting sparrows present.

4.2.2.2.8.4. Residual Effects

Aside from the direct loss of sagebrush cover, sage thrashers may nest in areas not covered by seasonal nesting protections for other species. This species would be subject to disturbance and possible loss of nests during construction activities.

4.2.2.2.9. Trumpeter Swan

4.2.2.2.9.1. Direct and Indirect Effects

Impacts to sensitive species will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.9.2. Cumulative Effects

PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.2.2.9.3. Mitigation Measures

No further mitigation proposed.

4.2.2.2.9.4. Residual Effects

None identified.

4.2.2.2.10. Western Burrowing Owl

4.2.2.2.10.1. Direct and Indirect Effects

Impacts to western burrowing owl will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.2.10.2. Cumulative Effects

Cumulative impacts are discussed in the PRB FEIS, pg. 4-221.

4.2.2.2.10.3. Mitigation Measures

The Thunder Basin National Grasslands in Campbell County, WY, who cooperated with the BLM in the creation of the 2003 PRB EIS, recommends a 0.25 mile timing restriction buffer zone for burrowing nest locations during their nesting season (April 15 to August 31). Instruction Memorandum No. 2006-197, directs the field offices to "use the least restrictive stipulations that effectively accomplish the resource objectives or uses." Alteration of the general raptor nest timing limitation (Feb 1 to July 31) to a more specific burrowing owl nesting season timing limitation will effectively reduce the vulnerability of owls to collision while shortening the timing restriction period to four and one half months from six months and from 0.5 mile to 0.25 mile.

4.2.2.2.10.4. Residual Effects

The timing limitation will do nothing to mitigate loss of nesting habitat. Wells, pipelines, and roads that are built in prairie dog colonies will directly impact nesting habitat and may reduce the quality of adjacent habitats for burrowing owls, regardless of the timing of their construction.

4.2.2.2.11. Black-tailed Prairie Dog

4.2.2.2.11.1. Direct and Indirect Effects

Impacts to black-tailed prairie dogs are discussed in the PRB FEIS on pg. 4-255 to 4-256. One well is proposed to be constructed within the prairie dog town in Section 4 of the project area. Individual prairie dogs may be disrupted or killed by vehicles and construction operations. The overall population number and habitat acreage will not be changed.

4.2.2.2.11.2. Cumulative Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.2.2.11.3. Mitigation Measures

No further mitigation measure applied.

4.2.2.2.11.4. Residual Effects

No further effects identified.

4.2.2.2.12. Swift Fox

4.2.2.2.12.1. Direct and Indirect Effects

Impacts to swift fox will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010). Impacts to swift fox are discussed in the PRB FEIS on pg. 4-265. Additional information is provided here. The project will impact swift foxes or their habitat. The construction of well pads, roads, and pipelines in prairie dog colonies and grasslands will cause direct habitat loss. During construction of these facilities, there is the possibility that swift foxes may be killed as a direct result of the earth moving equipment. Constant noise and movement of equipment and the destruction of burrows puts considerable stress on the animals and is likely to cause an increase in swift fox mortalities. During the construction of these facilities individuals are exposed more frequently to predators and have less protective cover. Mineral related traffic on the adjacent roads may result in swift fox road mortalities.

4.2.2.2.12.2. Cumulative Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273. In addition to the federal development, there will be fee development associated with the project that will have similar impacts on swift fox. Activities associated with livestock grazing may harass or disturb swift fox, but these activities are often transient in nature and occur at low enough frequencies that disturbance will be minimal. Practices such as poisoning or shooting of prairie dogs or other intentional methods of extermination in order to increase forage for livestock can potentially affect swift fox through a reduction in prey availability.

4.2.2.2.12.3. Mitigation Measures

The Thunder Basin National Grasslands (TBNG) in Campbell County, WY, cooperated with the BLM in the creation of the 2003 PRB EIS and has applied a standard condition to oil and gas activities in association with swift fox dens. Therefore, in order to protect the species, the BLM BFO incorporated the following condition from the TBNG Land Resource Management Plan into this project: "To reduce disturbances to swift fox during the breeding and whelping seasons, prohibit the following activities within 0.25 miles of their dens from March 1 to August 31: Construction (e.g. roads, water impoundments, oil and gas facilities), reclamation, gravel mining operations, drilling of water wells, and oil and gas drilling." This timing restriction, based on the best available science, will reduce direct impacts to swift foxes within the project area.

4.2.2.2.12.4. Residual Effects

A timing limitation will not mitigate habitat loss. Swift fox dens and prey availability will still be impacted through loss of prairie dog colonies, despite the restriction on the timing of construction.

4.2.2.3. Big Game

4.2.2.3.1. Direct and Indirect Effects

Impacts to pronghorn antelope and mule deer will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.3.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-181 to 4-215. Cumulative impacts to big game will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.3.3. Mitigation Measures

No further mitigation measure applied.

4.2.2.3.4. Residual Impacts

None identified.

4.2.2.4. Aquatics

4.2.2.4.1. Direct and Indirect Effects

Impacts will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.4.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, (pp. 4-247 to 4-249).

4.2.2.4.3. Mitigation Measures

Stock tanks receiving water produced from federal wells will be required to be equipped with wildlife escape ramps.

4.2.2.4.4. Residual Impacts

None identified.

4.2.2.5. Migratory Birds

4.2.2.5.1. Direct and Indirect Effects

Direct and indirect effects to migratory birds are discussed in the PRB FEIS (pp. 4-231 to 4-235).
Impacts to sensitive species will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

Disturbance of habitat within the project area is likely to impact migratory birds. Native habitats will be lost directly with the construction of wells, roads, and pipelines. Reclamation and other activities that occur in the spring may be detrimental to migratory bird survival. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Activities will likely displace migratory birds farther than the immediate area of physical disturbance. Drilling and construction noise can be troublesome for songbirds by interfering with the males' ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003).

Habitat fragmentation will result in more than just a quantitative loss in the total area of habitat available; the remaining habitat area will also be qualitatively altered (Temple and Wilcox 1986). Ingelfinger (2004) identified that the density of breeding Brewer's sparrows declined by 36% and breeding sage sparrows declined by 57% within 100 m of dirt roads within a natural gas field. Effects occurred along roads with light traffic volume (<12 vehicles per day). The increasing density of roads constructed in developing natural gas fields exacerbated the problem creating substantial areas of impact where indirect habitat losses through displacement were much greater than the direct physical habitat losses.

Those species that are edge-sensitive will be displaced further away from vegetative edges due to increased human activity, causing otherwise suitable habitat to be abandoned. If the interior habitat is at carrying capacity, then birds displaced from the edges will have no place to relocate. One consequence of habitat fragmentation is a geometric increase in the proportion of the remaining habitat that is near edges (Temple 1986). In severely fragmented habitats, all of the remaining habitat may be so close to edges that no interior habitat remains (Temple and Cary 1988). Over time, this leads to a loss of interior habitat species in favor of edge habitat species. Other migratory bird species that utilize the disturbed areas for nesting may be disrupted by the human activity, and nests may be destroyed by equipment.

Migratory bird species within the Powder River Basin nest in the spring and early summer and are vulnerable to the same effects as sage-grouse and raptor species. Though no timing restrictions are typically applied specifically to protect migratory bird breeding or nesting, where sage-grouse or raptor nesting timing limitations are applied, nesting migratory birds are also protected. Where these timing limitations are not applied and migratory bird species are nesting, migratory birds remain vulnerable.

4.2.2.5.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-235. No additional mitigation measures are required.

4.2.2.5.3. Mitigation Measures

Migratory bird species within the Powder River Basin nest in the spring and early summer and are vulnerable to the same effects as sage-grouse and raptor species. Though no timing restrictions are typically applied specifically to protect migratory bird breeding or nesting, where sage-grouse or raptor nesting timing limitations are applied, nesting migratory birds are also protected. Where these timing limitations are not applied and migratory bird species are nesting, migratory birds remain vulnerable.

4.2.2.5.4. Residual Effects

Sage-grouse timing limitations will not apply to the entire project area, only that within 2 miles of occupied sage-grouse leks. Those migratory bird species and individuals that are still nesting when the sage-grouse timing limitations are over (June 30) may have nests destroyed, or be disturbed, by construction activities. Protections around active raptor nests (Feb 1- July 31) extend past most migratory bird nesting seasons. Only a percentage of known nests are active any given year, so the protections for migratory birds from June 30-July 31 will depend on how many raptor nests area active.

A timing limitation does nothing to mitigate loss and fragmentation of habitat or changes in disease mechanisms. Suitability of the project area for migratory birds will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with CBNG development.

4.2.2.6. Raptors

4.2.2.6.1. Direct and Indirect Effects

Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to overheating or chilling of eggs or chicks and can result in egg or chick mortality. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Routine human activities near these nests can also draw increased predator activity to the area, resulting in increased nest predation.

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation be located in such a way as to provide adequate biologic buffer for nesting raptors. A biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that they will not be flushed by routine activities.

Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (pp. 4-216 to 4-221). Impacts to raptors will be similar to those identified in the Leavitt and Stoddard POD EAs (WY-070-08-170, WY-070-07-010).

4.2.2.6.2. Cumulative Effects

The cumulative effects on raptors are described in the PRB FEIS (pg. 4-221).

4.2.2.6.3. Mitigation Measures

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a timing limitation during the breeding season for all surface disturbing activities within 0.5 miles of active raptor nests.

4.2.2.6.4. Residual Impacts

Even with a timing limitation, raptors may abandon nests due to alteration in foraging habitats associated with development or because of sensitivity to well or infrastructure placement. Declines in breeding populations of some species that are more sensitive to human activities may occur.

4.2.2.7. Plains Sharp-tailed Grouse Effects

4.2.2.7.1. Direct and Indirect Effects

Impacts to sensitive species will be similar to those identified in the Leavitt and Stoddard POD Eas (WY-070-08-170, WY-070-07-010).

4.2.2.7.2. Cumulative Effects

The cumulative effects associated with Alternatives B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-221.

4.2.2.7.3. Mitigation Measures

None proposed.

4.2.2.7.4. Residual Impacts

None identified.

4.2.2.8. West Nile Virus

4.2.2.8.1. Direct and Indirect Effects

This project is likely to result in standing surface water which may potentially increase mosquito breeding habitat. BLM has consulted with applicable state agencies, County Weed and Pest and the State Health Department, per above mitigation in the PRB ROD page 18, regarding the disease and the need to treat. BLM has also consulted with the researchers that are studying the dynamics of WNv species and its effects in Wyoming.

4.2.2.8.2. Cumulative Effects

There are many sources of standing water, beyond CBM discharge, throughout the PRB that would add to the potential for mosquito habitat. Sources include; natural flows, livestock watering facilities, coal mining operations, and outdoor water use and features in and around communities.

4.2.2.8.3. Mitigation Measures

There is no evidence that treatment, either through the use of larvicides or malithion, on a site specific or basin-wide scale will have any effect on the overall spread of the disease. The State agencies have not instituted state-wide treatment for mosquitoes due to WNv, nor are they requiring any mitigation specific to permitting for CBM operations.

BLM will keep monitoring this issue by continuing to consult with the State agencies and the researchers working in the area in order to stay abreast of the most current developments and any need to apply mitigation.

4.2.3. Water Resources

The operator has submitted a comprehensive WMP for this project. It is incorporated-by-reference into this EA pursuant to 40 CFR 1502.21. The WMP incorporates sound water management practices, monitoring of downstream impacts within the Antelope Creek watershed and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from proposed water management strategies.

The maximum water production is predicted to be 15.0 gpm per well or 420.0 gpm (0.9 cubic feet per second (cfs) or 677 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Antelope Creek drainage, the projected volume produced within the watershed area was 3,574 acre-feet in 2010 (maximum production was estimated in 2004 at 17,685 acre-feet). As such, the volume of water resulting from the production of these wells is 0.7% of the total volume projected for 2010. This volume of produced water is within the predicted parameters of the PRB FEIS.

4.2.3.1. Groundwater

4.2.3.1.1. Direct and Indirect Effects

The PRB FEIS predicts an infiltration rate of 28% to groundwater aquifers and coal zones in the Antelope Creek drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 117.6 gpm will infiltrate at or near the discharge points and impoundments (190 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, "the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater." (PRB FEIS pg 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. "The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers." (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. There are 21 permitted water wells within 1 mile of Wilkinson Federal project area, which range from 100 to 855 feet in depth with static water zones ranging from 60 to 200 feet depth at the time they were completed, compared to the 800 to 1,100 feet depth to the Wyodak coal zones. The operator has offered water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells. (MSUP pg, 15).

Recovery of the coal bed aquifer was predicted in the PRB FEIS to "…resaturate and repressurize the areas that were partially depressurized during operations. The amount of groundwater stored within the Wasatch – Tongue River sand and coals, and sands units above and below the coals is almost 750 million acre-feet of recoverable groundwater are (PRB FEIS Table 3-5). Redistribution is projected to result in a rapid initial recovery of water levels in the coal. The model projects that this initial recovery period would occur over 25 years." (PRB FEIS page 4-38).

4.2.3.1.2. Cumulative Effects

As stated in the PRB FEIS, "The aerial extent and magnitude of drawdown effects on coal zone aquifers and overlying and underlying sand units in the Wasatch Formation also would be limited by the

discontinuous nature of the different coal zones within the Fort Union Formation and sandstone layers within the Wasatch Formation." (PRB FEIS page 4-64).

Development of CBNG through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS page 4-65). This volume of water "…cumulatively represents 0.5 percent of the recoverable groundwater stored in the Wasatch – Tongue River sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed during reasonably foreseeable CBNG development and coal mining would represent less than 0.3 percent of the total recoverable groundwater in the Wasatch and Fort Union Formations within the PRB (nearly 1.4 billion acre-feet, from Table 3-5)." (PRB FEIS page 4-65).

4.2.3.1.3. Mitigation Measures

Adherence to the drilling COAs, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and utilizing proper cementing procedures should protect any fresh water aquifers above the target coal zone. This will ensure that ground water will not be adversely impacted by well drilling and completion operations.

The operator has offered water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells. (MSUP pg, 15).

In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, "Compliance Monitoring and Siting Requirements for Unlined Impoundments Receiving Coalbed Methane Produced Water" (November, 2008). For all new WYPDES permits, the WDEQ requires that the proponent investigate the shallow groundwater at the proposed impoundment locations. Drilling at proposed impoundments began in the spring of 2004. Based on information received from the WDEQ, as of July, 2010, over 2013 impoundment sites have been investigated with more than 2297 borings. Of these impoundments, 264 met the criteria to require "compliance monitoring" if constructed and used for CBNG water containment. Only 135 impoundments requiring monitoring are presently being used. As of the second quarter of 2010, only 20 of those monitored impoundments (14.6%) caused a change in the "Class of Use" of any parameter in the underlying aquifer water.

4.2.3.1.4. Residual Effects

As described in Chapter 3.4.1, the production of CBNG in this project area has already removed some of the water saturation in the coal zones for the production of gas. The addition of more wells will continue to dewater the coal zones. As stated in Chapter 3.2.1 in the Dilts groundwater monitoring well operated by the BLM, the groundwater has dropped 371 feet to a depth of at least 658 feet below ground surface since CBNG production began dewatering the coal zones surrounding the well. The PRB FEIS states that groundwater recharge will occur once the dewatering of the coal zones ceases and that by the year 2060 the water levels in the coal generally would recover to within 10 to 50 feet of pre-operation levels (PRB FEIS pg.4-38).

4.2.3.2. Surface Water

4.2.3.2.1. Direct and Indirect Effects

Produced Water Quality

The following table shows the average values of EC and SAR as measured at selected USGS gauging stations at high and low monthly flows as well as the Wyoming groundwater quality standards for TDS and SAR for Class I to Class III water (there is no current standard for EC). It also shows constituent limits for TDS, SAR and EC detailed in the project area WYPDES permits, and the concentrations found in the POD's representative water sample.

Table 4.3 Comparison of Existing and Predicted Water Quality

Sample location or Standard	TDS mg/l	SAR	EC µmhos/cm
Antelope Creek Watershed near Teckla, WY Gauging station			
Historic Data Average at Maximum Flow		2.82	1,800
Historic Data Average at Minimum Flow		2.60	2,354
Sample location or Standard	**TDS mg/l**	**SAR**	**EC µmhos/cm**
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirement for WYPDES Permit: #WY0055913 at outfalls 001-006 Spring & Porcupine Creek.	5,000	10	2000
WDEQ Water Quality Requirement for WYPDES Permit: #WY0055166 at outfalls 001-002 Porcupine Creek	5,000	10	2000
Predicted Produced Water Quality			
Wyodak Coal Seam	370	NR	584
Hardwater Spring (8/27/2010)	3,150	NR	4,300

NR = Not Reported

The operator identified two spring/seeps located within the Wilkinson Federal POD boundary or within ½ mile radius. The operator states that during their field visit of August 2010, the Maycock Spring is inactive and therefore no water samples were collected for analysis. Water was present but not flowing at the Hardwater Spring. According to the landowner, Hardwater Spring discharges intermittently (WMP pg. 23). Water quality analysis for the water sample taken from the Hardwater Spring is shown above.

The operator has obtained Wyoming Pollutant Discharge Elimination System (WYPDES) permits # WY0055913, WY0055166, WY0053929, & WY0054186 for the direct discharge of water to ephemeral tributaries of Spring and Porcupine Creeks and via impoundments located within these ephemeral drainages. Spring and Porcupine Creeks are within the Antelope Creek Watershed. The WDEQ permit parameters for the water disposal and the representative well water quality sample parameters are shown below for comparison.

WDEQ Permit Parameters

Parameters	POD Water Quality 2/12/2010	WYPDES Permit WY0055913 Maximum Concentrations	WYPDES Permit WY0055913 Maximum Concentrations
pH	7.9	6.5 to 9.0	6.5 to 8.5
Specific Conductance	584 µmhos	2,000 µmhos/cm max	2,000 µmhos/cm max
Dissolved Iron	940 µg/l	1,000 µg/l max	1,000 µg/l max
Total Arsenic	NR	3 ug/l	2.4 ug/l
Chlorides	6 mg/l	46 mg/l	46 mg/l

Parameters	POD Water Quality 2/12/2010	WYPDES Permit WY0055913 Maximum Concentrations	WYPDES Permit WY0055913 Maximum Concentrations
Total Dissolved Solids	370 mg/l	NA	5,000 mg/l
Sulfate	12 mg/l	NA	3,000 mg/l

NA = Not Administered NR = Not Reported

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the Powder River Basin is the irrigation of crops (PRB FEIS pg 4-69). The water quality projected for this POD is 370.0 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Wyodak target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 15.0 gallons per minute (gpm) is projected is to be produced from these 28 wells, for a total of 420.0 gpm for the POD.

The proposed method for surface discharge provides passive treatment through the aeration supplied by the energy dissipation configuration at each discharge point outfall. Aeration adds dissolved oxygen to the produced water which can oxidize susceptible ions, which may then precipitate. This is particularly true for dissolved iron. Because iron is one of the key parameters for monitoring water quality, the precipitation of iron oxide near the discharge point will improve water quality at downstream locations.

The WYPDES permits also address existing downstream concerns such as irrigation use. The designated point of compliance identified for these permits is at their discharge points (End of Pipe)

In order to determine the actual water quality of the producing formations in this POD and to verify the water analysis submitted for the pre-approval evaluation, the operator has committed to designate a reference well to each coal zone within the POD boundary. The reference well will be sampled at the wellhead for analysis within sixty days of initial production. A copy of the water analysis will be submitted to the BLM Authorized Officer.

For more information, please refer to the WMP included in this POD.

Produced Water Control

There are nineteen discharge points proposed for this project. They have been appropriately sited and utilize appropriate water energy dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

There are four existing impoundments (3.9 acre-feet capacity) and two playas that may receive CBNG produced water from the Wilkinson Federal POD.

Two of the impoundments, 5-1 & 5-2 were previously analyzed and approved under the Stoddard Federal POD EA (approved 12-07-2007). The other two impoundments, 7-1 & 7-2 were constructed under a fee CBNG development. All four impoundments are located on private land. These on-channel impoundments disturb approximately 5.6 acres including the dam structures.

Of the two playas, only playa 33-17 will have a direct discharge located directly on the playa at discharge point WY0054186-012, located in the NWSE Sec 17 T43N R72W. The property owner has previously excavated out a low spot within the playa for stock watering into which the produced water will drain. For playa 21-8 the discharge is located nearly a mile to the south at WY0055913-004. The operator does not anticipate any water discharged from the 004 outfall will reach this playa.

Along with these water management facilities, there are seventeen existing discharge points within the water management infrastructure that may be used to dispose of the produced CBNG water from the Wilkinson Federal POD. These outfalls were analyzed and approved under previous EA actions for the Leavitt Federal and Stoddard Federal PODs. The Leavitt Federal EA was approved on 9-19-2008.

Additionally there are two spreader dikes within tributaries to Spring Creek located at the SENW Sec 18 and SESW Sec 7 T42N R72W that may be impacted by the produced water discharge. The spreader dikes were installed to control a potential high, ephemeral flow event. Perennial flow at these locations due to discharge water may impact adjacent terraces. If significant impacts occur at these locations, the need to mitigate CBNG water around these spreader dikes by either installation of a culvert or a V-channel is proposed by the operator.

Produced Water Quantity

The Wilkinson Federal POD is being developed in a broad, open plain and playa environment. The headwaters typically begin with a playa discharging into broad well vegetated swales with broad channel bottoms. As the area is a broad open undulating plain and is in the headwaters of Upper Porcupine and Upper Spring Creek, the amount of contributing CBNG wells upstream of each of the two creek drainages was not evaluated in the WMP or this analysis.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 0.1 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). The operator has committed to monitor the condition of channels and address any problems resulting from discharge.

Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Sedimentation will occur in the impoundments, but would be controlled through a concerted monitoring and maintenance program. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific, case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs and the Buffalo Field Office Impoundment Reclamation Guidance dated 6-14-2010.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2004 at a total contribution to the mainstem of Antelope Creek of 13 cfs (PRB FEIS pg 4-82). The predicted maximum discharge rate from these 28 wells is anticipated to be a total of 420.0 gpm or 0.9 cfs to impoundments and direct discharge to tributary drainages. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74), the produced water re-surfacing in Antelope Creek from this action (0.1 cfs) may add a maximum 0.1 cfs to the Antelope Creek flows, or 0.9% of the predicted total CBNG produced water contribution For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

The potential maximum flow rate of produced water of the Wilkinson Federal POD is 0.9 cfs. The surrounding two PODS, the Leavitt Federal and Stoddard Federal had a combined estimated maximum flow rate of 1.5 cfs. The combined maximum flow of CBNG produced water from these Federal POD's is estimated to be 2.4 cfs which is much less than the volume of runoff estimated from the 2-year storm

event of 196 cfs for the Upper Spring Creek and 206 cfs for the Upper Porcupine Creek drainages (402 cfs total, WMP pg. 8).

In-channel downstream impacts are addressed in the WMP for the Wilkinson POD prepared by WWC Engineering of Sheridan, Wyoming for Coleman Oil & Gas.

Springs
The development of coal bed natural gas and the production and discharge of water in the area surrounding the existing natural springs may affect the flow rate or water quality of the spring. The two springs identified within ½ mile of the POD boundary are the Hardwater and Maycock Springs. The Maycock is inactive and the Hardwater flows intermittingly. Increased surface flow and impoundment infiltration into the upper soil profiles in these drainages may impact the quantity and quality of the spring water. Water sampling was conducted on the Hardwater Spring and the results provided in the discussion above.

4.2.3.2.2. Cumulative Effects

The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Antelope Creek watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

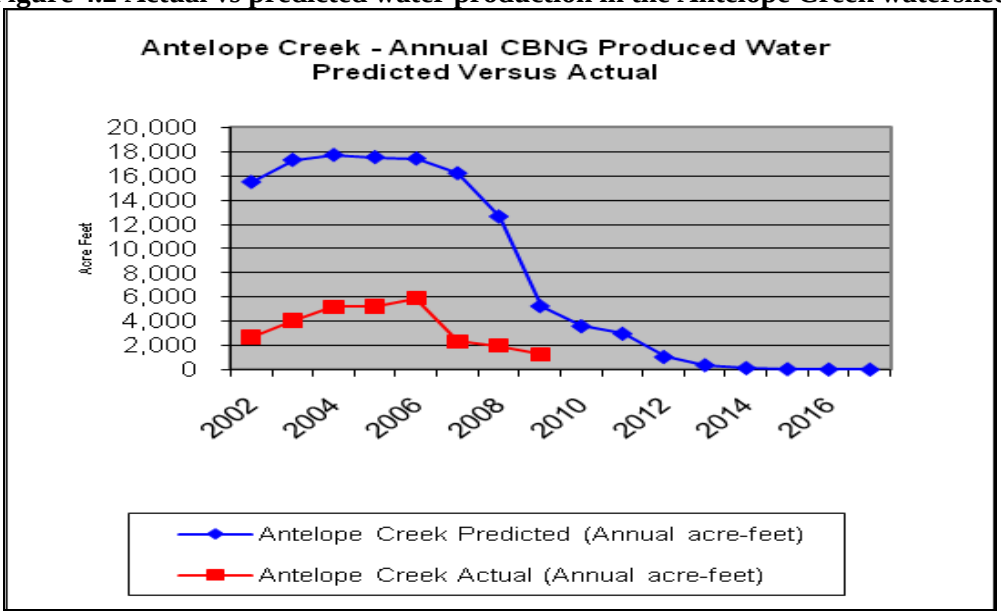
As of December 2009, all producing CBNG wells in the Antelope Creek watershed have discharged a cumulative volume of 28,599 acre-ft of water compared to the predicted 119,323 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.1 and Table 4.4 following. This volume is 2 % of the total predicted produced water analyzed in the PRB FEIS for the Antelope Creek watershed.

Table 4.4 Actual vs predicted water production in the Antelope Creek watershed *2009 Data Update 04-06-10*

Year	Antelope Creek Predicted (Annual acre-feet)	Antelope Creek Predicted (Cumulative acre-feet from 2002)	Antelope Creek Actual (Annual acre-feet)		Antelope Creek Actual (Cumulative acre-feet from 2002)	
			Actual Ac-ft	% of Predicted	Cum Ac-ft	% of Predicted
2002	15,460	15,460	2,668	17.3	2,668	17.3
2003	17,271	32,731	4,042	23.4	6,710	20.5
2004	17,685	50,416	5,181	29.3	11,891	23.6
2005	17,503	67,919	5,234	29.9	17,125	25.2
2006	17,385	85,304	5,869	33.8	22,994	27.0
2007	16,180	101,484	2,327	14.4	25,321	25.0
2008	12,613	114,097	1,983	15.7	27,304	23.9
2009	5,226	119,323	1,295	24.8	28,599	24.0
2010	3,574	122,897				
2011	2,956	125,853				
2012	1,041	126,894				
2013	363	127,257				
2014	124	127,381				
2015	40	127,421				
2016	13	127,434				

Year	Antelope Creek Predicted (Annual acre-feet)	Antelope Creek Predicted (Cumulative acre-feet from 2002)	Antelope Creek Actual (Annual acre-feet)		Antelope Creek Actual (Cumulative acre-feet from 2002)	
			Actual Ac-ft	% of Predicted	Cum Ac-ft	% of Predicted
2017	3	127,437				
Total	**127,437**		**28,599**			

Figure 4.2 Actual vs predicted water production in the Antelope Creek watershed



The PRB FEIS identified downstream irrigation water quality as the primary issue for CBNG produced water. Electrical Conductivity (EC) and SAR are the parameters of concern for suitability of irrigation water. The water quality analysis in the PRB FEIS was conducted using produced water quality data, where available, from existing wells within each of the ten primary watersheds in the Powder River Basin. These predictions of EC and SAR can only be reevaluated when additional water quality sampling is available.

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur as a result of discharged produced CBNG water. The cumulative effects relative to this project are within the analysis parameters and impacts described in the PRB FEIS for the following reasons:

1. They are proportional to the actual amount of cumulatively produced water in the Antelope Creek drainage, which is approximately 24% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
3. The commitment by the operator to manage the volume of water discharged.

Refer to the PRB FEIS, Volume 2, page 4-115 – 117 and table 4-13 for cumulative effects relative to the watershed and page 117 for cumulative effects common to all sub-watersheds.

4.2.3.2.3. Mitigation Measures

Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM. Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.

The operator has committed to monitor the water discharge points and the channels downstream for stability. If erosion is noted, the operator will be required to repair and stabilize the area using selected mitigation techniques.
The operator has also committed to expediently stabilize and revegetate disturbance within channel and floodplain associated with this project.

4.2.3.2.4. Residual Effects

"Streams enhanced by large volumes of CBM produced water may begin to establish meander patterns on longer wavelengths in response to increased flows. Stream drainages would readjust to their existing natural flows at the end of the project's life. Downcutting (stream erosion) and sediment deposition (aggradation) are natural processes that occur as stream drainages age through time. Downcutting occurs within the upper reaches of a drainage system as the stream channel becomes incised through erosion, until the slope of the stream and its velocity are reduced and further erosion is limited. Sediment is deposited within the lower, slower reaches of a stream.

Surface drainages could be degraded from erosion caused by increased surface flow, unless rates of CBM discharge and outfall locations are carefully controlled. Increased flows could cause downcutting in fluvial environments, resulting in increased channel capacity over time within the upper and middle reaches of surface drainages." (PRB FEIS pg 4-118).

4.2.4. Cultural Resources

4.2.4.1. Direct and Indirect Effects

No historic properties will be impacted by the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 11/08/10 that no historic properties exist within the APE. If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

4.2.4.2. Cumulative Effects

Construction and development of oil and gas resources impacts cultural resources through ground disturbance, unauthorized collection, and visual intrusion of the setting of historic properties. This results in fewer archaeological resources available for study of past human life-ways, changes in human behavior through time, and interpreting the past to the public. Additionally, these impacts may compromise the aspects of integrity that make a historic property eligible for the National Register of Historic Places.

Recording and archiving basic information about archaeological sites and the potential for subsurface cultural materials in the proposed project area serve to partially mitigate potential cumulative effects to cultural resources.

Fee actions constructed in support of federal actions can result in impacts to historic properties. Construction of large plans of coalbed natural gas development on split estate often include associated infrastructure that is not permitted through BLM. Project applicants may connect wells draining fee

minerals, or previously constructed pipelines on fee surface with a federal plan of development. BLM has no authority over such development which can impact historic properties. BLM has the authority to modify or deny approval of federal undertakings on private surface, but that authority is limited to the extent of the federal approval. Historic properties on private surface belong to the surface owner and they are not obligated to preserve or protect them. The BLM may go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally impacted by the landowner at any time. The cumulative effect of numerous federal approvals can result in impacts to historic properties. Archeological inventories reveal the location of sites and although the BLM goes to great lengths to protect site location data, information can potentially get into the wrong hands. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public.

4.2.4.3. Mitigation Measures

If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

4.2.4.4. Residual Effects

During the construction phase, there will be numerous crews working across the project area using heavy construction equipment without the presence of archaeological monitors. Due to the extent of work and the surface disturbance caused by large vehicles, it is possible that unidentified cultural resources can be damaged by construction activities. The increased human presence associated with the construction phase can also lead to unauthorized collection of artifacts or vandalism of historic properties.

4.2.5. Air Quality

4.2.5.1. Direct and Indirect Effects

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including non-CBM well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil & gas development would not violate any local, state, tribal or federal air quality standards.

4.2.5.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-386.

4.2.5.3. Mitigation Measures

During construction, emissions of particulate matter from well pad and road construction will be minimized by application of water, or other dust suppressants, with at least 50 percent control efficiency. Roads and well locations constructed on soils susceptible to wind erosion could be appropriately surfaced or otherwise stabilized to reduce the amount of fugitive dust generated by traffic or other activities, and dust inhibitors (surfacing material, non-saline dust suppressants, and water) could be used as necessary on unpaved roads that present a fugitive dust problem.

4.2.5.4. Residual Effects

Some increase in air pollution would occur as a direct result of development; however these direct impacts are predicted to be below applicable thresholds.

4.3. Summary of Effects

Table 4.5 provides a comparison of the cumulative effects associated with the alternatives.

Table 4.5 Summary of Alternatives

Resource/Species	Alternative A	Alternative B
Wetlands/Riparian Areas	No existing wetlands/ riparian areas would be disturbed.	
Wildlife		
Big Game	No habitat loss or fragmentation. Would likely see increased traffic passing through due to surrounding mineral development	Greatest habitat loss.
		Greatest habitat fragmentation.
Raptors	No habitat loss.	Greatest foraging habitat fragmentation.
	No wells authorized near nests.	
Migratory Birds	No habitat loss.	Greatest habitat loss.
		Greatest habitat fragmentation.
	No habitat fragmentation.	
		Overhead electric poses predation & collision risk.
Threatened and Endangered Species		
Bald eagle	No habitat loss	Overhead electricity increasing mortality risk from electrocution.
Sensitive Species		
Greater Sage Grouse	No habitat loss.	Greatest habitat loss.
	No decision on overhead electricity. Overhead power could be routed through project area on private surface without BLM discretion increasing predation and collision risk. Grouse may avoid overhead power lines.	Greatest predation and collision risk associated with overhead power lines.
West Nile Virus	No Impact	likely to have effect on the overall spread of WNV.

5. CONSULTATION & COORDINATION

Agencies and individuals summarized in Table 5.1 were consulted on the proposed project to confirm compliance with applicable laws and regulations.

Table 5.1 Consultations

NAME	TITLE	AGENCY	Onsite
Bob Vergnani	Operations Manager/Designated Agent	USA Exploration	Y
Danny Westervell		Manzana LLC	Y
Joe Ely		Manzana LLC	Y
Joey Granzer	Pumper	USA Exploration	Y
Dave Huber	Wildlife Biologist	Arcadis	Y
Brady Lewis	Engineer	WWC Engineering	Y
Rich Leavitt	Surface owner	Leavitt Ranch	Y
Carmen Goodman	Adminstrative	Continental Production	Y
Seth Lambert	Archaeologist	BLM	Y
Pat Cole	Wildlife Biologist	BLM	Y
Darci Stafford	Wildlife Biologist	BLM	N
Kathy Brus	Supervisory NRS, Hydrology	BLM	Y
Keith Anderson	Hydrologist	BLM	Y
Debby Green	Natural Resource Specialist	BLM	Y

6. OTHER PERMITS REQUIRED

A number of other permits are required from Wyoming State and other Federal agencies. These permits are identified in Table A-1 in the PRB FEIS Record of Decision.

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Appendix A Mitigation Measures and Conditions of Approval

Operator Committed Measures

The operator has incorporated several measures to alleviate resource impacts into the Master Surface Use Plan (MSUP), submitted on September 9 and October 14, 2010. Refer to the MSUP pages 1 through 16, for complete details of operator committed measures. The MSUP is available for review as part of the Wilkinson POD Administrative Record at the BLM Buffalo Field Office.

Additionally, the Operator, in their POD, has committed to:

1. Comply with all applicable Federal, State and Local laws and regulations.
2. Obtain the necessary permits for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
3. Offer water well agreements to the owners of record for permitted water wells within 0.5 mile of a federal CBNG producing well in the POD
4. Provide water analysis from a designated reference well in each coal zone.
5. The Operator has certified that a Surface Use Agreement has been reached with the landowners.

Site Specific Conditions of Approval

In addition to the operator committed measures, and those incorporated from the PRB FEIS, the BLM is including the following site-specific COAs to alleviate environmental impacts:

Surface Use

1. All road segments must be completed, including any culverts, low water crossings and required surfacing, before the drilling rig or other drilling equipment moves onto the pad.

2. Surface disturbance is prohibited in any of the following areas or conditions. Construction with frozen material or during periods when the soil material is saturated, or when watershed damage is likely to occur. Exception, waiver, or modification of this limitation may be approved in writing, including documented supporting analysis, by the Authorized Officer, with an acceptable plan for mitigation of anticipated impacts.

3. All permanent above-ground structures (e.g. , production equipment, tanks, etc.) not subject to safety requirements will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates “Standard Environmental Colors.” The color selected for this POD is Covert Green (18-0617 TPX).

4. The operator will seed on the contour to a depth of no more than 0.5 inch.To maintain quality and purity, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, use the following:

SPECIES-CULTIVAR **LBS PLS/ACRE**

10-14" Precipitation Zone
Loamy Ecological Site Seed Mix

Species	% in Mix	Lbs PLS*
Western Wheatgrass (Pascopyrum smithii)/ ***Thickspike Wheatgrass*** (Elymus lanceolatus ssp. Lanceolatus)	30	4.8
Bluebunch Wheatgrass (Pseudoroegneria spicata ssp. Spicata)	10	1.2
Green needlegrass (Nassella viridula)	25	3.0
Slender Wheatgrass (Elymus trachycaulus ssp. Trachycaulus)	20	1.2
Prairie coneflower (Ratibida columnifera)	5	0.6
White or purple prairie clover (Dalea candidum, purpureum)	5	0.6
Rocky Mountain beeplant (Cleome serrulata) /or ***American vetch***(Vicia □mericana)	5	0.6
Totals	**100%**	**12 lbs/acre**

*PLS = pure live seed. Northern Plains adapted species
Double this rate if broadcast seeding

Wildlife

Mountain Plover

The following conditions will alleviate impact to mountain plovers:

1. A mountain plover nesting survey shall be conducted in the prairie dog colonies in Sections 4 and 7 T43N R72W. This condition will be implemented on an annual basis for the duration of surface-disturbing activities. Mountain plover nesting surveys shall be conducted by a biologist following the most current USFWS Mountain Plover Survey Guidelines (the survey period is May 1-June 15). All survey results must be submitted in writing to the BFO.

    a. If no mountain plover observations are identified, then activities may be permitted until the following breeding season (March 15).

    b. If a plover is observed, no surface-disturbing activities shall occur within 0.25 miles of the prairie dog colony from 15 March through 31 July.

2. No dogs will be permitted at work sites to reduce the potential for harassment of mountain plovers.

Swift Fox

The following conditions will alleviate impacts to swift fox:

1. A swift fox survey will be required in Sections 4 and 7 T43N R72W between April 15 and June 15.

    This condition will be implemented on an annual basis for the duration of surface disturbing activities. All survey results must be submitted in writing to the BFO.

a. If a swift fox den is identified, then a seasonal disturbance-free buffer of 0.25 mile shall be maintained between March 1 and August 31. If no swift fox dens are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 1).

Raptors

The following conditions will alleviate impacts to raptors:

1. Surveys to document nest occupancy shall be conducted within 0.5 miles of the project by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a timing buffer will be implemented. The timing buffer restricts surface disturbing activities within 0.5 miles of occupied raptor nests from February 1 to July 31.

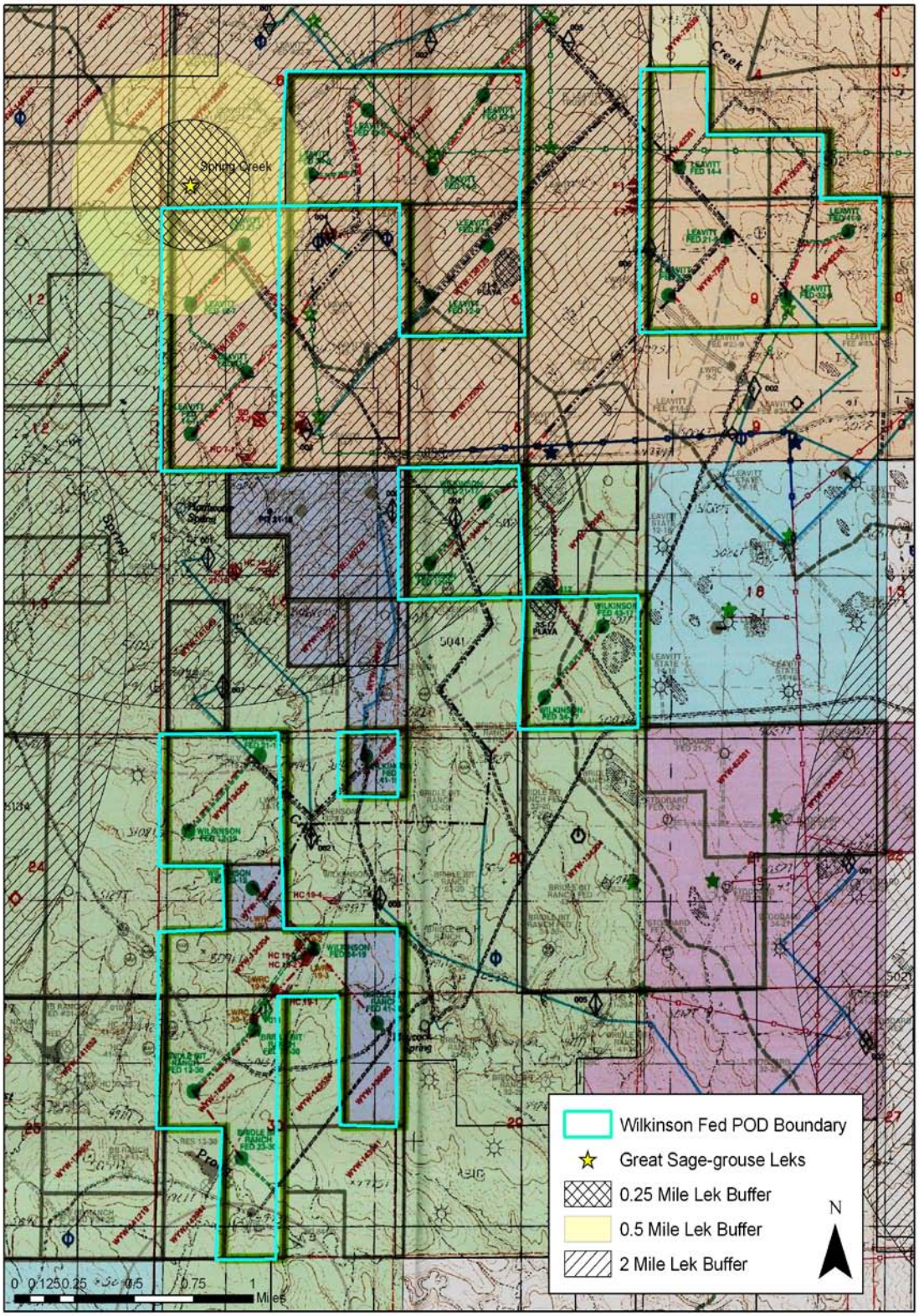
2. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

Sage-Grouse

The following conditions will alleviate impacts to sage-grouse:

1. No surface disturbing activities are permitted within 2 miles of the Spring Creek lek (S06 T42N R72W) between March 15 and June 30, prior to completion of a sage-grouse lek survey. This condition will be implemented on an annual basis for the duration of surface disturbing activities. See attached map for affected wells and infrastructure.

Well and infrastructure in the Wilinson POD affected by sage-grouse timing limitations.



2. If an active lek is identified during the survey, the 2 mile timing restriction (March 15-June 30) will

be applied, and surface disturbing activities will not be permitted until after the nesting season. The required sage-grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.

Western Burrowing Owls

The following conditions will alleviate impacts to burrowing owls:

1. No surface-disturbing activities shall occur within 0.25 mile of all identified prairie dog colonies, from 15 April through 31 August, annually, prior to a burrowing owl survey. This timing limitation will be in effect unless surveys determine that no burrowing owls are present. A 0.25 mile buffer will be applied if a burrowing owl nest is identified. This will affect wells and associated infrastructure within 0.25 miles of the prairie dog towns in Sections 4 and 7 T43N R72W.
    a. Surveys shall be conducted by a biologist following BLM protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
    b. If a burrowing owl nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

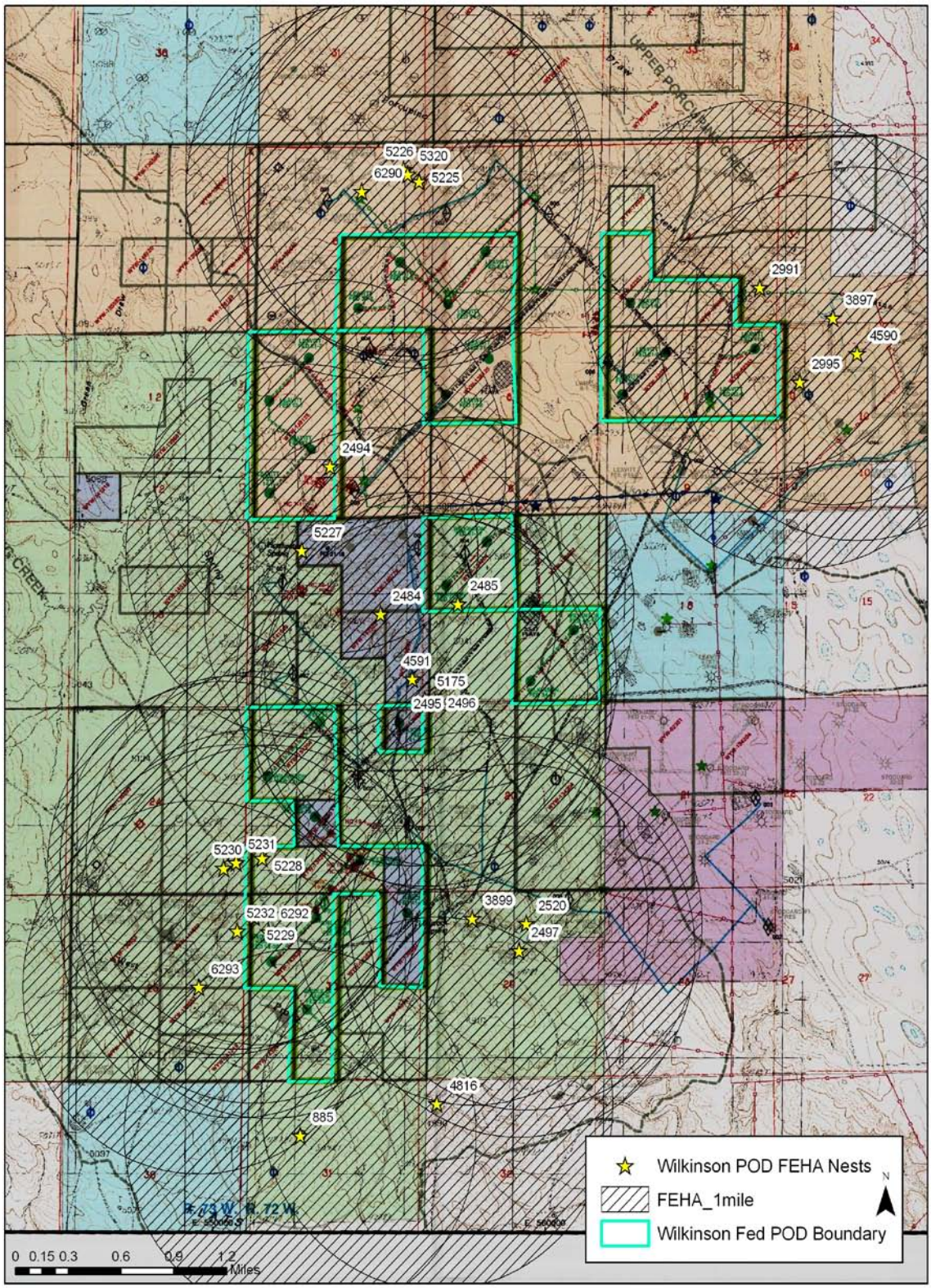
Ferruginous Hawks

The following conditions will alleviate impacts to ferruginous hawks:

1. No surface-disturbing activities shall occur within 1.0 mile of all identified ferruginous hawk nests, from 1 February through 31 July, annually, prior to a nesting survey (as agreed by the Operator). This timing limitation will be in effect unless surveys determine the nest to be inactive. See attached map for affected wells and infrastructure.
    a. Surveys shall be conducted by a biologist following BLM protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
    b. If an undocumented ferruginous hawk nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

2. Nest occupancy and productivity checks shall be completed for nests within one mile of any surface disturbing activities (e.g., well drilling or pipeline installation) across the entire POD for as long as the POD is under construction (as agreed by the Operator). Once construction of the POD has ceased, nest occupancy and productivity checks shall continue for the first five years on all nests that are within one mile of locations where any surface-disturbing activities took place. Productivity checks shall be completed only on those nests that were verified to be occupied during the initial occupancy check of that year. The productivity checks shall be conducted no earlier than June 1 or later than June 30, and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. In 2011, this applies to the nest(s) identified in the attached map and is subject to change each year after that, pending surveys.

Wells and infrastructure in the Wilkinson POD affected by timing limitations for ferruginous hawks.



Water

1. The operator will sample the Hardwater Spring located at NWNW Sec 18 T42N R72W, twice each year (spring and fall) for the duration of production to determine any changes in water quality or quantity. Maycock Spring, located in the NWNW Sec 28 T42N R72W, will be monitored in the spring and fall for active flow. If the Maycock Spring becomes active, the same sampling protocol will be followed as is required for Hardwater Spring. Analysis will follow the WYPDES Permit initial quality criteria suite. Flow rate will also be determined. Copies of water quality and quantity data will be reported to the BLM BFO. If it is determined that either are changing as a result of CBNG production in the area, additional mitigation may be required.

2. Provide the WSEO permit and bonding documentation for the 5-2 Reservoir prior to commencing well production.

Standard Conditions of Approval Identified in the PRB FEIS ROD

Standard Conditions of Approval are those measures that apply to all oil and gas development. These conditions are applied to both APD and SN when they are not specifically addressed in those plans by the Companies. There are standard conditions of approval that apply only to CBM activities and others that apply to both conventional oil and gas and CBM activities. Section A.2.1 identifies standard conditions of approval applicable to development involving only coal bed methane. Section A.2.2 identifies standard conditions of approval that are pertinent to all federal oil & gas lease development. Not all of the conditions in this second section are applicable to development of CBM.

It is important to note that site-specific mitigation measures are also developed by the BLM authorized officer, as needed, on a case-by-case basis at the onsite inspection to address special, unanticipated issues not addressed by a programmatic mitigation measure or standard conditions of approval (e.g., erosive soils, steep slopes, proximity to existing improvements, etc.).

The following standard conditions of approval are listed in Appendix A-4 of the PRB FEIS ROD.

Applicable to Coal Bed Methane Well Development Only

1. A pre-construction field meeting shall be conducted prior to beginning any dirt work approved under this POD. The operator shall contact the BLM Authorized Officer Debby Green @ 307-684-1058 at least 4-days prior to beginning operations so that the meeting can be scheduled. The operator is responsible for having all contractors present (dirt contractors, drilling contractor, pipeline contractor, project oversight personnel, etc.) including the overall field operations superintendent, and for providing all contractors copies of the approved POD, project map and BLM *Conditions of Approval* pertinent to the work that each will be doing.

2. Reserve pits will be adequately fenced during and after drilling operations until pit is reclaimed so as to effectively keep out wildlife and livestock. Adequate fencing, in lieu of more stringent requirements by the surface owner, is defined as follows:

   - Construction materials will consist of steel or wood posts. Three or four strand wire (smooth or barbed) fence or hog panel (16-foot length by 50-inch height) or plastic snow fence must be used with connectors such as fence staples, quick-connect clips, hog rings, hose clamps, twisted wire, etc. Electric fences will not be allowed.
   - Construction standards: Posts shall be firmly set in ground. If wire is used, it must be taut and evenly spaced, from ground level to top wire, to effectively keep out animals. Hog panels must be tied securely into posts and one another using fence staples, clamps, etc. Plastic snow fencing must be taut and sturdy. Fence must be at least 2-feet from edge of pit. 3 sides fenced before beginning

drilling, the fourth side fenced immediately upon completion of drilling and prior to rig release. Fence must be left up and maintained in adequate condition until pit is closed.

3. Reserve pits will be closed as soon as possible, but no later than 90 days from time of drilling/well completion, unless the BLM Authorized Officer gives an extension. Squeezing of pit fluids and cuttings is prohibited. Pits must be dry of fluids or they must be removed via vac truck or other environmentally acceptable method prior to backfilling, recontouring and replacement of topsoil. Mud and cuttings left in pit must be buried at least 3-feet below recontoured grade. The operator will be responsible for recontouring any subsidence areas that develop from closing a pit before it is sufficiently dry.

4. The operator shall complete wells (case, cement and under ream) as soon as possible, but no later than 30 days after drilling operations, unless an extension is given by the BLM Authorized Officer.

5. If in the process of air drilling the wells there is a need to utilize mud, all circulating fluids will be contained either in an approved pit or in an aboveground containment tank. The pit or containment tank will be large enough to safely contain the capacity of all expected fluids without danger of overflow. Fluid and cuttings will not be squeezed out of the pit, and the pit will be reclaimed in an expedient manner.

6. The operator shall restrict travel on unimproved two-track roads during periods of inclement weather or spring thaw when the possibility exists for excessive surface resource damage (e.g., rutting in excess of 4-inches, travel outside two-track roadway, etc.).

7. Phased reclamation plans will be submitted to BLM for approval prior to individual POD facility abandonment via a Notice of Intent (NOI) Sundry Notice. Individual facilities, such as well locations, pipelines, discharge points, impoundments, etc. need to be addressed in these plans as they are no longer needed. Individual items that will need to be addressed in reclamation plans include:

    - Pit closure (Close ASAP after suitably dry, but no later than 90 days from time of drilling unless an extension is given by BLM Authorized Officer.) BLM may require closure prior to 90 days in some cases due to land use or environmental concerns.
    - Configuration of reshaped topography, drainage systems, and other surface manipulations.
    - Waste disposal.
    - Revegetation methods, including specific seed mix (pounds pure live seed/acre) and soil treatments (seedbed preparation, fertilization, mulching, etc.). On private surface, the landowner should be consulted for the specific seed mix.
    - Other practices that will be used to reclaim and stabilize all disturbed areas, such as water bars, erosion fabric, hydro-mulching, etc.
    - An estimate of the timetables for beginning and completing various reclamation operations relative to weather and local land uses.
    - Methods and measures that will be used to control noxious weeds, addressing both ingress and egress to the individual well or POD.
    - Decommissioning/removal of all surface facilities.
    - Closure and reclamation of areas utilized or impacted by produced CBM water, including discharge points, reservoirs, off-channel pits, land application areas, livestock/wildlife watering facilities, surface discharge stream channels, etc..

8. The first well drilled to each targeted coal zone will be designated as the POD reference well. Designated reference wells must have the ability to be sampled at the wellhead. Water quality samples will be collected by the operator and submitted for analysis using WDEQ NPDES criteria within 30-60 days of initial water production. Results of the analysis will be submitted to the BFO-BLM Authorized Officer as soon as they become available.

Pertinent to All Oil and Gas Well Development

General

1. If any cultural values [sites, artifacts, human remains (Appendix L FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. The authorized officer will conduct an evaluation of the cultural values to establish appropriate mitigation, salvage or treatment. The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized BLM officer (AO). Within five working days the AO will inform the operator as to:

    - whether the materials appear eligible for the National Register of Historic Places;
    - the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
    - a time-frame for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.

2. If paleontological resources, either large or conspicuous, and/or a significant scientific value are discovered during construction, the find will be reported to the Authorized Officer immediately. Construction will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five (5) working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological values. Operations within 250 feet of such a discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The applicant will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant scientific interest discovered during the operation.

3. Please contact Debby Green, Natural Resource Specialist, at (307) 684-1058, Bureau of Land Management, Buffalo, if there are any questions concerning the following surface use COAs.

Construction

1. The operator will limit vegetation removal and the degree of surface disturbance wherever possible. Where surface disturbance cannot be avoided, all practicable measures will be utilized to minimize erosion and stabilize disturbed soils.

2. Construction and drilling activity will not be conducted using frozen or saturated soil material during periods when watershed damage or excessive rutting is likely to occur.

3. Remove all available topsoil (depths vary from 4 inches on ridges to 12+ inches in bottoms) from constructed well locations including areas of cut and fill, and stockpile at the site. Topsoil will also be salvaged for use in reclamation on all other areas of surface disturbance (roads, pipelines, etc.).

Clearly segregate topsoil from excess spoil material. Any topsoil stockpiled for one year or longer will be signed and stabilized with annual ryegrass or other suitable cover crop.

4. The operator will not push soil material and overburden over side slopes or into drainages. All soil material disturbed will be placed in an area where it can be retrieved without creating additional undue surface disturbance and where it does not impede watershed and drainage flows.

5. Construct the backslope no steeper than ½:1, and construct the foreslope no steeper than 2:1, unless otherwise directed by the BLM Authorized Officer.

6. Maintain a minimum 20-foot undisturbed vegetative border between toe-of-fill of pad and/or pit areas and the edge of adjacent drainages, unless otherwise directed by the BLM Authorized Officer.

7. With the overall objective of minimizing surface disturbance and retaining land stability and productivity, the operator shall utilize equipment that is appropriate to the scope and scale of work being done for roads and well pads (utilize equipment no larger than needed for the job).

8. To minimize electrocution potential to birds of prey, all overhead electrical power lines will be constructed to standards identified by the Avian Power Line Interaction Committee (1996).

9. The operator shall utilize wheel trenchers or ditch witches to construct all pipeline trenches, except where extreme topography or other environmental factors preclude their use.

10. A flare pit will be constructed on the well pad for use during drilling operations. It will be located at least 125 feet from the well head and will be located down-wind from the prevailing winds.

11. Reserve pit will be adequately fenced during and after drilling operations until reclaimed so as to effectively keep out wildlife and livestock. This requires that it be fenced on the three nonworking sides prior to drilling and on the remaining side immediately following rig release. Fencing will be constructed in accordance with BLM specifications. (Plastic snow fence is not acceptable fencing material for conventional wells.)

12. The reserve pit will be oriented to prevent collection of surface runoff. After the drilling rig is removed, the operator may need to construct a trench on the uphill side of the reserve pit to divert surface drainage around it. If constructed, the trench will be left intact until the pit is closed.

13. The reserve pit will be lined with an impermeable liner if permeable subsurface material is encountered. An impermeable liner is any liner having a permeability less than 10^{-7} cm/sec. The liner will be installed so that it will not leak and will be chemically compatible with all substances that may be put in the pit. Liners made of any man-made synthetic material will be of sufficient strength and thickness to withstand normal installation and pit use. In gravelly or rocky soils, a suitable bedding material such as sand will be used prior to installing the liner.

14. The reserve pit will be constructed so that at least half of its total volume is in solid cut material (below natural ground level).

15. Culverts will be placed on channel bottoms on firm, uniform beds, which have been shaped to accept them, and aligned parallel to the channel to minimize erosion. Backfill will be thoroughly compacted.

16. The minimum diameter for culverts will be 18 inches. However, all culverts will be appropriately sized in accordance with standards in BLM Manual 9113.

17. Construction and other project-related traffic will be restricted to approved routes. Cross-country vehicle travel will not be allowed.

18. Maximum design speed on all operator constructed and maintained roads will not exceed 25 miles per hour.

19. Pipeline construction shall not block nor change the natural course of any drainage. Pipelines shall cross perpendicular to drainages. Pipelines shall not be run parallel in drainage bottoms. Suspended pipelines shall provide adequate clearance for maximum runoff.

20. Pipeline trenches shall be compacted during backfilling. Pipeline trenches shall be routinely inspected and maintained to ensure proper settling, stabilization and reclamation.

21. During construction, emissions of particulate matter from well pad and road construction would be minimized by application of water or other non-saline dust suppressants with at least 50 percent control efficiency. Dust inhibitors (surfacing materials, non-saline dust suppressants, and water) will be used as necessary on unpaved roads that present a fugitive dust problem. The use of chemical dust suppressants on public surface will require prior approval from the BLM Authorized Officer.

22. Operators are required to obtain a National Pollution Discharge Elimination System (NPDES) Storm Water Permit from the Wyoming DEQ for any projects that disturb five or more acres (changing to one acre in March 2005). This general construction storm water permit must be obtained from WDEQ prior to any surface disturbing activities and can be obtained by following directions on the WDEQ website at http://deq.state.wy.us. Further information can be obtained by contacting Barb Sahl at (307) 777-7570.

23. The operator shall submit a Sundry Notice (Form 3160-5) to BLM for approval prior to construction of any new surface disturbing activities that are not specifically addressed in the approved APD or POD Surface Use Plan.

Operations/Maintenance

3. Confine all equipment and vehicles to the access road(s), pad(s), and area(s) specified in the approved POD.

4. All waste, other than human waste and drilling fluids, will be contained in a portable trash cage. This waste will be transported to a State approved waste disposal site immediately upon completion of drilling operations. No trash or empty barrels will be placed in the reserve pit or buried on location. All state and local laws and regulations pertaining to disposal of human and solid waste will be complied with.

5. Rat and mouse holes shall be filled and compacted from the bottom to the top immediately upon release of the drilling rig from the location.

6. The operator will be responsible for prevention and control of noxious weeds and weeds of concern on all areas of surface disturbance associated with this project (well locations, roads, water management facilities, etc.) Use of pesticides shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of Interior. Prior to the use of pesticides on public land, the holder shall obtain from

the BLM authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer to such use.

7. Sewage shall be placed in a self-contained, chemically treated porta-potty on location.

8. The operator and their contractors shall ensure that all use, production, storage, transport and disposal of hazardous and extremely hazardous materials associated with the drilling, completion and production of this well will be in accordance with all applicable existing or hereafter promulgated federal, state and local government rules, regulations and guidelines. All project-related activities involving hazardous materials will be conducted in a manner to minimize potential environmental impacts. In accordance with OSHA requirements, a file will be maintained onsite containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds and/or substances which are used in the course of construction, drilling, completion and production operations.

9. Produced fluids shall be put in test tanks on location during completion work. Produced water will be put in the reserve pit during completion work per Onshore Order #7.

10. The only fluids/waste materials which are authorized to go into the reserve pit are RCRA exempt exploration and production wastes. These include:

    - drilling muds & cuttings;
    - rigwash; and,
    - excess cement and certain completion & stimulation fluids defined by EPA as exempt.

    It does not include drilling rig waste, such as:

    - spent hydraulic fluids;
    - used engine oil;
    - used oil filter;
    - empty cement, drilling mud, or other product sacks;
    - empty paint, pipe dope, chemical or other product containers; and,
    - excess chemicals or chemical rinsate.

    Any evidence of non-exempt wastes being put into the reserve pit may result in the BLM Authorized Officer requiring specific testing and closure requirements.

11. Operators are advised that prior to installation of any oil and gas well production equipment which has the potential to emit air contaminants, the owner or operator of the equipment must notify the Wyoming Department of Environmental Quality, Air Quality Division (phone 307-777-7391) to determine permit requirements. Examples of pertinent well production equipment include fuel-fired equipment (e.g., diesel generators), separators, storage tanks, engines and dehydrators.

12. If this well is drilled during the fire season (June-October), the operator shall institute all necessary precautions to ensure that fire hazard is minimized, including but not limited to mowing vegetation on the access route(s) and well location(s), keeping fire fighting equipment readily available when drilling, etc.

Dry Hole/Reclamation

1. All disturbed lands associated with this project, including the pipelines, access roads, water management facilities, etc will be expediently reclaimed and reseeded in accordance with the surface use plan and any pertinent site-specific COAs.

2. Disturbed lands will be recontoured back to conform with existing undisturbed topography. No depressions will be left that trap water or form ponds.

3. The fluids and mud must be dry in the reserve pit before recontouring pit area. The operator will be responsible for recontouring of any subsidence areas that develop from closing a pit before it is

   The fluids and mud must be dry in the reserve pit before recontouring pit area. The operator will be responsible for recontouring of any subsidence areas that develop from closing a pit before it is completely dry. The plastic pit liner (if any) will be cut off below grade and properly disposed of at a state authorized landfill before beginning to recontour the site.

4. Before the location has been reshaped and prior to redistributing the topsoil, the operator will rip or scarify the drilling platform and access road on the contour, to a depth of at least 12 inches. The rippers are to be no farther than 24 inches apart.

5. Distribute the topsoil evenly over the entire location and other disturbed areas. Prepare the seedbed by disking to a depth of 4-to-6 inches following the contour.

6. Waterbars are to be constructed at least one (1) foot deep, on the contour with approximately two (2) feet of drop per 100 feet of waterbar to ensure drainage, and extended into established vegetation. All waterbars are to be constructed with the berm on the downhill side to prevent the soft material from silting in the trench. The initial waterbar should be constructed at the top of the backslope. Subsequent waterbars should follow the following general spacing guidelines:

Slope (percent)	Spacing Interval (feet)
≤ 2	200
2 – 4	100
4 – 5	75
≥ 5	50

7. BLM will not release the performance bond until the area has been successfully revegetated (evaluation will be made after the second complete growing season) and has met all other reclamation goals of the surface owner and surface management agency.

8. A Notice of Intent to Abandon and a Subsequent Report of Abandonment must be submitted for abandonment approval.

9. For performance bond release approval, a Final Abandonment Notice (with a surface owner release letter on split-estate) must be submitted prior to a final abandonment evaluation by BLM.

10. Soil fertility testing and the addition of soil amendments may be required to stabilize some disturbed lands.

11. Any mulch utilized for reclamation needs to be certified weed free.

Producing Well

1. Landscape those areas not required for production to the surrounding topography as soon as possible. The fluids and mud must be dry in the reserve pit before recontouring pit area. The operator will be responsible for recontouring and reseeding of any subsidence areas that develop from closing a pit before it is completely dry.

2. Reduce the backslope to 2:1 and the foreslope to 3:1, unless otherwise directed by the BLM Authorized Officer. Reduce slopes by pulling fill material up from foreslope into the toe of cut slopes.

3. Production facilities (including dikes) must be placed on the cut portion of the location and a minimum of 15 feet from the toe of the back cut unless otherwise approved by the BLM Authorized Officer.

4. A dike will be constructed completely around the production facilities (i.e. production tanks, water tanks, and heater-treater). The dikes for the production facilities must be constructed of impermeable soil, hold 110% of the capacity of the largest tank plus 1-foot of freeboard, and be independent of the back cut.

5. Any chemicals used in treating the wells (e.g., corrosion inhibitor, emulsion breaker, etc.) will be in a secure, fenced-in area with appropriate secondary containment structure (dikes, catchment pan, etc.).

6. The load out line coming from the oil/condensate tank(s) will have a suitable containment structure to capture and recycle any oil spillage that might occur.

7. Individual production facilities (tanks, treaters, etc.) will be adequately fenced off (if entire facility not already fenced off).

8. Any spilled or leaked oil, produced water or treatment chemicals must be reported in accordance with NTL-2A and immediately cleaned up in accordance with BLM requirements. This includes clean-up and proper disposition of soils contaminated as a result of such spills/leaks.

9. Distribute stockpiled topsoil evenly over those areas not required for production and reseed as recommended.

10. Upgrade and maintain access roads and drainage control (e.g., culverts, drainage dips, ditching, crowning, surfacing, etc.) as necessary and as directed by the BLM Authorized Officer to prevent soil erosion and accommodate safe, environmentally-sound access.

11. Prior to construction of production facilities not specifically addressed in the APD/POD, the operator shall submit a Sundry Notice to the BLM Authorized Officer for approval.

12. If not already required prior to constructing and drilling the well location, the operator shall immediately upgrade the entire access road to BLM standards (including topsoiling, crowning, ditching, drainage culverts, surfacing, etc.) to ensure safe, environmentally-sound, year-round access.

13. Waterbars shall be installed on all reclaimed pipeline corridors per the guidelines in A.4.2.4 #6.

Programmatic Mitigation Measures Identified in the PRB FEIS ROD
The following programmatic mitigation measures are listed in Appendix A-5 of the PRB FEIS ROD.

Programmatic mitigation measures are those, determined through analysis, which may be appropriate to apply at the time of APD approval if site specific conditions warrant. These mitigation measures can be applied by BLM, as determined necessary at the site-specific NEPA APD stage, as COAs and will be in addition to stipulations applied at the time of lease issuance and any standard COA.

Groundwater

1. Concerns exist about the interaction between reservoirs and shall groundwater. At impoundment

locations, it may be necessary to conduct investigations at representative sites around the basin to quantify impacts of water infiltration and lateral movement. Shall groundwater wells will be installed in cooperation with the operator and regularly sampled in areas where it has been determined during pre-construction that class I groundwater may be affected by infiltration or potential for lateral movement exists.

Surface Water

1. Locate discharge points in areas that will minimize erosion and impacts to the receiving channel, existing improvements, and downstream users.

2. Locate discharge points in stable, low gradient drainage systems and below active headcuts, when possible. If discharge is located above a Headcut, mitigation measures will be required by the BLM Authorized Officer on a site specific basis. Some mitigation measures will require engineering design.

3. All discharge points will require energy dissipation measures.

4. Discharge points may not be authorized by BLM regardless of NPDES status or previous use. Sites may be moved or otherwise mitigated by the BLM Authorized Officer during onsite inspections where environmental issues exist.

5. Cumulative produced water discharge must not exceed the naturally occurring 2 year peak flow of the receiving channel.

6. Discharge Points will not be located in playas or enclosed basins unless it can be demonstrated that it can be done without resulting in adverse impacts. Discharges into valley bottoms with no defined low-flow channel will generally not be allowed, but will be reviewed on a site-specific basis.

7. Channel Crossings:

    - Minimize channel disturbance as much as possible by limiting pipeline and road crossings.
    - Avoid running pipelines and access roads within floodplains or parallel to a stream channel.
    - Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
    - Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.

8. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.

9. Concerns regarding the quality of the discharged CBM water on downstream irrigation use may require operators to increase the amount of storage of CBM water during the irrigation months and allow more surface discharge during the non-irrigation months.

10. The BLM will consult with appropriate state agencies regarding West Nile Virus. If determined to be

necessary, a condition of approval will be applied at the time of APD approval to treat mosquitoes for any CBM discharge waters that become stagnant.

Soils

1. The Companies, on a case by case basis depending upon water and soil characteristics, will test sediments deposited in impoundments before reclaiming the impoundments. Tests will include the standard suite of cations, ions, and nutrients that will be monitored in surface water testing and any trace metals found in the CBM discharges at concentrations exceeding detectable limits.

2. Areas of highly erosive soils will be avoided when drill sites, two-track access routes, and pipeline routes are surveyed and staked in order to substantially reduce the amount of soil loss.

3. Where feasible, gas and water pipelines and electrical cables will be installed in disturbance corridors. Disturbance corridors combine two or more utility lines (water, gas, electric) in common trenches, usually within access roadways.

Cultural Resources

1. The Companies will conduct development in and around the Crazy Woman Battlefield in a way that preserves the eligibility of the site for nomination to the National Register of Historic Places. Approvals of APDs and PODs will require prior coordination with the SHPO and BLM's archaeologists.

2. For development within 0.25 mile either side of the Bozeman Trail, companies will conduct evaluation of segments to determine their eligibility to the National Register of Historic Places. Mitigation of adverse impacts to segments of the trail that contribute to its eligibility for the NRHP will be determined on a case-by-case basis.

Vegetation

1. Weed educational material will be reviewed with operators during preconstruction on-site meetings with operators, subcontractors, and landowners and will also be attached to approved APDs and PODs.

2. Temporarily fence reseeded areas, if not already fenced, for at least two complete growing seasons to insure reclamation success on problematic sites (e.g. close to livestock watering source, erosive soils etc.).

Wetland/Riparian

1. To protect the biological and hydrologic features of riparian areas, woody draws, wetlands, and floodplains, all well pads, compressors, and other non-linear facilities will be located outside of these areas.

2. To reduce adverse effects on existing wetlands and riparian areas, water discharge should not be allowed if increased discharge volumes or subsequent recharge of shallow aquifers will inundate and kill woody species, such as willows or cottonwoods.

3. For any jurisdictional wetlands identified that may be impacted, a detailed mitigation plan will be developed during the APD/POD or sundry notice approval process. Federal requirements to replace all impacted wetlands will mitigate this loss, so environmental impacts will occur only during the life of the project (including reclamation).

4. Any fences used in wetland areas should be placed well back from the wetlands to prevent waterfowl mortalities and should be constructed to standards that allow big game movements.

5. Crossings of wetland/riparian areas by linear features, such as pipelines, roads, and power lines will be avoided to the extent practicable. Where crossings cannot be avoided, impacts will be minimized through use of the following measures:

    - Site-specific mitigation plans will be developed during the APD, POD, or Sundry Notice approval process for all proposed disturbance to wetland/riparian areas.
    - Crossings will be constructed perpendicular to wetland/riparian areas where practical.
    - Power line corridors will avoid wetlands, to the extent possible, in order to reduce the chance of waterfowl hitting the lines. Where avoidance can't occur, the minimum number of poles necessary to cross the area will be used.
    - Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall), or when the ground is frozen during the winter.
    - No waste material will be deposited below high water lines in riparian areas, flood plains, or in natural drainage ways.
    - The lower edge of soil or other material stockpiles will be located outside the active floodplain.
    - Drilling mud pits will be located outside of riparian areas, wetlands, and floodplains, where practical.
    - Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.
    - Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

Wildlife

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities. The Companies will locate compressor stations so that noise from the stations at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.

2. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.

3. All stock tanks shall include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled *Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations*.

Threatened, Endangered, or Sensitive Species

Bald Eagle

1. In the event that a bald eagle (dead or injured) is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

2. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of Sundry Notices.

3. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM

biologist to have adverse effects to bald eagles or their habitat.

Black-footed Ferret

1. Additional mitigation measure may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to black-footed ferrets or their habitat. In the event that a mountain plover is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

Mountain Plover

1. A disturbance-free buffer zone of 0.25 mile will be established around all mountain plover nesting locations between March 15 and July 31.

2. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.

3. Creation of hunting perches or nest sites for avian predators within 0.5 mile of identified nesting areas will be avoided by burying power lines, using the lowest possible structures for fences and other structures and by incorporating perch-inhibiting devices into their design.

Ute Ladies'-tresses Orchid

1. Suitable habitat will be avoided wherever possible.

2. Companies operating in areas identified with weed infestations or suitable Ute ladies'- tresses orchid habitat will be required to submit an integrated pest management plan prior to APD approval.. Mitigation will be determined on a site-specific basis and may include such measures as spraying herbicides prior to entering areas and washing vehicles before leaving infested areas. Infestation areas of noxious weeds have been identified through the county Weed and Pest Districts and are available at the Buffalo BLM office.

Transportation

1. The companies will provide georeferenced spatial data depicting as-built locations of all facilities, wells, roads, pipelines, power lines, reservoirs, discharge points, and other related facilities to the BLM upon completion of POD construction and development.

2. Companies will contact the counties to pursue development of maintenance agreements to ensure county roads are adequately maintained for the projected increase in use.

Visual Resources

1. The companies will complete the following measures, where practical: use existing well pads where feasible; use vegetative and topographic screening when siting well locations; avoid highwall cuts.

2. Within the designated VRM Class II corridors along Interstate 90 and State Highway 14, all project facilities on BLM surface will be screened completely from these highways or camouflaged to retain basic elements of form, line, color and texture of the landscape.

3. The Companies will mount lights at compressor stations on a pole or building and direct them downward to illuminate key areas within the facility while minimizing the amount of light projected outside the facility.

4. Use buried power lines to each well, where feasible, to reduce the linear element in the landscape.

Air Quality
A number of mitigation options for CBM are part of WDEQ's normal regulatory procedure. For instance, in the permitting of compressors, the agency always requires the application of BACT. The theory here is simply that given the air resource available, within technological and financial feasibility, the number of operations that can be allowed is maximized.

1. During construction, emissions of particulate matter from well pad and resource road construction will be minimized by application of water, or other dust suppressants, with at least 50 percent control efficiency. Roads and well locations constructed on soils susceptible to wind erosion could be appropriately surfaced or otherwise stabilized to reduce the amount of fugitive dust generated by traffic or other activities, and dust inhibitors (surfacing materials, non-saline dust suppressants, and water) could be used as necessary on unpaved collector, local and resource roads that present a fugitive dust problem. The use of chemical dust suppressants on BLM surface will require prior approval form the BLM authorized officer.

    - A variety of potential emission reduction measures (BLM 1999d) are available to further limit Nox and other air pollutant emissions. The evaluation was not intended to rank or identify a required emission reduction measure; the appropriate level of control will be determined and required by the applicable air quality regulatory agencies during the pre-construction permit process.

      BLM will also continue to cooperate with existing visibility and atmospheric deposition impact monitoring programs. The need for, and the design of, additional monitoring could include the involvement of the EPA Region 8 Federal Leadership Forum and applicable air quality regulatory agencies. Based upon future recommendations, operators could be required to cooperate in the implementation of a coordinated air quality monitoring program. Oil and gas lease terms (Section 6) require the lessee, within the lease rights granted, to take measures deemed necessary by the lessor for the conduct of operations iin a manner that minimizes adverse impacts to air quality, as well as other resources.

2. Table A-1 and Table A-2 below present mitigation options for particulate matter and nitrogen oxide emissions.

Table A-1 Fugitive Dust Mitigation Measures (PM10), Effectiveness and Cost

	Dust Sources					
	Disturbed Areas			**Unpaved Roads[1]**		
Mitigation Options	Establish plant cover for all disturbed lands by certain time (re-vegetation)	Water roads to attain certain percent moisture[2]	Apply soil stabilizer	Set and enforce speed limit	Gravel roads	Paved road

Effectiveness	Level proportional to percentage of land cover	0-50% reduction in uncontrolled dust emissions	33 to 100% control efficiency	80% for 15 mph 65% for 20 mph 25% for 30 mph	30% reduction	90% reduction
Estimated Cost	$/acre	$4000/mile	$2,000 to $4,000/mile per year	Unknown	$9,000/mile	$11,000 to $60,000/mile

Note:
1. Improved and County roads
2. Wetting of construction roads during the construction period. Wetting of construction roads not required for once a month maintenance trips to well pads.
3. Reductions assume 40 mile per hour base speed.

Table A-2 Nitrogen Oxides (NO_x) Mitigation Measures Efficiency

	NO_x Emissions Sources			
	Field Compressors	**Sales Compressors**	**Temporary Diesel Generators[1]**	**Heavy Equipment**
Mitigation Options Efficiency	Implement Best Available Control Technology[2] Typically results in a NO_x emission rate of about 1 g/bhp-hr	Implement Best Available Control Technology[2] Typically results in a NO_x emission rate of about 1 b/bhp-hr	Register with State; will regulate as appropriate	Voluntary use of diesel engines

Notes: 1 Wyoming is currently registering these generators to determine NO_x emissions
2. BACT could include electric compression.

Geology

Inadvertent release to the atmosphere of the methane resource will be controlled through WOGCC requirements and APD conditions of approval that address well control, casing, ventilations, and plugging procedures appropriate to site-specific CBM development plans.

Areas of Critical Environmental Concern

1. When APDs are received that may affect the relevance and importance criteria for potential ACEC's, the need for interim management measures will be re-evaluated and/or additional site-specific mitigation would be implemented to ensure protection of values meeting the relevance and importance criteria, FEIS Appendix R.

Appendix B: Resource and Species Worksheets Affected Resources Worksheet

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Air quality	Y	Y	Y	PRB FEIS: 3-291-298, 4-404-406, 4-377-386
Noise	Y	Y		
Cultural	Y	Y	N	PRB FEIS: 3-206-228, 4-273-288, 4-394
Native American religious concerns	N	N	N	PRB FEIS: 3-218-219, 3-228, 4-277-278
Traditional Cultural Properties	N	N	N	PRB FEIS: 3-218-219, 4-277-278
Mineral Potential				PRB FEIS: 3-66-70, 3-230, 4-127-129
Coal	N	N	Y	PRB FEIS: 3-66
Fluid Minerals	Y	Y	Y	PRB FEIS: 3-68-69
Locatable Minerals	N	N	N	Add in EA
Other leasables	N	N	N	
Salable minerals	N	N	N	
Paleontology	N	N	Y	PRB FEIS: 3-65-66, 4-125-127
PFYC 3	Y	Y	Y	PRB FEIS: 3-65-66, 4-125-127
PFYC 5	N	N	Y	PRB FEIS: 3-65-66, 4-125-127
Rangeland management				Not in PRB FEIS
Existing range improvements	N	N		
Proposed range improvements	N	N		
Recreation				PRB FEIS: 3-263-273, 4-319-328
Developed site	N	N	Y	PRB FEIS: 3-266, 4-326
Walk-in-Area	N	N	Y	
Social & Economic				PRB FEIS: 3-275-289, 4-336-370
Environmental Justice	N	N		
Transportation	N	N		
Soils & Vegetation				PRB FEIS: 3-78-107, 4-134-152, 4-153-164, 4-393-394, 4-406
Erosion Hazard	Y	Y	Y	PRB FEIS: 3-82, 4-135
Poor Reclamation Potential	Y	Y	Y	PRB FEIS: 3-86, 4-149-152
Slope hazard	Y	N	Y	PRB FEIS: 3-81, 4-135
Forest products	N	N		
Prime and Unique Farmland	N	N		
Invasive Species	Y	Y	Y	PRB FEIS: 3-103-108, 4-153-172
Wetlands/Riparian	Y	Y	Y	PRB FEIS: 4-117-124, 3-108-113, 4-172-178, 4-406
Special Designations				
Proposed ACEC	N	N		
Wild & Scenic River	N	N		PRB FEIS: 3-273
Wilderness Characteristics/Citizen	N	N		

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Proposed				
WSA	N	N		
Visual Resources				PRB FEIS: 3-252-263, 4-302-314, 4-403
Class II	N	N		
Class III	N	N		
Water				PRB FEIS: 3-1-56, 4-1-122, 4-135, 4-33, 4-405
Floodplains	No	No	Yes	PRB FEIS: 3-1-56, 4-1-122, 4-135, 4-33, 4-405
Ground water	Yes	Yes	No	PRB FEIS: 3-1-30, 4-1-69, 4-392, 4-405
Surface water	Yes	Yes	No	PRB FEIS: 4-85 to 86, 4-117 to 124 3-36-56, 4-69-122, 4-393, 4-405
Drinking water	Yes	Yes	Yes	PRB FEIS: 3-52, 4-50-52
Wildland Urban Interface	N	N		
Waste Management	Y	N		
Wildlife				PRB FEIS: 3-113-153, 4-179, 4-247, 4-397
ESA listed, proposed, or candidate species	Y	Y	No	PRB FEIS: 4-251, 4-257 – 4-273, 4-254, 4-255 and BA
BLM sensitive species	Y	Y	Yes	PRB FEIS: 4-258, 4-260 to 4-264, 4-251 to 4-253, 4-264, 4-265
General wildlife	Y	Y	Yes	PRB FEIS: 4-179 to 4-235
West Nile virus potential				