DECISION RECORD
FOR
Yates Petroleum Company
NEO
ENVIRONMENTAL ASSESSMENT –WY-070-10-331

DECISION:
BLM's decision is to approve Yates NEO Coal Bed Natural Gas (CBNG) POD Alternative C of the attached Environmental Assessment (EA). Alternative C is the Modified Proposed Action, and is the result of collaboration between the Bureau of Land Management and Yates Petroleum Company. Alternative C 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 and site-specific mitigation measures are included in the attached EA.

Well Sites:
The following 29 Applications for Permit to Drill (APDs) and associated infrastructure are authorized:

Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
NEO CS FEDERAL	1*	NENE	10	53N	75W	WYW130613
NEO CS FEDERAL COM	2	SWNW	10	53N	75W	WYW130613
NEO CS FEDERAL	3	SWNE	10	53N	75W	WYW130613
NEO CS FEDERAL	4	NESE	10	53N	75W	WYW130613
NEO CS FEDERAL	5	NESW	10	53N	75W	WYW130613
NEO CS FEDERAL	6	SWSW	10	53N	75W	WYW130613
NEO CS FEDERAL	7	SWSE	10	53N	75W	WYW130613
NEO CS FEDERAL	8	NENW	11	53N	75W	WYW130613
NEO CS FEDERAL	9	SWNW	11	53N	75W	WYW130613
NEO CS FEDERAL	10	NESW	11	53N	75W	WYW130613
NEO CS FEDERAL	11	SWSW	11	53N	75W	WYW130613
NEO CYPHER CS FEDERAL COM	10	SWNW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	16	NENE	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	17	NENW	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	18	SWNW	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	19	SWNE	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	20	NESE	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	21	SWSE	35	53N	75W	WYW130087
NEO CYPHER INJECTOR FED	24	SWNE	35	53N	75W	WYW130087
NEO DOZER CS FEDERAL	1	NESW	35	53N	75W	WYW151895
NEO DOZER CS FEDERAL	2	SWSW	35	53N	75W	WYW151895
NEO TRINITY CS FEDERAL	1	NENE	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	2	NENW	27	53N	75W	WYW135224

NEO TRINITY CS FEDERAL	3	SWNW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	4	SWNE	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	5	NESE	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	6	NESW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	7	SWSW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	8	SWSE	27	53N	75W	WYW135224

Water Management Proposal:
The approved water management plan includes 8 of the water management infrastructures proposed for use in association with this POD. Facilities identified as secondary under approval status have undergone an environmental review, however, the operator has chosen not to provide reclamation bonds, and will not construct them until proof of bonding is provided. If the operator chooses to develop the facilities, they will submit a sundry notice to that effect with the relevant reclamation bonds.

Facility Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Disturbance (acres)	Lease #	Approval Status
Lake Reservoir	SWSW	27	53N	75W	4.7	0.9	WYW 135224	Secondary
Butte Reservoir	SENW	27	53N	75W	6.4	1.7	WYW 135224	Secondary
357 Reservoir	NENW	26	53N	75W	7.0	1.2	WYW 151891	Secondary
Six Gun Sam Res.	NWNE	26	53N	75W	16.5	2.2	WYW130 087	Secondary
Rifleman Reservoir	NENW	26	53N	75W	19.1	2.7	WYW 151891	Secondary
Holster Reservoir	NENE	35	53N	75W	6.8	1.2	WYW130 087	Secondary
Superior Reservoir	SWNE	35	53N	75W	19.4	1.7	WYW130 087	Secondary
Green Horn Reservoir	NESW	35	53N	75W	7.4	1.25	WYW 151895	Secondary

Water Management Facilities:
Three existing injector wells and one new injector wells are approved.

	Facility Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Distur-bance	Lease #
1	FARIS DEEP INJECTOR FED#10	SENW	11	52N	75W	NA	NO NEW	WYW130612
2	FUELS INJECTOR WELL #1	SWSE	24	53N	75W	NA	NO NEW	WYW151894
3	WORLEY DRAW INJECTOR WELL #1	NWNW	30	53N	74W	NA	NO NEW	WYW145147
4	CYPHER INJECTOR FED #24	SWNE	35	53N	75W	NA	0.1	WYW130087

Deferrals:
The following three (3) APDs, and two (2) impoundments with associated infrastructures, and access through the No Surface Occupancy (NSO) portion of lease number WYW130087 are deferred. Decisions on activities in the NSO are deferred, pending a 30 day comment period to modify the lease stipulation on the south half of section 26 from a No Surface Occupancy to Controlled Surface Use stipulation:

Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
NEO CYPHER CS FEDERAL	13	NESW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	14	SWSW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	15	SWSE	26	53N	75W	WYW130087
MORTON RESERVOIR		SESE	26	53N	75W	WYW130087
BAZOOKA JOE RESERVOIR		SENW	26	53N	75W	WYW130087

Operator Committed Measures:
The operator has incorporated several measures to alleviate resource impacts into their Master Surface Use Plan (MSUP), submitted on August 25, 2010, refer to Tab 4 in the MSUP, and the Travel Management and Mitigation Plans under Tab 7 of the project proposal for complete details of operator committed measures. See section 2.3.1. in the attached EA for details on operator committed measures.

In addition, to protect sage-grouse in the south half of section 26 T53N, R75W on lease WYW130087, Yates Petroleum Corporation has provided a plan for mitigation of potential adverse effects. Yates Petroleum Corporation submitted a mitigation plan to BLM that addresses potential impact mechanisms known, or suspected to affect sage-grouse recruitment and survival. This mitigation allowed BLM to consider modifying the stipulated NSO to a CSU on the lease WYW130087 in the Neo POD.

These include:

- A quantified travel plan that minimizes well site visits
- Placing POD infrastructure out of sagebrush plant communities and greater than 0.25 mile away from leks
- Placing noise-generating equipment away from leks
- Burying power
- Adapting well houses to prevent predatory species from burrowing under and denning in the well house structure
- Minimizing disturbance areas and developing a reclamation plan that speeds recovery of habitat function

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 attachment A.

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 (Section 4) of the attached EA. For a complete description of all site-specific COA's associated with this approval, see attachment A.

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

3. The selected alternative will help meet the nation's energy needs, and help stimulate local economies by maintaining workforce stability.

4. The Operator is required to:
   - Comply with all applicable Federal, State, and Local laws and regulations
   - 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.
   - 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.
   - 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.

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 NEO 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: 9/30/10

FINDING OF NO SIGNIFICANT IMPACT
FOR
Yates Petroleum Company
NEO
ENVIRONMENTAL ASSESSMENT –WY-070-10-331

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 C will not have significant environmental impacts beyond those already addressed in PRB EIS to which the EA is tiered; (2) Alternative C is in conformance with the Buffalo Field Office Resource Management Plan (1985, 2001); and (3) Alternative C 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 C is insignificant within the national, regional, and local context.

INTENSITY:
The implementation of Alternative C 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 C to prevent significant adverse environmental effects.

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 Section 4). No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected (EA Section 4). 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: 9/30/10

BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Yates Petroleum Company
NEO
COALBED NATURAL GAS PLAN OF DEVELOPMENT
WY-070-10-331

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 document is 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.

1.1. Background

Yates Petroleum Company submitted the NEO POD on December 30, 2008 to the BFO with 32 Federal APD's to develop and produce natural gas resources within coal bearing formations of the Powder River Basin (PRB). There are four leases associated with this POD. One of the four leases (lease number WYW130087) has a no surface occupancy (NSO) lease stipulation applied to one half of a section of the lease:

> Lease Stipulations WYW130087
> NSO - (1) south 1/2 section 26 (2) protecting sage grouse lek
> TLS - (1) Feb 1 to Jul 31 (2) section 22 SE; section 25 all; south 1/2 section 26
> (3) protecting sage/sharp-tailed grouse and/or raptor nesting habitat

Lease number WYW130087 was issued in 1993. At that time the popular convention was to apply an NSO to lek areas for the protection of the resource. In the same year the lease was issued (1993) the Wyoming BLM State Office implemented the Uniform Format for Lease Stipulations (IM-WY-93-103). The *Uniform Format for Lease Stipulations* was intended to produce consistent application of lease stipulations. In 1994 the *Guidance for Application of NSO and CSU Stipulations for Oil and Gas Leasing* (IM-94-084) was sent out to field offices from the Wyoming State Office. IM-94-084 expressed concern about applying an NSO, when a CSU should be used. It specifically states, "A prime example of a NSO that should be a CSU is the sage grouse lek stipulation" (pg 1).

The Buffalo Field Office recommends the NSO be modified to a CSU. The CSU should be applied to the 0.25 mile buffer around the lek. There is a timing limitation stipulation (TLS) in place for south half of section 26 to protect sage grouse nesting habitat.

This lease modification is in conformance with the subsequent 2003 PRB FEIS. One purpose of the 2003 PRB FEIS was to review lease stipulations to determine whether lease stipulations needed to be modified for coalbed natural gas development. The 2003 PRB FEIS determined a CSU is sufficient to protect Sage Grouse Breeding Areas:

> "A CSU stipulation is needed to ensure minimal effects on integrity and use of sage grouse breeding areas. The No Lease option and NSO stipulation were deemed to be overly restrictive because operations could be conducted outside the 0.25 mile buffer around the breeding area with minimal effects on the sage

grouse" (Appendix P Review of Leases, Lease Notices and Lease Stipulations pp 8-9 2003 PRB FEIS).

The approval of 3 APDs, two impoundments and infrastructure is contingent upon the BLM District State Director concurrence to modify the NSO to a CSU on lease WYW130087. In a letter dated June 16, 2010, Yates Petroleum Corporation formally requested the BLM Wyoming District State Director consider modifying the NSO lease stipulation on lease WYW130087. In this letter Yates proposed the following mitigation:

- Abide by timing limitations
- Apply restricted maintenance to only 9am to 3pm
- Coordinate well site visits to limit trips to the field
- Install additional monitoring equipment to monitor pressure and flow to reduce human visitation
- Limit well site visits to emergencies only, during timing restrictions. Yates will only visit wells when telemetry indicates a problem
- Apply for a variance for gas measurement calibration to reduce number of well visits. Move well measurement out of the south half of section 26 T 53N, R 75W
- Re-seed at optimal times following construction and seed with seed mix to improve grouse habitat
- Refrain from placing diesel generators in the south half of section 26 T 53N, R 75W

Onsite visits were conducted on June 22-25, 2010 and August 17, 2010, to evaluate the proposal and modify as necessary to alleviate environmental impacts. BLM sent a post-onsite deficiency letter on July 9, 2010. The deficiency reviewed discussions at the onsite and requested Yates further develop their mitigation plan to address potential impact mechanisms known, or suspected, to affect sage-grouse recruitment and survival, to include:

1. Human-caused disturbance/displacement
2. Auditory disturbance
3. Subsidized new-comer predators
4. POD infrastructure location relative to sage-grouse leks
5. Impaired habitat function.

During the onsite, Yates Petroleum Corporation and BLM personnel discussed well and infrastructure moves and other mitigating measures that could be categorized under each of the five impacts listed above. All of the BLM requested mitigation was included in Yates proposed mitigation plan (detailed in section 2.3.1). Mitigation includes:

- A quantified travel plan that minimizes well site visits
- Placing noise-generating equipment well away from leks
- Burying power in the south half of section 26 53N, R 75W
- Adapting well houses to prevent predatory species from burrowing under and denning in the well house structure
- Placing POD infrastructure out of sagebrush plant communities and greater than 0.25 mile from leks
- Minimizing disturbance area and developing a reclamation plan that speeds recovery of habitat function (e.g., applying Plateau herbicide to control annual grasses and using a diverse native seed mixture containing forbs, grasses, half-shrubs, and shrubs).

During the onsite, Yates Petroleum Corporation and BLM personnel discussed reservoir needs and siting options. As a result of these discussions Yates voluntarily removed six reservoirs and their associated infrastructure from the initial plan because of concerns for groundwater impacts, leakage, contributing area, and wildlife. These reservoirs include the: Feetsmarks, Juiced, Helix, Double, Quail Hunter, and

Kirby. Approval of the Morton Reservoir in the SESE and the Bazooka Joe in the SENW of Section 26, Township 53N, Range 75W were also deferred relative to the NSO lease stipulations in the south half of section 26.

The project proposal and APDs were considered complete when BLM received the operator's final responses to the post onsite deficiencies on August 30, 2010. Proposed COAs were shared with the operator on September 22, 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

Decisions to be made:

1. The BFO BLM will determine whether to convert the NSO Lease stipulation to a CSU Lease stipulation, through this environmental analysis and a 30 day public comment period
2. 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 as was verified by the few POD EAs that were externally scoped such as the Clabaugh POD (WY-070-EA08-134) and Hollcroft/Stotts Draw POD (WY-070-EA07-021).

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 A 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:

- Lease Stipulation: NSO was not converted to CSU in 1993 per Uniform Format for Lease Stipulations (IM-WY-93-103)
- Air Quality: dust, emisisons

- Soils and vegetation: site stability, reclamation potential, riparian and wetland communities, invasive species
- Wildlife: raptor productivity, greater sage-grouse lek occupancy and persistency, sharp-tailed grouse lek occupancy, nesting mountain plover occurrence, burrowing owl nesting
- Water: ground water depletion, quality and quantity of produced water
- Social and Economic: revenue potential, local economics.

Figure 1. Map Proposed Project with NSO and with 0.25 mile Buffer Lek

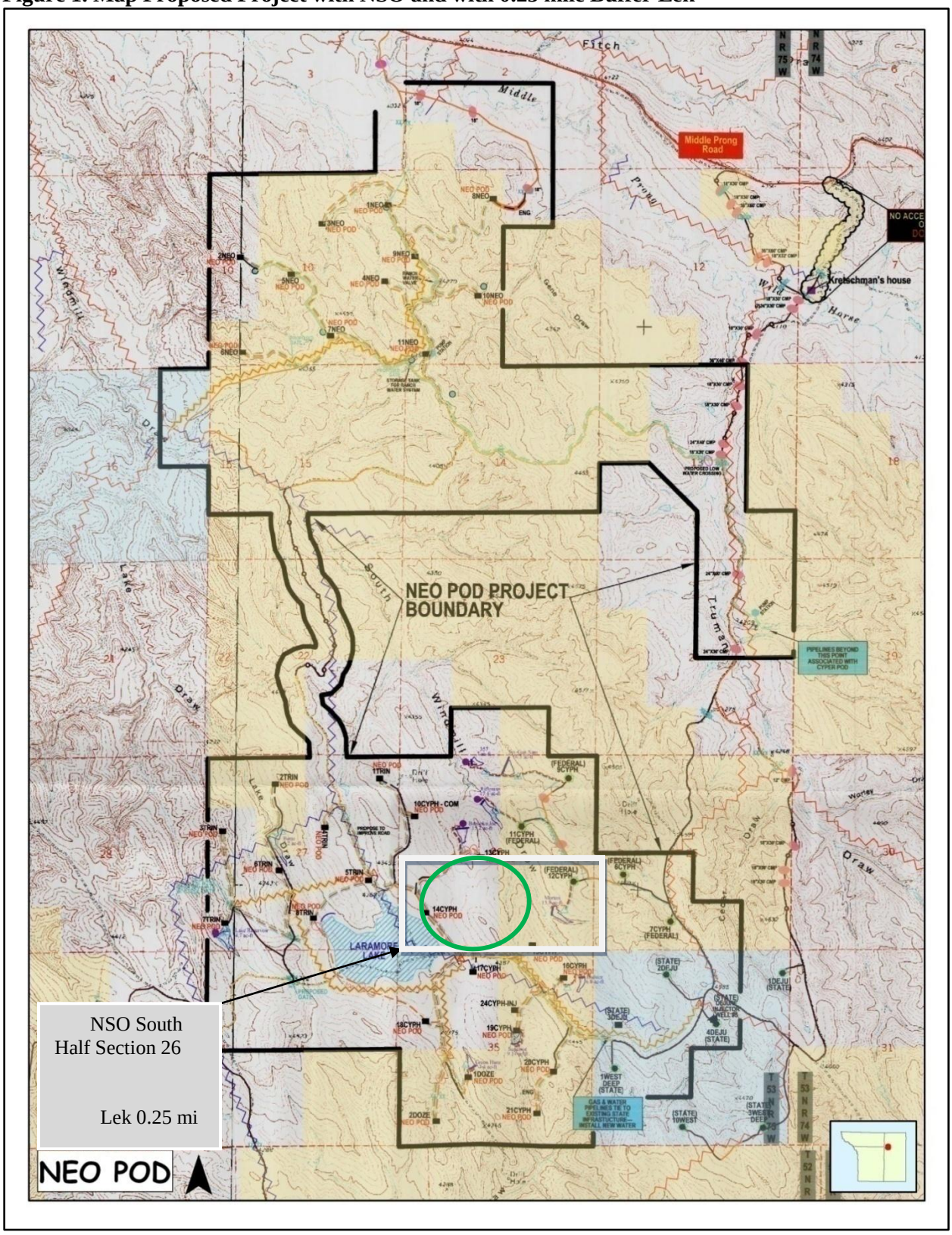

Figure 2. NEO Project Map

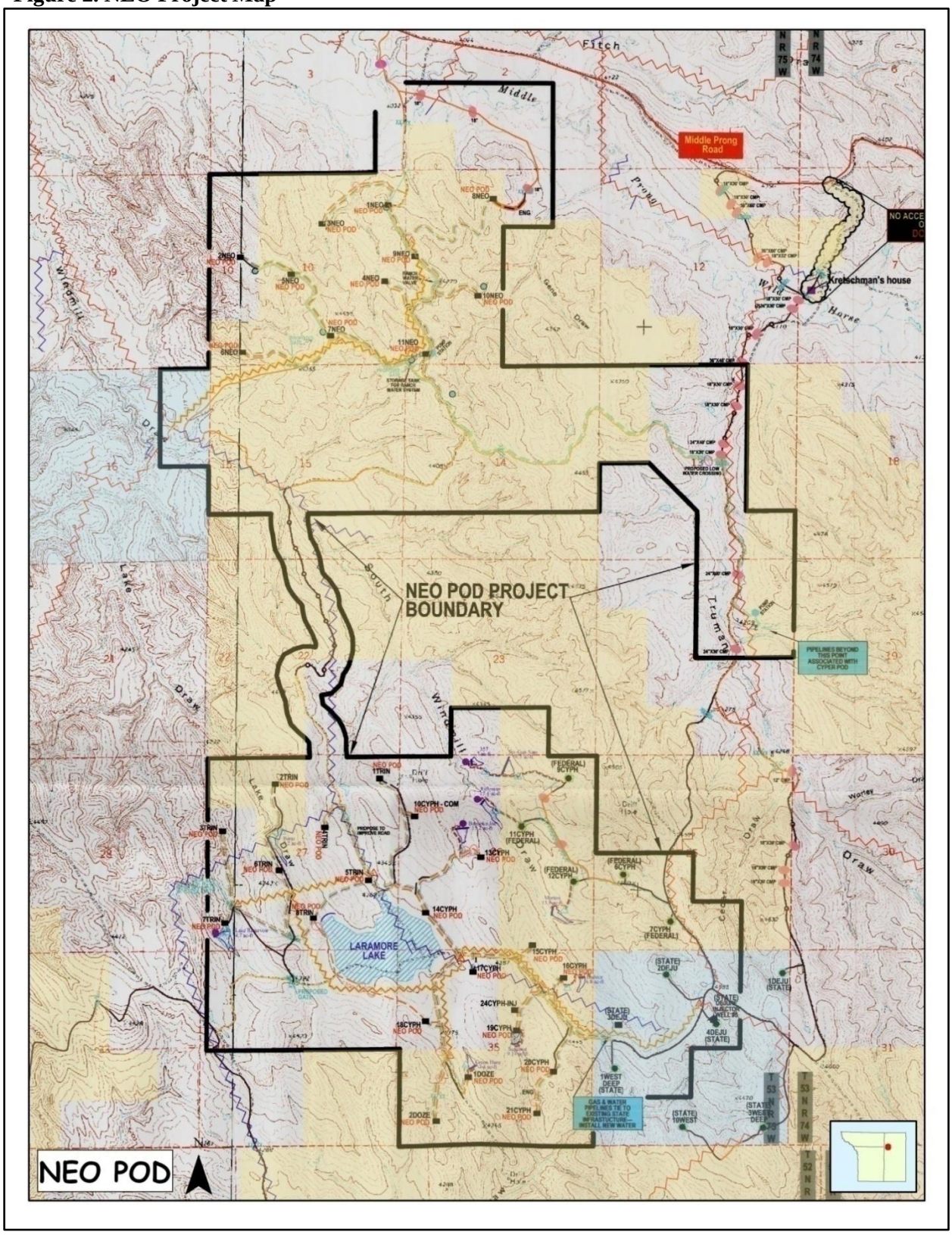

Photo looking out over a portion of the NSO: Foreground the Cypher 14 well stake; Background is one of the two dams built for future water to be added to the privately owned and operated Laramore Lake

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Three alternatives A, B, and C 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 C) 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 - Operator Proposed Action Retaining the NSO

Alternative B contains APDs and infrastructure as submitted with a no surface occupancy lease stipulation on the south half of Section 26 T53N, R75W Lease WYW130087. This alternative summarizes the POD as it was submitted to the BLM by Yates Petroleum Company.

Proposed Action Title/Type: Yates Petroleum Company's NEO CBNG POD.

Proposed Well Information: There are 32 wells proposed within this POD, one of which is a water injection well. The remaining 31 wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location. Each well will produce from multiple coal seams. Proposed well house dimensions are 6 ft wide, 10 ft long and 6 ft high. The list of proposed wells is included in Table 2.1.

Table 2.1 Proposed Wells – Alternative B

Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
NEO CS FEDERAL	1*	NENE	10	53N	75W	WYW130613
NEO CS FEDERAL COM	2	SWNW	10	53N	75W	WYW130613
NEO CS FEDERAL	3	SWNE	10	53N	75W	WYW130613
NEO CS FEDERAL	4	NESE	10	53N	75W	WYW130613
NEO CS FEDERAL	5	NESW	10	53N	75W	WYW130613
NEO CS FEDERAL	6	SWSW	10	53N	75W	WYW130613
NEO CS FEDERAL	7	SWSE	10	53N	75W	WYW130613
NEO CS FEDERAL	8	NENW	11	53N	75W	WYW130613
NEO CS FEDERAL	9	SWNW	11	53N	75W	WYW130613
NEO CS FEDERAL	10	NESW	11	53N	75W	WYW130613
NEO CS FEDERAL	11	SWSW	11	53N	75W	WYW130613
NEO CYPHER CS FEDERAL COM	10	SWNW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	13	NESW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	14	SWSW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	15	SWSE	26	53N	75W	WYW130087
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NEO CYPHER CS FEDERAL	19	SWNE	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	20	NESE	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	21	SWSE	35	53N	75W	WYW130087
NEO CYPHER INJECTOR FED	24	SWNE	35	53N	75W	WYW130087
NEO DOZER CS FEDERAL	1	NESW	35	53N	75W	WYW151895
NEO DOZER CS FEDERAL	2	SWSW	35	53N	75W	WYW151895
NEO TRINITY CS FEDERAL	1	NENE	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	2	NENW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	3	SWNW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	4	SWNE	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	5	NESE	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	6	NESW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	7	SWSW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	8	SWSE	27	53N	75W	WYW135224

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 Impoundments

	Facility Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Disturbance	Lease #
1	LAKE RESERVOIR	SWSW	27	53N	75W	4.7	0.9	WYW135224
2	BUTTE RESERVOIR	SENW	27	53N	75W	6.4	1.7	WYW135224
3	357 RESERVOIR	NENW	26	53N	75W	7.0	1.2	WYW151891
4	SIX GUN SAM RES.	NWNE	26	53N	75W	16.5	2.2	WYW130087
5	RIFLEMAN RESERVOIR	NENW	26	53N	75W	19.1	2.7	WYW151891
6	BAZOOKA JOE RESERVOIR	SENW	26	53N	75W	15.2	2.2	WYW130087
7	MORTON RESERVOIR	SESE	26	53N	75W	15.8	2.4	WYW130087
8	HOLSTER RESERVOIR	NENE	35	53N	75W	6.8	1.2	WYW130087
9	SUPERIOR RESERVOIR	SWNE	35	53N	75W	19.4	1.7	WYW130087
10	GREEN HORN RESERVOIR	NESW	35	53N	75W	7.4	1.25	WYW151895

Table 2.3 Existing Water Management Facilities

	Facility Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Distur-bance	Lease #
1	FARIS DEEP INJECTOR FED#10	SENW	11	52N	75W	NA	No New	WYW130612
2	FUELS INJECTOR WELL #1	SWSE	24	53N	75W	NA	No New	WYW151894
3	WORLEY DRAW INJECTOR WELL #1	NWNW	30	53N	74W	NA	No New	WYW145147

County: Campbell

Applicant: Yates Petroleum Company

Surface Owners: John C Kretschman, Deer Track LLC, Bureau of Land Management

Drilling and Construction:

- Wells will be drilled to multiple seams and will be produced by co-mingling production (a single well per location capable of producing from multiple coal seams). The following lists the coal seams followed by the approximate depth from top of ground surface: Felix 75 feet, Anderson 650 feet Upper Canyon 900 feet, Lower Canyon 1,020 feet, and Wall coal zones to depths of approximately 1,300 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. Metering would entail approximately one well visit per week, to each well or central metering facility, for about an hour.

- A Water Management Plan (WMP) that involves the following infrastructure and strategy: three existing injection wells, one proposed injection well, ten proposed discharge points, two existing stock water reservoirs, and eight proposed stock water reservoirs within the Upper Powder River primary watershed that would provide full containment of discharged water from this POD.

- A road network consisting of 6.8 miles of improved road and 6.57 miles of primitive road.

- An above ground power line network to be constructed by Powder River Energy Corporation with 6 power drops (see section 2.3 potential buried power). If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction has not been scheduled and will not be completed before the CBNG wells are producing. If the power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the power drops.

- A storage tank of 1000 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation for 6 months. Fuel deliveries are anticipated to be once per week. Generator noise level is expected to range from 75 to 85 decibels within 10 feet of the generator and have been recently tested at 40 to 42 decibels at a half mile distance.

- 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. Alternative C –Proposed Action Modifying the NSO to a CSU

Alternative C represents a modification of Alternative B based on the Operator working with the BLM changing design features and developing mitigation measures which are included in the revised project proposal. The purpose of these changes is to further reduce environmental effects. The Operator requested the BLM consider the proposed mitigation to modify the lease stipulation on the south half of Section 26 T53N, R75W Lease WYW 130087 from a No Surface Occupancy (NSO) to a Controlled Surface Use (CSU).

The description of Alternative C is the same as Alternative B, with the following project modifications: 3APDs, 2 impoundments, associated infrastructure and proposed access through NSO would be recommended for deferral. Decisions on activities in the NSO would be deferred, pending a 30 day comment period to modify the lease stipulation on the south half of section 26 from a No Surface Occupancy to Controlled Surface Use stipulation:

Table 2.4 Deferred wells, reservoirs and associated infrastructure

Well/Facility Name/Description	Disturbance	QTR	Sec	TWP	RNG	Lease #
NEO CYPHER CS FEDERAL 13	0.22 ac	NESW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL 14	0.22 ac	SWSW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL 15	0.23 ac	SWSE	26	53N	75W	WYW130087
MORTON RESERVOIR	2 ac	SESE	26	53N	75W	WYW130087
BAZOOKA JOE RESERVOIR	3 ac	SENW	26	53N	75W	WYW130087
NEW ACCESS ROADS	5.5ac (1mi)	South Half	26	53N	75W	WYW130087
EXISTING ACCESS ROADS	1.8ac (0.5 mi)	South Half	26	53N	75W	WYW130087
TOTAL ACRES DEFERRED	**12.97 acres**	**South Half**	**26**	**53N**	**75W**	**WYW130087**

BLM recommended mitigation for APDs and/or associated infrastructure in the south half of section 26 T53N, R75W Lease WYW 130087 as shown in the above table. In response to discussions at the onsite, Yates has proposed the following mitigation plan and travel management plan for sage grouse habitat in the south half of section 26.All of the BLM requested mitigation was included in Yates proposed mitigation plan as listed in section 2.3.1.

Three wells are proposed in the south half of section 26. Two of the well locations (Cypher 13 and Cypher 15) are located on spur roads that are a one well access, and the other location (Cypher 14) was placed along an existing access route that would connect five locations northeast of the Laramore Lake. This route cuts through the southwest corner of section 26, and is the preferred route for the private surface/land owner. The landowner has a stock well in the southwest 1/4 of section 26 to provide water for livestock. The landowner stated that he is not agreeable to finding alternative routes around the lek. BLM suggested utilizing the dam between the Trinity 5 and Trinity 8 wells; the landowner was not amenable to the using this route. A separate CBNG operator also has a discharge point to deliver water produced under non-federal development in the southwest 1/4 of section 26. Both of these locations are points of visitation and require access roads. The landowner and the other CBNG operator are not obligated to adhere to the oil and gas lease NSO, for non-federal development.

Rights-of-Way Necessary Prior to Construction:
The following rights-of-way locations were identified with the Neo POD (as shown on Map D) for roads, road/utility corridors and reservoirs. Construction of the following locations is prohibited until authorized rights-of-way have been issued for the following locations:

T. 53 N., R. 74 W.,
sec. 31,
T. 52 N., R. 75 W.,
sec. 1,
T. 53 N., R. 75 W.,
sec. 10, 11, 13, 15, 22, 24-27, 35

2.3.1. Operator Committed Measures

During the onsite, Yates Petroleum Corporation and BLM personnel discussed reservoir needs and siting options. As a result of these discussions Yates voluntarily removed six reservoirs and their associated infrastructure from the initial plan because of concerns for groundwater impacts, leakage, contributing area, and wildlife. These reservoirs include the: Feetsmarks, Juiced, Helix, Double, Quail Hunter, and Kirby.

2.3.2. Travel Management and Mitigation Plans

Yates has proposed the following:

1. Follow existing disturbance.
2. Measurement equipment will be located outside the south half of section 26
    - Measurement equipment from the three wells (Cypher 13, 14, & 15) will be located within a point of delivery building located adjacent the existing road in NENW section 35.
    - All measurement calibrations will be conducted outside of the south half of section 26.
    - All v-cone/orifice plate maintenance will be conducted outside the south half of section 26.
    - All mandatory v-cone/orifice plate changes due to an increase or decrease of gas production will occur outside of the south half of section 26.
    - All removal of scale deposits from the v-cone/orifice plate will occur outside of the south half of section 26.
    - All telemetry communications problems will be addressed and fixed outside of the south half of section 26.
    - Antennas for the communication system will not be located inside the south half of section 26.
3. During the Sage Grouse timing stipulations (March 1st to June 15th) wells will be visited approximately once a week and only between the hours of 9:00am and 3:00pm for inspection of the facilities and pipelines and routine maintenance.
    - Wells need to be inspected regularly to ensure that no problems exist (such as; water or gas leaks). Without the presence of problems once a week is an adequate timeframe for visitations.
    - If a problem arises Yates will notify the BFO BLM 24 hours in advance that contractors and remedial activities will be in the area. Corrective actions will occur within the hours of 9:00am to 3:00pm.
    - Before March 1st wells will be thoroughly inspected and any problems addressed to reduce the probability of a problem arising during the timing stipulations.
4. The proposed road that provides access from the south side of the lake to the north side will be limited to pumper or measurement traffic between March 1st to June 15th. If the need arises to utilize this road for contractors and construction equipment Yates will notify the BLM 24 hours in advance. Signs will also be added to state that Yates employees and contractors may only use this road between the hours of 9:00am to 3:00pm , March 1st to June 15th .
5. Yates will bury the primary delivery power from the power drop in the NWNE section 35 T53N R7SW into the southern portion of the POD (this power drop is located at the intersection between the main access road and the access to the Cypher 19 & 24).
6. Move all three wells (Cypher 13, 14, & 15) and associated infrastructure outside the 0.25 mile buffer of the Laramore Sage Grouse lek.
7. Infrastructure that is within the south half of section 26, will be kept out of sagebrush.
8. No generators will be placed within the south half of section 26.
9. Well houses that are located near the lek in section 26 will be fitted with a screen around the base to reduce the probability that a predator could utilize the house as a temporary den.

Note: A single phase overhead power line, which had been in place for many years, has recently been removed. The line supplied power to a stock well that was located in the bottom of the recently constructed Laramore Lake CBNG reservoir. A plan is in place to install a new overhead line to supply

power to the new location of the stock well (east of the Cypher 14). The location of the overhead power is established as a private agreement between PRE Corp and Deer Track LLC; however, Yates has contacted PRE Corp and discussed this project and the presence of the lek. PRE Corp said that they would be sensitive to sage grouse issues and would try to get the overhead power easement moved away from the lek (as displayed current NEO POD map).

Yates stated, they will only agree to these measures under non-precedent setting basis and with the understanding that if the NSO wells are not approved Yates will leave the power delivery to PRE Corp and will not bury the primary delivery. Yates feels that the approval of the NSO wells will be enough to offset their financial and liability concerns.

2.4. Alternatives Considered but Not Analyzed in Detail

The original project was submitted by Yates Petroleum Company on December 30, 2008 with 32 Federal APDs. A series of discussions and onsite visits occurred between BLM and Yates Petroleum Company based on the initial project of development. The changes as documented above in the revised project description provided by Yates Petroleum Company response to BLM's deficiency letter, resulted in a refined proposed project, which is discussed in this document as Alternative C. 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.

2.5. Summary of Alternatives

A summary of the infrastructure currently existing within the POD area (Alternative A), the infrastructure proposed in the project area with a NSO (Alternative B), and the infrastructure recommended by the BLM and incorporated by the operator with CSU replacing NSO (Alternative C) are presented in Table 2.5.

Table 2.5 Summary of Alternatives

Acres or mileage within the action alternatives represent additional facilities and do not include the existing facilities.

Facility	Alternative A (No Action) Existing Number/ Acres	Alternative B (Operator Proposal) Proposed Number/ Acres	Alternative C (Modified Alt.) Revised Number/ Acres
Total Wells	25qty	29 qty 8.49 ac total	32 qty 8.56 ac total
CBNG Well Locations Nonconstructed Constructed Slotted	Total approximately 5 acres		31 qty 7.94 ac total (20 qty) 4.6 ac total (5 qty) 2.65 ac total (6 qty) 1.3 ac total
Number of Ancillary Facilities (Staging/Storage Areas)		0	0
Acres of Template/ Spot Upgrade Roads No Corridor With Corridor		0 58.88	0 66.61
Acres of Engineered Roads No Corridor With Corridor	0 7.7	17.96 37.36	19.46 41.09
Acres of Primitive Roads No Corridor With Corridor	30.25 0	0 2.07	0 15.18

Facility	Alternative A (No Action) Existing Number/ Acres	Alternative B (Operator Proposal) Proposed Number/ Acres	Alternative C (Modified Alt.) Revised Number/ Acres
Acres of Buried Power No Corridor With Corridor		11.71 0	11.71 0
Acres of Pipeline No Corridor With Corridor		3.53 0	17.72 0
Acres of Overhead Powerlines		6.72	6.72
Number of Impoundments On-channel Off-channel Lined Unlined		12.9 ac	17.45 ac
Water Discharge Points		(8 qty x.1 ac) = 0.8	(10 qty x.1 ac) = 1.0
Total Acres Disturbance	**42.95**	163.75	201.77
Cumulative Acres of Distubance		**206.7**	**244.72**

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. Issues for this project include concerns with impacts to threatened and endangered species, greater sage-grouse, mountain plover, bald eagles, black-tailed prairie dogs, migratory birds, and raptors; cultural resources, soils, vegetation, water management, invasive species, minerals, and local economics.

Applications to drill were received on December 30, 2008. Field inspections of the proposed NEO CBNG project were conducted on June 22-25, 2010 and August 17, 2010. Personnel attending the field inspections are identified in the following Section 5, Consultation and Coordination.

3.1. Project Area Description

The project is located approximately 70 miles northeast of Buffalo, Wyoming in T. 53N., R75W. It is surrounded on three sides by existing oil and gas development. The POD boundary consists of two areas separated by 1.25 miles of existing road. The northern portion of the project area is located in sections 10, and 11; the southern portion is in sections 22, 23, 26, 27, 34 and 35 (see NEO POD Map Figure 1).

3.1.1. Geologic Features and Mineral Resources

Elevations range from 3,980 feet to 4,580 feet above sea level. Topography ranges from rough steep topography in the northern portion of the POD, to more level topography with rolling hills in the southern portion. The northern portion is dissected and gullied with areas of active erosion and natural head-cutting. On surfaces with steep topography vegetation is sparse, or even barren. Barren steep slopes experience higher velocity of water movement during heavy storm events. As storm water moves down-

slope the velocity is naturally mitigated by thicker vegetation found on slighter slopes. As water drops from some of the slighter slope into the drainages below it cuts into and erodes the soil below the vegetation. Undercutting like this causes head cuts to encroach onto slighter slopes. In rough topography and erosive soils, this becomes an issue when access roads and infrastructure are placed on slighter slopes. Head cuts can erode into the travel pathway if water drainage is not properly managed.

3.1.2. Land Ownership and Land Use

The entire POD area is utilized for cattle grazing. The land is mixed surface ownership underlain by federally managed minerals. Surface owners include John C Kretschman, Deer Track LLC, and public land managed (leased) by the Bureau of Land Management. The majority of the northern portion of the project is on public land leased by Crump Land and Livestock, LLC for cattle grazing. The grazing leasee has a stock watering pipeline system for his operation. Much of the pipeline is located on the same flat areas that the CBNG operator has proposed for development.

Approximatley half of the southern portion of the POD is public land leased by Deer Track LLC. Surface ownership in the south half of section 26 T. 53N., R75W (where the NSO lease stipulation is located) is on split estate with private surface in the southwest quarter and federally managed surface on the southeast quarter. The private surface owners have contracted with a separate CBNG operator to accept CBNG produced water by creating a lake on the their private surface portion of section 26. Laramore Lake has two large dams. The water is intended for land management to water cattle and flood out the existing prairie dog town. The south half of section 26 has existing roads utilized by landowner/grazing leasee.

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 differ with topographic location, slope and elevation. Erosion potential varies from severe to moderate depending on the soil type, vegetative cover and slope. The Figures 3.1 through 3.4 illustrate correlations between soil type, reclamation suitability, slope, and erosion hazard.

The soils in the NEO POD vary from clayey, shallow clayey, and shallow loamy to loamy, sandy and lowland. Primarily clayey, shallow clayey and loamy soils dominate the project area (Table 3.1). Soil, vegetative communities, and ecological descriptions are compiled by the Natural Resources Conservation Service (NRCS). They are field reviewed at the on-site inspection for the purpose of resource identification, and to provide management and reclamation recommendations. Soils within the project area were identified from the North Johnson County Survey Area, Wyoming (WY719) and South Campbell County Survey Area, Wyoming (WY605).

Figure 3.1 Dominant Soils in Proposed Action

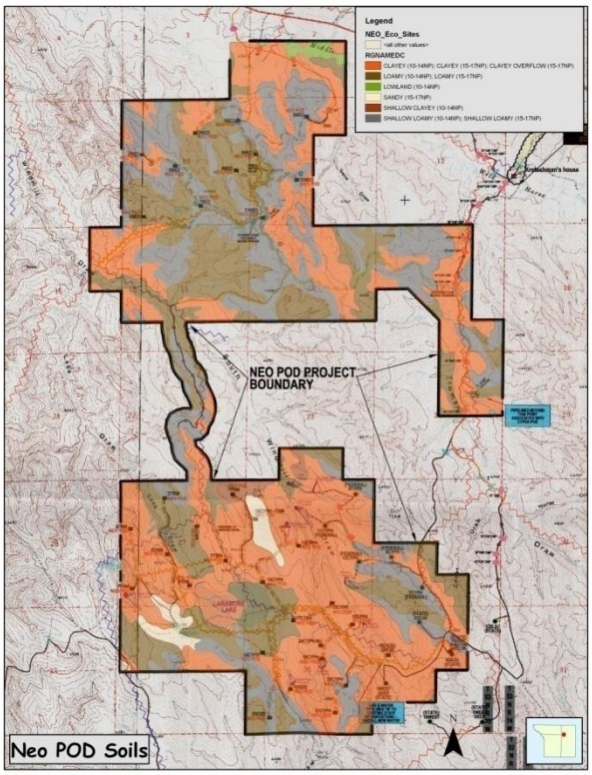
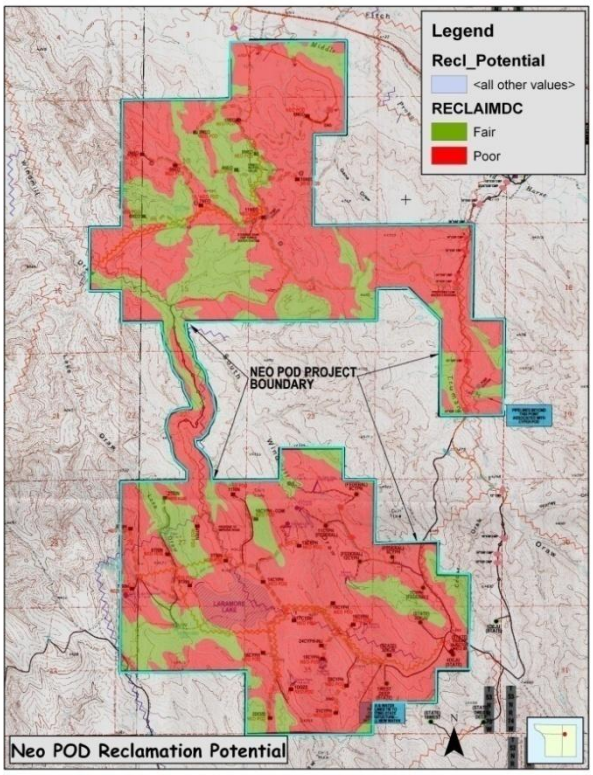


Figure 3.2 Reclamation Potential



Currently, soil conditions in the project area are impacted by CBNG development as well as traditional activities, including livestock grazing and wildlife use. Much of the area, 45%, is covered with clayey soils and steep slopes that are easily damaged by use or disturbance and are difficult to re-vegetate or otherwise reclaim.

Table 3.1 Dominant Soils and Reclamation Potential

Soil Type	Acreage	Percentage of POD	Reclamation Potential	Percentage by Reclamation
Clayey	2607	45%	Poor	69.5% Poor Reclamation Potential
Shallow Loamy	1287	22%	Poor	
Shallow Clay	48	0.8%	Poor	
Sandy	100	1.7%	Poor	
Loamy	1519	26%	Fair	Fair 26.3%
Lowland	17	0.3%	Fair	
Unknown	242	4.2%	Unknown	
Total	5820			

3.2.2. Reclamation Potential

According to the NRCS, soils in the NEO POD are rated at 69.5% poor and 26.3% fair reclamation potential (Table 3.1). Reclamation potential depends on the soil type. Clayey, shallow loamy and shallow clay soils have poor reclamation ratings. Soils with a fair rating for reclamation include the loamy and lowland sites. Topsoil available to be salvaged for use in reclamation varies in depths ranging from near zero on ridges to twelve inches in bottomlands**.**

Avoiding areas with limited reclamation potential, minimizing surface disturbance and salvaging surface organic matter (in the form of vegetation, litter and biological crust) are critical to maintaining the integrity and viability of the soil. Construction of well pads, impoundments, pipelines, and roads involves breaking through the topsoil, the physical and biological crust. Topsoil is the suitable growth medium salvaged and used in reclamation. It is the result of thousands of years of geological and climatic forces, and is the sum accumulation all organic matter available over time. Roads, linear pipeline scars, and artificial wet areas increase potential for soil erosion. This increased erosion potential can result in higher suspended sediment and turbidity levels in the Powder River.

Figure 3.3 Slopes > 25%

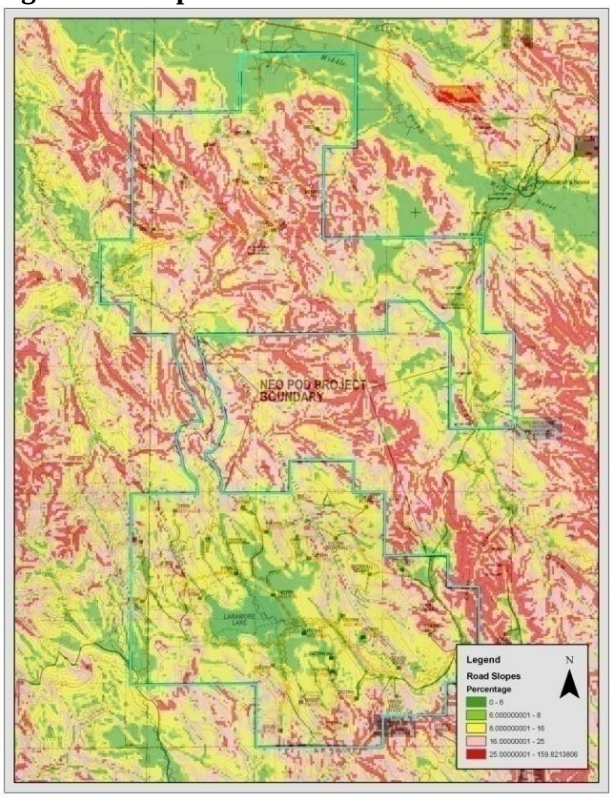


Figure 3.4 Severe Erosion Hazard

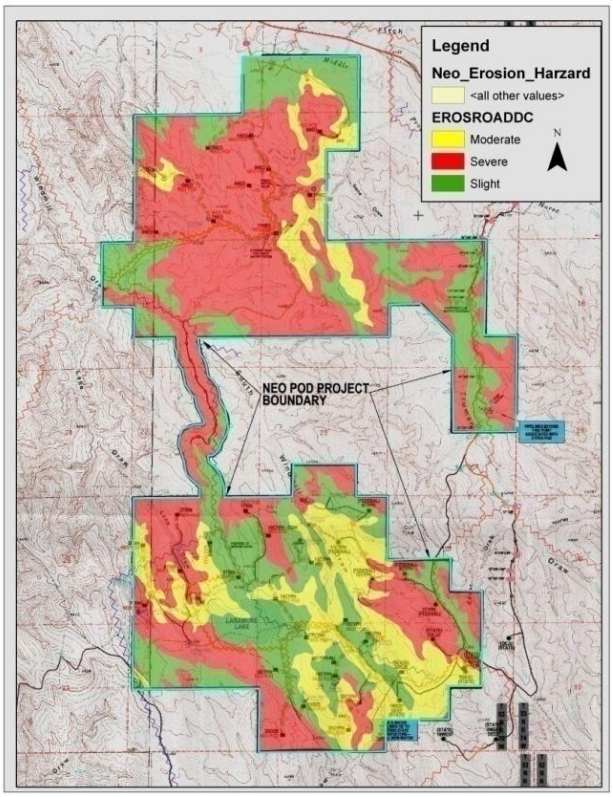


Table 3.2 Percent Slope and Erosion Potential

% Slope	Acres	% of Project Area		Erosion Potential	Acres	% of Project Area
> 35%	220	4%		Severe	2846	50%
35% to 25%	556	10%		Moderate	1161	20%
< 25%	5044	86%		Slight	1717	30%

3.2.2.1. Slope Hazard

14% of the project area has slopes 25% and greater. Greater slopes have increased potential for slumping, landslides and water erosion. Slopes less than 25% may also be prone to high erosion depending on soil type, particle size, texture, or amount of organic matter. Other contributing factors to slope stability include slope length, slope aspect and colluvium. Slope length has considerable control over runoff and potential accelerated water erosion. Slope aspect is the direction which the surface of the soil faces. Slope aspect may affect soil temperature, evapotranspiration, wind contact and soil moisture. Colluvium is poorly sorted debris that has accumulated at the base of slopes, in depressions, or along small streams

through gravity, soil creep, and local wash. It consists largely of material that has rolled, slid or fallen down the slope under the influence of gravity. The rock fragments in colluvium are usually angular, in contrast to the rounded, water-worn cobbles and stones in alluvium and glacial outwash (USDA 1993). These factors in combination with slope determine soil stability and the potential for mass soil movement.

3.2.2.2. Soils Susceptible to Erosion

Soils with severe erosion hazard ratings cover 50% of the project area, as shown in Figure 3.2. The project area is dissected and gullied with areas of active erosion and head cuts. Areas of slighter slopes and areas near drainages usually have deeper soils. Deeper soils tend to have a higher probability of supporting shrubbrush grassland communities. On surfaces with steep topography, vegetation is sparse or even barren. Barren steep slopes experience higher velocity of water movement during heavy storm events. As this storm water moves down slope the velocity is mitigated by thicker vegetation of the sagebrush grasslands. Road and pipeline construction removes vegetation that normally mitigates and controls water velocity. This loss of vegetative buffer increases water velocity and head cutting. As an example; existing ranch roads in sections 10 and 11 in the northern portion of the POD are exhibiting head cuts and slumping due to poor soils and erosion by the high velocity of water that drains from the surrounding uplands.

3.2.3. Ecological Sites

Ecological Site Descriptions are based on soil type and 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. Dominant soil types are 45% clayey, 26% loamy and 22% shallow loamy.

Table 3.3 Dominant Soil Types

Soil Type	Acreage	Percentage of POD
Clayey	2607	45%
Shallow Loamy	1287	22%
Shallow Clay	48	0.8%
Sandy	100	1.7%
Loamy	1519	26%
Lowland	17	0.3%
Unknown	242	4.2%
Total	5820	

A summary of the ecological sites within the project area are listed in Table 3.5 along with the individual acreage and the percentage of the total area identified within the POD boundary.

Table 3.4 Map Units, Ecological Sites

Map Unit Symbol	Map Unit Name, Percent Slope, Ecological Site	Reclamation Potential
107	ARWITE-VONALF FINE SANDY LOAMS, 0 TO 6 PERCENT SLOPES	Fair
131	DEEKAY LOAM, 0 TO 6 PERCENT SLOPES	Fair
135	DEEKAY-OLDWOLF LOAMS, 6 TO 15 PERCENT SLOPES	Fair
138	ECHETA-CROMACK CLAY LOAMS, 6 TO 15 PERCENT SLOPES	Poor

Map Unit Symbol	Map Unit Name, Percent Slope, Ecological Site	Reclamation Potential
148	FORKWOOD-ULM LOAMS, 0 TO 6 PERCENT SLOPES	Fair
166	JAYWEST LOAM, 0 TO 6 PERCENT SLOPES	Poor
168	JAYWEST-SPOTTEDHORSE LOAMS, 0 TO 6 PERCENT SLOPES	Poor
176	LEITER-CROMACK CLAY LOAMS, 3 TO 15 PERCENT SLOPES	Poor
183	MOORHEAD-LEITER CLAY LOAMS, 0 TO 6 PERCENT SLOPES	Poor
184	MOORHEAD-LEITER CLAY LOAMS, 6 TO 15 PERCENT SLOPES	Poor
206	SAMDAY-SHINGLE-BADLAND COMPLEX, 10 TO 45 PERCENT SLOPES	Poor
225	UCROSS-IWAIT-FAIRBURN LOAMS, 3 TO 30 PERCENT SLOPES	Fair
267	CROMACK-SAMSIL CLAY LOAMS, 3 TO 15 PERCENT SLOPES	Poor
275	ECHETA-MOORHEAD CLAY LOAMS, 0 TO 6 PERCENT SLOPES	Poor
278	FAIRBURN-SAMSIL-BADLAND COMPLEX, 10 TO 45 PERCENT SLOPES	Poor
280	FELIX CLAY, 0 TO 2 PERCENT SLOPES	Poor
285	HAVERDAD-BORUFF COMPLEX, 0 TO 3 PERCENT SLOPES	Fair
299	OLDWOLF-FAIRBURN LOAMS, 3 TO 15 PERCENT SLOPES	Fair
317	SILHOUETTE-ULM CLAY LOAMS, 0 TO 6 PERCENT SLOPES	Poor
324	UCROSS-FAIRBURN LOAMS, 15 TO 45 PERCENT SLOPES	Fair
334	VONALF-XEMA-MITTENBUTTE FINE SANDY LOAMS, 3 TO 30 PERCENT SLOPES	Fair
335	WIBAUX-SHINGLE-TALUCE COMPLEX, 6 TO 40 PERCENT SLOPES	Poor

Map symbol number 278, the Fairburn–Samsil-Badlands complex covers a large area of the northern portion of the project area (Figure 3.5). The topsoil is less than 6 inches in depth. This badland complex occurs on slopes of up 45%. It is composed of clayey and shallow clayey loams. Most of these badlands are moderately steep to very steep barren land dissected by many intermittent drainage channels. Potential runoff is very high, and erosion is active. On the surface vegetation is sparse or barren on slopes. This soil is highly dissected and gullied with active erosion ranging from slight to severe.

Map Units and Ecological Sites

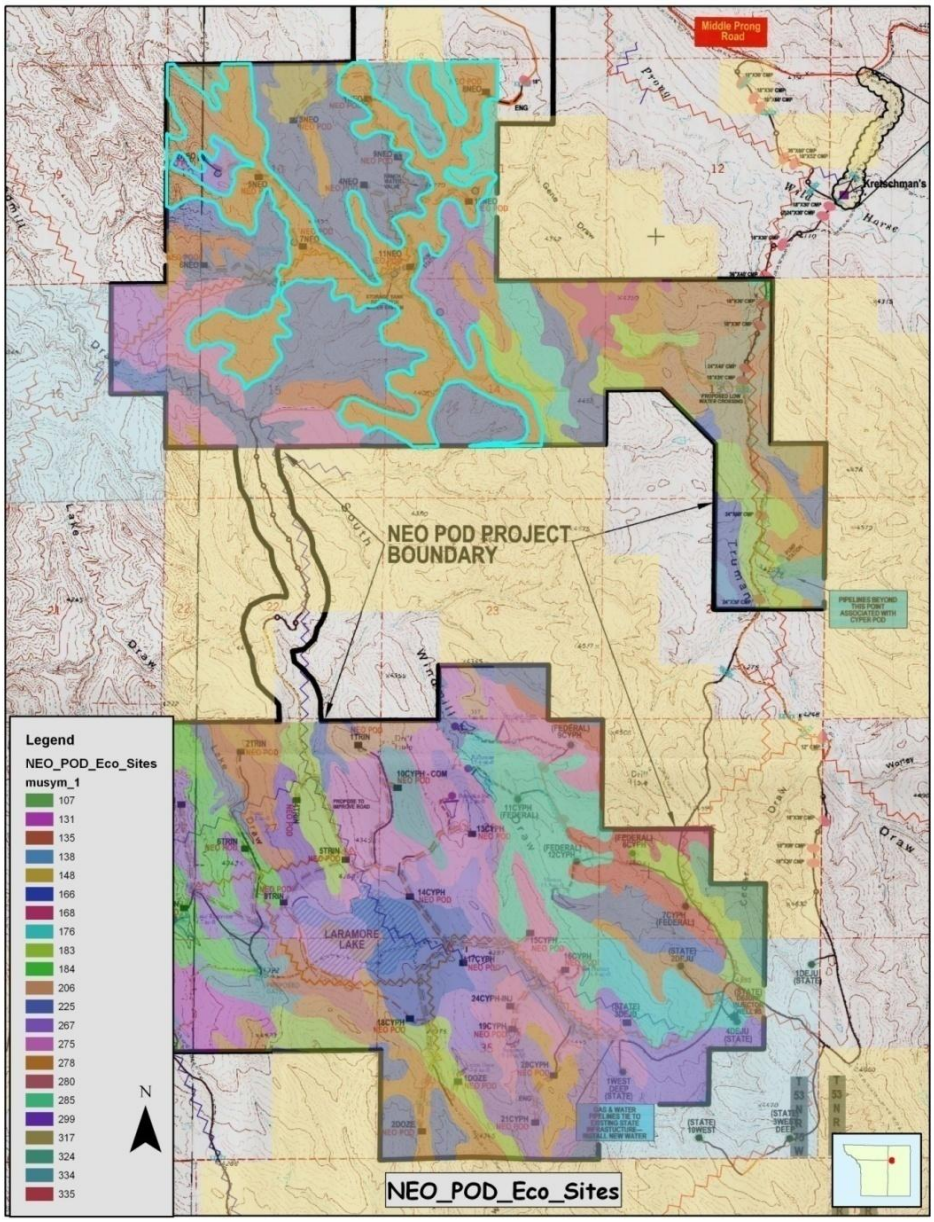


Table 3.5 Summary of Ecological Sites

Soil Type	Acreage	Percentage of POD
Clayey	2607	45%
Shallow Loamy	1287	22%
Shallow Clay	48	0.8%
Sandy	100	1.7%
Loamy	1519	26%
Lowland	17	0.3%
Unknown	242	4.2%
Total	5820	

3.2.4. Vegetation

3.2.4.1. General Description

Onsite visits revealed there are three main native vegetative communities in the NEO POD. Mixed sagebrush grasslands were found throughout the project, Western wheatgrass and cheatgrass were more prominent in the southern portion. Blue gramma was found in pastured areas. The landowner in the northern portion of the project has agricultural fields on his private surface. Due to the percentage of bare ground, areas of agriculture and oil and gas development have potential to become a "go-back land" plant community.

Plant communities react to disturbance, management and environmental pressure. The grass, forb, shrub ratios determine habitat utilization, season use and cover for wildlife. According the NRCS ecological site information, ecological functions vary with different plant communities such as:
Mixed Sagebrush/Grass Plant Community: The combination of an overstory of sagebrush and an understory of grasses and forbs provide a very diverse plant community for wildlife. The crowns of sagebrush tend to break up hard crusted snow on winter ranges, so mule deer and antelope may use this state for foraging and cover year-round, as would cottontail and jack rabbits. It provides important winter, nesting, brood-rearing, and foraging habitat for sage grouse. Brewer's sparrows' nest in big sagebrush plants and hosts of other nesting birds utilize stands in the 20-30% cover range.

Western Wheatgrass/Cheatgrass Plant Community: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover.

Blue Grama Sod and Go-back Land Plant Communities: These communities provide limited foraging for antelope and other grazers. They may be used as a foraging site by sage grouse if proximal to woody cover and if the Historic Climax Plant Community or the Western Wheatgrass/Cheatgrass Plant Community is limiting. Generally, these are not target plant communities for wildlife habitat management.

3.2.4.2. Wetlands/Riparian

The National Wetland Inventory (NWI) identifies approximately 53 acres of sporadic, isolated wetlands within the POD boundary. These wetlands have for the most part formed in low lying areas where surface water accumulates for extended periods of time. Some of the wetlands are adjacent to streams, others may be the result of leaking livestock water facilities, and others may be the result of natural springs. Identification and management of wetland resources is under the jurisdiction of the U.S. Army Corps of Engineers.

3.2.4.3. Invasive Species

A database containing invasive species locations and other data is maintained by the Wyoming Energy Resource Information Clearinghouse (WERIC). The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices. There were no state-listed noxious weeds and/or weed species of concern infestations discovered by a search of the WERIC database (www.weric.info).

The operator or BLM confirmed the following infestations and/or documented additional weed species during field investigations:

- Salt cedar
- Leafy spurge
- Field bind weed

- Canada thistle

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

Wildlife evaluations focused on species or species groupings considered ecologically, economically, or socially important. Several resources were consulted including wildlife databases compiled and managed by the BLM Buffalo Field Office (BFO), the PRB FEIS, and Wyoming Game and Fish Department (WGFD) big game and sage-grouse maps.

BLM and Yates Petroleum Corporation personnel conducted field visits to the area on June 22 and 24, and on August 17, 2010. A BLM biologist verified the wildlife survey information, evaluated impacts to wildlife resources, and recommended project modifications where wildlife issues arose.

Habitat assessment and wildlife inventory surveys on the NEO POD project area were performed by ICF Jones and Stokes (2008, 2009) and ICF International (2010). They surveyed bald eagle nesting and roosting habitat, raptor nest occupancy, greater sage-grouse and sharp-tailed grouse lek and nesting habitat, black-tailed prairie dog colonies, mountain plover habitat and occurrence, and blowout penstemon and Ute ladies'-tresses orchid habitat. All surveys were conducted according to the Powder River Basin Interagency Working Group's protocols (http://www.blm.gov/wy/st/en/field_offices/Buffalo/wildlife.html).

3.3.1. Habitat Types

Habitats contained within the NEO POD occur on relatively level to steep and broken topography. Plant communities are composed of sagebrush grasslands (53%), grasslands (40%), agricultural fields and other natural features. For more detailed ecological site descriptions, refer to section 3.2.

3.3.2. Threatened, Endangered, Proposed, and Candidate Species

3.3.2.1. Threatened and Endangered Species

3.3.2.1.1. Black-footed ferret

Ecoregion-scale habitat conversion combined with dramatic reduction in occurrence of colonial burrowing mammals rendered black-footed ferrets extremely rare or regionally extirpated. The USFWS listed the black-footed ferret as Endangered on March 11, 1967. Active reintroduction efforts have reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. However, the USFWS did not include the black-footed ferret in its 2010 list of threatened, endangered, candidate, and proposed species for the BLM Buffalo Field Office (USFWS 2010b).

Black-footed ferrets are a nocturnal predator closely associated with prairie dogs; depending almost entirely upon them for food and den sites. Research indicates that black-footed ferret populations require at least 1,000 acres of black-tailed prairie dog colonies for survival (USFWS 1989). The project area supports a 777.9-acre colony complex containing eleven active prairie dog colonies. However, the NEO POD is encompassed by black-tailed prairie dog colony complex of more than 127,750 acres when a 1.5 km (0.93) mile buffer is applied. Therefore, habitat for black-footed ferrets is present when analyzed according to habitat assessment parameters.

The WGFD noted that the combination of ongoing prairie dog poisoning with sylvatic plague have greatly reduced the likelihood of black-footed ferret population occurrence east of the Big Horn Mountains (Grenier 2003). Further, the USFWS has concluded that black-tailed prairie dog colonies within Wyoming are unlikely to be inhabited by black-footed ferrets (Kelly 2004).

3.3.2.1.2. Blowout Penstemon

Blowout penstemon is a regional endemic of the Sand Hills of west central Nebraska and the northeastern Great Divide Basin in Carbon County, Wyoming. The species was listed as endangered under the Endangered Species Act (ESA) on September 1, 1987. Suitable blowout penstemon habitat consists of sparsely vegetated, early successional, shifting sand dunes and blowout depressions created by wind (BLM 2005). 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. Based on the onsite assessment conducted by the BLM wildlife biologist and ICF Jones & Stokes (2008), the 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

Ute ladies'-tresses orchid was listed as threatened under the ESA on January 17, 1992. Wyoming drainages with documented orchid populations include Wind Creek and Antelope Creek in northern Converse County, Bear Creek in northern Laramie and southern Goshen Counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County. A WYNDD model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties.

According to ICF Jones & Stokes (2008), suitable habitat does not occur within the NEO POD boundary due to inappropriate hydrology. Laramore Lake supports surface water only in spring and early summer, and drainages in the area are ephemeral; containing flow only during run-off or immediately following precipitation events. The affected environment for ULT is discussed further in the PRB FEIS on pg. 3-175.

3.3.2.2. Proposed Species

3.3.2.2.1. Mountain Plover

According to the USFWS (2010), "the mountain plover is a small terrestrial shorebird inhabiting open, flat lands with sparse vegetation". This condition often occurs in prairie dog colonies. The NEO POD contains large areas of suitable mountain plover habitat in prairie dog colonies (777.9 acres, ICF Jones & Stokes 2008, 2009, ICF International 2010). However, no mountain plovers were observed during surveys conducted in 2005, 2006, 2008, 2009, or 2010.

The USFWS reinstated a proposal to list the mountain plover under ESA on June 29, 2010 (USFWS 2010). The species is also a Wyoming BLM sensitive species, a Wyoming game and Fish Department Species of Greatest Conservation Need (SGCN), and is a USFWS Bird of Conservation Concern for Region 17. Further description of the affected environment for mountain plover can be found in the PRB FEIS on pg. 3-177 to 3-178.

3.3.2.3. Candidate Species

3.3.2.3.1. Greater Sage-grouse

Sage-grouse are of magnified conservation concern because populations are declining range-wide and within the PRB. Sage-grouse within the Powder River Basin (PRB) link the Wyoming basin population to those in Montana and South Dakota (Doherty et al. 2008, US Fish and Wildlife Service 2010).

Sage-grouse are a Wyoming BLM sensitive species, a WGFD Species of Greatest Conservation Need (SGCN) (WGFD 2005), and are considered a candidate for listing under the Endangered Species Act (USFWS 2010). An important additional value of the species is its potential to serve as an indicator of healthy, functioning sagebrush-steppe ecosystems. Consequently, management for sage-grouse provides conservation coverage for sagebrush ecosystems and associated wildlife including many BLM sensitive species (Rowland et al., 2006).

Range-wide Context
Natural and human-caused stressors (e.g., wildfire, heavy grazing, tillage agriculture, energy development (e.g. CBNG), severe storms, periodic drought,) combine in complex ways to impact sagebrush ecosystems upon which sage-grouse depend. Viewed as impediments to socio-economic development, sagebrush ecosystems have been the focus of intentional conversion to grass or cropland for over a century, and have experienced severe loss and alteration across western North America. Due to their dependence on sagebrush ecosystems, sage-grouse have also experienced species-wide population declines and a 44 to 50% range contraction (Braun 1998, Schroeder et al. 2004).

Northeast Wyoming
The sage-grouse population within northeast Wyoming also exhibited a steady long term downward trend from 1967 to 2009 (Figure 1) and has experienced a 79% decline over 12 years; coincident with CBNG development (US Fish and Wildlife Service 2010). CBNG-induced effects include: 1) habitat loss, fragmentation, and degradation; 2) lek abandonment; 3) decreased lek attendance; 4) lower nest initiation; 5) poor nest success and chick survival; and 6) infrastructure avoidance during winter.

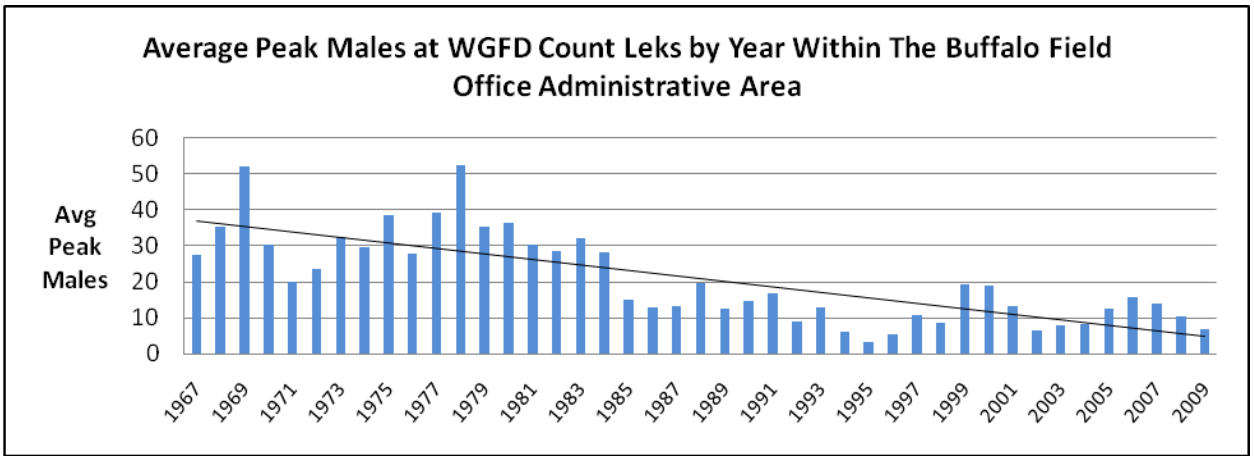


Figure 1

The PRB FEIS (BLM 2003, pg. 4-270) acknowledged and disclosed anticipated effects on sage-grouse associated with CBNG development in the PRB by stating "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."

Core Population Area Strategy
The State of Wyoming has adopted a Core Area concept that, on a state-wide basis, is deemed adequate to maintain viable sage-grouse populations (Freudenthal 2010). However, while the core area strategy was intended to protect "…no less than two-thirds of the Sage-grouse in Wyoming" (Sage Grouse Implementation Team 2008), core areas contain only approximately 26% of the PRB subpopulation based on 2007-2009 peak male counts (Nyssa Whitford, WGFD, personal communication). To address this inadequacy in the PRB, the BLM, in coordination with the State of Wyoming identified Connectivity habitat designed to link Wyoming sage-grouse populations to those in Montana and therefore contribute to maintenance of regional population viability.

On June 28, 2010 the Governor's Sage-grouse Implementation Team recommended procedures and guidelines for development inside and outside of Core and Connectivity habitats. The Governor of

Wyoming adopted those recommendations in Executive Order 2010-4 (Freudenthal 2010), noting that new development within "Core Population Areas" should be authorized when it can be demonstrated that the activity will not cause decline in sage-grouse populations. However, Executive Order 2010-4 encourages development (e.g., CBNG developments) outside of Core Population Areas and recommends a standard 0.25-mile no surface occupancy and two-mile seasonal buffer around sage-grouse leks. Executive Order 2010-4 indicated that the development scenarios should be designed to maintain populations, habitats, and essential migration routes, but acknowledged that the strategy may result in reduced sage-grouse numbers outside of core areas. The nearest Core Areas lie 20.7 miles west and 19.4 miles east of the NEO POD boundary.

NEO POD Site Specific Information

The NEO POD area is located in an area where high quality sage-grouse habitat is juxtaposed with intensifying energy development. Important land uses in the area include livestock grazing, large impoundment development (roughly 100 surface acres planned), and CBNG developments.

The NEO POD area supports habitat adequate to support sage-grouse throughout the year (ICF Jones & Stokes 2008). One occupied sage-grouse lek (Laramore) occurs within the boundary of the southern POD unit, and three occupied sage-grouse leks occur within two miles of the NEO POD boundary. However, impacts to sage-grouse leks due to oil and gas development are discernible to a distance of four miles (Walker et al. 2007, Walker 2008). WGFD records indicate that eight occupied sage-grouse leks occur within four miles of the project area (Table 3.6).

Table 3.6 Occupied sage-grouse leks within 4 miles of the NEO POD wells.

Lek Name	Distance from Project Area (mi)
Box Draw	3.4
Colton	1.7
Fitch Prong Road	2.3
Kretschmann	0.6
Laramore	(within POD area)
Playa	0.3
Ridgetop	2.4
Twentymile	3.5

Spatially explicit habitat models provide a tool by which landscape context may be integrated with land management effects analysis (Doherty et al. 2008). While sage-grouse winter and nesting habitat models are available for the NEO POD area, only the nesting model was used to characterize habitat. When the models were overlain with 2009 aerial imagery to validate accuracy, the winter model was determined to inaccurately characterize habitat. There are 1,221 acres (21% of the POD area) of highest quality nesting habitat (class 5) within the NEO POD boundary. The majority of this habitat occurs in the southern portion of the NEO POD area.

A no surface occupancy (NSO) lease stipulation (lease WYW130087) applies to the south half of section 26 (T53N, R75W) to protect the Laramore lek. The Laramore lek was discovered in 1982 after which surveys were inconsistently completed until 2004. The Lek was continuously active from 2004 to 2010.

3.3.3. BLM Sensitive Species

Wyoming BLM has prepared a list of sensitive species for which management efforts should focus on maintaining habitats under a multiple use mandate (BLM 2010). 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.

3.3.3.1. Black-tailed Prairie Dog

Once widespread and abundant, prairie dogs have declined to less than 2% of their original range due to eradication and land conversion (Miller et al. 1994). Further, populations have been decimated by recurrence of sylvatic plague; an exotic bacterial disease introduced into North America in the 1940's. Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented and isolated. In Wyoming, recurrence of plague and ongoing eradication may be more important than land conversion (Buseck et al. 2005).

Although the black-tailed prairie dog was removed from candidate species status for federal listing under ESA in 2004, Wyoming BLM considers the black-tailed prairie dog a sensitive species and continues to afford the protections described in the PRB FEIS Record of Decision (p. A-14). The black-tailed prairie dog is a WGFD Species of Greatest Conservation Need (SGCN) because populations are declining and habitat is vulnerable.

Prairie dog colonies create habitat for many species of wildlife (King 1955, Reading et al. 1989). Agnew et al. (1986) found that bird species diversity and rodent abundance were higher on prairie dog towns than on mixed grass prairie sites. Several studies (Agnew 1986, Clark et al. 1982, Campbell and Clark 1981 and Reading et al. 1989) suggest that species richness increases with colony size and regional colony density. In South Dakota, forty percent of the wildlife taxa (134 vertebrate species) are associated with prairie dog colonies (Agnew 1983, Apa 1985, McCracken et al. 1985, Agnew 1986, Uresk and Sharps 1986, Deisch et al. 1989). Of those species regularly associated with prairie dog colonies, six are Wyoming BLM sensitive species (i.e., swift fox, mountain plover, ferruginous hawk, burrowing owl, loggerhead shrike, and long-billed curlew).

The project area supports a 777.9-acre colony-complex containing eleven active prairie dog colonies within 0.5 miles of the NEO POD boundary (ICF Jones & Stokes 2009). However, black-tailed prairie dog colony-complex that encompasses the NEO POD is extensive (127,750 acres) when a 1.5 km (.93 miles) buffer is used.

Landowner control efforts were evident by observation of prairie dog carcasses near burrow entrances, and were verified during landowner discussions. Further, artificial enlargement of Laramore Lake through dam construction and addition of CBNG-produced water could flood roughly 79 acres that are currently occupied by prairie dogs. The affected environment for black-tailed prairie dogs is discussed further in the PRB FEIS (pg 3-179).

Bald EagleDue to successful recovery efforts, the bald eagle was removed from the ESA on 8 August 2007. However, the bald eagle remains protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles are a Wyoming BLM sensitive species and a WGFD Species of Greatest Conservation Concern (SGCC). They are also listed by USFWS as a Bird of Conservation Concern (BCC) for Region17.

According to habitat assessments conducted by ICF Jones & Stokes (2008), only marginal bald eagle habitat occurs in small stands of cottonwood trees on the NEO POD area. The closest documented bald

eagle nest is located approximately 20.1 miles northwest of the POD boundary along Clear Creek, while the closest documented bald eagle roost occurs 10.2 miles west of the POD boundary. The large area of black-tailed prairie dog colony contained within the NEO POD boundary likely provides a food source for wintering bald eagles. Further information regarding the affected environment for bald eagles is described in the PRB FEIS on pg. 3-175.

3.3.3.2. Western Burrowing Owl

Active burrowing owl nests were documented to occur on the NEO POD area in 2008, 2009, and 2010 (ICF Jones & Stokes 2008, 2009, BLM onsite notes). Ample nesting substrate for burrowing owls occurs over 777.9 acres of black-tailed prairie dog colony complex.

The burrowing owl is a small, long-legged owl found throughout open landscapes of North and South America. Burrowing owls can be found in grasslands, rangelands, agricultural areas, deserts, or any dry open area with low vegetation where abandoned burrows dug by mammals such as ground squirrels, prairie dogs, and badgers are available. Black-tailed prairie dog colonies provide the primary habitat for burrowing owls (Klute et al. 2003).

Dramatic reduction of prairie habitat in the United States is directly linked to reduction of burrowing owl populations (Klute et al. 2003). Trend data suggest continued declines throughout the burrowing owl range (McDonald et al. 2004). Primary threats include habitat loss and fragmentation mostly due to tillage agriculture, urban development, and declines in populations of colonial burrowing mammals (Klute et al. 2003).

In addition to being listed as a Wyoming BLM sensitive species, burrowing owls are a WGFD SGCN. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also a USFWS Bird of Conservation Concern in Region 17.Additional information regarding western burrowing owl is available in the PRB FEIS on pg. 3-186.

3.3.4. Big Game

Both pronghorn and mule deer were observed during field visits to the project area. WGFD data indicate that the project area is yearlong range for mule deer. A small portion of the north area is mapped as winter yearlong range. Yearlong range occurs when animals make general year-round use of the area but may leave during severe weather conditions. Winter-yearlong use occurs when animals make general year-round use of habitat, but a significant influx of animals may occur during the winter months. No crucial mule deer habitat is known to occur in the area.

Wyoming Game and Fish Department data indicate that the NEO POD area functions mainly as pronghorn winter range in the south, and as both winter and yearlong range in the north. No crucial pronghorn habitat is known to occur in the area. The affected environment for pronghorn is discussed in the PRB FEIS on pp. 3-117 to 3-122 and for mule deer on pp. 3-127 to 3-132.

3.3.5. Upland Game Birds

3.3.5.1. Plains Sharp-tailed Grouse

Sharp-tailed grouse inhabit short and mixed-grass prairie, sagebrush shrublands, woodland edges, and river canyons. In Wyoming, this species is found where grasslands are intermixed with shrublands; especially where wooded draws, shrubby riparian area, and wet meadows occur.

The mosaic of grasslands, sagebrush-grasslands, and woody draws in the NEO POD project area has the potential to support sharp-tailed grouse year-round. Cottonwoods, junipers, and deciduous shrubs (e.g., chokecherry, skunkbush sumac, wild rose) could provide buds and berries to sustain grouse through the winter.

The WGFD sharp-tailed grouse database identified one lek on the NEO POD area (T33N, R75W, NWNE section 35, Durban lek). However, no information has been gathered for the lek since 1985. ICF Jones & Stokes biologists noted a new lek located roughly 0.5 miles NW of the Durban lek with 12 grouse on April 28, 2006 (UTM NAD83, Zone 13N 432063E, 4932773N)(ICF Jones & Stokes 2008). Two grouse were flushed from the site on April 30, 2008. No grouse were observed at the site during aerial surveys conducted in 2009 and 2010 (ICF Jones and Stokes 2009, ICF International 2010). That lek is now named the Windmill Draw lek. The next nearest sharp-tailed grouse lek in the WGFD database is the Eaton II lek located 0.7 miles east of the NEO POD boundary.

3.3.6. Migratory Birds

Migratory birds are those that seasonally migrate for the purpose of breeding and foraging. According to Instruction Memorandum No. 2008-050, BLM must include migratory birds in every NEPA analysis of actions that have potential to affect migratory birds to fulfill obligations under the Migratory Bird Treaty Act.

The WGFD Wyoming Bird Conservation Plan (Nicholoff 2003) prioritized three groups of bird species in Wyoming based on conservation need: Level I – those that clearly need conservation action, Level II – species where the focus should be on monitoring, rather than active conservation, and Level III – species that are not otherwise of high priority but are of local interest. Species observed during the onsite inspection included: lark sparrow, Brewer's sparrow, vesper sparrow, lark bunting, and western burrowing owl. Those species that are anticipated to occur in the project area are listed in Table 3.7.

Table 3.7 High priority bird species that occur in the major vegetation types within the NEO POD project area

Level	Species	Wyoming BLM Sensitive
Level I	Brewer's sparrow	Yes
	Ferruginous hawk	Yes
	Greater sage-grouse	Yes
	Long-billed curlew	Yes
	McCown's longspur	
	Mountain plover	Yes
	Sage sparrow	Yes
	Short-eared owl	
	Upland sandpiper	
	Western burrowing owl	Yes
Level II	Black-chinned hummingbird	
	Bobolink	
	Chestnut-collared longspur	
	Dickcissel	
	Grasshopper sparrow	
	Lark bunting	
	Lark sparrow	
	Loggerhead shrike	Yes
	Sage thrasher	Yes
	Vesper sparrow	
Level III	Common poorwill	
	Say's phoebe	

The affected environment for migratory birds is discussed further in the PRB FEIS (pp. 3-150 to 3-153).

3.3.7. Raptors

Raptor nesting substrate in the NEO POD area includes juniper, willow, and cottonwood trees located along ephemeral draws. Four unique nests were documented by ICF Jones & Stokes (2008, 2009) and two additional nests were documented during onsite inspections (BLM onsite notes).

Raptor species documented to nest on the NEO POD area included red-tailed hawks, burrowing owls, and golden eagles. Four nests were confirmed active within 0.5 mile of the POD boundary in 2008 including two golden eagle nests, one red-tailed hawk nest, and one burrowing owl nest. Two active nests were documented in 2009 (golden eagle and burrowing owl). A burrowing owl nest was documented during the onsite inspection conducted in 2010.

Many species were also observed in proximity to prairie dog colonies including a ferruginous hawk, golden eagle, and burrowing owls (ICF Jones & Stokes 2009). Further treatment of the affected environment for raptors can be found on pages 3-141 to 3-148 of the PRB FEIS.

3.3.8. 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 3.8. Reported data from the Powder River Basin (PRB) includes Campbell, Sheridan and Johnson counties.

Table 3.8 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 Upper Powder River drainage system. The Wyoming Department of Environmental Quality (WDEQ) has assumed primacy from United States Environmental Protection Agency (EPA) for maintaining the water quality in the waters of the state of Wyoming. The Wyoming State Engineer's Office (WSEO) has authority for regulating water rights, and permitting reservoirs for impounding surface water within state. The Wyoming Oil and Gas Conservation Commission (WYOGCC) have authority for permitting and bonding off-channel impoundments that are located over State and fee minerals.

3.4.1. Groundwater

The groundwater in the project area has historically been used for stock water or domestic purposes. A search of the WSEO groundwater rights database for this area showed 26 registered stock and domestic water wells within 1 mile POD boundary with depths ranging from 22 to 330 feet. For additional information on groundwater, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36.

WDEQ Water Quality Rules and Regulations: Chapter 8. Quality Standards for Wyoming Groundwaters 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 internet site.

The ROD includes a Monitoring, Mitigation and Reporting Plan (MMRP). The objective of the MMRP is to monitor those elements of the analysis addressed in the ROD where there was limited information available during the preparation of the PRB FEIS. The MMRP called for the use of adaptive management to make management changes based on the results of monitoring data.

Specifically relative to groundwater, the MMRP 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 requires the temporary reduction of the hydraulic head in the saturated coal zones targeted for CBNG production. The Buffalo Field Office (BFO) has been monitoring coal zone water levels and gas pressures in the PRB since the early 1990s (Figure 3.3).

The NEO POD is surrounded by many approved Federal, fee, and state CBNG projects such as the Yates' Cypher and Acacia CBNG projects, as well as Williams Production Companies Cedar Draw CBNG projects. As a result, the target coal zone pressure may have been reduced through off set water production associated with those projects. The Cedar Draw Unit 1 Groundwater monitoring well was installed by Williams Production Company as a part of the BFO's groundwater monitoring program. The well is located in the NESW of Section 15, Township 53 N, Range 75 W, and is less than 0.25 miles from the Neo Pod boundary. The initial water level of the Wall coal at this site was recorded at 231 feet below ground level on February 20, 2004. On June 16, 2010, the water level was 805 feet below the ground surface, representing a decline of 574 feet since the well was completed. This level of drawdown is within the range predicted through the regional groundwater modeling conducted for the PRB FEIS. 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 internet site at: http://www.wsgs.uwyo.edu.

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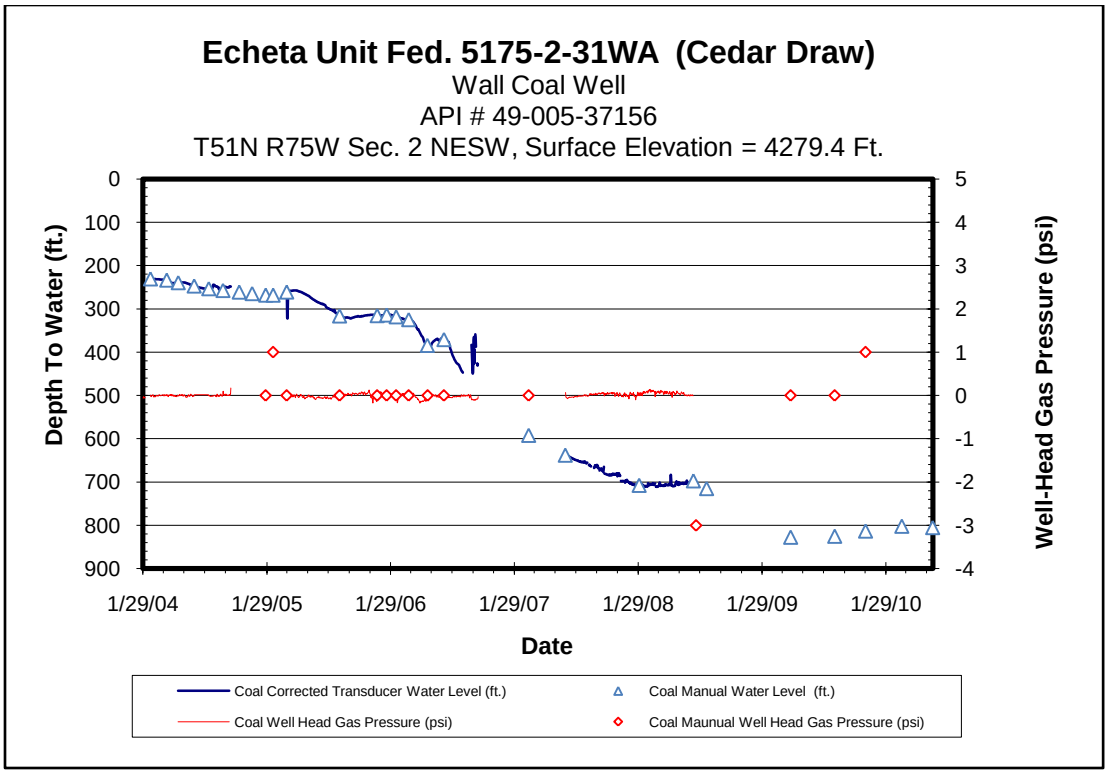


Figure 3.3 Depths to Water from Surface

3.4.2. Surface Water

The project area is within the Wild Horse Creek drainage which is tributary to the Upper Powder River watershed. Most of the drainages 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). The channels are primarily well vegetated and stable with mild incision and meandering.

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 the Upper Powder River Watershed, the EC ranges from 1,797 at maximum monthly flow to 3,400 at low monthly flow; and the SAR ranges from 4.76 at maximum monthly flow to 7.83 at low monthly flow. These values were determined at the USGS station (Station ID 06317000) located on the Upper Powder River at Arvada, WY (PRB FEIS page 3-49).

The operator has identified two natural springs within the POD boundary. The springs are located in the NENE of Section 35, and the NENW of Section 26, Township 53 N, Range 75 W. These springs were only identified through wet areas with no discernable water flow. As such, no water quality sample could be collected, and therefore no water quality data is available.

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

3.5. Economics and Recovery of CBNG Resources

Revenue from mineral development contributes to Wyoming's economy, and allows for improvements in state funded programs such as infrastructure and education. The development also provides local revenue by employing workers in the area to build the roads and project infrastructure, drill wells, and maintain and monitor projects. This pool of individuals employed to work on CBNG projects results in an increase in demand for goods and services from nearby communities, primarily those of the Powder River Basin area in Wyoming.

3.6. Cultural Resources

A Class III cultural resource inventory was performed for the NEO POD prior to on-the-ground project work (BFO project no. 70090041). Quality Services conducted a block and linear 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*. Clint Crago, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The results of the cultural resources inventory are summarized in Table 3.9.

Table 3.9 Cultural Resources Inventory Results

Site Number	Site Type	Eligibility
48CA5093	Prehistoric Lithic Scatter and Historic Artifact	Not Eligible
48CA5094	Prehistoric Lithic Scatter	Not Eligible
48CA5095	Prehistoric Lithic Scatter	Not Eligible
48CA5096	Prehistoric Lithic Scatter	Not Eligible
48CA5097	Prehistoric Lithic Scatter	Not Eligible
48CA5098	Prehistoric Lithic Scatter	Not Eligible
48CA5099	Prehistoric Lithic Scatter	Not Eligible
48CA5100	Historic Debris	Not Eligible
48CA5101	Prehistoric Lithic Scatter	Not Eligible
48CA5102	Prehistoric Lithic Scatter	Not Eligible
48CA5103	Prehistoric Lithic Scatter	Not Eligible
48CA5104	Prehistoric Lithic Scatter	Not Eligible
48CA5107	Prehistoric Lithic Scatter	Not Eligible
48CA5109	Prehistoric Lithic Scatter	Not Eligible
48CA5110	Prehistoric Lithic Scatter, FCR, Habitation, Hearths	Not Eligible
48CA5289	Historic Corral	Not Eligible
48CA5382	Prehistoric Lithic Scatter	Not Eligible

Site Number	Site Type	Eligibility
48CA5383	Prehistoric Lithic Scatter	Not Eligible

3.7. 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 A 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

Resource		Type of Effect	Page(s) of PRB FEIS
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. Project Description

Alternative B contains APDs and infrastructure as it was submitted with a No Surface Occupancy lease stipulation on the south half of section 26 T53N, R75W Lease WYW 130087. Under Alternative B, the NSO would remain and the following three APDs and/or associated infrastructure listed in Table 2.3 would be denied.

Table 2. Alternative B Project Components Denied

Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
NEO CYPHER CS FEDERAL	13	NESW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	14	SWSW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	15	SWSE	26	53N	75W	WYW130087
MORTON RESERVOIR		SESE	26	53N	75W	WYW130087
BAZOOKA JOE RESERVOIR		SENW	26	53N	75W	WYW130087

The Bazooka Joe Reservoir is not in the NSO but the access route to get to the reservoir passes through the NSO. Therefore an alternative access would need to be proposed by sundry. Retaining the NSO in the south half of section 26, would result in creation of new disturbance. Existing access routes through the lek would not be used. This would result in access roads and pipelines being constructed to avoid using existing disturbance within the half section boundary.

4.2.1.1. Land Ownership and Land Use

In the northern portion of the POD, the grazing leasee has exisitng ranch roads and stock watering pipeline system for his operation. The CBNG lessee has proposed development of acces roads and gas, water and electric lines along the exisitng disturbance, where possible**.**

In the southern poriton of the POD,Deer Track LLC, has existing ranch roads used for the livestock operation and to access Laramore Lake. The landowner will continue use his ranch roads and will continue to contract with a separate CBNG company to accept water to fill Laramore Lake. Plans for his discharge point, stock watering tanks, access roads, and overhead power for private surface owner's use and operations will not change.

4.2.1.1.1. Direct and Indirect Effects

Grazing may be effected by removal of vegetation. Reclamation efforts may be impacted by grazing.

4.2.1.1.2. Cumulative Effects

Split estate effects can be positive in that the land owners can provide valuable information about operating practices. Multiple use can be negative if resources are over taxed by both removal of vegetation for construction and lack of revegetation due grazing of seedlings prior to root establishment.

4.2.1.1.3. Mitigation Measures

- The BLM will provide information to the landowner about grazing management and long term effects of land use modification.

4.2.1.1.4. Residual Effects

The area where Laramore Lake is located may experience vegetative state transitions. Vegetation will be converted from upland grasses to wetland grasses. Once CBNG water is no longer available, the area may be infested with weeds.

4.2.2. Soils, Ecological Sites and Vegetation

4.2.2.1. Soils

The northern portion of the POD is dissected and gullied with areas of active erosion and natural head-cutting. Design features include avoiding head cuts. Where headcuts cannot be avoided, a remediation plan has been set in place. Yates will monitor construction to keep a 20 foot buffer between headcuts and surface disturbance, toe of slope and roads. They will also divert runoff water away from headcuts by crown and ditching roads and installing culverts. This would reduce the amount of water flowing over the headcut. If avoidance or diversion of water are not possible Yates will; 1) place riprap into the top of the headcut to stabilize the face of the culvert, or 2) install a culvert at the top of the headcut angled down to discharge water below the headcut into riprap, or 3) as a final resort, slope back the headcut and add erosion matting.

4.2.2.1.1. Direct and Indirect Effects Soils, Ecological Sites and Vegetation

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, 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. With expedient reclamation, productivity and stability should be regained in the shortest time frame.
- 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. Compaction may be remediated by plowing or ripping.
- Modification of hill slope hydrology.
- 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 predominantly composed of cyanobacteria, green and brown algae, mosses and lichens. They 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.

These impacts, singly or in combination, would 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.

4.2.2.1.2. Cumulative Effects Soils, Ecological Sites and Vegetation

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.

There will be shifts in the plant communities. This impacts ecological function and net primary production, effecting range and wildlife values through ecosystem degradation

4.2.2.1.3. Mitigation Measures Soils, Ecological Sites and Vegetation

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

- The Wyoming Reclamation Policy applies to all surface disturbing activities. The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231).
- All pit spoil must be placed back in the pit once dry. The pit area should usually be mounded slightly to allow for settling and positive surface drainage.

- Improved roads with utility corridor working width will not exceed 50 feet with a clearing and blading not to exceed 40 feet in width unless a specific design is included in the plan and profile section of the master surface use plan.
- Primitive roads with utility corridor working width will not exceed 40 feet with a clearing and blading not to exceed 30 feet in width.
- In areas where there are steep slopes and/or fragile soils, used in conjunction with accessing federal wells must be fully built (including all water control structures such as wingditches, culverts, relief ditches, low water crossings, surfacing, etc.) and functional to BLM standards as outlined in the BLM Manual 9113 prior to drilling of the well. The remaining roads in this POD, not constructed prior to drilling, will be fully built within 30 days of completion of the well they are used to access.

Township/Range	Section	Wells and Infrastructure
T 53 R75	S 11	Neo 10 access road
T 53 R75	S 35	Cypher 21

- The following well locations and access road/corridor in the project area have been identified to have limited reclamation potential that will require topsoil to be stabilized (stabilization efforts may include mulching, matting, soil amendments, etc.) in a manner which eliminates accelerated erosion until a self-perpetuating native plant community has stabilized the site in accordance with the Wyoming Reclamation Policy. Topsoil stabilization efforts shall be finished within 30 days of the initiation of construction activities: for the Neo 10 and the pipeline corridor between the Neo 7 and Neo 11 wells.

Township/Range	Section	Wells and Infrastructure
T 53 R75	S 11	Neo 10 well and access road
T 53 R75	S 10 & 11	Pipeline corridor between the Neo 7 and Neo 11 wells

- Signs must be placed at each side of the pipeline corridor between the Neo 7 and Neo 11 wells "No Oil and Gas Traffic" this is a pipeline only.

4.2.2.1.4. 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 desired native vegetation is successfully established. Produced CBNG water would likely continue to modify existing soil moisture and soil chemistry regimes in the areas of water release and storage.

There will be shifts in the plant communities. This impacts ecological function and net primary production, effecting range and wildlife values through ecosystem degradation. General effects of construction can be the lack of ecosystem function. If an area is not reclaimed or if seeding fails, the plant community could be reduced to a "Go-back Land Plant Community" (Section 3.2 Plant Communities and Ecological Function).

Control efforts by the operator are limited to the surface disturbance associated the implementation of the project. 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 leafy spurge, Russian knapweed, whitetop, Scotch thistle, salt cedar and Russian olive. 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. japonicus*) 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.

4.2.2.1.5. Wetlands/Riparian

4.2.2.1.5.1. Direct and Indirect Effects

Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. Continuous high stream flows into wetlands and riparian areas would change the composition of species and dynamics of the food web. 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).

4.2.2.1.5.2. 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.

4.2.2.1.6. Invasive Species

4.2.2.1.6.1. 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.

4.2.2.1.6.2. 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, leafy spurge, field bind weed, and Canada thistle.

4.2.2.1.6.3. 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):

- 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.
- 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.
- Education: Yates 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.

4.2.2.1.6.4. 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. japonicus*) 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.

4.2.3. Wildlife

Mitigating strategies for the NEO POD were developed following review of wildlife surveys conducted by ICF Jones & Stokes (2008, 2009) and ICF International (2010), and following analysis of geospatial datasets for big game, raptors, bald eagles, sage-grouse, sharp-tailed grouse, mountain plover, and black-tailed prairie dogs. Further, onsite inspections conducted by BLM and Yates Petroleum Corporation personnel revealed measures to reduce effects to wildlife resources

4.2.3.1. Threatened, Endangered, Proposed, and Candidate Species

4.2.3.1.1. Threatened and Endangered Species

The following table identifies anticipated effects to threatened, endangered, candidate, and proposed species.

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

Common Name (scientific name)	Habitat	Project Effects	Rationale
Endangered			
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NLAA	Species is not on USFWS T&E list for BFO, BFO "block-cleared" by USFWS; >127,750 acres of BTPD colony-complex using a 1.5 km buffer
Blowout penstemon (*Penstemon haydenii*)	Sparsely vegetated, shifting sand dunes	NE	No suitable habitat present.
Threatened			
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	Riparian areas with permanent water	NE	No suitable habitat present.
Proposed			
Mountain plover	Short-grass prairie with slopes < 5%	NLJ	Suitable habitat is present but no mountain plovers were observed during surveys in 2005, 2006, 2008, 2009, and 2010.
Candidate			
Greater Sage-grouse	Basin-prairie shrub, mountain-foothill shrub	MIIH	Sagebrush cover will be affected. Active sage-grouse leks occur.
Project Effects **NE** - No Effect **NLAA** - May Affect, not likely to adversely affect individuals or habitat. **NLJ** – Not likely to jeopardize **MIIH** – May impact individuals and health			

4.2.3.1.1.1. Black-footed ferret

4.2.3.1.1.1.1. Direct and Indirect Effects

No direct or indirect affects to black-footed ferrets will occur due to implementation of the NEO POD

because black-footed ferrets are not expected occur in Campbell County, Wyoming (http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A004).

4.2.3.1.1.1.2. Cumulative Effects

While black-footed ferrets are not expected to currently occur in the NEO POD area, the BLM has determined that the effects of the NEO POD are not significant enough to diminish the site potential to function as a possible future reintroduction site and therefore the NEO POD project may affect, but is not likely to adversely affect the black-footed ferret. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-251.

4.2.3.1.2. Proposed Species

4.2.3.1.2.1. Mountain Plover

4.2.3.1.2.1.1. Direct and Indirect Effects

No mountain plovers were observed during surveys conducted in 2005, 2006, 2008, 2009, or 2010 (ICF Jones & Stokes 2008, 2009, ICF International 2010). However, large areas of suitable mountain plover habitat exist within the NEO POD area (777.9 acres of black-tailed prairie dog colony-complex). Consequently, the effects discussed in the PRB FEIS (p. 4-255, e.g., placement of power lines that facilitate perching by mountain plover avian predators) could affect mountain plover should future nesting occur.

4.2.3.1.2.1.2. 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. 4-254 to 4-255.

4.2.3.1.2.1.3. Mitigation Measures

To ensure that impact to nesting mountain plover do not occur in the future, the PRB FEIS PROGRAMMATIC conditions of approval for mountain plover contained in Appendix A will be required, as conditions of approval.

4.2.3.1.2.1.4. Residual Effects

No residual effects to nesting mountain plover are expected to occur so long as the mitigation measures contained in Appendix A are effectively applied.

4.2.3.1.3. Candidate Species

4.2.3.1.3.1. Greater Sage-grouse

4.2.3.1.3.1.1. Direct and Indirect Effects

Direct Effects

Direct effects to sage-grouse habitats associated implementation of Alternative B include a total surface disturbance of 238.78 acres. This includes 32 CBNG well pads placed on 80-acre spacing, and associated infrastructure (Table 2.5). Most roads also include utility corridors. The impact to sagebrush habitat due to this alternative warrants emphasis on avoidance, minimization, and reclamation measures. Diverse, native seed mixtures composed of multiple functional/structural groups should be considered.

Design features included in the proposed action to minimize impacts to sagebrush habitat include: radio telemetry monitoring to reduce well visits to an estimated once per week; expedient interim and final reclamation emphasizing re-establishment of native plant assemblages; and minimizing road widths to that required for safe operations.

Indirect Effects

CBNG development can negatively affect sage-grouse lek persistence, lek attendance, female nest

selection, recruitment, yearling annual survival, and winter habitat use (USFWS 2010). CBNG effects to sage-grouse can occur via various mechanisms that can manifest at differing scales (Walker et al. 2007, Doherty et al. 2010). For example, effects may include:

1. Human-caused disturbance/displacement: (For example: rate of vehicle traffic from 1-12 vehicles per day can affect nest initiation rates (Lyon and Anderson 2003)).
2. Auditory disturbance: (For example: noise can affect lekking sage-grouse three miles downwind from drilling rigs, compressors, etc (Holloran 2005)).
3. Subsidized new-comer predators: (For example: Ellis (1987) reported that construction of an overhead power line within 220 yards of a lek resulted in sage-grouse harassment by golden eagles and an eventual 0.6 mile lek displacement. Knick et al. (in press) estimated that corvid predation (based on foraging distance) may extend 4.3 miles from artificial perch and nesting sites afforded by overhead power lines. Further, human-modified landscapes provide den site subsidies (e.g., well houses) that increase abundance of sage-grouse nest and brood predators (e.g., red fox, striped skunk, raccoon), and could limit local sage-grouse populations (USFWS 2010)).
4. Infrastructure proximity to leks: (For example: Harju et al. (2010) found that one or more wells within 0.25 miles of leks had 34.9-91.5 fewer attending males than did leks with zero wells within this distance).

These effect mechanisms impair habitat function and are difficult to quantify. Further, they are related to infrastructure proximity to sage-grouse habitat, infrastructure type, and frequency of human presence. For example, overhead power is largely absent from the NEO POD landscape. Its placement would introduce a new suite of possible effects (e.g., hunting perches for corvids and golden eagles, sage-grouse avoidance of tall structures, etc.).

Indirect effects may extend for some distance; reducing habitat function in zones surrounding CBNG developments (WGFD 2009). Walker et al. (2007) used a buffer of 350 meters (1,148 feet) from wells to approximate the area affected by CBNG development in the PRB.

Alternative B includes wells proposed to occur in close proximity to the Laramore lek, and new overhead power through the southern portion of the POD. However, application of a lease NSO (no surface occupancy) to the south half of section 26 would result in no wells, reservoirs, or roads placed within south half of section 26.

While the NSO would prevent placement of infrastructure near the Laramore lek, most of the effects described above are anticipated to negatively affect sage-grouse in the remainder of the NEO POD area. Using 350 meter as the metric for indirect CBNG effects, implementation of Alternative B would impair habitat function over roughly 680 acres (56%) of the 1,221 acres of modeled high quality nesting habitat contained within the NEO POD.

4.2.3.1.3.1.2. Cumulative Effects

Energy development began in the PRB in the late 1800's, but development accelerated after the 1960's and has included mainly coal mining, conventional oil, and development of CBNG (BLM 2005). Energy-related surface disturbance in the PRB was projected to increase from 220,257 acres in 2003 to 514,732 acres by 2020 (BLM 2005). While reclamation measures have been, or will be applied to most of this area, habitat function for sage-grouse will not recover for many decades. Sage-grouse have re-occupied disturbed areas following ecological recovery (Braun 1998). However, CBNG effects in the PRB are widespread and acute such that the rate of disturbance markedly outpaces ecological recovery (USFWS 2010). Consequently, energy-related impacts to sage-grouse accrue as disturbance advances across the landscape.

Generally declining trends in sage-grouse lek attendance attributable to CBNG development in the PRB occur due to the effects of decreasing lek-to-well distance, and increasing well density that manifest over time following development (Harju et al. 2010). Recent research suggests that the combined effects of past, 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 WGFD determined "impact thresholds" that indicate levels of habitat functional impairment (WGFD 2010). For sage-grouse, the extreme impact threshold is reached at three wells per square mile within two miles of occupied sage-grouse leks. The extreme impact threshold is reached when habitat function is "substantially impaired or lost" and cannot be fully mitigated on site (WGFD 2010).

The well density change attributable to the NEO POD was evaluated within two miles of occupied sage-grouse leks as recommended by WGFD for oil and gas developments (WGFD 2010). Using this analysis technique, the NEO POD would affect well density (i.e., wells/mi^2) within two miles of three sage-grouse leks. While these leks are already well above the extreme impact threshold identified by the WGFD, the NEO POD would markedly increase well density (Table 4.3).

Table 4.3 Existing, NEO POD additions, and foreseeable wells/mi^2 within two miles of sage-grouse leks.

Lek Name	Existing	NEO POD Addition	Foreseeable (Pending)
Kretschmann	6.1 wells/mi^2	6.6 wells/mi^2	8.1 wells/mi^2
Laramore	4.9	6.6	7.1
Playa	4.5	5.2	6.1

4.2.3.1.3.1.3. Mitigation Measures

Mitigating measures applied to the NEO POD include sage-grouse breeding season timing limitations for surface disturbing activities (e.g., drilling, road construction) (March 1st – June 15th, Appendix A).

4.2.3.1.3.1.4. Residual Effects

While measures designed to reduce effects to sage-grouse were employed throughout the planning process, it is likely that the proposed activity will further degrade habitat effectiveness and depress sage-grouse recruitment and survival in the area. There would be additional roads and pipelines outside of corridors in order keep disturbance out the south half of section 26.

The PRB FEIS (BLM 2003, p. 4-270) acknowledged and disclosed anticipated effects attributable to CBNG development by stating 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." Based on the impacts described in the PRB FEIS and the findings of more recent research, the proposed action will contribute to a decline in male attendance at three occupied leks, and may further contribute to eventual extirpation of the local grouse population. Uncertainties in these conclusions are: CBNG well "life" relative to the time lag in sage-grouse population effects (i.e., population persistence in developed areas); rate of ecological reintegration following well abandonment; and potential for subsequent sage-grouse population recovery.

4.2.3.2. BLM-Sensitive Species

4.2.3.2.1. Direct and Indirect Effects

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.

4.2.3.2.2. 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. 4-257 to 4-265.

4.2.3.2.3. Black-tailed Prairie Dog

4.2.3.2.3.1. Direct and Indirect Effects

Eight wells and associated infrastructure are planned to occur within documented black tailed prairie dog colonies. This will result in a relatively small direct impact footprint. However, there are 777.9 acres of occupied black-tailed prairie dog colonies within 0.5 miles of the NEO POD boundary, and 127,750 acres of black-tailed prairie dog colony-complex that encompasses the NEO POD when a 1.5 km (0.93 mile) buffer is applied. Consequently, direct and indirect effects to black-tailed prairie dogs are considered to be only incremental.

4.2.3.2.3.2. 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. 4-255-256

4.2.3.2.4. Western Burrowing Owl

4.2.3.2.4.1. Direct and Indirect Effects

The NEO POD provides excellent burrowing owl habitat as evidenced by actively nesting burrowing owls in each of 2008, 2009, and 2010. In each year the actual nest location moved indicating that there is ample nest site suitability throughout the 777.9 acres of black-tailed prairie dog colony-complex. The Cypher 17 and the Cypher 24 wells are located near the 2010 burrowing owl nest location. Well drilling and human activity could disturb nesting owls.

4.2.3.2.4.2. 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, pg. 4-221.

4.2.3.2.4.3. Mitigation Measures

BLM employs 0.25 mile seasonal buffer (April 15 to August 31, Appendix A) preventing surface disturbing activities to protect nesting burrowing owls. The Cypher 17 and the Cypher 24 wells would be affected by the location of the 2010 burrowing owl nest. However, all black-tailed prairie dog colonies must be surveyed prior to conducting surface disturbing activities as the owls may move within the colony-complex (Appendix A).

4.2.3.2.4.4. Residual Effects

While surface disturbing activities will be controlled during the nesting period, ongoing maintenance

activity could disturb nesting burrowing owls. However, there is ample opportunity for burrowing owls to select alternative nesting sites throughout the 777.9 acres of black-tailed prairie dog colony-complex.

4.2.3.2.5. Bald Eagle

4.2.3.2.5.1. Direct and Indirect Effects

While no bald eagle nests or winter roosts occur in the NEO POD area, there is valuable winter foraging resource in the form of a large black-tailed prairie dog colony-complex. Increased human occurrence associated with POD development and management is likely to limit bald eagle access to food resources. However, the impact is considered only incremental when viewed on a scale at which bald eagle forage in winter (100's of square miles).

4.2.3.2.5.2. 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. 4-251 to 4-253.

4.2.3.3. Big Game

4.2.3.3.1. Direct and Indirect Effects

Under Alternative B and C yearlong range for pronghorn and mule deer would be directly impacted by the construction of 32 CBNG wells and associated infrastructure (Table 2.5).

In addition to the direct habitat loss, big game would likely be displaced from the project area during drilling and construction (Hiatt and Baker 198). While big game animals are expected to return to the project area following construction, continued human-caused disturbance associated with operation and maintenance may result in reduced local populations because big game may fail to habituate to the new disturbances (Lustig 2003). Habitat effectiveness for big game is anticipated to be reduced in the project area. However, the site is not mapped as crucial habitat by the Wyoming Game and Fish Department. Further information regarding direct and indirect effects to big game is provided in the PRB FEIS on pp. 4-181 to 4-215.

4.2.3.3.2. 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.

4.2.3.3.3. Mitigation Measures

The amount of anticipated big game habitat disturbance warrants effective reclamation efforts designed to facilitate re-establishment of diverse native plant community assemblages. Please refer to Appendix A for more information regarding COA to follow the Wyoming BLM Reclamation requirements.

4.2.3.4. Upland Game Birds

4.2.3.4.1. Plains Sharp-tailed Grouse

4.2.3.4.1.1. Direct and Indirect Effects

While sharp-tailed grouse do not share dependency on sagebrush with sage-grouse, sharp-tailed grouse are subject to many of the same effects mechanisms as sage-grouse (described above under Greater Sage-Grouse, Indirect Effects). For example, placement of overhead power would result in elevated direct mortality due to collisions, and would provide perches for avian predators (PRB FEIS, p. 4-221-222)

A new sharp-tailed grouse lek was discovered within the NEO POD boundary by ICF Jones & Stokes (2008) and grouse were observed during 2006 and 2008. BLM employs a 250 yard CSU (controlled surface use) stipulation to sharp-tailed grouse leks. The Cypher 10 well and road were originally planned

to occur within 250 yards of the new lek. However, Yates Petroleum Corporation and BLM personnel moved both the well and road locations beyond the CSU limits.

4.2.3.4.1.2. 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. 4-225. No additional mitigation measures are required.

4.2.3.4.1.3. Mitigation Measures

TLS (timing limitation stipulations) for nesting and brood-rearing sage-grouse will apply to entire southern portion of the NEO POD and will therefore protect lekking sharp-tailed grouse as well. However, TLS specific to sharp-tailed grouse are described in Appendix A. No further mitigation is required.

4.2.3.5. Migratory Birds

4.2.3.5.1. Direct and Indirect Effects

Migratory bird species that utilize the disturbed areas for nesting may be disrupted by the human activity, and nests may be destroyed by equipment. Further, construction activities will likely displace migratory birds due to construction noise (BLM 2003). Disturbance of habitat within the project area may impact migratory birds. Direct impacts to native habitats result from construction of wells, roads, and pipelines. Prompt re-vegetation of short-term disturbance areas will help to reduce habitat impacts. Direct and indirect effects to migratory birds are discussed in the PRB FEIS (pp. 4-231 to 4-235).

4.2.3.5.2. 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.

4.2.3.5.2.1. 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.

4.2.3.6. Raptors

4.2.3.6.1. 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 and resulting in increased nest predation.

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius 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.

Two reservoirs were planned to occur immediately near a new nest discovered during the onsite inspection. Both of these reservoirs were dropped from the NEO POD. Further, a nearby well (Cypher 15) was moved so that it occurs > 0.25 miles away from, and out of line-of-sight of the nest.

A second new nest was also discovered in a juniper tree very near the NEO 3well. The site was evaluated in the field on two different occasions by the BLM biologist. The nest was determined to be inactive on close examination (e.g., no raptors, feathers, or prey remains observed at the nest site during the June 2010 onsite inspection), occurred in a deep draw, and was out of line-of-sight of the well and associated access road. The nesting substrate was not unique; alternate locations provided trees similar to the juniper tree that contained the nest. Further, alternate well locations located further from the nest site occurred upslope with increased potential for direct visibility to the nest. Consequently, the BLM biologist determined that the location for the well and access road were adequate to mitigate impacts to nest function, and that occurrence of the nest did not warrant denial of the well.

Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB EIS (pp. 4-216 to 4-221).

4.2.3.6.2. 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. 4-221.

4.2.3.6.3. Mitigation Measures

Please see the Raptor and Burrowing Owl Timing Limitation Stipulations map in Appendix A for a spatially explicit depiction of timing limitation stipulations (TLS). TLS to protect raptor nest function will be applied to the wells listed in Appendix A.

4.2.3.7. West Nile Virus

4.2.3.7.1. 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.

4.2.3.7.2. 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.

4.2.4. 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 Upper Powder River 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.

Yates proposes to use a combination of subsurface injection in existing and proposed injection wells, and full containment in existing and proposed on-channel reservoirs. Yates estimates that 80% of their produced water will be managed through injection wells, and the remaining 20% will go to the reservoirs.

The maximum water production for the Neo POD is predicted to be 25 gpm per well, or 700 gpm for the POD as approved under this alternative (1.6 cubic feet per second (cfs) or 1,129 acre-feet per year). 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 Upper Powder River drainage, the volume projected to be produced within the watershed in 2010 was 60,319 acre-feet (maximum production was estimated to be 171,423 acre-feet in 2006). As such, the volume of water from these wells is 1.9% of the total volume projected for 2010. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.2.4.1. Groundwater

4.2.4.1.1. Direct and Indirect Effects

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 280 gpm will infiltrate at or near the discharge points and impoundments (451 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 possible environmental consequences of CBNG production is 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 zones to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 31 to 330 feet compared to 60 feet to the Felix coal, and 1545 foot average depth to the Wall coal. The operator has committed to offer 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.

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).

4.2.4.1.2. 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).

4.2.4.1.3. 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.

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 April, 2010, approximately 2006 impoundment sites have been investigated with more than 2289 borings. Of these impoundments, 272 met the criteria to require "compliance monitoring" if constructed and used for CBNG water containment. Only 144 impoundments requiring monitoring are presently being used. As of the fourth quarter of 2009, only 22 of those monitored impoundments (15.2%) caused a change in the "Class of Use" of any parameter in the underlying aquifer water.

4.2.4.1.4. Residual Effects

As described in Chapter 3.4.1, the production of CBNG in this project area has already reduced the saturation level in some of the coal zones targeted for CBNG production.

4.2.4.2. Surface Water

4.2.4.2.1. Direct and Indirect Effects

Produced Water Quality

Table 4.4 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 permit, and the concentrations found in the POD's representative water sample.

Table 4.4 Comparison of Regulated Water Quality Parameters to Predicted Water Quality

Sample location or Standard	TDS mg/l	SAR	EC µmhos/cm
Primary Watershed at Powder River Gauging station			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
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 Standards for WYPDES Permit # WY0094129			
At discharge point	NA	<6.67*EC-3.33	3260
Predicted Produced Water Quality			
Comingled coals	957	12.9	1600

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 957.0 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 Felix, Anderson, Upper Canyon, Lower Canyon, and Wall target coal zones wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 25.0 gallons per minute (gpm) is projected is to be produced from these 29 wells, for a total of 700 gpm for the POD.

The outfall design proposed for use in this project provides passive water treatment by aerating the produced water. Aeration adds dissolved oxygen to the produced water, allowing susceptible ions to oxidize and precipitate out of the water. This action is of particular importance with dissolved iron, as it is a key water quality parameter that is monitored by the state. When iron precipitates from the produced water, it will frequently leave iron oxide at or near the outfall, which can be identified as an orange stain on materials that have been in contact with the water. The orange stain represents a positive benefit to the downstream waters, as iron left near the outfall means improved water quality downstream.

The operator has obtained Wyoming Pollutant Discharge Elimination System (WYPDES) permits from the WDEQ for the discharge of water produced from this project. Permit number WY0094129[1] will cover discharges within the Middle Prong of Wild Horse Creek drainage, and WY0094137[2] will cover discharges to the Wild Horse Creek drainage.

Permit effluent limits were set at (WYPDES page 2):

pH	6.5 to 9
Specific Conductance	3260[1] and 2560[2] mg/l max
Dissolved iron	1000 µg/l max
Sodium Adsorption Ratio	<6.67 x EC -3.33
Total Barium	1800 µg/l max
Total Arsenic	8.4 µg/l max
Chlorides	150 mg/l

([1] represents standards in WYPDES permit WY0094129, and [2] represent standards in permit WY0094137)

The WYPDES permit also addresses existing downstream concerns, such as irrigation use, in the COAs for the permit. As part of the WYPDES permits, an Irrigation Monitoring Point has been established in the NESW of Section 15, Township 53N, Range 75W.

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 8 discharge points proposed under this alternative. They have been appropriately sited and use appropriate water energy dissipation measures. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

To manage the produced water, eight on channel impoundments (108 acre feet of storage) would potentially be used within the project area. These impoundments will disturb approximately 14.75 acres including the dam structures. Of these water impoundments, two are existing structures and eight are proposed to be newly constructed. Monitoring may be required based upon shallow groundwater investigations required for new impoundments by the WDEQ. Existing impoundments will be upgraded and proposed impoundments will be constructed to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner. All water management facilities were evaluated for compliance with best management practices during the onsite.

Yates has designated three of the reservoirs as "primary" and the remaining seven as "secondary". This means that they will initially only construct the "primary" reservoirs. Although the "secondary" reservoirs meet environmental standards for BLM authorization, Yates will not construct them under this initial approval. The secondary designation allows them to forgo bonding the reservoirs until they are certain of their need for produced water management. If Yates determines that they need to construct the reservoirs, they will submit sundry notices to that effect with the associated bonds. Additionally, the Morton Reservoir in the SESE, and the Bazooka Joe in the SENW, of Section 26 Township 53N Range 75W are in the NSO portion of the lease stipulations in the south half of section 26. Under Alternative B the Morton Reservoir and the access to the Bazooka Joe reservoir would be denied.

In addition to managing water through on-channel impoundments, the operator proposes to use three previously approved injection wells and one proposed injection well. The operator estimates that they will manage 80% of their produced water through the injection wells, and the remaining 20% through the impoundments. For this action, that means that approximately 620 gpm (1000 acre feet/year) may be handled by the injection wells, and the remaining 155 gpm (250 acre feet/year) may be handled by the impoundments.

Well Name	Status	Location				WDEQ Permit	EA Number
		Qtr-Qtr	Section	Township	Range		
Faris Deep Injector Fed #10	Existing	SENW	11	52N	75W	WYW-130612	WY-070-07-049
Fuels Injector Well #1	Existing	SWSE	24	53N	75W	WYW-151894	CX70-3-040
Worley Draw Injector Well #1	Existing	NWNW	30	53N	74W	WYW-145147	CX70-3-041
Cypher Injector Fed #24	Proposed	SWNE	35	53N	75W	NA	NA

Produced Water Quantity
The PRB FEIS estimates 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 0.05 cfs below the lowest reservoir (after infiltration and evapotranspiration losses and considering the majority of water will be managed by injector wells). 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.

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 2006 with a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-87). The predicted maximum discharge rate from these 31 wells is anticipated to be a total of 775 gpm, with 155 gpm going to the impoundments (0.3 cfs), and as stated above, 0.05 cfs of flow may be expected to resurface below the lowest reservoir. Using full containment of the produced water, and an assumed conveyance loss of 20% (PRB FEIS pg 4-74) of the resurfaced flow below the reservoirs, this action may add a maximum 0.04 cfs to the Upper Powder River flows, or 0.05% 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).

In the WMP portion of the POD, the operator provided an analysis of the potential development in the watershed above the project area (WMP Attachment E). Based on the area of the South Windmill Draw watershed above the POD (45.73 sq mi) and an assumed density of one well per location, every 80 acres, the potential exists for the development of 366 wells which could produce a maximum flow rate of 9150 gpm (20 cfs) of water. The BLM agrees with the operator that this is not expected to occur because:

1. Some of these wells have already been drilled and are producing.
2. New wells will be phased in over several years, and
3. A decline in well discharge generally occurs after several months of operation.

The potential maximum flow rate of produced water within the watershed upstream of the project area, 20 cfs, is much less than the volume of runoff estimated from the 2-year storm event (412 cfs) for South Windmill Creek drainage (WMP Attachment E).

Springs

The development of CBNG, 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. However, the identified springs have only been presented as wet areas, and may in fact be a result of surface runoff. No discernible flow has been identified; and no beneficial use, permitted or otherwise, has been attributed to these springs. Therefore, any impacts to the springs will be negligible.

In-channel downstream impacts are addressed in the WMP for the NEO POD prepared by Western Water Consultants for Yates Petroleum Company.

4.2.4.2.2. Cumulative Effects

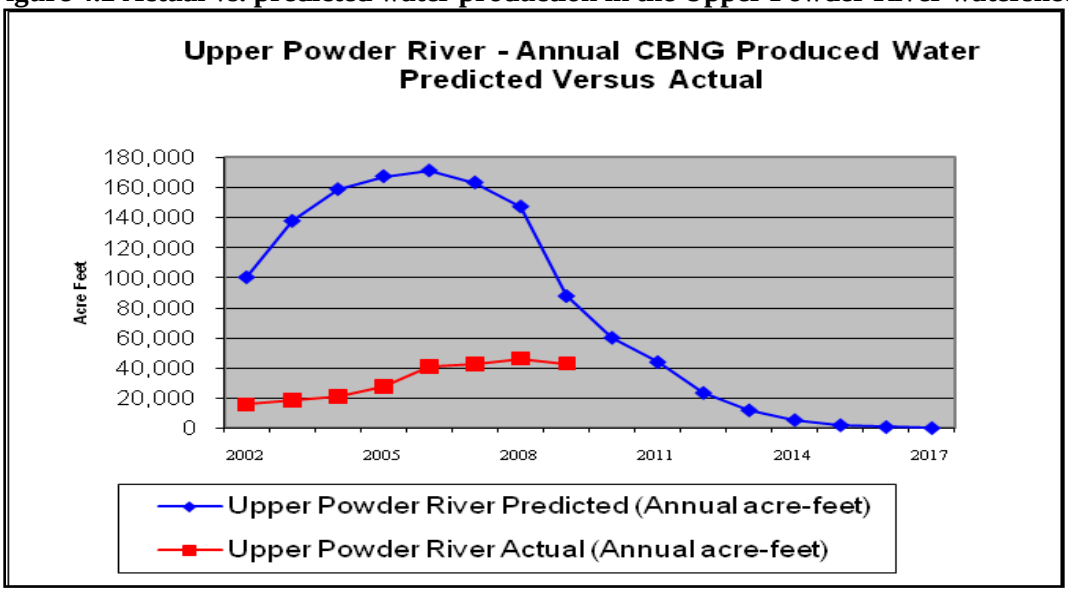
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Upper Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2009, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 255,531 acre-ft of water compared to the predicted 1,135,567 acre-ft disclosed in the PRB FEIS (Table 2-8, page 2-26). These figures are presented graphically in Figure 4.1 and Table 4.6 following. This volume is 22.5 % of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

Table 4.5 Actual vs. predicted water production in the Upper Powder River watershed *2009 Data Update 04-06-10*

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040	42,112	25.8	166,096	18.5
2008	147,481	1,047,521	45,936	31.1	212,522	20.3
2009	88,046	1,135,567	43,009	48.8	255,531	22.5
2010	60,319	1,195,886				
2011	44,169	1,240,055				
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	**1,285,233**		**255,531**			

Figure 4.2 Actual vs. predicted water production in the Upper Powder River 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 disclosed 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 Upper Powder River drainage, which is approximately 23% 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 by fully containing it or injecting it into subsurface formations.

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.

4.2.4.2.3. Mitigation Measures

Channel crossings by roads 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 channels and floodplains associated with this project.

4.2.4.2.4. 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).

4.2.5. Economics and Recovery of CBNG Resources

Development of this project would have effects on the local, state, and national economies. Based on the estimates in the BLM's 2009 Reasonably Foreseeable Development Scenario, the drilling of the 29 proposed wells in the NEO POD will generate approximately 0.23 billion cubic feet of gas (BCFG) per well, over the life of the well. Actual revenue from this amount of gas is difficult to calculate, as there are several variables contributing to the price of gas at any given time. Regardless of the actual dollar amount, the royalties from the gas produced in the NEO POD would have several benefits. The federal government collects 12.5% of the royalties from all federal wells, which helps offset the costs of maintaining the federal agencies that oversee permitting. In addition to generating federal income, approximately 49% of the royalties from the NEO POD wells would return to the State of Wyoming. This revenue from mineral development contributes to Wyoming's economy, and allows for improvements in state funded programs such as infrastructure and education. The development of the NEO POD would also provide local revenue by employing workers in the area to build the roads and project infrastructure, drill the wells, and maintain and monitor the project area. This pool of individuals employed to work on the NEO POD would also result in an increase in demand for goods and services from nearby communities, primarily those of the Powder River Basin area in Wyoming.

4.2.5.1. 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, please refer to the referenced PRB FEIS, Volume 2, Chapter 4.

4.2.5.2. Residual 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, please refer to the referenced PRB FEIS, Volume 2, Chapter 4.

4.2.6. Cultural Resources

4.2.6.1. Direct and Indirect Effects

Non eligible site(s) 48CA5098, 48CA5101, 48CA5103 will be impacted by the proposed project. 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 September 16, 2010 that no historic properties exist within the APE.

4.2.6.2. 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 in the proposed project areas serve to partially mitigate potential cumulative effects to cultural resources.

4.2.6.3. 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).

4.2.6.4. 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.

4.2.7. Air Quality

4.2.7.1. 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.

4.2.7.2. Cumulative Effects

Impacts of surface disturbing activities on air quality were analyzed in the 2003 Powder River RMP/FEIS (pgs 4-354-404). There are approximately 13,093 Federal wells existing in the Buffalo Field Office, which are predominately 84% coalbed methane production wells. Analysis of cumulative impacts for reasonably foreseeable development (RFD) of oil and gas wells on public lands in the Buffalo Field Office is presented in the 2003 Powder River RMP/FEIS.

4.3 Alternative C

List of Wells:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
1	NEO CS FEDERAL	1*	NENE	10	53N	75W	WYW130613
2	NEO CS FEDERAL COM	2	SWNW	10	53N	75W	WYW130613
3	NEO CS FEDERAL	3	SWNE	10	53N	75W	WYW130613
4	NEO CS FEDERAL	4	NESE	10	53N	75W	WYW130613
5	NEO CS FEDERAL	5	NESW	10	53N	75W	WYW130613
6	NEO CS FEDERAL	6	SWSW	10	53N	75W	WYW130613
7	NEO CS FEDERAL	7	SWSE	10	53N	75W	WYW130613
8	NEO CS FEDERAL	8	NENW	11	53N	75W	WYW130613
9	NEO CS FEDERAL	9	SWNW	11	53N	75W	WYW130613
10	NEO CS FEDERAL	10	NESW	11	53N	75W	WYW130613
11	NEO CS FEDERAL	11	SWSW	11	53N	75W	WYW130613
12	NEO CYPHER CS FEDERAL COM	10	SWNW	26	53N	75W	WYW130087
13	NEO CYPHER CS FEDERAL	13	NESW	26	53N	75W	WYW130087
14	NEO CYPHER CS FEDERAL	14	SWSW	26	53N	75W	WYW130087
15	NEO CYPHER CS FEDERAL	15	SWSE	26	53N	75W	WYW130087
16	NEO CYPHER CS FEDERAL	16	NENE	35	53N	75W	WYW130087
17	NEO CYPHER CS FEDERAL	17	NENW	35	53N	75W	WYW130087
18	NEO CYPHER CS FEDERAL	18	SWNW	35	53N	75W	WYW130087
19	NEO CYPHER CS FEDERAL	19	SWNE	35	53N	75W	WYW130087

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
20	NEO CYPHER CS FEDERAL	20	NESE	35	53N	75W	WYW130087
21	NEO CYPHER CS FEDERAL	21	SWSE	35	53N	75W	WYW130087
22	NEO CYPHER INJECTOR FED	24	SWNE	35	53N	75W	WYW130087
23	NEO DOZER CS FEDERAL	1	NESW	35	53N	75W	WYW151895
24	NEO DOZER CS FEDERAL	2	SWSW	35	53N	75W	WYW151895
25	NEO TRINITY CS FEDERAL	1	NENE	27	53N	75W	WYW135224
26	NEO TRINITY CS FEDERAL	2	NENW	27	53N	75W	WYW135224
27	NEO TRINITY CS FEDERAL	3	SWNW	27	53N	75W	WYW135224
28	NEO TRINITY CS FEDERAL	4	SWNE	27	53N	75W	WYW135224
29	NEO TRINITY CS FEDERAL	5	NESE	27	53N	75W	WYW135224
30	NEO TRINITY CS FEDERAL	6	NESW	27	53N	75W	WYW135224
31	NEO TRINITY CS FEDERAL	7	SWSW	27	53N	75W	WYW135224
32	NEO TRINITY CS FEDERAL	8	SWSE	27	53N	75W	WYW135224

List of Impoundments:

	Facility Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Disturbance	Lease #
1	LAKE RESERVOIR	SWSW	27	53N	75W	4.7	0.9	WYW135224
2	BUTTE RESERVOIR	SENW	27	53N	75W	6.4	1.7	WYW135224
3	357 RESERVOIR	NENW	26	53N	75W	7.0	1.2	WYW151891
4	SIX GUN SAM RES.	NWNE	26	53N	75W	16.5	2.2	WYW130087
5	RIFLEMAN RESERVOIR	NENW	26	53N	75W	19.1	2.7	WYW151891
6	BAZOOKA JOE RESERVOIR	SENW	26	53N	75W	15.2	2.2	WYW130087
7	MORTON RESERVOIR	SESE	26	53N	75W	15.8	2.4	WYW130087
8	HOLSTER RESERVOIR	NENE	35	53N	75W	6.8	1.2	WYW130087
9	SUPERIOR RESERVOIR	SWNE	35	53N	75W	19.4	1.7	WYW130087
10	GREEN HORN RESERVOIR	NESW	35	53N	75W	7.4	1.25	WYW151895

Under Alternative C, 29 of the above wells, and 8 reservoirs and associated infrastructure would be approved.

The following 3APDs, 2 impoundments, associated infrastructure and proposed access through south half of section 26 would be pending a 30 day comment period on lease stipulation modifications.

Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
NEO CYPHER CS FEDERAL	13	NESW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	14	SWSW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	15	SWSE	26	53N	75W	WYW130087

Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
MORTON RESERVOIR		SESE	26	53N	75W	WYW130087
BAZOOKA JOE RESERVOIR		SENW	26	53N	75W	WYW130087

4.2.8. Project Area Description

The following describes the project as planned with all 32 wells, 10 impoundments, and associated infrastructure. Assuming the NSO is modified to a CSU, infrastructure would utilize existing disturbance corridors. The 3APDs, 2 impoundments, associated infrastructure and proposed access through south half of section 26 would be located on spur roads or on the existing access route. Power associated with CBNG development would be buried in the south half of section 26.

4.2.8.1. Land Ownership and Land Use

Effects to landowners and land use would be reduced under Alternative C. There would be fewer redundant access roads across the landscape. The oil and gas operator has incorporated design features in the Neo POD NSO Travel and Mitigation Plan that reduce impacts to the ranching operation. Disturbance from the NEO project would corridor the linear disturbance features used for their ranching operation.

4.2.8.2. Direct and Indirect Effects

Fewer access routes reduce impacts to the ranching operation. Current pastures remain intact for grazing livestock. Direct effects are better working relationships between landowners, BLM and the operator. Reducing linear disturbance also benefits wildlife and habitat functionality.

4.2.8.3. Mitigation Measures

Buried power lines would be marked by flagging above ground.

4.2.8.4. Residual Effects

The land owner will be affected and land use would be modified with the implementation of CBNG development. Stock rates may need to be reduced during development.

4.2.9. Soils, Vegetation, and Ecological Sites

The operator has incorporated using existing roads, and has proposed treatment of cheat grass in design features for Alternative C. Using existing roads would reduce disturbance areas and reduce impacts to soil and vegetation. The most effective method to reclaim an area is to not disturb more area than what is necessary in the first place.

4.2.9.1. Direct and Indirect Effects

Direct impacts are the same as for Alternative B, except under Alternative C impacts include: constructing 3 wells, 2 impoundments, associated infrastructure and using proposed access through south half of section 26. This creates more total area disturbed under Alternative C. This additional disturbance will have indirect effects; specifically more area will need to be managed during construction, interim and final reclamation.

4.2.9.2. Cumulative Effects

Cumulative effects are the same as for Alternative B, but are reduced by incorporating design features in the Neo POD NSO Travel and Mitigation Plan under Alternative C.

4.2.9.3. Mitigation Measures

Mitigation measures are the same as described as for Alternative B.

4.2.9.4. Residual Effects

Residual effects are the same as described as for Alternative B.

4.2.10. Wildlife

Yates Petroleum Corporation proposed a *Neo POD NSO Mitigation Plan* (Plan) involving a more comprehensive approach to mitigating the CBNG effects mechanisms described in section 4.2.3.1.3.1.1 (see Section 2.3.1 for a detailed description of the Plan). The Plan proposes measures designed to reduce negative CBNG effects to sage-grouse while allowing the NSO lease stipulation to be modified so that CBNG wells can be placed in the south half of section 26 (to improve CBNG drainage).

The effects of Alternative C on wildlife would be the same as described for Alternative B with the exception of mountain plover, greater sage-grouse, and sharp-tailed grouse as described below.

4.2.10.1. Threatened, Endangered, Proposed, and Candidate Species

4.2.10.1.1. Proposed Species

4.2.10.1.1.1. Mountain Plover

4.2.10.1.1.1.1. Direct and Indirect Effects

The PRB FEIS noted that an important conservation measure for mountain plovers is avoidance of creation of hunting perches within 0.5 miles of identified nesting areas such as by burying power lines. While no mountain plovers were observed during surveys, suitable nesting habitat exists within the NEO POD and nesting plovers could occupy the site at some future date. Consequently, burial of approximately 2.78 miles of power lines (Alternative C) could benefit future nesting mountain plover.

4.2.10.1.1.1.2. Cumulative Effects

The cumulative effects associated with Alternative are the same as those described for Alternative B.

4.2.10.1.1.2. Mitigation Measures

To ensure that impact to nesting mountain plover do not occur in the future, the PROGRAMMATIC conditions of approval for mountain plover contained in Appendix A will be required.

4.2.10.1.1.3. Residual Effects

No residual effects to nesting mountain plover are expected to occur so long as the mitigation measures contained in Appendix A are effectively applied.

4.2.10.1.2. Candidate Species

4.2.10.1.2.1. Greater Sage-grouse

4.2.10.1.2.1.1. Direct and Indirect Effects

Alternative C incorporates the Plan as an operator-committed measure. While the NSO lease stipulation (Alternative B) limits infrastructure location relative to the Laramore lek, Alternative C includes: 1) a travel plan with reduced frequency of well visitation; 2) infrastructure placement >0.25 miles from the Laramore lek; 3) prohibiting generator placement in the south ½ of section 26; 4) screening mammalian predators from well houses in the south ½ of section 26; and 5) burial of 2.78 miles of overhead power. These measures were designed to address a broader array of mechanisms known or suspected to negatively affect sage-grouse than would occur with implementation of alternative B (Table 4.6). Further, these measures would be applied over a larger area than application of the NSO (Alternative B).

Table 4.6 Comparison of Alternative B and C relative to sage-grouse effect mechanisms.

Effect Mechanism	Alternative B	Alternative C
Human Disturbance	Unmitigated	Well visits reduced to 1/wk; 9:00-3:00; March 1 to June 15; signs placed

Auditory Disturbance	NSO applied; no infrastructure in S1/2 Section 26	No generators placed in NSO acreage
Effect Mechanism	**Alternative B**	**Alternative C**
New Predators	Unmitigated	*Most overhead power buried (approx. 2.78 mi.)**; well houses in NSO acreage screened to prevent predator entry
Lek to Infrastructure Proximity	NSO applied; no infrastructure in S1/2 Section 26	All wells and associated infrastructure located >0.25 mile from the Laramore lek

*An especially valuable element of Alternative C is burial of most of the overhead power (roughly 2.78 mi.) because its placement would introduce a new suite of effects (e.g., hunting perches for corvids and golden eagles, sage-grouse avoidance of tall structures, etc.) into a landscape where little overhead power currently occurs. Burial of power will positively affect sharp-tailed grouse and mountain plover as well.

4.2.10.1.2.2. Cumulative Effects

The cumulative effects associated with implementation of Alternative C are the same as those already described for Alternative B.

4.2.10.1.2.3. Mitigation Measures

The mitigation measures already described for implementation of Alternative C are the same as those already described for Alternative B.

4.2.10.1.2.3.1. Residual Effects

While measures designed to reduce effects to sage-grouse were employed throughout the planning process, it is likely that the proposed activity will further degrade habitat effectiveness and depress sage-grouse recruitment and survival in the area. However, the comprehensive mitigations in Alternative C would reduce the magnitude of habitat degradation when compared to Alternative B (see Table 4.7). These measures were designed to address a broader array of negative effects mechanisms associated with CBNG development, and would be applied over a larger area (e.g., burial of overhead power).

The PRB FEIS (BLM 2003, p. 4-270) acknowledged and disclosed anticipated effects attributable to CBNG development by stating 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." Based on the impacts described in the PRB FEIS and the findings of more recent research, the proposed action will contribute to a decline in male attendance at three occupied leks, and may further contribute to eventual extirpation of the local grouse population.

Uncertainties in these conclusions are: CBNG well "life" relative to the time lag in sage-grouse population effects (i.e., population persistence in developed areas); rate of ecological reintegration following well abandonment; and potential for subsequent sage-grouse population recovery. For example, considerable variation in lek persistence following CBNG development has been documented (Doherty et al. 2010, Oil City lek, p. 5). While this variation is not well understood, implementation of the comprehensive mitigation measures that address commonly accepted effects mechanisms (Alternative C) may extend lek persistence through the life of NEO POD wells; facilitating eventual population recovery in the area.

4.2.10.2. Upland Game Birds

4.2.10.2.1. Plains Sharp-tailed Grouse

4.2.10.2.1.1. Direct and Indirect Effects

Application of the NSO (Alternative B) would not benefit sharp-tailed grouse because habitat contained within the NSO area (i.e., south ½ of section 26) contains only marginal sharp-tailed grouse habitat. However, burial of overhead power (Alternative C, Table 4.7) would address a negative effect mechanism shared by both sage-grouse and sharp-tailed grouse (e.g., reduced occurrence of raven and golden eagle hunting perches). Therefore, implementation of Alternative C would benefit sharp-tailed grouse more than implementation of Alternative B.

4.2.10.2.1.2. Cumulative Effects

The cumulative effects associated with implementation of Alternative C are the same as those already described for Alternative B.

4.2.10.2.1.3. Mitigation Measures

The mitigation measures already described for implementation of Alternative C are the same as those already described for Alternative B.

4.2.11. Water Resources

Impacts to water resources will be the same as those described in Alternative B except that three CBNG wells that were denied from the plan in Alternative B are not denied in this alternative. This increases the estimated water production for the POD to 775 gpm (1.7 cfs, or 1,250 acre feet per year).

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 Upper Powder River drainage, the volume projected to be produced within the watershed in 2010 was 60,319 acre-feet (maximum production was estimated to be 171,423 acre-feet in 2006). As such, the volume of water from these wells is 2.1% of the total volume projected for 2010. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.2.11.1. Groundwater

4.2.11.1.1. Direct and Indirect Effects

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, under this alternative, it may be assumed that a maximum of 310 gpm will infiltrate at or near the discharge points and impoundments (500 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.

4.2.11.1.2. Cumulative Effects

Cumulative effects are the same as described as for Alternative B.

4.2.11.1.3. Mitigation Measures

Mitigation measures are the same as described as for Alternative B.

4.2.11.1.4. Residual Effects

Residual effects are the same as described as for Alternative B.

4.2.11.2. Surface Water

Under this alternative ten impoundments would be authorized but will be considered secondary until proof of bonding is provided by the operator.

List of Impoundments:

Reservoir Name	Qtr	Sec	Twp	Rng	Capacity	Surface Dist	Lease #
LAKE RESERVOIR	SWSW	27	53N	75W	4.7	0.9	WYW135224
BUTTE RESERVOIR	SENW	27	53N	75W	6.4	1.7	WYW135224
357 RESERVOIR	NENW	26	53N	75W	7.0	1.2	WYW151891
SIX GUN SAM RES.	NWNE	26	53N	75W	16.5	2.2	WYW130087
RIFLEMAN RESERVOIR	NENW	26	53N	75W	19.1	2.7	WYW151891
BAZOOKA JOE RESERVOIR	SENW	26	53N	75W	15.2	2.2	WYW130087
MORTON RESERVOIR	SESE	26	53N	75W	15.8	2.35	WYW130087
HOLSTER RESERVOIR	NENE	35	53N	75W	6.8	1.2	WYW130087
SUPERIOR RESERVOIR	SWNE	35	53N	75W	19.4	1.7	WYW130087
GREEN HORN RESERVOIR	NESW	35	53N	75W	7.4	1.25	WYW151895

4.2.11.2.1. Direct and Indirect Effects

Impacts under this alternative are the same as those described in Alternative B.

Produced Water Control

Impacts under this alternative are the same as those described in Alternative B.

Produced Water Quantity

Impacts under this alternative are the same as those described in Alternative B except that the water produced by the POD as a whole will be increased by 75 gpm. For this alternative, that will cause the amount of water estimated to be managed by the four injection wells to be increased to 620 gpm (1.4 cfs, 1000 acre feet/year), with the remainder of 155 gpm (0.4 cfs, 250 acre feet/year) to be managed through the impoundments.

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 2006 with a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-87). The predicted maximum discharge rate from these 31 wells described in this alternative is anticipated to be a total of 775 gpm, with 155 gpm going to the impoundments (0.4 cfs) to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment, this action may add a maximum 0.28 cfs to the Upper Powder River flows, or 0.41% 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).

Springs
Impacts under this alternative are the same as those described in Alternative B.

4.2.11.2.2. Cumulative Effects
Cumulative effects are the same as described as for Alternative B.

4.2.11.2.3. Mitigation Measures
Mitigation measures are the same as described as for Alternative B.

4.2.11.2.4. Residual Effects
Residual effects are the same as described as for Alternative B.

4.2.12. Economics and Recovery of CBNG Resources
4.2.12.1. Direct and Indirect Effects
The three wells would be differed under this alternative. Otherwise impacts are the same as described as for Alternative B. Development of this project would have effects on the local, state, and national economies. Based on the estimates in the BLM's 2009 Reasonably Foreseeable Development Scenario, the drilling of the 32 proposed wells in the NEO POD will generate approximately 0.23 billion cubic feet of gas (BCFG) per well, over the life of the well. Actual revenue from this amount of gas is difficult to calculate, as there are several variables contributing to the price of gas at any given time. Regardless of the actual dollar amount, the royalties from the gas produced in the NEO POD would have several benefits. The federal government collects 12.5% of the royalties from all federal wells, which helps offset the costs of maintaining the federal agencies that oversee permitting. In addition to generating federal income, approximately 49% of the royalties from the NEO POD wells would return to the State of Wyoming. This revenue from mineral development contributes to Wyoming's economy, and allows for improvements in state funded programs such as infrastructure and education. The development of the NEO POD would also provide local revenue by employing workers in the area to build the roads and project infrastructure, drill the wells, and maintain and monitor the project area. This pool of individuals employed to work on the NEO POD would also result in an increase in demand for goods and services from nearby communities, primarily those of the Powder River Basin area in Wyoming.

4.2.12.2. Cumulative Effects
Cumulative effects are the same as described as for Alternative B.

4.2.12.3. Mitigation Measures
Mitigation measures are the same as described as for Alternative B.

4.2.12.4. Residual Effects
Residual effects are the same as described as for Alternative B.

4.2.13. Cultural Resources
4.2.13.1. Direct and Indirect Effects
Impacts are the same as described as for Alternative B

4.2.13.2. Cumulative Effects
Cumulative effects are the same as described as for Alternative B.

4.2.13.3. Mitigation Measures

Mitigation measures are the same as described as for Alternative B.

4.2.13.4. Residual Effects

Residual effects are the same as described as for Alternative B.

5. CONSULTATION & COORDINATION

The pre-approval onsite was conducted on June 22-25, 2010 and August 17, 2010. By the following interdisciplinary personnel:

Interdisciplinary Personal	Title	Agency	Onsite
Jennifer Spegon	Natural Resource Specialist	BLM	June 22, 24, 25 Aug 17
Patrick Cole	Biologist	BLM	June 22, 24, 25 Aug 17
Brent Sobotka	Hydrologist	BLM	June 22
J Bunderson	Civil Engineer	BLM	June 22, 24, 25 Aug 17
Clint Crago	Archeologist	BLM	Not at onsite
Matthew Warren	Petroleum Engineer	BLM	Not at onsite
Christine Sadler	Realty Specialist	BLM	June 25
Kerry Aggen	Geologist	BLM	Not at onsite
Kristine Phillips	Legal Instruments Examiner	BLM	Not at onsite
Laura Atwood	Legal Assistant	BLM	Not at onsite
Bud Stewart	Biologist	WY Game and Fish	Not at onsite
Pauline Schuette	Biologist	USFWS	Not at onsite
Jeb Tachick	Regulatory Specialist	Yates Petroleum	June 22, 24, 25 Aug 17
Saunda Phillips	Landman	Yates Petroleum	June 22, 25
Boyd Albelseth	Hydrologist	Yates Petroleum	June 22,
Heather Arambel	Land man	Yates Petroleum	June 22, 24, 25
Richard Kretschman	Landowner	Landowner	June 22
John Crump	Landowner	Landowner	June 24
Dudley Mackey	Landowner	Landowner	June 25
Candy Laramore	Landowner	Landowner	June 22,25

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

Table 5.1 Consultations

Contact	Title	Organization	Present at Onsite
Mary Hopkins	SHPO	Wyoming State Historic Preservation Office	no
Pauline Schuette	Wildlife Biologist	U.S. Fish & Wildlife Service	no
Bud Stewart	Energy Coordinator	WGFD	no

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.

7. REFERENCES AND AUTHORITIES

Agnew, W. D. 1983. Flora and Fauna Associated with Prairie Dog Ecosystems. Unpublished thesis. Colorado State University, Fort Collins. 47pp.

Agnew, W., D. W. Uresk. and R. M. Mansen. 1986. Flora and Fauna Associated with Prairie Dog Colonies and Adjacent Ungrazed Mixed-grass Prairie in Western South Dakota. Journal of Range Management 39, pgs 135-139

AHPIS, Animal and Plant Health Inspection Service. 2002. General information available online at http://www.aphis.usda.gov/lpa/issues/wnv/wnv.html.

Apa, A. D. 1985. Efficiency of Two Black-tailed Prairie Dog Rodenticides and Their Impacts on Non-target Bird Species. Unpublished thesis, South Dakota State University Brookings. 71pp.

Avian Power Line Interaction Committee (APLIC) 2006. R. Harness, contributing author to: Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006. 207pp.

Braun C. E. 1998. Sage-grouse declines in western North America: what are the problems? Proceedings of the Western Association of State Fish and Wildlife Agencies. 67:134–144.

Bureau of Land Management. 1990. Instruction Memorandum No. WY-90-564: Resource Management Plan Action and Wyoming BLM Standard Mitigation Guidelines for Surface Disturbing Activities. Bureau of Land Management, Wyoming State Office. Cheyenne, WY.

Buseck, R. S., D. A. Kienath, and E. Everett. Species assessment for black-tailed prairie dog (*Cynomys ludovicianus*) in Wyoming. Wyoming Natural Diversity Database, University of Wyoming, Laramie, WY.

Campbell, Thomas and Tim Clark. 1981. Colony Characteristics and Vertebrate Associates of White-tailed and Black-tailed Prairie Dogs. American Midland Naturalist, Vol. 105, No. 2 (April 1981). pgs 269-276.

Clark, T. W., T. M. Campbell, D. G. Socha, and D. E. Casey. 1982. Prairie Dog Colony attributes and Associated Vertebrate Species. Great Basin Naturalist 42: 572-582.

Code of Federal Regulations (CFR)

1. 40 CFR All Parts and Sections inclusive Protection of Environment. Revised as of July 1, 2004.
2. 43 CFR All Parts and Sections inclusive - Public Lands: Interior. Revised as of October 1, 2006.

Confluence Consulting, Inc. 2004. Powder River Biological Survey and Implications for Coalbed Methane Development. Bozeman, MT. 179pp.

Cornish, Todd; Terry Creekmore; Walter Cook; and Elizabeth Williams. 2003. "West Nile Virus - Wildlife Mortality in Wyoming 2002-2003". In: The Wildlife Society Wyoming Chapter Program and Abstracts for the Annual Meeting at the Inn in Lander, WY November 18-21, 2003. Wildlife Society Wyoming Chapter. 17pp.

Deisch, M. S., D. W. Uresk, and R. L. Lindor. 1989. Effects of Two Prairie Dog Rodenticides on Ground Dwelling Invertebrates in Western South Dakota. Ninth Great Plains Wildlife Damage Control Workshop Proceedings. USDA Forest Service General Technical Report RM. Pgs 171-181.

Doherty, K.E., D.E. Naugle, B.L. Walker, J.M. Graham. 2008. Greater sage-grouse winter habitat selection and energy development. Journal of Wildlife Management.72:187-195.

Doherty, K. E., D. E. Naugle, and J. S. Evans. 2010. A currency for offsetting energy development impacts: horse-trading sage-grouse on the open market. PLoS ONE 5(4): e10339.

Ellis, K. L. 1984. Behavior of lekking sage-grouse in response to a perched golden eagle. Western Birds. 15:37-38.

Freudenthal, D. 2010. State of Wyoming executive department executive order 2010-4 (Replaces 2008-2) greater sage-grouse core area protection. The State Of Wyoming. Office of the Governor.

Gelbard J. L., and J. Belnap. 2003. Roads as conduits for exotic plant invasions in a semiarid landscape. Conservation Biology. 17:420–432.

Grenier, M. 2003. An Evaluation of Black-footed Ferret Block Clearances in Wyoming: Completion Report. Wyoming Game and Fish Department. Lander, WY. 16pp

Harju, S. M., M. R. Dzialak, R. E. Taylor, L. D. Hayden-Wing, and J. B. Winstead. 2010. Thresholds and time lags in effects of energy development on greater sage-grouse populations. Journal of Wildlife Management 74:437-448.

Hiat, G.S. and D. Baker. 1981. Effects of oil/gas drilling on elk and mule deer winter distributions on Crooks Mountain, Wyoming. Wyoming Game and Fish Department.

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

Hubert, W. A. 1993. *The Powder River: a relatively pristine stream on the Great Plains*. Pages 387-395 in L. W. Hesse, C. B. Stalnaker, N. G. Benson, and J. R. Zuboy, editors. Restoration planning for the rivers of the Mississippi River ecosystem. Biological Report 19, National Biological Survey, Washington, D.C.

ICF Jones & Stokes. 2008. NEO plan of development. Prepared for Yates Petroleum Corporation by ICF Jones & Stokes, Gillette, WY. 16 pp.

ICF Jones & Stokes. 2009. NEO plan of development addendum A: wildlife surveys. Prepared for Yates Petroleum Corporation by ICF Jones & Stokes, Gillette, WY. 11 pp.

ICF International. 2010. NEO plan of development addendum B: wildlife surveys. Prepared for Yates Petroleum Corporation by ICF International, Gillette, WY. 11 pp.

Ingelfinger, F., and S. Anderson. 2004. Passerine response to roads associated with natural gas extraction in a sagebrush steppe habitat. Western North American Naturalist 64:385-395

Ingelfinger F. 2001. *The effects of natural gas development on sagebrush steppe passerines in Sublette County, Wyoming*. M.Sc. thesis, University of Wyoming, Laramie, WY.

Kelly Brian T. 2004. Letter to interested parties: Black-footed ferret clearance surveys. U.S. Fish and Wildlife Service (February 2, 2004). Cheyenne, WY. 4pp.

King, J. A. 1955. Social Behavior, Social Organization and Population Dynamics in a Black-tailed Prairie Dog Town in the Black Hills of South Dakota. Contr. Lab. Vert. Biol., University of Michigan. 67pp.

Klute, D. S., L.W. Ayers, M.T. Green, W.H. Howe, S.L. Jones, J.A. Shaffer, S.R. Sheffield, and T.S. Zimmerman. 2003. *Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States*. U.S. Department of the Interior; Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.

Knick, S. T., and J. T. Rotenberry. 1995. Landscape characteristics of fragmented shrubsteppe habitats and breeding passerine birds. Conservation Biology 9:1059-1071.

Knick, S.T.. *in press*. Ecological influence and pathways of land use in sagebrush. Studies in Avian Biology. 71 pp.

Litzel, R. 2004. Personal communication [January 6 phone conversation with Jim Sparks]. Johnson County Weed and Pest District.

Lowham, H.W. Streamflows in Wyoming WRIR 88-4045 U.S. Geological Survey 1988

Lustig, Thomas D., March. 2003. Where Would You Like the Holes Drilled into Your Crucial Winter Range? Transactions of the 67th North American Wildlife and Natural Resources Conference.

Lyon, A. G., and S. H. Anderson. 2003. Potential gas development impacts on sage grouse nest initiation and movement. Wildlife Society Bulletin 31:486-491.

Marra PP, Griffing SM, McLean RG. West Nile virus and wildlife health. Emerg Infect Dis [serial online] 2003 Jul. Available from: URL: http://www.cdc.gov/ncidod/vol9no7/03-0277.htm.

McCraken, J. G., D. W. Uresk and R. M. Mansen. 1985. Burrowing Owl Foods in Conata Basin, South Dakota. Great Basin Naturalist 45: 287-290.

McDonald, D., N.M. Korfanta, and S.J. Lantz. 2004. *The Burrowing Owl (Athene cunicularia): a technical conservation assessment*. USDA Forest Service, Rocky Mountain Region.

Meffe, G.K. and C.R. Carroll. 1994. *Principles of Conservation Biology*. Sinauer Associates, Inc. Sunderland, MA.

Miller, B., G. Ceballos, and R. Reading. 1994. The prairie dog and biotic diversity. Conservation Biology 8:667-681.

Miller, K.A Peak-Flow Characteristics of Wyoming Streams WRIR 03-4107 U.S. Geological Survey 2003

Mooney, A. 2004. Personal Communication [January 6 phone conversation with Jim Sparks]. Campbell County Weed and Pest District.

Nicholoff, S. H. compiler. 2003. Wyoming bird conservation plan, Version 2.0. Wyoming Partners in Flight. Wyoming Game and Fish Department, Lander, WY.

Noss, R. F. and A. Cooperrider. 1994. *Saving Nature's Legacy: Protecting and Restoring Biodiversity*. Defenders of Wildlife and Island Press, Washington, D. C.

Primack, R.B. 1993. Essentials of conservation biology. Sinauer Associates, Sunderland, Massachusetts, USA.

Reading, R. P., S. R. Beissinger, J. J. Grensten, and T. W. Clark. 1989. Attributes of Black-tailed Prairie Dog Colonies in North Central Montana with Management Recommendations for the Conservation of Biodiversity. Attributes of Black-tailed Prairie Dog Colonies in North Central Montana with Management Recommendations for the Conservation of Biodiversity. pgs 13-28.

Rinkes, T. 2003. Personal communication [Draft notes from Annual Sage-Grouse and Sagebrush Species of Concern Meeting]. Bureau of land Management Wildlife Biologist/Sage Grouse Coordinator.

Romin, Laura A., and Muck, James A. May 1999. Utah Field Office Guidelines For Raptor Protection From Human And Land Use Disturbances. U.S. Fish and Wildlife Service, Salt Lake City, Utah

Rowland, M. M., W. J. Wisdom, L. H. Suring, and C. W. Mienke. 2006. Gteater sage-grouse as an umbrella species for sagebrush-associated vertebrates. Biological Conservation 129:323-335.

Sage Grouse Implementation Team. 2008. Letter from Bob Budd (Chairman) to Wyoming governor Dave Freudenthal. March 2008.

Schroeder, M.A., C.L. Aldridge, A.D. Apa, J.R. Bohne, C.E. Braun, S.D. Bunnell, J.W. Connelly, P.A. Deibert, S.C. Gardner, M.A. Hilliard, G.D. Kobriger, S.M. McAdam, C.W. McCarthy, J.J. McCarthy, D.L. Mitchell, E.V. Rickerson, and S. J. Stiver. 2004. Distribution of sage-grouse in North America. Condor 106:363-376.

The National Environmental Policy Act of 1969 (NEPA), as amended (Pub. L. 91-90, 42 U.S.C. 4321 et seq.).

Urban, D. L., and H. H. Shugart, Jr. 1984. Avian demography in mosaic landscapes: modeling paradigm and preliminary results. Pages 273-280 in J. Verner, M. L. Morrison, and C. J. Ralph editors. Wildlife 2000: Modeling habitat relationships of terrestrial vertebrates. University of Wisconsin Press, Madison.

U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. The Federal Land Policy and Management Act, as amended. Public Law 94-579.

U.S. Department of the Interior 2001, Bureau of Land Management, Buffalo Field Office. Approved Resource Management Plan for Public Lands Administered by the Bureau of Land Management Buffalo Field Office April 2001.

U.S. Department of the Interior 2003, Bureau of Land Management. Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment. April 30, 2003.

U.S. Department of the Interior 2005, Bureau of Land Management. Task 2 report for the Powder River Basin Coal review past and present and reasonably foreseeable development activities. Prepared by ENSR Corporation, Fort Collins, CO for the Bureau of Land Management Casper Field Office. http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/prbdocs/coalreview/Task2.html

U.S. Department of the Interior 2010, Bureau of Land Management. BLM Wyoming sensitive species policy and list. Ma4rch 31, 2010. IM WY-2010-027.

U.S. Department of the Interior 2007, US Fish and Wildlife Service. Reinitiation of Formal Consultation for Powder River Oil and Gas Project. March 23, 2007

U.S. Department of the Interior, Fish and Wildlife Service. 2002. Final Biological and Conference Opinion for the Powder River Oil and Gas Project, Campbell, Converse, Johnson, and Sheridan Counties (WY6633). U.S. Fish and Wildlife Service. December 17, 2002. Cheyenne, WY. 58pp.

U.S. Department of the Interior, Fish and Wildlife Service (USFWS). 1989. Black-footed ferret Survey Guidelines for Compliance with the Endangered Species Act. Denver, CO and Albuquerque, NM.

U.S. Department of the Interior, Fish and Wildlife Service (USFWS). 2010. Endangered and threatened wildlife and plants; 12-month finding for petitions to list the greater sage-grouse (Centrocercus urophasianus) as threatened or endangered. Proposed Rules.

U.S. Department of the Interior, Fish and Wildlife Service (USFWS). 2010a. Endangered and threatened wildlife and plants; listing the mountain plover as threatened. Proposed Rules.

U.S. Department of the Interior, Fish and Wildlife Service (USFWS). 2010b. Threatened, endangered, candidate, and proposed species Bureau of Land Management, Buffalo Field Office. Updated August 2010. Ecological Services. Cheyenne, WY.

Walker B, Naugle D, Rinkes T. 2003. The Response of Sage Grouse to Coal-bed Methane Development and West Nile virus in the Powder River Basin: Is There a Link ? Page 6 in: Program and Abstracts for the Annual Wildlife Society Meeting, Wyoming Chapter.

Walker, B.L., D. E. Naugle, and K.E. Doherty. 2007. Greater sage-grouse population response to energy development and habitat loss. Journal of Wildlife Management 71:2644-2654.

Walker, B. L. 2008. Greater sage-grouse response to coal-bed natural gas development and West Nile virus in the Powder River Basin, Montana and Wyoming, U. S. A. PhD Dissertation. University of Montana, Missoula.

WDEQ, June 14, 2004. Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments

Windingstad, R. M., F. X. Kartch, R. K. Stroud, and M. R. Smith. 1987. Salt toxicosis in waterfowl in North Dakota. Jour. Wildlife Diseases 23(3):443-446.

Wyoming Game and Fish Department (WGFD). 2004. Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands. WGFD. Cheyenne, WY

WGFD. 2005. Northeast Wyoming Local Working Group Area: Annual Sage-Grouse Completion Report for 2005. Wyoming Game and Fish Department. Buffalo, WY. 42pp.

8. LIST OF INTERDISCIPLINARY TEAM PREPARERS AND REVIEWERS

Jennifer Spegon, Natural Resource Specialist
Casey Freise, Supervisory Natural Resource Specialist
Brent Sobotka, Hydrologist
James Evans, Petroleum Engineer
Denise Oliverius, Realty Specialist
Kristine Phillips, Legal Instruments Examiner
Clint Crago, Archaeologist
Pat Cole, Wildlife Biologist
KerryAggen, Geologist
Chris Durham, Assistant Field Manager, Resources
Paul Beels if applicable, Associate Field Manager, Minerals & Lands
Duane W. Spencer, Field Manager

Interdisciplinary Team Lead: Jennifer Spegon

APPENDIX A: CONDITIONS OF APPROVAL FOR THE APPLICATION

FOR PERMIT TO DRILL

POD Name: NEO POD

Operator Name: Yates Petroleum Company

Field Office: Buffalo Field Office
1425 Fort Street
Buffalo, Wyoming 82834
307-684-1100

Well Sites:
The following 29 Applications for Permit to Drill (APDs) and associated infrastructure are authorized:

Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
NEO CS FEDERAL	1*	NENE	10	53N	75W	WYW130613
NEO CS FEDERAL COM	2	SWNW	10	53N	75W	WYW130613
NEO CS FEDERAL	3	SWNE	10	53N	75W	WYW130613
NEO CS FEDERAL	4	NESE	10	53N	75W	WYW130613
NEO CS FEDERAL	5	NESW	10	53N	75W	WYW130613
NEO CS FEDERAL	6	SWSW	10	53N	75W	WYW130613
NEO CS FEDERAL	7	SWSE	10	53N	75W	WYW130613
NEO CS FEDERAL	8	NENW	11	53N	75W	WYW130613
NEO CS FEDERAL	9	SWNW	11	53N	75W	WYW130613
NEO CS FEDERAL	10	NESW	11	53N	75W	WYW130613
NEO CS FEDERAL	11	SWSW	11	53N	75W	WYW130613
NEO CYPHER CS FEDERAL COM	10	SWNW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	16	NENE	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	17	NENW	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	18	SWNW	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	19	SWNE	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	20	NESE	35	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	21	SWSE	35	53N	75W	WYW130087
NEO CYPHER INJECTOR FED	24	SWNE	35	53N	75W	WYW130087
NEO DOZER CS FEDERAL	1	NESW	35	53N	75W	WYW151895
NEO DOZER CS FEDERAL	2	SWSW	35	53N	75W	WYW151895
NEO TRINITY CS FEDERAL	1	NENE	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	2	NENW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	3	SWNW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	4	SWNE	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	5	NESE	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	6	NESW	27	53N	75W	WYW135224

Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
NEO TRINITY CS FEDERAL	7	SWSW	27	53N	75W	WYW135224
NEO TRINITY CS FEDERAL	8	SWSE	27	53N	75W	WYW135224

Water Management Proposal:
The approved water management plan includes 8 of the water management infrastructures proposed for use in association with this POD. Facilities identified as secondary under approval status have undergone an environmental review, however, the operator has chosen not to provide reclamation bonds, and will not construct them until proof of bonding is provided. If the operator chooses to develop the facilities, they will submit a sundry notice to that effect with the relevant reclamation bonds.

Facility Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Disturbance (acres)	Lease #	Approval Status
Lake Reservoir	SWSW	27	53N	75W	4.7	0.9	WYW-135224	Secondary
Butte Reservoir	SENW	27	53N	75W	6.4	1.7	WYW-135224	Secondary
357 Reservoir	NENW	26	53N	75W	7.0	1.2	WYW-151891	Secondary
Six Gun Sam Res.	NWNE	26	53N	75W	16.5	2.2	WYW130087	Secondary
Rifleman Reservoir	NENW	26	53N	75W	19.1	2.7	WYW-151891	Secondary
Holster Reservoir	NENE	35	53N	75W	6.8	1.2	WYW130087	Secondary
Superior Reservoir	SWNE	35	53N	75W	19.4	1.7	WYW130087	Secondary
Green Horn Reservoir	NESW	35	53N	75W	7.4	1.25	WYW-151895	Secondary

Water Management Facilities:
Three existing injector wells and one new injector wells are approved.

	Facility Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Distur-bance	Lease #
1	FARIS DEEP INJECTOR FED#10	SENW	11	52N	75W	NA	NO NEW	WYW130612
2	FUELS INJECTOR WELL #1	SWSE	24	53N	75W	NA	NO NEW	WYW151894
3	WORLEY DRAW INJECTOR WELL #1	NWNW	30	53N	74W	NA	NO NEW	WYW145147
4	CYPHER INJECTOR FED #24	SWNE	35	53N	75W	NA	0.1	WYW130087

Deferrals:
The following 3APDs, 2 impoundments, associated infrastructure and proposed access through NSO are deferred. Decisions on activities in the NSO are deferred, pending a 30 day comment period to modify the lease stipulation on the south half of section 26 from a No Surface Occupancy to Controlled Surface Use stipulation:

Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
NEO CYPHER CS FEDERAL	13	NESW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	14	SWSW	26	53N	75W	WYW130087
NEO CYPHER CS FEDERAL	15	SWSE	26	53N	75W	WYW130087
MORTON RESERVOIR		SESE	26	53N	75W	WYW130087
BAZOOKA JOE RESERVOIR		SENW	26	53N	75W	WYW130087

Rights-of-Way Necessary Prior to Construction:
The following rights-of-way locations were identified with the Neo POD (as shown on Map D) for roads, road/utility corridors and reservoirs. Construction of the following locations is prohibited until authorized rights-of-way have been issued for the following locations:

T. 53 N., R. 74 W.,
sec. 31,
T. 52 N., R. 75 W.,
sec. 1,
T. 53 N., R. 75 W.,
sec. 10, 11, 13, 15, 22, 24-27, 35

SITE SPECIFIC

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. Approval of this APD does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease that would entitle the applicant to conduct operations thereon. In addition, approval of this APD does not imply that the operator has legal access to the drilling location. When crossing private surface 43 CFR 3814 regulations must be complied with and when crossing public surface off-lease the operator must have an approved right-of-way.

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

3. The approval of this project does not grant authority to use off lease Federal lands. No surface disturbing activity, or use of off-lease federal lands, is allowed on affected leases until right-of-way grants become effective which is the date signed by the authorized officer.

4. The Wyoming Reclamation Policy applies to all surface disturbing activities. The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231).

5. All pit spoil must be placed back in the pit once dry. The pit area should be mounded slightly to allow for settling and positive surface drainage.

6. Improved roads with utility corridor working width will not exceed 50 feet average width for total disturbance (working, and clearing). Blading is not to exceed 40 feet width with the possibility that under certain circumstances (such as encountering rock) the width may be exceeded and then returned to 50 feet as soon as possible.

7. Primitive roads with utility corridor working width will not exceed an average of 40 feet with a clearing and blading not to exceed 30 feet in width. Under certain circumstances (such as encountering rock) width may be exceeded and then returned to 40 feet as soon as possible.

8. The following engineered access roads must be fully built (including all water control structures such as wingditches, culverts, relief ditches, low water crossings, surfacing, etc.) and functional prior to drilling of the well.

Township/Range	**Section**	**Wells and Infrastructure**
T 53 R75	S 11	Neo 10 access road
T 53 R75	S 35	Cypher 21

9. Topsoil will be stabilized within 30 days of the initiation of construction activities for the Neo 10 and the pipeline corridor between the Neo 7 and Neo 11 wells. Topsoil stabilization methods include mulching, matting, or tackifiers to hold topsoil in place during construction. The following well locations and access road/corridor in the project area have been identified to have limited reclamation potential (with a shallow layer of organic material) that will require topsoil to be stabilized in a manner which eliminates erosion from weather (wind and water) until the construction crew can re-apply the topsoil and apply a final stabilization method (mulch, matting, or tackifier) to hold topsoil in place until a self-perpetuating native plant community has stabilized the site in accordance with the Wyoming Reclamation Policy. If factors outside of Yates' control prevents the stabilization within 30 days of the completion of construction, Yates will notify the AO.

Township/Range	**Section**	**Wells and Infrastructure**
T 53 R75	S 11	Neo 10 well and access road
T 53 R75	S 10 & 11	Pipeline corridor between the Neo 7 and Neo 11 wells

10. Signs must be placed at each side of the pipeline corridor between the Neo 7 and Neo 11 wells to read "No through Traffic Pipeline Only.

11. Facility color Covert Green, selected to blend with the surrounding vegetation.

12. 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:

Loamy Ecological Site Seed Mix 10-14" Precipitation Zone

Species	**% in Mix**	**Lbs PLS***
Western Wheatgrass (Pascopyrum smithii)/ ***Thickspike Wheatgrass*** (Elymus lanceolatus ssp. lanceolatus)	30	4.8

Species	% in Mix	Lbs PLS*
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 americana)	5	0.6
Totals	**100%**	**12 lbs/acre**

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

10-14" Precipitation Zone
Clayey Ecological Site Seed Mix

Species	% in Mix	Lbs PLS*
Western Wheatgrass (Pascopyrum smithii)	35	4.2
Green needlegrass (Nassella viridula)	30	4.8
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 americana)	5	0.6
Totals	**100%**	**12 lbs/acre**

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

Wildlife

Yates Petroleum Corporation requested that spring seeding be allowed during sage-grouse, raptor, and mountain plover nesting and breeding seasons in the NEO POD Surface Use Plan. However, BLM will only evaluate exception requests on a case by case basis. Timing limitations developed to protect nesting mountain plovers, nesting raptors, and breeding sage-grouse are important to maintain habitat function, and to ensure compliance with the Migratory Bird Treaty Act. Consequently, timing limitations will apply to the NEO POD as follows to protect nesting mountain plovers, nesting raptors, and breeding sage-grouse:

Mountain Plover

Please refer to mountain plover protective requirements derived from the PRB FEIS ROD (BLM 2003, pg. A-35 and A-36) under PROGRAMMATIC, below.

1. If plovers are observed during the nesting season (March 15 to July 31), a disturbance-free buffer zone of 0.25 mile will be established around all mountain plover habitat between March 15 and July 31.

Raptors

1. No surface-disturbing activity shall occur within 0.5 mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey. Surveys shall be conducted by a biologist following the most current BLM protocol. All survey results must be submitted in writing to the BFO and approved prior to initiation of surface-disturbing activities. A 0.5 mile timing restriction will be applied if a nest is identified as active. This timing limitation will affect the following wells and infrastructure (also see the Raptor and Burrowing Owl TLS map below):

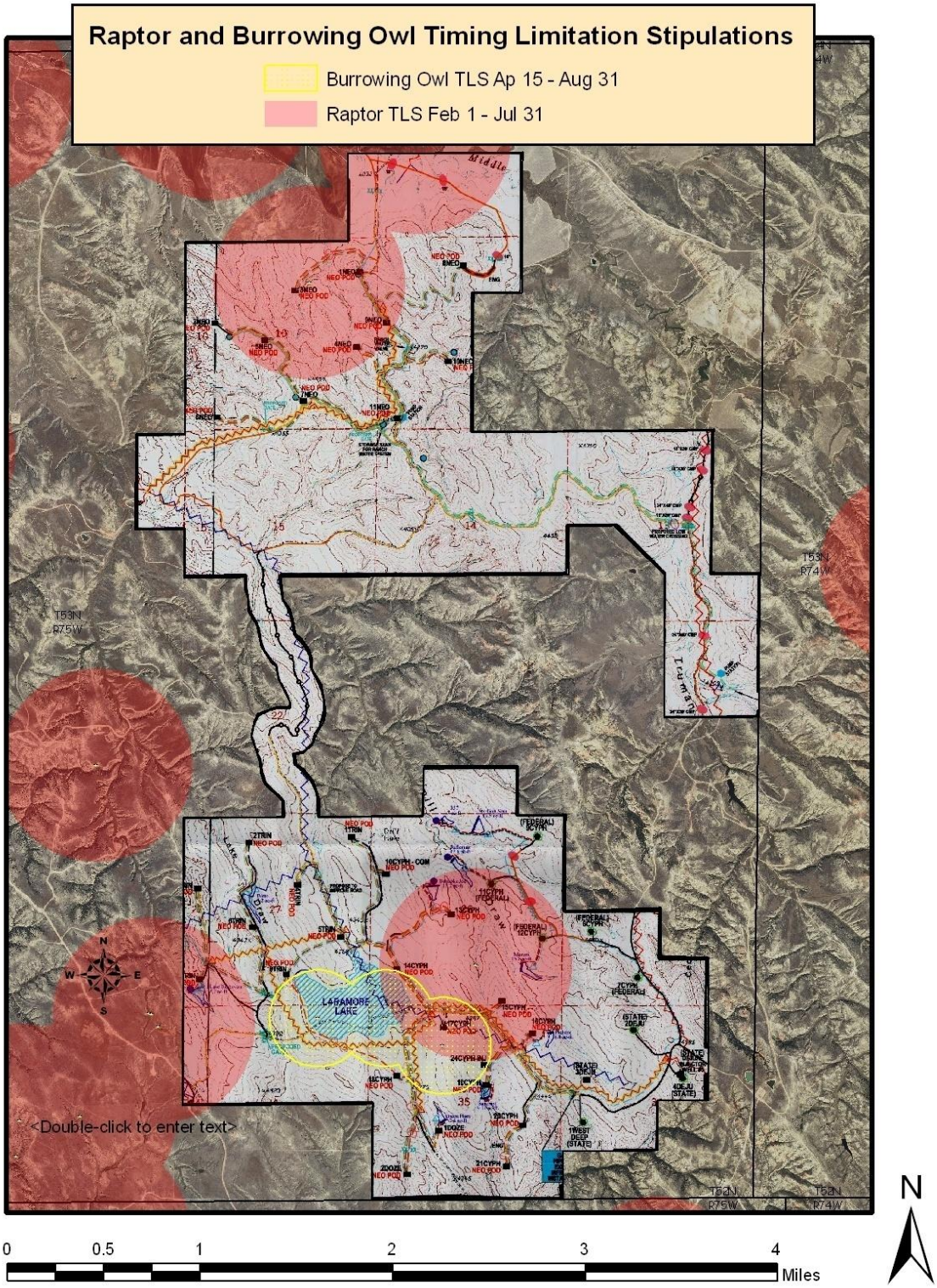
WELLS	**RESERVOIRS**
Cypher 13, 14, 15, 16, 17	Morton
Trinity 7	Bazooka Joe
NEO 1, 3, 4, 5, 9	Lake

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.

Burrowing Owl

The following conditions will alleviate impacts to burrowing owls:

1. No surface disturbing activity shall occur within 0.25 miles of all identified prairie dog colonies from April 15 to August 31, annually, prior to a burrowing owl nest occupancy survey for the current breeding season. This 0.25 mile timing limitation will then be applied if a burrowing owl nest is identified. This condition will be implemented on an annual basis for the duration of surface disturbing activities within the prairie dog town(s). This timing limitation will be in effect unless surveys determine the nest(s) to be inactive. This timing limitation will affect the Cyper 17 and Cyper 24 wells (also see the Raptor and Burrowing Owl TLS map below):



Sage-Grouse

The following conditions will reduce impacts to sage-grouse (also refer to clearance survey requirements derived from the PRB FEIS ROD (BLM 2003, pg. A-33) under PROGRAMMATIC, below):

1. No surface-disturbing activities are permitted in suitable nesting and brood-rearing habitat within the NEO POD boundary between March 15 and June 30. This timing limitation applies to the entire south one-half of the NEO POD, and to construction and/or improvements to the access road/pipeline in sections 13 and 14. This condition will be implemented on an annual basis for the life of the project. Application of this timing limitation stipulation is based on proximity to sage-grouse leks and to occurrence of suitable nesting and brood-rearing habitat. Due to lack of suitable habitat, this timing limitation does not apply to the remainder of the north one-half of the NEO POD.
2. Should a sage-grouse lek be discovered during clearance surveys (see item #1 under PROGRAMMATIC below), the following applies: surface disturbing activity is restricted on or within a 0.25 mile radius of the perimeter of occupied or undetermined sage-grouse leks.
3. Noise from infrastructure within the POD is not to exceed 49 decibels (10 dBA above background noise) at any nearby sage grouse or sharp-tailed grouse display grounds.

Sharp-tailed Grouse

1. No surface disturbing activities are permitted within 0.64 miles of a sharp-tailed grouse lek. This condition will be implemented on an annual basis for the duration of surface disturbing activities. This timing stipulation will affect the following (note that the following areas are also covered by sage-grouse timing limitations that begin before and end after sharp-tailed grouse timing limitations): All roads and infrastructure in sections 26 and 27 associated with the following infrastructure:

WELLS	**RESERVOIRS**
Cypher 10, 13, 14	357
Trinity 1, 4, 5	Bazooka Joe
	Six Gun Sam
	Rifleman

   a. Creation of raptor hunting perches will be avoided within 0.64 miles of documented sharp-tailed grouse lek sites. Perch inhibitors will be installed to deter avian predators from preying on sharp-tailed grouse.

<u>PROGRAMMATIC</u>

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.

Air Quality

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 from the BLM authorized officer.

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.

Threatened, Endangered, or Sensitive Species

1. The companies will conduct clearance surveys for threatened, endangered or other special-concern species at the optimum time. Inventory for special concern species, other than federally listed species below, is contingent upon landowner concurrence. This will require coordination with the BLM before November 1 annually to review the potential for disturbance and to agree on inventory parameters.

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.

Mountain Plover

3. No ground-disturbing activities will occur in suitable nesting habitat prior to surveys for nesting mountain plovers conducted in compliance with the USFWS' Mountain Plover Survey Guidelines (USFWS 2002). A BLM approved biologist will conduct the surveys. Once occupied mountain plover nesting habitat is located, the BLM will initiate section 7 consultation with the USFWS on any project-related activities proposed for such habitat. The amount and nature of ground-disturbing activities will be limited within identified nesting ares in a manner to avoid the abandonment of these areas.

   Project-related features that encourage or enhance the hunting efficiency of predators of mountain plover will not be constructed within ¼ mile of known mountain plover nest sites.

4. Construction of ancillary facilities (for example, compressor stations, processing plants) will not be located within ½ mile of known nesting areas. The threats of vehicle collision to adult plovers and their broods will be minimized, especially within breeding aggregation areas.

5. Where possible, roads will be located outside of plover nesting areas.

6. 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.

Water Management

1. As per the PRB FEIS, impoundments constructed over Federal minerals or on Federal surface to manage CBNG-produced water must be reclaimed when the production phase concludes. In order to establish soil chemistry goals for eventual reclamation (or release to the private landowner), baseline soil samples will be collected from all impoundments carrying water from this federal action located over Federal minerals or on Federal surface. Following the instructions below:
   Samples will be taken from the approximate proposed deepest point in the pool area prior to any construction. The recommended location is 10 feet upstream of the proposed low level outlet within the reservoir pool. Discrete samples will be taken from 0 to 6 inches, 6 to 24 inches and 24 to 48

inches for analysis for the following 10 parameters:

- Texture, pH, EC, Soluble Ca, Soluble Mg, Soluble Na, Soluble K, SAR, Total Organic Carbon (TOC), Total metals including: Al, Ba, B, Cd, Cu, Fe, Mn, , Mo, Ra-226, Se and Zn.
- Standard soil sampling protocol will be used. Analysis results will be sent to the BLM BFO Authorized Officer.
- After the construction of the impoundment, an additional surface sample will be taken from 0 to 6 inches at the lowest point in the pool area and analyzed for the same parameters.
- This baseline analysis will characterize existing soil chemistry and set reclamation target ranges. If the operator does not establish baseline parameters prior to impoundment construction, it would be required to do so at the time of reclamation by sampling a location upstream of the facility.

STANDARD

General

1. All contractors/operators will have a complete copy of the approved APD/POD, including COAs, at the drill site, during the construction of the roads and drill pad, the drilling of the well, completion of the well, and all other related construction activities.

2. 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 NRS Jennifer Spegon at 307- 684-1059 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.

3. These APDs are valid for two years from the date of approval or until the oil and gas lease expires/terminates, whichever occurs first. If this well intends to earn a lease extension, diligent operations (actual drilling) must be in progress over the lease expiration date, advance lease rentals must have been paid, and a letter stating drilling operations were in progress must be submitted to this office no later than five days past the expiration date. If the APD terminates, any surface disturbance created under the application must be reclaimed according to an approved plan.

4. The operator will be in compliance with all applicable local, state and/or federal laws, regulations, and/or statutes.

5. A progress report must be filed a minimum of once a month starting with the month the well was spudded continuing until the well is completed. The report must be filed by the 25th of each month on a Sundry Notice (Form 3160-5). The report will include the spud date, casing information such as size, grade, weight, hole size, and setting depth, amount and type of cement used, top of cement, depth of cementing tools, casing test method, intervals tested, perforated, acidized, fractured and results obtained and the dates all work done.

6. In the event abandonment of the hole is desired, an oral request may be granted by this office but must be timely followed within 5 days with a "Notice of Intention to Abandon" (Form 3160-5). The "Subsequent Report of Abandonment" (Form 3160-5) must be submitted within 30 days after the actual plugging of the well bore, reporting where the plugs were placed, and the current status of the surface restoration.

7. Whether the well is completed as a dry hole or as a producer, two copies of all logs run, core

descriptions, core analysis, well-test data, geologic summaries, sample descriptions, and all other surveys or data obtained and compiled during the drilling, work over, and/or completion operations will be filed with Form 3160-4. A gamma ray log shall be run from T.D. to ground surface.

8. The operator is responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any archaeological, historical, or vertebrate fossil objects on site. If archaeological, historical, or vertebrate fossil materials are discovered, the operator is to suspend all operations that further disturb such materials and immediately contact the Authorized Officer. Operations are not to resume until written authorization to proceed is issued by the Authorized Officer.

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

10. The operator is responsible for the cost of any mitigation required by the Authorized Officer. The Authorized Officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the Authorized Officer that the required mitigation has been completed, the operator will be allowed to resume operations.
    a. 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.

    b. 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.

11. The operator shall be responsible for the prevention of fires on public lands caused by its employees, contractors or subcontractors. During conditions of extreme fire danger, surface use operations may

be limited or suspended in specific areas.

12. All survey monuments found within the area of operations shall be protected. Survey monuments include, but are not limited to: General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U. S. Coast and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any survey monuments, the incident shall be reported in writing to the Authorized Officer.

13. If any time the facilities located on public lands authorized by the terms of the lease are no longer included in the lease (due to a contraction in the unit or other lease or unit boundary change) the BLM will process a change in authorization to the appropriate statute. The authorization will be subject to appropriate rental, or other financial obligation determined by the authorized officer.

14. Gas produced from this well may not be vented or flared beyond an initial authorized test period of 30 days or 50 MMCF following its completion, whichever first occurs, without the prior written approval of the authorized officer. If gas is vented or flared without approval beyond the test period authorized above, you may be directed to shut-in the well until the gas can be captured or approval to continue venting or flaring as uneconomic is granted. You shall be required to compensate the lessor for that portion of the gas vented or flared without approval which is determined to have been avoidably lost.

15. The first producing well drilled to each targeted coal zone will be designated as the POD "Reference Well". Reference wells will not be required for PODs within a 6 mile radius of the first reference well designated by the operator, nor for co-mingled coal zones. The designated reference well must be equipped to be sampled at the well head. A reference well sample will be collected from the wellhead and submitted for analysis; using the list of analytes identified in WDEQ WYPDES Application for Permit to Surface Discharge Produced Water from CBM New Discharges, Renewals, or Major Modifications, within 30 to 60 days of initial water production. Results of the analysis will be submitted to the BFO-BLM authorized Officer as they become available and will include the following information: Operator Name, POD Name, Well Name and location and Date Sampled.

16. By November 1 each year, companies will submit the following information, attached to a Sundry Form 3160-5, where construction and development have taken place in the last year.

    - 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 for all PODs.
    - Two as-built copies of Map D.

17. If any dead or injured threatened, endangered, proposed, or candidate species is located during construction or operation, the U.S. Fish and Wildlife Service's Wyoming Field Office (307-772-2374), their law enforcement office (307-261-6365), and the BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours. If any dead or injured sensitive species is located during construction or operation, the BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

18. Operators shall comply with all other conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (ES-6-WY-07-F012).

19. 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.

DRILLING AND PRODUCTION OPERATIONS

1. The spud date will be reported electronically, (see website location above) to the Authorized Officer 24 HOURS BEFORE SPUDDING, unless otherwise required in site specific conditions of approval.

   Spud Notice Site:
   http://www.wy.blm.gov/minerals/og/og_notices/spud_notice.php

2. The operator shall complete coal bed natural gas 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.

Well Control Equipment

1. The well control equipment approved in this project lists the minimum requirements.

2. The flow line shall be a minimum of 30 feet from the well bore and securely anchored. The 30-foot length of line is a minimum and operators must make consideration for increasing this length for topography and/or wind direction.

3. The flow line shall be a straight run.

4. The flow line must be constructed from non-flammable material.

5. All cuttings and circulating medium shall be directed to and contained in a reserve pit.

6. The nearest edge of the pits shall be a minimum of 25' from the rig.

7. A minimum of 2' of freeboard shall be maintained in the pits at all times.

8. The authorized officer may modify these requirements at any time if it is determined that increased pressure control is deemed necessary.

9. Verbal notification shall be given to the Authorized Officer at least 24 hours before formation tests, BOP tests, running and cementing casing, and drilling over lease expiration dates.

Casing Program

1. The minimum requirement for casing centralizers is as follows: all casing strings will have centralizers on the bottom three joints (i.e. a minimum of one centralizer per joint starting with the shoe joint).

2. In addition, the production casing string shall be centralized with API approved centralizers using the following specifications:

   2.1. One centralizer per~120'(specifically every third or fourth joint depending on joint length).

   2.2. One centralizer 25' above surface casing shoe.

3. Surface casing length shall follow current requirements set forth by the WOGCC. Increased surface casing may be required so that the surface casing shoe may be set into a competent formation.

Cement Program

1. If there are indications of inadequate primary cementing of the surface, intermediate, or production casing strings; such as but not limited to no returns to surface, cement channeling, fallback or mechanical failure of equipment, the operator will evaluate the adequacy of the cementing operations. This evaluation will consist of running a cement bond log (CBL) or an alternate method approved by the Authorized Officer (AO) no sooner than 12 hours and no later than 24 hours from the time the cement was first pumped.

2. If the evaluation indicates inadequate cementing, the operator shall contact a BLM Buffalo Field Office Petroleum Engineer for approval of remedial cementing work. Remedial cementing will consist of, but may not be limited to:

    2.1. Perforating and squeezing cement to ground surface should the top of cement (TOC) be below the surface casing shoe. This shall be done within 36 hours of the completion of pumping the primary cement job.

    2.2. One-inching cement to ground surface should the top of cement (TOC) be above the surface casing shoe.

    2.3. Fallback that is found to be less than 30' from ground surface may be topped off with cement slurry.

3. The adequacy of the remedial cementing operations shall be verified by a cement bond log (CBL) or an alternate method approved by the Authorized Officer (AO). All remedial work shall be completed and verified prior to drilling out the casing shoe or perforating the casing for purposes other than remedial cementing.

4. The cement mix water used must be the same water used to develop the cement program and be of adequate quality, so as not to degrade the setting properties. Waters containing high carbonates or bicarbonates (greater than 2,000 ppm) should be avoided.

Production Equipment

1. All gas measurement equipment that deviates from Onshore Order #5 (or WY NTL 2004-1 in the case of electronic flow computers) shall be approved via a Notice of Intent sundry (Form No. 3160-5) prior to installation and use. This includes any type of primary device other than a standard orifice plate meter. Requests for a variance from the minimum standards of Onshore Order #5 must list:

    The specific type of equipment.

    How this equipment will meet or exceed the requirements of Onshore Order #5.

    The location, specific well and lease number where the equipment will be used.

2. An appropriate pressure gauge is required to be installed on each casing annulus to monitor this pressure.

3. Other actions such as off-lease measurement, commingling, allocation, etc. shall be approved via a Notice of Intent sundry (Form No. 3160-5). Submission of additional information in the POD shall not be construed as permission for these items. If the operator wishes to utilize off-lease gas measurement for wells approved in this POD, they are required to obtain approval via a Notice of Intent sundry (Form No. 3160-5) prior to any gas production. A map shall be attached to the sundry

that delineates where the individual wells will be measured for federal royalty. Unless this POD is committed to a Federal Oil & Gas Unit or Agreement, the production from all Federal wells shall be measured for Federal royalty prior to being combined with production from any other Federal, Indian, or non-Federal leases.

Well and POD Building Identification

1. From the time a well pad is constructed or a well is spudded (if no well pad needed), until abandonment, all well locations must be properly identified with a legible sign. The sign will include the well name and number, operator name, lease number, and the surveyed location.
2. At each POD building site where federal wells are metered, the operator is required to maintain a legible sign displayed in a conspicuous place. This sign is required to be in place at the time metering goes online. The sign shall include: POD name, Operator, Federal well names and numbers, Federal lease numbers being metered at the POD building, and surveyed location of the building.

Protection of Fresh Water Resources

1. All oil and gas operations shall be conducted in a manner to prevent the pollution of all freshwater resources. All fresh waters and waters of present or probable future value for domestic, municipal, commercial, stock or agricultural purposes will be confined to their respective strata and shall be adequately protected. Special precautions will be taken to guard against any loss of artesian water from the strata in which it occurs and the contamination of fresh water by objectionable water, oil, condensate, gas or other deleterious substance to such fresh water.

Miscellaneous Conditions

1. Any changes to the approved drilling plan and/or these conditions of approval shall be approved by the BLM-Buffalo Field Office Petroleum Engineer prior to being implemented.

   After hour's numbers:
   Petroleum Engineer: Matthew Warren Home Telephone: 307-620-0103
   Petroleum Engineer: James Evans Home Telephone: 307-331-5421

2. If any cores are collected, a copy of all analysis performed shall be submitted to the BLM-Buffalo Field Office Petroleum Engineer.

SURFACE USE STANDARD

A. Construction

1. All roads, well pads, rig slots, culverts, spot upgrades and locations where engineered construction will occur will be completely slope staked for review prior to construction.

2. Topsoil will be segregated for all excavation including the entire disturbance area for constructed pads and excavated areas for rig leveling, reserve pits, constructed roads, spot upgrades, reservoir upgrades, outfalls and utility trenches and redistributed for interim reclamation activities. This requirement will not be applied for pipelines installed with wheel trenchers.

3. 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.

4. Maintain a minimum 20-foot undisturbed vegetative border between disturbance areas and the edge of adjacent drainages, unless otherwise directed by the BLM Authorized Officer.

5. 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.

6. 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.

7. The reserve pit will be lined with an impermeable liner if permeable subsurface material is encountered. An impermeable liner is any liner having 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.

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

9. The culvert locations will be staked prior to construction. The culvert invert grade and finished road grade will be clearly indicated on the stakes. Culverts will be installed on natural ground, or on a designed flow line of a ditch. The minimum cover over culverts will be 12” or one-half the diameter

whichever is greater. Drainage laterals in the form of culverts or waterbars shall be placed according to the following spacing:

Soil Type	Road Grade 2-4%	Road Grade 5-8%	Road Grade 9-12%	Road Grade 13-16%
Highly erosive Granitic or sandy	240	180	140	100
Intermediate Erosive clay or load	310	260	200	150
Low erosive shale or gravel	400	325	250	175

10. Provide 4" of aggregate where grades exceed 8%. Surface material must meet requirements set forth in Wyoming Supplement to BLM Road Manual 9113.

11. The minimum diameter for culverts will be 18 inches. However, all culverts will be appropriately sized in accordance with standards in BLM Manual 9113 or at the discretion of the Authorized Officer.

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

13. Pipeline construction shall not block nor change the natural course of any drainage. Pipelines shall cross perpendicular to drainages. Suspended pipelines shall provide adequate clearance for maximum runoff.

14. 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.

15. All overhead power lines will be constructed to Avian Power Line Interaction Committee (2006 edition or most recent edition) by the standards and additional standards identified in the PRB FEIS Biological Opinion (Volume 3, Appendix K, page 43).

B. Operations/Maintenance

1. 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. Operators and their contractors will comply with all state and local laws and regulations pertaining to disposal of human and solid waste will be complied with.

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

3. 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 these wells 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.

4. 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.

5. 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
   - 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
   - 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.

6. 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. Pits must be dry of fluids or they must be removed via vac-truck or other environmentally acceptable method prior to backfilling, re-contouring and replacement of topsoil. Mud and cuttings left in pit must be buried at least 3-feet below re-contoured grade. The operator will be responsible for re-contouring any subsidence areas that develop.

7. The fluids and mud must be dry in the reserve pit before re-contouring pit area. The operator will be responsible for re-contouring 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 re-contour the site.

8. 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.

9. Prior to the use of pesticides on public land, the holder shall obtain from the BLM authorized officer a pesticide use permit (PUP). The PUP must include a 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.

C. 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 re-contouring pit area. The operator will be responsible for re-contouring and reseeding of any subsidence areas that develop.

2. Any spilled or leaked oil, produced water or treatment chemicals must be reported in accordance with NTL-3A 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.

3. Distribute stockpiled topsoil evenly over those areas not required for production (ie.,cut/fill slopes, road ditches, pipelines, etc.) and reseed with approved seed mix.

4. 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.

D. Reclamation/Dry Hole

1. BLM will not release the performance bond until all disturbed areas associated with the APD/POD have 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.

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

3. 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.

4. 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:

    - 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 CBNG water, including discharge points, reservoirs, off-channel pits, land application areas, livestock/wildlife watering facilities, surface discharge stream channels, etc.
    - Refer to *BLM Impoundment Reclamation Guidance* for further information on reclaiming impoundments.
    - Refer to the *Wyoming Reclamation Policy* for further guidance on reclamation.

5. All disturbed lands associated with this project, including the pipelines, access roads, water management facilities, etc will be reclaimed and reseeded within 180 days of well plugging. The reclamation work must be in accordance with the surface use plan and any pertinent site-specific COAs.

6. Disturbed lands will be re-contoured back to conform with existing undisturbed topography. No depressions will be left that trap water or form ponds.

7. The fluids and mud must be dry in the reserve pit before re-contouring pit area. The operator will be responsible for re-contouring 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 re-contour the site.

8. Before the location has been reshaped and prior to redistributing the topsoil, the operator will rip or scarify the drilling area and access road on the contour to 4" below the compacted layer. The rippers are to be no farther than 24 inches apart.

9. Distribute the topsoil evenly over all disturbed areas. Prepare the seedbed and seed with approved seed mix.

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.

12. 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

Appendix B: Resource and Species Worksheets

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Air quality	Yes	Yes	Yes	PRB FEIS: 4-354-404
Noise	Yes	Yes	Yes	PRB FEIS: 3-291-298, 4-404-406, 4-377-386
Cultural	Yes	Yes	No	PRB FEIS: 3-206-228, 4-273-288, 4-394
Native American religious concerns	No	No	No	PRB FEIS: 3-218-219, 3-228, 4-277-278
Traditional Cultural Properties	No	No	No	PRB FEIS: 3-218-219, 4-277-278
Mineral Potential				PRB FEIS: 3-66-70, 3-230, 4-127-129
Coal	No	No	Yes	PRB FEIS: 3-66
Fluid Minerals	Yes	Yes	Yes	PRB FEIS: 3-68-69
Locatable Minerals	No	No	Yes	PRB FEIS: 3-66-70, 3-230, 4-127-129
Other leasables	No	No	Yes	PRB FEIS: 3-66-70, 3-230, 4-127-129
Salable minerals	No	No	Yes	PRB FEIS: 3-66-70, 3-230, 4-127-129
Paleontology	No	No	Yes	PRB FEIS: 3-65-66, 4-125-127
PFYC 3	No	No	Yes	PRB FEIS: 3-65-66, 4-125-127
PFYC 5	No	No	Yes	PRB FEIS: 3-65-66, 4-125-127
Rangeland management				
Existing range improvements	No	No	No	Not in PRB FEIS
Proposed range improvements	No	No	No	Not in PRB FEIS
Recreation				PRB FEIS: 3-263-273, 4-319-328
Developed site	No	No	Yes	PRB FEIS: 3-266, 4-326
Walk-in-Area	No	No	Yes	PRB FEIS: 3-263-273, 4-319-328
Social & Economic				PRB FEIS: 3-275-289, 4-336-370
Environmental Justice	No	No	Yes	PRB FEIS: 3-275-289, 4-336-370
Transportation	No	No	Yes	PRB FEIS: 3-275-289, 4-336-370
Soils & Vegetation	Yes	Yes	No	PRB FEIS: 3-78-107, 4-134-152, 4-153-164, 4-393-394, 4-406
Erosion Hazard	Yes	Yes	No	PRB FEIS: 3-82, 4-135
Poor Reclamation Potential	Yes	Yes	No	PRB FEIS: 3-86, 4-149-152
Slope hazard	Yes	Yes	No	PRB FEIS: 3-81, 4-135
Forest products	No	No	Yes	PRB FEIS: 3-271-272
Prime and Unique Farmland	No	No	No	
Invasive Species	Yes	Yes	No	PRB FEIS: 3-103-108, 4-153-172
Wetlands/Riparian	Yes	No	Yes	PRB FEIS: 4-117-124, 3-108-113, 4-172-178, 4-406
Special Designations	No	No	Yes	
Proposed ACEC	No	No	Yes	PRB FEIS Appendix R, ROD RMP pgs. 9-10

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Wild & Scenic River	No	No	Yes	PRB FEIS: 3-273
Wilderness Characteristics/Citizen Proposed	No	No	No	
WSA	No	No	No	
Visual Resources				PRB FEIS: 3-252-263, 4-302-314, 4-403
Class II	No	No	Yes	PRB FEIS: 3-252-263, 4-302-314, 4-403
Class III	No	No	Yes	PRB FEIS: 3-252-263, 4-302-314, 4-403
Water	Yes	Yes	No	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	Yes	PRB FEIS: 4-85-86, 4-117-124, 3-36-56. 4-69-122, 4-393, 4-405
Drinking water	Yes	No	Yes	PRB FEIS: 3-52, 4-50-52
Waste Management	Yes	Yes	Yes	PRB FEIS: 4-370-376
Wildlife	Yes	Yes	No	PRB FEIS: 3-113-153, 4-179, 4-247, 4-397
ESA listed, proposed, or candidate species	Yes	Yes	No	PRB FEIS: 4-251-273, BA & BO
BLM sensitive species	Yes	Yes	No	PRB FEIS: 4-258
General wildlife	Yes	Yes	No	PRB FEIS: 4-181-226
West Nile virus potential	Yes	Yes	No	

Threatened, Endangered, Proposed, and Candidate Species Worksheet

Common Name	Habitat	Presence? (NP, NS, S, K)	Direct Impacts Anticipated?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Endangered					
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	Yes	No	No	4-251, BA & BO
Blowout penstemon	Sparsely vegetated, shifting sand dunes	No	No	No	Not in FEIS
Threatened					
Ute ladies'-tresses orchid	Areas with appropriate hydrology	No	No	No	4-253, BA & BO
Proposed					
Candidate					

Common Name	Habitat	Presence? (NP, NS, S, K)	Direct Impacts Anticipated?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Greater sage-grouse	Basin-prairie shrub, mountain-foothill shrub	*Yes*	*Yes*	*Yes*	4-257 to 4-273

Sensitive Species worksheet

Common Name	Habitat	Presence? (NP, NS, S, K)	Direct Impacts Anticipated ?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Amphibians					**4-258**
Northern leopard frog	Beaver ponds and cattail marshes from plains to montane zones.	Yes	No	No	No
Columbia spotted frog	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	No	No	No	No
Fish					**4-259 & 4-260**
Yellowstone cutthroat trout	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	No	No	No	No
Birds					**4-260 to 4-264**
Baird's sparrow	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	No	No	No	No
Bald eagle	Mature forest cover often within one mile of large water body with reliable prey source nearby.	No	No	No	4-251 to 4-253 & BA
Brewer's sparrow	Sagebrush shrubland	Yes	Yes	No	No
Ferruginous hawk	Basin-prairie shrub, grasslands, rock outcrops	No	No	No	No
Loggerhead shrike	Basin-prairie shrub, mountain-foothill shrub	Yes	Yes	No	No
Long-billed curlew	Grasslands, plains, foothills, wet meadows	Yes	Yes	No	No

Common Name	Habitat	Presence? (NP, NS, S, K)	Direct Impacts Anticipated ?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Mountain plover	Short-grass prairie with slopes < 5%	*Yes*	Yes	Yes	4-254, 4-255 & BA
Northern goshawk	Conifer and deciduous forests	No	No	No	No
Peregrine falcon	Cliffs	No	No	No	No
Sage sparrow	Basin-prairie shrub, mountain-foothill shrub	Yes	Yes	No	No
Sage thrasher	Basin-prairie shrub, mountain-foothill shrub	Yes	Yes	No	No
Trumpeter swan	Lakes, ponds, rivers	No	No	No	No
Western Burrowing owl	Grasslands, basin-prairie shrub	Yes	Yes	Yes	Site-specific
White-faced ibis	Marshes, wet meadows	No	No	No	No
Yellow-billed cuckoo	Open woodlands, streamside willow and alder groves	No	No	No	No
Mammals					**4-264 &4-265**
Black-tailed prairie dog	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	Yes	Yes	No	No
Fringed myotis	Conifer forests, woodland chaparral, caves and mines	No	No	No	No
Long-eared myotis	Conifer and deciduous forest, caves and mines	No	No	No	No
Spotted bat	Cliffs over perennial water.	No	No	No	No
Swift fox	Grasslands	Yes	No	No	No
Townsend's big-eared bat	Caves and mines.	No	No	No	No
Plants					**4-258**
Limber pine	Mountains, associated with high elevation conifer species	No	No	No	No
Porter's sagebrush	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	No	No	No	No
William's wafer parsnip	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	No	No	No	No

Non-designated wildlife worksheet

Common Name / Group	**Presence? (NP, NS, S, K)**	**Direct Impacts Anticipated?**	**Intend to apply COA?**	**Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?**
Big Game	Yes	Yes	No	4-181 to 4-215
Aquatics	Yes	No	No	4-235 to 4-249
Migratory Birds	Yes	Yes	No	4-231 to 4-235
Raptors	Yes	Yes	Yes	4-216 to 4-221
Plains Sharp-tailed Grouse	Yes	Yes	Yes	4-221 to 4-226