

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD  
FOR**

Windsor Energy Group, LLC.

**Horse Creek North POD**

ENVIRONMENTAL ASSESSMENT –WY-070-07-131

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Windsor Energy Group, LLC.’s Horse Creek North Coal Bed Natural Gas (CBNG) POD comprised of the following 8 Applications for Permit to Drill (APDs) and 2 Right-of-Way grants as follows:

Well Name	Number	QTR	Section	Township	Range	Lease
HORSE CREEK N HCN	12-19	SWNW	19	55N	72W	WYW145539
HORSE CREEK N HCN	21-19	NENW	19	55N	72W	WYW145539
HORSE CREEK N HCN	23-19	NESW	19	55N	72W	WYW145539
HORSE CREEK N HCN	32-19	SWNE	19	55N	72W	WYW145539
HORSE CREEK N HCN	34-19	SWSE	19	55N	72W	WYW145539
HORSE CREEK N HCN	41-19	NENE	19	55N	72W	WYW145539
HORSE CREEK N HCN	43-19	NESE	19	55N	72W	WYW145539
HORSE CREEK N HCN	43-25	NESE	25	55N	73W	WYW25700

The following impoundment was inspected and approved for use in association with the water management strategy for the POD. The impoundment is bonded for reclamation cost through the BLM under a Right of Way action.

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Lease Number
1	13-30-5572	NWSW	30	55	72	W-9938

Amendments to BLM Right-of-Way grants:

Case #	Operator	County	ROW Action	POD Name	Acres	Legal location/description
WYW-169523	Windsor	Campbell	Gas pipeline	Horse Creek North	1.085	T. 55 N., R. 72 W., Sec. 30: Lots 9, 15, and 16
WYW-169522	Windsor	Campbell	Access road and Corridor (water & electric)	Horse Creek North	1.807	T. 55 N., R. 72 W., Sec. 30: Lots 9, 15, and 16

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

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

1. The Operator, in their POD, has committed to:

- Comply with all applicable Federal, State and Local laws and regulations.
  - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
  - Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD.
  - Provide water analysis from a designated reference well in each coal zone.
2. The Operator has certified that a Surface Use Agreement has been reached with the Landowner(s).
  3. Alternative C will not result in any undue or unnecessary environmental degradation.
  4. It is in the public interest to approve these wells, as the leases are being drained of federal gas, resulting in a loss of revenue for the government.
  5. Mitigation measures applied by the BLM will alleviate or minimize environmental impacts.
  6. Alternative C is the environmentally-preferred Alternative.
  7. The proposed action is in conformance with the PRB FEIS and the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management (BLM), Buffalo Field Office, April 2001.

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

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

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

Field Manager: \_\_\_\_\_ Date: \_\_\_\_\_

**BUREAU OF LAND MANAGEMENT  
BUFFALO FIELD OFFICE  
ENVIRONMENTAL ASSESSMENT (EA)  
FOR  
Windsor Energy Group, LLC.  
Horse Creek North POD  
PLAN OF DEVELOPMENT  
WY-070-07-131**

## **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 define and produce coal bed natural gas (CBNG) on three valid federal oil and gas mineral leases (WYW130790, WYW145539, WYW25700) issued to the applicant by the BLM. The need exists because without approval of the Applications for Permit to Drill (APDs), federal lease royalties will be lost and the lessee will be deprived of the federal gas they have the rights to develop.

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

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

### **2. ALTERNATIVES INCLUDING THE PROPOSED ACTION**

#### **2.1. Alternative A - No Action**

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

#### **2.2. Alternative B Proposed Action**

Proposed Action Title/Type: Windsor Energy Group, LLC’s Horse Creek North Plan of Development (POD) for 10 coal bed natural gas well APD’s and associated infrastructure.

Proposed Well Information: There are 10 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 CBNG from the Wall coal zone. Proposed well house dimensions are 4 ft wide x 4 ft length x 4 ft height, with a disturbance area of 16 square feet. Well house color is covert green, selected to blend with the surrounding vegetation. Wells are located as follows:

Well Name	Number	QTR	Section	Township	Range	Lease
HORSE CREEK N HCN	14-8	SWSW	8	55N	72W	WYW130790
HORSE CREEK N HCN	23-8	NESW	8	55N	72W	WYW130790
HORSE CREEK N HCN	12-19	SWNW	19	55N	72W	WYW145539
HORSE CREEK N HCN	21-19	NENW	19	55N	72W	WYW145539
HORSE CREEK N HCN	23-19	NESW	19	55N	72W	WYW145539
HORSE CREEK N HCN	32-19	SWNE	19	55N	72W	WYW145539
HORSE CREEK N HCN	34-19	SWSE	19	55N	72W	WYW145539
HORSE CREEK N HCN	41-19	NENE	19	55N	72W	WYW145539
HORSE CREEK N HCN	43-19	NESE	19	55N	72W	WYW145539
HORSE CREEK N HCN	43-25	NESE	25	55N	73W	WYW25700

The following Impoundments were proposed to be used for water management:

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Lease Number
1	13-30-5572	NWSW	30	55	72	WYW009938
2	43-30-5572	NESE	30	55	72	NA
3	11-20-5572	NWNE	20	55	72	WYW150747
4	Parks Playa	NE	20	55	72	WYW150746
5	24-8-5572	SESW	8	55	72	WYW130790

County: Campbell

Applicant: Windsor Energy Group, LLC.

Surface Owners: Mary J. Harris, Will Parks, Marsha Pownall

The proposed action involves the following:

- Drilling of 10 total federal CBM wells in the Wall coal zone to depths ranging from 330 to 495 feet below ground surface.
- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners may impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.
- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 1 existing and 4 new discharge points; 3 proposed and 2 existing stock water impoundments, one of which will be upgraded, within the Little Powder River watershed. The operator has applied for a modification of an existing Wyoming Pollutant Discharge Elimination System (WYPDES) permit (Permit #WY0052493) issued by the Wyoming Department of Environmental Quality (WDEQ). The water will be used beneficially for livestock and wildlife.
- An unimproved and improved road network.

- An existing above ground power line network
- A buried gas, water and power line network, and no central gathering/metering facilities or compression facilities.
- Amendments to the following BLM Right-of-Ways:

Case #	Operator	County	ROW Action	POD Name	Acres	Legal location/description
WYW-169523	Windsor	Campbell	Gas pipeline	Horse Creek North	1.085	T. 55 N., R. 72 W., Sec. 30: Lots 9, 15, and 16
WYW-169522	Windsor	Campbell	Access road and Corridor (water & electric)	Horse Creek North	1.807	T. 55 N., R. 72 W., Sec. 30: Lots 9, 15, and 16

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

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

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

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

### **2.3. Alternative C – Environmentally Preferred**

Alternative C represents a modification of Alternative B based on the operator and BLM working cooperatively to reduce environmental impacts. The description of Alternative C is the same as Alternative B with the addition of the project modifications identified by BLM and the operator following the initial project proposal (Alternative B).

At the on-sites, all areas of proposed surface disturbance were inspected to reduce potential impacts to natural resources. 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 Horse Creek North POD are listed below under 2.3.1:

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

After the submission of the POD, but prior to the onsite, the operator made the following changes to the water management plan:

- The Parks Playa NE ¼ Sec 20 and the 11-20 Impoundment NWNE Sec 20 T55N R72W were withdrawn from the water management plan. The operator intends to pursue direct discharge of water produced in association with CBNG under the Section 20 Agricultural Use provision of the WDEQ.

The following table provides a summary of the changes made at the pre-approval onsite:

Well ID	Aliquot	Section	T/R	Notes
HCN-23-8-5572	NESW	8	55/72	The landowner proposed a different access route to the project area. The proposed route will use an existing primitive road (two-track) that goes across Federal (BLM) surface. It comes from the west of the project area through Section 7, and the S1/2 NW1/4 of Section 8. Brush hogging for the access road to the well location will be limited to a width of 25'.
HCN-14-8-5572	SWSW	8	55/72	Well location moved due to sizeable disturbance of dense sagebrush stand. A new location was proposed on a cheatgrass pocket approx. 600' East/Southeast from the original location. Well site layout will be limited to an oval area of 80' x 80'. An adjacent cheatgrass opening/pocket would be used as a possible staging area. Brush hogging for the access road will be limited to a width of 25'.
HCN-12-19-5572	SWNW	19	55/72	Well location moved to avoid access road engineering and 16% slope approach to the well location. New well site to the North/Northwest of previous location; located on a cheatgrass pocket/opening adjacent to the main access road. Minimal brush hogging is required on this location.
HCN-34-19-5572	SWSE	19	55/72	An existing two-track (rancher's road), which linked the well location to the county road (Collins Rd.), was dropped during the onsite. An alternative access route was selected and will only use a portion of the existing two-track above. The new shorter route will come from the northwest instead of the southeast as originally planned. Due to the location's proximity to an adjacent drainage and the location's sandy soils, the reserve pit will be lined with an impermeable liner. Brush hogging for the well access road will be limited to a width of 25'.

Well ID	Aliquot	Section	T/R	Notes
HCN-41-19-5572	NENE	19	55/72	Access road will be limited to a blading/clearing width of 25'. No trenching will be allowed near the head cut along the access road. Due to 8% slope, gravel/spot upgrade will be required near the bottom of the draw and the upslope section of the access road.
HCN-21-19-5572	NENW	19	55/72	Well location moved both to avoid sizeable disturbance of dense sagebrush stand, and to better accommodate rig placement. Well site was moved 30' North/Northeast. New well location is situated along the existing access road. Well site layout will not exceed an area of 100' x 100'. The access road will require a template design on sloped sections that exceed 8%. (Two sections noted on the onsite).

Subsequent to the onsite, the operator removed the following infrastructure from the Horse Creek North Plan of Development:

- 1) Wells HCN 14-8 and HCN 23-8, as well as the 24-8-5572 impoundment, and all the associated proposed access routes and infrastructure located in Section 8, T55N R72W.
- 2) Stock Reservoir 43-30-5572 and the associated discharge location and utility corridor, Section 30 T55N R72W.

Following the discovery of a new Golden Eagle nest during the 2007 raptor survey season, the location of the 21-19 well was determined to be within ¼ mile of the nest. As a result, on June 29, 2007 Guymen Easdale, BLM Wildlife Biologist, required that Windsor Energy Group relocate the 21-19 well to a location outside the ¼ mile buffer. An acceptable location was found. As a result of the well move, a segment of two-track access road was also eliminated from the POD.

### **2.3.2. Programmatic mitigation measures identified in the PRB FEIS ROD**

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

#### **2.3.2.1. Surface Water**

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

#### **2.3.2.2. Soils**

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

#### **2.3.2.3. Wetland/Riparian**

1. Power line corridors will avoid wetlands, to the extent possible, in order to reduce the chance of waterfowl hitting the lines. Where avoidance can't occur, the minimum number of poles necessary to cross the area will be used.
2. Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall), or when the ground is frozen during the winter.
3. No waste material will be deposited below high water lines in riparian areas, flood plains, or in natural drainage ways.
4. The lower edge of soil or other material stockpiles will be located outside the active floodplain.
5. Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.
6. Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

#### **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. The Companies will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.
4. The Companies will locate aboveground power lines, where practical, at least 0.5 mile from any sage grouse breeding or nesting grounds to prevent raptor predation and sage grouse collision with the conductors. Power poles within 0.5 mile of any sage grouse breeding ground will be raptor-proofed to prevent raptors from perching on the poles.
5. 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.
6. The Companies will limit the construction of aboveground power lines near streams, water bodies, and wetlands to minimize the potential for waterfowl colliding with power lines.
7. 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. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to bald eagles or their habitat.

#### **2.3.2.5.2. Ute Ladies'-tresses Orchid**

1. If suitable habitat for Ute ladies'-tresses cannot be avoided, surveys will be conducted in compliance with USFWS standards (USFWS 1995) by a BLM approved biologist or botanist. Surveys can only be conducted between July 20 and August 31.
2. Moist soils near wetlands, streams, lakes, or springs in the project area will be promptly revegetated if construction activities impact the vegetation in these areas. Revegetation will be designed to avoid the establishment of noxious weeds.

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

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

#### **2.3.2.7. Noise**

1. 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 reduced 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**

1. All changes made at the onsite will be followed. They have all been incorporated into the operator's POD.
2. Please contact Julian Serafin – Natural Resource Specialist, @ (307) 684-1043, Bureau of Land Management, Buffalo Field Office, if there are any questions concerning these surface use COAs.

#### **Surface Use**

1. Access roads/pipeline corridors to the following well locations will be allowed a working width of 40 feet with a blading/clearing width not to exceed 25 feet: 23-19, 32-19, and 34-19.
2. Proposed primitive roads (2-tracks) with utility corridor will not exceed a disturbance width of 40 feet.
3. Pipelines installation and/or corridors not within an access will not exceed a disturbance width of 30 feet.
4. Well site layouts for all the well locations in the Horse Creek North POD will be limited to working areas of 100ft by 100ft.

5. Due to the proximity to an adjacent drainage and to prevent excessive infiltration due to porous material, the drilling pits at the 34-19 and 21-19 well locations will be lined.
6. To reduce the potential for erosion related to storm events, any channel crossing will be reclaimed expediently to BLM standards, including appropriate revegetation and stabilization using Best Management Practices.
7. All topsoil removed for the construction activity will be respread for interim reclamation success.
8. For those proposed disturbance areas mentioned below, there are lands with limited reclamation capability that shall be stabilized in a manner which eliminates accelerated erosion until a self-perpetuating non-weed native plant community has stabilized the site in accordance with the Wyoming Reclamation Policy. Stabilization efforts shall be completed within 30 days of cessation of construction activities. Stabilization efforts include mulching, matting, soil amendments, etc.
  - Well locations: 21-19 and 32-19
  - Road/Pipeline section(s): Template sections between wells 12-19 and 21-19; access road to well 32-19; and, spot upgrade section (headcut) to well 41-19.
9. Interim Reclamation of disturbed areas will adhere to the following guidance (as per the Wyoming Policy on Reclamation (IM WY-90-231):
  - A. The reclaimed area shall be stable and exhibit none of the following characteristics:
    - i. Large rills or gullies.
    - ii. Perceptible soil movement or head cutting in drainages.
    - iii. Slope instability on, or adjacent to, the reclaimed area in question.
  - B. The soil surface must be stable and have adequate surface roughness to reduce runoff and capture rainfall and snow melt. Additional short-term measures, such as the application of mulch, shall be used to reduce surface soil movement.
  - C. Vegetation canopy cover (on unforested sites), production and species diversity (including shrubs) shall approximate the surrounding undisturbed area. The vegetation shall stabilize the site and support the planned post disturbance land use, provide for natural plant community succession and development, and be capable of renewing itself.  
This shall be demonstrated by:
    - i. Successful onsite establishment of species included in the planting mixture or other desirable species.
    - ii. Evidence of vegetation reproduction, either spreading by rhizomatous species or seed production.
  - D. The reclaimed landscape shall have characteristics that approximate the visual quality of the adjacent area with regard to location, scale, shape, color and orientation of major landscape features and meet the needs of the planned post disturbance land use.
10. 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 Horse Creek North POD is Covert Green 18-0617 TPX.
11. Provide 4" of aggregate where grades exceed 8% for stability and erosion prevention.
12. The culvert locations will be staked prior to construction. The culvert invert grade and finished road grade will be clearly indicated on the stakes. Culverts will be installed on natural ground, or on a

designed flow line of a ditch. The minimum cover over culverts will be 12” or one-half the diameter whichever is greater. Drainage laterals in the form of culverts or water bars shall be placed according to the following spacing:

Grade	Drainage Spacing
2-4%	310 ft
5-8%	260 ft
9-12%	200 ft

13. 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:

Ecological Site	Wells and infrastructure
Ponderosa Pine/Little Bluestem	12-19, 21-19, 32-19, 43-19
Loamy	23-19, 34-19, 41-19, 43-25

Ponderosa Pine/Little Bluestem Ecological Sites:

Species	% in Mix	Lbs PLS*
<b><i>Needleandthread</i></b> ( <i>Hesperostipa comata</i> ssp. <i>Comata</i> ) Or <b><i>Indian ricegrass</i></b> ( <i>Achnatherum hymenoides</i> )	10	1.2
<b><i>Bluebunch Wheatgrass</i></b> ( <i>Pseudoroegneria spicata</i> ssp. <i>Spicata</i> )	25	3.0
<b><i>Sideoats grama</i></b> ( <i>Bouteloua curtipendula</i> )	20	2.4
<b><i>Thickspike Wheatgrass</i></b> ( <i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i> )	30	3.6
<b><i>Prairie coneflower</i></b> ( <i>Ratibida columnifera</i> )	5	0.6
<b><i>White or purple prairie clover</i></b> ( <i>Dalea candidum, purpureum</i> )	5	0.6
<b><i>American vetch</i></b> ( <i>Vicia Americana</i> )	5	0.6
<b>Totals</b>	<b>100%</b>	<b>12 lbs/acre</b>

Loamy Ecological Sites:

Species	% in Mix	Lbs PLS*
<b><i>Western Wheatgrass</i></b> ( <i>Pascopyrum smithii</i> )/or <b><i>Thickspike Wheatgrass</i></b> ( <i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i> )	35	4.2
<b><i>Bluebunch Wheatgrass</i></b> ( <i>Pseudoroegneria spicata</i> ssp. <i>Spicata</i> )	15	2.1
<b><i>Green needlegrass</i></b> ( <i>Nassella viridula</i> )	25	3.0

Species	% in Mix	Lbs PLS*
<i>Rocky Mountain beeplant</i> ( <i>Cleome serrulata</i> ) /or <i>American vetch</i> ( <i>Vicia americana</i> )	10	1.4
<i>White or purple prairie clover</i> ( <i>Dalea candidum, purpureum</i> )	5	0.3
<i>Scarlet Globemallow</i> ( <i>Sphaeralcea coccinea</i> ) / or <i>Blue flax</i> ( <i>Linum lewisii</i> )	5	0.4
<i>Prairie coneflower</i> ( <i>Ratibida columnifera</i> )	5	0.8
<b>Totals</b>	<b>100%</b>	<b>12.2 lbs/acre</b>

**Wildlife**

1. No surface disturbing activity shall occur within ½ mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. **This condition will be implemented on an annual basis for the duration of surface disturbing activities.** This timing limitation will affect the following proposed wells and their associated infrastructure:

Township/Range	Section	Affected Wells and Infrastructure
T55N R72W	19	<b>21-19 well and infrastructure; access road from the 12-19 well to the 21-19; 32-19 well and associated infrastructure</b>

- a. Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a 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.
- b. Nest productivity checks shall be completed for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. Nests to be checked are within a ½ mile or less of the proposed development. The nests are listed below:

BLM ID #	UTM N	UTM E	Legal
New	4954547N	455138E	SESW Sec 18, T55N R73W

- c. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours and timing limitations will be applied.
  - d. Well metering, maintenance and other site visits within 0.5 miles of raptor nests shall be minimized as much as possible during the breeding season (February 1 – July 31), and restricted to between 0900 and 1500 hours.
2. The following conditions will minimize the impacts to sage-grouse:
    - a. A survey is required for sage-grouse between April 1 and May 7, annually, within the project area for the life of the project and results shall be submitted to a BLM biologist. The required sage grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.

- 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. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 2 mile buffer until the following breeding season (March 1).
  - c. Well metering, maintenance and other site visits within 0.5 miles of documented sage grouse lek sites shall be minimized as much as possible during the breeding season (March 1– June 15), and restricted to between 0900 and 1500 hours.
3. 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 life 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. 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) If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 0.5 mile buffer until the following breeding season (April 1).
  - b. 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.
4. No surface disturbing activity shall occur within 1 mile of bald eagle roosting habitat (ponderosa pine trees scattered throughout the project area) from November 1 through April 1, annually, prior to a bald eagle roost survey (CM9). No surface disturbing activity shall occur within 1 mile of bald eagle nesting habitat (ponderosa pine trees scattered throughout the project area) from February 1 through August 15 (CM8) prior to a bald eagle nest survey. This condition will be implemented on annual basis for the duration of the surface disturbing activities.

**This timing limitation will affect the Entire project area.**

- a. If bald eagles are observed using the area on a consistent basis, all activity will stop and the 1 mile timing limitation will apply. “Consistent use” is defined as one or more bald eagles (adult or immature) using the same general area multiple times in the same year or in consecutive years.
- b. If a roost is identified and construction has not been completed, a year round disturbance-free buffer zone of 0.5 mile and a seasonal (November 1 - April 1) disturbance-free buffer zone of 1 mile will be established for all bald eagle winter roost sites. Additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 AM and 3:00 PM may be necessary to prevent disturbance.
- c. If a nest is identified and construction has not been completed, a minimum 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-free buffer zone of 1-mile will be established for all bald eagle nest sites (February 1 - August 15).

**Water Management**

- 1. To control erosion, no water will be allowed to overflow the tire stock water tanks.
- 2. The operator shall submit to the BLM a copy of the WYPDES Permit(s) as they become available from the WDEQ. The operator has committed to comply with all the regulations and reporting requirements of the WYPDES permits as issued by the WDEQ for this action.

3. If water is allowed to discharge from the 13-30-5572 impoundment, the operator will be required to submit a Sundry Notice to the BLM BFO with a change to the Water Management Plan and a proposal for monitoring the condition of the channel downstream and the impoundment located on Federal surface at 43-30-5572.

**Cultural Mitigation**

1. All earth moving activity in the following area will be monitored by an archeologist who meets or exceed the qualification standards recommended by the Secretary of the Interior. The Bureau has identified this area as containing the potential for buried cultural deposits. The Bureau will require the submission of two copies of a monitoring report within 30 days of the completion of all monitoring work. All monitored areas must be plotted on a map provided with the monitoring report.
  - a. All earth moving activity associated with the construction of the portion of the access and utility corridor between the 12-19 well and the 14-19 well in T 55N R 72W Section 19 W1/2SW that is in the alluvial terrace of Spring Creek between these two wells.

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

Windsor has conducted pre-planning for this project in conjunction with the landowners. Specifically, a variety of water management alternatives were considered for the project, including the following:

- Land Application Disposal. This alternative was not pursued for the following reasons:
  - This alternative is not a year-round strategy, and as such storage would still be required for the non-irrigation season.
  - There was not a need expressed by the landowners.
- Re-injection into disposal wells and/or Aquifer Storage and Retrieval: This alternative was not pursued for the following reasons:
  - Re-injection reduces the beneficial use of water for stock, which were desired results for the project.
  - Costs were prohibitive.

**3. DESCRIPTION OF AFFECTED ENVIRONMENT**

Applications to drill were received on 10/30/2006. Field inspections of the proposed Horse Creek North CBNG project were conducted on 4/12/2007 by Kathy Brus, Natural Resource Specialist – BLM; Guymen Easdale, Wildlife Biologist – BLM; Leigh Grench, Archeologist – BLM; Lee Harrelson, Civil Engineer – BLM; Rick Highfield, Contractor/Production Foreman – Windsor Energy Group, LLC; Will Parks, Surface Owner – Paulette Parks Trust; Brad Rogers, Wildlife Biologist – USFWS; Alan Schultz, Environmental Manager – Windsor Energy Group, LLC; Julian Serafin, Natural Resource Specialist – BLM; Ben Shoup, Consultant – Arcadis US, Inc; Eric Smith – Paulette Parks Trust; Claude Voyles, Surface Owner – Representing Mary Jane Harris.

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.**

<b>Mandatory Item</b>	<b>Potentially Impacted</b>	<b>No Impact</b>	<b>Not Present On Site</b>	<b>BLM Evaluator</b>
Threatened and Endangered Species	X			Guymen Easdale

<b>Mandatory Item</b>	<b>Potentially Impacted</b>	<b>No Impact</b>	<b>Not Present On Site</b>	<b>BLM Evaluator</b>
Floodplains		X		Kathy Brus
Wilderness Values			X	Julian Serafin
ACECs			X	Julian Serafin
Water Resources	X			Kathy Brus
Air Quality		X		Julian Serafin
Cultural or Historical Values		X		Leigh Grench
Prime or Unique Farmlands			X	Julian Serafin
Wild & Scenic Rivers			X	Julian Serafin
Wetland/Riparian	X			Kathy Brus
Native American Religious Concerns			X	Leigh Grench
Hazardous Wastes or Solids		X		Julian Serafin
Invasive, Nonnative Species	X			Julian Serafin
Environmental Justice		X		Julian Serafin

### 3.1. Topographic Characteristics of Project Area

The proposed Horse Creek North POD is located approximately twenty five miles north of Gillette, Wyoming, within Section 25, T55N R73W, and Section 19, T55N R72W. Elevations within the project area range from 3750 to 4940 feet above sea level. The topography throughout the general area consists of ephemeral bottomlands rising to ponderosa and juniper breaks with moderate sloping ridges and draws. This area is also characterized by an abundance of scoria outcrops. The ephemeral drainages of Horse Creek and White Tail Creek drain the area. The climate in the area is semi-arid, averaging 12-14 inches of precipitation annually, more that 60% of which occurs between May and September. CBNG development exists on all sides of the proposed Horse Creek North POD as well as existing conventional oil wells within the project area. Other than oil and gas development, livestock grazing and native hay production are the major land uses within the general area.

### 3.2. Vegetation & Soils

Ecological Site Descriptions are used to provide soils and vegetation information needed for resource identification, management and reclamation recommendations. To determine the appropriate Ecological Sites for the area contained within this proposed action, BLM specialists analyzed data from onsite field reconnaissance and Natural Resources Conservation Service published soil survey soils information. The map unit symbols identified for the soils and the associated ecological sites found within the POD boundary are listed in the table below.

**Table – Ecological Sites**

<b>Map Unit Symbol</b>	<b>Ecological site</b>
131	LOAMY (15-17NP)
134	LOAMY (15-17NP)
136	LOAMY (15-17NP)
168	LOAMY (15-17NP)
224	LOAMY (15-17NP)
225	LOAMY (15-17NP)
244	LOAMY (15-17NP)
248	LOAMY (15-17NP)
303	LOAMY (15-17NP)
323	LOAMY (15-17NP)

Map Unit Symbol	Ecological site
311	LOWLAND (15-17NP)
279	Ponderosa Pine and Little Bluestem
283	Ponderosa Pine and Little Bluestem
291	Ponderosa Pine and Little Bluestem
297	Ponderosa Pine and Little Bluestem
103	SANDY (15-17NP)
105	SANDY (15-17NP)
185	SANDY (15-17NP)
295	SHALLOW CLAYEY (15-17NP)
239	SHALLOW LOAMY (15-17NP)
251	WATER

Dominant Ecological Sites and Plant Communities identified in this POD and its infrastructure, by dominant soil series are:

***Loamy Sites (45%):***

This site occurs on land nearly level up to 50% slopes on landforms which include hill slopes and the associated alluvial fans and stream terraces, in the 15-17 inch precipitation zone.

The soils of this site are moderately deep to deep (greater than 20" to bedrock), well drained soils that formed in alluvium and residuum derived from unspecified sandstone. These soils have moderate permeability and may occur on all slopes.

The Historic Climax Plant Community (HCPC - defined as the plant community that was best adapted to the unique combination of factors associated with this ecological site) for this site would be a Rhizomatous Wheatgrasses/Needleandthread/Big Bluestem Plant Community. The potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants. A mix of warm and cool season mid-grasses dominate the state.

The present plant community is a *Mixed Sagebrush/Grass*. Compared to the HCPC, sagebrush and blue grama have increased. Production of the cool season grasses have decreased.

Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) is a significant component of this Mixed Sagebrush/Grass 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.

***Ponderosa Pine-Little Bluestem Sites (38%):***

This site occurs on moderate to steep slopes on landforms which include upland ridges, escarpments and badlands, in the 15-17 inch precipitation zone.

The soils of this site are shallow (less than 20" to bedrock), well drained soils that formed in moderately fine to moderately coarse loamy materials weathered from interbedded shale and sandstone. These soils have moderate permeability, and fair to moderate reclamation capability.

The HCPC for this site would be a Ponderosa Pine site. The potential vegetation is about 80% perennial grasses or grass-like plants, 15% forbs, and 5% woody plants.

Native vegetative species in the upland areas are ponderosa pine (*Pinus ponderosa*), juniper (*Juniperus*

*scopulorum*), Wyoming big-sagebrush, bluebunch wheatgrass (*Agropyron spicatum*), needleandthread (*Stipa comata*), threadleaf sedge (*Carex filifolia*) and blue grama (*Bouteloua gracilis*).

Lowland areas are comprised of ephemeral stream channels predominately vegetated by grasses and forbs. Common species included Kentucky bluegrass (*Poa pratensis*), western wheatgrass (*Agropyron smithii*) and green needlegrass (*Stipa viridula*). Isolated cottonwood trees (*Populus spp.*) were found in some drawbottoms.

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

**Table 3.4 – Summary of Ecological Sites**

<b>Ecological Site</b>	<b>Acres</b>	<b>Percentage</b>
LOAMY (15-17NP)	535.5	45%
Ponderosa Pine and Little Bluestem	457.3	38%
SANDY (15-17NP)	78.2	7%
SHALLOW CLAYEY (15-17NP)	41.9	4%
SHALLOW LOAMY (15-17NP)	35.8	3%
LOWLAND (15-17NP)	25.5	2%
WATER	14.8	1%
<b>Total</b>	<b>1189.0</b>	<b>100%</b>

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

This project area is dissected by the broad floodplain for the intermittent Spring Creek which is a tributary to Horse Creek. The 43-30-5572 impoundment, located in the NESE Sec 30 T55N R72W, was constructed to detain water for stock use at some time in the distant past. Riparian vegetation such as cattails, bulrush and alkali cordgrass flourishes at this location. There are rare isolated cottonwoods interspersed along the course. This impoundment contained water in April at the time of the onsite due to recent storm events. Upstream water discharge from CBNG project may also contribute to the water detained at this location.

Low gradient ephemeral drainages tributary to Spring Creek were dry at the time of the onsite. Even though the gradient in some of these drainages approaches that of the creek, there were no riparian areas noted in the ephemeral drainages within the project area.

### **3.2.2. Invasive Species**

The operator conducted a weed inventory in August 2006 to identify, map, and characterize the extent of any existing weed infestations in the Horse Creek North POD. The inventory identified scattered Canada thistle (*Cirsium arvense* (L.) Scop) infestations throughout the project area, and well established downy brome (*Bromus tectorum* L.) infestations in Section 20 and Section 19. Additional weedy species found in the study included curlycup gumweed (*Grindelia squarrosa*), common ragweed (*Ambrosia artemisiifolia*), and yellow sweet clover (*Melilotus officinalis*).

### **3.3. Wildlife**

Elevations within the project area range from 3,880 to 4,000 feet above sea level. The topography throughout most of the project area consists of flat draw bottoms and abruptly rising ponderosa breaks. Ephemeral tributaries of Spring Creek and White Tail Creek drain the area. All tributaries appear to be ephemeral or intermittent and no perennial flow within any stream was observed. The climate in the area

is semi-arid, averaging 12 inches of precipitation annually, more than 55% of which occurs between May and September (Huber 2006).

General vegetation communities in the survey area are comprised of ponderosa breaks (70%) and an ephemeral draw bottom (30%). Native vegetative species in the upland areas are ponderosa pine (*Pinus ponderosa*), big sagebrush (*Artemisia tridentate*), needleandthread (*Stipa comata*), bluebuck wheatgrass (*Agropyron spicatum*), fringed sagewort (*Artemisia frigida*), cheatgrass (*Bromus tectorum*), and prairie junegrass (*Koeleria macrantha*) (Huber 2006).

Lowland areas are comprised of ephemeral stream channels predominately vegetated by grasses, forbs and shrubs. Common species include western wheatgrass, green needlegrass (*Stipa viridula*), phlox (*Phlox spp.*) and silver sagebrush (*Artemisia cana*) (Huber 2006).

A habitat assessment and wildlife inventory surveys were performed by Arcadis Consulting. Arcadis performed aerial surveys for bald eagle winter roosts on January 17, 27 and February 21, 2006 and December 12, January 16 and February 23, 2007; no formal surveys were conducted for mountain plover nesting activity; surveys for greater sage-grouse and sharp-tailed grouse were conducted from the air and on the ground on April 9, 20, and May 2, 2006, and April 8, 16 and 28, 2007; ground searched for raptor nests and prairie dog colonies were conducted on April 20, May 2, June 7 and July 14, 2006 and April 16, and June 4, 2007. A formal survey for Utes Ladies Tresses orchid was conducted on August 22, 2006 along Spring Creek.

A BLM biologist conducted field visits on April 12, 2007. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project adjustment recommendations where wildlife issues arose. A Biological Assessment was prepared by a BLM biologist. The Biological Assessment was submitted to the U.S. Fish and Wildlife Service (USFWS) for consultation.

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

### **3.3.1. Big Game**

Big game species expected to be within the project area include pronghorn antelope, mule deer, white-tailed deer and elk. The project area is part of the Gillette pronghorn antelope herd unit. The 2004 estimated population of this herd was 13,985 with a population objective of 11,000 (Wyoming Game and Fish Department 2004). The project area is part of the Powder River mule deer herd unit. The 2004 population estimate for this herd was 55,561 animals with a herd objective of 52,000 (WGFD 2004). The population of each herd unit has been increasing since 1998.

The WGFD has determined the entire project area to be Winter range for pronghorn antelope. Approximately 80% of the project area is Winter/Yearlong range and 20% Yearlong range for mule deer. Approximately 80% of the project area is Yearlong range for white-tailed deer. The project area is located 23 miles northeast of the Fortification Creek Elk Management area. According to the BLM Buffalo Field Office data base elk were observed approximately 10 miles north and 10 miles east of the project area. As some of the elk move from Fortification Creek north to Montana they may use the project area for foraging. The land owner has observed elk in the project area on a regular basis. **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.

**3.3.2. Aquatics**

The project area is drained by Spring Creek and Horse Creek which are ephemeral tributaries of the Little Powder River. Amphibian and reptile species occur throughout the Basin, but there is little recorded baseline information available for them. Fish that have been identified in the Powder River watershed are listed in the PRB FEIS (3-156-159).

**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**

Five new raptor nests and one previously identified nest were located within or adjacent to the Horse Creek North project area. In 2007, there was one active nest. Five nests were inactive in 2007.

**Table 3.2 Documented raptor nests within or adjacent to the project area in 2007 (UTM Zone 13, NAD 83).**

BLM ID#	SPECIES	UTM	LEGAL LOCATION	SUBSTRATE	CONDITION	STATUS
New	Unknown	456492E 4954547N	SWSW Sec 17 T55N R72W	Ponderosa pine live	poor	inactive
New	GOEA	455138E 4954547N	SESW Sec 18 T55N R73W	Ponderosa pine live	good	active
New	GOEA	454484E 4950623N	SWNW Sec 31 T55N R72W	Ponderosa pine live	good	inactive
New	Unknown	454487E 4950623N	SWNW Sec 31 T55N R72W	Ponderosa pine live	fair	inactive
New	Unknown	454771E 4950625N	SWNW Sec 31 T55N R72W	Ponderosa pine live	unknown	inactive
3440	RTHA	457882E 4954820N	Sec 16 T55N, R72W	pole	gone	gone

**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 three 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).

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

According to the wildlife surveys conducted by Arcadis for 2006 and 2007 no black-tailed prairie dog colonies occur within or adjacent to the project area. Black-footed ferret habitat does not exist within the project area.

#### **3.3.5.1.2. Bald eagle**

On February 14, 1978, the bald eagle was federally listed as Endangered in all of the continental United States except for Minnesota, Wisconsin, Michigan, Oregon, and Washington. In these states the bald eagle was listed as Threatened. On July 12, 1995 the eagle's status was changed to Threatened throughout the United States. Species-wide populations are recovering from earlier declines, and the bald eagle was proposed for de-listing in 2000, but as yet no final decision has been made.

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.

Dense stands of ponderosa pine trees occur along the ridges throughout most of Section 17, 18, 19 and Section 30, Township 55 North, Range 72 West and the eastern Section 25, Township 55 North, Range 73 West. The trees are large enough to support nesting and roosting bald and golden eagles.

There are two existing reservoirs within the project area and three existing outside the project area. The 43-30 reservoir (existing) was constructed by the BLM approximately 20 years ago for the purpose of being a wetland. It is well vegetated with wetland species. During the onsite on April 12, 2007, six groups of 5 to 30 birds, containing at least five species of waterfowl, were observed using the 43-30 reservoir.

An abundant prey base exists within the project area in the form of waterfowl and rabbits. Suitable nesting and roosting habitat exists within and adjacent to the Horse Creek North project area.

Two adult bald eagles were observed perched in ponderosa pine tree approximately 3.0 miles southeast of the project area. According to the BLM Buffalo Field Office database there were five eagle sightings (2 bald eagles and 3 golden eagles) approximately 5.5 miles southwest of the project area.

#### **3.3.5.1.3. 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.

During the initial habitat evaluations conducted in 2006, intermittent stretches of standing water and moist soils containing wetland vegetation were observed during mid summer months along Spring Creek and adjacent to the reservoir located in NESE Section 30, Township 55 North, Range 72 West. Potential orchid habitat characteristics were also noted at a spring located in the NWSW Section 19, Township 55 North, Range 72 West. Arcadis consulted with Sarah Bucklin-Comiskey, wildlife biologist for the BLM Casper Field Office on August 3, 2006, indicating peak orchid flowering stage would occur from August 13-26, 2006 in the Campbell County region. On August 22, 2006 Arcadis conducted a thorough investigation along the stretch of Spring Creek within the Horse Creek North project area and the Section 19 spring. Although wetland vegetative species were present along Spring Creek, the channel bottom was dry. Associated vegetation found within the channel and around the reservoir included cattails (*Typha spp.*), saltmarsh (*Scirpus maritimus*), alkali cordgrass (*Spartina gracilis*), Canada thistle (*Cirsium arvense*) and various weed species. These species indicate alkali soils and are not usually associated with the Ute ladies tresses orchid. The vegetation around the spring in Section 19 was heavily grazed and trampled. No Ute ladies tresses orchids were found during the survey (Huber 2006).

### **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. 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.

According to the BLM data base, wildlife surveys conducted by Arcadis Consulting in 2006 and 2007 and a field visit to the project area by a BLM biologist on April 12, 2007, no black-tailed prairie dog colonies were identified within or near the project area.

#### **3.3.5.2.2. Greater 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). Within and adjacent to the Horse Creek North project area there are pockets of sagebrush that range in size from 2 to 15 acres and are of moderate (10-15%) to dense (15-25%) stands. The sagebrush height within these pockets is 15-30 inches tall. Numerous small broad draws occur throughout the project area; a variety forb species were abundant throughout the area and were denser in the drainages.

The area provides good nesting, early and late brood rearing habitat. Sage grouse are likely to use the area year round.

Suitable sage-grouse habitat is present throughout the project area. One documented sage-grouse lek is present within 3 miles of the project area (Table 5). Arcadis conducted an aerial survey for sage grouse and sharp-tailed grouse on April 8, 2007. Ground surveys were conducted on April 16 and 28, 2007.

**Table 3.3. Sage-grouse lek(s) surrounding the Horse Creek North project area.**

Lek ID	UTM NAD83	Legal Location	Status (Peak Males)	Distance From Project Area (Miles)
Squaw Creek	451333E, 4949992N	NWSE Sec 35 T55N, R73W	6 males and 2 females were observed	1.8 miles from the project boundary.

**Sharp-tailed grouse**

During the surveys no sharp-tailed grouse were observed.

**3.3.5.2.3. 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.

The topography within the project area consist flat bottom lands 0-6% slope, rolling hills 6-15% slope and ridges and cliffs with slopes greater than 15%. Ponderosa pine and juniper trees are found on the steeper slopes, moderate to dense stands of sagebrush/grassland habitat occurs throughout the rolling topography and down in Spring Creek Basin is primarily grassland. Grass cover in the basin areas are dense and range from 8-15 inches tall. Suitable mountain plover habitat is not present within the Horse Creek North project area. Depending on grazing practices, development, fire and prairie dogs moving into the area, portions of Horse Creek North could become suitable mountain plover habitat.

**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**

Year	Total WY	Human Cases	Veterinary Cases	Bird Cases
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	<b>Human Cases</b>	<b>PRB</b>	<b>PRB</b>	<b>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

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 the Little Powder River drainage system. Spring Creek, which is an intermittent stream, dissects the project area. Spring Creek is tributary to Horse Creek which is tributary to the Little Powder River. The Little Powder River, which flows north to Montana, is tributary to the Powder River.

#### 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).

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 18 registered stock and domestic water wells within ½ mile of a Federal CBNG producing well in the POD with depths ranging from 3 to 1125 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).

As a requirement for obtaining a WYPDES permit from the WDEQ, the presence of shallow groundwater and that groundwater quality must be determined at sites proposed to impound water produced in association with CBNG. For this project area, the results of the investigation at the existing impoundment 43-30-5572 on Spring Creek were included. This groundwater quality, which would be classified as Class IV based on the WDEQ Chapter 8 definitions, may be indicative of the shallow groundwater quality in the area.

Well	Location	Depth, ft	TDS, mg/l	SAR	EC, µmhos/cm
43-30-5572 Groundwater Monitor Well	NESE Sec 30 T55N R72W	17 – wet 92 TD	7,520	4.4	7,580

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;
- The WDEQ has determined that it may be necessary to conduct investigations impoundment sites to quantify these impacts;
- Provide site specific guidance on the placement and design of CBNG impoundments, and;
- Shallow groundwater wells will be installed and monitored where necessary.

#### 3.5.2. Surface Water

The project area is within the Spring Creek drainage which is tributary to the Little 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). With the exception of Spring Creek, 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 Little Powder River, the EC ranges from 1,785 at Maximum monthly flow to 3,300 at Low monthly flow and the SAR ranges from 4.44 at Maximum monthly flow to 6.94 at Low monthly flow. These values were determined at the USGS station located at the Little Powder River above Dry Creek near Weston, WY (PRB FEIS page 3-49).

The operator has not identified any natural springs within this POD boundary.

At the time of the onsite (04-12-07) there was water in the 43-30-5572 impoundment as a result of recent storm events. The operator obtained a sample for analysis and the results follow.

Impoundment	Location	TDS, mg/l	SAR	EC, $\mu\text{mhos/cm}$
43-30-5572	NESE Sec 30 T55N R72W	692	1.0	916

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 Horse Creek North POD project prior to on-the-ground project work (BFO project # 70070046). ARCADIS G&M Inc. conducted a block Class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) for the project. Leigh Grench, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. No cultural resources are located within the Area of Potential Effect (APE), however the following resources are located near the project area.

**Table 3.5 Cultural Resources Inventory Results**

Site Number	Site Type	Eligibility
48CA6372	Prehistoric Camp	Not Eligible
48CA6373	Prehistoric Camp	Not Eligible
48CA6374	Prehistoric Camp	Not Eligible
48CA6375	Historic Debris and Features	Not Eligible
48CA6376	Prehistoric Lithic Scatter	Not Eligible
48CA6377	Prehistoric Camp	Not Eligible
48CA6378	Prehistoric Camp	Not Eligible

#### 4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed 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

Impacts to vegetation and soils from surface disturbance will be reduced by following the operator’s plans and BLM applied mitigation. The 8 proposed well locations can be drilled without a well pad being constructed. Two of the wells are located on old reclaimed conventional well pads. Surface disturbance associated with the drilling of all the wells would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 8 x 20 feet), and compaction (from vehicles driving/parking at the drill site). Well site layouts for all the well locations will be limited to working areas of 100 x 100 feet or approximately 0.23 acre/well. Therefore, the total estimated disturbance for all 8 wells would be 1.84 acres.

Approximately 3.38 miles of new and existing two-track trails would be utilized to access well sites. The majority of proposed pipelines (gas and water) have been located in “disturbance corridors.” Disturbance corridors involve the combining of 2 or more utility lines (water, gas, power) in a common trench, usually along access routes. This practice results in less surface disturbance and overall environmental impacts. Approximately 0.23 miles of pipeline would be constructed outside of corridors. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, etc.) would ensure land productivity/stability is regained and maximized.

Proposed stream crossings, including culverts and fords (low water crossings) are shown on the MSUP and the WMP maps (see the POD). These structures would be constructed in accordance with sound, engineering practices and BLM standards.

The PRB FEIS made predictions regarding the potential impact of produced water to the various soil types found throughout the Basin, in addition to physical disturbance effects. “Government soil experts state that SAR values of 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	8	0.23/acre	1.84	Long Term
Constructed Pad	0		0	
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Screw Compressors	0	Site Specific	0.0	Long Term
Monitor Wells	0	0.1/acre	0.0	Long Term
Impoundments	1 Existing			Long Term
On-channel		Site Specific	0.0	

<b>Facility</b>	<b>Number or Miles</b>	<b>Factor</b>	<b>Acreeage of Disturbance</b>	<b>Duration of Disturbance</b>
Off-channel Water Discharge Points		Site Specific Site Specific	0.0 0.0	
Channel Disturbance Headcut Mitigation*	0	Site Specific	0.0	
Channel Modification	0	Site Specific	0.0	
Improved Roads No Corridor With Corridor	0.0	40' Width or Site Specific	0.0	Long Term
2-Track Roads No Corridor With Corridor	0.34 3.04	14' Width 40' Width	0.58 14.74	Long Term
Pipelines No Corridor	0.23	25' Width	0.71	Short Term
Buried Power Cable No Corridor	0	20' Width	0.0	Short Term
Overhead Powerlines	0	30' Width	0.0	Long Term

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

The topography, ecology and soils in this area are diverse. There are many areas which will be reclaimed by traditional methods, reducing the overall impact of the project. However, some areas will be challenging for reclamation due to soil properties and/or site characteristics. The operator planned their project to avoid those areas where possible; however, the proposed action will affect some areas of soils with a limited potential for successful reclamation. Disturbances within these areas require the programmatic/standard COA's be complimented with a site specific performance based reclamation related COA.

Direct and indirect soil effects resulting from well site layouts, access roads, pipelines, and other activities include: mixing of soil horizons, loss of soil vegetative cover, organic matter and productivity, increased susceptibility of the soil to erosion, soil compaction, and modification of hillslope hydrology and. Soil productivity would be eliminated along improved roads and severely restricted along two track trails until successful final reclamation is achieved.

Soil horizon mixing may result where construction of roads, pipelines or other activities occur. Mixing of horizons may result in moving organic matter and nutrients at depths out of reach of surface plants or destroyed. Horizon mixing may bring soil texture and structure to the surface that are more susceptible to wind and water erosion. If soil structure is destroyed, surface infiltration by water and air may be affected. Inorganic compounds, such as carbonates and other salts, or unweathered material may be brought to the surface which effect seed germination, plant health and viability.

Soil erosion would affect soil health and productivity. Erosion rates are site specific and are dependent on soil, climate, topography, and cover. Expedient reclamation of disturbed land with salvaged topsoil,

proper seedbed preparation techniques, and appropriate seed mixes, along with use of erosion control measures would help ensure soil productivity and stability will be regained in the shortest time frame.

Soil compaction by vehicle traffic results in the collapse of soil pores reducing the transmissivity of water and air. Compaction decreases infiltration thus increasing runoff and hazard of water erosion. The potential for compaction is greatest when soils are wet. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction in these areas may be reduced by remedial action such as plowing or ripping.

Soil disturbances other than permanent facilities would be short term, and impacts would be mitigated with expedient, successful interim reclamation and site stabilization. Construction activities would be designed following Best Management Practices (BMPs) to control erosion and sedimentation; erosion control measures would be maintained and continued until adequate vegetation cover is re-established; vegetation would be removed only when necessary and reseeded following the BLM seeding policy.

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

#### **4.1.1. Wetland/Riparian**

The original proposal for the water management strategy for this project included discharge to an impoundment located in the Spring Creek channel. This water discharge point and upgrade to the dam structure of the 43-30-5572 impoundment was subsequently withdrawn. However, in the future, CBNG produced water from the 13-30-5572 impoundment may be allowed to discharge to the ephemeral channel below that impoundment, based on a WYPDES permit change. This water may impact the existing detention dam on Spring Creek. Historically, according to the adjacent landowner, this impoundment is dry for most of the summer. The contribution of perennial water from CBNG water discharge up stream may change that. There is presently an abundance of hydric vegetation in the pool area of the impoundment, which may be affected by continuous water contact. The operator will be required to notify the BLM and prepare a monitoring plan for the impoundment which addresses ground and surface water quality as well as existing vegetation and waterfowl activity.

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

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

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

1. Control Methods, including frequency, such as mowing, tillage, and herbicide applications.
2. Preventive practices including sanitary procedures for equipment, identification and delineation of new weed infestations, and the use of certified weed-free seed for revegetation projects.
3. Education and awareness programs for field employees and contractors through county weed districts, state and federal agencies and educational institutions.

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

time. Pricklypear cactus (*Opuntia polyacant*) is a native species and found throughout native rangelands. A control program for this species is not recommended.

The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, water management infrastructure, produced water discharge points and related facilities would present opportunities for weed invasion and spread. Produced CBNG water would likely continue to modify existing soil moisture and soil chemistry regimes in the areas of water release and storage. The activities related to the performance of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants such as salt cedar, Canada thistle and perennial pepperweed. However, mitigation as required by BLM applied COAs will reduce potential impacts from noxious weeds and invasive plants.

#### **4.1.3. 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 may occur to soils and vegetation as a result of discharged produced CBNG water. The cumulative effects on vegetation and soils are within the analysis parameters and impacts described in the PRB FEIS for the following reasons:

- They are proportional to the actual amount of cumulatively produced water in the Little Powder River drainage, which is approximately 43.2% 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 Spring Creek.
- The WMP for the Horse Creek North POD proposes that produced water will not contribute significantly to flows downstream.

No additional mitigation measures are required.

## **4.2. Wildlife**

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

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

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**

Produced water is to be discharged to an impoundment in the NWSE Sec 30 T55N R72W. If this impoundment were to discharge, it is unlikely produced water would reach a fish-bearing stream. Downstream species should not be affected.

##### **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, pipelines and reservoirs. Prompt revegetation 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).

Density of breeding Brewer’s sparrows declined by 36% within 100 m of dirt roads within a natural gas field. Effects occurred along roads with light traffic volume (<12 vehicles per day). Findings suggest that indirect habitat losses from energy development may be substantially larger than direct habitat losses (Ingelfinger 2004).

Density of breeding sage sparrows was reduced by 57% within a 100-m buffer of dirt roads regardless of traffic volume. The density of roads constructed in natural gas fields exacerbated the problem and the area of impact was substantial (Ingelfinger 2004).

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.

Existing and newly constructed reservoirs may have either a positive or negative affect on waterfowl. The reservoirs may provide winter forage and nesting habitat for migrating waterfowl and shore birds. Concentrations of salts and metals, particularly barium and selenium, may increase in the containment reservoirs receiving coalbed natural gas produced water discharges, as water evaporates overtime. Direct effects (toxicity) to waterfowl could occur, depending on the quality of the produced water. Additional direct and indirect effects to migratory birds are discussed in the PRB FEIS (4-226-235).

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

**Table 4.2. Wells within close proximity to documented raptor nests within the Horse Creek North project area** (Timing limitations will apply to these wells).

<b>BLM ID#</b>	<b>UTM (NAD 83)</b>	<b>SPECIES</b>	<b>STATUS</b>	<b>WELL / PIT NUMBER</b>	<b>DISTANCE</b>
New	455138E 4954547	Golden eagle	active	21-19	0.25 miles

One raptor nest site was identified by Arcadis on the northern boundary of the project area; the nest was found in 2007 and was active. The active golden eagle nest is located in SW Section 18 and is within 0.15 miles from the proposed 21-19 well. The nest is out of line of sight. However, the access road is in direct line of sight to the nest for approximately a half mile. The well was relocated so that it is 0.25 miles from the nest. The access road has been rerouted to come in from the east. Both the new well site and the access road are out of line of sight.

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.

#### **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 PRB FEIS, Volume 2, Chapter 4, page 4-221. No additional mitigation measures are required.

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

Within the BLM Buffalo Field Office there are three species that are Threatened or Endangered under the Endangered Species Act. Potential project effects on Threatened and Endangered Species were analyzed in a Biological Assessment and a summary is provided 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.**

<b>Common Name (scientific name)</b>	<b>Habitat</b>	<b>Presence</b>	<b>Project Effects</b>	<b>Rationale</b>
<b>Endangered</b>				
Black-footed ferret ( <i>Mustela nigripes</i> )	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	NE	Suitable habitat not present.
<b>Threatened</b>				
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Mature forest cover often within one mile of large water body.	S	LAA	Project includes overhead power and roads.
Ute ladies'-tresses orchid ( <i>Spiranthes diluvialis</i> )	Riparian areas with permanent water	NP	NE	No suitable habitat 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.
- Effect Determinations

**Listed Species**

- 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**

No black-tailed prairie dogs occur within or near the project area. No black-footed ferret habitat exists within the project area. Implementation of the proposed development should have “*no effect*” on the black-footed ferret.

#### **4.2.5.1.2. Bald eagle**

Suitable habitat exists for roosting and nesting bald eagles. With a well established wetland within the project area and other existing reservoirs surrounding the project area, there is the potential for waterfowl to use the area on a regular basis and provide a food source for bald eagles. No bald eagle nests or roost sites have been documented within the project area.

There are 6.5 miles of existing overhead three-phase and single phase distribution lines within and adjacent to the project area. The wire spacing is likely in compliance with the Avian Power Line Interaction Committee’s (1996) suggested practices and with the Service’s standards (USFWS 2002); however other features may not be in compliance. No overhead power is being proposed for the Horse Creek North project area. Collins road is an improved road that runs adjacent to the project area and is a major road into the region.

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. Twenty-two raptors including 16 golden eagles were electrocuted within Wyoming’s Powder River Basin in 2003; 12 electrocutions were on recently constructed lines which did not fully meet APLIC standards (Rogers pers. Comm.). 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.

Roads present a collision hazard, primarily from bald eagles scavenging on carcasses resulting from other road related wildlife mortalities. Collision risk increases with automobile travel speed. Typically two-tracks and improved project roads pose minimal collision risk. In one year of monitoring road-side carcasses the BLM Buffalo Field Office reported 439 carcasses, 226 along Interstates (51%), 193 along paved highways (44%), 19 along gravel county roads (4%), and 1 along an improved CBNG road (<1%) (Bills 2004). No road-killed eagles were reported; eagles (bald and golden) were observed feeding on 16 of the reported road-side carcasses (<4%). With considerable coalbed natural gas development already occurring in the region, there is already heavy truck traffic using the county road (Collins Road). The posted speed limit for the road is 45 miles per hour. Vehicles are often observed going much faster.

Produced water will be stored in 1 existing reservoir within the project area. This reservoir may attract eagles if reliable prey is present, most likely in the form of waterfowl. The effect of the reservoirs 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). At least five species of waterfowl have been observed using the existing reservoir within the project area. Eagle use of reservoirs should be reported to determine the need for any future management.

#### **4.2.5.1.3. Ute’s Ladies Tresses Orchid**

Produced water will be stored in one existing reservoir within the project area and can be distributed to eight reservoirs within the Horse Creek Central project area. All reservoirs are full containment. One spring has been identified in the NWSW of Section 19. Suitable habitat is not present within the Horse Creek North 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 coal bed natural gas project should have “no effect” on 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	MIIH	Additional water will effect existing waterways. Prairie not mountain habitat.
Spotted frog ( <i>Ranus pretiosa</i> )	Ponds, sloughs, small streams	NP	NI	
<b>Birds</b>				
Baird’s sparrow ( <i>Ammodramus bairdii</i> )	Grasslands, weedy fields	S	MIIH	Sagebrush cover will be affected.
Brewer’s sparrow ( <i>Spizella breweri</i> )	Basin-prairie shrub	S	MIIH	
Burrowing owl ( <i>Athene cucularia</i> )	Grasslands, basin-prairie shrub	NP	NI	No prairie dog burrows present.
Ferruginous hawk ( <i>Buteo regalis</i> )	Basin-prairie shrub, grasslands, rock outcrops	S	MIIH	Grassland/shrub/Ponderosa pine habitat; drilling and construction activity may displace birds.
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	MIIH	Sagebrush cover will be affected.
Long-billed curlew ( <i>Numenius americanus</i> )	Grasslands, plains, foothills, wet meadows	NP	NI	Habitat not present.
Mountain plover ( <i>Charadrius montanus</i> )	Short-grass prairie with slopes < 5%	NP	NI	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 billineata</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Trumpeter swan ( <i>Cygnus buccinator</i> )	Lakes, ponds, rivers	S	MIIH	Reservoirs may provide migratory habitat.
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	Prairie dog towns will be affected.
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	NP	NI	Habitat not present.
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. Black-tailed prairie dog**

There are no blacked-tailed prairie dog colonies within or adjacent to the Horse Creek North project area.

#### **4.2.5.2.2. Greater sage-grouse**

Suitable sage-grouse habitat is present throughout the Horse Creek North project area. The Squaw Creek lek is 1.8 miles from the project area.

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

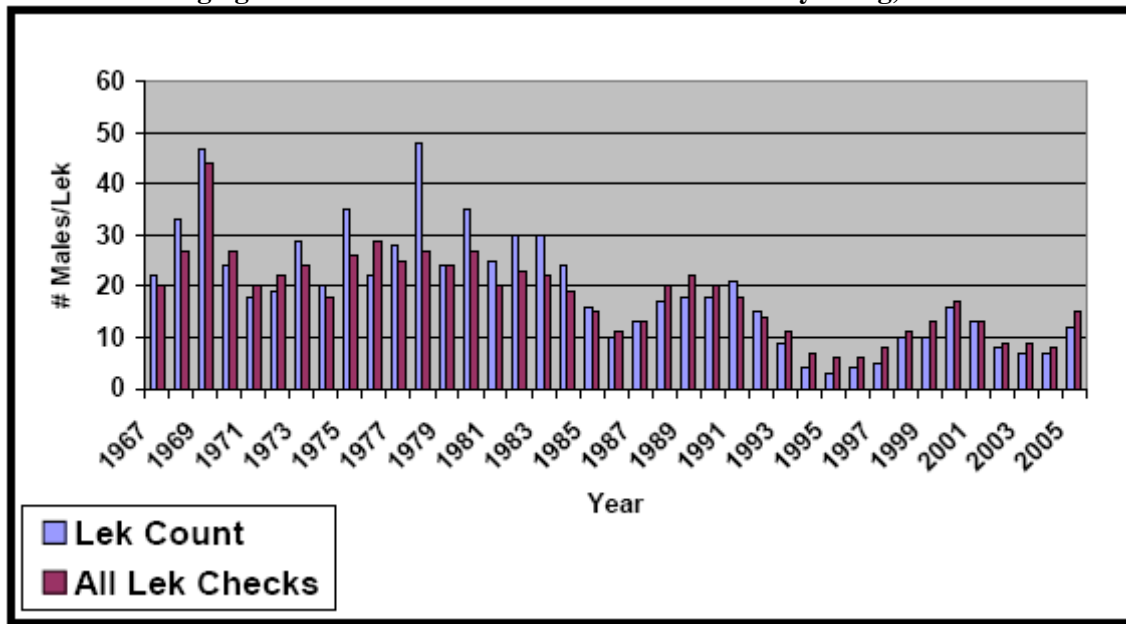
dominant shrub species (Moynahan et al. In press).

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 4.1) (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).

**4.2.5.2.3. Mountain plover**

Mineral development may have mixed effects on mountain plovers. Disturbed ground such as buried pipe line corridors and roads may be attractive to plovers while human activities within one-quarter mile may be disruptive. Use of roads and pipe line corridors by mountain plovers may increase their vulnerability to vehicle collision. The existing overhead power lines provide perch sites for raptors potentially

resulting in increased mountain plover predation. CBNG infrastructure such as the well houses, roads, pipe line corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes. An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

Currently the Horse Creek North project area is unsuitable mountain plover habitat. Many factors could alter the environment making the project area suitable for mountain plovers, such as a change in grazing practices and the area becomes heavily grazed in the flats, fire, development and prairie dogs moving into the 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 Direct and Indirect Effects**

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

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.

#### **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 Little 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 reduce project area and downstream potential impacts from proposed water management strategies.

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 8.0 gpm per well or 64 gpm (0.14 cfs or 103.2 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 Little Powder River drainage, the projected volume produced within the watershed area was 18,607 acre-feet in 2007 (maximum production was estimated in 2005 at 22,427 acre-feet). As such, the volume of water resulting from the production of these wells is 0.6% of the total volume projected for 2007. This volume of produced water is within the predicted parameters of the PRB FEIS.

#### **4.4.1. Groundwater**

The PRB FEIS predicts an infiltration rate of 34% to groundwater aquifers and coal zones in the Little Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 21.8 gpm will infiltrate at or near the discharge points and impoundments (35.1 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 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 3 to 1125 feet compared to 485 feet to the Wall coal zone. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

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

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

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

As part of the WYPDES Permit application, the operator drilled a shallow groundwater investigation well at the 43-30-5572 location. Groundwater was encountered at 17 feet and total depth of the well was 92 feet. The results of the sample analysis, as listed in Section 3.5.1 classify the groundwater at this location as Class IV, which would not be suitable for livestock or agriculture use. The addition of CBNG water to this impoundment should not have a negative impact on groundwater quality.

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 CBNG through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS page 4-65). This volume of water “...cumulatively represents 0.5 percent of the recoverable groundwater stored in the Wasatch – Tongue River sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed during reasonably foreseeable 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 limits for TDS, SAR and EC detailed in the WDEQ’s WYPDES permit, the levels found in the POD’s representative water sample, an example of ambient surface water quality and ambient shallow groundwater quality.

**Table 4.5 Comparison of Regulated Water Quality Parameters to Predicted Water Quality**

<b>Predicted Values</b>	<b>TDS, mg/l</b>	<b>SAR</b>	<b>EC, µmhos/cm</b>
Little Powder River Watershed above Dry Creek near Weston, WY Gauging station			
Historic Data Average at Maximum Flow		4.44	1,785
Historic Data Average at Minimum Flow		6.94	3,300

<b>Predicted Values</b>	<b>TDS, mg/l</b>	<b>SAR</b>	<b>EC, µmhos/cm</b>
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirement for WYPDES Permit # WY0052493			
At discharge point	5,000	NA	7,500
At Irrigation Compliance point (NESE Sec 32 T55N R72W)	NA	11	2,000
Predicted Produced Water Quality			
Wall Coal Zone	729	9.4	1,180
Existing Surface Water Quality			
NESE Sec 30 T55N R72W	692	1.0	916
Existing Shallow Groundwater Quality			
NESE Sec 30 T55N R72W	7,520	4.4	7,580

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 729 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM. The CBNG produced water quality is similar to the water quality sample taken from the pool area of the 43-30-5572 impoundment 04-13-07.

The quality for the water produced from the Wall 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 8.0 gallons per minute (gpm) is projected is to be produced from these 8 wells, for a total of 64 gpm for the POD. See Table 4.5 .

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

There is one existing discharge points proposed for this project. It has been appropriately sited and has been installed using appropriate water erosion dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

To manage the produced water, 1 existing impoundment will be used within the project area. This impoundment was included in the Horse Creek Central POD and was analyzed in the Environmental Analysis (EA) #WY-070-06-092 which was approved 06-09-06.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 9.6 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 2005 at a total contribution to the mainstem of the Little Powder River of 13 cfs (PRB FEIS pg 4-109). The predicted maximum discharge rate from these 8 wells is anticipated to be a total of 64 gpm or 0.14 cfs to this impoundment. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) the produced water potentially impacting Spring Creek from this action may add a maximum 0.12 cfs to the Little Powder River flows, or 0.9% of the predicted total CBNG produced water contribution. The confluence of Horse Creek with the Little Powder River is over 12 stream miles from the discharge point located in the SWSW Sec 30 T55N R72W. 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 for the discharge of water produced from this project from the WDEQ (WY0052493).

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

Total Petroleum Hydrocarbons	10 mg/l max
pH	6.5 to 8.5
TDS	5000 mg/l max
Specific Conductance	7500 mg/l max
Sulfates	3000 mg/l max
Dissolved iron	1000 µg/l max
Dissolved manganese	720 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	3.6 µg/l max
Total Flow	0.62 Million Gallons/Day

The WYPDES permit also addresses existing downstream concerns, such as irrigation use, in the COA for the permit. The designated points of compliance (ICP) identified for this permit are on Spring Creek at NWSE Sec 32 T55N R72W and on Horse Creek in NESE Sec 6 T55N R72W. The water quality criteria mandated in the permit are protective of agricultural use. For these ICPs, the water quality parameter limits are listed in Table 4.5 above. When flow is present, the operator will also be required to sample for flow volume, calcium, magnesium, sodium, bicarbonate, sodium adsorption ratio and specific conductance (WPDES Permit –SB page3).

In addition, there are water quality monitoring stations on Horse Creek and on the Little Powder River upstream and downstream of the Horse Creek confluence. When flow is present, the operator will be required to monitor volumes and water quality. The WPDES permit may be changed as a result of this monitoring.

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.

In-channel downstream impacts are addressed in the WMP for the Horse Creek North POD prepared by ARCADIS for Windsor Energy Group. Several adjudicated irrigation water rights exist on the downstream reaches of Horse Creek. Windsor has committed to avoid or mitigate potential impact through appropriate means, including controlling stream flows to keep CBNG produced water from flooding the irrigated lands, unless diluted with runoff water from storm events. For more information, refer to the POD WMP.

#### 4.4.2.1. Surface Water Cumulative Effects

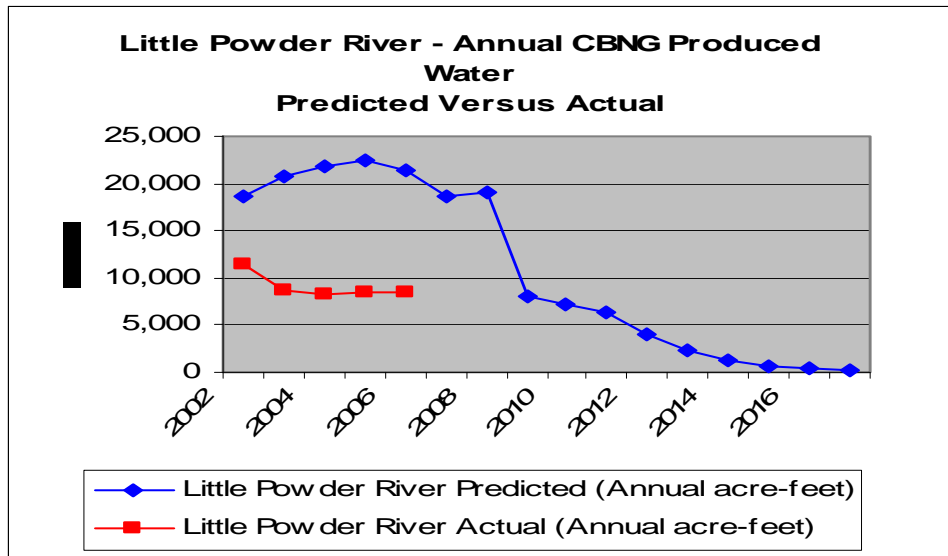
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Little Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2006, all producing CBNG wells in the Little Powder River watershed have discharged a cumulative volume of 45,336 acre-ft of water compared to the predicted 105,024 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 43.2% of the total predicted produced water analyzed in the PRB FEIS for the Little Powder River watershed.

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

Year	Little Powder River Predicted (Annual acre-feet)	Little Powder River Predicted (Cumulative acre-feet from 2002)	Little Powder River Actual (Annual acre-feet)		Little Powder River Actual (Cumulative acre-feet from 2002)	
			Actual Ac-ft	% of Predicted	Cum Ac-ft	% of Predicted
2002	18,613	18,613	11,391	61.2	11,391	61.2
2003	20,822	39,435	8,767	42.1	20,158	51.1
2004	21,832	61,267	8,266	37.9	28,424	46.4
2005	22,427	83,694	8,529	38.0	36,953	44.2
2006	21,330	105,024	8,383	39.3	45,336	43.2
2007	18,607	123,631				
2008	19,121	142,752				
2009	8,016	150,768				
2010	7,124	157,892				
2011	6,439	164,331				
2012	3,930	168,261				
2013	2,340	170,601				
2014	1,335	171,936				
2015	699	172,635				
2016	350	172,985				
2017	133	173,118				
<b>Total</b>	<b>173,118</b>		<b>45,336</b>			

**Figure 4.2 Actual vs predicted water production in the Little Powder River watershed**



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

The PRB FEIS states, “Cumulative effects to the suitability for irrigation of the Powder River would be minimized through the interim Memorandum of Cooperation (MOC) that the Montana and Wyoming DEQ’s (Departments of Environmental Quality) have signed. This MOC was developed to ensure that designated uses downstream in Montana would be protected while CBM development in both states continued. As the two states develop a better understanding of the effects of CBM discharges through the enhanced monitoring required by the MOC, they can adjust the permitting approaches to allow more or less discharges to the Powder River drainage. Thus, through the implementation of in-stream monitoring and adaptive management, water quality standards and interstate agreements can be met.” (PRB FEIS page 4-117)

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

1. They are proportional to the actual amount of cumulatively produced water in the Little Powder River drainage, which is approximately 43.2% 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 Little Powder River watershed and page 117 for cumulative effects common to all sub-watersheds.

#### 4.5. Cultural Resources

The Bureau has identified the portion of the access and utility corridor between the 12-19 well and the 14-19 well in T 55N R 72W Section 19 W1/2SW that is in the alluvial terrace of Spring Creek between these two wells as containing the potential for buried cultural deposits. A monitoring COA is attached to this area. Construction monitoring is performed by a qualified archeologist working in unison with construction crews. If buried cultural resources are located by the archeologist, construction is to be halted and the BLM will consult with the State Historic Preservation Office (SHPO) for mitigation or avoidance.

Non-eligible sites 48CA6372, 48CA6373, and 48CA6375 are likely to be impacted by the proposed project. No mitigation is being required as the sites are non-eligible for national register consideration.

According to the Wyoming State Protocol Section VI (A)(1) the Bureau of Land Management notified the Wyoming State Historic Preservation Officer (SHPO) that it was determined that no eligible historic properties exist within the Area of Potential effect (APE) in the proposed project area.

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
Rick Highfield	Contractor/Production Foreman	Windsor Energy Group, LLC.	Yes
Will Parks	Surface Owner	Paulette Parks Trust	Yes
Brad Rogers	Wildlife Biologist	US Fish & Wildlife Service	Yes
Alan Schultz	Resource Manager	Windsor Energy Group, LLC.	Yes
Ben Shoup	Consultant	Arcadis U.S. Inc	Yes
Eric Smith	Ranch Hand/Surface	Paulette Parks Trust	Yes
Claude Voyles	Surface Owner	Rep. Mary Jane Harris	Yes
Mary Hopkins	Interim Wyoming 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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