

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Yates Petroleum
Acacia**

ENVIRONMENTAL ASSESSMENT –WY-070-EA07-114

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Yates Petroleum’s Acacia Coal Bed Natural Gas (CBNG) POD comprised of the following 55 Applications for Permit to Drill (APDs), as follows:

	Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
1	ACACIA FARIS CS FEDERAL COM	1	NENE	1	52N	75W	WYW130612
2	ACACIA FARIS CS FEDERAL COM	3	SWSW	1	52N	75W	WYW130612
3	ACACIA FARIS CS FEDERAL COM	2	NENW	1	52N	75W	WYW130612
4	ACACIA GILDA CS FEDERAL COM	1	SWNW	1	52N	75W	WYW128607
5	ACACIA GILDA CS FEDERAL COM	2	SWNE	1	52N	75W	WYW128607
6	ACACIA GILDA CS FEDERAL COM	3	NESW	1	52N	75W	WYW128607
7	ACACIA FARIS CS FEDERAL COM	4	NENE	2	52N	75W	WYW130612
8	ACACIA GILDA CS FEDERAL	6	NESW	2	52N	75W	WYW128607
9	ACACIA GILDA CS FEDERAL	7	SWSW	2	52N	75W	WYW128607
10	ACACIA GILDA CS FEDERAL	8	SWSE	2	52N	75W	WYW128607
11	ACACIA GILDA CS FEDERAL	5	NESE	2	52N	75W	WYW128607
12	ACACIA GILDA CS FEDERAL COM	4	SWNE	2	52N	75W	WYW128607
13	ACACIA NORTON CS	2	NESW	4	52N	75W	WYW136626
14	ACACIA NORTON CS FEDERAL	1	NESE	4	52N	75W	WYW136626
15	ACACIA NORTON CS FEDERAL	3	SWSW	4	52N	75W	WYW136626
16	ACACIA NORTON CS FEDERAL	4	SWSE	4	52N	75W	WYW136626
17	ACACIA CS	5	NESE	5	52N	75W	WYW130085
18	ACACIA CS	7	SWSW	5	52N	75W	WYW130085
19	ACACIA CS	8	SWSE	5	52N	75W	WYW130085
20	ACACIA CS FEDERAL	1	NENE	5	52N	75W	WYW130085
21	ACACIA CS FEDERAL	2	NENW	5	52N	75W	WYW130085
22	ACACIA CS FEDERAL	4	SWNE	5	52N	75W	WYW130085
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24	ACACIA CS FEDERAL COM	3	SWNW	5	52N	75W	WYW130085
25	ACACIA CS	9	NENE	6	52N	75W	WYW130085
26	ACACIA CS	10	SWNE	6	52N	75W	WYW130085
27	ACACIA CS COM	11	NESE	6	52N	75W	WYW130085
28	ACACIA CS FEDERAL	12	NENE	8	52N	75W	WYW130085
29	ACACIA CS FEDERAL	13	SWNE	8	52N	75W	WYW130085
30	ACACIA CS FEDERAL COM	14	NESE	8	52N	75W	WYW130085
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36	ACACIA NORTON CS FEDERAL	7	SWNW	9	52N	75W	WYW136626
37	ACACIA NORTON CS FEDERAL	8	SWNE	9	52N	75W	WYW136626
38	ACACIA CS	16	SWNE	10	52N	75W	WYW130085
39	ACACIA CS COM	15	NENW	10	52N	75W	WYW130085
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42	ACACIA GILDA CS COM	12	SWNW	10	52N	75W	WYW128607
43	ACACIA GILDA CS COM	13	NESE	10	52N	75W	WYW128607
44	ACACIA FARIS CS COM	7	NESW	11	52N	75W	WYW130612
45	ACACIA FARIS CS FEDERAL	6	SWNW	11	52N	75W	WYW130612
46	ACACIA FARIS CS FEDERAL	5	NENW	11	52N	75W	WYW130612
47	ACACIA FARIS CS FEDERAL	8	NENW	14	52N	75W	WYW130612
48	ACACIA FARIS CS FEDERAL	9	SWNW	14	52N	75W	WYW130612
49	ACACIA IVAN CS	1	NENE	14	52N	75W	WYW132256
50	ACACIA IVAN CS FEDERAL	2	SWNE	14	52N	75W	WYW132256
51	ACACIA IVAN CS FEDERAL	3	NESE	14	52N	75W	WYW132256
52	ACACIA IVAN CS FEDERAL	4	SWSE	14	52N	75W	WYW132256
53	ACACIA GILDA CS COM	16	NESW	15	52N	75W	WYW128607
54	ACACIA IVAN CS	5	NENE	15	52N	75W	WYW132256
55	ACACIA IVAN CS COM	6	SWSW	15	52N	75W	WYW132256

The following impoundments/outfalls have been approved under this federal action:

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Lease Number	Outfall Number
1	CORKY	NENE	4	52	75	WYW138313	031
2	CORN FIELD	NESW	10	52	75	WYW128607	010
3	COYOTE DRAW	SWNE	10	52	75	WYW130085	008
4	DAME	NESW	33	53	75	WYW143986	032
5	DEER TRACKS	NENE	15	52	75	WYW132256	016
6	EDLEE	NWSE	4	52	75	WYW136626	025
7	GLIDE	SWSW	10	52	75	WYW128607	012
8	HACK	SWSE	4	52	75	WYW136626	023
9	HORSE PASTURE	NENW	10	52	75	WYW130085	006
10	HYDROPHYLILIC	NWNE	14	52	75	WYW132256	017
11	LESLIE	SESE	10	52	75	WYW132256	015
12	MIDDLE FORK	SWSW	10	52	75	WYW128607	011
13	MOUTH	SESW	14	52	75	WYW139678	021
14	NOTRE DAME	NWNE	14	52	75	WYW132256	018

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Lease Number	Outfall Number
15	ROCK	SENE	15	52	75	WYW132256	019
16	ROWDY	SWNW	15	52	75	WYW128607	020
17	SCORIA FALLS	NWSE	6	52	75	WYW130085	033
18	SHELF ROCK	SWNE	2	52	75	WYW146813	005
19	TARGET	NWNE	4	52	75	WYW138313	029
20	TEN RING	SWNE	4	52	75	WYW138313	028
21	THE BANDIT	SENE	10	52	75	WYW130085	009
22	TIE	SESE	4	52	75	WYW136626	024
23	TRAFFIC	NWNW	15	52	75	WYW128607	013
24	VALLEY VIEW	NENE	4	52	75	WYW138313	027
25	VIBE	NWNE	2	52	75	WYW146813	004
26	WELL GARDEN	NWSW	3	52	75	WYW146813	026
27	WORLEY DRAW	NWNW	11	52	75	WYW130612	007
28	TREE HOUSE	SESW	8	52	75	N/A	022
29	FRANKY	NWNW	14	52	75	N/A	014
30	COTTONWOOD	NWNW	1	52	75	WYW128607	003

The following impoundments/outfalls have not been approved under this federal action:

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Lease Number	Outfall Number
1	EXISTING RESERVOIR	NWNE	4	52	75	WYW138313	030
3	BURNING COAL	NWNE	1	52	75	WYW130612	002
4	DIXIE LYNN	NENW	1	52	75	WYW130612	001

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
Acacia
PLAN OF DEVELOPMENT
WY-070-EA07-114**

INTRODUCTION

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

1. PURPOSE AND NEED

The purpose for the proposal is to define and produce coal bed natural gas (CBNG) on 5 valid federal oil and gas mineral leases issued to the applicant by the BLM. Analysis has determined that federal CBNG is being drained from the federal leases by surrounding fee or state mineral well development. The need exists because without approval of the Applications for Permit to Drill (APDs), federal lease royalties will be lost and the lessee will be deprived of the federal gas they have the rights to develop. It is the continuing policy of the Federal Government to foster and encourage private enterprise in the development of a stable domestic minerals industry and the orderly and economic development of domestic mineral resources; as set forth in the Mining and Minerals Policy Act of 1970. In addition the Energy Policy Act of 2005 encourages the development of the nation's domestic energy resources to reduce the United States dependence of foreign energy sources.

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 Acacia Plan of Development (POD) for 55 coal bed natural gas well APD's and associated infrastructure.

Proposed Well Information: There are 55 wells proposed within this POD, as follows:

	Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
1	ACACIA FARIS CS FEDERAL COM	1	NENE	1	52N	75W	WYW130612
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20	SHELF ROCK	SWNE	2	52	75	WYW146813	005
21	TARGET	NWNE	4	52	75	WYW138313	029

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Lease Number	Outfall Number
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23	THE BANDIT	SENE	10	52	75	WYW130085	009
24	TIE	SESE	4	52	75	WYW136626	024
25	TRAFFIC	NWNW	15	52	75	WYW128607	013
26	VALLEY VIEW	NENE	4	52	75	WYW138313	027
27	VIBE	NWNE	2	52	75	WYW146813	004
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30	TREE HOUSE	SESW	8	52	75	FEE	022
31	FRANKY	NWNW	14	52	75	FEE	014
32	EXISTING RESERVOIR	NWNE	4	52	75	WYW138313	030
33	COTTONWOOD	NWNW	1	52	75	WYW128607	003

County: Campbell

Applicant: Yates Petroleum

Surface Owners: Kit and Patricia Laramore-Deer Track, LLC, Dixie Lynn and Richard W. Reece,
Fred and Darlene Floyd-Floyd Land and Livestock Inc., T.J. Ferguson-Eaton Bros.,
USA/BLM

Project Description:

The proposed action involves the following:

- Drilling of 55 total federal CBM wells proposed to be single well bores for each location in which subsurface commingling is proposed in the Anderson, Canyon, Smith, and Wall coal zones to depths of approximately 500-1,400 feet. Coal zones will be developed on a well by well decision per coal thickness and relative volume of water production determined during drilling. Each coal zone will have a minimum thickness requirement for production due to economic return. Drilling of these wells will use standard timeframes and drilling techniques.
- An unimproved and improved road network.
- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 33 discharge points and 33 stock water reservoirs within the Upper Powder River primary watershed.
- A buried gas, water and power line network, and 0 central gathering/metering facilities and 0 compression facilities.
- An above ground power line network.

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

pages 2-9 through 2-40 (January 2003).

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

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

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

The following Right-of-Way applications that are associated with this project have been received and are currently being processed.

- WYW-169785
- WYW-169786

2.3. Alternative C – Environmentally Preferred

Alternative C represents a modification of Alternative B based on the operator and BLM working cooperatively to reduce environmental impacts. The description of Alternative C is the same as Alternative B with the addition of the project modifications identified by BLM and the operator following the initial project proposal (Alternative B). At the on-sites, all areas of proposed surface disturbance were inspected to reduce potential impacts to natural resources. In some cases, access roads were re-routed, and well locations, pipelines, discharge points and other water management control structures were moved, modified, mitigated or dropped from further consideration to alleviate or minimize 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 Acacia POD are listed below under 2.3.1:

2.3.1. Changes as a result of the on-sites

- Access and well location for 3GILD-COM was moved out of line-of sight from a golden eagle nest that was active in 2006.
- Acacia CS Federal 10 – The location sits on a sidehill and would require a constructed pad. Reserve pit to be lined, soil stabilization measures will need to be identified especially on the east side of the location.
- Acacia CS Federal Com. 11 – Expedient reclamation due to sandy soils being present that are highly susceptible to wind erosion.
- Gilda CS Federal 11 – Gravel in low area of road and waterwings to provide traction and drainage as road is planned to remain primitive.
- Ivan CS Federal 5 – Location changed to slot design; Road to be a primitive road and gate could be locked; BLM will need a key or the combination.

- Gilda CS Federal Com #10 – Expedient reclamation on engineered section and template road for stabilization due to sandy soils being present that are highly susceptible to wind erosion. Turnout needed at the bottom and a turnout needed where access road meets main road.
- Gilda CS Federal Com #12 – Expedient reclamation on road due to sandy soils being present that is highly susceptible to wind erosion.
- Norton CS Federal #5 – Road to be a primitive road. Some short sections, grade exceeds 8% so gravel will need to be applied.
- Acacia CS Federal #1 – Constructed Pad; Point E will be pulled in 25ft and Points A&B will be widened. Pipeline goes to the SE across drainage and a 50-60ft disturbance corridor will be needed.
- Acacia CS Federal #9 -- Expedient Reclamation due to sandy soils being present that are highly susceptible to wind erosion and the road to south is for ranch access only.
- Acacia CS Federal #7 – Cattle congregate here as there is an existing stock tank and the stock tank cannot be moved. Currently the area is heavily grazed and the reclamation potential would be low. The location will be fenced off from livestock until interim reclamation has taken place and the vegetation has become established enough to withstand livestock grazing.
- Acacia CS Federal Com #3 – Expedient reclamation due to sandy soils being present that is highly susceptible to wind erosion.
- Acacia CS Federal #4 – The road crosses a number of places that are at the tops of side drainages; Monitoring of Low Water Crossing's put in for erosion will be needed.
- Gilda CS Federal #6 – Road to be brush-hogged 25ft to protect sagebrush habitat.
- Norton CS Federal #8 – 20ft undisturbed vegetative buffer between edge of disturbance and drainage
- Norton CS Federal #6 – Road disturbance estimated at 50-70ft wide; more in steeper terrain. Headcut present and a 45° pipe to bottom of drainage; rock and riprap will need to be installed; Monitor for erosion. Expedient reclamation due to potential erosive soils.
- Faris CS Federal #8 – Pipeline route will need to be blocked off from vehicle traffic.
- Ivan CS Federal #2 – 20ft undisturbed vegetative buffer between edge of disturbance and drainage.
- Ivan CS Federal #4 – Expedient reclamation due to sandy soils being present that are highly susceptible to wind erosion; knock down small hump where well road takes off of main road to give better sighting distance and turnout.
- Ivan CS Federal #1 – Well moved to North to be farther away from Petro-Canada's existing line.
- Faris CS Federal #5 – Moved location to south to edge of sagebrush; still in the window.
- Gilda CS Federal #8 – Expedient reclamation and 20ft undisturbed vegetative buffer between edge of disturbance and drainage.
- Gilda CS Federal Com #4 – The location was moved upslope as the staked location would have put the well pad into the drainage which is unacceptable. The location will still need a pad and a new road will be constructed.
- Faris CS Federal Com #4 – Spot upgrades will be needed on road to level some spots for rig access.
- Faris CS Federal Com #1 – Expedient reclamation due to sandy soils being present that is highly susceptible to wind erosion. Access road was changed to go along the side hill to the North then hook back into main road; this will eliminate the steep grade as the original road came off of hill.

2.3.2. Programmatic mitigation measures identified in the PRB FEIS ROD

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

addition to stipulations applied at the time of lease issuance and any standard COA.

2.3.2.1. Groundwater

1. In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ had developed a guidance document, "Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments" (June 14, 2004). This guidance document was revised and is superseded by the "Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments" which was approved September, 2006. Approximately 1,106 new impoundments have been investigated to date (3/07) with 161 impoundments being regulated under 71 permits. Of these impoundments 7 have caused exceedance of the class of use of the receiving aquifer, of which only 1 has not returned to existing class of use of the shallow ground water beneath it.

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 be required to provide a reclamation bond for impoundments over federal minerals in the amount specified by a qualified Professional Engineer for the impoundments to be used for the management of CBNG water. The bond amount will be submitted within 90 days after POD approval and will be approved by the BLM prior to commencing construction.
5. 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. Vegetation

1. Temporarily fence reseeded areas, if not already fenced, for at least two complete growing seasons to insure reclamation success on problematic sites (e.g. close to livestock watering source, erosive soils etc.).

2.3.2.5. Wetland/Riparian

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

2.3.2.6. Wildlife

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.
2. The Companies will locate facilities so that noise from the facilities at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.
3. The Companies will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.
4. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.
5. The Companies will limit the construction of aboveground power lines near streams, water bodies, and wetlands to minimize the potential for waterfowl colliding with power lines.
6. All stock tanks shall include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.
7. At the discretion of the surface owner, native species would be planted to re-establish special habitats.
8. Additional measures may be necessary if the site-specific project is determined by a Bureau biologist to have an adverse effect on a Threatened, Endangered, Proposed, or Candidate species or their habitat.

2.3.2.7. Threatened, Endangered, or Sensitive Species

2.3.2.7.1. Bald Eagle

1. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of Sundry Notices.
2. Surveys for active bald eagle nests and winter roost sites will be conducted within suitable habitat by a biologist. Surface disturbing activities will not be permitted within one mile of suitable habitat prior to survey completion.
3. A disturbance-free buffer zone of at least 0.5 mile will be established year round for any identified bald eagle nests. This buffer may be adjusted based on topographic features, visibility, disturbance and human activity levels, land use plans, and other factors. A seasonal minimal disturbance buffer zone of at least 1-mile will be established for all bald eagle nest sites (February 1 – August 15). These buffer zone restrictions will be based on site specific information and coordinated with the Service's Wyoming Field Office which will provide written agreement. Note: Although active bald eagle nests occur throughout the PRBEIS project area; they are more concentrated along Clear Creek, Piney Creek, Powder River, and Tongue River.
4. A year-round disturbance-free buffer zone of at least 0.5 mile will be established year round for any identified bald eagle roost sites. This buffer may be adjusted based on topographic features, visibility, disturbance and human activity levels, land use plans, and other factors. A seasonal minimal disturbance buffer zone of at least 1-mile will be established for all bald eagle roost sites (November 1 – April 15). These buffer zone restrictions will be based on site specific information and coordinated with the Service's Wyoming Field Office which will provide written agreement. Note: Although active bald eagle roosts occur throughout the PRBEIS project area; they are more concentrated along Clear Creek, Piney Creek, Powder River, and Tongue River.
5. Weed treatment and limited reclamation activities (i.e. seeding) may occur within a 0.5 to 1.0 mile radius of active bald eagle nests between May 15 and June 15. Operators must contact the authorizing agency who will coordinate with and receive written confirmation from the Service before application of this measure.

2.3.2.7.2. Ute Ladies'-tresses Orchid

1. Moist soils near wetlands, streams, lakes, or springs in the project area will be promptly revegetated if construction activities impact the vegetation in these areas. Revegetation will be designed to avoid the establishment of noxious weeds.
2. If reclamation or weed treatment is proposed within suitable Ute ladies'-tresses habitat and during the orchid's growing season (July 1 – September 30) then a survey for the orchid, according to FWS protocol, shall be conducted prior to treatment. If any orchids are found, in order to minimize potential effects, the Service shall be consulted with prior to implementation.

2.3.2.8. Visual Resources

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

2.3.2.9. 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.

2.3.2.10. 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

1. All changes made at the onsite will be followed. They have all been incorporated into the operator’s POD.
2. The proposed disturbances are along ridges in shallow sandy and sandy soils that are highly susceptible to wind erosion. For those proposed disturbance areas identified below, there are lands having a wind erodibility index (I) in tons/acre/year averaging 220 ton/acre/year if not properly mitigated. These soils have low available water holding capacity, low soil organic matter content, limited topsoil depth, and low soil fertility making the potential for reclamation and stabilization very difficult. The sites must be stabilized in a manner which eliminates erosion until a self-perpetuating non-weed native plant community has stabilized the site in accordance with the Wyoming Reclamation Policy. Stabilization efforts shall be finished within 30 days of the initiation of construction activities.

Well name(s):

Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG
ACACIA CS COM	11	NESE	6	52N	75W
ACACIA CS	9	NENE	6	52N	75W
ACACIA CS FEDERAL COM	3	SWNW	5	52N	75W
ACACIA NORTON CS FEDERAL	6	NENW	9	52N	75W
ACACIA IVAN CS FEDERAL	4	SWSE	14	52N	75W
ACACIA GILDA CS FEDERAL	8	SWSE	2	52N	75W
ACACIA FARIS CS FEDERAL COM	1	NENE	1	52N	75W

Road / Pipeline section (s):

- Engineered section and template road for the Gilda CS Federal Com #10 well site.
- Access Road for the Gilda CS Federal Com #12 well site.

3. The following well locations will be temporarily fenced reseeded areas, if not already fenced, for at least two complete growing seasons to insure reclamation success

Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG
ACACIA CS COM	11	NESE	6	52N	75W
ACACIA CS	9	NENE	6	52N	75W

Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG
ACACIA CS FEDERAL COM	3	SWNW	5	52N	75W
ACACIA NORTON CS FEDERAL	6	NENW	9	52N	75W
ACACIA IVAN CS FEDERAL	4	SWSE	14	52N	75W
ACACIA GILDA CS FEDERAL	8	SWSE	2	52N	75W
ACACIA FARIS CS FEDERAL COM	1	NENE	1	52N	75W
ACACIA GILDA CS FEDERAL	7	SWSW	2	52N	75W

4. The following three reservoirs were denied in order to protect a red-tail hawk nest and sharp tail grouse nesting and brooding habitat:

	IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Lease #	Outfall Number
1	EXISTING RESERVOIR SPRING DRAW	NWNE	4	52	75	WYW138313	030
3	BURNING COAL	NWNE	1	52	75	WYW130612	002
4	DIXIE LYNN	NENW	1	52	75	WYW130612	001

5. The following impoundments are located on BLM surface and are not allowed to be constructed until a ROW application and bond has been authorized by the Buffalo Field Office.

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Lease Number
1	DAME	NESW	33	53	75	WYW143986
2	EDLEE	NWSE	4	52	75	WYW136626
3	HACK	SWSE	4	52	75	WYW136626
4	HYDROPHYLILIC	NWNE	14	52	75	WYW132256
5	LESLIE	SESE	10	52	75	WYW132256
6	MOUTH	SESW	14	52	75	WYW139678
7	NOTRE DAME	NWNE	14	52	75	WYW132256
8	SCORIA FALLS	NWSE	6	52	75	WYW130085
9	SHELF ROCK	SWNE	2	52	75	WYW146813
10	TEN RING	SWNE	4	52	75	WYW138313
11	THE BANDIT	SENE	10	52	75	WYW130085
12	TIE	SESE	4	52	75	WYW136626
13	TRAFFIC	NWNW	15	52	75	WYW128607
14	VIBE	NWNE	2	52	75	WYW146813
15	WORLEY DRAW	NWNW	11	52	75	WYW130612
16	COTTONWOOD	NWNW	1	52	75	WYW128607

6. The approval of this project does not grant authority to use off lease Federal lands. No access or surface activity is allowed on or off the affected leases on Federal lands until right-of-way grants become authorized.
7. All permanent above-ground structures (e.g., production equipment, tanks, etc.) not subject to safety requirements will be painted to blend with the natural color of the landscape. The paint used will be a

color which simulates “Standard Environmental Colors.” The color selected for the Acacia POD is Covert Green, 18-0617 TPX.

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:

(15”-17”Precip Zone) Loamy Sites:

Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
ACACIA FARIS CS FEDERAL COM	1	NENE	1	52N	75W	WYW130612
ACACIA FARIS CS FEDERAL COM	3	SWSW	1	52N	75W	WYW130612
ACACIA GILDA CS FEDERAL COM	1	SWNW	1	52N	75W	WYW128607
ACACIA GILDA CS FEDERAL COM	3	NESW	1	52N	75W	WYW128607
ACACIA FARIS CS FEDERAL COM	4	NENE	2	52N	75W	WYW130612
ACACIA GILDA CS FEDERAL	6	NESW	2	52N	75W	WYW128607
ACACIA GILDA CS FEDERAL	7	SWSW	2	52N	75W	WYW128607
ACACIA GILDA CS FEDERAL	8	SWSE	2	52N	75W	WYW128607
ACACIA GILDA CS FEDERAL	5	NESE	2	52N	75W	WYW128607
ACACIA GILDA CS FEDERAL COM	4	SWNE	2	52N	75W	WYW128607
ACACIA NORTON CS FEDERAL	3	SWSW	4	52N	75W	WYW136626
ACACIA NORTON CS FEDERAL	4	SWSE	4	52N	75W	WYW136626
ACACIA CS	5	NESE	5	52N	75W	WYW130085
ACACIA CS	8	SWSE	5	52N	75W	WYW130085
ACACIA CS FEDERAL	4	SWNE	5	52N	75W	WYW130085
ACACIA CS FEDERAL	6	NESW	5	52N	75W	WYW130085
ACACIA CS FEDERAL	12	NENE	8	52N	75W	WYW130085
ACACIA CS FEDERAL	13	SWNE	8	52N	75W	WYW130085
ACACIA GILDA CS	9	NESE	9	52N	75W	WYW128607
ACACIA NORTON CS FEDERAL	5	NENE	9	52N	75W	WYW136626
ACACIA NORTON CS FEDERAL	6	NENW	9	52N	75W	WYW136626
ACACIA NORTON CS FEDERAL	7	SWNW	9	52N	75W	WYW136626
ACACIA NORTON CS FEDERAL	8	SWNE	9	52N	75W	WYW136626
ACACIA CS	16	SWNE	10	52N	75W	WYW130085
ACACIA FARIS CS COM	7	NESW	11	52N	75W	WYW130612
ACACIA IVAN CS	1	NENE	14	52N	75W	WYW132256
ACACIA IVAN CS FEDERAL	2	SWNE	14	52N	75W	WYW132256
ACACIA GILDA CS COM	16	NESW	15	52N	75W	WYW128607
ACACIA IVAN CS	5	NENE	15	52N	75W	WYW132256
ACACIA IVAN CS COM	6	SWSW	15	52N	75W	WYW132256

15"-17" Loamy Ecological Site

Species - Cultivar	% in Mix	Lbs PLS
Thickspike Wheatgrass – <i>Critana</i> OR Western Wheatgrass - <i>Rosana</i>	35	4.2
Bluebunch Wheatgrass – <i>Secar</i> or <i>P-7</i>	15	1.8
Green needlegrass - <i>Lodorm</i>	25	3.0
American vetch OR Cicer Milkvetch - <i>Lutana</i>	10	1.2
White – <i>Antelope</i> or Purple Prairie Clover – <i>Bismarck</i>	5	0.60
Lewis - <i>Appar</i> , Blue, or Scarlet flax	5	0.60
Winterfat – <i>Open Range</i>	5	0.60
Totals	100%	12 lbs/acre

(15"-17" Precip Zone) Shallow Loamy Sites:

Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
ACACIA NORTON CS	2	NESW	4	52N	75W	WYW136626
ACACIA CS FEDERAL	2	NENW	5	52N	75W	WYW130085
ACACIA CS FEDERAL COM	3	SWNW	5	52N	75W	WYW130085
ACACIA CS	9	NENE	6	52N	75W	WYW130085
ACACIA CS	10	SWNE	6	52N	75W	WYW130085
ACACIA CS COM	11	NESE	6	52N	75W	WYW130085
ACACIA CS FEDERAL COM	14	NESE	8	52N	75W	WYW130085
ACACIA GILDA CS	11	SWSE	9	52N	75W	WYW128607
ACACIA GILDA CS FEDERAL COM	10	NESW	9	52N	75W	WYW128607
ACACIA GILDA CS	14	NESW	10	52N	75W	WYW128607
ACACIA GILDA CS	15	SWSW	10	52N	75W	WYW128607
ACACIA GILDA CS COM	12	SWNW	10	52N	75W	WYW128607
ACACIA FARIS CS FEDERAL	5	NENW	11	52N	75W	WYW130612
ACACIA FARIS CS FEDERAL	8	NENW	14	52N	75W	WYW130612
ACACIA FARIS CS FEDERAL	9	SWNW	14	52N	75W	WYW130612
ACACIA IVAN CS FEDERAL	3	NESE	14	52N	75W	WYW132256
ACACIA IVAN CS FEDERAL	4	SWSE	14	52N	75W	WYW132256

15''-17'' Shallow Loamy Ecological Site

Species - Cultivar	% in Mix	Lbs PLS
Western Wheatgrass – <i>Rosana</i>	30	3.6
Bluebunch Wheatgrass – <i>Secar or P-7</i>	20	2.4
Green needlegrass - <i>Lodorm</i>	20	2.4
Thickspike Wheatgrass – <i>Critana</i>	15	1.8
White – <i>Antelope</i> or Purple Prairie Clover – <i>Bismarck</i>	5	0.60
Prairie coneflower	5	0.60
American vetch	5	0.60
Totals	100%	12 lbs/acre

(15''-17'' Precip Zone) Clayey Sites:

Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
ACACIA FARIS CS FEDERAL COM	2	NENW	1	52N	75W	WYW130612
ACACIA GILDA CS FEDERAL COM	2	SWNE	1	52N	75W	WYW128607
ACACIA NORTON CS FEDERAL	1	NESE	4	52N	75W	WYW136626
ACACIA CS FEDERAL	1	NENE	5	52N	75W	WYW130085
ACACIA CS COM	15	NENW	10	52N	75W	WYW130085
ACACIA GILDA CS COM	13	NESE	10	52N	75W	WYW128607
ACACIA FARIS CS FEDERAL	6	SWNW	11	52N	75W	WYW130612

15''-17'' Clayey Ecological Site

Species - Cultivar	% in Mix	Lbs PLS
Western Wheatgrass – <i>Rosana</i>	40	4.8
Green needlegrass - <i>Lodorm</i>	40	4.8
American vetch OR Cicer Milkvetch - <i>Lutana</i>	10	1.2
Lewis - <i>Appar</i> , Blue, or Scarlet flax	5	0.60

Species - Cultivar	% in Mix	Lbs PLS
Fourwing saltbush	5	0.60
Totals	100%	12 lbs/acre

(10"-14" Precip Zone) Clayey Sites:

Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
ACACIA CS	7	SWSW	5	52N	75W	WYW130085

10"-14" Clayey Ecological Site

Species - Cultivar	% in Mix	Lbs PLS
Western Wheatgrass - <i>Rosana</i>	35	4.2
Slender Wheatgrass	20	1.2
Green needlegrass - <i>Lodorm</i>	30	4.8
American vetch OR Rocky Mountain beeplant	5	0.60
White – <i>Antelope</i> or Purple Prairie Clover – <i>Bismarck</i>	5	0.60
Prairie coneflower	5	0.60
Totals	100%	12 lbs/acre

9. 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.
10. The Record of Decision for the Powder River Basin EIS includes a programmatic mitigation measure that states, "The companies will conduct clearance surveys for threatened and endangered or other special-concern species at the optimum time". The measure requires companies to coordinate with the BLM before November 1 annually to review the potential for disturbance and to agree on inventory parameters. Should this project not be completed by November 1, 2007 additional surveys may be required.
11. The following conditions will minimize impacts to bald eagles:
 - a. Prior to contracting for the overhead powerline that crosses Wild Horse Creek, Yates, the contracting entity, BLM and the US Fish and Wildlife shall meet to decide how this line can be constructed to comply with the Endangered Species Act
 - b. No surface disturbing activity shall occur within one mile of bald eagle habitat (Wild Horse Creek) annually from November 1 through April 1 (CM9), prior to a winter roost survey or

from February 1 through August 15 (CM8) prior to a nesting survey. This affects the 10 Acacia, 11 Acacia wells and access, and the 7 Acacia well. A survey will be required on an annual basis for the duration of surface disturbing activities.

- c. If a roost is identified and construction has not been completed, a year round disturbance-free buffer zone of 0.5 mile and a seasonal (November 1 - April 1) minimal disturbance buffer zone of 1 mile will be established for all bald eagle winter roost sites. Additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 AM and 3:00 PM will be necessary to prevent disturbance.
 - d. If a nest is identified and construction has not been completed, a disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) would be established year round for all bald eagle nests. A seasonal minimum disturbance buffer zone of 1-mile will be established for all bald eagle nest sites (February 1 - August 15).
 - e. The Companies will construct power lines to minimize the potential for eagle/raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors (particularly within one mile of bald eagle nest and roost habitat).
12. The following conditions will minimize impacts to raptors:
- a. The western-most existing reservoir in Spring Draw (NWNE Section 4) will not be permitted to receive produced water in order to protect the red-tailed hawk nest next to the dam.
 - b. No surface disturbing activity including maintenance activity shall occur on Cottonwood Reservoir that is within ½ mile of the golden eagle nest (BLM ID # 2770) from February 1 through July 31, annually prior to a raptor nest occupancy survey for the current breeding season.
 - c. No surface disturbing activity shall occur within ½ mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This affects the following wells, reservoirs and their associated infrastructure;

WELL / PIT #	BLM ID #	SPECIES	UTM (NAD 83)	2006 STATUS	DISTANCE IN MILES
Dame Reservoir	3519	Unknown	429965 4931817	Inactive	0.25
Dame Reservoir	3795	Great-horned owl	429367 4930964	Active	0.25
10ACAC	3796	Unknown	425952 4930055	Undetermined	.05
10ACAC	3797	Unknown	425945 4930048	Undetermined	.05
Target , Corky, Ten Ring, Ed Lee Reservoirs	3798	Red-tailed hawk	429480 4929990	Active	0.25-0.5
10ACAC	3799	Unknown	425933 4929942	Undetermined	.05
10ACAC Scoria Falls Reservoir	3800	Red-tailed hawk	425845 4929520	Undetermined	.05
2FARI COM	2770	Golden Eagle	434196 4929484	Active	0.4
2GILD COM					0.3
3GILD COM					0.3
3FARI COM					0.5
5GILD					0.5
Cottonwood					0.3
					0.3

WELL / PIT #	BLM ID #	SPECIES	UTM (NAD 83)	2006 STATUS	DISTANCE IN MILES
					0.25
10ACAC 11ACAC COM Scoria Falls Res.	3801	Great-horned owl	426246 4929241	Undetermined	0.4 0.5 0.25
1NORT 5NORT 12GILD COM 15ACAC Well Garden Tie Horse Pasture	3802	Unknown buteo	430834 4928854	Inactive	0.4 0.4 0.5 0.3 0.4 0.4 0.3
11GILD COM	2632	Red-tailed hawk	429975 4926488	Inactive	0.4
15GILD 11GILD COM Middle Fork Clide Traffic	3806	Unknown	430306 4926583	Inactive	0.4 0.3 0.5 0.4 0.4
3IVAN 4IVAN	2635	Unknown	433410 4925311	Undetermined	0.5 0.3

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

13. The following conditions will minimize impacts to sage-grouse:

- a. No surface disturbing activities are permitted within 2 miles of the Twentymile lek (T52N:R75W:S24), the Laramore lek T53N:R75W:S26, and the 41-Colton lek T53N:R74W:S32 between March 1 and June 15, prior to completion of a greater sage-grouse lek survey (activity status on previously identified leks and searches for new lek sites) for the current breeding season and results reviewed by a BLM biologist. This condition will be implemented on an annual basis for the duration of surface disturbing activities.

This will apply to following as depicted on the 2/27/07 map D: **all of sections 1, 2, 11, 14, 16GILD-COM, 5IVAN.**

- b. If an active lek is identified during the survey, the 2 mile timing restriction (March 1-June 15) will be applied and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 2 mile buffer until the following

- breeding season (March 1). The required sage grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
- c. Well metering, maintenance and other site visits within 0.5 miles of documented sage grouse lek sites shall be minimized as much as possible during the breeding season (March 1– June 15), and restricted to between 0900 and 1500 hours.
 - d. Creation of raptor hunting perches will be avoided within 0.5-mile of documented sage grouse lek sites. Perch inhibitors will be installed to deter avian predators from preying on sage grouse.
14. The following conditions will minimize impacts to sharp-tailed grouse:
- a. The Burning Coal and Dixie Lynn Reservoirs will not be permitted to protect the Eaton II sharp-tailed lek and adjacent nesting and brood-rearing habitat.
 - b. A 1/2 mile timing restriction (March 1-June 15) will be applied to the Eaton II lek. Surface disturbing activities will not be permitted until after the nesting season for the following locations: 1FARI-COM, 2FARI-COM, 1GILD-COM, 2GILD-COM, and Cottonwood Reservoirs.
 - c. The project area, and surrounding buffer (1/2 miles from proposed disturbance) shall be surveyed for grouse yearly until all construction is completed. If an active lek is identified during future surveys, the 1/2 mile timing restriction (March 1-June 15) will be applied and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities will be permitted within the buffer until the following breeding season (March 1). The required survey will be conducted by a biologist following BLM and WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist prior to surface disturbing activities.
15. The following conditions will minimize impacts to black-tailed prairie dog:
- a. The powerline proposed over the prairie dog town in the NESW Section 2 shall be fitted with perch inhibitors to prevent raptor perching. If power poles are placed by a contractor, then Yates shall specify in their work order that poles be fitted with perch inhibitors.

2.4. Alternatives considered but not analyzed in detail

Direct Discharge

Direct discharge to tributaries of Wild Horse Creek is not feasible as the sole water management strategy because there are not a sufficient number of tributaries to contain the proposed water production volume prior to reaching the Powder River as required by the WDEQ.

Re-injection

Re-injection of produced water within the Acacia POD has also been considered. A review of the well logs on file with the Wyoming Oil and Gas Conservation Commission and available geologic information suggests that there are no aquifers within the immediate area that have sufficient storage capacity to accept the volume of CBNG water that would be produced within the Acacia POD. Re-injection into deep saltwater aquifers would also render the relatively high quality produced water unsuitable for future use. Therefore, re-injection is not a reasonable solution for the disposal of produced water within the Acacia POD.

Land Application

Land application of produced water within the Acacia POD has also been considered. Land application would involve applying the water to cropland at agronomic rates through an irrigation system. Land application is at best a seasonal approach and would require the construction of several reservoirs to store produced water during the non-irrigation season. Due to the high construction and operating costs and lack of landowner interest, land application was ruled out.

Treatment of Produced Water

Treatment of produced water from the Acacia POD with subsequent discharge into the Wild Horse Creek has been extensively researched to examine the full range of possibilities. The following potential treatment technologies were considered: Sulfur burners, constructed wetlands, rapid spray distillation, electro dialysis reversal, electronic water purification, reverse osmosis, ion exchange with resins, ion exchange with zeolites and cation exchange and cation removal. Sulfur burner technologies were rejected since they will not address sodium concentrations in the produced water. Use of constructed wetlands was determined to not be a reasonable alternative since they have limited utility in removing total dissolved solids and salts. Given the short growing season in the Wild Horse Creek, substantial reservoir storage would still be needed. Rapid spray distillation and electronic water purification are emerging technologies that are unproven and have not been demonstrated to effectively treat CBNG water. Electro dialysis reversal has not been cost effectively applied the treatment of CBNG water. Both electro dialysis reversal and reverse osmosis would generate a brine reject stream of up to 20 percent of the design flow of the treatment system. With ion exchange technologies, it is possible to substantially reduce the volume of brine reject water however the resulting reject stream would be more concentrated. The concentrated brine from these treatment systems would need to be appropriately managed to address potential environmental concerns. The brine waters could potentially be trucked off-site for disposal, which given the volumes associated with electro dialysis reversal and reverse osmosis, would render those options uneconomic. Other options for managing the brine reject streams include evaporation in a lined pit; or dilution to stock water standards and discharge to total containment reservoirs.

Relocation of Wells

During the onsite for the Acacia POD, a number of wells were looked at to be relocated to either reduce or eliminate the need for a constructed pad, to place in a more suitable area for better reclamation potential, to reduce visual contrast with the surrounding landscape, or to avoid wildlife habitat fragmentation. In most cases this can be accomplished however, the Acacia CS Federal 10, Acacia CS Federal Com. 11, and the Gilda CS Federal Com 10 well sites could not be relocated as it would place the well too close to the lease boundary line or the well would no longer be in the correct spacing pattern.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on June 27, 2006. Field inspections of the proposed Acacia CBNG project were conducted on 11/28/2006—11/30/2006, 12/8/2006, 12/11/2006, 1/16/2007, 1/17/2007 & 1/26/2007 by.

DATE	NAME	TITLE	AGENCY
11/28/06	Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation
11/28/06	Ralph Tronstad	Pipeline	Rowdy Pipeline
11/28/06	Jim Niese	Drilling	Yates Petroleum Corporation
11/28/06	Buster Ivory	Hydrologist	Yates Petroleum Corporation
11/28/06	Mike McKinley	Hydrologist	BLM-BFO
11/28/06	Arnie Irwin	Soil Scientist	BLM-BFO
11/28/06	Lee Harrelson	Civil Engineer	BLM-BFO

DATE	NAME	TITLE	AGENCY
11/28/06	Mary Maddux	NRS/Team Lead	BLM-BFO
11/29/06	Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation
11/29/06	Ralph Tronstad	Pipeline	Rowdy Pipeline
11/29/06	Justin Roswadowski	Drilling	Yates Petroleum Corporation
11/29/06	Tim Barber	Federal Regulatory Agent	Yates Petroleum Corporation
11/29/06	Candy Laramore	Surface Owner	Deer Track, LLC
11/29/06	Darrin	Ranch Manager	Laramore Property
11/29/06	Mary Maddux	NRS/Team Lead	BLM-BFO
11/30/06	Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation
11/30/06	Justin Roswadowski	Drilling	Yates Petroleum Corporation
11/30/06	Candy Laramore	Surface Owner	Deer Track, LLC
11/30/06	Darrin	Ranch Manager	Deer Track, LLC
11/30/06	Mary Maddux	NRS/Team Lead	BLM-BFO
12/8/06	Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation
12/8/06	Justin Roswadowski	Drilling	Yates Petroleum Corporation
12/8/06	Ralph Tronstad	Pipeline	Rowdy Pipeline
12/8/06	Candy Laramore	Surface Owner	Deer Track, LLC
12/8/06	Darrin	Ranch Manager	Deer Track, LLC
12/8/06	Lee Harrelson	Civil Engineer	BLM-BFO
12/8/06	Mary Maddux	NRS/Team Lead	BLM-BFO
12/11/06	Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation
12/11/06	Ralph Tronstad	Pipeline	Rowdy Pipeline
12/11/06	Darrin	Ranch Manager	Deer Track, LLC
12/11/06	Mary Maddux	NRS/Team Lead	BLM-BFO
1/16/07	Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation
1/16/07	Bill Ostheimer	NRS/Wildlife Biologist	BLM-BFO
1/17/07	Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation
1/17/07	Bill Ostheimer	NRS/Wildlife Biologist	BLM-BFO
1/26/07	Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation
1/26/07	Bill Ostheimer	NRS/Wildlife Biologist	BLM-BFO

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

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

Mandatory Item	Potentially Impacted	No Impact	Not Present On Site	BLM Evaluator
Threatened and Endangered Species	X			Bill Ostheimer
Floodplains		X		Mike McKinley
Wilderness Values			X	Mary Maddux
ACECs			X	Mary Maddux
Water Resources	X			Mike McKinley
Air Quality		X		Mary Maddux
Cultural or Historical Values		X		BJ Earle
Prime or Unique Farmlands			X	Mary Maddux

Mandatory Item	Potentially Impacted	No Impact	Not Present On Site	BLM Evaluator
Wild & Scenic Rivers			X	Mary Maddux
Wetland/Riparian		X		Mike McKinley
Native American Religious Concerns			X	BJ Earle
Hazardous Wastes or Solids		X		Mary Maddux
Invasive, Nonnative Species	X			Mary Maddux
Environmental Justice		X		Mary Maddux

3.1. Topographic Characteristics of Project Area

The Acacia POD area is located 21 miles northwest of Gillette, Wyoming on Echeta Road and 14 miles southeast of Arvada, Wyoming. The project area is currently on 80 acre spacing except for section 6 which has 64 acre spacing.

The topography of the project area is dominated by numerous ridges and steep draws. The topography levels out with more rolling hills and flat areas along the Wild Horse and Twentymile Creek drainages. Some of the steep draws have active headcuts and erosion due to snow runoff and storm events. There are numerous outcroppings of sandstone and scoria in many of the draws and ridges, as well as areas of exposed soil along the steeper slopes and higher ridge tops. Elevation of the project area ranges from 3920 to 4660 feet above sea level. There is existing CBM development in the area with the majority of the activity occurring within the last couple of years. The oldest CBM development is to the south of the project area with the North Shell Draw POD. The area has been explored for oil in the past and due to various reasons the wells were found uneconomical and plugged. The primary use of the project area is livestock grazing.

3.2. Vegetation & Soils

Ecological Site Descriptions are used to provide soils and vegetation information needed for resource identification, management and reclamation recommendations. To determine the appropriate Ecological Sites for the area contained within this proposed action, BLM specialists analyzed data from onsite field investigations and Natural Resources Conservation Service (NRCS) published soil survey soils information. The map unit symbols identified for the soils and the associated ecological sites found with the Acacia POD boundary are listed in Table 3.2 below.

Table 3.2.1-Ecological Sites with Acreage

Acacia Ecological Sites	Acres	Percentage
LOAMY (15-17NP)	3273.1	48%
SHALLOW LOAMY (15-17NP)	2096.7	31%
CLAYEY (15-17NP)	762.5	11%
CLAYEY (10-14NP)	335.3	5%
LOWLAND (15-17NP)	141.3	2%
LOWLAND (10-14NP)	105.1	2%
SANDY (15-17NP)	64.4	1%
LOAMY (10-14NP)	8.4	0%

Dominate Ecological Sites and Plant Communities identified in this POD and its infrastructure are:

(15”-17”Precip Zone) Loamy Sites:

ACACIA FARIS CS FEDERAL COM	1	ACACIA CS FEDERAL	6
ACACIA FARIS CS FEDERAL COM	3	ACACIA CS FEDERAL	12
ACACIA GILDA CS FEDERAL COM	1	ACACIA CS FEDERAL	13
ACACIA GILDA CS FEDERAL COM	3	ACACIA GILDA CS	9
ACACIA FARIS CS FEDERAL COM	4	ACACIA NORTON CS FEDERAL	5
ACACIA GILDA CS FEDERAL	6	ACACIA NORTON CS FEDERAL	6
ACACIA GILDA CS FEDERAL	7	ACACIA NORTON CS FEDERAL	7
ACACIA GILDA CS FEDERAL	8	ACACIA NORTON CS FEDERAL	8
ACACIA GILDA CS FEDERAL	5	ACACIA CS	16
ACACIA GILDA CS FEDERAL COM	4	ACACIA FARIS CS COM	7
ACACIA NORTON CS FEDERAL	3	ACACIA IVAN CS	1
ACACIA NORTON CS FEDERAL	4	ACACIA IVAN CS FEDERAL	2
ACACIA CS	5	ACACIA GILDA CS COM	16
ACACIA CS	8	ACACIA IVAN CS	5
ACACIA CS FEDERAL	4	ACACIA IVAN CS COM	6

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

The soils of this site are moderately deep to deep (greater than 20” to bedrock), well drained and moderately permeable.

The Historic Climax Plant Community (HCPC – defined as the plant community that was best adapted to the unique combination of factors associated with this ecological site) for this site is dominated by a mix of warm and cool season mid-grasses. The potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants.

The present plant community is a *Mixed Sagebrush/Grass*. Compared to the HCPC sagebrush and blue grama have become more dominate.

Dominant grasses identified include: Western Wheatgrass, Bluebunch Wheatgrass, and Threadleaf Sedge. Forbs identified include: Fringed Sagewort. Other vegetative species identified at onsite include: Big Sagebrush, Plains Pricklypear, and Downy Brome.

Wyoming big sagebrush is a significant of this Mixed Sagebrush/Grass plant community. Cool-season grasses make up the majority of the understory with the remainder being made up of short warm-season grasses, annual cool-season grasses, and various forbs.

(15”-17”Precip Zone) Shallow Loamy Sites:

ACACIA NORTON CS	2	ACACIA CS	9
ACACIA CS FEDERAL	2	ACACIA CS	10
ACACIA CS FEDERAL COM	3	ACACIA CS COM	11

ACACIA CS FEDERAL COM	14	ACACIA FARIS CS FEDERAL	5
ACACIA GILDA CS	11	ACACIA FARIS CS FEDERAL	8
ACACIA GILDA CS FEDERAL COM	10	ACACIA FARIS CS FEDERAL	9
ACACIA GILDA CS	14	ACACIA IVAN CS FEDERAL	3
ACACIA GILDA CS	15	ACACIA IVAN CS FEDERAL	4
ACACIA GILDA CS COM	12		

This site occurs 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 that formed in alluvium over residuum or residuum. These soils have moderate permeability and may occur on all slopes. The main soil limitations include depth to bedrock and low organic matter content.

The HCPC for this site would be a Rhizomatous Wheatgrasses/Needleandthread, Blue Grama Plant Community. The potential vegetation is about 80% grasses or grass-like plants, 10% forbs, and 10% woody plants. Cool season mid-grasses dominate the state.

The present plant community is a *Mixed Sagebrush/Grass*. Compared to the HCPC, sagebrush and blue grama have increased. Production of the cool season grasses have decreased. The production of bluebunch wheatgrass has also decreased, only present where protected from grazing by the sagebrush canopy.

Dominant grasses identified include: Western Wheatgrass, Bluebunch Wheatgrass, and Threadleaf Sedge. Forbs identified include: Prairieclovers, Western Yarrow and Fringed Sagewort. Other vegetative species identified at onsite include: Big Sagebrush, some Downy Brome, Rabbitbrush and Plains Pricklypear.

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. This diverse plant community will support domestic livestock and wildlife such as deer and antelope.

(15"-17" Precip Zone) Clayey Sites:

ACACIA FARIS CS FEDERAL COM	2	ACACIA CS COM	15
ACACIA GILDA CS FEDERAL COM	2	ACACIA GILDA CS COM	13
ACACIA NORTON CS FEDERAL	1	ACACIA FARIS CS FEDERAL	6
ACACIA CS FEDERAL	1		

This site occurs on nearly level to 30% slopes on landforms which include hill sides, alluvial fans and stream terraces, in the 15-17 inch precipitation zone.

The soils of this site are moderately deep to very deep (greater than 20" to bedrock), well drained soils that have formed in alluvium or alluvium over residuum. These soils have slow permeability.

The HCPC for this site would be a Rhizomatous Wheatgrasses, Green Needlegrass Plant Community. The potential vegetation is about 80% grasses or grass-like plants, 10% forbs, and 10% woody plants. A

mix of cool season mid-grasses and warm season grasses dominate the state.

The present plant community is a *Mixed Sagebrush/Grass*. Compared to the HCPC, sagebrush and blue grama have increased. Green needlegrass and big bluestem have decreased, often occurring only where protected from grazing by the sagebrush canopy. Production of the cool season grasses have decreased.

Dominant grasses identified include: Western Wheatgrass, Prairie Junegrass. Forbs identified include: Prairieclovers, Western Yarrow and Fringed Sagewort. Other vegetative species identified at onsite include: Big Sagebrush, Downy Brome, Rabbitbrush and Plains Pricklypear.

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. This diverse plant community will support domestic livestock and wildlife such as deer and antelope.

(10"-14" Precip Zone) Clayey Sites:

ACACIA CS 7

This site occurs on nearly level to 30% slopes on landforms which include hill sides, alluvial fans and stream terraces, in the 10-14 inch precipitation zone.

The soils of this site are moderately deep to very deep (greater than 20" to bedrock), well drained soils that have formed in alluvium or alluvium over residuum. These soils have slow permeability. The main soil limitations for this site include: low organic matter content and soil droughtiness.

The HCPC for this site would be a Rhizomatous Wheatgrasses, Green Needlegrass Plant Community. The potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants. Cool season mid-grasses dominate the state.

The present plant community is a *Mixed Sagebrush/Grass*. Compared to the HCPC, sagebrush and blue grama have increased. Green needlegrass has decreased, often occurring only where protected from grazing by the sagebrush canopy. Production of the cool season grasses have also been reduced.

Dominant grasses identified include: Western Wheatgrass, Prairie Junegrass. Forbs identified include: Western Yarrow and Fringed Sagewort. Other vegetative species identified at onsite include: Big Sagebrush, Downy Brome, and Plains Pricklypear.

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. This diverse plant community will support domestic livestock and wildlife such as deer and antelope.

3.2.1. Wetlands/Riparian

No wetland/riparian areas were noted during the onsite within the POD boundary. The channels within the project area are well vegetated grassy swales of dry land species, without defined bed and bank and therefore are not indicative of a riparian environment. Riparian areas have developed along Wild Horse Creek as a result as a result of treated and non-treated CBNG-produced water being direct-discharged to tributaries and the mainstem of Wild Horse Creek.

3.2.2. Invasive Species

Four state-listed noxious weeds and invasive/exotic plant infestations were discovered by a search of inventory maps and/or databases compiled by the University of Wyoming and modified to reflect local conditions by BLM Range Conservationist and Johnson County Weed and Pest Weed Specialist or during subsequent field investigation by the proposed project proponent. The project area has potential for invasion of Leafy spurge, Canada Thistle, Field Bindweed and Salt cedar. No noxious weeds were observed during the onsite because the onsites were held in November and no plants were actively growing at that time.

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 Wildlife Consulting Inc (TWS 2006). TWS performed aerial surveys for greater sage-grouse and plains sharp-tailed grouse on 18, 25, 30 April 2005 and 30 March, 11, and 21 April 2006; ground surveys for mountain plover nesting activity were completed on 17 May, and 2 and 15 June 2005; the project area was ground searched for raptor nests and prairie dog colonies on 17 May, 2 and 15 June 2005 and 28 April 2006.

A BLM biologist conducted field visits on January 11, 16, 17 and 26, 2007. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project adjustment recommendations where wildlife issues arose. The site specific effects determinations to listed species from the proposed action are included in this EA and the section 7 consultation tiers to the March 23, 2007 programmatic Biological Opinion for the Powder River Oil and Gas Project (ES-6-WY-07-F012).

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. Plains sharp-tailed grouse

The plains sharp-tailed grouse is found from Alberta south to Colorado along the front-range of the Rocky Mountains to the Great Plains in the Dakotas. The subspecies is listed as endangered by the Colorado Department of Natural Resources Division of Wildlife due to habitat loss from grazing and housing development (CDoW 2007). In Wyoming, sharp-tailed grouse are predominantly found in the Northeastern corner of the State (PRB FEIS at 3-148).

The Eaton II lek is within the project area. This lek is active and most likely shares some breeding with the Eaton lek located approximately 3.5 miles to the south. The project area contains breeding, brood-rearing, and winter habitat.

3.3.2. Big Game

Big game species expected to be within the project area include mule deer and pronghorn antelope with occasional elk. The project area is part of the Powder River mule deer herd unit #319. The 2003 population was 51,401, and the 2004 population was estimated at 55,561. The population objective for the Powder River herd unit is 52,000 (WGFD 2004). Pronghorn belong to the Gillette herd unit #351. There was a population of 12,051 in 2003, and the 2004 population was estimated at 13,339. The population objective for the Gillette herd unit is 11,000 (WGFD 2004). Elk from the Fortification herd occasionally

use the project area.

The WGFD has designated the entire project area as Winter-Yearlong range for mule deer and winter range for pronghorn. Populations of mule deer and pronghorn within their respective hunt areas are above WGFD objectives.

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. Winter Range supports substantial numbers of a population only during winter. Big game range maps are available in the PRB FEIS (3-119-143), and from the WGFD.

3.3.3. Aquatics

The project area is located within the Twentymile Creek drainage, a tributary of Wild Horse Creek and then the Powder River. Twentymile Creek is characterized by ephemeral stream flows mostly in response to precipitation and snowmelt. In recent years (2005-2007) CBNG produced water has been discharged into both Twentymile Creek and Wild Horse Creek. Currently Twentymile and Wild Horse Creek have intermittent perennial flows. Fish that have been identified in the Powder River watershed are listed in the PRB FEIS (3-156-159).

3.3.4. Migratory Birds

A wide variety of migratory birds may be found in the proposed project area at some point throughout the year. Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year. Migratory bird species of management concern that may occur in the project area are listed in the PRB FEIS (3-151).

3.3.5. Raptors

Eighteen raptor nest sites were identified by TWS (TWS 2006) and BLM within 0.5 mile of the project area, of these nine nests were active in 2005 and or 2006. Raptor nests within 0.5 miles of proposed activity are listed in Table 3.2

Table 3.2. Documented raptor nests within the project area in 2006.

BLM ID#	SPECIES	UTM (NAD 83)	LEGAL LOCATION	SUBSTRATE	CONDITION	2006 STATUS
3519	Unknown	429965 4931817	NWSW 33 5375	Live Cottonwood	Fair	Inactive
3795	Great-horned owl	429367 4930964	NESW 33 5375	Live Juniper	Good	Active
3796	Unknown	425952 4930055	NWNW 6 5275	Live Cottonwood	Fair	Undetermined
3797	Unknown	425945 4930048	NWNW 6 5275	Live Cottonwood	Poor	Undetermined
3798	Red-tailed hawk	429480 4929990	NENW 4 5275	Live Cottonwood	Good	Active
3799	Unknown	425933 4929942	NWNW 6 5275	Live Cottonwood	Fair	Undetermined
3800	Red-tailed hawk	425845 4929520	SWNW 6 5275	Live Cottonwood	Good	Undetermined
2770	Golden Eagle	434196 4929484	SENE 1 5275	Live Cottonwood	Good	Active
3801	Great-horned owl	426246 4929241	NESW 6 5275	Live Cottonwood	Good	Undetermined

BLM ID#	SPECIES	UTM (NAD 83)	LEGAL LOCATION	SUBSTRATE	CONDITION	2006 STATUS
3802	Unknown buteo	430834 4928854	SWSW 3 5275	Live Juniper	Fair	Inactive
2632	Red-tailed hawk	429975 4926488	SWNE 16 5275	Live Cottonwood	Good	Inactive
3806	Unknown	430306 4926583	NENE 16 5275	Live Cottonwood	Fair	Inactive
2635	Unknown	433410 4925311	NENE 23 5275	Live Cottonwood	Fair	Undetermined

3.3.6. Threatened and Endangered and Sensitive Species

3.3.6.1. Threatened and Endangered Species

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

3.3.6.1.1. Black-footed ferret

The USFWS listed the black-footed ferret as Endangered on March 11, 1967. Active reintroduction efforts have reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 1988, the WGFD identified four prairie dog complexes (Arvada, Recluse, Thunder Basin National Grasslands, and Midwest) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Oakleaf 1988).

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

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

Five black-tailed prairie dog colonies totaling 125 acres were identified during site visits by TWS within the POD in NW Sec 11, (60 acres), SW Section 10 (39 acres), SW Section 2 (21.4 acres), NE Section 16 (3 acres) and NW Section 3 (5.5 acres). Large (over 100 acre) colonies are located to the north of the project area along Wild Horse Creek to its confluence with Middle Prong, part of the Arvada Complex.

3.3.6.1.2. Bald eagle

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

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

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

There is suitable roosting and marginal nesting habitat within one mile of the project area. Both Twentymile and Wild Horse Creeks support large cottonwoods and in recent years these streams have become perennial. Although the wildlife report completed for this project and the BLM database did not identify bald eagles near the project area, a BLM biologist observed a perched adult bald eagle within a mile of the project area at UTM 425789E and 4929540N on January 16, 2007 and a flying adult bald eagle on January 26, 2007 at UTM 432905E and 4920146N (approximately 6 miles south of the POD).

3.3.6.1.3. Ute Ladies-Tresses Orchid

This orchid is listed as Threatened under the Endangered Species Act. It is extremely rare and occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level. Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. Prior to 2005, only four orchid populations had been documented within Wyoming. Five additional sites were located in 2005 (Heidel pers. Comm.). The new locations were in the same drainages as the original populations, with two on the same tributary and within a few miles of an original location. Drainages with documented orchid populations include Antelope Creek in northern Converse County, Bear Creek in northern Laramie and southern Goshen Counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County.

The project area is drained by Twentymile and Wild Horse Creeks tributaries of the Powder River. In recent years these streams have become perennial and suitable Ute Ladies'-Tresses orchid habitat may be developing. No springs were identified in the wildlife report or water management plan.

3.3.6.2. Sensitive Species

The USDI Bureau of Land Management (BLM) Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. The authority for this policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A.

3.3.6.2.1. Black-tailed prairie dog

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

Five black-tailed prairie dog colonies were identified during site visits by TWS within the POD in NW Sec 11, (60 acres), SW Section 10 (39 acres), SW Section 2 (21.4 acres), NE Section 16 (3 acres) and NW Section 3 (5.5 acres). Large (over 100 acre) colonies are located to the north of the project area along Wild Horse Creek to its confluence with Middle Prong, part of the Arvada Complex.

3.3.6.2.2. Greater sage-grouse

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

Suitable sage-grouse habitat is present in portions of the project area. BLM records identified three sage grouse lek(s) within 2 miles of the POD. These leks are identified below (Table 6).

Table 3.3. Sage-grouse lek(s) surrounding the project area.

Lek Name	UTM NAD83	Legal Location	2006 Activity	Distance From Project Area (miles)
Laramore	432409E 4932197N	SWSW 26 5375	Active Occupied	1.2
Colton	437309E 4930528N	NESW 32 5374	Active Occupied	1.3
Twentymile	433945E 4924673N	SWNW 24 5475	Active Occupied	0.4

3.3.6.2.3. Mountain plover

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

Small patches (5-10 acres) of suitable mountain plover habitat are present within the project area along the upper terraces of Twentymile and Wild Horse Creek. Although prairie dog colonies are present, the presence of relatively steep topography away from the alluvial flats, and trees on the alluvial flats reduce the potential for plovers.

3.4. West Nile Virus

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

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

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

Table 3.4 Historical West Nile Virus Information

Year	Total WY Human Cases	Human Cases PRB	Veterinary Cases PRB	Bird Cases PRB
2001	0	0	0	0
2002	2	0	15	3
2003	392	85	46	25
2004	10	3	3	5
2005	12	4	6	3
2006	65	0	2	2

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

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

Mosquitoes can potentially breed in any standing water that lasts more than four days. In the Powder River Basin, there is generally increased surface water availability associated with CBNG development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the Powder River Basin indicates WNV mosquito vectors were notably more abundant on a developed CBNG site than two similar undeveloped sites (Walker et al. 2003). Reducing the population of mosquitoes, especially species that are apparently involved with bird-to-bird transmission of WNV, such as *Culex tarsalis*, can help to reduce or eliminate the presence of virus in a given geographical area (APHIS 2002). The most important step any property owner can take to control such mosquito populations is to remove all potential man-made sources of standing water in which mosquitoes might breed (APHIS 2002).

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

The WDEQ and the Wyoming Department of Health sent a letter to CBNG operators on June 30, 2004.

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

3.5. Water Resources

The project area is within the Wild Horse Creek watershed of the Upper Powder River drainage system. The watershed consists of relatively undisturbed rangeland with a mixture of sagebrush and native grasses. The ephemeral tributary draws in which the proposed reservoirs are located possess moderately sinuous vegetated bottoms with slopes that range from 20% in the upper reaches to 5% in the lower reaches.

3.5.1. Groundwater

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

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

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

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

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

The on-going shallow groundwater impoundment monitoring at four other impoundment locations are less intensive and consist of batteries of between 4 and 6 wells. Preliminary data from two of these other sites also are showing an increasing TDS level as water infiltrates while two other sites are not. The operator proposed to drill one boring at the 29 approved impoundment locations.

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 32 registered stock, domestic and miscellaneous water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 55 to 1,000 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 Wild Horse Creek drainage which is tributary to the Upper Powder River watershed. Most of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). The channels are primarily well vegetated grassy swales, without defined bed and bank.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in µmhos/cm) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters “illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM produced water of varying chemical composition to surface drainages within the Project Area” (PRB FEIS page 3-48). For the Upper Powder River, the EC ranges from 1,797 at Maximum monthly flow to 3,400 at Low monthly flow and the SAR ranges from 4.76 at Maximum monthly flow to 7.83 at Low monthly flow. These values were determined at the USGS station located at Arvada, WY (PRB FEIS page 3-49).

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

3.6. Cultural Resources

Class III cultural resource inventory was conducted for the Acacia project prior to on-the-ground project work (BFO #70060237; 70050213; 70050182; 70060103; and 70060142). A total of 4815 acres of block and linear inventory were surveyed for this project. Twenty-five cultural sites and six isolated resource finds were located by the survey. Only one historic property, 48 CA 265, a railroad bridge, is considered Eligible to the National Register, and this site is outside the current Area of Effect. The project has been reviewed in consultation with SHPO, and no eligible properties will be affected by the proposed project. The project area is mapped as tertiary Wasatch formation with a Paleontological sensitivity rating of 5, but no remains or localities have been reported in the project area. No resources of interest to Native American cultural groups or Traditional Cultural Properties are known to occur in the immediate area. Cultural clearance is recommended for this project.

Table 3.5 Cultural Resources Inventory Results

Site Number	Site Type	Eligibility
48CA265	Historic Linear Resource	Eligible A, C Outside Area of Effect
48CA746	Historic Site	Not Eligible
48CA2528	Historic Site	Not Eligible
48CA3070	Historic Linear Resource	Not Eligible No Effect

Site Number	Site Type	Eligibility
48CA3704	Prehistoric Site	Not Eligible
48CA5241	Prehistoric Site	Not Eligible
48CA5242	Prehistoric Site	Not Eligible
48CA5243	Prehistoric Site	Not Eligible
48CA5244	Historic Site	Not Eligible
48CA5245	Prehistoric Site	Not Eligible
48CA5246	Prehistoric Site	Not Eligible
48CA5247	Historic Site	Not Eligible
48CA5248	Historic Site	Not Eligible
48CA5249	Prehistoric Site	Not Eligible
48CA5250	Historic and Prehistoric Site	Not Eligible N No Effect
48CA5251	Historic Site	Not Eligible
48CA5252	Prehistoric Site	Not Eligible
48CA5253	Prehistoric Site	Not Eligible
48CA5254	Historic Site	Not Eligible
48CA5255	Prehistoric Site	Not Eligible
48CA5256	Historic Site	Not Eligible
48CA5257	Historic Site	Not Eligible
48CA5258	Historic Site	Not Eligible
48CA5259	Prehistoric Site	Not Eligible
48CA5849	Historic Site	Not Eligible
48IR0	Prehistoric Isolate	Not Eligible
48IR0	Prehistoric Isolate	Not Eligible
48IR0	Prehistoric Isolate	Not Eligible
48IR0	Prehistoric Isolate	Not Eligible
48IR0	Prehistoric Isolate	Not Eligible
48IR0	Prehistoric Isolate	Not Eligible

4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed action POD, which resulted in development of Alternative C as the preferred alternative, have reduced the potential impact to the environment which will result from this action. The

environmental consequences of Alternative C are described below.

4.1. Vegetation & Soils Direct and Indirect Effects

Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator's plans and BLM applied mitigation. Of the 55 proposed well locations, 51 can be drilled without a well pad being constructed, 3 will require a constructed (cut & fill) well pad, and 1 will require a slot pad. Surface disturbance associated with the drilling of the (51) wells without constructed pads would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 15 x 55 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 51 wells would involve approximately 0.1 acre/well for 5.1 total acres. The other 3 wells requiring cut & fill pad construction would disturb approximately 0.5 acres/well pad for a total of 1.5 acres, and the 1 well requiring a slot pad would disturb approximately 0.08 acres (estimated approximate size of 120 x 30 feet). The total estimated disturbance for all 55 wells would be 6.7 acres.

Approximately 1.5 miles of improved roads would be constructed to provide access to various well locations. Approximately 5.2 miles of existing improved roads would be utilized to access various well locations. Approximately 6.99 acres of disturbance would occur for 9 engineered sections of road that has to be built to allow access to the various well locations. Approximately 3.3 miles of new and existing two-track trails would be utilized to access well sites. The majority of proposed pipelines (gas and water) have been located in "disturbance corridors." Disturbance corridors involve the combining of 2 or more utility lines (water, gas, power) in a common trench, usually along access routes. This practice results in less surface disturbance and overall environmental impacts. Approximately 31.1 miles of disturbance corridor would be constructed along new and existing access routes. Approximately 0 miles of pipeline would be constructed outside of corridors. Approximately 7.6 miles of new overhead power lines would be constructed by a third party. In addition approximately 4.6 miles of existing overhead power lines would be utilized by the Acacia POD. Approximately 0.016 acres of disturbance would occur with construction of the water pump station located adjacent to the Acacia #5 well site. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, etc.) would ensure land productivity/stability is regained and maximized.

Several well sites and sections of access road showed evidence of shallow sandy or sandy soils that are highly susceptible to wind erosion. For those proposed disturbance areas, there are lands having a wind erodibility index (I) in tons/acre/year averaging 220 ton/acre/year if not properly mitigated. These soils have low available water holding capacity, low soil organic matter content, limited topsoil depth, and low soil fertility making the potential for reclamation and stabilization very difficult. In addition to stabilization efforts being completed within 30 days of the start of construction activities, the well sites will be fenced off for a minimum of 2 growing seasons to insure reclamation success. The Acacia CS Federal #7 well location will also be fenced off for a minimum of 2 growing seasons to insure reclamation success due to its proximity to a livestock watering tank.

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

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

page 4-144).

Table 4.1 summarizes the proposed surface disturbance.

Table 4.1 - SUMMARY OF DISTURBANCE

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Nonconstructed Pad	51	0.1/acre	5.1	Long Term
Constructed Pad	3	0.5/acre	1.5	
Slot Pad	1	Site Specific	0.08	
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Screw Compressors	0	Site Specific	0.0	Long Term
Investigative Wells/Borings	30	0.01/acre	0.3	Long Term
Impoundments				Long Term
On-channel	30	Site Specific	45	
Off-channel	0	Site Specific	0	
Water Discharge Points	30	Site Specific or 0.01 ac/WDP	0.3	
Channel Disturbance				
Headcut Mitigation*	0	Site Specific	0	
Channel Modification	0	Site Specific	0	
Improved Roads				Long Term
No Corridor	1.5	45' Width	8.4	
With Corridor	15.1	Site Specific	127.6	
2-Track Roads				Long Term
No Corridor	0.9	20' Width	2.1	
With Corridor	12.7	45' Width	68.9	
Pipelines				Short Term
No Corridor	0	Site Specific	0	
With Corridor	3.3	Site Specific	18.6	
Buried Power Cable				Short Term
No Corridor	0	12' Width or Site Specific	0	
Overhead Powerlines	7.6	30' Width	27.6	Long Term
Additional Disturbance		Site Specific	7.0	Long Term

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

4.1.1. Wetland/Riparian

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow which will potentially allow for streambed enhancement through wetland-riparian species establishment.

4.1.2. Invasive Species

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

4.1.3. Cumulative Effects

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

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

- They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 16.8% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The commitment by the operator to monitor the volume of water flowing into Wild Horse Creek and to construct additional downstream reservoirs, if necessary, to prevent significant volumes of water from flowing into the Upper Powder River Watershed.
- The WMP for the Acacia proposes that produced water will not contribute significantly to flows downstream due to all of the reservoirs being full-containment.

No additional mitigation measures are required.

4.2. Wildlife

4.2.1. Plains sharp-tailed grouse

The proposed action will impact sharp-tailed grouse by removing nesting and brood-rearing habitat, adding overhead power which supplies perches for grouse predators, and increasing the potential for vehicle strikes. Habitat fragmentation from roads and pipelines may increase ground predator abundance. The proposed project would place two reservoirs (Dixie Lynn and Burning Coal) and one well (2FARI-COM) within ¼ mile and in view of the Eaton II lek. The two reservoirs will occupy excellent brood-rearing habitat and the well location may attract predators. Seasonal restrictions for reservoir construction and activity at the well site would not ensure continued use of this lek due to; 1) direct habitat loss from the Dixie Lynn and Burning Coal reservoirs and 2FARI-COM well location as well as, 2) indirect impacts due to the proximity of the reservoirs (50 yards to Burning Coal and 130 yards to Dixie Lynn) and well (260 yards) to the lek. Emergency repair work on the reservoirs, well work-over rigs, or a worker getting out of his/her truck to make minor repairs could disrupt breeding by displacing females from the lek.

Baydack and Hein (1987) as described in the Birds of North America species account

(<http://bna.birds.cornell.edu/BNA/account/>) found males at leks to be more disturbance tolerant than females but were displaced by human presence. Disturbances to leks may limit reproductive opportunities and may result in regional population declines. It is unknown if the 260 yards between the lek location and the 2FARI-COM well is sufficient to permit undisturbed lekking. The well is in plain view and 10 yards beyond the 250 yard Conditional Surface Use area defined by BLM for protection of sharp-tailed grouse leks.

4.2.2. Big Game Direct and Indirect Effects

Under the environmentally preferred alternative approximately 300 acres of mule deer winter yearlong, and antelope winter ranges 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.

4.2.2.1. 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.

4.2.3. Aquatics Direct and Indirect Effects

Produced water is to be fully contained in reservoirs. If a reservoir were to fail, it is unlikely produced water would reach a fish-bearing stream.

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 4-247. No additional mitigation measures are required.

4.2.4. Migratory Birds Direct and Indirect Effects

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

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

Seasonal timing limitations applied within 0.5 miles of raptor nests (Feb 1- July 31) and 2.0 miles from sage-grouse leks (March 1 – June 15) will limit construction and drilling. These restrictions will supply some degree of protection to migratory birds during their breeding seasons.

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 4-235.

4.2.5. Raptors Direct and Indirect Effects

Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to over heating or chilling of eggs or chicks. The prolonged disturbance can also lead to the abandonment of the nest by the adults. Both actions can result in egg or chick mortality. In addition, routine human activities near these nests can draw increased predator activity to the area and increase nest predation. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

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

BLM ID#	SPECIES	UTM (NAD 83)	2006 STATUS	WELL / PIT NUMBER	DISTANCE IN MILES
3519	Unknown	429965 4931817	Inactive	Dame Reservoir	0.25
3795	Great-horned owl	429367 4930964	Active	Dame Reservoir	0.25
3796	Unknown	425952 4930055	Undetermined	10ACAC	.05
3797	Unknown	425945 4930048	Undetermined	10ACAC	.05

BLM ID#	SPECIES	UTM (NAD 83)	2006 STATUS	WELL / PIT NUMBER	DISTANCE IN MILES
3798	Red-tailed hawk	429480 4929990	Active	Target , Corky, Ten Ring, Ed Lee Reservoirs	0.25-0.5
3799	Unknown	425933 4929942	Undetermined	10ACAC	.05
3800	Red-tailed hawk	425845 4929520	Undetermined	10ACAC Scoria Falls Reservoir	.05
2770	Golden Eagle	434196 4929484	Active	2FARI COM 2GILD COM 3GILD COM 3FARI COM 5GILD Dixie Lynn, Burning Coal Cottonwood	0.4 0.3 0.3 0.5 0.5 0.3 0.3 0.25
3801	Great-horned owl	426246 4929241	Undetermined	10ACAC 11ACAC COM Scoria Falls Res.	0.4 0.5 0.25
3802	Unknown buteo	430834 4928854	Inactive	1NORT 5NORT 12GILD COM 15ACAC Well Garden Tie Horse Pasture	0.4 0.4 0.5 0.3 0.4 0.4 0.3
2632	Red-tailed hawk	429975 4926488	Inactive	11GILD COM	0.4
3806	Unknown	430306 4926583	Inactive	15GILD 11GILD COM Middle Fork Clide Traffic	0.4 0.3 0.5 0.4 0.4
2635	Unknown	433410 4925311	Undetermined	3IVAN 4IVAN	0.5 0.3

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.

To further reduce the impacts of the proposed action on raptors, the operator and BLM worked together to move the 3GILD well location and access road out of view of the Golden Eagle nest (2770 above). In addition, to protect this nest, the Cottonwood Reservoir will be approved with a Condition of Approval that no surface disturbing activity including maintenance activity will occur from February 1 through July 31, annually. The reservoir itself would not be an impact, however, if the dam were to leak or need repair, then the operator would have no choice but to repair it. Should such a repair be needed during sensitive periods for the eagle pair, such as pair bonding, nest initiation, or fledging, they may abandon the nest. BLM will not approve improvements to or use of the existing reservoir 100 meters upstream of

the red-tailed hawk nest (3798) nest.

4.2.5.1. 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.

4.2.6. Threatened and Endangered and Sensitive Species

Within the BLM Buffalo Field Office there are three species that are Threatened or Endangered under the Endangered Species Act. Potential project effects on Threatened and Endangered Species were analyzed in a Biological Assessment and a summary is provided in Table 4.3. Threatened and Endangered Species potentially affected by the proposed project area are further discussed following the table.

The proposed action tiers to the March 23, 2007 Reinitiation of Formal Consultation for the Powder River Basin Oil and Gas Project, Campbell, Converse, Johnson, and Sheridan Counties, Wyoming (Formal Consultation Number ES-6-WY-07-F012). All terms and conditions will be followed. The effects determinations for listed species are presented in Table 4.3

4.2.6.1. 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 (<i>Mustela nigripes</i>)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	NE	Species is not present in the action area.
Threatened				
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Mature forest cover often within one mile of large water body.	S	LAA	Project includes overhead power within suitable habitat.
Ute ladies'-tresses orchid (<i>Spiranthes diluvialis</i>)	Riparian areas with permanent water	NP	NE	No historically suitable habitat present.

Presence

K Known, documented observation within project area.

S Habitat suitable and species suspected, to occur within the project area.

NS Habitat suitable but species is not suspected to occur within the project area.

NP Habitat not present and species unlikely to occur within the project area.

Effect Determinations

Listed Species

LAA Likely to adversely affect

NE No Effect.

NLAA May Affect, not likely to adversely effect individuals or habitat.

4.2.6.1.1. Black-footed ferret

The proposed action will impact one prairie dog town in section 10 with construction of pipeline along an existing primitive road and some upgrade to the roadway. Implementation of the proposed development will have **no effect** black-footed ferret since the species is not present in the action area.

4.2.6.1.2. Bald eagle

According to the February 27, 2007 Surface Use Data Summary Form, there are 4.6 miles of existing overhead 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. The operator is proposing an additional 7.6 miles of overhead three-phase distribution lines.

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

Produced water will be stored in 29 proposed reservoir(s) 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.

Wild Horse Creek may be attracting bald eagles in the winter months. BLM survey information does not indicate any roosts, however two adults were seen along Wild Horse Creek at the onsite. A condition of approval for surveying potential roosting and nesting habitat for the duration of disturbance has been included to prevent unforeseen impacts.

4.2.6.1.3. Ute's Ladies Tresses Orchid

Suitable habitat may be being created due to existing CBNG discharge into Twentymile and Wild Horse Creeks. Reservoir seepage may create suitable habitat. No populations are known from the entire Powder River watershed despite multiple surveys and the likelihood of a seed source or bank is very low. Implementation of the proposed coal bed natural gas project will have **no effect** on the Ute ladies'- tresses orchid.

4.2.6.2. Sensitive Species Direct and Indirect Effects

Table 4.4 Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (<i>Rana pipiens</i>)	Beaver ponds, permanent water in plains and foothills	S	MIIH	Additional water will effect existing waterways.
Spotted frog (<i>Ranus pretiosa</i>)	Ponds, sloughs, small streams	NP	NI	No known records from the area.
Birds				
Baird's sparrow (<i>Ammodramus bairdii</i>)	Grasslands, weedy fields	S	MIIH	Sagebrush cover will be affected.
Brewer's sparrow (<i>Spizella breweri</i>)	Basin-prairie shrub	K	MIIH	Sagebrush cover will be affected.
Burrowing owl (<i>Athene cucularia</i>)	Grasslands, basin-prairie shrub	S	MIIH	Prairie dog colony present.
Ferruginous hawk (<i>Buteo regalis</i>)	Basin-prairie shrub, grasslands, rock outcrops	S	MIIH	Prairie dog colony present. May affect foraging.
Greater sage-grouse (<i>Centrocercus urophasianus</i>)	Basin-prairie shrub, mountain-foothill shrub	K	MIIH	Sagebrush cover will be affected.
Loggerhead shrike (<i>Lanius ludovicianus</i>)	Basin-prairie shrub, mountain-foothill shrub	K	MIIH	Sagebrush cover will be affected.
Long-billed curlew (<i>Numenius americanus</i>)	Grasslands, plains, foothills, wet meadows	S	MIIH	Suitable habitat exists.
Mountain plover (<i>Charadrius montanus</i>)	Short-grass prairie with slopes < 5%	NP	NI	Habitat not present.
Northern goshawk (<i>Accipiter gentilis</i>)	Conifer and deciduous forests	NP	NI	No forest habitat present.
Peregrine falcon (<i>Falco peregrinus</i>)	cliffs	NP	NI	No nesting habitat present.

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

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

Presence

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

Project Effects

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

4.2.6.2.1. Black-tailed prairie dog

Mineral related traffic on the through road in Section 10 may result in prairie dog road mortalities. The trenching for the pipeline may displace individuals. The corridor trenching for the road to 6GILD may kill individuals, The proposed power line may impact the town by providing raptor perches, and increasing predation. A condition of approval will be placed on the powerline over this town. All other proposed power lines avoid prairie dog towns.

4.2.6.2.2. Greater sage-grouse

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

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

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

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

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

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

Additional studies, across more of the sage-grouse's range, indicate that many populations nest much farther than two miles from the lek of breeding (Bennett 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported only 45% of their sage grouse hens nested within 3 km (1.86 mi) of the capture lek. Moynahan and Lindberg (2004) found 36% of their grouse nesting within 3 km of the capture leks. Moynahan's study area was north-central Montana in an area of mixed-grass

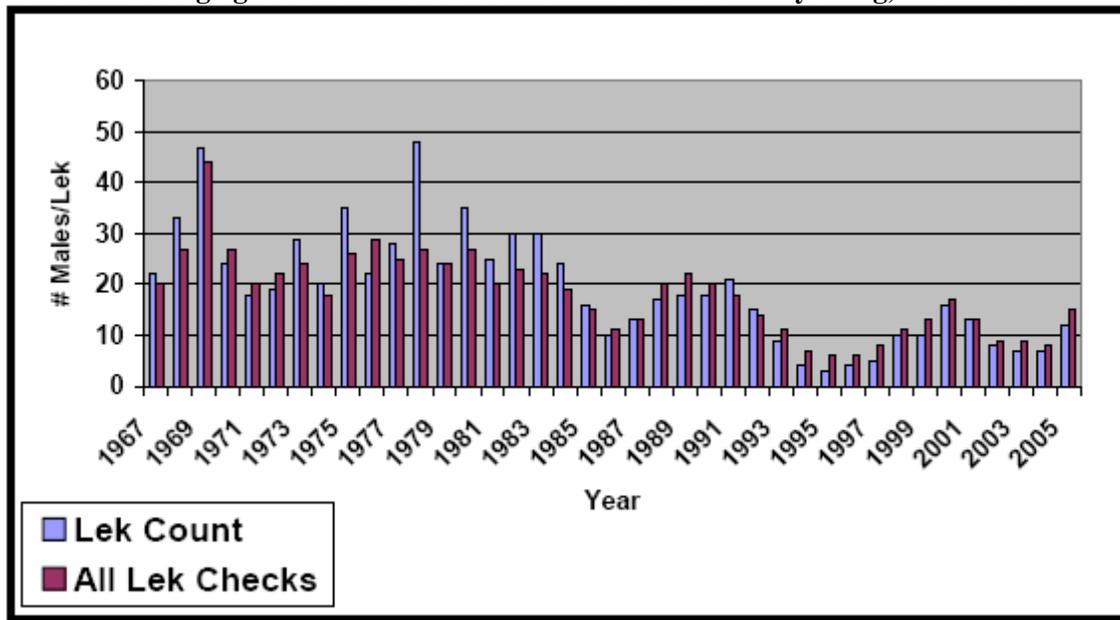
prairie and sagebrush steppe, with Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) being the dominant shrub species (Moynahan et al. In press).

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

Vegetation communities within the Powder River Basin are naturally fragmented as they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. The Powder River Basin is also near the eastern edge of greater sage-grouse range. Without contiguous habitat available to nesting grouse it is likely a smaller percentage of grouse nest within two-miles of a lek within the PRB than grouse within those areas studied in the development of the 1977 WAFWA recommendations and even the Holloran and Moynahan study areas. Holloran and Moynahan both studied grouse in areas of contiguous sagebrush habitats without large scale fragmentation and habitat conversion (Moynahan et al In press, Holloran and Anderson 2005). A recent sagebrush cover assessment within Wyoming basins estimated sagebrush coverage within Holloran and Anderson's Upper Green River Basin study area to be 58% with an average patch size greater than 1200 acres; meanwhile Powder River Basin sagebrush coverage was estimated to be 35% with an average patch size less than 300 acres (Rowland et al. 2005). The Powder River Basin patch size decreased by more than 63% in forty years, from 820 acre patches and an overall coverage of 41% in 1964 (Rowland et al. 2005). Recognizing that many populations live within fragmented habitats and nest much farther than two miles from the lek of breeding WAFWA revised their sage grouse management guidelines (Connelly et. al. 2000) and now recommends the protection of suitable habitats within 5 km (3.1 mi) of leks where habitats are not distributed uniformly such as the Powder River Basin.

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

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



Sage-grouse populations within the PRB are declining independent of coalbed natural gas development. CBNG is a recent development, with the first well drilled in 1987 (Braun et al. 2002). In February 1998 there were 420 producing wells primarily restricted to eastern Campbell County (BFO 1999). By May 2003 there were 26,718 CBNG wells permitted within the BFO area (Oedekoven 2004). The Powder River Basin Oil and Gas Project Final Environmental Impact Statement estimated 51,000 additional CBNG wells to be drilled over a ten year period beginning in 2003 (BFO 2003). Impacts from CBNG development are likely to be significant and additive to the long-term impacts afflicting the sage-grouse population (Oedekoven 2004). In other terms, CBNG development is expected to accelerate the downward sage-grouse population trend.

A two-mile timing limitation given the long-term population decline and that less than 50% of grouse are expected to nest within the limitation area is likely insufficient to reverse the population decline. Moynahan and Lindberg (2004) like WAFWA (Connelly et al. 2000) recommend increasing the protective distance around sage grouse leks. Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production. As stated earlier, a well density of eight wells per section creates sage-grouse avoidance zones which overlap creating contiguous avoidance areas (WGFD 2004).

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

4.2.6.2.3. Mountain plover

The project area contains marginal mountain plover habitat in prairie dog towns. The steep topography reduces nesting habitat suitability. The project should not affect mountain plovers. An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

4.2.6.3. Cumulative effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-271.

4.3. West Nile Virus Direct and Indirect Effects

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

There is no evidence that treatment, either through the use of larvicides or 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 CBM operations.

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

BLM will keep monitoring this issue by continuing to consult with the State agencies and the researchers working in the area in order to stay abreast of the most current developments and any need to apply mitigation.

4.4. Water Resources

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

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 24.5 gpm per well or 1347.5 gpm (3.0 cfs or 2,173.2 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was 171,423 acre-feet in 2006 (maximum production). As such, the volume of water resulting from the production of these wells is 1.3% of the total volume projected for 2006, which will result in an insignificant increase to the present volume of water produced from coal bed natural gas in the Powder River Basin. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.4.1. Groundwater

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 539 gpm will infiltrate at or near the discharge points and impoundments (870 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, “the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater.” (PRB FEIS pg 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. “The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers.” (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 55 to 1,000 feet compared to 500 feet to the Anderson, 800-1000 feet to the Canyon, 200 feet to the Smith, and 1,400 feet to the Wall. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

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

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

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

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

In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, “Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments” (June 14, 2004) which can be accessed on their website. This guidance document became effective August 1, 2004, and is currently being revised as the “Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments” which should be approved by June, 2006. Approximately 800 new impoundments have

been investigated to date with 102 impoundments in 52 permits that have gone into compliance monitoring. The Wyoming DEQ has established an Impoundment Task Force which is in the process of drafting an “Impoundment Monitoring Plan” to investigate the potential for existing impoundments to have impacted shallow groundwater. Drilling at selected existing impoundments should begin in the spring of 2006. For WYPDES permits received by DEQ after the August 1st effective date, the BLM will require that operators comply with the requirements outlined in the current approved DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

4.4.1.1. Groundwater Cumulative Effects:

As stated in the PRB FEIS, “The aerial extent and magnitude of drawdown effects on coal zone aquifers and overlying and underlying sand units in the Wasatch Formation also would be limited by the discontinuous nature of the different coal zones within the Fort Union Formation and sandstone layers within the Wasatch Formation.” (PRB FEIS page 4-64).

Development of CBNG through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS page 4-65). This volume of water “...cumulatively represents 0.5 percent of the recoverable groundwater stored in the Wasatch – Tongue River sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed during reasonably foreseeable 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 watershed for SAR, and EC, the average value measured at selected USGS gauging stations at high and low monthly flows, and Wyoming groundwater quality standards for TDS and SAR for Class I to Class III water. It also shows pollutant limits for TDS, SAR and EC detailed in the WDEQ’s WYPDES permit, and the levels found in the POD’s representative water sample.

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

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Most Restrictive Proposed Limit –		2	1,000
Least Restrictive Proposed Limit		10	3,200
Primary Watershed at Arvada Gauging station			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirement for WYPDES Permit # Pending			
At discharge point	5,000	5-9	2,000-3,000
Predicted Produced Water Quality			
Co-mingled Anderson, Upper and Lower Canyon, Smith and Wall	1,000	12.7	1,580

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the Powder River Basin is the irrigation of crops (PRB FEIS pg 4-69). The water quality projected for this POD is 1,000.0 mg/l TDS which is not within the WDEQ criteria for agricultural use (2000 mg/l TDS).

The co-mingled quality for the water produced from the Anderson, Canyon, Smith, and Wall target 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 24.5 gallons per minute (gpm) is projected to be produced from these 55 wells, for a total of 1347.5 gpm for the POD. See Table 4.5.

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

There are 33 discharge points proposed (29 of which will be approved) 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, 29 impoundments (326.08 acre-feet of storage) would potentially be constructed within the project area. These impoundments will disturb approximately 43.8 acres including the dam structures of which all 29 would be on-channel reservoirs. The operator proposed to drill one boring at the 29 approved impoundment locations. Ground water quality results will determine which impoundments will be constructed. All proposed and existing water management facilities were evaluated for compliance with best management practices during the onsite.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 0.45 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). The operator has committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Sedimentation will occur in the impoundments, but would be controlled through a concerted monitoring and maintenance program. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific, case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2006 at a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 55 wells is anticipated to be a total of 1347.5 gpm or 3.0 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment the produced water re-surfacing in Wild Horse Creek from this action (0.45 cfs) may add a maximum 0.36 cfs to the Upper Powder River flows, or 0.53% of the predicted total CBNG produced water contribution. This incremental volume is statistically below the measurement capabilities for the volume of flow of the Upper Powder River (refer to Statistical Methods in Water Resources U.S. Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). The addition of the water produced from these wells will not significantly impact the water quantity in the mainstem of the Upper Powder River. For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

The proposed method for surface discharge provides passive treatment through the aeration supplied by the energy dissipation configuration at each discharge point outfall. Aeration adds dissolved oxygen to the produced water which can oxidize susceptible ions, which may then precipitate. This is particularly

true for dissolved iron. Because iron is one of the key parameters for monitoring water quality, the precipitation of iron oxide near the discharge point will improve water quality at downstream locations.

The operator has applied for a Wyoming Pollutant Discharge Elimination System (WYPDES) permit for the discharge of water produced from this project from the WDEQ.

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

As stated previously, the operator has committed to offer water well agreements to properly permitted domestic and stock water wells within the circle of influence, 1/2 mile of the nearest federal producing CBNG well.

In-channel downstream impacts are addressed in the WMP (page 26) for the Acacia POD prepared by Western Water Consultants 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 watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

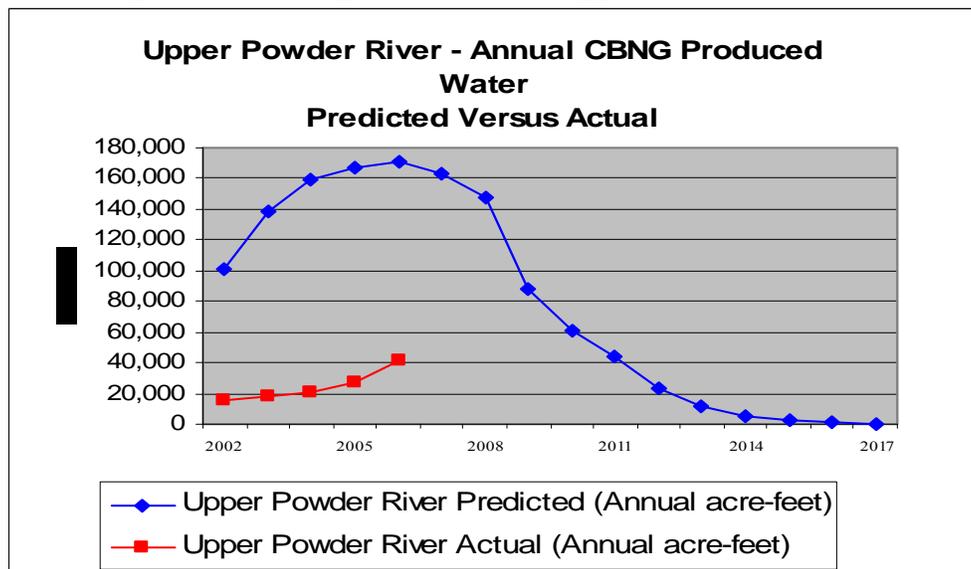
As of March 2007, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 123,984 acre-ft of water compared to the predicted 900,040 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.1 and Table 4.6 following. This volume is 16.8% of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

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

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040				
2008	147,481	1,047,521				
2009	88,046	1,135,567				
2010	60,319	1,195,886				

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2011	44,169	1,240,055				
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	1,285,233		123,984			

Figure 4.1 Actual vs predicted water production in the Upper Powder River watershed



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

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

and adaptive management, water quality standards and interstate agreements can be met.” (PRB FEIS page 4-117)

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

1. They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 16.8% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
3. The commitment by the operator to monitor the volume of water discharged.

No additional mitigation measures are required.

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

4.5. Cultural Resources

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
Mary Hopkins	Interim Wyoming SHPO	Wyoming SHPO	No
Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation	Yes
Justin Roswadowski	Drilling	Yates Petroleum Corporation	Yes
Tim Barber	Federal Regulatory Agent	Yates Petroleum Corporation	Yes
Candy Laramore	Surface Owner	Deer Track, LLC	Yes
Ralph Tronstad	Pipeline	Rowdy Pipeline	Yes
Jim Niese	Drilling	Yates Petroleum Corporation	Yes
Buster Ivory	Hydrologist	Yates Petroleum Corporation	Yes

6. OTHER PERMITS REQUIRED

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

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