FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Yates Petroleum
Bridger II POD
ENVIRONMENTAL ASSESSMENT –WY-070-08-057

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Yates Petroleum's Bridger II POD Coal Bed Natural Gas (CBNG) POD comprised of the following 6 Applications for Permit to Drill (APDs):

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	BRIDGER II BRIDGER CS	7*	NENE	24	53N	73W	WYW130064
2	BRIDGER II BRIDGER CS	8	NENW	24	53N	73W	WYW130064
3	BRIDGER II BRIDGER CS	9	SWNW	24	53N	73W	WYW130064
4	BRIDGER II BRIDGER CS	10	SWNE	24	53N	73W	WYW130064
5	BRIDGER II BRIDGER CS	11	NESE	24	53N	73W	WYW130064
6	BRIDGER II BRIDGER CS	12	SWSE	24	53N	73W	WYW130064

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

IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
LYNDE	NESE	24	53	73	18.9	5.1	WYW130064
LYNDE #1 ENLARGEMENT	SWNE	25	53	73	19.9	3.0	FEE

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
Yates Petroleum
Bridger II POD
PLAN OF DEVELOPMENT
WY-070-08-057

INTRODUCTION

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the Powder River Basin Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS), #WY-070-02-065 (approved April 30, 2003), pursuant to 40 CFR 1508.28 and 1502.21. This document is available for review at the Buffalo Field Office. This project EA addresses site-specific resources and impacts that were not covered within the PRB FEIS.

1. PURPOSE AND NEED

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

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

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

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Alternative A - No Action

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

2.2. Alternative B Proposed Action

Proposed Action Title/Type: Yates Petroleum's Bridger II Plan of Development (POD) for 6 coal bed natural gas well APDs and associated infrastructure.

Proposed Well Information: There are 6 wells proposed within this POD, the wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location. Each well will produce from the Upper and Lower Canyon coal seams. Proposed well house dimensions are 6 ft wide x 10 ft length x 6 ft height. Well house color ix Covert Green (18-0617 TPX), selected to blend with the surrounding vegetation. Wells are located as follows:

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	BRIDGER II BRIDGER CS	7	NENE	24	53N	73W	WYW130064
2	BRIDGER II BRIDGER CS	8	NENW	24	53N	73W	WYW130064
3	BRIDGER II BRIDGER CS	9	SWNW	24	53N	73W	WYW130064
4	BRIDGER II BRIDGER CS	10	SWNE	24	53N	73W	WYW130064
5	BRIDGER II BRIDGER CS	11	NESE	24	53N	73W	WYW130064
6	BRIDGER II BRIDGER CS	12	SWSE	24	53N	73W	WYW130064

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Sect	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	LYNDE	NESE	24	53	73	18.9	5.1	WYW130064
2	LYNDE #1 ENLARGEMENT	SWNE	25	53	73	19.9	3.0	FEE

County: Campbell

Applicant: Yates Petroleum

Surface Owners: Joy L. and Dean Hall Trust, Mary L. Keeney, Richard M. and Judy K. Lynde

Project Description:
The proposed action involves the following:

- Drilling of 6 total federal CBNG wells in the Lower Canyon and Upper Canyon coal zones to depths of approximately 150 to 390 feet. Multiple seams will be produced by co-mingling production (a single well per location cable of producing from multiple coal seams).

- 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.

- Well metering shall be accomplished by telemetry and well visitation. Metering would entail 4 visits per month to each well.

- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 2 discharge points and 2 stock water reservoirs within the Little Powder River watershed. Water would be stored until a release could be coordinated among all operators with CBNG storage reservoirs in the Wildcat Creek drainage (according to the conditions outlined in Appendix A, "Water Administration Plan" for WYPDES permit # WY0055808). The Lynde reservoir in section 24 will only be permitted to discharge water according to the requirements set forth in its applicable WYPDES permit. Seepage and continuous discharge of water produced as a result of this or any federal action will not be permitted.

- An unimproved and improved road network. About a 1.5 mile section of a county road (Collins

Road) transects the POD.

- An above ground power line network to be constructed by Powder River Energy Corporation. The proposed power will follow the west side of a county road (Collins Road).
  The proposed route has been reviewed by the contractor. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction has not been scheduled and may not be completed before the CBNG wells are producing. If the power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the power drops or in other approved disturbance locations. The operator could not identify how many generators would be used.

- A storage tank of 1000 gallon capacity shall be located with each diesel generator. The operator could not identify how many generators would be used. Fuel deliveries are anticipated to be every 10 days. The operator could not provide the decibel level of the generators.

- A compressor constructed by a third party.

- A buried gas, water and power line network, and one existing compression facility.

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

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

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

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

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

2.3. Alternative C – Environmentally Preferred

Alternative C represents a modification of Alternative B based on the operator and BLM working cooperatively to reduce environmental impacts. The description of Alternative C is the same as Alternative B with the addition of the project modifications identified by BLM and the operator following the initial project proposal (Alternative B). At the on-sites, all areas of proposed surface disturbance were inspected to insure that the project would meet BLM multiple use objectives to conserve natural resources while allowing for the extraction of Federal minerals. In some cases, access roads may have been re-

routed and well locations, pipelines, discharge points and other water management control structures may have been 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 Bridger II POD are listed below under 2.3.1:

2.3.1. Changes as a result of the on-sites

Bridger II POD, Campbell Co., T53N, R73W, Sec 24, Lease WYW130064			
Well Name	**Well #**	**Qtr**	**Well Notes**
BRIDGER CS FEDERAL	9	SWNW	Location OK. Site is on an abandoned conventional pad. West half of the access road (two-track) is on a slope and is rutted. This section of the road needs to be repaired and stabilized.
BRIDGER CS FEDERAL	11	NESE	Location OK. Due to the proximity to drainages the pits will be lined.

2.3.2. Programmatic mitigation measures identified in the PRB FEIS ROD

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

2.3.2.1. Groundwater

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

2.3.2.2. Surface Water

1. Channel Crossings:
   a) Minimize channel disturbance as much as possible by limiting pipeline and road crossings.
   b) Avoid running pipelines and access roads within floodplains or parallel to a stream channel.
   c) Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
   d) Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.
3. Concerns regarding the quality of the discharged CBNG water on downstream irrigation use may require operators to increase the amount of storage of CBNG water during the irrigation months and allow more surface discharge during the non-irrigation months.
4. The operator will supply a copy of the complete approved SW-4, SW-3, or SW-CBNG permits to

BLM as they are issued by WSEO for impoundments.

2.3.2.3. Soils

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

2.3.2.4. 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 geomorphologic configuration and properly stabilized.
6. Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

2.3.2.5. 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.

2.3.2.6. Threatened, Endangered, or Sensitive Species

2.3.2.6.1. 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.

2.3.2.7. 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.

2.3.2.8. 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.

2.3.2.9. Air Quality

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

2.3.3. Site specific mitigation measures

Surface Use

1. Due to their proximity to drainages the BRIDGER II CS Federal 8 and 11 well locations will require pit liners.
2. In areas of sensitive soils road construction will be complete, including surfacing material (if applicable) before drilling rigs, water trucks and other heavy equipment arrives at well locations (BRIDGER II CS Federal 8, 9 and 10).
3. Where access roads for the BRIDGER II CS Federal 8 and 10 cross drainages, the Operator shall construct Low Water Crossings with filter fabric beneath surfacing aggregate OR construct Culverts according to the submitted designs (Typical Culvert Placement – Attachment B or Typical Low Water Crossing – Attachment D).

4. Proposed template roads/spot upgrades with a utility corridor will have a maximum working width of 45 feet with a blading/clearing width not to exceed 35feet. If it is not possible to keep the disturbance within the above width due to conditions such as bedrock or steep topography, the Operator shall contact the AO in advance and provide the following information. The length and location of the road/utility corridor affected; how much additional width is needed beyond the width specified above and; what are the conditions (e.g. rock, steep topography, etc.) that require the additional width.

5. Proposed primitive roads with utility corridor will be allowed a maximum working width of 35 ft with a blading/clearing width not to exceed 20ft. If it is not possible to keep the disturbance within the above width due to conditions such as bedrock or steep topography, the Operator shall contact the AO in advance and provide the following information. The length and location of the road/utility corridor affected; how much additional width is needed beyond the width specified above and; what are the conditions (e.g. rock, steep topography, etc.) that require the additional width.

6. The culvert locations will be staked prior to construction. The culvert invert grade and finished road grade will be clearly indicated on the stakes. Culverts will be installed on natural ground, or on a designed flow line of a ditch. The minimum cover over culverts will be 12" or one-half the diameter whichever is greater. Drainage laterals in the form of culverts or waterbars shall be placed according to the following spacing:

Grade	Drainage Spacing
2-4%	310 ft
5-8%	260 ft
9-12%	200 ft
12-16%	150 ft

7. The proposed developments identified below are in areas with limited reclamation potential. These areas shall be stabilized in a manner which eliminates accelerated erosion until a self-perpetuating, native plant community is established on the sites in accordance with the Wyoming

Reclamation Policy. Stabilization efforts shall be finished within **30 days** of the initiation of construction activities.

Affected developments

- BRIDGER II CS Federal 7, 8, 9 and 10 and; all associated proposed road surface upgrades and utility corridors to above wells
- Lynde 1 Reservoir and 0.20 miles of water line northeast of Lynde 1 Reservoir

The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231) specifically the following:

Reclamation Standards:

C. 3 The reclaimed area shall be stable and exhibit none of the following characteristics:

a. Large rills or gullies.
b. Perceptible soil movement or head cutting in drainages.
c. Slope instability on, or adjacent to, the reclaimed area in question.

C.4. The soil surface must be stable and have adequate surface roughness to reduce runoff and capture rainfall and snow melt. Additional short-term measures, such as the application of mulch, shall be used to reduce surface soil movement.

C.5. Vegetation canopy cover (on unforested sites), production and species diversity (including shrubs) shall approximate the surrounding undisturbed area. The vegetation shall stabilize the site and support the planned post disturbance land use, provide for natural plant community succession and development, and be capable of renewing itself. This shall be demonstrated by:

a. Successful onsite establishment of species included in the planting mixture or other desirable species.
b. Evidence of vegetation reproduction, either spreading by rhizomatous species or seed production.

C.6. The reclaimed landscape shall have characteristics that approximate the visual quality of the adjacent area with regard to location, scale, shape, color and orientation of major landscape features and meet the needs of the planned post disturbance land use.

8. 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:

Shallow Loamy Ecological Site Seed Mix (Use for on the entire POD)

Species	% in Mix	Lbs PLS*
Western Wheatgrass (*Pascopyrum smithii*)	30	3.6
Bluebunch Wheatgrass (*Pseudoroegneria spicata* ssp. *spicata*)	20	2.4
Green needlegrass (*Nassella viridula*)	20	2.4
Thickspike Wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus*)	15	1.8
Prairie coneflower (*Ratibida columnifera*)	5	0.6

White or purple prairie clover (*Dalea candidum* or *purpureum*)	5	0.6
Rocky Mountain beeplant (*Cleome serrulata*)	5	0.6
Totals	**100%**	**12 lbs/acre**

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

This is a recommended seed mix based on the native plant species listed in the NRCS Ecological Site descriptions, U.W. College of Ag., and seed market availability. A site-specific inventory will allow the resource specialist to suggest the most appropriate species, percent composition, and seeding rate for reclamation purposes.

9. 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 "Supplemental Environmental Colors." The color selected for the Bridger II POD is Covert Green (18-0617 TPX).
10. Please contact Dave Skinner, Natural Resource Specialist, at (307) 684-1179, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

Wildlife

1. The following conditions will minimize impacts to raptors;
   a. No surface disturbing activity shall occur within 0.5 mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This affects the following;

Township/Range	Section	Affected Wells and Infrastructure
53/73	24	Wells: BRIDGER II CS Federal 7, 8, 9 and 10 and related proposed utility corridors/roads, truck turn around and storage areas.

   b. Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a ½ mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within ½ mile of occupied raptor nests from February 1 to July 31.
   c. Nest productivity checks shall be completed for all raptor nests within the Bridger II POD listed in the table below. The productivity checks shall be completed for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success/production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year.

BLM Nest Number	UTM X	UTM Y	Qtr, Qtr Sec., T:R	Species[2]	Substrate	2007Status	Condition[2]
4333	454298	4935476	SE SE 13, 53:73	UNK	Juniper, live	Inactive	Fair
4334	453156	4934892	NW NW 24, 53:73	UNK	Cottonwood, live	Inactive	Fair

[1]UNK = unknown raptor species.
[2]Fair = nest is not dilapidated, but needs significant repair in order to be used

d. If an undocumented raptor nest during project construction or operation, the Buffalo Field Office (307/684-1100) shall be notified within 24 hours.
e. No blanket approval for reclamation/seeding activities is permitted during wildlife timing limitations at this time.

Water Management

The enlargement of the Lynde Dam, located in the NESE portion of section 24, township 53N, range 73 west, and its associated reservoir will be subject to the following conditions:

1. An approved WYPDES permit will be submitted to the BLM's Buffalo Field Office
2. This dam and reservoir will be operated according to the WYPDES permit that is finally approved for this dam's outfall, except that discharge or seepage which creates continuous flow will not be permitted. If continuous flow caused by seepage occurs, it will be mitigated within 60 days of discovery. Mitigation plans will be submitted to BLM for review and comment. This impoundment will be non-compliant if the proposed mitigation, or approved action, is not successful, i.e. if seepage continues. Disposal of water produced as a result of any federal action will cease into the non-compliant impoundment until successful mitigation is achieved. If produced water resurfaces below the mitigation site the mitigation will be deemed unsuccessful and the impoundment will be lined or reclaimed. Additional mitigation measures may be required to aid in the restoration of the channel below the leaking impoundment to baseline range characteristics and conditions.

2.3.4. Standard Conditions of Approval

A. General

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

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

2. If paleontological resources, either large or conspicuous, and/or a significant scientific value are discovered during construction, the find will be reported to the Authorized Officer immediately. Construction will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five (5) working days, weather permitting, to determine the appropriate action(s) to

prevent the potential loss of any significant paleontological values. Operations within 250 feet of such a discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The applicant will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant scientific interest discovered during the operation.

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

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

5. By November 1 each year, companies will provide georeferenced spatial data depicting as-built locations of all facilities, wells, roads, pipelines, power lines, reservoirs, discharge points, and other related facilities to the BLM for all PODs where construction and development have been completed.

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

7. Wildlife species are dynamic and new individuals may have moved into the Bridger II POD area after the initial wildlife surveys were completed. The Record of Decision for the PRB FEIS includes a programmatic mitigation measure that states, "The companies will conduct clearance surveys for threatened and endangered or other special-concern species at the optimum time". The measure requires companies to coordinate with the BLM before November 1 annually to review the potential for disturbance and to agree on inventory parameters. Should this project not be completed by January 15, and surface disturbance is planned for that year, a Yates Petroleum Corporation company representative will coordinate with the BLM to discuss required surveys.

8. All other conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (WY07F0075) shall be complied with.

9. 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.

10. All contractors will have a copy of the pod map and conditions of approval with them at all times.

B. Construction

1. A pre-construction field meeting shall be conducted prior to beginning any dirt work approved under this POD. The operator shall contact the BLM Authorized Officer David

Skinner @ 307-684-1179 at least 4-days prior to beginning operations so that the meeting can be scheduled. The operator is responsible for having all contractors present (dirt contractors, drilling contractor, pipeline contractor, project oversight personnel, etc.) including the overall field operations superintendent, and for providing all contractors copies of the approved POD, project map and BLM Conditions of Approval pertinent to the work that each will be doing.

2. The operator will limit vegetation removal and the degree of surface disturbance wherever possible. Where surface disturbance cannot be avoided, all practicable measures will be utilized to minimize erosion and stabilize disturbed soils.
3. Construction and drilling activity will not be conducted using frozen or saturated soil material during periods when watershed damage or excessive rutting is likely to occur.
4. Remove all available topsoil (depths vary from 4 inches on ridges to 12+ inches in bottoms) from constructed well locations including areas of cut and fill, and stockpile at the site. Topsoil will also be salvaged for use in reclamation on all other areas of surface disturbance (roads, pipelines, etc.). Clearly segregate topsoil from excess spoil material. Any topsoil stockpiled for one year or longer will be signed and stabilized with annual ryegrass or other suitable cover crop.
5. The operator will not push soil material and overburden over side slopes or into drainages. All soil material disturbed will be placed in an area where it can be retrieved without creating additional undue surface disturbance and where it does not impede watershed and drainage flows.
6. Construct the backslope no steeper than 1½:1, and construct the foreslope no steeper than 2:1, unless otherwise directed by the BLM Authorized Officer.
7. Maintain a minimum 20-foot undisturbed vegetative border between toe-of-fill of pad and/or pit areas and the edge of adjacent drainages, unless otherwise directed by the BLM Authorized Officer.
8. With the overall objective of minimizing surface disturbance and retaining land stability and productivity, the operator shall utilize equipment that is appropriate to the scope and scale of work being done for roads and well pads (utilize equipment no larger than needed for the job).
9. To minimize electrocution potential to raptors, all overhead electrical power lines will be constructed to Avian Power Line Interaction Committee (1996) standards and additional standards identified in the PRB FEIS Biological Opinion (Volume 3, Appendix K, page 43).
10. The operator shall utilize wheel trenchers or ditchers to construct all pipeline trenches, except where extreme topography or other environmental factors preclude their use.
11. Reserve pits will be adequately fenced during and after drilling operations until pit is reclaimed so as to effectively keep out wildlife and livestock. Adequate fencing, in lieu of more stringent requirements by the surface owner, is defined as follows:

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

Plastic snow fencing must be taut and sturdy. Fence must be at least 2-feet from edge of pit. 3 sides fenced before beginning drilling, the fourth side fenced immediately upon completion of drilling and prior to rig release. Fence must be left up and maintained in adequate condition until pit is closed.

12. The reserve pit will be oriented to prevent collection of surface runoff. After the drilling rig is removed, the operator may need to construct a trench on the uphill side of the reserve pit to divert surface drainage around it. If constructed, the trench will be left intact until the pit is closed.
13. The reserve pit will be lined with an impermeable liner if permeable subsurface material is encountered. An impermeable liner is any liner having a permeability less than 10^{-7} cm/sec. The liner will be installed so that it will not leak and will be chemically compatible with all substances that may be put in the pit. Liners made of any man-made synthetic material will be of sufficient strength and thickness to withstand normal installation and pit use. In gravelly or rocky soils, a suitable bedding material such as sand will be used prior to installing the liner.
14. The reserve pit will be constructed so that at least half of its total volume is in solid cut material (below natural ground level).
15. Culverts will be placed on channel bottoms on firm, uniform beds, which have been shaped to accept them, and aligned parallel to the channel to minimize erosion. Backfill will be thoroughly compacted.
16. The minimum diameter for culverts will be 18 inches. However, all culverts will be appropriately sized in accordance with standards in BLM Manual 9113.
17. Construction and other project-related traffic will be restricted to approved routes. Cross-country vehicle travel will not be allowed.
18. Maximum design speed on all operator-constructed and maintained roads will not exceed 25 miles per hour.
19. Pipeline construction shall not block nor change the natural course of any drainage. Pipelines shall cross perpendicular to drainages. Pipelines shall not be run parallel in drainage bottoms. Suspended pipelines shall provide adequate clearance for maximum runoff.
20. Pipeline trenches shall be compacted during backfilling. Pipeline trenches shall be routinely inspected and maintained to ensure proper settling, stabilization and reclamation.
21. During construction, emissions of particulate matter from well pad and road construction would be minimized by application of water or other non-saline dust suppressants with at least 50 percent control efficiency. Dust inhibitors (surfacing materials, non-saline dust suppressants, and water) will be used as necessary on unpaved roads that present a fugitive dust problem. The use of chemical dust suppressants on public surface will require prior approval from the BLM Authorized Officer.
22. Operators are required to obtain a National Pollution Discharge Elimination System (NPDES) Storm Water Permit from the Wyoming DEQ for any projects that disturb five or more acres (changing to one acre in March 2005). This general construction storm water permit must be obtained from WDEQ prior to any surface disturbing activities and can be obtained by following directions on the WDEQ website at http://deq.state.wy.us. Further information can be obtained by contacting Barb Sahl at (307) 777-7570.
23. The operator shall submit a Sundry Notice (Form 3160-5) to BLM for approval prior to construction of any new surface disturbing activities that are not specifically addressed in the

approved APD or POD Surface Use Plan.

24. Weed educational material will be reviewed with operators during pre-construction on-site meetings with operators, subcontractors, and landowners and will also be attached to approved APDs and PODs.
25. Companies will contact the counties to pursue development of maintenance agreements to ensure county roads are adequately maintained for the projected increase in use.

C. Operations/Maintenance

1. The operator shall complete coal bed natural gas wells (case, cement and under ream) as soon as possible, but no later than 30 days after drilling operations, unless an extension is given by the BLM Authorized Officer.
2. If in the process of air drilling the wells there is a need to utilize mud, all circulating fluids will be contained either in an approved pit or in an aboveground containment tank. The pit or containment tank will be large enough to safely contain the capacity of all expected fluids without danger of overflow. Fluid and cuttings will not be squeezed out of the pit, and the pit will be reclaimed in an expedient manner.
3. Confine all equipment and vehicles to the access road(s), pad(s), and area(s) specified in the approved APD or POD.
4. All waste, other than human waste and drilling fluids, will be contained in a portable trash cage. This waste will be transported to a State approved waste disposal site immediately upon completion of drilling operations. No trash or empty barrels will be placed in the reserve pit or buried on location. All state and local laws and regulations pertaining to disposal of human and solid waste will be complied with.
5. Rat and mouse holes shall be filled and compacted from the bottom to the top immediately upon release of the drilling rig from the location.
6. The operator will be responsible for prevention and control of noxious weeds and weeds of concern on all areas of surface disturbance associated with this project (well locations, roads, water management facilities, etc.) Use of pesticides shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of Interior. Prior to the use of pesticides on public land, the holder shall obtain from the BLM authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer to such use.
7. Sewage shall be placed in a self-contained, chemically treated porta-potty on location.
8. The operator and their contractors shall ensure that all use, production, storage, transport and disposal of hazardous and extremely hazardous materials associated with the drilling, completion and production of these wells will be in accordance with all applicable existing or hereafter promulgated federal, state and local government rules, regulations and guidelines. All project-related activities involving hazardous materials will be conducted in a manner to minimize potential environmental impacts. In accordance with OSHA requirements, a file will be maintained onsite containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds and/or substances which are used in the course of construction, drilling, completion and production operations.
9. Produced fluids shall be put in test tanks on location during completion work. Produced water will be put in the reserve pit during completion work per Onshore Order #7.

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

    – drilling muds & cuttings
    – rigwash
    – excess cement and certain completion & stimulation fluids defined by EPA as exempt

    It does not include drilling rig waste, such as:

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

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

11. Reserve pits will be closed as soon as possible, but no later than 90 days from time of drilling/well completion, unless the BLM Authorized Officer gives an extension. Squeezing of pit fluids and cuttings is prohibited. Pits must be dry of fluids or they must be removed via vac-truck or other environmentally acceptable method prior to backfilling, re-contouring and replacement of topsoil. Mud and cuttings left in pit must be buried at least 3-feet below re-contoured grade. The operator will be responsible for re-contouring any subsidence areas that develop from closing a pit before it is sufficiently dry.
12. Operators are advised that prior to installation of any oil and gas well production equipment which has the potential to emit air contaminants, the owner or operator of the equipment must notify the Wyoming Department of Environmental Quality, Air Quality Division (phone 307-777-7391) to determine permit requirements. Examples of pertinent well production equipment include fuel-fired equipment (e.g., diesel generators), separators, storage tanks, engines and dehydrators.
13. If this well is drilled during the fire season (June-October), the operator shall institute all necessary precautions to ensure that fire hazard is minimized, including but not limited to mowing vegetation on the access route(s) and well location(s), keeping fire fighting equipment readily available when drilling, etc.

D. Dry Hole/Reclamation

1. All disturbed lands associated with this project, including the pipelines, access roads, water management facilities, etc will be expediently reclaimed and reseeded in accordance with the surface use plan and any pertinent site-specific COAs.
2. Disturbed lands will be re-contoured back to conform with existing undisturbed topography. No depressions will be left that trap water or form ponds.
3. The fluids and mud must be dry in the reserve pit before re-contouring pit area. The operator will be responsible for re-contouring of any subsidence areas that develop from closing a pit before it is completely dry. The plastic pit liner (if any) will be cut off below grade and properly disposed of at a state authorized landfill before beginning to re-contour the site.
4. Before the location has been reshaped and prior to redistributing the topsoil, the operator will rip or scarify the drilling platform and access road on the contour, to a depth of at least 12

5. Distribute the topsoil evenly over the entire location and other disturbed areas. Prepare the seedbed by disking to a depth of 4-to-6 inches following the contour.
6. Phased reclamation plans will be submitted to BLM for approval prior to individual POD facility abandonment via a Notice of Intent (NOI) Sundry Notice. Individual facilities, such as well locations, pipelines, discharge points, impoundments, etc. need to be addressed in these plans as they are no longer needed. Individual items that will need to be addressed in reclamation plans include:
    - Pit closure (Close ASAP after suitably dry, but no later than 90 days from time of drilling unless an extension is given by BLM Authorized Officer.) BLM may require closure prior to 90 days in some cases due to land use or environmental concerns.
    - Configuration of reshaped topography, drainage systems, and other surface manipulations
    - Waste disposal
    - Revegetation methods, including specific seed mix (pounds pure live seed/acre) and soil treatments (seedbed preparation, fertilization, mulching, etc.). On private surface, the landowner should be consulted for the specific seed mix.
    - Other practices that will be used to reclaim and stabilize all disturbed areas, such as water bars, erosion fabric, hydro-mulching, etc.
    - An estimate of the timetables for beginning and completing various reclamation operations relative to weather and local land uses.
    - Methods and measures that will be used to control noxious weeds, addressing both ingress and egress to the individual well or POD.
    - Decommissioning/removal of all surface facilities
    - Closure and reclamation of areas utilized or impacted by produced CBM water, including discharge points, reservoirs, off-channel pits, land application areas, livestock/wildlife watering facilities, surface discharge stream channels, etc
7. BLM will not release the performance bond until all disturbed areas associated with the APD/POD have been successfully revegetated (evaluation will be made after the second complete growing season) and has met all other reclamation goals of the surface owner and surface management agency.
8. A Notice of Intent to Abandon and a Subsequent Report of Abandonment must be submitted for abandonment approval.
9. For performance bond release approval, a Final Abandonment Notice (with a surface owner release letter on split-estate) must be submitted prior to a final abandonment evaluation by BLM.
10. Soil fertility testing and the addition of soil amendments may be required to stabilize some disturbed lands.
11. Any mulch utilized for reclamation needs to be certified weed free.
12. Waterbars are to be constructed at least one (1) foot deep, on the contour with approximately two (2) feet of drop per 100 feet of waterbar to ensure drainage, and extended into established vegetation. All waterbars are to be constructed with the berm on the downhill side to prevent the soft material from silting in the trench. The initial waterbar should be constructed at the top of the backslope. Subsequent waterbars should follow the following general spacing guidelines:

Slope (percent)	Spacing Interval (feet)
< 2	200
2 - 4	100
4 - 5	75
> 5	50

E. Producing Well

1. Landscape those areas not required for production to the surrounding topography as soon as possible. The fluids and mud must be dry in the reserve pit before re-contouring pit area. The operator will be responsible for re-contouring and reseeding of any subsidence areas that develop from closing a pit before it is completely dry.
2. Reduce the backslope to 2:1 and the foreslope to 3:1, unless otherwise directed by the BLM Authorized Officer. Reduce slopes by pulling fill material up from foreslope into the toe of cut slopes.
3. Production facilities (including dikes) must be placed on the cut portion of the location and a minimum of 15 feet from the toe of the back cut unless otherwise approved by the BLM Authorized Officer.
4. Any spilled or leaked oil, produced water or treatment chemicals must be reported in accordance with NTL-3A and immediately cleaned up in accordance with BLM requirements. This includes clean-up and proper disposition of soils contaminated as a result of such spills/leaks.
5. Distribute stockpiled topsoil evenly over those areas not required for production and reseed as recommended.
6. Upgrade and maintain access roads and drainage control (e.g., culverts, drainage dips, ditching, crowning, surfacing, etc.) as necessary and as directed by the BLM Authorized Officer to prevent soil erosion and accommodate safe, environmentally-sound access.
7. Prior to construction of production facilities not specifically addressed in the APD/POD, the operator shall submit a Sundry Notice to the BLM Authorized Officer for approval.
8. If not already required prior to constructing and drilling the well location, the operator shall immediately upgrade the entire access road to BLM standards (including topsoiling, crowning, ditching, drainage culverts, surfacing, etc.) to ensure safe, environmentally-sound, year-round access. This requirement does not supercede or apply where specific road requirements are addressed in the APD/POD surface use plan (e.g., two track road, spot upgrade, etc.)
9. Waterbars shall be installed on all reclaimed pipeline corridors per the guidelines in D #12.

2.4. Summary of Alternatives

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

The summary below includes existing disturbance (Alternative A) within the federal lease boundary (the

north half of the POD). Existing disturbance outside the lease boundary but within the POD is not included since it is over fee minerals. However, proposed disturbance in the entire POD boundary is included (Alternatives B and C) since it will be a connected to a federal action. Existing disturbance outside the lease boundary but within the POD boundary includes 6 CBNG wells (1 on a P&A conventional pad), 2 impoundments, 1 compressor and an extensive, redundant road network

Table 2.1 Summary of the Alternatives

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.) Revised Number or Miles
Total CBNG Wells	0	6	6
Total Locations		6	6
Nonconstructed Pads		6	6
Slotted Pads		0	0
Constructed Pads		0	0
Conventional Wells	1 (P&A)	0	0
Gather/Metering Facilities	0	0	0
Compressors	1	1	1
Monitor Wells	1	0	0
Impoundments			
On-channel	1	2	2
Off-channel	0	0	0
Water Discharge Points	0	2	2
Treatment Facilities	0	0	0
Improved Roads			
No Corridor	0.54	---	---
With Corridor	---	0.63	0.63
2-Track Roads			
No Corridor	2.21	1.26	1.26
With Corridor	---	1.17	1.17
Buried Utilities			
No Corridor	---	0.32	0.32
With Corridor	---	0.83	0.83
Overhead Powerlines	1.24	0.54	0.54
Communication Sites	0	0	0
Staging/Storage Areas	0	0	0
Other Disturbance	0	0	0
Acres of Disturbance	14.91	36.73	36.73

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on 03/01/2007. Field inspections of the proposed Bridger II POD CBNG project were conducted on 11/19/2007 (general) and 11/28/2007 (water management) by the individuals below.

Contact	Title	Organization	Present at Onsite
Dave Skinner	NRS	BLM	Y
Wendy Sutton	Archeologist	BLM	Y
Guymen Easdale	Wildlife Biologist	BLM	Y
Jennifer Morton	Wildlife Biologist	BLM	N
Ben Adams	Hydrologist	BLM	Y
Jeb Tachick	Regulatory Agent	Yates Petroleum	Y
Boyd Abelseth	Environmental Agent	Yates Petroleum	Y
Justin Roswadouski	Drilling Foreman	Yates Petroleum	Y
Jason Thomas	Lead Permit Writer	WDEQ	N
Ed Swartz	Neighboring Landowner	Neighboring Landowner	N

This section describes the environment that would be affected by implementation of the Alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major issues. Certain critical environmental components require analysis under BLM policy. These items are presented below in Table 3.1.

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

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

3.1. Topographic Characteristics of Project Area

The project is located in northeast Wyoming with rolling sagebrush grasslands. Topography ranges from gently rolling open sagebrush grasslands becoming moderately steep sloped ridges with several deeply eroded draws, scoria outcrops, boulders, and sandstone ledges in the northern part of the project area. Cantley Draw and other unnamed draws drain the project area. Wildcat Creek and Mumma Draw are the main drainages near this project. Elevations range from approximately 3975 feet in the drainages to 4,220 feet on hill tops. Current use of the area includes ranching, crop production and CBNG wells and related infrastructure. Currently 6 fee CBNG wells exist withn the POD boundary but off the federal lease. One P&A conventional well is also in this area. The project area is bordered by CH4 Energy's Mumma POD to the west. Pinnacle's Noah Draw POD does not border the Bridger II POD but is located 0.75 miles to the north and northwest. Fee CBNG development is south of the POD

3.2. Vegetation & Soils

The vegetation of the project area is comprised of 65% sagebrush grasslands, 25% grasslands, 8% cropland, 2% bare soil and rock and <1% is trees or water. The majority of the area consisted of sparse to dense sagebrush habitats; grasslands were prevalent along ridges and some bottomlands. Grass cover was moderately dense (~25% bare ground) and tall (6 to 24 inches high) in most upland areas, but denser in bottomlands

Grasses on windswept ridge tops and within the one historical prairie dog colony (SW NW Section 19) were shorter <6 inches) and less dense (~50% bare ground). Common grasses included: native wheatgrasses *(Pascopyrum* and *Elymus* spp.), crested wheatgrass *(Agropyron cristatum).* cheatgrass *(Bromus tectorum),* Japanese brome *(lBromus japonicus),* needle-and-thread *(Hesperostipa comata),* junegrass *(Koeleria macrantha),* Kentucky bluegrass *(Poa pratensis),* and blue grama *(Bouteloloua gracilis.* Patches of exposed bare soil were common on hilltops and knobs throughout the area, and in the playa in NW SE Section 24. Cultivated wheat fields encompassed the majority of NW Section 30, SE Section 24, and NE Section 25.

Wyoming big sagebrush (*Artemisia tridentata wyomingensis),* the primary shrub, occurred in sparse to dense stands throughout the project area. Large tracts of sparse to moderately dense sagebrush averaged 12 to 24 inches in height and existed along drainages and gentle slopes throughout the project area. Dense stands of sagebrush were generally taller (up to 36 inches), and were present along a tributary of CantIey Draw (SE SE Section 13 and NE NE Section 24), throughout SW Section 24 and in SW NE Section 25. Green rabbitbrush *(Chrysothamnus viscidiflorus)* was scattered on slopes throughout the northeast. In addition, chokecherry *(Prunus virginiana)* and snowberry *(Symphoricarpos* spp.) had patchy distributions within drainages throughout the northern half of the project area. Finally, Great Plains yucca *(Yucca glauca*) was scattered along slopes and ridges throughout the project area.

Trees are scarce within the project area, small junipers *(Juniperus* spp.), most less than 10 feet in height, were scattered as lone individuals or in small stands (2-10 trees) throughout the north. Only one tree was documented within the project area: a single plains cottonwood *(Populus deltoides)* within a draw in NW NW Section 24 (Gregory 2006).

Soils within the project area were identified from the *North Campbell Survey Area, Wyoming (WY705).* The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. Pertinent information for analysis was obtained from the published soil survey and the National Soils Information System (NASIS) database for the area.

The map units identified for the soils within this 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 3.2 – Soil Map Unit Types

Map Unit Symbol	Map Unit Name	Acres	Percent
131	DEEKAY LOAM, 0 TO 6 PERCENT SLOPES	29.6	4%
134	DEEKAY-OLDWOLF LOAMS, 0 TO 6 PERCENT SLOPES	118.5	15%
135	DEEKAY-OLDWOLF LOAMS, 6 TO 15 PERCENT SLOPES	72.8	9%
167	JAYWEST-MOORHEAD LOAMS, 0 TO 6 PERCENT SLOPES	69.2	9%
183	MOORHEAD-LEITER CLAY LOAMS, 0 TO 6 PERCENT SLOPES	53.4	7%
239	IRONBUTTE-FAIRBURN-MITTENBUTTE COMPLEX, 6 TO 40 PERCENT SLOPES	6.3	1%
244	MULEHERDER-IRONBUTTE CHANNERY LOAMS, 3 TO 40 PERCENT SLOPES	49.8	6%
278	FAIRBURN-SAMSIL-BADLAND COMPLEX, 10 TO 45 PERCENT SLOPES	213.1	26%
280	FELIX CLAY, 0 TO 2 PERCENT SLOPES	10.3	1%
323	UCROSS-FAIRBURN LOAMS, 3 TO 15 PERCENT SLOPES	19.6	2%
324	UCROSS-FAIRBURN LOAMS, 15 TO 45 PERCENT SLOPES	171.0	21%

Additional site specific soil information is included in the Ecological Site interpretations which follow in Section 3.2.2.

The main soil limitations in the project area include: depth to bedrock, low organic matter content, low water holding capacity, and high erosion potential especially in areas of steep slopes. Four of the six wells and one of the two reservoirs within the POD boundary have been identified by BLM as being susceptible to degradation (low reclamation potential) due to steep slopes and/or highly erosive soil utilizing Soil Survey Geographical Data (SSURGO). The table below summarizes the erosion hazard and reclamation potential for the POD facilities.

Table 3.3

Facility	Erosion Hazard	Reclamation Potential
BRIDGER II CS Federal 7	Moderate	Poor
BRIDGER II CS Federal 8	Moderate	Poor
BRIDGER II CS Federal 9	Moderate	Poor
BRIDGER II CS Federal 10	Moderate	Poor
BRIDGER II CS Federal 11	Moderate	Moderate
BRIDGER II CS Federal 12	Slight	Good
Lynde reservoir	Moderate	Moderate
Lynde 1 reservoir	Moderate	Poor

3.2.1. Wetland/Riparian

No naturally occurring wetland or riparian areas were observed in the proposed project development area. The Lynde Dam in section 24 seeps enough to have created a wetland with standing water at its downstream toe. Weathered shale lenses were observed in the area around the dam. On the day of the onsite, ice was observed below the downstream toe of the embankment. Native upland vegetation in that area has changed to a hydrophytic community of rushes and sedges.

BLM was informed by the operator that the WDEQ required shallow groundwater monitoring well had been drilled approximately 150 feet into one of their (the operator's) proposed production coal zones (Upper Canyon). The channel downstream of the dam crosses onto a different landowner, Mr. Ed Swartz.

The draw joins Cantley Draw on Mr. Swartz's property and is generally a broad-bottomed swale with no major headcuts for at least a mile downstream of the dam. The plant assemblage is a mixture of excellent forage grasses, shrubs and other upland vegetation. Mr. Swartz has expressed reservations about the effects that CBNG discharge to the reservoir and subsequent seepage would have on the forage quality of his pasture. The seepage which occurs presently is confined to a relatively short time span following a precipitation event which is large enough to add water to the dam's pool. Addition of CBNG product water would add constant pressure to the seepage pathways, causing the shallow groundwater table to rise closer to the surface and increasing the potential to create continuous stream flow in the draw downstream with the attendant inundation of the current desirable forage.

Downstream of the project area are Wildcat Creek and the Little Powder River, which have significant wetland and riparian area development, including, but not limited to, mature galleries of cottonwood forests.

3.2.2. Dominant Ecological Sites and Plant Communities by dominant soil series

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 3.4 – Map Units and Ecological Sites

Map Unit Symbol	Ecological site
131	LOAMY (15-17NP)
134	LOAMY (15-17NP)
135	LOAMY (15-17NP)
167	LOAMY (15-17NP)
183	CLAYEY (15-17NP)
239	SHALLOW LOAMY (15-17NP)
244	LOAMY (15-17NP)
278	SHALLOW LOAMY (15-17NP)
280	CLAYEY OVERFLOW (15-17NP)
323	LOAMY (15-17NP)
324	LOAMY (15-17NP)

Dominant Ecological Sites and Plant Communities identified in this POD and its infrastructure, by dominate soil series are: Loamy and Shallow Loamy sites in the 15-17 inch precipitation zone.

Loamy Sites occur 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 present plant community is a *Mixed Sagebrush/Grass*.
Wyoming big sagebrush 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. Dominant grasses

include bluebunch wheatgrass, rhizomatous wheatgrass, blue grama, and little bluestem. Other grasses occurring on the state include Cusick's and Sandberg bluegrass, and prairie junegrass. Cheatgrass has invaded the state. Other vegetative species identified at onsite include: pricklypear and fringed sagewort.

Shallow Loamy Sites occur on steep slopes and ridge tops, but may occur on all slopes, on landforms which include hill sides, ridges and escarpments in the 15-17 inch precipitation zone. The soils of this site are shallow (less than 20" to bedrock) well-drained soils formed in alluvium over residuum or residuum derived from sandstone and shale. These soils have moderate permeability and may occur on all slopes. The bedrock may be any kind which is virtually impenetrable to plant roots, except igneous. The main soil limitations include the depth to bedrock.

The present plant community is a *Mixed Sagebrush/Grass*. (See description above)

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 3.5 – Summary of Ecological Sites

Ecological Site	Acres	Percent
LOAMY (15-17NP)	530.6	65%
SHALLOW LOAMY (15-17NP)	219.4	27%
CLAYEY (15-17NP)	53.4	7%
CLAYEY OVERFLOW (15-17NP)	10.3	1%

3.2.3. Invasive Species

No state-listed noxious weeds and/or weed species of concern infestations were discovered by a search of inventory databases on the Wyoming Energy Resource Information Clearinghouse (WERIC) web site (www.weric.info). The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices. The operator confirmed the following WERIC identified infestations and/or documented additional weed species during subsequent field investigations:

- Canada thistle
- Field bindweed
- Leafy spurge

Other invasive species noted by Thunderbird-Jones and Stokes are:

- Cheatgrass
- Japanese brome
- Kentucky bluegrass.

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

3.3. Wildlife

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

A habitat assessment and wildlife inventory surveys were performed by Thunderbird – Jones & Stokes (Gregory 2006). Surveys for bald eagles, mountain plover, sharp-tailed grouse, greater sage-grouse,

raptor nests and prairie dog colonies were conducted according to Powder River Basin Interagency Working Group (PRBIWG) protocol. PRBIWG accepted protocol is available on the CBNG Clearinghouse website (www.CBNGclearinghouse.info).

A BLM biologist conducted field visits on 11/19/07. A subsequent visit was made on 1/30/08 to assess the nest near the BRIDGER II CS Federal 8 well location. The biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project adjustment recommendations where wildlife issues arose.

Wildlife species common to the habitat types present are identified in the Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project (PRB FEIS 3-114). Species that have been identified in the project area or that have been noted as being of special importance are described below.

3.3.1. Big Game

Big game species expected to be within the Bridger II POD project area include pronghorn antelope and mule deer. The WGFD has determined that the project area contains winter yearlong range for pronghorn antelope; and yearlong and winter-yearlong range for mule deer.

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

Pronghorn antelope within the project area belong to the Gillette herd unit. The 2006 proposed estimate herd population is 18,600 with a population objective of 11,000. Mule deer within the project area belong to the Powder River herd unit. The 2006 proposed estimate herd population is 54,000 with a population objective of 52,000. The 2006 proposed estimate herd population is 10,655 with a population objective of 8000. Populations of pronghorn antelope and mule deer within their respective hunt areas are above WGFD objectives. 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 ephemeral tributaries of Wildcat and Calf creeks. No spring locations were documented in the WMP and given the position of this development along a major hydrologic divide, it is highly unlikely that natural springs exist within the POD boundary. 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). Since the wildlife inventory and the POD on-site were conducted in November 2006 and 2007, respectively, no migratory birds (other than raptors) of note were observed.

3.3.4. Raptors

Two raptor nest sites were identified by Thunderbird – Jones & Stokes (Gregory 2006) within 0.5 mile of the project area; neither nest was active in 2007.

Table 3.6 Documented raptor nests within the Bridger II project area in 2007.

BLM Nest Number	UTM X	UTM Y	Qtr, Qtr Sec., T:R	Species	Substrate	2007Status	Condition*
4333	454298	4935476	SESE 13, 53:73	UNK	Juniper, live	Inactive	Fair
4334	453156	4934892	NWNW 24, 53:73	UNK	Cottonwood, live	Inactive	Fair

* The condition of Nest 4334 was assessed on January 31, 2008 and was rated as poor

3.3.5. Threatened and Endangered and Sensitive Species

3.3.5.1. Threatened and Endangered Species

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

3.3.5.1.1. Black-footed ferret

The USFWS listed the black-footed ferret as Endangered on March 11, 1967. Active reintroduction efforts have re-established 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).

One inactive black-tailed prairie dog colony was identified during site visits by Jessica Gregory of Thunderbird – Jones & Stokes (Gregory 2006) just to the east of the project area (SWNW Section 19). Dirt mounds were evident in that area, but the burrows were collapsed and overgrown. Dirt mounds were evident but the burrows were collapsed and overgrown. The closest documented prairie dog town is approximately 3.08 km (1.91 mi) to the northwest (PrairieDogs_2007_Nov_6). The project area is located approximately 2 miles from the Arvada complex, the nearest potential reintroduction area. Black-footed ferret habitat is not present within the Bridger II POD project area.

3.3.5.1.2. Ute Ladies' Tresses Orchid

This orchid is listed under the Threatened and 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 and one in 2006 (Heidel pers. comm.). The new locations were in the same drainages as the original populations, with two on the same tributary and within a few miles of an original location. Drainages with documented orchid populations include Antelope Creek in northern Converse County, Bear Creek in northern Laramie and southern Goshen Counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County.

All drainages in the project area are ephemeral. No springs are documented within the project area. Thunderbird – Jones & Stokes (Gregory 2006) reported that, in general, habitats and environmental features in and near the Bridger POD lack the potential to support Ute ladies'-tresses orchids, and it is unlikely that an orchid population occurs in the area due to the lack of a local seed source. With the exception of a few filled reservoirs, all drainages within the Bridger POD were dry at the time of the survey. Although soils within the drainages were suitable for the Ute ladies'-tresses (primarily loams), all drainages within the POD hosted upland sagebrush habitats and showed little potential to host water during any time of the year. Surface water within the POD was limited to one naturally filled reservoir (NE SE Section 24) and two CBNG-discharge reservoirs (SE NW Section 30 and SW NE Section 25). At all three reservoirs, the transition to upland habitat was abrupt, with no emergent or mesic edge vegetation. In addition, a small playa in NW SE Section 24 held a small amount of water (1-2 inches) from recent snowmelt and likely holds water seasonally, but was surrounded by bare ground and heavy clay soils.

3.3.5.2. Sensitive Species

The USDI Bureau of Land Management (BLM) Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. Two habitat types, prairie dog colonies and sagebrush ecosystems, specifically, are the most common among habitat types within the Powder River Basin and contain habitat components required in the life cycle of several sensitive species. These are described below in general terms. Those species within the Powder River Basin that were once listed or candidates for listing under the Endangered Species Act of 1973 and remain BLM Wyoming sensitive species are described in more detail. The authority for this policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A.

3.3.5.2.1. Sagebrush obligates

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

3.3.5.2.2. Bald eagle

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

Bald eagle nesting habitat is generally found in areas that support large mature trees. Eagles typically will build their nests in the crown of mature trees that are close to a reliable prey source. This species feeds primarily on fish, waterfowl, and carrion. In more arid environments, such as the Powder River Basin, prairie dogs, ground squirrels, and lagomorphs (hares and rabbits) can make up the primary prey base. The diets of wintering bald eagles can be more varied. In addition to prairie dogs, ground squirrels, and

lagomorphs, carcasses of domestic sheep and big game may provide a significant food source in some areas. Historically, sheep carcasses from large domestic sheep ranches provided a reliable winter food source within the Powder River Basin (Patterson and Anderson 1985). Today, few large sheep operations remain in the Powder River Basin. Wintering bald eagles may congregate in roosting areas generally made up of several large trees clumped together in stands of large ponderosa pine, along wooded riparian corridors, or in isolated groups. Bald eagles often share these roost sites with golden eagles as well.

No bald eagles or bald eagle nests were documented on or near the Bridger POD during the 21 November 2006 survey. The nearest known nest is located along Clear Creek 31.5 miles northwest of the POD (BLM *Bald eagle nests)* (Gregory 2006). On 20 December 2006 a single bald eagle was observed by O & G Environmental Consulting (BLM EagleSurvey-091307).

No adequate bald eagle nesting or roosting habitat exists in or within one mile of the Bridger POD due to the paucity of large trees in the area. Other than junipers, the only trees within one mile of the POD consist of two lone cottonwoods within drainages (NW NW Section 24 and SE SE Section 13) and two stands of trees surrounding occupied residences. Specifically, the stands included a group of approximately 5 cottonwoods in SW SE Section 19 and a group of approximately 15 trees (primarily cottonwoods) in SESW Section 30. The proximity of those stands to occupied residences with frequent human activity diminishes their suitability for bald eagle roosting and nesting. In addition, while small reservoirs of open water are present in the project area, terrestrial prey are very limited as no active prairie dog colonies or sheep ranches occur in the area. Overall, the lack of large, dense stands of cottonwoods or pines precludes the area from attracting roosting or nesting bald eagles (Gregory 2006).

3.3.5.2.3. 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.

One inactive black-tailed prairie dog colony was identified during site visits by Thunderbird – Jones & Stokes (Gregory 2006) just east of the project area (SW NW Section 19). Dirt mounds were evident in that area, but the burrows were collapsed and overgrown. Dirt mounds were evident but the burrows were collapsed and overgrown. The closest documented prairie dog town is approximately 3.08 km (1.91 mi) to the north.

3.3.5.2.4. Greater sage-grouse

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

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

According to Gregory (2006), habitats within project area have the potential to support sage-grouse throughout the year as extensive portions of the project area host at least moderately dense sagebrush.

Particularly dense stands of sagebrush in SE SE Section 13, NE NE Section 24, SW Section 24 and SWNE Section 25 could provide adequate habitat for nesting and wintering sage-grouse, and moist draws and tributaries throughout the project area could provide brood rearing and late summer habitat. No sage-grouse or sage-grouse sign were documented within the project area on 21 November 2006.

BLM and WGFD records do not indicate the presence of any sage-grouse leks within three miles of the Bridger II POD. Gregory (2006), states that the nearest sage-grouse lek (McGee) is 3.5 miles southeast of the POD. A review of the 2007 WGFD Leks & Observations 09192007 database confirms that the closest known sage grouse lek is 3.5 miles from the Bridger II POD. This may indicate that the project area is not suitable habitat or that existing disturbance or development may have degraded the habitat suitability.

3.3.5.2.5. 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 GIS suitability model for mountain plovers indicates that approximately half the project area is suitable habitat; however, the CBNG development in this POD is in areas that the model identifies as poor habitat. The habitat assessment by Thunderbird-Jones and Stokes (Gregory 2006) concurs with this. Due to rough topography, rock outcrops, dense sagebrush habitats, and a lack of occupied prairie dog colonies, the majority of habitats within 0.25 mile of the Bridger POD are unsuitable for mountain plovers. The best habitat for nesting plovers near the POD exists within a historic prairie dog colony in NWNW Section 19 where grasses are short (<6 inches) and sparse (~50% bare ground). However, the area is surrounded by dense sagebrush, and the slope is greater than what is normally acceptable to plovers. Most of the remaining areas of level topography (NW Section 30 SE Section 24 and NE Section 25) have been converted to cultivated wheat fields. Marginal mountain plover habitat was limited to disturbed ground near pipelines and sparse hilltops and knobs; and a bare playa in NW SE Section 24. Due to their small size and patchy distribution, those areas are unlikely to attract nesting plovers (Gregory 2006).

3.4. West Nile Virus

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

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

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

Table 3.7 Historical West Nile Virus Information

Year	Total WY Human Cases	Human Cases PRB	Veterinary Cases PRB	Bird Cases PRB
2001	0	0	0	0

Year	Total WY Human Cases	Human Cases PRB	Veterinary Cases PRB	Bird Cases PRB
2002	2	0	15	3
2003	392	85	46	25
2004	10	3	3	5
2005	12	4	6	3
2006	65	0	2	2
2007*	155	22	UNK	1

*Wyoming Department of Health Records September 12, 2007.

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 persists four days or more. 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 in uplands within the Little Powder River drainage system. The POD lies along a divide between Mumma Draw to the west and Cantley Draw to the east. Both systems drain to Wildcat Creek and join the Little Powder River approximately 33 stream miles away.

3.5.1. Groundwater

WDEQ water quality parameters for groundwater classifications (Chapter 8 – Quality Standards for Wyoming Groundwater) define the following limits for TDS: 500 mg/l TDS for Drinking Water (Class I), 2000 mg/l for Agricultural Use (Class II) and 5000 mg/l for Livestock Use (Class III).

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

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

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

As stated in the MMRP, an Interagency Working Group has been established to implement an adaptive management approach. BLM is working with the WDEQ and the Interagency Working Group regarding the monitoring information being collected and assessed to determine if changes in mitigation are warranted.

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

The on-going shallow groundwater impoundment monitoring at four other impoundment locations are

less intensive and consist of batteries of between 4 and 6 wells. Preliminary data from two of these other sites also are showing an increasing TDS level as water infiltrates while two other sites are not.

The WDEQ implemented requirements for monitoring shallow groundwater of Class III or better quality under unlined CBNG water impoundments effective August 1, 2004. The intent is to identify locations where the impoundment of water could potentially degrade any existing shallow groundwater aquifers. These investigations are conducted where discharged water will be detained in existing or proposed impoundments. If shallow groundwater is detected and the water quality is determined to fall within the Class III or better class of use (WDEQ Chapter 8 classifications for livestock use), operators are required to install batteries of 1 to 3 wells, develop a monitoring plan and monitor water levels and quality. The results of these investigations have yet to be analyzed and interpreted.

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 9 registered stock and domestic water wells within one mile of the Bridger II federal POD with depths ranging from 80 to 784 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

3.5.2. Surface Water

The project area is within the Wildcat Creek drainage which is tributary to the Little Powder River. All of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt – PRB FEIS Chapter 9 Glossary). The topography ranges from the ridge line along the divide to gentle swales which change rapidly to deep, steep-sided gullies characteristic of semi-arid landforms created by irregular frequency, high intensity, short duration precipitation events. As the ephemeral channels move toward Wildcat Creek, they lose their steepness, become broader, flatter swales, and lose all channel definition. Wildcat Creek is an intermittent to perennial stream with a definite meandering channel cut into a broad, flat flood-plain.

There are two existing impoundments in the project area. One, the Lynde #1 in section 25, is an existing stockwater dam which has been receiving CBNG water produced by Devon Energy. There was no seepage observed immediately downstream of this dam on the day of the onsite. The second dam, the Lynde in section 24, is also a stockwater dam which is filled by natural runoff from its small watershed. Noticeable seepage was observed at the onsite. However, the seepage did not appear to flow downstream very far onto the adjoining landowner, Mr. Ed Swartz. This seepage is likely of relatively short duration, serving to lower the reservoir's pool during times when storms do fill it. The vegetation in the major draw on Mr. Swartz's property, Cantley Draw, did not exhibit a transition to hydrophytic plants.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in μmhos/cm) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters "…illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBNG 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 1785 μmhos/cm at Maximum monthly flow to 3300 μmhos/cm 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 on the Little Powder River above Dry Creek near Weston, WY (PRB FEIS page 3-49).

The operator did not state whether or not any natural springs were identified. However, given the position of this development along a major hydrologic divide, it is highly unlikely that natural springs exist within the POD boundary.

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 Bridger II POD project prior to on-the-ground project work (BFO Nos. 70070069 & 70000222), following the Secretary of the Interior's Guidelines and Standards. The Bridger POD Sundry Class III archaeological inventory (BLM# 70070069) was conducted by ACR specifically for this project. No new sites were recorded as a result of the project. A previously reviewed and accepted Class III cultural resource inventory (BFO # 70000222) also covered a portion of the proposed project area. No cultural resources lie within the area of potential effect.

4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed action (Alternative B) resulted in development of Alternative C as the preferred alternative. The changes have reduced impacts 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. Of the 6 proposed well locations, 1 is on an existing conventional well pad and 5 can be drilled without a well pad being constructed. The total estimated disturbance for all 6 wells would be 5.4 acres (0.90 acres/well). Surface disturbance associated with the drilling of the wells without constructed pads involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 15 x 55 feet), and compaction (from vehicles driving/parking at the drill site). Approximately 0.63 miles of improved roads would be constructed to provide access to various well locations. Approximately 1.26 miles of new and existing two-track roads would be utilized to access well sites. The majority of proposed pipelines (gas and water) have been located in "disturbance corridors." Disturbance corridors involve 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 0.32 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 (gravelling, waterbars, wing ditches and relief culverts) would ensure land productivity/stability is regained and maximized.

Two well locations and the Lynde Reservoir can be reclaimed by traditional methods. However, some areas will be challenging for reclamation due to soil properties and other site characteristics. In the Bridger II POD, 33% (269 acres) of the project area has been identified, through on-sites and data analysis, to have low/poor reclamation potential. Programmatic and site specific reclamation COAs will help ensure successful reclamation in these areas. Proposed facilities within these areas of poor reclamation potential include the BRIDGER II CS Federal 7, 8, 9, 10 and associated infrastructure; and the Lynde 1 Reservoir.

The seed mix for the Bridger II POD was determined based on soil map unit types, the dominant ecological sites found within the project area, and the mixing of soil horizons in disturbed areas. A Shallow Loamy seed mix was selected for the entire POD (see site specific COAs).

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

- Mixing of soil horizons – occurs where construction on roads, pipelines or other activities take

place. Mixing results in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved from the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts or weathered materials may be relocated and have a negative impact on revegetation. Drastically disturbed areas may change the ecological integrity of the site and the recommended seed mix.

- Soil compaction – the collapse of soil pores results in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, and the number of passes and pressure exerted by vehicle traffic or machinery. Compaction may be remediated by plowing or ripping.
- Loss of soil vegetation cover, organic matter and productivity. Soil productivity may be eliminated along improved roads and severely restricted along two track trails until successful final reclamation is achieved.
- Modification of hill slope hydrology.

These impacts are likely to increase the potential loss of valuable soil due to increased water and wind erosion, invasive plant establishment and increased sedimentation and salt loads to the watershed system. With expedient reclamation, productivity and stability should be regained in the shortest time frame.

The Bureau of Land Management has an obligation to protect lands from disturbance which could lead to irretrievable and irreversible impacts. The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231). BLM reclamation goals emphasize ecosystem reconstruction, which means returning the land to a condition approximate to or better than that which existed before it was disturbed. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal.

Proposed stream crossings, including culverts and low water crossings are shown on the MSUP and the WMP maps. 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).

Cumulative Effects: Most soil disturbances would be short term impacts 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.

Table 4.1 - SUMMARY OF DISTURBANCE

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Nonconstructed Pad Constructed Pad	6	0.9 ac/pad	5.40	Long Term
Gather/Metering Facilities	0	Site Specific		Long Term
Compressors	1	0.75 ac/compressor	0.75	Long Term

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Impoundments				
On-channel	2	Site Specific	8.10	Long Term
Off-channel	0	Site Specific	0.00	
Water Discharge Points	2	0.25 ac/WDP	0.50	
Channel Disturbance				
Headcut Mitigation*	0	Site Specific		
Channel Modification	0	Site Specific		
Improved Roads				
No Corridor	0			
With Corridor	0.63	75' Width	5.73	Long Term
2-Track Roads				
No Corridor	1.26	16' Width	2.44	Long Term
With Corridor	1.17	45' Width	6.38	
Pipelines				
No Corridor	0.32	35' Width	1.36	Short Term
With Corridor	0.34	35' Width	1.44	
With Corridor	0.49	45' Width	2.67	
Buried Power Cable				
No Corridor	0	Site Specific		
Overhead Powerlines	0.54	30' Width	1.96	Long Term
Additional Disturbance		Site Specific		
Total Acres of Short Term Disturbance			**36.73**	
Total Acres of Long Term Disturbance			**35.37**	

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

4.1.1. Wetland/Riparian

The 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 but will adversely affect upland forage species which rely on only periodic flooding. This is especially true of the Lynde impoundment in section 24. Desirable range vegetation in the downstream riparian areas, which cannot tolerate year-round inundation, would die and would be replaced by less desirable plants such as rushes, sedges and cattails. This change from upland range vegetation to hydrophytic plants would adversely affect the vegetation on the Ed Swartz property.

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 the following measures in an Integrated Pest Management Plan (IPMP) included in the proposal:

1. The operator will use the following control methods on noxious weeds. The operator will also address any weed concerns landowners have. The operator did not address the annual frequency of control measures in the IPMP.
    a. Herbicide application
    b. Bio-control agents
    c. Hand-pulling small infestations of weeds
    d. Mowing weeds during the year after reseeding
2. The IPMP included the following preventive control practices
    a. Contractors will be encouraged to clean equipment between job locations
    b. Soil disturbance will be minimized
    c. Prompt reseeding with certified weed free seed will be done
    d. If mulch is used it will be certified weed free
3. Noxious weed education in the IPMP
    a. On April 21, 2004 Campbell County Weed and Pest Coordinator trained Operator personnel on weed identification and prevention.
    b. During preconstruction meeting and on-site inspections information on specific weeds and control will be provided.

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

The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, water management infrastructure, produced water discharge points and related facilities 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).

The potential flows that could be added to the Wildcat Creek wetland and riparian areas from this plan of development are likely to have negligible adverse impacts on Wildcat Creek. However, seepage from the Lynde Dam in section 24 could have significant adverse impacts on Cantley Draw.

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur to soils and vegetation. 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 and the total amount that was predicted in the PRB FEIS, which is approximately 43% of that total (see section 4.4.2.1).
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The commitment by the operator to monitor the volume of water flowing into the Lynde dams and to and to mitigate damages caused by discharges to Wildcat Creek as described in their WYPDES permit, WY0055808.
- The WMP for the Bridger II POD proposes that produced water will not contribute significantly to flows downstream.

4.2. Wildlife

4.2.1. Big Game Direct and Indirect Effects

Under the environmentally preferred alternative Winter-Yearlong (pronghorn antelope) and Yearlong and Winter-Yearlong (mule deer) range 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 two reservoirs. Discharges are allowed to Mumma Draw based on conditions outlined in Appendix A, "Water Administration Plan", which is a part of WYPDES permits issued for the Wildcat Creek drainage. At the time this document was finalized, there was no discharge permit approved for the Lynde impoundment in section 24.

The Wyoming Department of Environmental Quality (DEQ) regulates effluent discharge through the National Pollution Discharge Elimination System in compliance with the Federal Water Pollution Control Act and the Wyoming Environmental Quality Act. The Wyoming DEQ has established effluent limits for the protection of game and non-game, aquatic life other than fish, wildlife, and other water uses.

4.2.2.1. Cumulative effects

The addition of water produced as a result of this action, in itself, is not likely to cause any changes to the flow regimes of Wildcat Creek or the Little Powder River. However, cumulatively, water being added to Wild Cat Creek will ultimately cause impacts, both beneficial and adverse, which will be measurable in the Little Powder River.

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-247. No additional mitigation measures are required.

4.2.3. Migratory Birds Direct and Indirect Effects

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

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

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

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.

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

4.2.3.1. 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. No additional mitigation measures are required.

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.

Power poles provide attractive perch sites in areas where mature trees and other natural perches are lacking. From May 2003, through December 28, 2006, Service Law Enforcement salvage records for northeast Wyoming identified that 156 raptors, including 1 bald eagle, 93 golden eagles, 1 unidentified eagle, 27 hawks, 30 owls and 4 unidentified raptors were electrocuted on power poles within the Powder River Basin Oil and Gas Project area (USFWS 2006a). Of the 156 raptors electrocuted 31 were at power poles that are considered new construction (post 1996 construction standards). Additionally, two golden eagles and a Cooper's hawk were killed in apparent mid span collisions with powerlines (USFWS 2006a). Power lines not constructed to APLIC suggestions pose an electrocution hazard for eagles and other raptors perching on them; the Service has developed additional specifications improving upon the APLIC suggestions. Constructing power lines to the APLIC suggestions and Service standards minimizes but does not eliminate electrocution risk. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

Table 4.2. Infrastructure within close proximity to documented raptor nests within the Bridger II project area.

BLM ID#	UTM (NAD 83)	SPECIES	STATUS	WELL / PIT NUMBER	DISTANCE
4333	454298E 4935476N	UNK	Inactive	7BRID	0.36 MILES
4334	453156E 4934892N	UNK	Inactive	8BRID	0.09 MILES

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.

During the on-site a BLM Biologist recommended that the well location for BRIDGER II CS Federal 8

should be moved due to a raptor nest (#4334) being in close proximity (0.09 mi.). Yates Petroleum did not agree to this change. Documentation indicated that this nest has not been active in the last two years. On January 31, 2008 the nest was visited again. No raptors were observed in the area. The nest was examined and was found to be dilapidated. It is likely that the nest had not been used for several years. Because an acceptable alternative well location could not be identified and the nest has not been used in recent years, the proposed well location was accepted. It is probable that this nest will not be used as long as there is CBNG activity nearby. Nest #4333 is 0.36 miles from the BRIDGER II CS Federal 7 well location. This nest has no record of recent use.

If annual nest surveys find that these nests become active then timing restrictions will go into effect.

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

4.2.5.1. Threatened and Endangered and Sensitive Species

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered				
Black-footed ferret (*Mustela nigripes*)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	NE	No active prairie dog colonies are present
Threatened				
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	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
LAA Likely to adversely affect
NE No Effect.
NLAA May Affect, not likely to adversely affect individuals or habitat.

4.2.5.1.1. Black-footed ferret

Because there are no black-tailed prairie dog colonies within or in the immediately vicinity of the Bridger II POD of sufficient size for supporting ferrets and the POD is isolated from any prairie dog complexes,

implementation of the proposed development should have "***no effect***" on the black-footed ferret. The nearest colony is 3.08 km (1.91 mi) from the project area.

4.2.5.1.2. Ute Ladies' Tresses Orchid

Due to the lack of suitable habitat for the Ute ladies'-tresses orchid, proposed infrastructure associated with Bridger II POD is not expected to disturb any potential habitat for this species. (Gregory 2006). This project should have "***no effect***" on the Ute ladies'- tresses orchid.

Table 4.4 Summary of Sensitive Species Habitat and Project Effects.

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

Table 4.4 Summary of Sensitive Species Habitat and Project Effects (continued).

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

Table 4.4 Summary of Sensitive Species Habitat and Project Effects (continued).

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

Presence

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

Project Effects

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

4.2.5.2. Sensitive Species Direct and Indirect Effect

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

4.2.5.2.1. Sagebrush obligates

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

4.2.5.3.

Fragmentation of shrubsteppe habitat is a major disruption that has consequences for sagebrush-obligate species (Braun et al. 1976; Rotenberry & Wiens 1980a). In fragmented habitats, suitable habitat area remains only as a remnants surrounded by unusable environments (Urban and Shugart 1984; Fahrig & Paloheimo 1988). Populations of sagebrush-obligate species decline because areas of suitable habitat decrease (Temple & Cary 1988), because of lower reproduction, and/or because of higher mortality in remaining habitats (Robinson 1992; Porneluzi et al. 1993). Fragmentation of shrubsteppe has the further potential to affect the conservation of shrub-obligate species because of the permanence of disturbance (Knick and Rotenberry 1995).

4.2.5.3.1. Bald eagle

Based on the raptor nesting and bald eagle winter roost surveys and lack of suitable habitat, it is unlikely bald eagles nest or roost within the Bridger II POD project area. The proposed project should not affect bald eagle nesting or winter roosting.

There are 1.24 miles of existing overhead three-phase distribution lines within the project area. The wire spacing is likely in compliance with the Avian Power Line Interaction Committee's (1996) suggested practices and with the Service's standards (USFWS 2002); however other features may not be in compliance. Yates Petroleum is proposing an additional 0.54 miles of overhead three-phase distribution lines. There are currently 0.54 miles of improved roads within the project area, with 0.63 miles proposed.

The presence of overhead power lines 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. From May 2003, through December 28, 2006, Service Law Enforcement salvage records for northeast Wyoming identified that 156 raptors, including 1 bald eagle, 93 golden eagles, 1 unidentified eagle, 27 hawks, 30 owls and 4 unidentified raptors were electrocuted on power poles within the Powder River Basin Oil and Gas Project area (USFWS 2006a). Of the 156 raptors electrocuted 31 were at power poles that are considered new construction (post 1996 construction

standards). Additionally, two golden eagles and a Cooper's hawk were killed in apparent mid span collisions with powerlines (USFWS 2006a). Power lines not constructed to APLIC suggestions pose an electrocution hazard for eagles and other raptors perching on them; the Service has developed additional specifications improving upon the APLIC suggestions. Constructing power lines to the APLIC suggestions and Service standards minimizes but does not eliminate electrocution risk.

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%).

Produced water will be stored in 1 or 2 proposed reservoirs which may attract eagles if reliable prey is present, most likely in the form of waterfowl. The effect of the reservoir(s) on eagles is unknown. The reservoir(s) could prove to be a benefit (e.g. increased food supply) or an adverse effect (e.g. contaminants, proximity of power lines and/or roads to water). Eagle use of reservoirs should be reported to determine the need for any future management.

4.2.5.3.2. Black-tailed prairie dog

There is currently no active prairie dog colony in the project area; therefore there should be no impact to prairie dogs.

4.2.5.3.3. Greater sage-grouse

BLM and Wyoming Game and Fish Department (WGFD) records do not indicate the presence of any sage-grouse leks within three miles of the Bridger II POD. Gregory (2006) states that the nearest sage-grouse lek (McGee) is 3.5 miles southeast of the POD. A review of the 2007 WGFD Leks & Observations 09192007 database confirms that the closest **documented** sage grouse lek is 3.5 miles from the Bridger II POD. No sage grouse or sage grouse sign was documented in the Thunderbird - Jones and Stokes wildlife survey of the project area, however, the project area appears to be suitable habitat (Gregory 2006). Existing disturbance may have degraded the habitat suitability. To the south and west of the project area adjacent CBNG development has been occurring since 1999 with the most recent well drilled in 2005. CBNG may have resulted in undocumented leks being abandoned prior to their discovery.

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).

The presence of powerlines results in changes in sage-grouse dispersal patterns and fragmentation of the

habitat. Leks within 0.25 mile of new powerlines constructed for coalbed natural gas development in the Powder River Basin of Wyoming had significantly lower growth rates, as measured by recruitment of new males onto the lek, compared to leks further from these lines (Braun et al. 2002). Braun (1998) reported that the presence of powerlines may limit sage-grouse use within 0.6 mile in otherwise suitable habitat. Furthermore, studies indicate that leks were abandoned within 1.4 miles after new transmission lines were erected and lek attendance declined within 2-3 miles (Stinson et al. 2004). The nearest lek to the proposed powerlines associated with the Bridger II project area are over 3.5 miles from the nearest lek. The abandonment of occupied leks and reduced lek attendance at additional occupied leks is not expected.

Noise can affect sage grouse by masking vocalizations that influence courtship 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.com.).

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).

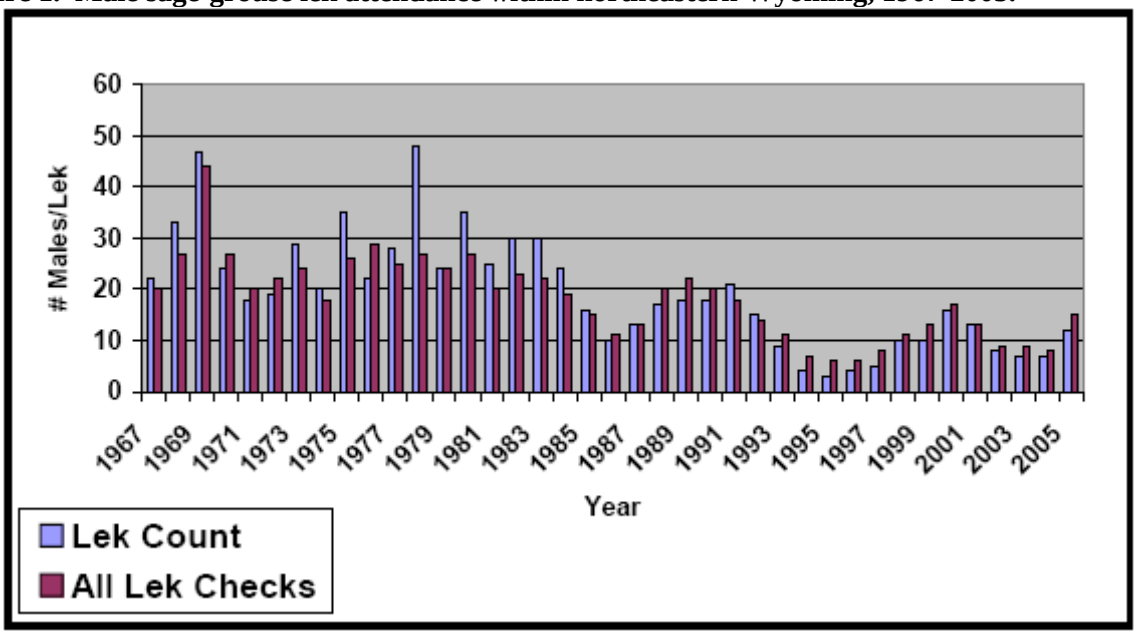
Percentage of sage-grouse nesting within a certain distance from their breeding lek is unavailable for the Powder River Basin. The Buffalo and Miles City field offices through the University of Montana with assistance from other partners including the U.S. Department of Energy and industry are currently 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 Hollaran 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. This six well POD proposal predominately will use existing roads, most underground utilities will be corridored and proposed overhead power will follow an exising county road. Therefore, additional habitat fragmentation will be minimal.

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

Figure 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 (Connely 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).

4.2.5.3.4. 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 in the project area 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).

The proposed facilities are in areas of rough topography and are not suitable mountain plover habitat; however, the remainder of the area is potential habitat.

4.2.5.4. 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 malathion, 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 CBNG operations.

Cumulatively, there are many sources of standing water, beyond CBNG 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 a commitment to comply with Wyoming State water laws/regulations. It addresses potential impacts to the environment and some landowner concerns. Qualified hydrologists developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from the proposed water management strategy, which calls for discharge of produced water into one of two reservoirs and periodic discharge of stored water according to the "Wildcat Creek Water Administration Plan" outlined in Attachment A of the WYPDES permit.

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 20.0 gpm per well or 120.0 gpm (0.27 cfs or 195 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 CBNG 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 19,121 acre-feet in 2008 (maximum production was predicted to have occurred in 2005 at 22,427 acre-feet). As such, the volume of water resulting from the production of these wells is 1% of the total volume projected for 2008. 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 under alternative 2A (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 40 gpm will infiltrate at or near the discharge points and impoundments (66 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). However, there is potential for infiltration of produced water to influence the quality of the antecedent groundwater. The WDEQ requires that operators determine initial groundwater quality below impoundments to be used for CBNG produced water storage. If high quality water is detected (Class 3 or better) the operator is required to establish a groundwater monitoring program at those impoundments.

Shallow ground water monitoring is ongoing at numerous 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 variability in 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 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. The Wyoming DEQ also established

an Impoundment Task Force which has drafted an "Impoundment Monitoring Plan" to investigate the potential for existing impoundments to have impacted shallow ground water. WYPDES permits received by DEQ prior to August 1, 2004, for discharging to impoundments will be assessed through the "Impoundment Monitoring Plan". For WYPDES permits received by DEQ after August 1, 2004, the BLM will require that operators comply with the requirements outlined in the DEQ compliance monitoring guidance document (June 14, 2004) prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

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 CBNG 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 water wells in the area. The permitted water wells in the area produce from water bearing zones ranging in depth from 80 to 784 feet below the ground surface. The targeted coal zones range from 150-390 feet below ground surface. 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 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 analyses submitted for the pre-approval evaluation, the operator has committed to designate a reference well within the POD boundary. The well will be capable of being sampled at the wellhead. A sample will be collected at the wellhead for analysis using the WYDEQ's list of analytes within sixty days of initial production. A copy of the water analysis will be submitted to the BLM Authorizing Officer.

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 CBNG development and coal mining would represent less than 0.3 percent of the total recoverable groundwater in the Wasatch and Fort Union Formations within the PRB (nearly 1.4 billion acre-feet, from Table 3-5)." (PRB FEIS page 4-65). No additional mitigation is necessary.

4.4.2. Surface Water

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

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

Predicted Values	**TDS, mg/l**	**SAR**	**EC,** μmhos/cm
Most Restrictive Proposed Limit –		3	1000
Least Restrictive Proposed Limit		10	3000
Little Powder River ab Dry Ck nr Weston, WY Historic Data Average at Maximum Flow Historic Data Average at Minimum Flow		 4.44 6.94	 1785 3300
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8) Drinking Water (Class I) Agricultural Use (Class II) Livestock Use (Class III)	 500 2,000 5,000	 8	
WDEQ Water Quality Requirement for WYPDES Permit # WY0055808 At discharge point At Irrigation Compliance point	 5000 5000	See tabulation on page 50 below	See tabulation on page 50 below
Predicted Produced Water Quality Lower and Upper Canyon co-mingled sample	 958	 11.6	 1580

Due to the controversial nature of discharges into Wildcat Creek and as a result of litigation between the CBNG developers, WDEQ and the local landowners, an agreement which deals with water quality and discharge quantities was developed. All operators who apply for discharge permission into these reaches of Wildcat Creek become party to this agreement. The addendum governs all discharges into Wildcat Creek and its tributaries and is attached by the WDEQ to all WYPDES permits issued for this watershed. It is known as "Appendix A, 'Water Administration Plan'", and outlines specific conditions applicable to these WYPDES permits. These specific conditions can be seen on pages 1-5 of permit WY0055808. As of the approval date of this document, a permit for discharge in the Lynde reservoir in section 24 has not been approved.

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 has 958.0 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Upper and Lower Canyon coal zones from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 20.0 gallons per minute (gpm) is projected is to be produced from each of these 6 wells, for a total of 120.0 for the POD. (See Table 4.5.)

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

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

To manage the produced water, 2 impoundments with a combined proposed storage of 39 acre-feet would potentially be re-built within the project area. One of these impoundments, the Lynde, will only be used as part of this or any federal action if it adheres to the site specific conditions of approval developed for it (see Section 2.3.2, Water Management). These impoundments will disturb approximately 8.1 acres, 5.1 Ac for the Lynde #1 and 3 Ac for the Lynde, including the dam structures. Both of these water impoundments have on-channel dams. Monitoring of shallow groundwater will be required as stated in WYPDES permit WY0055808, unless specifically exempted by Don Fisher, WDEQ Sheridan. These impoundments will be upgraded and constructed to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner. All water management facilities were evaluated for compliance with best management practices during the onsite.

The PRB FEIS assumes that, basin-wide, 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). This amount of flow can vary considerably depending on the soils and substrates in the vicinity of the impoundment. Consequently, the volume of water produced from these wells may result in the addition of 18 gpm 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. Seepage from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Downstream of the Lynde Dam, however, the resulting wetland-riparian vegetation establishment would replace upland plant species, degrading the palatability of the forage in the swales where this occurs. 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, stated that the peak production of water discharged to the surface in the Little Powder River Watershed would occur in 2005 at a total contribution to the mainstem of 13 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 6 wells is anticipated to be a total of 120.0 gpm or 0.3 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment the produced water re-surfacing in Wildcat Creek from this action (0.04 cfs) could add a maximum 0.03 cfs to the Little Powder River flows, or 0.2% of the predicted total CBNG produced water contribution. This incremental volume increase is statistically below the measurement capabilities for the volume of flow in either Wildcat Creek or the Little Powder River (refer to Statistical Methods in Water Resources U.S. Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

In the WMP portion of the POD, the operator did not provide an analysis of the potential development in the watershed above the project area. However, based on the project's location at the top of these particular watersheds, unnamed draws which are tributaries to Mumma and Cantley draws, and because this area has already been heavily developed for oil and gas production, it is unlikely that there will be extensive additional development. The potential maximum discharge rate of produced water, 0.3 cfs, is much less than the volume of runoff estimated from the 2-year storm event for Mumma Draw, 103 cfs, and Cantley Draw, 62 cfs.

The proposed method for surface discharge provides passive treatment through the aeration supplied by the energy dissipation configuration at each discharge point. Aeration adds dissolved oxygen to the

produced water which can oxidize and precipitate susceptible ions. 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 reduce the potential for water quality degradation downstream.

The operator has obtained a Wyoming Pollutant Discharge Elimination System (WYPDES) permit for the discharge of water produced to Mumma Draw.

Permit effluent limits were set at WYPDES PART I, page 1:

WY0055808 (disch to unnamed tributary to Mumma Draw)	Daily Max at the outfall	Daily Maximum at Attenuation zone
Chlorides, mg/l	46	
Dissolved Iron, µg/l	1000	
Dissolved Manganese, µg/l	718	
Dissolved Copper, µg/l	14.6	
Dissolved Lead, µg/l	7.7	
pH, standard units	6.5 - 9.0	
Specific Conductance, µS/cm, (flow at CRX* =>20 cfs)	2500	
Specific Conductance, µS/cm, (flow at CRX* <20 cfs)	7500	
Sulfates, mg/l	3000	
Total Arsenic, µg/l	4.1	
Total Barium, µg/l	1800	
Total Dissolved Solids, mg/l	5000	
SAR, calculated (flow at CRX* =>20 cfs)	N/A	(7.1 x EC dS/m) - 2.48
SAR, calculated (flow at CRX* <20 cfs)	N/A	N/A

*CRX = Collins Road Crossing

By establishing these limits, the WYPDES permit addresses existing downstream concerns, such as irrigation use, in the COA for the permit. The designated point of compliance identified for this permit is at the end of the discharge pipe. The Attenuation Zone Terminus, located in Mumma Draw above where Collins Road crosses Wildcat Creek downstream of this project, is an additional sampling location when flows at the Collins Road crossing exceed 20 cfs. For more details, see WYPDES permit WY0055808, Statement of Basis, pages 2 and 3.

The operator has applied for a WYPDES permit to discharge into the Lynde Reservoir in section 24. The terms and conditions outlined in the final approved WYPDES permit will be followed. Due to concerns with seepage and continuous flow which could occur at this site, the operator agrees to mitigate seepage which causes continuous flow onto Mr. Swartz's property. This mitigation is outlined in the COA's for this structure.

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. A water sample will be collected from the reference well at the wellhead and analyzed, using WDEQ's list of analytes, 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 partially addressed in the WMP for the Bridger II POD prepared by WWC Engineering for Yates Petroleum Corporation.

4.4.2.1. Surface Water Cumulative Effects

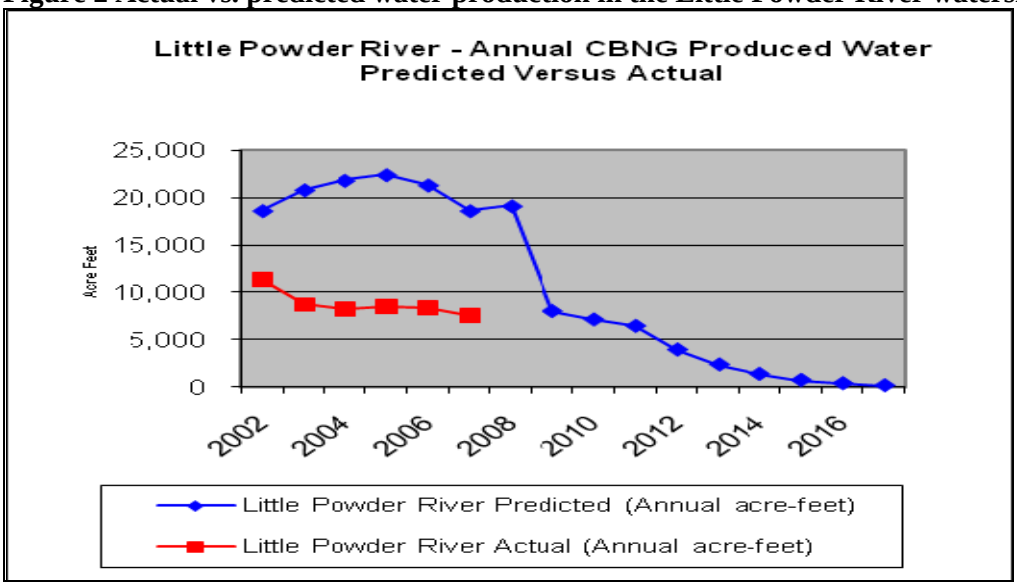
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Little Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2007 all producing CBNG wells in the Little Powder River watershed have discharged a cumulative volume of 52,902 acre-ft of water compared to the predicted 123,631 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% 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 *2007 Data Update 3-08-08*.

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	7,566	40.7	52,902	42.8
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				
Total	**173,118**		**52,902**			

Figure 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 Sodium Absorption Ratio (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 CBNG development in both states continued. However, this MOC has expired and has not been renewed. The EPA has approved the Montana Surface Water Standards for EC and SAR and as such the WDEQ is responsible for ensuring that the Montana standards are met at the state line under the Clean Water Act (CWA). Thus, through the implementation of in-stream monitoring and adaptive management, water quality standards and interstate agreements can be met." (PRB FEIS page 4-117) Litigation between Wyoming and Montana, which was entered into after issuing the PRB FEIS ROD, will eventually determine the water quality and quantity parameters which will be applied to CBNG produced water flowing from Wyoming into Montana.

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur as a result of discharging 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 and the total amount that was predicted in the PRB FEIS, which is approximately 43% of that total.
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.
4. The BLM applied COA's applicable to this action.

No additional mitigation measures are required.

Refer to the PRB FEIS, Volume 2, page 4-115 – 117 and table 4-12 for cumulative effects relative to the Little Powder River watershed and begin on page 4-117 for cumulative effects common to all sub-watersheds.

4.5. Cultural Resources

BLM review, conducted by Wendy Sutton, has determined that no sites or isolates will be impacted by the current project. Following the Wyoming State Protocol, Section VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 2/11/2008 that the proposed project would result in no historic properties affected/no effect (DBU_WY_2008_395).

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
Dave Skinner	NRS	BLM	Y
Wendy Sutton	Archeologist	BLM	Y
Jennifer Morton	Wildlife Biologist	BLM	N
Guymen Easdale	Wildlife Biologist	BLM	Y
Ben Adams	Hydrologist	BLM	Y
Jeb Tachick	Regulatory Agent	Yates Petroleum	Y
Boyd Abelseth	Environmental Agent	Yates Petroleum	Y
Justin Roswadouski	Drilling Foreman	Yates Petroleum	Y
Jason Thomas	Lead Permit Writer	Wyoming DEQ	N
Ed Swartz	Neighboring Landowner	Neighboring Landowner	N

6. OTHER PERMITS REQUIRED

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

7. REFERENCES AND AUTHORITIES

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

Agnew, W. D. 1988. Arthropod Consumption by Small Mammals on Prairie Dog Colonies and Adjacent Ungrazed Mixed-grass Prairie in Western South Dakota. Eighth Great Plains Wildlife Damage Control Workshop Proceedings. USDA Forest Service General Technical Report RM 154. pgs. 81-87.

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

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

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

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

Bennett, Robert A. 2004. Instruction Memorandum No. WY-2005-057: Statement of Policy Regarding Sage-Grouse Management Definitions, and Use of Protective Stipulations, and Conditions of Approval. Bureau of Land Management, Wyoming State Office. Cheyenne, WY.

Bills, Thomas E. 2004. Powder River Basin Oil & Gas Project Semi-Annual Report: May 1, 2003 – October 31, 2003. BLM Buffalo Field Office. Buffalo, WY. 8pp.

Braun, C.E., O.O. Oedekoven, and C.L. Aldridge. 2002. Oil and Gas Development in Western north America: Effects on Sagebrush Steppe Avifauna with Particular Emphasis on Sage Grouse. In: Transactions of the 67th North American Wildlife and Natural Resources Conference. pp337-349.

Byer, Timothy. 2006. Personal Communication. Wildlife Biologist. Thunder Basin National Grasslands. USDA Forest Service, Douglas, WY.

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

Canfield, J. E., L. J. Lyon, J. M. Hillis, and M. J. Thompson. 1999. Ungulates. Chapter 6 in Effects of Recreation on Rocky Mountain Wildlife: A Review for Montana, coordinated by G. Joslin and H. Youmans. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society.

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

Code of Federal Regulations (CFR)

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

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

Cornish, Todd. Personal Communication. Wyoming State Veterinary Laboratory, University of Wyoming. Laramie, WY. (307) 742-6638. tcornish@uwyo.edu.

Danvir, Rick E. 2002. Sage Grouse Ecology and Management in Northern Utah Sagebrush-Steppe: A Deseret Land and Livestock Wildlife Research Report. Deseret Land and Livestock Ranch and the Utah Foundation for Quality Resource Management. Woodruff, UT.

Deisch, M. S., D. W. Uresk, and R. L. Lindor. 1989. Effects of Two Prairie Dog Rodenticides on Ground Dwelling Invertebrates in Western South Dakota. Ninth Great Plains Wildlife Damage Control

Workshop Proceedings. USDA Forest Service General Technical Report RM. Pgs 171-181.

Geist, V. 1978. Behavior. Big Game of North America; ecology and management. Stackpole Books, Harrisburg, Pennsylvania.

Gregory, Jessica. 2006. Wildlife and Ute Ladies'-Tresses Habitat Assessments and Raptor Nest Surveys. Thunderbird – Jones & Stokes. Gillette, WY 9pp.

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

Heidel, Bonnie. Botanist. Wyoming Natural Diversity Database. University of Wyoming. Laramie, WY

Holloran, Matthew J.; Brian J. Heath; Alison G. Lyon; Steven J. Slater; Jarren L. Kuppiers; and Stanley H. Anderson. 2005. Greater sage-grouse nesting habitat selection and success in Wyoming. J. Wildl. Manage. 69(2):638-649.

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

Jalkotzy, M.G., P.I. Ross, and M.D. Nasserden. 1997. The Effects of Linear Developments on Wildlife: A Review of Selected Scientific Literature. Arc Wildlife Services Ltd., Calgary, Alberta, Canada.

Jellison, Bert. 2005. Sage-Grouse Restoration Project: Lake DeSmet Conservation District. Wyoming Game and Fish Department. Sheridan, WY.

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

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

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

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

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

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

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

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

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

Moynahan, Brendan J.; Mark S. Lindberg; Jay J. Rotella; and Jack Ward Thomas. In Press. Factors Affecting Nest Survival of Greater Sage-Grouse in Northcentral Montana. J. Wildl. Manage.

Moynahan, Brendan J. and Mark S. Lindberg. 2004. Nest Locations of Greater Sage-Grouse in Relation to Leks in North-Central Montana. *Presented at* Montana Sage-Grouse Workshop, Montana Chapter of The Wildlife Society, Billings.

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

Naugle, David E.; Cameron L. Aldridge; Brett L. Walker; Todd E. Cornish; Brendan J. Moynahan; Matt J. Holloran; Kimberly Brown; Gregory D. Johnson; Edward T. Schmidtmann; Richard T. Mayer; Cecilia Y. Kato; Marc R. Matchett; Thomas J. Christiansen; Walter E. Cook; Terry Creekmore; Roxanne D. Falise; E. Thomas Rinkes; and Mark S. Boyce. 2004. West Nile virus: Pending Crisis of Greater Sage-grouse. Ecology Letters. 7:704-713.

Oakleaf, Bob. January 13, 1988. Letter to BFAT: Preliminary BFF Reintroduction Site Analysis, Meeteetse Management Plan Assignments. Wyoming Game and Fish Department. Lander, WY. 10pp.

Oedekoven, Olin O. 2004. Sheridan Region Wyoming Game and Fish Department: Annual Sage-Grouse Completion Report for 2004. Wyoming Game and Fish Department. Gillette, WY.

Patterson, Craig T. and Stanley H. Anderson. 1985. Distributions of Eagles and a Survey for Habitat Characteristics of Communal Roosts of Bald Eagles (Haliaeetus leucocephalus) Wintering in Northeastern Wyoming. Wyoming Cooperative Fishery and Wildlife Research Unit. University of Wyoming. Laramie, WY.

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

Reading, R., and Randy Matchet. 1997. Attributes of Black-tailed Prairie Dog Colonies in Northcentral Montana. Journal of Wildlife Management 61(3): 664-673.

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

Rogers, Brad. Personal Communication. Fish and Wildlife Biologist. U.S. Fish and Wildlife Service, Cheyenne Field Office. Cheyenne, WY.

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

Rowland, M. M., M. Leu, , S. P. Finn, S. Hanser, L. H. Suring, J. M. Boyd, C. W. Meinke, S. T. Knick, and M. J. Wisdom. 2005. Assessment of threats to sagebrush habitats and associated species of concern in the Wyoming Basins. Version 1.1, June 2005, unpublished report on file at USGS Biological Resources Discipline, Snake River Field Station, 970 Lusk St., Boise, ID 83706.

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

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

Uresk, D. W. and J. C. Sharps. 1986. Denning Habitat and Diet of the Swift Fox in Western South Dakota. Great Basin Naturalist 46: 249-253.

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

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

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

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

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

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

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

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

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

WGFD. 2003. Wyoming Greater Sage-Grouse Conservation Plan. WGFD. Cheyenne, WY

8. LIST OF INTERDISCIPLINARY TEAM PREPARERS AND REVIEWERS

Dave Skinner, Natural Resource Specialist
Casey Freise, Supervisory Natural Resource Specialist
Ben Adams, Hydrologist
Dave Chase, Petroleum Engineer
Kristine Phillips, Legal Instruments Examiner
Wendy Sutton, Archaeologist
Guymen Easdale/Dave Skinner, Wildlife Biologist
Gerald Queen, Geologist
Tom Bills, NEPA Coordinator
Jennifer Morton, Wildlife Biologist
Jennifer Spegon, Natural Resource Specialist
Buddy Green, Assistant Field Manager, Resources
Paul Beels, Associate Field Manager, Minerals & Lands
Chris E. Hanson, Field Manager

Interdisciplinary Team Lead: Dave Skinner