

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD  
FOR  
Lance Oil & Gas  
Coulter 5 POD**

ENVIRONMENTAL ASSESSMENT –WY-070-EA07-123

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Lance Oil & Gas’s Coulter 5 Coal Bed Natural Gas (CBNG) POD comprised of the following 14 Applications for Permit to Drill (APDs), and the use of 13 full-containment reservoirs as follows:

	Well Name	Well #	Qtr/Qtr	Sec	Twp	Rng	Lease #
1	COULTER 5 CAT CREEK LAND	12-7*	SWNW	7	48N	78W	WYW129050
2	COULTER 5 FEDERAL	21-7	NENW	7	48N	78W	WYW161928
3	COULTER 5 FEDERAL	23-7	NESW	7	48N	78W	WYW161928
4	COULTER 5 FEDERAL	32-7	SWNE	7	48N	78W	WYW161928
5	COULTER 5 FEDERAL	42-7	SENE	7	48N	78W	WYW161928
6	COULTER 5 FEDERAL	43-7	NESE	7	48N	78W	WYW161928
7	COULTER 5 CAT CREEK LAND	14-18	SWSW	18	48N	78W	WYW174118
8	COULTER 5 CAT CREEK LAND	23-18	NESW	18	48N	78W	WYW174118
9	COULTER 5 CAT CREEK LAND	32-18	SWNE	18	48N	78W	WYW174118
10	COULTER 5 WELLES	34-12	SWSE	12	48N	79W	WYW140253
11	COULTER 5 WELLES	32-13	SWNE	13	48N	79W	WYW140253
12	COULTER 5 FEDERAL	34-13	SWSE	13	48N	79W	WYW140253
13	COULTER 5 WATKINS	41-13	NENE	13	48N	79W	WYW140253
14	COULTER 5 WATKINS	43-13	NESE	13	48N	79W	WYW140253

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Lease Number	WYPDES Outfall No.
1	33-7-4878	NWSE	7	48	78	WYW161928	005
2	13-10-4878	NWSW	10	48	78	WYW137926	003
3	24-1-4879	SESW	3	48	79	WYW147387	009
4	14-1-4879	SWSW	1	48	79	WYW147387	010
5	Pocahontas	NESE	13	48	79	WYW140253	009*
6	11-10-4878	NWNW	10	48	78	WYW146903	004
7	11-15-4878	NWNW	15	48	78	WYW146903	002
8	12-5-4878	SWNW	5	48	78	NA	008
9	43-6-4878	NESE	6	48	78	NA	007
10	44-6-4878	SESE	6	48	78	NA	006
11	44-2-4879	SESE	2	48	79	NA	011
12	42-3-4879	SENE	3	48	79	NA	012
13	Pit 41-11-4879	NENE	11	48	79	NA	013

- Discharge permit number WY0053015

In addition to the listed APDs, it is my decision to approve the following right-of-way grant:

<b>ROW Grant</b>	<b>Type</b>	<b>Sections</b>	<b>TWP/RNG</b>
WYW169763	Access Road, 50' wide, 2550' long, approx. 2.9 acres	Sec.7, lots 10, 14, 15	T48N, R78W

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 within 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  
Lance Oil & Gas  
Coulter 5 POD  
PLAN OF DEVELOPMENT  
WY-070-EA07-123**

## **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/or impacts that are not covered within the PRB FEIS.

### **1. PURPOSE AND NEED**

The purpose for the proposal is to produce coal bed natural gas (CBNG) on 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**

Description of the Proposed Action

Proposed Action Title/Type: Lance Oil & Gas’s Coulter 5 POD Plan of Development (POD) for 15 coal bed natural gas well APDs and associated infrastructure.

Proposed Well Information: There are 15 wells proposed within this POD. The wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location. Each well will produce from 1 coal seam, the Big George. Proposed well house dimensions are 3.5 ft width x 3.5 ft length x 3.5 ft height.

Well house color is Covert Green, selected to blend with the surrounding vegetation. Wells are located as follows:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
1	COULTER 5 CAT CREEK LAND	12-7*	SWNW	7	48N	78W	WYW129050
2	COULTER 5 FEDERAL	21-7	NENW	7	48N	78W	WYW161928
3	COULTER 5 FEDERAL	23-7	NESW	7	48N	78W	WYW161928
4	COULTER 5 FEDERAL	32-7	SWNE	7	48N	78W	WYW161928
5	COULTER 5 FEDERAL	41-7	SWSW	7	48N	78W	WYW161928
6	COULTER 5 FEDERAL	43-7	NESE	7	48N	78W	WYW161928
7	COULTER 5 CAT CREEK LAND	14-18	SWSW	18	48N	78W	WYW146905
8	COULTER 5 CAT CREEK LAND	23-18	NESW	18	48N	78W	WYW146905
9	COULTER 5 CAT CREEK LAND	32-18	SWNE	18	48N	78W	WYW146905
10	COULTER 5 CAT CREEK LAND	41-18	NENE	18	48N	78W	WYW146905
11	COULTER 5 WELLES	34-12	SWSE	12	48N	79W	WYW140253
12	COULTER 5 WATKINS	41-13	NENE	13	48N	79W	WYW140253
13	COULTER 5 WATKINS	43-13	NESE	13	48N	79W	WYW140253
14	COULTER 5 FEDERAL	34-13	SWSE	13	48N	79W	WYW140253
15	COULTER 5 WELLES	32-13	SWNE	13	48N	79W	WYW140253

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	Lease Number	WYPDES Outfall No.
1	33-7-4878	NWSE	7	48	78	WYW161928	005
2	13-10-4878	NWSW	10	48	78	WYW137926	003
3	24-1-4879	SESW	3	48	79	WYW147387	009
4	14-1-4879	SWSW	1	48	79	WYW147387	010
5	Pocahontas	NESE	13	48	79	WYW140253	009*
6	11-10-4878	NWNW	10	48	78	WYW146903	004
7	11-15-4878	NWNW	15	48	78	WYW146903	002
8	12-5-4878	SWNW	5	48	78	NA	008
9	43-6-4878	NESE	6	48	78	NA	007
10	44-6-4878	SESE	6	48	78	NA	006
11	44-2-4879	SESE	2	48	79	NA	011
12	42-3-4879	SENE	3	48	79	NA	012
13	Pit 41-11-4879	NENE	11	48	79	NA	013

County: **Johnson**

Applicant: **Lance Oil & Gas**

Surface Owners: **Priscilla Welles, Indian Creek Land Co., Simon J. Iberlin**

Project Description:

The proposed action involves the development of the project, which includes the following:

Drilling of 14 total federal CBM wells in Big George coal zone to depths of approximately 2000 feet. The coal seam targeted in this project is approximately 90 feet thick.

Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Construction of this project will commence upon approval of APDs, and each well will take approximately 4 days to drill and 2 days to complete. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners may impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.

Well metering shall be accomplished by telemetry. Metering would entail approximately 1 visit every 6 months to each central metering facility once the field is up and running. Prior to that, each well site may be visited as often as once a week.

- An unimproved and improved road network.
- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 13 discharge points, 12 stock water reservoirs and 1 off-channel pit within the Upper Powder River watershed. The pit and all reservoirs will be full containment, but water will be transferred to the Indian Creek Emits Facility as a contingency in case of overflow.
- An above ground power line network to be constructed by Powder River Energy Corporation. The proposed route has been reviewed by the contractor. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction has been scheduled but schedule may change due to wildlife, and will not be completed before the CBNG wells are producing. If the power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the power drops.

A storage tank of 500 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation for 24 months. Fuel deliveries are anticipated to be three times per week. Generator volume is expected to be 100.5 decibels at 1 meter distance.

- A buried gas, water and power line network. There are no central gathering/metering facilities proposed for this POD. Gas will be measured at the wellhead using wafer-style V-Cone gas metering devices.

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(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 MSRP, 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 within 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 ensure that potential impacts to natural resources would be alleviated. 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 **Coulter 5 POD** are listed below under 2.3.1:

#### **2.3.1. Changes as a result of the on-sites**

1. Well 32-7 was moved approximately 350' S to a flatter location to reduce surface disturbance.
2. Well 41-7 is located in a drainage, and was moved S out of the drainage. It will be replaced with the 42-7 well.
3. Well 43-7 was moved approximately 100' NW because the staked location was too close to an existing impoundment to allow for construction.
4. Well 14-18 was moved approximately 100' N, closer to main access road, to reduce disturbance to sagebrush.
5. The proposed access road to the 23-18 well bisects a sage grouse lek, so it was re-routed. The new access road will run from the 23-18 well to the 32-18 well.
6. Well 32-18 was moved approximately 400' W to shorten the length of the access road through the sagebrush.
7. Well 41-18 was dropped due to its location within a sage-grouse lek.
8. A temporary access road, water pipeline for the discharge point 002, and access to 3 monitoring wells associated with the P13-10 pit were all relocated to avoid the Indian Creek I sage-grouse lek site.

#### **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. Groundwater**

1. In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed and revised a guidance document, "Compliance Monitoring and siting Requirements for Unlined Impoundments Containing Coalbed Methane Produced Water" (September, 2006) which can be accessed on their website. For all WYPDES permits the BLM will require that operators comply with the latest DEQ standards and monitoring guidance.

#### **2.3.2.2. Surface Water**

1. Channel Crossings:
  - a) Minimize channel disturbance as much as possible by limiting pipeline and road crossings.
  - b) Avoid running pipelines and access roads within floodplains or parallel to a stream channel.
  - c) 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.
  - d) 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. Concerns regarding the quality of the discharged CBM water on downstream irrigation use may require operators to increase the amount of storage of CBM water during the irrigation months and allow more surface discharge during the non-irrigation months.
4. 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.

#### **2.3.2.3. Soils**

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

#### **2.3.2.4. Wildlife**

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.
2. The Companies will locate facilities so that noise from the facilities at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.
3. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.

4. 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. Bald Eagle**

1. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of Sundry Notices.
2. Surveys for active bald eagle nests and winter roost sites will be conducted within suitable habitat by a BLM approved biologist. Surface disturbing activities will not be permitted within one mile of suitable habitat prior to survey completion.

#### **2.3.2.6. Visual Resources**

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

#### **2.3.2.7. Noise**

1. Noise mufflers will be installed on the exhaust of compressor engines to reduce the exhaust noise.
2. 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**

All changes made at the onsite will be followed. They have all been incorporated into the operator's POD.

1. In order to compensate for the detrimental effects to sage-grouse of putting an overhead power line through the Indian Creek III lek, LOG will replace four diesel generators currently being used on the Coulter 5 POD and the Welles POD. Elimination of these generators will benefit sage-grouse and other wildlife species by reducing noise levels.
2. As an additional sage-grouse habitat mitigation measure, LOG will attempt to utilize the Spider Plow to install a two mile water and gas line along the road in the Coyer Reservoir area. Currently, there is little information about the efficacy of the Spider Plow, and in the event that the use of the Spider Plow proves unfeasible, LOG will provide the Buffalo Field Office with a

written explanation detailing the reasons the plow cannot be used. The lines will then be installed using the least invasive methods in order to reduce impacts to sagebrush. In this case the existing road corridor will not exceed 35 feet. Disturbed corridors will be reclaimed with site specific (based on soil type) forbs to benefit wildlife species.

3. Specific reclamation plans describing planned method and application of site stabilization measures are required for the engineered road access to the 21-7 well.
4. To reduce disturbance to sagebrush and facilitate reclamation, sagebrush mowing will be restricted to a 35' width for the road access, and to a 35' radius from the well stake, on the road access and well sites for the 43-7, 14-18, 23-18, and 32-18 well.
5. The steep, sandy portion of the access road to the 34-12 well will require stabilization measures.
6. The head cut near the access road to 32-13 well will be stabilized to prevent it from moving any closer to the road.
7. 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 Coulter 5 POD is Covert Green, 18-0617 TPX.
8. 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.
9. The operator will drill seed on the contour to a depth of 0.5 inch, followed by cultipaction to compact the seedbed, preventing soil and seed losses. To maintain quality and purity, the current years tested, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, use the following:

**AREA: Loamy**

<b>MIXED: Yes</b>	<b>PLS LBS/ ACRE</b>
Western Wheatgrass Rosana	3.60 lbs/acre
Bluebunch Wheatgrass Whitmar CT	1.20 lbs/acre
Green Needlegrass Lodorm	3.00 lbs/acre
Slender Wheatgrass Revenue	2.40 lbs/acre
Coneflower, Prairie Stillwater	0.60 lbs/acre
White Prairie Clover Antelope	0.60 lbs/acre
Beeplant Rocky Mountain	0.60 lbs/acre
<b>AREA TOTALS</b>	<b>12.00 lbs/acre</b>

10. Please contact Melanie Hunter, Natural Resource Specialist, @ (307) 684-1138, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

**Wildlife**

1. If any dead or injured sensitive species is located during construction or operation, the BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

2. The Record of Decision for the Powder River Basin EIS includes a programmatic mitigation measure that states, “The companies will conduct clearance surveys for threatened and endangered or other special-concern species at the optimum time”. The measure requires companies to coordinate with the BLM before November 1 annually to review the potential for disturbance and to agree on inventory parameters. Should this project not be completed by November 1, Lance/Anadarko will coordinate with the BLM to determine if additional surveys will be required.
3. The following conditions will minimize impacts to roosting and nesting bald eagles;
  - a) Surveys for bald eagle winter roosts and nest sites are required annually until construction completion throughout the project boundaries.
  - b) If a roost is identified a year round disturbance-free buffer zone of 0.5 mile will be established for all bald eagle winter roost sites. A seasonal limited activity zone of 1mile will be established for all bald eagle roost sites (November 1 - April 1).
  - c) If a bald eagle nest is identified 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).
  - d) 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.
4. The following conditions will minimize impacts to raptors;
  - a) No surface disturbing activities shall occur within ½ mile of all identified nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This affects the following;

<b>Township/Range</b>	<b>Section</b>	<b>Wells and Infrastructure</b>
48/78	5	The 12-5-4878 Reservoir, its associated discharge point 008, pipeline, monitoring wells, and temporary access road.
48/78	10	The 13-10-4878 and 11-10-4878 Reservoirs, their associated temporary access roads, discharge points 003-004, monitoring wells, and water pipelines.
48/78	15	The 11-15-4878 Reservoir, its associated temporary access road, discharge point 002, monitoring wells, and water pipeline.
48/79	12	The 34-12 well and its associated infrastructure north east of the well.
48/79	13	The 32-13, 34-13, 43-13 wells and their associated infrastructure and all improvements to the Pocahontas reservoir including monitoring wells, access roads and water pipeline.
48/79	19	All roads, utility corridors, and overhead powerlines.

- b) 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. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a ½ mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within ½ mile of occupied raptor nests from February 1 to July 31.
- c) Nest productivity checks shall be completed for all raptor nests within the Coulter V POD listed in the table below. The 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/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.

BLM ID	UTM E	UTM N	Species	2006 Activity	2007 Activity
3809	396083	4886032	GHOW	Active	Inactive
2003	395563	4886756	Unk	Inactive	Inactive
1985	397131	4885148	GOEA	Active	Inactive
2002	394520	4888025	Magpie	Unk	Unk
2001	394398	4887599	Unk	Unk	Inactive
2004	395598	4888661	Magpie	Unk	Unk
3389	397208	4885502	Magpie	Unk	Unk
3853	398975	4891031	RTHA	Unk	Active - failed
478	396054	4886312	Unk	Unk	Gone
474	395702	4886522	Unk	Unk	Inactive
504	401477	4888703	GOEA	Unk	Destroyed
2690	401529	4888701	RTHA	Gone-DNLO	Gone
1998	393257	4888583	GHOW	Unk	Active
1999	393558	4888444	Unk	Unk	Inactive
2689	401940	4890449	GOEA	Active	Active
467	394879	4887124	Unk	Unk	Inactive

5. The following conditions will minimize impacts to sage-grouse:
  - a) No surface disturbing activities are permitted **throughout the entire project area** from March 1<sup>st</sup> to June 15<sup>th</sup>, prior to conducting sage-grouse surveys (activity status on previously identified leks and searches for new lek sites) for the current breeding season and results reviewed by a BLM biologist. This condition will be implemented on an annual basis for the duration of surface disturbing activities.
  - b) If an active lek is identified during the survey, the 2 mile timing restriction (March 1-June 15) will be applied and surface disturbing activities will not be permitted until after the nesting season.
  - c) Minimal mowing, burying utilities down the center of the road, and a road width not to exceed 25 feet will be required for the 32-13 and 14-18 well locations.
  - d) No improvements are permitted for the temporary access road associated with the P13-10 pit.

If the Indian Creek I lek (T48N:R78W:S10) is active, the following will be affected;

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and infrastructure</i>
48/78	10	The 13-10-4878 and 11-10-4878 Reservoirs, their associated temporary access roads, discharge points 003-004, monitoring wells, water pipelines, and overhead power lines.
48/78	15	The 11-15-4878 Reservoir, its associated temporary access road, discharge point 002, monitoring wells, water pipeline, and all overhead power lines.
All overhead powerlines within 2 miles of the lek site.		

If the Indian Creek III lek (T48N:R78W:S7) is active, the following will be affected;

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and infrastructure</i>
48/78	5	The 12-5-4878 Reservoir its associated temporary access road, discharge point 008, monitoring wells, water pipeline, and all overhead power lines.
48/78	6	The 43-6-4878 and 44-6-4878 Reservoirs their associated temporary access roads, discharge points

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and infrastructure</i>
		007 and 006, monitoring wells, water pipeline, and all overhead power lines.
48/78	7,8,9,17,18,19,20,24	All activities including wells, roads, utility corridors, buried and overhead power, power drops, and reservoirs (construction and/or improvements).
48/79	12, 13	All activities including wells, roads, utility corridors, buried and overhead power, power drops, and reservoirs (construction and/or improvements).
48/79	1	The 24-1-4879 Reservoir its associated temporary access road, discharge point 009, monitoring wells, water pipeline, and all overhead power lines.

If the Indian Creek IV lek (T48N:R79W:S1) is active, the following will be affected;

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and infrastructure</i>
48/79	1,2,11,12,13	All activities including wells, roads, utility corridors, buried and overhead power, power drops, and reservoirs (construction and/or improvements).
48/78	5,6,7,8,17,18	All activities including wells, roads, utility corridors, buried and overhead power, power drops, and reservoirs (construction and/or improvements).

If the Ploessers lek (T49N:R79W:S35) is active, the following will be affected;

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and infrastructure</i>
48/79	1,2,11	All activities including wells, roads, utility corridors, buried and overhead power, power drops, and reservoirs (construction and/or improvements).

6. The following conditions will minimize impacts to sharp-tail-grouse:
  - a) A survey is required for sharp-tailed grouse between April 1 and May 7, annually, within the project area for the construction phase of the project and results shall be submitted to a BLM biologist.
    - 1) If an active lek is identified during the survey, the 0.64 mile timing restriction (March 1-June 15) will be applied and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 0.64 mile buffer until the following breeding season (April 1). The required sharp-tailed grouse survey will be conducted by a biologist following WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
    - 2) Creation of raptor hunting perches will be avoided within 0.64 miles of documented sharp-tailed grouse lek sites. Perch inhibitors will be installed to deter avian predators from preying on grouse.
7. All other conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (WY07F0075) shall be complied with.

#### **2.4. Alternatives considered but not analyzed in detail**

1. Class V injection wells were considered. A review of the well logs on file with the Wyoming Oil and Gas Conservation Commission and available geologic information suggests that there are no aquifers within the immediate area that have sufficient storage capacity to accept the volume of CBNG water

that would be produced within the Coulter 5 POD

2. Class V shallow injection systems (horizontal pipe networks) have been evaluated. Currently this technology is in a 'pilot' phase and there is uncertainty in regulatory compliance and cost-effectiveness.
3. Irrigation was considered however the terrain within this area is highly dissected and there are few areas that would be suitable. Also high clay content in the soils makes this management strategy less feasible.
4. Treatment and discharge was evaluated and not selected due to engineering and costs, as well as regulatory review.
5. Direct discharge to channels was not selected due to water quality and regulatory review/compliance.
6. Misters were evaluated but not selected due to soil salinity concerns.

### 3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on 06/15/2006. Field inspections of the proposed Coulter 5 POD CBM project were conducted on 11/8, 11/9/2006, and 1/05/2007 by Ethan Jahnke, Joy Kennedy-Lance Oil and Gas; Brian Venn-WWC Engineering; Priscilla Welles-Landowner; Mike McKinley, Arlene Kosic, Melanie Hunter-BLM.

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		Arlene Kosic / Jennifer Morton
Floodplains		X		Mike McKinley
Wilderness Values		X		Melanie Hunter
ACECs			X	Melanie Hunter
Water Resources	X			Mike McKinley
Air Quality	X			Melanie Hunter
Cultural or Historical Values		X		Rob Wilson/G.L. "Buck" Damone III
Prime or Unique Farmlands			X	Melanie Hunter
Wild & Scenic Rivers			X	Melanie Hunter
Wetland/Riparian		X		Mike McKinley
Native American Religious Concerns			X	Rob Wilson/G.L. "Buck" Damone III
Hazardous Wastes or Solids			X	Melanie Hunter
Invasive, Nonnative Species	X			Melanie Hunter
Environmental Justice		X		Melanie Hunter

### **3.1. Topographic Characteristics of Project Area**

The Coulter 5 POD is located approximately 25 miles southeast of Buffalo, in Johnson County, Wyoming. Elevations within the project area range from 4,525 to 4,700 feet. The topography throughout the area consists of rugged draws separated by numerous ridges. Sloped, open areas exist between ridges. Indian Creek Divide is on the north boundary of the project area. Historically, ephemeral draws drain the project area, including Cat Creek and Fourmile Creek. Produced water from various CBNG operators now flows into Cat Creek and Fourmile Creek. The major drainages in the area are the Powder River to the east and Crazy Woman Creek to the west, both are outside the project area (Maechtle 2006).

### **3.2. Vegetation & Soils**

Species typical of short grass prairie comprise the project area flora. Specific species observed throughout the project area include sagebrush, prairie junegrass, cheatgrass, prickly pear, rabbitbrush, needle and thread grass, and little bluestem. The majority of the project area is located in moderate to heavy sagebrush.

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. Wyoming 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. Cheatgrass (downy brome) has invaded the project area. 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.

The soils in the majority of the project area are shallow loamy. Wells located in this soil type include: 12-7, 21-7, 23-7, 41-7, 14-18, 23-18, 32-18, 34-12, 32-13, and the 43-13 wells.

The shallow loamy site is stable and protected from excessive erosion. The biotic integrity of this plant community is at risk due to a shift in plant composition toward blue grama, sagebrush, and cheatgrass. The watershed is functioning, but is at risk because of an increase in the canopy cover of sagebrush, blue grama sod, and bare ground.

The remainder of the wells in this POD are located in shallow sandy sites. These include: The 32-7, 43-7, 34-13, and the 41-13 wells.

This site occurs on nearly level to 50% slopes. Landform: Hill sides, ridges and escarpments.

The soils of the shallow sandy site are shallow (less than 20" to bedrock) well-drained soils formed in eolian deposits or alluvium over residuum or residuum. These soils have moderately rapid to rapid permeability and may occur on all slopes. In this POD, these soils are found on the ridgelines with rocky outcroppings and steeper slopes. The bedrock may be of any kind except igneous or volcanic and is virtually impenetrable to plant roots. The surface soils range from sandy loam, to loamy sand, to sand. Thin ineffectual layers of other soil 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: depth to bedrock, low organic matter content, soil droughtiness, low water holding capacity, and high wind erosion potential. The low annual precipitation should be considered when planning a seeding. Locating wells in these areas requires extra attention to site stabilization and reclamation.

#### **3.2.1. Wetlands/Riparian**

No wetland or riparian areas were noted during the onsite. The channels within the project area are primarily well vegetated grassy swales of dry land species, without defined bed and bank and therefore are not indicative of a riparian environment. It is not anticipated that discharge of produced water into full-containment reservoirs or the off-channel pit will impact channels producing, or enhancing, wetland or riparian areas.

### **3.2.2. Invasive Species**

No state-listed noxious weeds and/or weed species of concern infestations were discovered by a search of inventory maps or databases on the CBM Clearinghouse website (<http://www.cbmclearinghouse.info/>). The CBM Clearinghouse database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices. The subsequent field investigations found several areas of cheatgrass. This POD also contains a recently burned area which shows the beginnings of a cheatgrass infestation.

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**

A habitat assessment and wildlife inventory surveys were performed by Big Horn Environmental Consultant (Big Horn). Big Horn performed surveys for bald eagles, mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests, and prairie dog colonies according to protocol in 2006 and 2007. No formal surveys were conducted for Ute ladies'-tresses orchid.

A BLM Biologist conducted field visits on September 6, and November 13 and 14 of 2006. During this time, she reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project adjustment recommendations where wildlife issues arose.

Wildlife species common to the habitat types present are identified in the Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project (PRB FEIS 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 and mule deer. The WGFD has determined the entire project area to be Yearlong range for antelope and Winter Yearlong for mule deer.

**Yearlong** use is when a substantial portion of a population makes general use of the habitat on a year-round basis. **Winter/Yearlong** use is when a population of animals makes general use of suitable habitat sites within a 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. Big game range maps are available in the PRB FEIS (3-119-143), the project file, and from the WGFD.

The project area is part of the Upper Powder River pronghorn antelope and mule deer herds. There was a 2004 population estimate of 6,200 for pronghorn antelope and 18,000 for mule deer. The population objective for the pronghorn antelope herd is 3,000 and the objective for mule deer is 18,300 (WGFD 2004).

#### **3.3.2. Aquatics**

The project area is located within Coyer Draw and 5 unnamed tributaries of Cat Creek and Indian Creek. Coyer Draw, Cat Creek and Indian Creek are tributaries to the Powder River.

The Powder River is one of the last free-flowing prairie stream ecosystems left in the United States, and still supports an intact native aquatic community. Native fish species include sauger, shovelnose sturgeon, goldeye, plains minnow, sand shiner, flathead chub, plains killifish, river carpsucker, sturgeon chub, western silvery minnow, channel catfish, fathead minnow, longnose dace, mountain sucker, shorthead redhorse, longnose sucker, stonecat, and white sucker. Six of these are designated as either Native Species Status (NSS) 1, 2, or 3 species by the Wyoming Game and Fish Department. Species in these designations are considered to be species of concern, in need of more immediate management attention, and more likely to be petitioned for listing under the Endangered Species Act.

NSS1 species (sturgeon chub and western silvery minnow) are those that are physically isolated and/or exist at extremely low densities throughout their range, and habitat conditions are declining or vulnerable. NSS2 species (goldeye, shovelnose sturgeon, and sauger) are physically isolated and/or exist at extremely low densities throughout their range, and habitat conditions appear to be stable. NSS3 species (plains minnow) are widely distributed throughout their native range and appear stable; however, habitats are declining or vulnerable. For these species, our Department has been directed by the Wyoming Game and Fish Commission to recommend that no loss of habitat function occur. Some modification of the habitat may occur, provided that habitat function is maintained (i.e., the location, essential features, and species supported are unchanged).

### 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. 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, prairie falcon, short-eared owl, great horned owl, bald eagle, rough-legged hawk, merlin, 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 (PRB FEIS 3-145-148).

The BLM database and Big Horn identified 17 raptor nests within 0.5 miles of the Coulter 5 project area. Table 3.3.4.1 lists the species and activity status of these nests in 2006. Several of the nests listed in the table below have been identified as magpie nests. Occupancy of these nests by magpies has not been confirmed. Owls and raptors have been documented using nests that have been constructed by magpies.

**Table 3.3.4.1. Documented raptor nests within the Coulter 5 project area in 2006 and 2007 (UTM Zone 13, NAD83).**

BLM ID	UTM E	UTM N	Species	2006 Activity	2007 Activity
3809	396083	4886032	GHOW	Active	Inactive
2003	395563	4886756	Unk	Inactive	Inactive
1985	397131	4885148	GOEA	Active	Inactive
2002	394520	4888025	Magpie	Unk	Unk
2001	394398	4887599	Unk	Unk	Inactive
2004	395598	4888661	Magpie	Unk	Unk
3389	397208	4885502	Magpie	Unk	Unk
3853	398975	4891031	RTHA	Unk	Active - failed
478	396054	4886312	Unk	Unk	Gone

<b>BLM ID</b>	<b>UTM E</b>	<b>UTM N</b>	<b>Species</b>	<b>2006 Activity</b>	<b>2007 Activity</b>
474	395702	4886522	Unk	Unk	Inactive
504	401477	4888703	GOEA	Unk	Destroyed
2690	401529	4888701	RTHA	Gone-DNLO	Gone
1998	393257	4888583	GHOW	Unk	Active
1999	393558	4888444	Unk	Unk	Inactive
2689	401940	4890449	GOEA	Active	Active
467	394879	4887124	Unk	Unk	Inactive

### **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 1988, the WGFD identified four prairie dog complexes (Arvada, Recluse, Thunder Basin National Grasslands, and Midwest) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Oakleaf 1988).

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).

Active reintroduction efforts of black-footed ferrets have reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 1988, the WGFD identified four prairie dog complexes (Arvada, Recluse, Thunder Basin National Grasslands, and Midwest) partially or wholly within the BLM BFO administrative area as potential black-footed ferret reintroduction sites (Oakleaf 1988). Today, 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 USFWS has also concluded that black-tailed prairie dog colonies within Wyoming are unlikely to be inhabited by black-footed ferrets (Kelly 2004).

No prairie dog colonies were identified within the project area. Black-footed ferret habitat is not present within the project area.

##### **3.3.5.1.2. Ute's 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. Prior to 2005, only four orchid populations had been documented within Wyoming. Five additional sites were located in 2005 (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.

The project area is located in dry upland vegetation with no source of perennial water. Historically ephemeral draws drain the project area, including Cat Creek and Fourmile Creek. The major drainages in the area are the Powder River to the east and Crazy Woman Creek to the west, both are outside the project area (Maechtle 2006). No natural springs were identified within the project area.

### **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. 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. 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 protection by 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) 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 can be more varied. In addition to prairie dogs, ground squirrels, and lagomorphs, domestic sheep and big game carcasses 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.

The Coulter 5 project area is suitable for bald eagle roosting and nesting. Bald eagle habitat exists within the drainages of Cat Creek, Indian Creek and their tributaries. Dense cottonwood trees occur along the drainages and a mix of juniper and cottonwoods occur within the upland areas. A historical bald eagle roost site is documented approximately 4 miles from the project boundary. Several bald eagles have also been identified within 5 miles of the project area. Surveys conducted in 2006 and 2007 did not identify bald eagle nests or roosts within the project area. However, it is highly likely that bald eagles use the project area for foraging.

#### **3.3.5.2.2. Black-tailed prairie dog**

On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate status. The Buffalo Field Office however will consider prairie dogs as a sensitive species and continue to afford this species the protections described in the FEIS. The black-tailed prairie dog is a diurnal rodent inhabiting prairie and desert grasslands of the Great Plains. Their decline is related to multiple factors including, habitat destruction, poisoning, and Sylvatic plague.

No prairie dog colonies were identified within the project area.

#### **3.3.5.2.3. Greater sage-grouse**

Sage-grouse are listed as a sensitive species by BLM (Wyoming). In recent years, seven petitions have been submitted to the U.S. Fish and Wildlife Service (FWS) to list greater sage-grouse as threatened or endangered. On January 12<sup>th</sup>, 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.

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). Sage-grouse attend traditional courtship areas called leks which are in or adjacent to sagebrush dominated habitat. Several lek sites form clusters defined as a lek complex. Sage-grouse may be expected to interchange within a lek complex, visiting one lek site to another from one day to the next. Lek sites within a complex are usually < 3 km from one another. Lek complexes are clearly spatially separated from adjacent lek complexes by 6 km (Schroeder et al. 2000).

The Coulter 5 project area is suited for sage-grouse breeding, nesting, and wintering grounds. Habitats within the Coulter 5 project area have the potential to support sage-grouse throughout the year. Eight sage-grouse lek sites are located within and surrounding the project area. The Indian Creek I, III, and IV lek sites are located within the Coulter 5 project area. The Indian Creek II lek is located 0.15 miles northeast, Ploesser’s Dry Lake lek is located 0.13 miles north, the Cat Creek I lek is located 1.0 miles west, the Cat Creek II lek is located 2.0 miles southwest, and the Fourmile lek is located 2.5 miles southeast of the project area. These eight lek sites make up the Fourmile Creek Complex. All of the leks, except for the Fourmile lek, are designated as occupied by the Wyoming Game and Fish Department. Sage-grouse were observed on each of the occupied leks in 2006. In 2007, Big Horn observed sage-grouse at all of the occupied leks except for Indian Creek IV and Ploesser’s Dry Lake leks (Maechtle 2007). Additionally, sage-grouse sign was abundant throughout the project area and birds were documented approximately 0.5 miles south of the Indian Creek III lek site, along Iberlin-Four Mile Road (Maechtle 2006).

#### **Sharp-tailed grouse**

Sharp-tailed grouse inhabit short and mixed-grass prairie, sagebrush shrublands, woodland edges, and river canyons. In Wyoming, this species is common where grasslands are intermixed with other shrublands, especially wooded draws, shrubby riparian area, and wet meadows (PRB FEIS 3-148).

The Coulter 5 project area is suited for sharp-tailed grouse breeding and nesting grounds. Habitats within the project area have the potential to support sharp-tailed grouse most of the year. The mosaic of grasslands and sagebrush-grasslands could provide habitat year round. Surveys were conducted for sharp-tailed grouse in conjunction with sage-grouse surveys. No sharp-tailed grouse were identified.

#### **3.3.5.2.4. Mountain plover**

Mountain plovers, which are a Buffalo Field Office sensitive species, are typically associated with high, dry, short grass prairies containing vegetation typically shorter than four inches tall, and slopes less than 5 degrees (BLM 2003). Mountain plovers are closely associated with heavily grazed areas such as prairie dog colonies and livestock pastures.

Suitable mountain plover habitat is not present within the Coulter 5 project area. No prairie dog colonies were identified within the project area and habitat for the species as defined by Knopf (1996) is marginal due to the steep sloped draws, areas of heavy sagebrush and spring precipitation that was sufficient to increase production of cheatgrass and native grasses to over 6 inches in height in many areas (Maechtle 2006).

### **3.4. West Nile Virus**

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

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

The human health issues related to WNV are well documented and continue to escalate. Historic data collected by the CDC and published by the USGS at [www.westnilemaps.usgs.gov](http://www.westnilemaps.usgs.gov) are summarized below. Reported data from the Powder River Basin (PRB) includes Campbell, Sheridan and Johnson counties.

**Table 3.4 Historical West Nile Virus Information**

<b>Year</b>	<b>Total WY Human Cases</b>	<b>Human Cases PRB</b>	<b>Veterinary Cases PRB</b>	<b>Bird Cases PRB</b>
2001	0	0	0	0
2002	2	0	15	3
2003	392	85	46	25
2004	10	3	3	5
2005	12	4	6	3
2006	65	0	2	2
2007	119	20	Unk	Unk

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

Although most of the attention has been focused on human health issues, WNV has had an impact on vertebrate wildlife populations. At a recent conference at the Smithsonian Environmental Research Center, scientists disclosed WNV had been detected in 157 bird species, horses, 16 other mammals, and alligators (Marra et al 2003). In the eastern US, avian populations have incurred very high mortality, particularly crows, jays and related species. Raptor species also appear to be highly susceptible to WNV. During 2003, 36 raptors were documented to have died from WNV in Wyoming including golden eagle, red-tailed hawk, ferruginous hawk, American kestrel, Cooper's hawk, northern goshawk, great-horned owl, prairie falcon, and Swainson's hawk (Cornish et al. 2003). Actual mortality is likely to be greater. Population impacts of WNV on raptors are unknown at present. The Wyoming State Vet Lab determined 22 sage-grouse in one study project (90% of the study birds), succumbed to WNV in the PRB in 2003. While birds infected with WNV have many of the same symptoms as infected humans, they appear to be more sensitive to the virus (Rinkes 2003).

Mosquitoes can potentially breed in any standing water that lasts more than four days. In the Powder River Basin, there is generally increased surface water availability associated with CBNG development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the Powder River Basin indicates WNV mosquito vectors were notably more abundant on a developed CBNG site than two similar undeveloped sites (Walker et al. 2003). Reducing the population of mosquitoes, especially species that are apparently involved with bird-

to-bird transmission of WNV, such as *Culex tarsalis*, can help to reduce or eliminate the presence of virus in a given geographical area (APHIS 2002). The most important step any property owner can take to control such mosquito populations is to remove all potential man-made sources of standing water in which mosquitoes might breed (APHIS 2002).

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

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

### **3.5. Water Resources**

The project area is within Coyer Draw and 5 unnamed tributaries of Cat Creek and Indian Creek, all tributaries to the Upper Powder River drainage system. The upper reaches and main portions of the tributary drainages in this POD consist of steep, dissected terrain with slopes at times exceeding 30%. These upper drainages are characterized by narrow dendritic tributaries with steeply incised sides (1H:1V to 2H:1V) and narrow bottom widths from 5 to 10 feet wide. The watersheds have slope gradients in the range of 5 to 20 % throughout most of the catchment.

#### **3.5.1. Groundwater**

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).

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

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

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

The BLM has installed shallow groundwater monitoring wells at five impoundment locations throughout the PRB to assess ground-water quality changes due to infiltration of CBNG produced water. The most intensively monitored site has a battery of nineteen wells which have been installed and monitored jointly by the BLM and USGS since August, 2003. Water quality data has been sampled from these wells on a regular basis. That impoundment lies atop approximately 30 feet of unconsolidated deposits (silts and sands) which overlie non-uniform bedrock on a side ephemeral tributary to Beaver Creek and is approximately one and one-half miles from the Powder River. Baseline investigations showed water in two sand zones, the first was at a depth of 55 feet and the second was at a depth of 110 feet. The two water bearing zones were separated by a fifty-foot thick shale layer. The water quality of the two water bearing zones fell in the WDEQ Class III and Class I classifications respectively. Preliminary results from this sampling indicate increasing levels of TDS and other inorganic constituents over a six month period resulting in changes from the initial WDEQ classifications.

The on-going shallow groundwater impoundment monitoring at four other impoundment locations are less intensive and consist of batteries of between 4 and 6 wells. Preliminary data from two of these other sites also are showing an increasing TDS level as water infiltrates while two other sites are not.

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 6 registered stock water wells and 1 miscellaneous appropriation well within one mile of the POD boundary with depths ranging from 85 to 1,735 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).

### **3.5.2. Surface Water**

The project area is within the Coyer Draw drainage and five unnamed tributaries of Cat Creek and Indian Creek, which are tributaries to the **Upper Powder River** watershed. Most of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). The channels are primarily well vegetated grassy swales, without defined bed and bank.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in  $\mu\text{mhos/cm}$ ) 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 located at Arvada, WY (PRB FEIS page 3-49).

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

### **3.6. Cultural Resources**

Class III cultural resource inventories were conducted for the Coulter 5 POD project prior to on-the-ground project work (BFO project no. 70060244). North Platte Archaeological Services conducted a Class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) for the project. Rob Wilson and G.L. “Buck” Damone III, BLM Archaeologists, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The following cultural resources

are located in or near the area of potential effect.

**Table 3.5 Cultural Resources Inventory Results**

<b>Site Number</b>	<b>Site Type</b>	<b>National Register Eligibility</b>
48JO2332	Historic Trash	Not Eligible
48JO2809	Lithic Scatter	Not Eligible
48JO2810	Historic Trash	Not Eligible
48JO3702	Lithic Scatter	Not Eligible
48JO3703	Historic Features	Not Eligible
48JO3704	Lithic Scatter/Historic Trash	Unevaluated

#### **4. ENVIRONMENTAL CONSEQUENCES**

The changes to the proposed action POD, 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.

##### **4.1. Vegetation & Soils Direct and Indirect Effects**

Overall impacts to vegetation and soils from surface disturbance will be reduced, based on the operator’s plans and BLM applied mitigation. Of the 14 proposed well locations, 4 can be drilled without a well pad being constructed, 8 will be slotted, and 1 will require a constructed (cut & fill) well pad. Surface disturbance would still occur with the drilling of the 13 wells without a constructed pad. This disturbance would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 64 x 20 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance would involve approximately 0.2 acre/well for the 4 wells with no pad for a total 0.8 acres. The 8 slotted wells will be 30’ X 120 slots, but the work area will be approximately the same as the non-constructed pads; average slot will also be 0.2 acres of disturbance/well. The 1 well requiring cut & fill pad construction would disturb approximately 0.2 acres. The well pad that Lance has planned for this POD is small in size and will serve to keep disturbance to approximately the same level as a slotted or no pad well. The total estimated disturbance for all 14 approved wells is 2.8 acres. This would be a short-term impact with expedient, successful reclamation and site-stabilization, as committed to by the operator in their POD MSUP and as required by BLM in COAs.

Approximately 0.2 miles of improved roads would be constructed to provide access to various well locations. Approximately 6.3 miles of new and existing two-track trails, (including “template” roads), 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 3.6 miles of pipeline corridor will be constructed along existing roads. Approximately 1.7 miles of pipeline would be constructed outside of corridors, and approximately 1.3 miles of overhead power will be constructed. 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., mulch, erosion control blankets, bonded fiber matrix, waterbars, and culverts) would ensure land productivity/stability is regained and maximized.

Proposed culverts are shown on the MSUP and the WMP maps (see the POD). These structures will be

constructed in accordance with sound engineering practices and according to 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 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	13	0.2/acre	2.6	Long Term
Constructed Pad	1	0.2/acre	0.2	
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Screw Compressors	0	Site Specific	0.0	Long Term
Monitor Wells	39	0.01/acre	0.39	Long Term
Impoundments	13		41.4	Long Term
On-channel	12	Site Specific	37.0	
Off-channel	1	Site Specific	4.4	
Water Discharge Points	13	Site Specific or 0.01 ac/WDP	0.13	
Channel Disturbance				
Headcut Mitigation*		Site Specific	0.0	
Channel Modification		Site Specific	0.0	
Improved Roads		45' Width		Long Term
With Corridor	0.2		1.1	
2-Track Roads	0.4	12' Width or Site Specific	0.6	Long Term
No Corridor				
With Corridor	5.9	45' Width or Site Specific	32.2	
Pipelines		20' Width or Site Specific		Short Term
No Corridor	1.7		4.1	
Buried Power Cable	0	12' Width or Site Specific	0	Short Term
No Corridor				
Overhead Powerlines	1.3	15' Width	2.4	Long Term
Additional Disturbance		Site Specific		

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. Wetland/Riparian**

The channels within the project area are primarily well vegetated grassy swales of dry land species, without defined bed and bank and therefore are not indicative of a riparian environment. Also, due to the produced water being discharged into full-containment reservoirs, or transferred to the Indian Creek Emits Facility, no impact to existing, or creation of, wetland/riparian areas is anticipated.

#### **4.1.2. Invasive Species**

Utilization of existing facilities and 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 will 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 perennial pepperweed, and cheatgrass.

Pre-approval onsite inspections of the POD area found extensive areas of cheatgrass. The presence of cheatgrass in this POD is particularly a concern in a recently burned area, and the proposed construction/distribution areas since these areas are vulnerable to cheatgrass invasions. Lance Oil and Gas has submitted an Integrated Pest Management Plan that outlines several methods of weed and pest control. The company plans to approach the problem using educational, physical, biological, and chemical approaches. LOG's goal is to use a combination of these methods to control existing infestations, and also to prevent the future spread of noxious weeds. LOG has also committed to preventive practices such as;

- Prompt reseeding and revegetation of areas of disturbed soils with certified weed-free seed
- Cleaning of equipment and vehicles prior to entering and leaving each worksite
- Herbicide application
- Mowing newly revegetated areas during the first season of establishment, prior to seed formation on the weeds of concern to avoid the transport and spread of noxious weeds into the area .

#### **4.1.3. 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 will occur to soils and vegetation as a result of discharged produced CBNG water. The cumulative effects on vegetation and soils are anticipated to be within the PRB EIS parameters for the following reasons:

- They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 16.8% 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 monitor the volume of water flowing into the Upper Powder River and to construct additional downstream reservoirs, if necessary, to prevent significant volumes of water from flowing into the Watershed.
- The WMP for the Coulter 5 POD proposes that produced water will not contribute to flows downstream due to the produced water being discharged into full-containment reservoirs.

## **4.2. Wildlife**

### **4.2.1. Big Game Direct and Indirect Effects**

Under the environmentally preferred alternative, Yearlong range for pronghorn antelope and Winter Yearlong range for mule deer will 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 may provide some habitat value as these areas are reclaimed and native vegetation becomes established. Although, when these reclaimed areas are located along road sides, vehicular collisions may increase.

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 feels 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 accepted 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. In order to survive 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.

#### **4.2.1.1. 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**

The discharge of all produced CBNG produced water will be full containment in one proposed off-channel pit, 9 proposed on-channel reservoirs, and 3 existing on-channel reservoirs. Once the pit and reservoirs reach maximum capacity, CBNG water will be pumped to the Indian Creek water treatment facility previously approved under the Coulter II Environmental Assessment # WY-070-05-224. No impacts to aquatic species are anticipated.

#### **4.2.2.1. Cumulative effects**

WDEQ is aware of the concerns about the effects of water quality and flows relative to discharge of treated water directly into the Powder River. They are taking a conservative approach to permitting until more information can be obtained and their watershed based permitting approach is implemented. Long

term water quality and flow monitoring, that would be required in the NPDES permit, would ensure that effluent limitations are met. Under permitted conditions, it is not anticipated that existing downstream water uses would be affected. 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. No additional mitigation measures are required.

#### **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).

Overhead power lines may affect migratory birds in several ways. Power poles provide raptors with perch sites and may increase predation on migratory birds. Power lines placed in flight corridors may result in collision mortalities. Some species may avoid suitable habitat near power lines in an effort to avoid predation. Additional direct and indirect effects to migratory birds are discussed in the PRB FEIS (4-231-235).

##### **4.2.3.1. 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 over heating or chilling of eggs or chicks. The 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.

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. Occupancy of the magpie nests has not been confirmed. Owls and raptors have been documented using nests that have been constructed by magpies. Due to this, the one-half mile radius timing limitation will be applied to all of the nests identified and occupancy checks will be required.

Despite commitments such as telemetry metering to limit well visits, well visits during the nesting season will occur 2 to 3 times per week which may lead to nest failure through nest abandonment, displacement, and increased predation. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

##### **4.2.4.1. 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

**4.2.5. Threatened and Endangered and Sensitive Species**

Within the BLM Buffalo Field Office there are two species that are Threatened or Endangered under the Endangered Species Act. Potential project effects on Threatened and Endangered Species are summarized in Table 4.3. Threatened and Endangered Species potentially affected by the proposed project area are further discussed following the table.

4.2.5.1. Threatened and Endangered and Sensitive Species

Table 4.3 Summary of Threatened and Endangered Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<b>Endangered</b>				
Black-footed ferret ( <i>Mustela nigripes</i> )	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	NE	No suitable habitat present.
<b>Threatened</b>				
Ute ladies'-tresses orchid ( <i>Spiranthes diluvialis</i> )	Riparian areas with permanent water	NP	NE	Historically perennial water not within the project area.

**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.

**Effect Determinations**

**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**

Prairie dog colonies are not present within the Coulter V project area. Because it is highly unlikely ferrets are present and no suitable habitat occurs within the project area, implementation of the proposed development will have “no effect” on the black-footed ferret.

**4.2.5.1.2. Ute’s Ladies Tresses Orchid Direct and Indirect Effects**

Produced water will be piped and contained in 12 on-channel reservoirs and one off-channel pit. If the reservoirs and pit reach maximum capacity, CBNG water will be piped to an existing water treatment facility, treated and then directly discharged to the Powder River.

Suitable orchid habitat is not present within the Coulter V project area. Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial, however no historic seed source is present within or upstream of the project area. Implementation of the proposed project should have “no affect” the Ute ladies’- tresses orchid as suitable habitat is not present.

#### 4.2.5.2. Sensitive Species Direct and Indirect Effects

**Table 4.4 Summary of Sensitive Species Habitat and Project Effects.**

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<b>Amphibians</b>				
Northern leopard frog ( <i>Rana pipiens</i> )	Beaver ponds, permanent water in plains and foothills	S	NI	Additional water may affect existing waterways.
Spotted frog ( <i>Rana pretiosa</i> )	Ponds, sloughs, small streams	NP	NI	Prairie not mountain habitat.
<b>Birds</b>				
Baird's sparrow ( <i>Ammodramus bairdii</i> )	Grasslands, weedy fields	S	MIH	Sagebrush cover will be affected.
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Mature forest cover often within one mile of large water body.	K	MIH	Overhead power proposed.
Brewer's sparrow ( <i>Spizella breweri</i> )	Basin-prairie shrub	S	MIH	Sagebrush cover will be affected.
Burrowing owl ( <i>Athene cunicularia</i> )	Grasslands, basin-prairie shrub	NP	NI	No prairie dog colonies present.
Ferruginous hawk ( <i>Buteo regalis</i> )	Basin-prairie shrub, grasslands, rock outcrops	S	MIH	Grassland and shrubland habitats will be affected.
Greater sage-grouse ( <i>Centrocercus urophasianus</i> )	Basin-prairie shrub, mountain-foothill shrub	K	WIPV	Sagebrush cover will be affected.
Loggerhead shrike ( <i>Lanius ludovicianus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIH	Sagebrush cover will be affected.
Long-billed curlew ( <i>Numenius americanus</i> )	Grasslands, plains, foothills, wet meadows	S	MIH	Grasslands will be affected.
Mountain plover ( <i>Charadrius montanus</i> )	Short-grass prairie with slopes < 5%	NP	NI	Suitable habitat not present.
Northern goshawk ( <i>Accipiter gentilis</i> )	Conifer and deciduous forests	NP	NI	No forest habitat present.
Peregrine falcon ( <i>Falco peregrinus</i> )	cliffs	NP	NI	No nesting habitat present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Sage sparrow ( <i>Amphispiza billneata</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIH	Sagebrush cover will be affected.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIH	Sagebrush cover will be affected.
Trumpeter swan ( <i>Cygnus buccinator</i> )	Lakes, ponds, rivers	S	MIH	New reservoirs may increase usage during migration.
White-faced ibis ( <i>Plegadis chihi</i> )	Marshes, wet meadows	NP	NI	Permanently wet meadows not present.
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	Open woodlands, streamside willow and alder groves	NP	NI	Streamside habitats not present
<b>Fish</b>				
Yellowstone cutthroat trout ( <i>Oncorhynchus clarki bouvieri</i> )	Mountain streams and rivers in Tongue River drainage	NP	NI	Outside species range.
<b>Mammals</b>				
Black-tailed prairie dog ( <i>Cynomys ludovicianus</i> )	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	NP	NI	No prairie dog colonies identified within the project.
Fringed myotis ( <i>Myotis thysanodes</i> )	Conifer forests, woodland chaparral, caves and mines	NP	NI	Habitat not present.
Long-eared myotis ( <i>Myotis evotis</i> )	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Spotted bat ( <i>Euderma maculatum</i> )	Cliffs over perennial water.	NP	NI	Cliffs & perennial water not present.
Swift fox ( <i>Vulpes velox</i> )	Grasslands	S	MIH	Grassland habitat will be affected.
Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> )	Caves and mines.	NP	NI	Habitat not present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<b>Plants</b>				
Porter's sagebrush ( <i>Artemisia porteri</i> )	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip ( <i>Cymopterus williamsii</i> )	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.

**MIH** 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**

The proposed project may impact bald eagles due to the presence of proposed and existing and overhead powerlines.

Lance proposes 6.5 miles of three phase overhead powerlines throughout the project area. Currently, there are approximately 3.0 miles of overhead powerlines within the project boundaries and over 6.0 miles of existing overhead power lines are located directly east, north and south of 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).

The presence of overhead power lines and roads may adversely affect 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, such as the Coulter V project area. 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.

Produced water will flow into 12 on-channel reservoirs and one off-channel pit, which may attract eagles if a reliable prey base is present. The effect of the reservoirs and pits on eagles is unknown. The 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 reservoirs should be reported to determine the need for any future management.

#### **4.2.5.2.2. Black-tailed prairie dog Direct and Indirect Effects**

No prairie dog colonies were identified within the project area. Prairie dogs will not be impacted by the proposed CBNG development.

#### **4.2.5.2.3. Greater sage-grouse Direct and Indirect Effects**

Greater sage-grouse habitat is being directly lost with the addition of well sites, roads, pipelines, power lines, reservoirs and other infrastructure (Theiele 2005, Oedekoven 2004). Sage grouse avoidance of CBNG infrastructure results in even greater indirect habitat loss. The Wyoming Game and Fish Department (WGFD) feels a well density of eight wells per section creates a high level of impact for sage grouse and that sage-grouse avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004).

The presence of overhead power lines and roads within the project area may adversely affect sage grouse. Overhead power lines create hunting perches for raptors, thus increasing the potential for predation on sage grouse. Increased predation from overhead power near leks may cause a decrease in lek attendance and possibly lek abandonment. Overhead power lines are also a collision hazard for sage grouse flying through the area. Increased roads and mineral related traffic can affect grouse activity and reduce survival (Braun et al. 2002). Activity along roads may cause nearby leks to become inactive over time (WGFD 2003).

Noise can affect sage grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003). Sage grouse attendance on leks within one mile of compressors is lower than for sites farther from compressors locations (Braun et al. 2002).

Another concern with CBNG is that reservoirs created for water disposal provide habitat for mosquitoes associated with West Nile virus (Oedekoven 2004). West Nile virus represents a significant new stressor which in 2003 reduced late summer survival of sage-grouse an average of 25% within four populations including the Powder River Basin (Naugle et al. 2004). Powder River Basin grouse losses during 2004 and 2005 were not as severe. Summer 2003 was warm and dry, more conducive to West Nile virus replication and transmission than the cooler summers of 2004 and 2005 (Cornish pers. Comm.).

The Buffalo Field Office (BFO) Resources Management Plan (BLM 2001) and the Powder River Basin Oil and Gas Project Record of Decision (BLM 2003) include a two-mile timing limitation within sage-grouse nesting habitat. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA), which includes the WGFD, 1977 sage-grouse guidelines (Bennett 2004). Under pressure for standardization BLM Wyoming adopted the two-mile recommendation in 1990, and instructed the field offices to incorporate the measure into their land use plans (Bennett 2004, Murkin 1990).

The two-mile recommendation was based on research which indicated between 59 and 87 percent of sage-grouse nests were located within two-miles of a lek (Bennett 2004). These studies were conducted within prime, contiguous sage-grouse habitat such as Idaho's Snake River plain.

Additional studies, across more of the sage-grouse's range, indicate that many populations nest much farther than two miles from the lek of breeding (Bennett 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported only 45% of their sage grouse hens nested within 3 km (1.86 mi) of the capture lek. Moynahan and Lindberg (2004) found 36% of their grouse nesting within 3 km of the capture leks. Moynahan's study area was north-central Montana in an area of mixed-grass prairie and sagebrush steppe, with Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) being the dominant shrub species (Moynahan et al. In press).

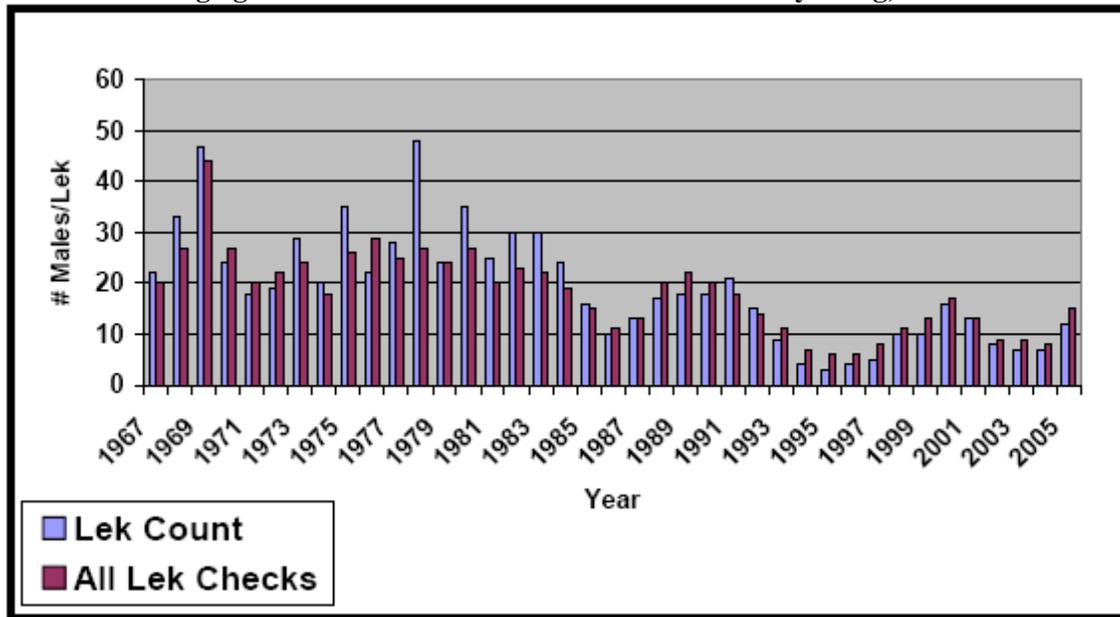
Percentage of sage-grouse nesting within a certain distance from their breeding lek is unavailable for the Powder River Basin. The Buffalo and Miles City field offices through the University of Montana with assistance from other partners including the U.S. Department of Energy and industry are currently researching nest location and other sage-grouse questions and relationships between grouse and coalbed natural gas development. Habitat conditions and sage grouse biology within the Buffalo Field Office is probably most similar to Moynahan's north-central Montana study area.

Vegetation communities within the Powder River Basin are naturally fragmented as they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. The Powder River Basin is also near the eastern edge of greater sage-grouse range. Without contiguous habitat available to nesting grouse it is likely a smaller percentage of grouse nest within two-miles of a lek within the PRB than grouse within those areas studied in the development of the 1977 WAFWA recommendations and even the Holloran and Moynahan study areas. Holloran and Moynahan both studied grouse in areas of contiguous sagebrush habitats without large scale fragmentation and habitat conversion (Moynahan et al In press, Holloran and Anderson 2005). A recent sagebrush cover assessment within Wyoming basins estimated sagebrush coverage within Holloran and Anderson's Upper Green River Basin study area to be 58% with an average patch size greater than 1200 acres; meanwhile Powder River Basin sagebrush coverage was estimated to be 35% with an average patch size less than 300 acres (Rowland et al. 2005). The Powder River Basin patch size decreased by

more than 63% in forty years, from 820 acre patches and an overall coverage of 41% in 1964 (Rowland et al. 2005). Recognizing that many populations live within fragmented habitats and nest much farther than two miles from the lek of breeding WAFWA revised their sage grouse management guidelines (Connelly et al. 2000) and now recommends the protection of suitable habitats within 5 km (3.1 mi) of leks where habitats are not distributed uniformly such as the Powder River Basin.

The sage grouse population within northeast Wyoming is exhibiting a steady long term downward trend (Figure 1) (Thiele 2005). The figure illustrates a ten year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak and each periodic low is lower than the previous population low. Long-term harvest trends are similar to that of lek attendance (Thiele 2005).

**Figure 4.1. Male sage-grouse lek attendance within northeastern Wyoming, 1967-2005.**



Sage-grouse populations within the PRB are declining independent of coalbed natural gas 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 Powder River Basin Oil and Gas Project Final Environmental Impact Statement 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 two-mile timing limitation given the long-term population decline and that less than 50% of grouse are expected to nest within the limitation area is likely insufficient to reverse the population decline. Moynahan and Lindberg (2004) like WAFWA (Connelly et al. 2000) recommend increasing the protective distance around sage grouse leks. Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production. As stated earlier, 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 Wyoming Game and Fish Department (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).

**The following wells, power lines, pipeline, pits and discharge points were proposed within the 0.25 mile Controlled Surface Use (CSU) of the Indian Creek I, III, and IV lek sites:**

1. The 41-18-4878 well and its associated 2-track utility corridor. This well was withdrawn from the project. This eliminates 0.25 miles of 2-track road and approximately 2 acres of surface disturbance in sage grouse habitat.
2. The 2-track and template road utility corridor associated with the 32-18-4878 well. The 2-track and template utility road associated with the 32-18-4878 well were relocated outside of the CSU for the Indian Creek III lek.
3. The 2-track utility corridor associated with the 43-7-4878 well. Mowing limited to 35', burying utilities down the center of the road, and a road width not to exceed 35 feet will be required for the 43-7, 32-13, and 14-18 well locations. These measures will minimize direct sage-grouse habitat loss.
4. The P11-7 pit, three monitoring wells, temporary access roads, discharge point 006, the temporary access road associated with the P13-10 pit and the water pipeline for discharge point 002. The P11-7 pit, three monitoring wells, temporary access roads, and discharge point 006 were relocated greater than 0.5 miles from the Indian Creek III lek site. No surface disturbance is permitted for proposed temporary roads which will be used to access reservoirs, pits, and water monitoring wells. These measures will minimize direct sage-grouse habitat loss.
5. Overhead power lines through the center of the Indian Creek IV lek in section 12 of Township 48, Range 79. The BLM BFO pursued various options to relocate this power line beyond 0.5 mile of the Indian Creek IV lek. Due to landowner concerns and topography, this line could not be relocated. To mitigate impacts to sage-grouse resulting from the overhead power line LOG will pursue the following mitigation plan:
  - LOG will replace four diesel generators currently being used on the Coulter 5 POD and the Welles POD. Elimination of these generators will benefit sage-grouse and other wildlife species by reducing noise levels. Power drop locations include NWNW of section 7 and 18, T48:R78, and SWSE section 7. LOG's goal is to retire all diesel generators in the Indian Creek Divide area as conventional power becomes available.
  - LOG will attempt to utilize the Spider Plow to install a two mile water and gas line along the road in the Coyer Reservoir area. In the event the Spider Plow can not perform the necessary task, these lines will be installed using the least invasive methods in order to reduce impacts to sagebrush. In this case the existing road corridor will not exceed 35 feet. Disturbed corridors will be reclaimed with site specific (based on soil type) forbs to benefit wildlife species.
  - LOG will provide funding to facilitate the Lake DeSmet Conservation District (LDCD) and Natural Resources Conservation Service (NRCS) sage-grouse habitat enhancement goals for the Welles and Camino properties in the amount of \$20,000.00. This will result in expediting habitat enhancements and develop a grazing strategy for each property that landowners commit to for three years. Most landowners continue to practice these grazing strategies once they experience

the economic benefits, resulting in long-term benefits for rangeland and wildlife. Grazing deferments are achieved through incentives to the landowners and will result in establishment of forbs within treated areas and provide better escape cover for prey species such as sage-grouse. Grazing deferments could also assist with reclamation of disturbed areas within the POD with good planning, preventing invasive weeds. This plan further develops conservation partnerships with industry, landowners, and agencies on large acreages. Please refer to the “Sage-Grouse Habitat Enhancement on Lance Oil and Gas Company, Inc. Leases within the Indian Creek and Cat Creek Lek Complexes.”

#### **4.2.5.2.4. Mountain plover Direct and Indirect Effects**

Suitable mountain plover habitat is not present within the Coulter V project area.

#### **4.2.5.3. 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. West Nile Virus**

The PRB FEIS and ROD included a programmatic mitigation measure that states, “The BLM will consult with appropriate state agencies regarding WNV. If determined to be necessary, a COA will be applied at the time of APD approval to treat mosquitoes for any CBM discharge waters that become stagnant.” This project is likely to result in standing surface water which may potentially increase mosquito breeding habitat. BLM has consulted with applicable state agencies, County Weed and Pest and the State Health Department, per above mitigation in the PRB ROD page 18, regarding the disease and the need to treat. BLM has also consulted with the researchers that are studying the dynamics of WNV species and its effects in Wyoming.

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

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

BLM will keep monitoring this issue by continuing to consult with the State agencies and the researchers working in the area in order to stay abreast of the most current developments and any need to apply mitigation. Based on current information, we determined that no significant impacts in the spread of WNV would occur from the implementation of this project.

### **4.4. Water Resources**

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

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 15.0 gpm per well or 210.0 gpm (0.47 cfs or 339 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 drainage, the projected volume produced within the watershed area was 171,423 acre-feet in 2006 which is the maximum production. As such, the volume of water resulting from the production of these wells is 0.2% of the total volume projected for 2006. This volume of produced water is also within the predicted parameters of the PRB FEIS.

#### **4.4.1. 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). For this action, it may be assumed that a maximum of 84 gpm will infiltrate at or near the discharge points and impoundments (135.6 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 85 to 1,735 feet compared to 1,900 to 2,200 feet to the Big George. 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 (1/2 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 Wyoming DEQ 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 is currently being revised as the “Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments” which should be approved by June, 2006. Approximately 800 new impoundments have been investigated to date with 102 impoundments in 52 permits that have gone into compliance monitoring. The Wyoming DEQ has established an Impoundment Task Force which is in the process of drafting an “Impoundment Monitoring Plan” to investigate the potential for existing impoundments to have impacted shallow groundwater. Drilling at selected existing impoundments should begin in the spring of 2006. For WYPDES permits received by DEQ after the August 1<sup>st</sup> effective date, the BLM will require that operators comply with the requirements outlined in the current approved DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

**4.4.1.1. 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 CBM 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 CBM 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.

**4.4.2. Surface Water**

The following table shows Wyoming proposed numeric limits for the watershed for SAR, and EC, the average value measured at selected USGS gaging 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 4.5 Comparison of Regulated Water Quality Parameters to Predicted Water Quality**

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Most Restrictive Proposed Limit –		2	1,000
Least Restrictive Proposed Limit		10	3,200
Primary Watershed at <b>Arvada</b> 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)			

Predicted Values	TDS, mg/l	SAR	EC, $\mu$ mhos/cm
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirement for WYPDES Permit # WY0053015 At discharge point	5,000	5-9	2,000-3,000
Predicted Produced Water Quality Coal Zone Big George	1,710	8.0	2,600

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 1,710.0 mg/l TDS which is/is not within the WDEQ criteria for agricultural use (2000 mg/l TDS).

The quality for the water produced from the target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 15.0 gallons per minute (gpm) is projected to be produced from these 15 wells, for a total of 225.0 gpm for the POD. See Table 4.4 .

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

There are 12 discharge points proposed for 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, 13 impoundments (198.32 acre-feet) would potentially be constructed within the project area. These impoundments will disturb approximately 54.6 acres including the dam structures. Of these water impoundments, 12 would be on-channel reservoirs disturbing 50.2 acres, and 1 would be off-channel ponds disturbing 4.4 acres. The off-channel impoundments would result in evaporation and infiltration of CBNG water. Criteria identified in “Off-Channel, Unlined CBNG Produced Water Pit Siting Guidelines for the Powder River Basin, Wyoming” (WDEQ, 2002) will be used to locate these impoundments. 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 in infiltration reservoirs 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 0.5 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). The operator has committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Sedimentation will occur in the impoundments, but would be controlled through a concerted monitoring and maintenance program. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific, case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

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 of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 15 wells is anticipated to be a total of 225.0 gpm or 0.5 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment the produced water re-surfacing in Upper Powder River from this action (0.08 cfs) may add a maximum 0.06 cfs to the flows, or 0.09% of the predicted total CBNG produced water contribution. This incremental volume is statistically below the measurement capabilities for the volume of flow of the Upper Powder River (refer to Statistical Methods in Water Resources U.S. Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). The addition of the water produced from these wells will not impact the water quantity in the mainstem of the Upper Powder River. For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

The 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 Wyoming Pollutant Discharge Elimination System (WYPDES) permit # WY0053015 for the discharge of water produced from this project from the WDEQ.

Permit effluent limits were set at (WYPDES, Attachment B):

pH	6.5 to 8.5
TDS	5000 mg/l max
Specific Conductance (Oct.-July)	3000 mg/l max
Specific Conductance (Aug.-Sept.)	2000 mg/l max
SAR (Oct.-July)	9
SAR (Aug.-Sept.)	5
Sulfates	3000 mg/l max
Radium 226	1 pCi/l max
Dissolved iron	300 µg/l max
Dissolved manganese	630 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	7 µg/l max
Chlorides	46 mg/l
Total Flow Volume, MGD	1.29

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 Downstream Powder River (DPR) in the NWSE, Section 20 T48N, R77W and Upstream Powder River (UPR) in the SWSW, Section 17, T48N, R77W..

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 spring.

**4.4.2.1. Surface Water Cumulative Effects**

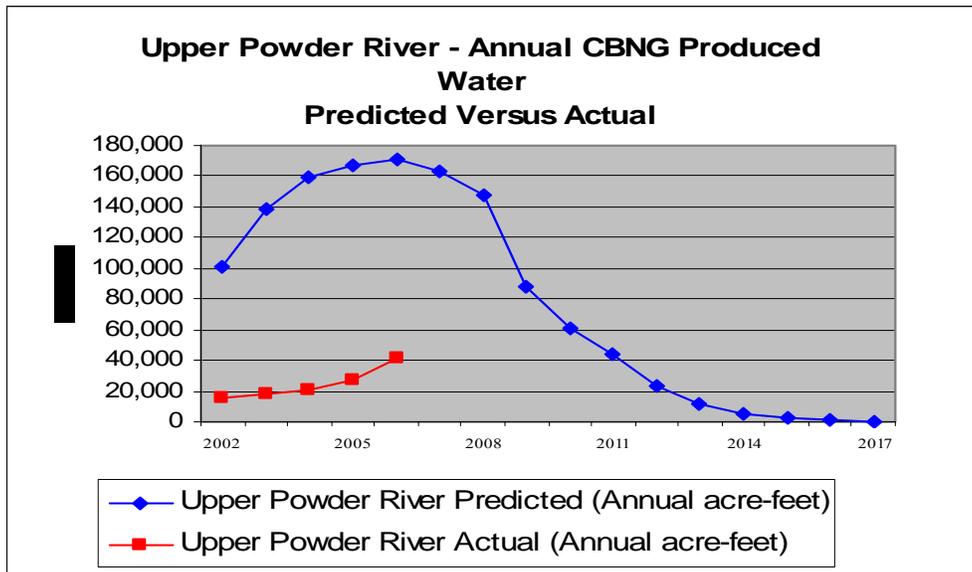
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of March 2007, all producing CBNG wells in the watershed have discharged a cumulative volume of **123,984** 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 **16.8%** of the total predicted produced water analyzed in the PRB FEIS for the watershed.

**Table 4.6 Actual vs predicted water production in the Upper Powder River watershed 2006 Data Update 3-16-07**

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				
2008	147,481	1,047,521				
2009	88,046	1,135,567				
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				
<b>Total</b>	<b>1,285,233</b>		<b>123,984</b>			

**Figure 4.1 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. Conductivity (EC) and SAR are the parameters of concern for suitability of irrigation water. The water quality analysis in the PRB FEIS was conducted using produced water quality data, where available, from existing wells within each of the ten primary watersheds in the Powder River Basin. These predictions of EC and SAR can only be reevaluated when additional water quality sampling is available.

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur as a result of discharged produced CBNG water. The cumulative effects relative to this project are within the parameters of the PRB EIS 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 16.8% 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 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 watershed and page 117 for cumulative effects common to all sub-watersheds.

#### 4.5. Cultural Resources

There are no eligible sites within the APE of the proposed project. Following the Wyoming State Protocol Section VI (A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 2/8/07 that no historic properties exist within the APE.

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

## 5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Ethan Jahnke	Federal Permitting Agent	Lance Oil and Gas	Yes
Priscilla Welles	Landowner		Yes
Brian Venn	Civil Engineer	WWC Engineering	Yes
Brian Kelly	Field Supervisor	USFWS	No
Mary Hopkins	Acting SHPO	Wyoming SHPO	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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