FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Cedar Resources
Clabaugh POD
ENVIRONMENTAL ASSESSMENT –WY-070-EA**07-158**

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Cedar Resources Clabaugh POD Coal Bed Natural Gas (CBNG) POD comprised of the following 20 Applications for Permit to Drill (APDs):

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
1	CLABAUGH	12-3WA*	SWNW	3	53N	76W	WYW141581
2	CLABAUGH	32-3WA	SWNE	3	53N	76W	WYW141581
3	CLABAUGH	43-4WA	NESE	4	53N	76W	WYW152133
4	CLABAUGH	12-10WA	SWNW	10	53N	76W	WYW142836
5	CLABAUGH	14-10WA	SWSW	10	53N	76W	WYW142836
6	CLABAUGH	41-10WA	NENE	10	53N	76W	WYW142836
7	CLABAUGH FEDERAL	34-10WA	SWSE	10	53N	76W	WYW142836
8	CLABAUGH	14-11WA	SWSW	11	53N	76W	WYW142836
9	CLABAUGH	34-11WA	SWSE	11	53N	76W	WYW142836
10	CLABAUGH	12-14WA	SWNW	14	53N	76W	WYW142836
11	CLABAUGH	14-14WA	SWSW	14	53N	76W	WYW142836
12	CLABAUGH	21-14WA	NENW	14	53N	76W	WYW142836
13	CLABAUGH	32-14WA	SWNE	14	53N	76W	WYW142836
14	CLABAUGH	34-14WA	SWSE	14	53N	76W	WYW142836
15	CLABAUGH	41-14WA	NENE	14	53N	76W	WYW142836
16	CLABAUGH	43-14WA	NESE	14	53N	76W	WYW142836
17	CLABAUGH FEDERAL	23-14WA	NESW	14	53N	76W	WYW142836
18	CLABAUGH	21-15WA	NENW	15	53N	76W	WYW142836
19	CLABAUGH	32-15WA	SWNE	15	53N	76W	WYW142836
20	CLABAUGH	23-22WA	NESW	22	53N	76W	WYW142836

The following impoundments were inspected and approved for use in association with the water management strategy for the POD.

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	Clabaugh 11-3-53-76	NENE	4	53	76	25.1	4.5	NA
2	Deadman Stock	SESE	15	53	76	19	2.9	NA
3	Landry Stock	SENW	33	54	76	13.9	4.8	NA

This approval is subject to adherence with all of the operating plans 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 Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS) approved April 30, 2003.

RATIONALE: The decision to authorize Alternative C, as described in the attached Environmental Assessment (EA), is based on the following:

1. The Operator, in their POD, has committed 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.
2. The Operator has certified that a Surface Use Agreement has been reached with the Landowner(s).
3. Alternative C will not result in any undue or unnecessary environmental degradation.
4. It is in the public interest to approve these wells, as the leases are being drained of federal gas, resulting in a loss of revenue for the government.
5. Mitigation measures applied by the BLM will alleviate or minimize environmental impacts.
6. Alternative C is the environmentally-preferred Alternative.
7. The proposed action is in conformance with the PRB FEIS and the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management (BLM), Buffalo Field Office, April 2001.

FINDING OF NO SIGNIFICANT IMPACT: Based on the analysis of the potential environmental impacts, I have determined that NO significant impacts are expected from the implementation of Alternative C and, therefore, an environmental impact statement is not required.

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: _____

BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Cedar Resources
Clabaugh POD
PLAN OF DEVELOPMENT
WY-070-EA07-158

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 Buffalo Field Office. This project EA addresses site-specific resources and impacts that were not covered within the PRB FEIS.

1. PURPOSE AND NEED

The purpose for the proposal is to define and produce coal bed natural gas (CBNG) on four (4) valid federal oil and gas mineral leases issued to the applicant by the BLM. Analysis has determined that federal CBNG is being drained from the federal leases by surrounding fee or state mineral well development. The need exists because without approval of the Applications for Permit to Drill (APDs), federal lease royalties will be lost and the lessee will be deprived of the federal gas they have the rights to develop.

1.1. Conformance with Applicable Land Use Plan and Other Environmental Assessments:

The proposed action is in conformance with the terms and the conditions of the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office (BFO), April 2001 and the PRB FEIS, as required by 43 CFR 1610.5

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

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 Proposed Action

Proposed Action Title/Type: Cedar Resources's Clabaugh Plan of Development (POD) for 25 coal bed natural gas well APD`s and associated infrastructure.

Proposed Well Information: There are 25 wells proposed within this POD, the wells are vertical bores proposed on an 80 acre spacing pattern with one well per location. Each well will produce from up to four coal seams at a time, but will begin with the shallowest coals. Proposed well house dimensions are 10 ft wide x 10 ft length x 6 ft height. Wells are located as follows:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
1	CLABAUGH	12-3WA*	SWNW	3	53N	76W	WYW141581
2	CLABAUGH	32-3WA	SWNE	3	53N	76W	WYW141581
3	CLABAUGH	43-4WA	NESE	4	53N	76W	WYW152133
4	CLABAUGH	12-10WA	SWNW	10	53N	76W	WYW142836
5	CLABAUGH	14-10WA	SWSW	10	53N	76W	WYW142836
6	CLABAUGH	41-10WA	NENE	10	53N	76W	WYW142836
7	CLABAUGH FEDERAL	34-10WA	SWSE	10	53N	76W	WYW142836
8	CLABAUGH	14-11WA	SWSW	11	53N	76W	WYW142836
9	CLABAUGH	34-11WA	SWSE	11	53N	76W	WYW142836
10	CLABAUGH	12-14WA	SWNW	14	53N	76W	WYW142836
11	CLABAUGH	14-14WA	SWSW	14	53N	76W	WYW142836
12	CLABAUGH	21-14WA	NENW	14	53N	76W	WYW142836
13	CLABAUGH	32-14WA	SWNE	14	53N	76W	WYW142836
14	CLABAUGH	34-14WA	SWSE	14	53N	76W	WYW142836
15	CLABAUGH	41-14WA	NENE	14	53N	76W	WYW142836
16	CLABAUGH	43-14WA	NESE	14	53N	76W	WYW142836
17	CLABAUGH FEDERAL	23-14WA	NESW	14	53N	76W	WYW142836
18	CLABAUGH	21-15WA	NENW	15	53N	76W	WYW142836
19	CLABAUGH	32-15WA	SWNE	15	53N	76W	WYW142836
20	CLABAUGH	32-21WA	SWNE	21	53N	76W	WYW130292
21	CLABAUGH	33-21WA	NWSW	21	53N	76W	WYW130292
22	CLABAUGH	41-21WA	NENE	21	53N	76W	WYW130292
23	CLABAUGH	43-21WA	NESE	21	53N	76W	WYW130292
24	CLABAUGH FEDERAL	24-21WA	SWSE	21	53N	76W	WYW130292
25	CLABAUGH	23-22WA	NESW	22	53N	76W	WYW142836

Water Management Proposal: The following impoundments were proposed for use in association with the water management strategy for the POD.

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	Clabaugh 11-3-53-76	NENE	4	53	76	25.1	4.5	NA
2	Deadman Stock	SESE	15	53	76	19	2.9	NA
3	Landry Stock	SENW	33	54	76	13.9	4.8	NA

County: Campbell

Applicant: Cedar Resources Corporation

Surface Owners: Clabaugh Ranch, Inc., Bureau of Land Management

Project Description:
The proposed action involves the following:

- Drilling of 25 total federal CBM wells in the Wall (1330' to 1620'), Cook (1010' to 1300'), Canyon (810' to 1100') and Swartz-Anderson (460' to 750') coal seams. Multiple seams will be produced, beginning with the shallowest (Swartz-Anderson) and Canyon, eventually co-mingling production from the deeper coals in the same wellbore.

- Drilling and construction activities are anticipated to be completed within two years, the term of an APD.

- Well metering shall be accomplished by telemetry from the individual wells with the information transmitted to a central gathering facility. Metering would entail 4 visits per month to each well.

- A Water Management Plan (WMP) that involves the following infrastructure and strategy: Discharge to several existing subsurface drip irrigation (SDI) systems or to 2 existing and one proposed discharge point and 2 existing and one proposed stock water impoundments within the Upper Powder River watershed. These impoundments will be operated to fully contain the water discharged to them with the exception of storm events. The operator has obtain permits from the Wyoming Department of Environmental Quality (WDEQ) Groundwater Division (Permit# UIC 07-805) for the SDI systems and Wyoming Pollutant Discharge Elimination System (WYPDES) program (Permit #WY0055859) for discharge into impoundments. The operator has also obtained a permit from the Wyoming Oil and Gas Conservation Commission (WOGCC) to spread produced water on county roads for dust control.

- An unimproved and improved road network.

- An existing above ground power line network constructed by a contractor.

- A buried gas, water and power line network, and 0 central gathering/metering facilities and 0 compression facilities.

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 and/or APDs for maps showing the proposed well locations and associated facilities described above. More information on CBNG well drilling, production and standard practices is also 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 COA contained in the PRB FEIS Record of Decision Appendix A, are incorporated and analyzed in this alternative.

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

1. Comply with all applicable Federal, State and Local laws and regulations.
2. Obtain the necessary permits for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
3. Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD
4. Provide water analysis from a designated reference well in each coal zone.

The Operator has certified that a Surface Use Agreement has been reached with the Landowners.

2.3. Alternative C – Environmentally Preferred

Alternative C represents a modification of Alternative B based on the operator and BLM working cooperatively to reduce environmental impacts. The description of Alternative C is the same as Alternative B with the addition of the project modifications identified by BLM and the operator following the initial project proposal (Alternative B). At the on-sites, all areas of proposed surface disturbance were inspected to insure that the project would meet BLM multiple use objectives to conserve natural resources while allowing for the extraction of Federal minerals. In some cases, access roads were re-routed, and well locations, pipelines, discharge points and other water management control structures were moved, modified, mitigated or dropped from further consideration to alleviate environmental impacts. Alternatives to the different aspects of the proposed action are always considered and applied as pre-approval changes, site specific mitigation and/or Conditions of Approval (COAs), if they will alleviate environmental effects of the operator's proposal. The specific changes identified for the Clabaugh POD POD are listed below under 2.3.1:

2.3.1. Changes as a result of the on-sites

Well Number	Qtr/Qtr	Sec	Lease #	Notes
32-3WA	SWNE	3	WYW141581	Relocated well ~ 140 feet to the east to avoid slot construction. **Slot design will be removed.**
43-4WA	NESE	4	WYW152133	Access road will be straight from the fee well location, not as staked in the field.
12-10WA	SWNW	10	WYW142836	Moved well ~ 100 feet to the NW to avoid slot construction. **Slot design will be removed.**
34-10WA	SWSE	10	WYW142836	Relocate well to the south and west out of sagebrush and away from toe of native slope. Add pipeline roadbore detail to map.
41-10WA	NENE	10	WYW142836	Moved well to the north to a location with better reclamation potential. Access will be rerouted across the drainage.
14-11WA	SWSW	11	WYW142836	No need for slot at this location. **Slot design will be removed.**
34-11WA	SWSE	11	WYW142836	Slot design will be changed to provide additional area for access. This well is end of road since 23-11 has been dropped.
12-14WA	SWNW	14	WYW142836	No need for slot at this location. **Slot design will be removed.**
14-14WA	SWSW	14	WYW142836	Moved well ~120 yards to the N & W to flat location to avoid pad construction.
21-14WA	NENW	14	WYW142836	Moved well and will redesign pad to move disturbance away from cliff edge.
41-14WA	NENE	14	WYW142836	Well relocated 20' up slope to avoid drainage.
43-14WA	NESE	14	WYW142836	Moved well S & W ~ 150 feet to improve access and reduce disturbance.
32-15WA	SWNE	15	WYW142836	Moved well ~ 40 feet to the E to accommodate pit.
24-21WA	SWSE	21	WYW130292	Well not inspected due to location on BLM surface in the proposed ACEC. **Withdraw well from POD**.
33-21WA	NWSW	21	WYW130292	Access will be realigned to avoid disturbing ridge.

Well Number	Qtr/Qtr	Sec	Lease #	Notes
43-21WA	NESE	21	WYW130292	Well will be relocated down the slope, as per landowner request.

The following wells, which were proposed by the operator, will not be approved or analyzed at this time. These wells are located within elk yearlong range and the area designated as the Fortification Creek Special Management Area in the Buffalo Field Office (BFO) Resource Management Plan (April, 2001). This area is currently undergoing a Resource Plan Amendment; approval of the wells at this time could limit the choice of reasonable alternatives within that amendment (40 CFR 1506.1).

Well Name	Number	Qtr	Sec	T	R	Lease#
CLABAUGH	32-21WA	SWNE	21	53N	76W	WYW130292
CLABAUGH	33-21WA	NWSW	21	53N	76W	WYW130292
CLABAUGH	41-21WA	NENE	21	53N	76W	WYW130292
CLABAUGH	43-21WA	NESE	21	53N	76W	WYW130292

2.3.2. Programmatic mitigation measures identified in 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.

2.3.2.1. Surface Water

1. Channel Crossings:
   a) Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
   b) Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.

3. The operator will supply a copy of the complete approved SW-4, SW-3, or SW-CBNG permits to BLM as they are issued by WSEO for impoundments.

4. The operator will supply a copy of the complete approved Chapter 3 permit to construct associated with treatment facilities to BLM as they are issued by WDEQ.

2.3.2.2. Soils

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

2.3.2.3. Wetland/Riparian

1. Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall), or

when the ground is frozen during the winter.

2. No waste material will be deposited below high water lines in riparian areas, flood plains, or in natural drainage ways.

3. The lower edge of soil or other material stockpiles will be located outside the active floodplain.

4. Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.

5. Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

2.3.2.4. Wildlife

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

2.3.2.5. Threatened, Endangered, or Sensitive Species

2.3.2.5.1. Black-footed Ferret

1. If any black-footed ferrets are located, the USFWS will be consulted. Absolutely no disturbance will be allowed within prairie dog colonies inhabited by black-footed ferrets.

2.3.2.6. Visual Resources

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

2.3.2.7. Noise

1. Where noise impacts to existing sensitive receptors are an issue, noise levels will be required to be no greater than 55 decibels measured at a distance of one-quarter mile from the appropriate booster (field) compressor. When background noise exceeds 55dBA, noise levels will be no greater than 5dBA above background. This may require the installation of electrical compressor motors at these locations.

2.3.2.8. 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.

2.3.3. Site specific mitigation measures

General

1. All changes made at the onsite will be followed. They have all been incorporated into the operator's plan of development.

2. All permanent above-ground structures (e.g., production equipment, tanks, etc.) not subject to safety

requirements will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates "Standard Environmental Colors." The color selected for the Clabaugh POD is Covert Green (PANTONE for Architecture Color Guide 18-0617 TPX).

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 on the date in which the right-of-way grant is signed by the authorized officer of the BLM.

4. Please contact Kathy Brus, Supervisory Natural Resource Specialist, @ (307) 684-1087, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

Drilling

1. The operator intends to eventually produce several coal zones at the same time from one wellbore. The operator is required to submit a Sundry for approval to commingle these coals.

2. All drilling pits will maintain at least 2' of freeboard.

3. If the source of water used to mix casing cement is from any other source than a municipal water supply, the operator will provide a copy of the water analysis from the source to the BLM Petroleum Engineer prior to use for cementing.

Surface Use

1. Provide 4" of aggregate where grades exceed 8% for stability and erosion prevention.
2. The operator is responsible for having a licensed professional engineer certify that the actual construction of the road meets the design criteria and is constructed to Bureau standards.
3. 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 water bars shall be placed according to the following spacing:

Grade	Drainage Spacing
2-4%	310 ft
5-8%	260 ft
9-12%	200 ft
13-15%	150 ft.

4. "Roughed-in" or "Pioneer" roads shall be constructed according to the line and grade shown in the approved engineering designs. Non-engineered roads shall be constructed to a line and grade established to meet the BLM Gold Book and 9113 guidelines as approved in the SUP, and shaped according to an approved design template for that road.

5. Adequate drainage control must be in place at all stages of construction and culverts installed as soon as feasible.

6. Pipeline corridor disturbance shall not exceed the approved disturbance width for road construction.

7. Final grading and surfacing shall occur immediately after utility installation is complete. All rills, gullies, and other surface defects shall be ripped to the full depth of erosion across the entire width of the roadway prior to final grading and surfacing.

8. The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231) specifically the following:
   Reclamation Standards:
   C. 3. The reclaimed area shall be stable and exhibit none of the following characteristics:
      a. Large rills or gullies.
      b. Perceptible soil movement or head cutting in drainages.
      c. Slope instability on, or adjacent to, the reclaimed area in question.
   C.4. The soil surface must be stable and have adequate surface roughness to reduce runoff and capture rainfall and snow melt. Additional short-term measures, such as the application of mulch, shall be used to reduce surface soil movement.
   C.5. Vegetation canopy cover (on unforested sites), production and species diversity (including shrubs) shall approximate the surrounding undisturbed area. The vegetation shall stabilize the site and support the planned post disturbance land use, provide for natural plant community succession and development, and be capable of renewing itself. This shall be demonstrated by:
      a. Successful onsite establishment of species included in the planting mixture or other desirable species.
      b. Evidence of vegetation reproduction, either spreading by rhizomatous species or seed production.
   C.6. The reclaimed landscape shall have characteristics that approximate the visual quality of the adjacent area with regard to location, scale, shape, color and orientation of major landscape features and meet the needs of the planned post disturbance land use.

9. At the Well 14-10-5376 SWSW Sec 10 T53N R76W, the operator will monitor the drainage to the south of the drilling pit for any resurfacing of drilling fluids in the channel. If fluids begin to resurface, the operator will remove all fluids and either line the pit prior to further use or add a closed loop mud tank to prevent additional seepage.

10. Well 34-14-5376 SESW Sec 14 T53N R76 W Access route will require expedient reclamation across drainage.

11. Well 41-14-5376 NENE Sec 14 Access route will be constructed prior to drilling the well. Due to erosive soils and steep slopes, the access route to this well will require interim reclamation and slope stabilization to be completed within 30 days of road construction.

12. Well 41-10-5376 NENE Sec 10: Access route will be constructed prior to drilling the well. Due to erosive soils and steep slopes, the access route to this well will require interim reclamation and slope stabilization to be completed within 30 days of road construction.

13. Any seed mix used for revegetation on Federal surface will contain only native species. No introduced species will be included, as committed to by the operator in MSUP page 1-34.

14. Invasion by kochia or Russian thistle will not be deemed acceptable interim reclamation.

Wildlife

Bald Eagles

1. The following conditions will alleviate impacts to bald eagles:
   No project related actions shall occur within one mile of bald eagle habitat along Wild Horse Creek

annually from November 1 through April 1 (CM9), prior to a winter roost survey or from February 1 through August 15 (CM8) prior to a nesting survey. This timing limitation will be in effect unless surveys determine the nest/roost to be inactive. This affects the following wells and infrastructure:

Wells and Infrastructure
43-4, 12-10, 14-10, 21-15, 32-15, 14-14

a. If a roost is identified and construction has not been completed, a year-round disturbance-free buffer zone of 0.5 mile will be established for all bald eagle winter roost sites (November 1 - April 1). Additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 AM and 3:00 PM may be necessary to prevent disturbance.
b. If a nest is identified and construction has not been completed, a disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) would be established year round for all bald eagle nests. A seasonal minimum disturbance buffer zone of 1 mile will be established for all bald eagle nest sites (February 1 - August 15).
c. Additional mitigation measures may be necessary if the site-specific project is determined by a Bureau biologist to have an adverse affect to bald eagles or their habitat.

Burrowing Owls

1. The following conditions will alleviate impacts to burrowing owls:
   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. A 0.25 mile buffer will 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 following

Wells and Infrastructure
12-3, access to 41-10 and 32-3.
Access to 34-14

Mountain Plover

1. The following conditions will alleviate impacts to mountain plovers:
   a. A mountain plover nesting survey is required in suitable habitat prior to commencement of surface disturbing activities in the following areas: T53N-R76W - E 1/2 of Section 4, NW ¼ of Section 3; S and W ½ of Section 10, N ½ Section 15, SE ¼ Section 14.
   b. No surface disturbing activities are permitted in the suitable habitat area listed above, from March 15-July 31, unless a mountain plover nesting survey has been conducted during the current breeding season. This timing limitation will be in effect unless surveys determine no plovers are present. This timing limitation will affect the following

Wells and Infrastructure
12-3, 14-10, 34-14, 21-15, 32-15 and 32-3, access to 43-4, 41-10.

      1) Mountain plover nesting surveys shall be conducted by a biologist following the most current USFWS Mountain Plover Survey Guidelines (the survey period is May 1-June 15). All survey results must be submitted in writing to the BFO and approved prior to initiation of surface disturbing activities.
         a. If occupied mountain plover habitat is identified, then a seasonal disturbance-free buffer of ¼ mile shall be maintained between March 15 and July 31. If no mountain plover observations are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 15).

2) If mountain plovers are found, nesting areas will be surveyed for five years following project completion. Surveys will be conducted by a biologist follow the most current U.S. Fish and Wildlife Service Mountain Plover Survey Guidelines.

Raptors

1. The following conditions will alleviate impacts to raptors:
   a. 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 for the current breeding season. This timing limitation will affect the following

Wells and Infrastructure
Subsurface irrigation in section 33
23-14, 32-14, 34-14, 43-14, access to 41-14 in the south half of Section 13

   1) Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a 0.5 mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within 0.5 mile of occupied raptor nests from February 1 to July 31.
   2) Nest productivity checks shall be completed for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. This applies to the following nest(s):

BLM ID#	SPECIES	UTM E (NAD 83)	UTM N	TWP	RNG	SEC	SUBSTRATE
4457	Unknown	419934	4936594	53N	76W	9	Dead Cottonwood
4459	Great-Horned Owl	423168	4935261	53N	76W	14	Juniper
3946	Cooper's Hawk	423514	4935112	T53	R76n	14	Juniper
4464	Red-tailed hawk	421082	4935206	53N	76W	15	Live Cottonwood
4462	Unknown	420684	4935166	53N	76W	15	Dead Cottonwood
4463	Great-Horned Owl	420294	4935672	53N	76W	16	Live Cottonwood
635	Red-tailed hawk	421987	4934383	53N	76W	22	Live Cottonwood
4351	Northern Harrier	423585	4934686	53N	76W	23	ground
4353	Red-tailed hawk	421902	4934209	53N	79W	22	Live Cottonwood
4461	Unknown	420247	4934307	53N	76W	21	Dead Cottonwood
4458	Unknown	421764	4934582	53N	76W	22	Live Cottonwood
None (#396 in KTI report)	Golden Eagle	420601	4940613	53N	76W	33	Live Cottonwood

b. 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.
c. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31).

Swift Fox

1. A swift fox survey will be required in T53N-R76W - E 1/2 of Section 4, NW ¼ of Section 3; SE ¼ Section 14, between April 15 and June 15. This condition will be implemented on an annual basis for the duration of surface disturbing activities.
   a. If a swift fox den is identified, then a seasonal disturbance-free buffer of 0.25 mile shall be maintained between March 1 and August 31. If no swift fox dens are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 1).

Water Management

1. The operator will provide a copy of the approved UIC Permit for discharge into the new SDI System prior to the discharge of any water produced in association with this POD.

2. The operator shall provide copies of the SDI monitoring reports to the BFO as submitted to the WDEQ if requested.

3. The operator shall provide a copy of the SDI spill prevention and containment contingency plan for the filtration facility and a list of the chemicals which will be used at the facility.

4. In order to determine if CBNG development is impacting the stock water wells in the POD area, the operator will be required to sample the wells for water quality, using WYPDES parameters, in the spring and the fall of each year. Monitoring will be required through the life of the project and for two years after production ceases. Copies of reports will be submitted to the BLM BFO. The stock water wells are located as follows:
   A. Landry #1 P1384W NENW Sec 33 T54N R76W Located near the Landry Reservoir.
   B. Coy#1 P3335W NWSW Sec 14 T53N R76W Located near the Deadman Stock Reservoir.
   The first sample analysis will be submitted prior to the discharge of any water produced in association with this project.

5. The operator will be required to monitor the seep area located adjacent to the access road in the SENW Sec 14 T53N R76W. The perimeter will be delineated yearly in September. Water samples will be taken for analysis in the spring and fall of each year for the life of the project and for two years after production ceases. Copies of reports will be submitted to the BLM BFO.

6. As stated in the MSUP, the three impoundments associated with this action will not be allowed to discharge except as a result of storm events.

7. The operator will provide proof of bonding through the WDEQ for the three impoundments to the BLM BFO prior to the addition of any water produced in association with this project.

8. To control erosion, no water will be allowed to overflow the tire stock water tanks located near proposed water discharge points.

2.4. Alternatives considered but not analyzed in detail

Alternatives for development of the Clabaugh POD by the operator were considered prior to POD submittal. The operator's leases include locations on land managed by the BLM where access

construction would be challenging and successful reclamation improbable. The operator chose to withhold these areas from their development plan.

Most of the alternatives considered but not analyzed in detail involve the water management strategy. The methods for water disposal selected were primarily based on landowner needs and preference. Direct discharge to the channels in the Clabaugh POD was considered but discounted due to the potential for erosion and due to the landowner concerns.

Off-channel pits, injection wells and water treatment alternatives were not considered due to landowner preference and estimated costs.

2.5. Summary of Alternatives

A summary of the infrastructure currently existing within the POD area (Alternative A), the infrastructure originally proposed by the operator (Alternative B), and the infrastructure within the BLM/operator modified proposal (Alternative C) are presented in Table 2.5.

Table 2.1 Summary of the Alternatives

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.) Revised Number or Miles
POD Boundary Size, acres	0	2373	2373
Total CBNG Wells	1	25	20
Total Locations	1	25	20
Nonconstructed Pads		7	9
Slotted Pads		13	8
Constructed Pads		5	3
Conventional Wells	2 P&A'd	2 P&A'd	2 P&A'd
Gather/Metering Facilities	1	0	0
Compressors	0	0	0
Monitor Wells	0	0	0
Impoundments			
On-channel	2	1	1
Off-channel	0	0	0
Water Discharge Points	2	1	1
Treatment Facilities	0	0	0
Improved Roads			
No Corridor	1.6		
With Corridor		2.3	2.1
2-Track Roads			

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.) Revised Number or Miles
No Corridor	4.2	4.5	4.2
With Corridor		7.7	3.9
Buried Utilities			
No Corridor	5.4		
With Corridor	1.8	2.9	2.5
Overhead Powerlines	3.5	0	0
Communication Sites	0	0	0
Staging/Storage Areas	3	0	0
Other Disturbance			
Subsurface Drip Irrigation Fields	30 acres	150 acres	150 acres
Acres of Disturbance	100.3	216.9	192.8

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on 06-18-2007. Field inspections of the proposed Clabaugh POD CBNG project were conducted as follows:

DATE	NAME	TITLE	AGENCY
11-14, 27 & 12-18-07	Rich Lynde		Cedar Resources Corp.
11-14, 27-07	Randy Lynde		CH4 Consulting
11-14-07	Don Malli	Landowner Representative	Clabaugh
11-14, 27-07	Nick Sessions	Landowner Representative	Clabaugh
11-14, 27 & 12-18-07	Naomi Knight	Owner	Knight Technologies
11-14, 27 & 12-18-07	Craig Knight	Owner	Knight Technologies
11-14, 27-07	Levi Jensen	Drilling Coordinator	Knight Technologies
11-14, 27 & 12-18-07	Gretchen Romans	Water Management	Knight Technologies
11-14, 27 & 12-18-07	Scott Benson	Project Coordinator	Knight Technologies
11-14 & 12-18-07	Kathy Brus	Natural Resource Specialist/Hydro	BLM
11-14,17 &12-18-07	Ted Hamersma	Civil Engineering Technician	BLM
11-14, 27-07	Wendy Sutton	Archeologist	BLM
11-14, 27-07	Bill Ostheimer	Wildlife Biologist	BLM
11-27-07	Hilarie Peck	Civil Engineer	BLM
11-27 & 12-	Arnie Irwin	Soil Scientist	BLM

DATE	NAME	TITLE	AGENCY
18-07			
12-18-07	Ken Clabaugh	Landowner	
12-18-07	Tom Lahti	Reclamation Specialist	BLM – WY State Office

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. Certain critical environmental components require analysis under BLM policy. These items are presented below in Table 3.1.

Table 3.1 - Critical elements requiring mandatory evaluation are presented below.

Mandatory Item	Potentially Impacted	No Impact	Not Present On Site	BLM Evaluator
Threatened and Endangered Species	X			Bill Ostheimer
Floodplains		X		Kathy Brus
Wilderness Values		X		Kathy Brus
ACECs		X		Kathy Brus
Water Resources	X			Kathy Brus
Air Quality		X		Kathy Brus
Cultural or Historical Values		X		Wendy Sutton
Prime or Unique Farmlands			X	Kathy Brus
Wild & Scenic Rivers			X	Kathy Brus
Wetland/Riparian	X			Kathy Brus
Native American Religious Concerns		X		Wendy Sutton
Hazardous Wastes or Solids		X		Kathy Brus
Invasive, Nonnative Species	X			Kathy Brus
Environmental Justice		X		Kathy Brus

3.1. Topographic Characteristics of Project Area

The Clabaugh POD area is located at the far western edge of Campbell County, Wyoming, along the lower reaches of Wild Horse Creek, tributary to the Upper Powder River. The POD area (2373 acres) is divided from the SE to the NW by the Echeta County Road, which parallels the creek on the eastern side in this area. Of the total acreage, less than 10 percent is BLM managed (360 acres). The railroad parallels the creek on the western side and defines the edge of the area designated by the BLM as Fortification Creek, which has been identified as a special management area in the Buffalo Field Office Resource Management Plan (April 2001).

On the west rise rough breaks with incised ephemeral drainages to an elevation of over 4500 feet. The creek itself lies in a broad floodplain at an elevation of 3600 feet. The Wild Horse Creek channel is well defined and the primary floodplain is well vegetated with cottonwoods and other riparian species. To the east, the land profile also rises in rough breaks and ephemeral drainages to an elevation of 4400 feet. Primary vegetation is typical of the arid high plains with areas of sagebrush stands interspersed with native grasses and forbs. In some areas, dryland crops and wheatgrasses have been introduced as crops. Cheat grass (Downy Brome) has invaded the area. Annual precipitation rates range from 10 to 17 inches.

Historically, this area has been primarily used for hunting, ranching and livestock production. In the 1960-80's there was some limited conventional oil and gas development which has since been abandoned. More recently, there has been CBNG development of State and fee minerals.

The Clabaugh POD is surrounded on three sides by CBNG projects, approved and proposed. It is bounded on the east by the Yates Petroleum Corp. Morphious POD (approved), on the NW by the Lance Oil and Gas Tincom Butte POD (approved) and to the south by the proposed Lance NW Croton POD.

3.2. Soils and Vegetation

Physiography: This area is in the Missouri Plateau, Unglaciated, Section of the Great Plains Province of the Interior Plains. It is an area of old plateaus and terraces that have been deeply eroded. Typically, local relief is about 150 to 250 feet. Slopes generally are gently rolling to steep, and wide belts of steeply sloping badlands border a few of the larger drainage valleys. Terraces are common along most of the major river systems in the area. In places flat-topped, steep-sided buttes rise sharply above the general level of the plains.

3.2.1. Soils

The dominant soil orders in this Major Land Resource Area (MLRA) are Aridisols and Entisols. Soils have developed in alluvium and residuum derived mainly from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams resulting in a wide variety of surface and subsurface textures. The soils in the area dominantly have a mesic soil temperature regime, an aridic soil moisture regime that borders on ustic, and mixed or smectitic mineralogy. They are shallow to very deep, and generally well drained.

Soils within the project area were identified from the *North Campbell County* and the *North Johnson County Survey Areas, Wyoming*. The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. Pertinent information for analysis was obtained from the published soil survey and the National Soils Information System (NASIS) database for the area.

Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on the ridges and side slopes to 12+ inches in the bottomland and on the floodplain. Erosion potential varies from moderate to severe depending on the soil type, vegetative cover, and slope. Reclamation potential of soils also varies throughout the project area.

Many of the soils and landforms of this area present distinct challenges for development. Approximately 36 percent of the area within the boundary of the proposed action contains soil mapping units with a named component identified as being a highly erosive or susceptible to degradation, 27% of the area has slopes greater than 25% and 31% of the POD area has a poor reclamation potential, making reclamation challenging if not impossible. The Bureau of Land Management has an obligation to protect these lands from disturbance which could lead to irretrievable and irreversible impacts, as stated in the ROD. "Areas of highly erosive soils will be avoided when drill sites, two-track access routes, and pipeline routes are surveyed and staked in order to reduce the amount of soil loss." (ROD page A-31).

The map units identified for the soils within this project area are listed in the table below along with the individual acreage.

Table 3.2 Clabaugh POD Soil Map Unit Types

Map Unit Symbol	Map Unit Name	Acres
135	DEEKAY-OLDWOLF LOAMS, 6 TO 15 PERCENT SLOPES	7.2
166	JAYWEST LOAM, 0 TO 6 PERCENT SLOPES	0.4
167	JAYWEST-MOORHEAD LOAMS, 0 TO 6 PERCENT SLOPES	53.3
184	MOORHEAD-LEITER CLAY LOAMS, 6 TO 15 PERCENT SLOPES	39.7

Map Unit Symbol	Map Unit Name	Acres
204	SAMDAY-SAMDAY,COOL-SHINGLE CLAY LOAMS, 6 TO 40 PERCENT SLOPES	7.0
206	SAMDAY-SHINGLE-BADLAND COMPLEX, 10 TO 45 PERCENT SLOPES	132.9
216	THEEDLE-KISHONA-SHINGLE LOAMS, 3 TO 30 PERCENT SLOPES	177.7
225	UCROSS-IWAIT-FAIRBURN LOAMS, 3 TO 30 PERCENT SLOPES	289.6
228	ULM-RENOHILL CLAY LOAMS, 0 TO 6 PERCENT SLOPES	0.2
229	ULM-RENOHILL CLAY LOAMS, 6 TO 15 PERCENT SLOPES	23.6
256	BIDMAN-ULM COMPLEX, 0 TO 6 PERCENT SLOPES	38.4
262	CAMBRIA-KISHONA-ZIGWEID LOAMS, 0 TO 6 PERCENT SLOPES	35.8
267	CROMACK-SAMSIL CLAY LOAMS, 3 TO 15 PERCENT SLOPES	125.5
275	ECHETA-MOORHEAD CLAY LOAMS, 0 TO 6 PERCENT SLOPES	111.6
278	FAIRBURN-SAMSIL-BADLAND COMPLEX, 10 TO 45 PERCENT SLOPES	590.2
285	HAVERDAD-BORUFF COMPLEX, 0 TO 3 PERCENT SLOPES	1.1
313	SAVAGETON-SAMDAY CLAY LOAMS, 3 TO 15 PERCENT SLOPES	87.7
317	SILHOUETTE-ULM CLAY LOAMS, 0 TO 6 PERCENT SLOPES	110.5
327	ULM-BIDMAN COMPLEX, 0 TO 6 PERCENT SLOPES	438.3
330	ULM CLAY LOAM, 6 TO 10 PERCENT SLOPES	17.1
339	ZIGWEID-KISHONA-CAMBRIA COMPLEX, 6 TO 15 PERCENT SLOPES	2.7

Some of the map units listed above have been identified as highly erosive lands, with a badlands component. Highly erosive soils (low reclamation potential areas) in this POD have been designated using the following criteria:

- Slopes in excess of 25%
- Soils classified as miscellaneous areas
- Taxon above the family level of soil taxonomy and/or
- Existing ecological sites of Very Shallow or Shale.

3.2.2. Vegetation

Ecological Site Descriptions are used to provide soils 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. The map units identified for the soils and the associated ecological sites found within the POD boundary are listed in the table below. This area falls within the 10 - 14" Northern Plains precipitation zone, but some of the Map Units include characteristics of the 15-17" Northern Plains precipitation zone.

Table 3.3 Clabaugh POD Ecological Sites

Map Unit Symbol	Ecological Site	Acres
278	Shallow Loamy	590.2
327	Clayey	438.3
225	Loamy	289.6
216	Loamy	177.7
206	Shallow Clayey	132.9
267	Clay Loam	125.5
275	Clay Loam	111.6
317	Clay Loam	110.5

Map Unit Symbol	Ecological Site	Acres
313	Clay Loam	87.7
167	Loamy	53.3
184	Clay Loam	39.7
256	Loamy	38.4
262	Loamy	35.8
229	Clay Loam	23.6
330	Loamy	17.1
135	Loamy	7.2
204	Clay Loam	7.0
339	Loamy	2.7
285	Lowland	1.1
166	Loamy	0.4
228	Clay Loam	0.2

Dominant Ecological Sites and Plant Communities identified in this POD by soil series are described below. A summary of the ecological sites within the project area are listed in the table below along with the individual acreage and the percentage of the total area identified within the POD boundary.

Table 3.4 Dominant Ecological Sites in the Clabaugh Project Area

Ecological Site	Acres	Percentage
CLAYEY (10-14NP)	677.3	29.6
SHALLOW LOAMY (15-17NP)	590.2	25.8
LOAMY (15-17NP)	350.5	15.3
CLAYEY (15-17NP)	276.8	12.1
LOAMY (10-14NP)	254.6	11.1
SHALLOW CLAYEY (10-14NP)	139.9	6.1
LOWLAND (10-14NP)	1.1	0.0

Clayey Ecological Sites

In this project area, 42 percent of the landforms and soils are clayey sites, located on slopes and ridge tops. These sites occur on nearly level to 30% slopes, on hill sides, in alluvial fans, stream terraces and ridge tops in the 10-14" and 15-17" precipitation zones. The soils of these sites are moderately deep (greater than 20" to bedrock) to very deep, well-drained soils that formed in alluvium or alluvium over residuum. These soils have slow permeability. The bedrock is clay shale which is virtually impenetrable to plant roots. The main soil limitations include shallow depth to bedrock, high clay content and low organic matter content. The surface soil will vary from 2 to 5 inches deep and have one of the following textures: silty clay, sandy clay, clay, and the finer portions of silty clay loam, clay loam, and sandy clay loam. These soils may develop severe cracks.

The present plant community in this project area is a Mixed Sagebrush/Grass. Historically, this plant community evolved under grazing by bison and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock in the absence of fire or brush control. Big sagebrush is a significant component of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs.

Dominant grasses identified include: Western wheatgrass, crested wheat, downy brome, Japanese brome, Sandburg bluegrass, common pepperweed, prairie junegrass, and blue gramma. Forbs identified include:

Tumble mustard, scarlet globemallow, fringed sagewort, and cudweed sagewort. Other vegetative species identified at onsite: Wyoming big sagebrush, silver sagebrush, yucca, prickly pear cactus, Russian thistle and juniper.

Cheatgrass (downy brome) has invaded the site. The overstory of big sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope.

These sites will prove challenging for reclamation success and may require additional or extraordinary measures for interim and final site stability.

Loamy Ecological Sites

In this project area, 26 percent of the landforms and soils are loamy sites located on relatively flat topography, dissected by ephemeral drainages and interspersed with eroded shallow loamy or shallow clayey ridges.

The soils of this site are moderately deep to deep (greater than 20" to bedrock), well drained soils that formed in alluvium and residuum. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. These layers consist of the A horizon with very fine sandy loam, loam, or silt loam texture and may also include the upper few inches of the B horizon with sandy clay loam, silty clay loam or clay loam texture. These soils have moderate permeability and may occur on all slopes. The main soil limitations include low organic matter content and soil droughtiness.

The Western Wheatgrass/Cheatgrass Plant Community is the plant community for this site. Cheatgrass has invaded with western wheatgrass and thickspike wheatgrass maintaining at a similar or slightly higher level that the Historic Plant Climax Community. Plant diversity is low.

This plant community is relatively stable with the rhizomatous wheatgrasses being somewhat resistant to overgrazing with the cheatgrass competing against the establishment of perennial cool-season grasses. An increase in bare ground reduces water infiltration and increases soil erosion. The watershed is usually functioning. The biotic integrity is reduced by the lack of diversity in the plant community.

Dominant grasses identified at the onsite which are associated with this ecological site include western wheatgrass, downy brome, and green needlegrass. Grasses of secondary importance include prairie sandreed, bluebunch wheatgrass, and Sandberg bluegrass. Forbs commonly found in this plant community include hairy goldaster, slimflower scurfpea, fringed sagewort and scarlet globemallow. Wyoming big sagebrush canopy ranges from 20% to 30%.

These areas can be reclaimed by traditional methods identified in the programmatic and standard conditions of approval (COA's) relative to reclamation and applying the appropriate "Best Management Practices".

Shallow Loamy Ecological Sites

In this project area, 26 percent of the landforms and soils are shallow loamy sites. This site occurs on steep slopes and ridge tops, but may occur on all slopes. The soils of this site are shallow (less than 20"to bedrock) well-drained soils formed in alluvium over residuum or residuum. These soils have moderate permeability and may occur on all slopes. The bedrock may be any kind, except igneous, which is virtually impenetrable to plant roots. The surface soil will have one or more of the following textures: very fine sandy loam, loam, silt loam, sandy clay loam, silty clay loam, and clay loam. Thin ineffectual layers of other textures are disregarded. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. The main soil limitations include the depth to bedrock, low organic matter

content, and soil droughtiness. The low annual precipitation should be considered when planning a seeding.

The Mixed Sagebrush/Grass Plant Community is the plant community for this site. Fringed sagewort is commonly found. Plains pricklypear and winterfat can also occur. Cheatgrass (downy brome) has invaded the state. The overstory of big sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope.

Due to the shallow characteristics of these sites, reclamation success will be challenging and may require additional or extraordinary measures for interim and final site stability.

For more detailed soil information, see the NRCS Soil Survey 705 – Northern Campbell County.

3.2.3. Wetlands/Riparian

The project area includes the lower reaches of Wild Horse Creek, approximately 20 stream miles above the confluence with the Upper Powder River. There is an existing access crossing located in the SWNE Sec 22 T53N R76W. The floodplain at this point is very broad (~ 2000 feet) and well vegetated with cottonwoods, greasewood and riparian vegetation. The access road through this area has been constructed for ranch and fee CBNG well development. Utility corridors for gas and water production and electric supply have already been installed for fee wells. The operator reduced 1200 feet of pipeline installation disturbance to the riparian area and the channel proper by boring under instead of digging through the channel.

A natural seep area is located in this POD area in the SENW Section 14, along the existing access road. The area (delineated by the operator to be approximately an acre) is saturated for a good portion of the year and vegetated with sedges and reeds. This seep area does not have a distinct source of flow.

3.2.4. Invasive Species

A potential infestation of leafy spurge, a state-listed noxious weed was discovered by a search of inventory databases on the Wyoming Energy Resource Information Clearinghouse (WERIC) web site (www.weric.info). The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices.

Additionally, salt cedar, common cocklebur, buffalobur, and Russian thistle were documented during subsequent field investigations by BLM or the operator. The state-listed noxious weeds are listed in PRB FEIS Table 3-21 (p. 3-104) and the Weed Species of Concern are listed in Table 3-22 (p. 3-105.

3.3. Wildlife

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

A habitat assessment and wildlife inventory surveys were performed by Knight Technologies, Inc (KTI 2007). KTI performed surveys for bald eagles, mountain plover, sharp-tailed and greater sage-grouse, raptor nests, and prairie dog colonies according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol (available on the CBM Clearinghouse website www.cbmclearinghouse.info). Surveys were also conducted for Ute ladies'-tresses orchid.

A BLM biologist conducted field visits on November 14, 2007. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided

project modification recommendations where wildlife issues arose.

Wildlife species common to the habitat types present are identified in the PRB FEIS (pg. 3-114). Species that have been identified in the project area or that have been noted as being of special importance are described below.

3.3.1. Big Game

Big game species expected to be within the project area include pronghorn antelope, mule deer, white-tailed deer, and elk. The WGFD has determined that the project area contains yearlong range for pronghorn antelope, and white-tailed deer, and yearlong and winter yearlong range for mule deer.

Winter-Yearlong use is when a population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis. During the winter months there is a significant influx of additional animals into the area from other seasonal ranges. **Yearlong** use is when a population of animals makes general use of suitable documented habitat sites within the range on a year round basis. Animals may leave the area under severe conditions.

Pronghorn antelope within the project area belong to the Gillette herd unit. The 2007 proposed estimate herd population is 2040 with a population objective of 11,000. Mule deer within the project area belong to the Powder River herd unit. The 2007 proposed estimate herd population is 56,400 with a population objective of 52,000. White-tailed deer within the project area belong to the Powder River herd unit. The 2007 proposed estimate herd population is 8,200 with a population objective of 8,000. Elk within the project area belong to the Fortification herd unit. The 2007 proposed estimate herd population is 237 with a population objective of 150. All big game populations in the project area are above WGFD objectives. Big game range maps are available in the PRB FEIS (3-119-143), the project file, and from the WGFD.

Elk have been observed within the POD boundary by ranch personnel. One radio-collared individual was located May 18, 2005 just east of the POD boundary in Section 11. The portion of the POD that consists of designated elk range, west of the railroad tracks, will not be included in this document analysis. This area is currently undergoing a Resource Plan Amendment; approval of the wells at this time could limit the choice of reasonable alternatives within that amendment (40 CFR 1506.1).

3.3.2. Aquatics

The project area is drained by Wild Horse Creek, a tributary of the Powder River. Fish that have been identified in the Powder River watershed are listed in the PRB FEIS (3-156-159).

Amphibian and reptile species occur throughout the Basin, but there is little recorded baseline information available about them. Confluence Consulting, Inc. identified the following species present within the Clear Creek and Powder River watersheds: Woodhouse's toad, Northern leopard frog, gopher snake, and garter snake (2004). Because sampling at the upper two sites on Clear Creek occurred late in the season, seasonality may have influenced the lack of reptiles and amphibians observed at these sites.

3.3.3. Migratory Birds

A wide variety of migratory birds may be found in the proposed project area at some point throughout the year. Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year. Many species that are of high management concern use shrub-steppe and shortgrass prairie areas for their primary breeding habitats (Saab and Rich 1997). Migratory bird species of management concern that may occur in the project area are listed in the PRB FEIS (3-151).

3.3.4. Raptors

Raptors species expected to occur in suitable habitats within the project area include northern harrier,

golden eagle, red-tailed hawk, Swainson's hawk, ferruginous hawk, American kestrel, short-eared owl, great horned owl, bald eagle, rough-legged hawk, merlin, Cooper's hawk, long-eared owl, and burrowing owl. Most raptor species nest in a variety of habitats including but not limited to; native and non-native grasslands, agricultural lands, live and dead trees, cliff faces, rock outcrops, and tree cavities.

Twelve raptor nest sites were identified by KTI (KTI 2007, 2008) and BLM within 0.5 mile of the project area, of these 4 nests were active in (2007).

Table 3.5. Documented raptor nests within the Clabaugh project area in 2007.

BLM ID#	SPECIES	UTM E (NAD 83)	UTM N	TWP	RNG	SEC	SUBSTRATE	REMARKS
4457	Unknown	419934	4936594	53N	76W	9	Dead Cottonwood	3221' to nearest fed disturbance (well 14-10-5376)
4459	Great-Horned Owl	423168	4935261	53N	76W	14	Juniper	228' to nearest fed disturbance (road) Young: 2 in 2007.
3946	Cooper's Hawk	423514	4935112	T53	R76n	14	Juniper	836 feet to nearest Federal (fed) disturbance.
4464	Red-tailed hawk	421082	4935206	53N	76W	15	Live Cottonwood	2490' to nearest fed disturbance (road)
4462	Unknown	420684	4935166	53N	76W	15	Dead Cottonwood	1283' to nearest fed disturbance (road).
4463	Great-Horned Owl	420294	4935672	53N	76W	16	Live Cottonwood	2600' to nearest fed disturbance (road) Young: 1 in 2007.
635	Red-tailed hawk	421987	4934383	53N	76W	22	Live Cottonwood	Knight updated UTMs in 2007 from 421885E, 4934432N. 2511' to nearest fed disturbance.
4351	Northern Harrier	423585	4934686	53N	76W	23	ground	2,000 feet to nearest fed disturbance. 3 young in '06.
4353	Red-tailed hawk	421902	4934209	53N	79W	22	Live Cottonwood	1,500 feet to nearest fed disturbance
4461	Unknown	420247	4934307	53N	76W	21	Dead Cottonwood	350' to nearest fed disturbance (road)
4458	Unknown	421764	4934582	53N	76W	22	Live Cottonwood	2295' to nearest fed disturbance (well 23-22-5376) Observer: Knight Technologies.
None (#396 in KTI report)	Golden Eagle	420601	4940613	53N	76W	33	Live Cottonwood	Adjacent to drip irrigation field

3.3.5. Threatened and Endangered and Sensitive Species

3.3.5.1. Threatened and Endangered Species

Within the BLM Buffalo Field Office there are two species that are Threatened or Endangered under the Endangered Species Act.

3.3.5.1.1. Black-footed ferret

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. In 2004, the WGFD identified six prairie dog complexes (Arvada, Sheridan, Pleasantdale, Four Corners, Linch, Kaycee, and, Thunder Basin National Grasslands) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Grenier et al. 2004).

This nocturnal predator is closely associated with prairie dogs, depending almost entirely upon them for its food. The ferret also uses old prairie dog burrows for dens. Current science indicates that a black-footed ferret population requires at least 1000 acres of black-tailed prairie dog colonies for survival (USFWS 1989).

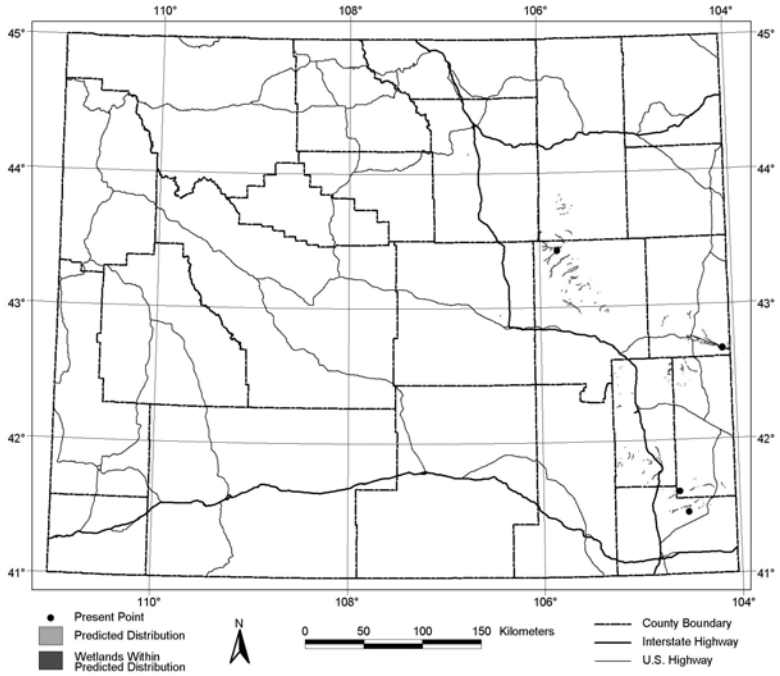
The WGFD believes the combined effects of poisoning and Sylvatic plague on black-tailed prairie dogs have greatly reduced the likelihood of a black-footed ferret population persisting east of the Big Horn Mountains (Grenier 2003). The U.S. Fish and Wildlife Service has also concluded that black-tailed prairie dog colonies within Wyoming are unlikely to be inhabited by black-footed ferrets (Kelly 2004).

One 6.5 acre black-tailed prairie dog colony in T53, R76 Section 14 was identified during site visits by KTI within the project area. Despite the project area only harboring one small town, the project area is located within the Arvada Complex with approximately 8,000 acres of prairie dog towns adjacent to the project area. Suitable ferret habitat does exist in the project area.

3.3.5.1.2. Ute Ladies'-Tresses Orchid

This orchid is listed as Threatened under the Endangered Species Act. It is extremely rare and occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level. Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. Wyoming Natural Diversity Database model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties.

Figure 1. Predicted Distribution of Ute ladies'-tresses in Wyoming



Prior to 2005, only four orchid populations had been documented within Wyoming. Five additional sites were located in 2005 and one in 2006 (Heidel pers. Comm.). The new locations were in the same drainages as the original populations, with two on the same tributary and within a few miles of an original location. Drainages with documented orchid populations include 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. In Wyoming, *Spiranthes diluvialis* blooms from early August to early September, with fruits produced in mid August to September (Fertig 2000).

Wild Horse Creek and its tributaries are historically ephemeral with portions of Wild Horse Creek being intermittent. One seep was identified (SENW Section 14 T53,R76) by the operator. All potential habitat areas, including this spring were assessed by an experienced surveyor for suitable habitat characteristics with a finding that suitable habitat is not present within the project area due to inappropriate soils and abrupt transitions from wetlands (reeds) to uplands (sage). (KTI 2007b).

3.3.5.2. Sensitive Species

The USDI Bureau of Land Management (BLM) Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. Two habitat types, prairie dog colonies and sagebrush ecosystems, specifically, are the most common among habitat types within the Powder River Basin and contain habitat components required in the life cycle of several sensitive species. These are described below in general terms. Those species within the Powder River Basin that were once listed or candidates for listing under the Endangered Species Act of 1973 and remain BLM Wyoming sensitive species are described in more detail. The authority for this 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.

3.3.5.2.1. Prairie dog colony obligates

Prairie dog colonies create habitat for many species of wildlife (King 1955, Reading et al. 1989). Agnew

(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 1982, Campbell and Clark 1981 and Reading et al. 1989) suggest that species richness increases with colony size and regional colony density. Prairie dog colonies attract many insectivorous and carnivorous birds and mammals because of the concentration of prey species (Clark 1982, Agnew 1986, Agnew 1988).

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 on the Wyoming BLM sensitive species list: swift fox (*Vulpes velox*), mountain plover (*Charadrius montanus*), ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), and long-billed curlew (*Numenius americanus*).

3.3.5.2.2. Sagebrush obligates

Sagebrush ecosystems support a variety of species. Sagebrush obligates are animals that cannot survive without sagebrush and its associated perennial grasses and forbs; in other words, species requiring sagebrush for some part of their life cycle. Sagebrush obligates within the Powder River Basin, listed as sensitive species by BLM Wyoming include greater sage-grouse, Brewer's sparrow, sage thrasher, and sage sparrow. Sage sparrows, Brewer's sparrows, and sage thrashers all require sagebrush for nesting, with nests typically located within or under the sagebrush canopy. Sage thrashers usually nest in tall dense clumps of sagebrush within areas having some bare ground for foraging. Sage sparrows prefer large continuous stands of sagebrush, and Brewer's sparrows are associated closely with sagebrush habitats having abundant scattered shrubs and short grass (Paige and Ritter 1999). Other sagebrush obligate species include sagebrush vole and pronghorn antelope.

3.3.5.2.3. Bald eagle

On February 14, 1978, the bald eagle was federally listed as Endangered. On August 8, 2007, the bald eagle was removed from the Endangered Species list. The bald eagle remains under the protection of the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In order to avoid violation of these laws and uphold the BLM's commitment to avoid any future listing of this species, all conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (WY07F0075) (USFWS 2007) shall continue to be complied with.

Bald eagle nesting habitat is generally found in areas that support large mature trees. Eagles typically will build their nests in the crown of mature trees that are close to a reliable prey source. This species feeds primarily on fish, waterfowl, and carrion. In more arid environments, such as the Powder River Basin, prairie dogs, ground squirrels, and lagomorphs (hares and rabbits) can make up the primary prey base. The diets of wintering bald eagles are often more varied. In addition to prairie dogs, ground squirrels, and lagomorphs, carcasses of domestic sheep and big game may provide a significant food source in some areas. Historically, sheep carcasses from large domestic sheep ranches provided a reliable winter food source within the Powder River Basin (Patterson and Anderson 1985). Today, few large sheep operations remain in the Powder River Basin. Wintering bald eagles may congregate in roosting areas generally made up of several large trees clumped together in stands of large ponderosa pine, along wooded riparian corridors, or in isolated groups. Bald eagles often share these roost sites with golden eagles as well.

Suitable roosting and nesting habitat occurs along Wild Horse Creek within the POD area. Mature cottonwoods occur along the drainage and there are large (> 1,000 acre) prairie dog colonies within a few miles of the project area. Protocol surveys for roosting and nesting were performed in 2007 and 2008. Individual bald eagles were seen during the winter roost surveys but no consistent use was recorded. No nesting bald eagles were found.

3.3.5.2.4. Black-tailed prairie dog

The black-tailed prairie dog was added to the list of Candidate species for federal listing on February 4, 2000 (USFWS 2000). On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate status. BLM Wyoming considers prairie dogs as a sensitive species and continues to afford this species the protections described in the PRB FEIS. The black-tailed prairie dog is a diurnal rodent inhabiting prairie and desert grasslands of the Great Plains.

Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented, and isolated (Miller 1994). Most colonies are small and subject to potential extirpation due to inbreeding, population fluctuations, and other problems, such as landowner poisoning and disease, which affect long term population viability (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994).

The black-tailed prairie dog is considered common in Wyoming, although its abundance fluctuates with activity levels of Sylvatic plague and the extent of control efforts by landowners. Comparisons with 1994 Digital Ortho Quads indicated that black-tailed prairie dog acreage remained stable from 1994 through 2001. However, aerial surveys conducted in 2003 to determine the status of known colonies indicated that a significant portion (approximately 47%) of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier 2004).

One 6.5 acre black-tailed prairie dog colony in T53, R76 Section 14 was identified during site visits by KTI within the project area. Despite the project area only harboring one small town, the project area is located within the Arvada Complex with approximately 8,000 acres of prairie dog towns adjacent to the project area.

3.3.5.2.5. Burrowing owl

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 (*Spermophilus spp*.), prairie dogs (*Cynomys spp.),* and badgers (*Taxidea taxus*) are available. Black-tailed prairie dog colonies provide the primary habitat for burrowing owls (Klute et al. 2003).

The western burrowing owl has declined significantly throughout its North American range. Current population estimates for the United States are not well known but trend data suggest significant declines (McDonald et al. 2004). The last official population estimate placed them at less than 10,000 breeding pairs. The majority of the states within the owl's range have recognized that western burrowing owl populations are declining. It is listed as a sensitive species by the BLM throughout the west and by the USDAFS. Primary threats across the North American range of the burrowing owl are habitat loss and fragmentation primarily due to intensive agricultural and urban development, and habitat degradation due to declines in populations of colonial burrowing mammals (Klute et al. 2003).

Burrowing owl nesting habitat consists of open areas with mammal burrows. Individual burrowing owls have moderate to high site fidelity to breeding areas and even to particular nest burrows (Klute et al. 2003). Burrow and nest sites are reused at a higher rate if the bird has reproduced successfully during the previous year. Favored nest burrows are those in relatively sandy sites (possibly for ease of modification and drainage), areas with low vegetation around the burrows (to facilitate the owl's view and hunting success), holes at the bottom of vertical cuts with a slight downward slope from the entrance, and slightly elevated locations. In Wyoming, egg laying begins in mid-April. Incubation is assumed to begin at the mid-point of the laying period and lasts for 26 days (Olenick 1990). Young permanently leave the primary nest burrow around 44 days from hatch (Landry 1979). Juveniles will continue to hunt with and associate with parents until migration (early September through early November) (Haug 1985).

The BLM BFO databases and the survey information provided by KTI indicate no burrowing owl nests in or within 0.25 mile of the project area. Surveys in 2008 shall be performed.

3.3.5.2.6. Grouse

3.3.5.2.6.1. Greater sage-grouse

The Greater sage-grouse is listed as a sensitive species by BLM (Wyoming). In recent years, several petitions have been submitted to the USFWS to list greater sage-grouse as Threatened or Endangered. On January 12th, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was "not warranted" following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse. A judge in Idaho ordered the USFWS to conduct a new Status Review as a result of a lawsuit and questions surrounding the 2005 review (Winmill Decision Case No. CV-06-277-E-BLW, December 2007).

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

Suitable brood rearing exists along Wild Horse Creek and marginal quality nesting habitat is limited in the project area. BLM records identified no greater sage-grouse leks within 3 miles of the POD. The Laramore lek is approximately five miles to the East.

3.3.5.2.6.2. 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 wooded draws, shrubby riparian area, and wet meadows.

The project area has the potential to support sharp-tailed grouse during most of the year. The mosaic of grasslands and sagebrush-grasslands could provide habitat from April through October. Cottonwoods and junipers could provide buds and berries, respectively, to sustain grouse through the winter. The closest lek, 41-Fitch Prong, in 2.7 miles to the south-east of the POD.

3.3.5.2.7. Mountain plover

The mountain plover was proposed for listing in 1999 (USFWS). In 2003, the USFWS withdrew a proposal to list the Mountain Plover as a Threatened species, stating that the population was larger than had been thought and was no longer declining. Mountain plovers, which are a BLM sensitive species, are typically associated with high, dry, short grass prairies (BLM 2003). Mountain plover nesting habitat is often associated with heavily grazed areas such as prairie dog colonies and livestock pastures.

Suitable mountain plover habitat, in the form of prairie dog towns, is present within the project area. Protocol surveys were completed in 2007 and no individuals were seen.

3.3.5.2.8. Swift Fox

The swift fox is native to the grassland prairies of North America. The original range of the species was influenced primarily by the extent of the shortgrass prairie and midgrass prairie ecosystems. The swift fox range primarily follows the distribution of the black-tailed prairie dog. Swift fox populations have been reduced to about 40 percent of their former range. The swift fox was removed from the Federal list of candidate species in January 2001 due to the implementation of the Swift Fox Conservation Plan. It remains a BLM sensitive species and as such, recommendations for mitigation contained within the Swift Fox Conservation Plan will be applied to the project in order to uphold the direction set forth in the BLM Manual 6840.

Swift foxes tend to have their dens on or within 0.8 kilometers of prairie dog colonies (Hillman and Sharps 1978). Breeding occurs from December to February depending on latitude (Kilgore 1969, Hines 1980, Covell 1992). Gestation is approximately 51 days (Kahn et al. 1997). Pups are reared in dens with den sites possibly being changed several times during the pup-rearing period (Kahn et al. 1997). Under certain circumstances, litters from different fox pairs might share the same natal dens. At four or five months, the young foxes are almost fully grown and difficult to distinguish from adults (Kahn et al. 1997). Though little is known about pup-dispersal, it begins during September and October (Kahn et al. 1997).

The major portions of the swift fox diet are prairie dogs (49%) and insects (27%) (Uresk and Sharps 1986). Suitable swift fox habitat exists throughout the project area with the prairie grasslands and prairie dog colonies. For prairie dog colony locations, refer to the prairie dog section of this document.

3.4. Water Resources

The project area is within the Wild Horse Creek drainage area, tributary to the Upper Powder River.

3.4.1. Groundwater

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 13 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 115 to 1300 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

The operator has provided several existing shallow groundwater water quality analyses in preparation of applications associated with water discharge permitting. The results of those analyses are listed below.

Parameter	**Landry #1**	**MW#1**
	Permitted Stock Water Well (P1384W)	Shallow Groundwater investigation well at Deadman Reservoir
Location	NENW Sec 33 T54N R76W	Sec 15 T53N R76W
Depth	1100 feet	75 feet
pH	8.1	6.96
Total Dissolved Solids, mg/l	870	6,230
Electrical Conductivity, µmhos/cm	1,390	6,200
Sodium Adsorption Ratio	27.0	3.5

WDEQ water quality parameters for groundwater classifications (Chapter 8 – Quality Standards for Wyoming Groundwater) define the following limits for 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).

3.4.2. Surface Water

The project area is within the Wild Horse Creek drainage which is tributary to the Upper Powder River primary 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). Other ephemeral channels are primarily well vegetated grassy swales, without defined bed and bank.

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, 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 #0631700 located at Arvada, WY (PRB FEIS page 3-49).

The operator has identified a natural seep area within this POD boundary at T53N, R76W, Sec 14. The estimated flow of the spring has not been determined. Water quality and quantity determinations will be provided prior to project initiation.

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

3.5. Cultural Resources

Class III cultural resource inventories were conducted for the Clabaugh POD project, following the Secretary of the Interior's Guidelines and Standards. A Class III inventory specifically for the project was conducted by NPAS (BLM project no. 70070137). The inventory covered approximately 1982 acres; this inventory recorded, rerecorded, or revisited 2 sites and 3 isolates. Sites and isolates are defined as specified by the 2006 State Protocol Between the Wyoming Bureau of Land Management State Director and the Wyoming State Historic Preservation Officer. The following cultural resources are located in or near the APE (area of potential effect).

Table 3.6 Cultural Resources Inventory Results

Site Number	Site Type	National Register Eligibility
48CA6578	Historic	NE
48CA6579	Prehistoric	E
IR1	Prehistoric	NE
IR2	Prehistoric	NE
IR3	Prehistoric	NE

4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed action which resulted in development of Alternative C as the preferred alternative have reduced the potential impact to the environment which will result from this action. The environmental consequences of Alternative C are described below. Under this alternative, 20 wells would be drilled at 20 locations to Federal minerals on 80 acre spacing. For the most part, the operator utilized existing primitive roads as infrastructure for this POD. The wells have been sited so that construction will disturb a minimum area. There are some areas along the access routes that cross highly erosive soils and will require expedient or extraordinary stabilization to reduce erosion potential.

4.1. Soils and Vegetation

Impacts to vegetation and soils from surface disturbance will be reduced by following the operator's plans and BLM applied mitigation. Of the 20 proposed locations (20 wells), one is on existing or reclaimed conventional well pads, 8 can be drilled without a well pad being constructed, 8 will require a slot and 3 will require a constructed (cut & fill) well pad. Surface disturbance associated with the drilling of the 9 wells without constructed pads would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 20 x 50 feet for each well), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these wells would involve approximately 0.52 acres/location for 4.68 total acres. The 8 slotted pad locations would involve the excavation of a slot 30 x 120 feet for the rig in a work area of 150 x 150 feet, or a disturbance of 0.52 acres per well or 4.2 acres total. The other 3 locations which require cut and fill pad construction would disturb approximately 1.0 acres/location for a total of 2.9 acres. The total estimated disturbance for all 20 wells would be 12.1acres.

Approximately 2.1 miles of improved roads would be constructed to provide access to various well locations. Approximately 8.1 miles of new and existing two-track trails would be utilized to access well sites. The majority of proposed pipelines (gas and water) have been located in "disturbance corridors." Disturbance corridors involve the combining of 2 or more utility lines (water, gas, power) in a common trench, usually along access routes. This practice results in less surface disturbance and overall environmental impacts. Approximately 2.5 miles of pipeline would be constructed outside of access corridors with no individual pipelines installed outside of pipeline or access corridors. Cedar Resources intends to install the utilities using a Cable Plow Dozer, which will plow the utility lines in a common ditch within the road disturbance area. This practice will minimize the disturbance associated with the construction of this project and reduce the area where reclamation will be required. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, etc.) would ensure land productivity is regained and stability is maximized.

Proposed stream crossings, including culverts and fords (low water crossings) are shown on the MSUP and the WMP maps (see the POD). Engineering designs have been provided for some of these crossings. The structures would be constructed in accordance with sound engineering practices and BLM standards.

The PRB FEIS made predictions regarding the potential impact of produced water to the various soil types found throughout the Basin, in addition to physical disturbance effects. "Government soil experts state that SAR values of only 13 or more cause potentially irreversible changes to soil structure, especially in clayey soil types, that reduce permeability for infiltration of rainfall and surface water flows, restrict root growth, limit permeability of gases and moisture, and make tillage difficult." (PRB FEIS page 4-144).

Table 4.1 summarizes the proposed surface disturbance.

Table 4.1 - SUMMARY OF DISTURBANCE

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Nonconstructed Pad	17	0.1/acre	9.2	Long Term
Constructed Pad	3	or Site Specific	2.9	
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Screw Compressors	0	Site Specific	0.0	Long Term
Monitor Wells		0.1/acre		Long Term
Impoundments	3			Long Term

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
On-channel	3	Site Specific	12.2	
Off-channel	0	Site Specific	0.0	
Water Discharge Points	3	Site Specific or 0.01 ac/WDP	0.3	
Channel Disturbance				
Headcut Mitigation*		Site Specific	0.0	
Channel Modification		Site Specific	0.0	
Improved Roads	2.1			Long Term
No Corridor				
With Corridor	2.1	28' Width or Site Specific	12.6	
2-Track Roads	8.1			Long Term
No Corridor	4.2	12' Width	5.1	
With Corridor	3.9	12' Width	4.8	
Pipelines				Short Term
No Corridor				
With Corridor	2.5	12' Width	3.6	
Buried Power Cable		12' Width or Site Specific		Short Term
No Corridor	0		0	
Overhead Powerlines	0	15' Width	0	Long Term
Additional Disturbance		Site Specific	0	
Subsurface Drip Irrigation (SDI) Sites	3		150	Short Term
TOTAL			192.8	Short Term
			39.2	Long Term

The designation of the duration of disturbance is defined in the PRB FEIS (pg 4-1 and 4-151). "For this EIS, short-term effects are defined as occurring during the construction and drilling/completion phases. Long-term effects are caused by construction and operations that would remain longer".

4.1.1. Soils

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

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

The proposed action was designed to avoid highly erosive areas which have a low potential for successful reclamation wherever possible. As stated previously, most of the well locations were situated in areas that did not require pad construction. However, the operator used existing disturbance (primitive roads) for access to the well locations and some of those roads are located the only place where access was possible through some very erosive sites. Disturbance within these areas may require extraordinary measures to insure that reclamation success is attained. The following roads and well locations are identified as areas requiring additional reclamation efforts beyond traditional methods.

- The access road in SESE of Sec 3 to the 41-10 location.
- The access road in NWSW and SWNW Sec13 to the 41-14 location.
- The access road from SESW Sec 14 across the drainage to the 34-14 location.

The proposed action will affect areas of soils with a limited potential for successful reclamation. These areas are identified as having slope >15%, limiting the use of conventional farm machinery and farming practices or ecological sites susceptible to site degradation and increased soil erosion. Disturbances within these areas require the programmatic/standard COA's be complimented with a site specific performance based reclamation related COA.

Soil disturbances other than permanent facilities would be short term with expedient, successful interim reclamation and site stabilization. In locations of highly erosive soils, the operator will be required to stabilize disturbed surface within 30 days of the initial disturbance. Construction activities would be designed following Best Management Practices (BMPs).

There are two road sections that access single wells which, due to the lack of reclamation potential, the BLM would have relocated to a more desirable location. However, in both instances, the landowner insisted that the routes be permitted as proposed. The roads are proposed along existing primitive roadways that were once used for conventional well access, which are in disrepair and eroded. The recommendation of the BLM resource specialists (Soil Scientist, Civil Engineer and Natural Resource Specialist) is that additional disturbance along these routes could not be reclaimed to meet the requirements of the Wyoming State Reclamation Policy. The landowner, Mr. Clabaugh has provided a signed affidavit stating that he intends to use these road segments after the CBNG production ceases, and at that time, he is willing to release the BLM from any responsibility for the continued use, maintenance

or reclamation of these roads. (See Clabaugh POD SUP Attachment A). These sections have been designed to upgrade the existing primitive road to insure safe access for construction activities. The roads traverse steep slopes (>15%) and shallow loam soils on private surface.

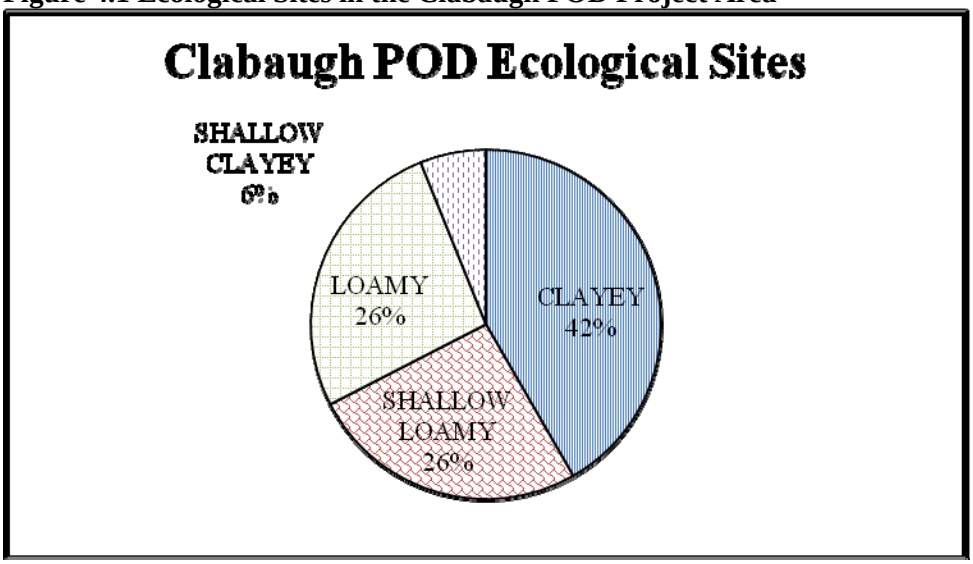
The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231). The Wyoming Reclamation Policy applies to all surface disturbing activities. Authorizations for surface disturbing actions are based upon the assumptions that an area can and ultimately will be successfully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

4.1.2. Vegetation

The construction associated with this project will disturb a total of 192.8 acres in the short term construction phase. To insure expedient reclamation that conforms to the Wyoming Reclamation Plan objectives, native seed mixes are recommended for use on the different ecological sites. These seed mixes were determined based on soil types, the dominant ecological sites, onsite observations, and the potential for mixing of soil horizons in disturbed areas. The operator has proposed acceptable seed mixes for the private surface which includes introduced species. They have proposed and will be required to only use native species on Federal surface. These native species should adapt readily to each soil and ecological site in the POD area to ensure revegetation, with prompt and appropriate recontouring and reclamation.

The following figure depicts the ecological sites present within the project area. The operator will be provided with a map (Attachment 1) of the project area highlighted with the ecological sites in order to assist in the proper placement of seed mixes.

Figure 4.1 Ecological Sites in the Clabaugh POD Project Area



The construction of the access roads, pipelines and well locations will also disturb sagebrush. Wyoming big sagebrush has not been included in these mixes because direct seeding success has been marginal in the past. With expedient reclamation and respreading of the topsoil, sagebrush seed should be present in

the seed base and should regenerate given proper environmental conditions

4.1.3. Wetland/Riparian

The wetland and riparian areas within the Clabaugh POD area have mostly been avoided with the proposed construction areas in this project. As stated previously, the operator has already installed the infrastructure at an existing Wild Horse Creek channel crossing area that will be used for fee as well as this proposed Federal action. There is an ephemeral drainage area in the SESW Sec 14 that the access to three wells in that section will cross. The operator will be required to expediently reclaim and stabilize the crossing area.

The seep or wetland area in the SENW Sec 14 parallels an existing road which was installed for conventional well development in the 1980's. The road is passable, but will be spot upgraded and stabilized as a part of this action. Construction on this road should not directly impact the seep area. The utility corridor will be installed in the road or on the side away from the seep area. Production of water from the coal seams may impact the quantity of source water for this wet area. The operator will be required to monitor the water quality and quantity (through periodic delineation of area) in the seep area.

There will be no direct discharge associated with this project to the creek channel or to any tributary ephemeral drainages.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. 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).

The PRB FEIS identified effects to gallery forests of mature cottonwood trees. Included in the ROD is programmatic mitigation "which may be appropriate to apply at the time of APD approval if site specific conditions warrant."(ROD page A-30). One of the conditions included in that section addresses the impact to trees in A.5.8-2: "To reduce adverse effects on existing wetlands and riparian areas, water discharge should not be allowed if increased discharge volumes or subsequent recharge of shallow aquifers will inundate and kill woody species, such as willows or cottonwoods."(ROD Page A-32).

4.1.4. Invasive Species

Based on the investigations performed during the POD planning process, the operator has committed to the control of noxious weeds and species of concern using the following measures in an Integrated Pest Management Plan (IPMP) included in the proposal:

1. Control Methods will include:
    a. Mowing prior to seed formation on weeds of concern.
    b. Hand pulling of small infestations
    c. Use of domestic animals
    d. Application of appropriate herbicides
2. Preventive practices will include:

a. Prompt reseeding and revegetation with a certified weed free seed mixture
b. Use of certified weed free mulch
c. Use of weed free road surfacing and other earthen materials for maintenance and construction
d. Cleaning of vehicles or equipment prior or entering or leaving each worksite
e. Minimization of surface disturbance

3. Education:
   a. Weed awareness programs will be provided to Cedar Resources employees and contractors
   b. Field personnel will report infestations to supervisors

Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) are known to exist in the affected environment. These two species are found in such high densities and numerous locations throughout NE Wyoming that a control program is not considered feasible at this time.

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

4.1.5. Cumulative Effects

The PRB FEIS stated that cumulative impacts to soils could occur due to sedimentation from water erosion that could change water quality and fluvial characteristics of streams and rivers in the sub-watersheds of the Project Area. SAR in water in the sub-watersheds could be altered by saline soils because disturbed soils with a conductivity of 16 mmhos/cm could release as much as 0.8 tons/acre/year of sodium (BLM 1999c). Soils in floodplains and streambeds may also be affected by produced water high in SAR and TDS. (PRB FEIS page 4-151).

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

- They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 18.5% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The commitment by the operator to fully contain the produced water within the POD boundary.
- The WMP for the Clabaugh POD proposes that produced water will not contribute significantly to flows downstream.

No additional mitigation measures are required.

4.2. Wildlife

During the environmental analysis process, the BLM identified project modifications resulting in an environmentally preferred alternative (Alternative C). At the on-sites, all areas of proposed surface disturbance were inspected to ensure that potential impacts to natural resources would be reduced. In some cases, access roads were re-routed, and well locations, pipelines, discharge points and other water management control structures were moved, modified, mitigated or dropped from further consideration to

alleviate or minimize environmental impacts.

4.2.1. Big Game Direct and Indirect Effects

Under the environmentally preferred alternative, yearlong range for pronghorn antelope, white-tailed deer, and yearlong and winter yearlong range for mule deer would be directly disturbed with the construction of wells, reservoirs, pipelines and roads. Table 4.1 summarized the proposed activities; items identified as long term disturbance would be direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they should provide some habitat value as these areas are reclaimed and native vegetation becomes established.

Impacts to designated elk ranges are anticipated to be minimal given that designated parturition and winter ranges are approximately 2 and 3 miles respectively to the south of the POD boundary and the portion of the POD that was in yearlong range will not be approved or analyzed until completion of the RMP amendment. Although no direct impacts will occur to designated elk ranges west of the railroad tracks in the Fortification Creek area, elk have been documented within the modified project area and project development will disturb elk living in, or traveling through, the POD area. However, this area is outside the WGFD elk management area and therefore displacement of elk from the Clabaugh project area will not impact the elk population or elk management.

In addition to the direct habitat loss, big game would likely be displaced from the project area during drilling and construction. A study in central Wyoming reported that mineral drilling activities displaced mule deer by more than 0.5 miles (Hiatt and Baker 1981). The WGFD indicates a well density of eight wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). A multi-year study on the Pinedale Anticline suggests not only do mule deer avoid mineral activities, but after three years of drilling activity the deer have not become accustomed to the disturbance (Madson 2005).

Big game animals are expected to return to the project area following construction; however, populations will likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. Mule deer are more sensitive to operation and maintenance activities than pronghorn, and, as the Pinedale Anticline study suggests, mule deer do not readily habituate. A study in North Dakota stated "Although the population (mule deer) had over seven years to habituate to oil and gas activities, avoidance of roads and facilities was determined to be long term and chronic" (Lustig 2003). Deer have even been documented to avoid dirt roads that were used only by 4-wheel drive vehicles, trail bikes, and hikers (Jalkotzy et al. 1997).

Winter big game diets are sub-maintenance, meaning they lose weight and body condition as the winter progresses. Survival below the maintenance level requires behavior that emphasizes energy conservation. Canfield et al. (1999) pointed out that forced activity caused by human disturbance exacts an energetic disadvantage, while inactivity provides an energetic advantage for animals. Geist (1978) further defined effects of human disturbance in terms of increased metabolism, which could result in illness, decreased reproduction, and even death. Activities that occur within big game habitats during the spring will likely displace does and fawns due to the human presence in the area. This may cause reduced survival rate of does, fawns and calves that must expend increased energies to avoid such activities.

4.2.1.1. Big Game Cumulative effects

The cumulative effects associated with Alternative C 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, page 4-211.

4.2.2. Aquatics Direct and Indirect Effects

Produced water is to be stored in reservoirs, and used in subsurface irrigation. No discharged to Wild Horse Creek is proposed, therefore no impacts to aquatics are anticipated. Reservoirs and discharge points may provide habitat for amphibians (Vetter 2007).

4.2.2.1. Aquatics Cumulative effects

The cumulative effects associated with Alternative C 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, page 4-247.

4.2.3. Migratory Birds Direct and Indirect Effects

Disturbance of the habitat types within the project area is likely to impact migratory birds. Native habitats are being lost directly with the construction of wells, roads, and pipelines. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Human activities likely displace migratory birds farther than simply the physical habitat disturbance. Drilling and construction noise can be troublesome for songbirds by interfering with the males' ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003).

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

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

Migratory bird species within the Powder River Basin nest in the spring and early summer and are vulnerable to the same affects as sage-grouse and raptor species. Though no timing restrictions are typically applied specifically to protect migratory bird breeding or nesting, where sage-grouse or raptor nesting timing limitations are applied, nesting migratory birds are also protected. Where these timing limitations are not applied and migratory bird species are nesting, migratory birds remain vulnerable. Additional direct and indirect effects to migratory birds are discussed in the PRB FEIS (4-231-235).

4.2.3.1. Migratory Birds Cumulative effects

The cumulative effects associated with Alternative C 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, Page 4-235.

4.2.4. Raptors 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. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Both actions can result in egg or chick mortality. In addition, routine human activities near these nests can draw increased predator activity to the area and increase nest predation.

Due to the topographical relief of the Clabaugh POD most of the raptor nests identified are out of view from well locations and roads. A few nests are close to roads. The Cooper's hawk and great-horned owl nests in section 14 are 836 and 228 feet from the proposed road, however the nests are both out of sight in a draw bottom. The unknown raptor nests in section 21 are 333 and 350 feet from and out of view of the access road. Timing limitations during the construction phase of development should provide adequate protection for these nests.

The presence of overhead power lines may impact foraging raptors. Raptors forage opportunistically throughout the Powder River Basin. Power poles provide attractive perch sites in areas where mature trees and other natural perches are lacking. From May 2003, through December 28, 2006, Service Law Enforcement salvage records for northeast Wyoming identified that 156 raptors, including 1 bald eagle, 93 golden eagles, 1 unidentified eagle, 27 hawks, 30 owls and 4 unidentified raptors were electrocuted on power poles within the Powder River Basin Oil and Gas Project area (USFWS 2006a). Of the 156 raptors electrocuted 31 were at power poles that are considered new construction (post 1996 construction standards). Additionally, two golden eagles and a Cooper's hawk were killed in apparent mid span collisions with powerlines (USFWS 2006a). Power lines not constructed to APLIC suggestions pose an electrocution hazard for eagles and other raptors perching on them; the Service has developed additional specifications improving upon the APLIC suggestions.

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a one-half mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation to be located greater than one-quarter mile from occupied raptor nests. Those nest with timing limitations were listed earlier in Table 4. Project changes made at the onsite and implementation of the timing limitations should avoid direct impacts to raptors.

4.2.4.1. Raptors Cumulative effects

The cumulative effects associated with Alternative C 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, page 4-221. .

4.2.5. Threatened and Endangered and Sensitive Species

Potential project effects on Threatened and Endangered Species were analyzed and a summary is provided in Table 4.2.5.1. Threatened and Endangered Species potentially affected by the proposed project area are further discussed following the table.

4.2.5.1. Threatened and Endangered Species

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered				
Black-footed ferret (*Mustela nigripes*)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NS	NLAA	Suitable habitat of insufficient size.
Threatened				
Ute ladies'-tresses	Riparian areas with permanent water	NP	NE	No suitable habitat

orchid (*Spiranthes diluvialis*)				present.

Presence
K Known, documented observation within project area.
S Habitat suitable and species suspected, to occur within the project area.
NS Habitat suitable but species is not suspected to occur within the project area.
NP Habitat not present and species unlikely to occur within the project area.

Project Effects
LAA Likely to adversely affect
NE No Effect.
NLAA May Affect, not likely to adversely effect individuals or habitat.

4.2.5.1.1. Black-Footed Ferret Direct and Indirect Effects

Despite the project area only harboring one small town, the project area is located within the Arvada Complex, a complex identified as biologically sufficient for black footed ferret. No surveys for ferrets were required by USFWS or conducted. It is extremely unlikely that any black-footed ferret is present in the project area. However, if any become present, the proposed action will most likely make portions of the project area unsuitable for ferrets. Implementation of the proposed development "may affect, but is not likely to adversely affect" the black-footed ferret. The proposed project will not preclude recovery efforts if they were to occur in this area. If a black footed ferret is discovered in the project area, then the USFWS will be notified immediately.

4.2.5.1.2. Ute Ladies'-Tresses Orchid Direct and Indirect Effects

One seep was identified within the project area. All potentially suitable habitats were assessed for suitability. Suitable habitat is not present within the project area and the proposed project will not effect Ute Ladies-tresses orchids.

Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial, however no historic seed source is present within the project area. Implementation of the proposed coal bed natural gas project have no effect on Ute ladies'- tresses orchid as suitable habitat is not present.

4.2.5.2. Sensitive Species 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: "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."

4.2.5.2.1. Prairie dog colony obligates

Wells, roads, pipelines and other infrastructure associated with energy development constructed within prairie dog colonies will directly remove habitat for prairie dog colony obligate species. Activities that disturb these species could lead to temporary or even long-term or permanent abandonment. Direct loss of species may also occur from vehicle traffic. Continued loss of prairie dog habitat and active prairie dog towns will result in the decline of numerous sensitive species in the short grass prairie ecosystem.

4.2.5.2.2. Sagebrush obligates

Shrubland and grassland birds are declining faster than any other group of species in North America (Knick et al. 2003). In Wyoming, existing oil and gas wells are located primarily in landscapes dominated by sagebrush, causing direct loss of this habitat. Associated road networks, pipelines, and powerline transmission corridors also influence vegetation dynamics by fragmenting habitats or by creating soil conditions facilitating the spread of invasive species (Braun 1998, Gelbard and Belnap 2003). Density of sagebrush-obligate birds within 100 m (328 feet) of roads constructed for natural gas development in Wyoming was 50% lower than at greater distances (Ingelfinger 2001). Increased numbers of corvids and raptors associated with powerlines (Steenhof et al. 1993, Knight and Kawashima 1993, Vander Haegen et al. 2002) increases the potential predation impact on sage-grouse and other sagebrush-breeding birds (Knick et al. 2003)

Fragmentation of shrubsteppe habitat is a major disruption that has consequences for sagebrush-obligate species (Braun et al. 1976; Rotenberry & Wiens 1980a). In fragmented habitats, suitable habitat area remains only as a remnants surrounded by unusable environments (Urban and Shugart 1984; Fahrig & Paloheimo 1988). Populations of sagebrush-obligate species decline because areas of suitable habitat decrease (Temple & Cary 1988), because of lower reproduction, and/or because of higher mortality in remaining habitats (Robinson 1992; Porneluzi et al. 1993). Fragmentation of shrubsteppe has the further potential to affect the conservation of shrub-obligate species because of the permanence of disturbance (Knick and Rotenberry 1995). Several decades are required to reestablish ecologically functioning mature sagebrush communities. Due to this, sagebrush obligate species may not return even after habitat reestablishment.

Table 4.3 Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (*Rana pipiens*)	Beaver ponds, permanent water in plains and foothills	S	MIIH	Additional water will affect existing waterways.
Spotted frog (*Ranus pretiosa*)	Ponds, sloughs, small streams	NP	NI	Prairie not mountain habitat.
Birds				
Baird's sparrow (*Ammodramus bairdii*)	Grasslands, weedy fields	S	MIIH	Sagebrush cover will be affected.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body.	K	MIIH	Project includes overhead power.
Brewer's sparrow (*Spizella breweri*)	Basin-prairie shrub	S	MIIH	Sagebrush cover will be affected.
Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	S	MIIH	Prairie dog colony will be impacted.
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	S	MIIH	Prairie dog colony will be impacted.
Greater sage-grouse (*Centrocercus urophasianus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Loggerhead shrike (*Lanius ludovicianus*)	Basin-prairie shrub, mountain-foothill shrub	K	MIIH	Sagebrush cover will be affected.
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	NP	NI	Habitat not present.
Mountain plover (*Charadrius montanus*)	Short-grass prairie with slopes < 5%	NP	NI	Habitat present. None found.
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	NP	NI	No forest habitat present.
Peregrine falcon (*Falco peregrinus*)	cliffs	NP	NI	No nesting habitat present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Sage sparrow (*Amphispiza billneata*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Sage thrasher (*Oreoscoptes montanus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Trumpeter swan (*Cygnus buccinator*)	Lakes, ponds, rivers	S	MIIH	Reservoirs may provide migratory habitat.
White-faced ibis (*Plegadis chihi*)	Marshes, wet meadows	NP	NI	Permanently wet meadows not present.
Yellow-billed cuckoo (*Coccyzus americanus*)	Open woodlands, streamside willow and alder groves	NP	NI	Streamside habitats not present
Fish				
Yellowstone cutthroat trout (*Oncoryhynchus clarki bouvieri*)	Mountain streams and rivers in Tongue River drainage	NP	NI	Outside species range.
Mammals				
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	MIIH	Prairie dog towns will be impacted.
Fringed myotis (*Myotis thysanodes*)	Conifer forests, woodland chaparral, caves and mines	NP	NI	Habitat not present.
Long-eared myotis (*Myotis evotis*)	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Spotted bat (*Euderma maculatum*)	Cliffs over perennial water.	NP	NI	Cliffs & perennial water not present.
Swift fox (*Vulpes velox*)	Grasslands	S	MIIH	Prairie dog colony will be impacted.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	NP	NI	Habitat not present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Plants				
Porter's sagebrush (*Artemisia porteri*)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Habitat not present.

Presence
K Known, documented observation within project area.
S Habitat suitable and species suspected, to occur within the project area.
NS Habitat suitable but species is not suspected to occur within the project area.
NP Habitat not present and species unlikely to occur within the project area.

Project Effects
NI No Impact.
MIIH May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species.
WIPV Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.
BI Beneficial Impact

4.2.5.2.1. Bald eagle Direct and Indirect Effects

Suitable roosting habitat is found along Wild Horse Creek and increasing perennial water from CBNG development in the area is creating marginal nesting habitat. Surveys for roosts will be required each winter prior to construction activities within one mile of Wild Horse Creek. Winter bald eagle use 3-6 miles up-steam of the POD area and in March 27 and May 21, 2007 in the POD. Raptor surveys would detect nesting bald eagles. To reduce the risk of decreased productivity or nest failure, BLM BFO requires a 0.5 mile no surface occupancy radius and a one mile radius timing limitation of all activity during the breeding season around active bald eagle nests. To reduce the risk of disruption to the winter roosting activities of bald eagles, the BLM BFO requires a 0.5 mile no surface occupancy radius and a one mile radius timing limitation of all winter roosts (either communal or consistent use).

There are approximately 8 miles of existing overhead three-phase distribution lines within the project area. The wire spacing is likely in compliance with the Avian Power Line Interaction Committee's (1996) suggested practices and with the Service's standards (USFWS 2002); however other features may not be in compliance. No additional overhead three-phase distribution lines are proposed. There are currently 1.6 miles of improved roads within the project area, with 2.1 miles proposed.

The presence of overhead power lines may impact foraging bald eagles. Bald eagles forage opportunistically throughout the Powder River Basin particularly during the winter when migrant eagles join the small number of resident eagles. Power poles provide attractive perch sites in areas where mature trees and other natural perches are lacking. From May 2003, through December 28, 2006, Service Law Enforcement salvage records for northeast Wyoming identified that 156 raptors, including 1 bald eagle, 93 golden eagles, 1 unidentified eagle, 27 hawks, 30 owls and 4 unidentified raptors were electrocuted on power poles within the Powder River Basin Oil and Gas Project area (USFWS 2006a). Of the 156 raptors electrocuted 31 were at power poles that are considered new construction (post 1996 construction standards). Additionally, two golden eagles and a Cooper's hawk were killed in apparent mid span collisions with powerlines (USFWS 2006a). Power lines not constructed to APLIC suggestions pose an electrocution hazard for eagles and other raptors perching on them; the Service has developed additional specifications improving upon the APLIC suggestions. Constructing power lines to the APLIC suggestions and Service standards minimizes but does not eliminate electrocution risk.

Typically two-tracks and improved project roads pose minimal collision risk. In one year of monitoring road-side carcasses the BLM Buffalo Field Office reported 439 carcasses, 226 along Interstates (51%), 193 along paved highways (44%), 19 along gravel county roads (4%), and 1 along an improved CBNG road (<1%) (Bills 2004). No road-killed eagles were reported; eagles (bald and golden) were observed feeding on 16 of the reported road-side carcasses (<4%). The risk of big-game vehicle-related mortality along CBNG project roads is so insignificant or discountable that when combined with the lack of bald eagle mortalities associated with highway foraging leads to the conclusion that CBNG project roads do not affect bald eagles.

Produced water will be stored in 2 existing and 1 proposed reservoirs, and discharged to Wild Horse Creek. Increased open water may attract eagles if waterfowl or fish are present. The effect of CBNG produced water on eagles is unknown. Reservoirs could prove to be a benefit (e.g. increased food supply) or an adverse effect (e.g. contaminants, proximity of power lines and/or roads to water). Eagle use of CBNG discharge should be reported to determine the need for any future management.

4.2.5.2.2. Black-tailed prairie dog Direct and Indirect Effects

Individual pairie dogs will likely be killed during road and pipeline construction through the active colonies. Individuals that survive the excavation process but whose burrows were destroyed will be displaced. As the prairie dog town grows in size, prairie dogs move from an area of high population density to an area of low population density. Male prairie dogs resort to either long-distance dispersal to

new colonies (mostly as yearlings, rarely as adults) or short distance within the home colony. Female prairie dogs disperse over long distances to other colonies (as either yearlings or adults). Short-distance dispersal of females within the home colony almost never occurs (Hoogland 1995). Dispersal of prairie dogs occurs as single individuals. Both male and female prairie dogs prefer to move into an existing colony or one that has been abandoned rather than start a completely new colony. Coterie (small family group within the colony) members resist attempted invasions by conspecifics including immigrants. Dispersing prairie dogs have increased stress levels, higher exposure to predators, and are unlikely to be accepted by other colonies if they even encounter one. Both males and females actively protect their coterie territories from invading males and females (Hoogland 1995).

Unlike roads and pipelines, the construction and operation of reservoirs will permanently remove habitat. By the time the reservoirs are no longer needed, the reservoirs may become hard-pan, soil that has hardened due to mineral deposits and evaporation. Prairie dogs may be unable to burrow in this type of soil compaction. The presence of a reservoir will limit colony expansion. Well houses and power poles may provide habitats for mammal and avian predators increasing prairie dog predation. Mineral related traffic on the adjacent roads may result in prairie dog road mortalities. During construction of these facilities, there is the possibility that prairie dogs within these colonies may be killed as a direct result of the earth moving equipment. Constant noise and movement of equipment and the destruction of burrows puts considerable stress on the animals and will cause an increase in prairie dog mortalities. During the construction of these facilities individuals are exposed more frequently to predators and have less protective cover.

4.2.5.2.3. Burrowing owl Direct and Indirect Effects

The dramatic reduction of prairie habitat in the United States has been linked to reduction of burrowing owl populations (Klute et al. 2003). Use of roads and pipeline corridors may increase owl vulnerability to vehicle collision. Overhead power lines provide perch sites for larger raptors that could potentially result in increased burrowing owl predation. CBNG infrastructure such as roads, pipe line corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes.

The USDAFS Thunder Basin National Grasslands (TBNG) in Campbell County, WY, whom cooperated with the BLM in the creation of the 2003 PRB EIS, recommends a 0.25 mile timing restriction buffer zone for burrowing nest locations during their nesting season (April 15 to August 31). Instruction Memorandum No. 2006-197, directs the field offices to "use the least restrictive stipulations that effectively accomplish the resource objectives or uses." Alteration of the general raptor nest timing limitation (Feb 1 to July 31) to a more specific burrowing owl nesting season timing limitation will effectively reduce the vulnerability of owls to collision while shortening the timing restriction period to four and one half months (See Chapter 3 for breeding, nesting, and migration chronology) from six and one half months and from 0.5 mile to 0.25 mile. The project area will be surveyed for burrowing owls in 2008.

4.2.5.2.4. Grouse

4.2.5.2.4.1. Greater sage-grouse Direct and Indirect Effects

No leks are known within three miles of the project area. Marginal to suitable nesting and brood rearing habitat exists within the project area. Suitable greater sage-grouse nesting and brood-rearing habitat will be lost with the addition of well sites, roads, pipelines, powerlines, reservoirs and other infrastructure. Due to the distance to the nearest lek (5 miles), negative project-specific survey results, and steep topography, project impacts to sage-grouse are not anticipated to impact population levels.

Sage-grouse populations within the PRB are declining independent of CBNG development. CBNG is a recent development, with the first well drilled in 1987 (Braun et al. 2002). In February 1998 there were

420 producing wells primarily restricted to eastern Campbell County (BFO 1999). By May 2003 there were 26,718 CBNG wells permitted within the BFO area (Oedekoven 2004). The PRB FEIS estimated 51,000 additional CBNG wells to be drilled over a ten year period beginning in 2003 (BFO 2003). Impacts from CBNG development are likely to be significant and additive to the long-term impacts afflicting the sage-grouse population (Oedekoven 2004). In other terms, CBNG development is expected to accelerate the downward sage-grouse population trend. A well density of eight wells per section creates sage-grouse avoidance zones which overlap, creating contiguous avoidance areas (WGFD 2004).

An integrated approach including habitat restoration, grazing management, temporal and spatial mineral limitations etc. is necessary to reverse the population decline. The WGFD has initiated such a program within the Buffalo Field Office area (Jellison 2005). The WGFD program is modeled after a successful program on the Deseret Ranch in southwestern Wyoming and northeastern Utah. The Deseret Ranch has demonstrated a six-fold increase in their sage-grouse population while surrounding areas exhibited decreasing populations (Danvir 2002).

4.2.5.2.4.2. Sharp-tailed grouse Direct and Indirect Effects

The closest know sharp-tailed grouse lek is 2.7 miles to the south. Impacts from CBNG development on sharp-tailed grouse are anticipated to be similar to those discussed for greater sage-grouse.

4.2.5.2.5. Mountain plover Direct and Indirect Effects

Suitable mountain plover habitat is present within the project area. The project should not impact mountain plovers. No Mountain Plover were found in the 2007 survey. Another survey in 2008 shall take place.

Mineral development has mixed effects on mountain plovers. Disturbed ground, such as buried pipeline corridors and roads, may be attractive to plovers, while human activities within one-quarter mile may be disruptive. To reduce impacts to nesting mountain plovers, the BLM BFO requires a 0.25 mile timing limitation for potential nesting habitat prior to nest survey completion and a 0.25 mile timing limitation for all occupied nesting habitat for the entire nesting season.

Use of roads and pipe line corridors by mountain plovers may increase their vulnerability to vehicle collision. Limiting travel speed to 25mph provides drivers an opportunity to notice and avoid mountain plovers and allows mountain plovers sufficient time to escape from approaching vehicles. Even if a nesting plover flushes in time, the nest likely would still be destroyed. Overhead power lines provide perch sites for raptors that could result in increased mountain plover predation. CBNG infrastructure such as well houses, roads, pipeline corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes.

Mountain plovers have been forced to seek habitat with similar qualities that may be poor quality habitat when loss or alteration of their natural breeding habitat (predominately prairie dog colonies) occurs, such as heavily grazed land, burned fields, fallow agriculture lands, roads, oil and gas well pads and pipelines. These areas could become reproductive sinks. Adult mountain plovers may breed there, lay eggs and hatch chicks; however, the young may not reach fledging age due to the poor quality of the habitat. Recent analysis of the USWFS Breeding Bird Survey (BBS) data suggests that mountain plover populations have declined at an annual rate of 3.7 % over the last 30 years which represents a cumulative decline of 63% during the last 25 years (Knopf and Rupert 1995). An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

4.2.5.2.6. Swift Fox Direct and Indirect Effects

The construction of well pads, roads, pipelines and reservoirs causes direct habitat loss (i.e. loss of prairie dogs and prairie dog burrows). During construction of these facilities, there is the possibility that swift

foxes may be killed as a direct result of the earth moving equipment. Constant noise and movement of equipment and the destruction of burrows puts considerable stress on the animals and is likely to cause an increase in swift fox mortalities. During the construction of these facilities individuals are exposed more frequently to predators and have less protective cover. Mineral related traffic on the adjacent roads may result in swift fox road mortalities.

The BLM BFO has very little data on swift fox occurrence within the PRB associated with oil and gas PODs. The TBNG in Campbell County, WY whom cooperated with the BLM in the creation of the 2003 PRB EIS, has applied a standard condition to oil and gas activities in association with swift fox dens. Therefore, in order to adequately protect the species, the BLM BFO incorporated the following condition from the TBNG Land Resource Management Plan into this project: "To reduce disturbances to swift fox during the breeding and whelping seasons, prohibit the following activities within 0.25 miles of their dens from March 1 to August 31: Construction (e.g. roads, water impoundments, oil and gas facilities), reclamation, gravel mining operations, drilling of water wells, and oil and gas drilling." This timing restriction, based on the best available science, will reduce direct impacts to swift foxes within the project area. A swift fox survey will be required in 2008.

4.2.5.3. Sensitive Species Cumulative effects

The cumulative effects associated with Alternative C 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, page 4-271.

4.3. Water Resources

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

The primary component of Cedar Resources water management strategy for the Clabaugh POD is water disposal at 180 acres of subsurface drip irrigation (SDI) upland hay fields. Additionally, the operator will use three impoundments outside the POD boundary to fully contain additional produced water which may be used for stock watering or dust control.

The WDEQ has assumed primacy from United States Environmental Protection Agency for maintaining the water quality in the waters of the state. The WSEO has authority for regulating water rights issues and permitting impoundments for the containment of surface waters of the state.

The maximum water production is predicted to be 72.0 gpm per well or 1440.0 gpm (3.21 cfs or 2322 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was 171,423 acre-feet in 2006 (maximum production). As such, the volume of water resulting from the production of these wells is 1.3% of the total volume projected for 2006. This volume of produced water is within the predicted parameters of the PRB FEIS.

4.3.1. Groundwater

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). However, the primary water management strategy of subsurface irrigation could increase that potential significantly. The operator is required to monitor the periphery of the irrigated fields for migration outside the permitted area, but no monitoring is required by the state for the groundwater immediately below the irrigation sites. However, this infiltration rate is difficult to predict. For this action, it may be assumed that a maximum of 576 gpm will infiltrate at or near the discharge points and impoundments (929 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, "the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater." (PRB FEIS pg 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. "The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers." (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 115 to 1300 feet compared to 460 feet to the Swartz-Anderson and 1330 feet to the Wall. As mitigation, 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 storage within the coals and sands units above and below the coals is enormous. Almost 750 million acre-feet of recoverable groundwater are stored within the Wasatch - Tongue River sand and coals (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).

Adherence to the drilling plan, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and utilizing proper cementing procedures will protect any potential 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 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 within the POD. The reference well will be sampled at the well head for analysis within sixty days of initial production and a copy of the water analysis will be submitted to the BLM Authorizing Officer.

Shallow ground water monitoring is ongoing at impoundment sites across the basin. Due to the limited data available from these sites, the still uncertain overall fate or extent of change that is occurring due to infiltration at those sites, and the extensive variable site characteristics both surface and subsurface, it is not reliable at this time to infer that findings from these monitoring wells should be directly applied to other impoundment locations across the basin.

In order to address the potential impacts from infiltration on shallow ground water, the WDEQ has developed a guidance document, "Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments" (June 14, 2004) which can be accessed on their

website. This guidance document became effective August 1, 2004, and has been revised as the "Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments" issued September, 2006. Approximately 1650 new impoundment sites have been investigated with over 1850 borings as of 12-2007. 240 of those impoundments met the criteria to provide compliance monitoring data if constructed and used for CBNG water containment. Only 108 monitored impoundments are currently in use. As of the 4th quarter 2007, only 9 monitored impoundments exceed groundwater class of use limits (Fischer 03-08). The BLM requires that operators comply with the DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

4.3.1.1. Groundwater 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). No additional mitigation is necessary.

4.3.2. Surface Water

The following table shows Wyoming proposed numeric limits for the watershed for SAR, and EC, the average value measured at selected USGS gauging stations at high and low monthly flows, and Wyoming groundwater quality standards for TDS and SAR for Class I to Class III water. It also shows pollutant limits for TDS, SAR and EC detailed in the WDEQ's WYPDES permit, and the levels found in the POD's representative water sample.

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

Predicted Values	**TDS, mg/l**	**SAR**	**EC,** μmhos/cm
Upper Powder River Watershed at Arvada, WY 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		
Existing Groundwater Quality			
Landry #1 NENW Sec 33	870	27.0	1,390
MW#1 Sec 15	6,260	3.5	6,200
WDEQ Water Quality Requirement for WYPDES Permit # 0055859			
At discharge point	NA	NA	7,500
Predicted Produced Water Quality			
Anderson/Canyon Coal	1,620	24.1	2,450

Predicted Values	TDS, mg/l	SAR	EC, μmhos/cm
Cook Coal	1,240	18.3	2,080
Wall Coal	1,110	17.3	1,780
Commingled Coals (all)	1,350	26.7	2,110

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 1350 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). Subsurface drip irrigation (SDI) is proposed for water disposal in this proposal. The operator has obtained one SDI permit for 50 acres of upland hayfield (Permit UIC 06-369) and has applied for an additional permit for 150 acres through the WDEQ. These fields are located in the northern portion of the POD and north of the POD boundary in cultivated field areas which have been seeded with a mixture of perennial introduced grasses. Sub-surface investigations have been conducted to determine the quality of and depth to shallow groundwater at both locations, as well as the soil characteristics. The operator is required to monitor the area surrounding the SDI fields for water re-surfacing. These fields would be functioning in these locations regardless of the Federal action. There is potential that the chemistry of the CBNG produced water (high SAR) may negatively impact the soils in the area which contain clay components. The operator has proposed to monitor the soil condition and mitigate any degradation if necessary.

The quality for the water produced from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 72 gallons per minute (gpm) is projected to be produced from these 20 wells, for a total of 1440 gpm for the POD. See Table 4.5.

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

There are 2 existing and 1 proposed discharge points included in this project. They have been appropriately sited and utilize appropriate water erosion dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

To manage the produced water, 1 proposed and 2 exisiting impoundments (57.9 acre feet total capacity) would be utilized. These impoundments will disturb approximately 12.2 acres including the dam structures. All these water impoundments are on-channel reservoirs. Monitoring may be required based upon WYDEQ findings relative to "Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments" (June 14, 2004). 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.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 0.48 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). The operator has committed to fully contain the water within the impoundment (except as a result of a storm event), to monitor the condition of channels and address any problems resulting from discharge or resurfacing. 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 at a total contribution to the

mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 20 wells is anticipated to be a total of 1440 gpm or 3.21 cfs to impoundments and SDI systems. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment, the produced water re-surfacing in Wild Horse Creek from this action (0.48 cfs) may add a maximum 0.38 cfs to the Upper Powder River flows, or 0.6% 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 page 3-7). Based on the area of the watersheds above the impoundment locations in the POD (9.7 sq mi) and an assumed density of one well per location every 80 acres, the potential exists for the development of 77 additional wells which could produce a maximum flow rate of 5544 gpm (12.35 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, 12.4 cfs, is much less than the volume of runoff estimated from the 2-year storm event of 181.5 cfs for the drainages.

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

The operator has obtained a WYPDES permit # WY0055859 for the discharge of water produced from this project from the WDEQ.

Permit effluent limits were set at (WYPDES Part 1page 2-3):

pH	6.5 to 9.0
Specific Conductance	7500 mg/l max
Dissolved iron	1000 µg/l max
Dissolved Copper	6 µg/l max
Total Recoverable Barium	1800 µg/l max
Total Recoverable Arsenic	8.4 µg/l max
Chlorides	150 mg/l

The WYPDES permit also addresses existing downstream concerns, such as irrigation use, in the COA for the permit. The designated point of compliance identified for this permit is below the Deadman Stock Reservoir (SESE Sec 15) and at and above the confluence of Wild Horse Creek with the Powder River.

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.

As stated previously, the operator has committed to offer water well agreements to properly permitted domestic and stock water wells within the circle of influence of the proposed CBNG wells.

The development of coal bed natural gas and the production and discharge of water in the area surrounding the existing natural spring may affect the flow rate or water quality of the seep area located in the SENW Sec 14. The operator will be required to monitor the size and water quality of the seep area for potential changes. If changes occur as a result of CBNG production in the area, the operator may be required to mitigate the impacts to the seep area.

In-channel downstream impacts are addressed in the WMP for the Clabaugh POD prepared by Knight Technologies for Cedar Resources Corporation. In the recent past, there have been problems created in this area by the freezing of an accumulation of CBNG water discharged upstream in the Wild Horse Creek drainage during the winter months. Localized impact to cottonwood health has been noted. The landowner has been in communications with the WDEQ Water Quality Division regarding this problem. The water management strategy for this project was designed so that additional flow would not be added to the drainage to exacerbate the problem.

The operator has also obtained a permit from the WOGCC to apply water produced from this action to the Echeta County road for dust suppression. The permit includes conditions of approval that must be followed in the application process (WMP Attachment J).

4.3.2.1. Surface Water 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).

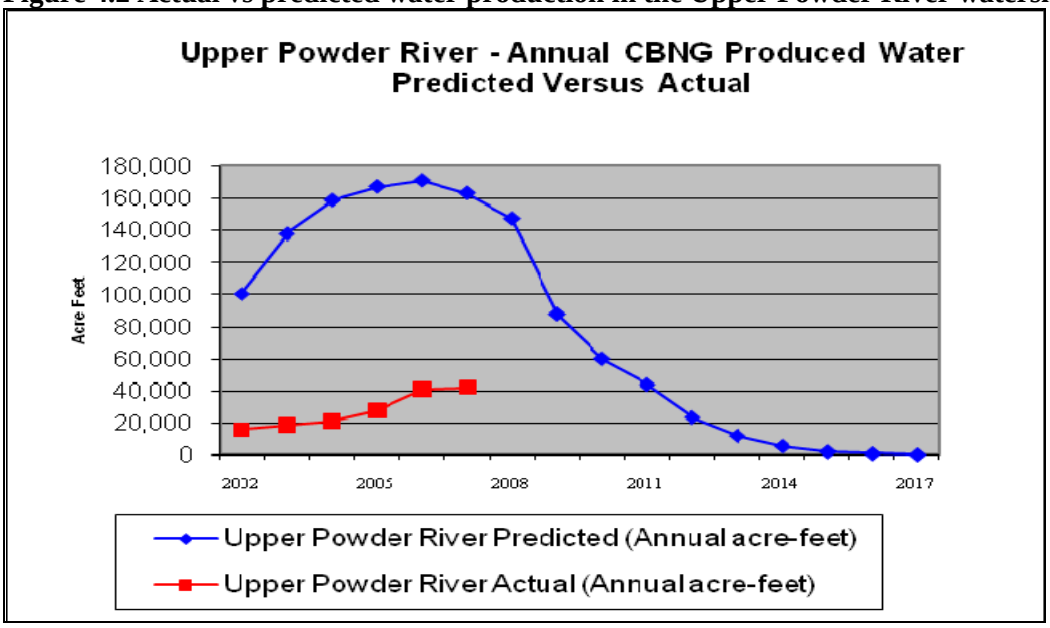
As of December 2007, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 166,096 acre-ft of water compared to the predicted 900,040 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.1 and Table 4.6 following. This volume is 18.5 % 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 *2007 Data Update 3-08-08*

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				
2009	88,046	1,135,567				

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
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**		**166,096**			

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.

The PRB FEIS states, "Cumulative effects to the suitability for irrigation of the Powder River would be minimized through the interim Memorandum of Cooperation (MOC) that the Montana and Wyoming DEQ's (Departments of Environmental Quality) have signed. This MOC was developed to ensure that designated uses downstream in Montana would be protected while CBM development in both states

continued. However, this MOC has expired and has not been renewed. The EPA has approved the Montana Surface Water Standards for EC and SAR and as such the WDEQ is responsible for ensuring that the Montana standards are met at the state line under the Clean Water Act (CWA). Thus, through the implementation of in-stream monitoring and adaptive management, water quality standards and interstate agreements can be met." (PRB FEIS page 4-117)

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

1. They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 18.5% 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 fully contain and monitor the volume of water discharged.

No additional mitigation measures are required.

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

4.4. Cultural Resources

BLM review, conducted by Wendy Sutton, has determined that one site will be impacted by the current project. The impacted site (48CA6578) has been recommended as not eligible to the National Register of Historic Places. As such, this resource is not considered a historic property; therefore, the impact to this resource result in no historic properties affected. Eligible site 48CA6579 will not be impacted. Following the Wyoming State Protocol, Section VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 4/16/2008 that the proposed project would result in no historic properties affected/no effect (DBU_WY_2008_867).

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).

5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Rich Lynde		Cedar Resources Corp.	Yes
Randy Lynde		CH4 Consulting	Yes
Don Malli	Landowner Representative	Clabaugh	Yes
Nick Sessions	Landowner Representative	Clabaugh	Yes
Naomi Knight	Owner	Knight Technologies	Yes
Craig Knight	Owner	Knight Technologies	Yes
Levi Jensen	Drilling Coordinator	Knight Technologies	Yes
Gretchen Romans	Water Management	Knight Technologies	Yes
Scott Benson	Project Coordinator	Knight Technologies	Yes
Ken Clabaugh	Landowner	Clabaugh Ranches	Yes
Don Fischer	Permitting Supervisor	WDEQ	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.

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