

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

Pinnacle Gas Resources, Inc.  
**Cabin Creek Phase V**

ENVIRONMENTAL ASSESSMENT –**WY-070-08-176**

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Pinnacle Gas Resources, Inc.’s Cabin Creek Phase V Coal Bed Natural Gas (CBNG) POD comprised of the following 50 Applications for Permit to Drill (APDs), 1 water impoundment and 4 Right-of-Ways:

	<b>Well Name</b>	<b>Well #</b>	<b>QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease</b>
1	CABIN CREEK V CB	5-4	SWNW	4	57N	77W	WYW149973
2	CABIN CREEK V CB	13-4	SWSW	4	57N	77W	WYW141874
3	CABIN CREEK V CB	14-4	SESW	4	57N	77W	WYW141874
4	CABIN CREEK V CB	3-4	NENW	4	57N	77W	WYW141874
5	CABIN CREEK V CB	15-4	SWSE	4	57N	77W	WYW141874
6	CABIN CREEK V CB	1-7	NENE	7	57N	77W	WYW144218
7	CABIN CREEK V CB	7-7	SWNE	7	57N	77W	WYW144218
8	CABIN CREEK V CB	3-8	NENW	8	57N	77W	WYW149973
9	CABIN CREEK V CB	11-8	NESW	8	57N	77W	WYW149973
10	CABIN CREEK V CB	13-8	SWSW	8	57N	77W	WYW144218
11	CABIN CREEK V CB	15-8	SWSE	8	57N	77W	WYW144218
12	CABIN CREEK V CB	3-9	NENW	9	57N	77W	WYW149973
13	CABIN CREEK V CB	7-9	SWNE	9	57N	77W	WYW141874
14	CABIN CREEK V CB	13-10	SWSW	10	57N	77W	WYW144217
15	CABIN CREEK V CB	1-15	NENE	15	57N	77W	WYW149974
16	CABIN CREEK V CB	5-15	SWNW	15	57N	77W	WYW149974
17	CABIN CREEK V CB	7-15	SWNE	15	57N	77W	WYW149974
18	CABIN CREEK V CB	11-15	NESW	15	57N	77W	WYW149974
19	CABIN CREEK V CB	13-15	SWSW	15	57N	77W	WYW149974
20	CABIN CREEK V CB	11-17	NESW	17	57N	77W	WYW149973
21	CABIN CREEK V CB	3-18	NENW	18	57N	77W	WYW149973
22	CABIN CREEK V CB	7-18	SWNE	18	57N	77W	WYW149973
23	CABIN CREEK V CB	15-18	SWSE	18	57N	77W	WYW144220
24	CABIN CREEK V CB	1-18	NENE	18	57N	77W	WYW149973
25	CABIN CREEK V CB	5-18	SWNW	18	57N	77W	WYW149973
26	CABIN CREEK V CB	5-19	SWNW	19	57N	77W	WYW144220
27	CABIN CREEK V CB	11-19	NESW	19	57N	77W	WYW144220
28	CABIN CREEK V CB	3-20	NENW	20	57N	77W	WYW144220
29	CABIN CREEK V CB	5-20	SWNW	20	57N	77W	WYW144220
30	CABIN CREEK V CB	7-20	SWNE	20	57N	77W	WYW144220
31	CABIN CREEK V CB	9-20	NESE	20	57N	77W	WYW144220
32	CABIN CREEK V CB	13-20	SWSW	20	57N	77W	WYW144220

	<b>Well Name</b>	<b>Well #</b>	<b>QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease</b>
33	CABIN CREEK V CB	1-20	NENE	20	57N	77W	WYW144220
34	CABIN CREEK V CB	11-20	NESW	20	57N	77W	WYW144220
35	CABIN CREEK V CB	15-20	SWSE	20	57N	77W	WYW144220
36	CABIN CREEK V CB	5-21	SWNW	21	57N	77W	WYW144220
37	CABIN CREEK V CB	10-21	NWSE	21	57N	77W	WYW144220
38	CABIN CREEK V CB	13-21	SWSW	21	57N	77W	WYW144220
39	CABIN CREEK V CB	11-21	NESW	21	57N	77W	WYW144220
40	CABIN CREEK V CB	1-22	NENE	22	57N	77W	WYW149974
41	CABIN CREEK V CB	3-22	NENW	22	57N	77W	WYW141874
42	CABIN CREEK V CB	9-22	NESE	22	57N	77W	WYW149974
43	CABIN CREEK V CB	15-22	SWSE	22	57N	77W	WYW149974
44	CABIN CREEK V CB	7-22	SWNE	22	57N	77W	WYW149974
45	CABIN CREEK V CB	1-27	NENE	27	57N	77W	WYW149974
46	CABIN CREEK V CB	5-27	SWNW	27	57N	77W	WYW144221
47	CABIN CREEK V CB	11-27	NESW	27	57N	77W	WYW144221
48	CABIN CREEK V CB	10-27	NWSE	27	57N	77W	WYW144221
49	CABIN CREEK V CB	11-35	NESW	35	57N	77W	WYW144221
50	CABIN CREEK V CB	5-35	SWNW	35	57N	77W	WYW144221

The following 10 wells are located in high quality sage grouse habitat. At this time sufficient mitigation has not been provided that would reduce the impacts to sage grouse. BLM is deferring the following wells until such time as adequate site specific mitigation can be obtained. Additional analysis will be required before BLM can issue a decision on these wells

	<b>Well Name</b>	<b>Well #</b>	<b>QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease</b>
1	CABIN CREEK V CB	1-5	NENE	5	57N	77W	WYW141874
2	CABIN CREEK V CB	3-5	NENW	5	57N	77W	WYW141874
3	CABIN CREEK V CB	7-5	SWNE	5	57N	77W	WYW141874
4	CABIN CREEK V CB	1-9	NENE	9	57N	77W	WYW141874
5	CABIN CREEK V CB	9-9	NESE	9	57N	77W	WYW149973
6	CABIN CREEK V CB	10-9	NWSE	9	57N	77W	WYW149973
7	CABIN CREEK V CB	14-10	SESW	10	57N	77W	WYW144217
8	CABIN CREEK V CB	3-15	NENW	15	57N	77W	WYW149974
9	CABIN CREEK V CB	3-19	NENW	19	57N	77W	WYW144220
10	CABIN CREEK V CB	13-19	SWSW	19	57N	77W	WYW144220

The overhead powerline network as proposed will not be approved due to lack of cultural inventory. The proponent will have to submit a sundry notice with the appropriate cultural inventory to BLM for review. Additional NEPA analysis may be required at that time.

An injection well site in the SWNE portion of section 16, Township 57 north, Range 77 west, was inspected and approved for use in association with the water management strategy for this POD. An EMIT water treatment facility, approved under the Cabin Creek Phase I plan, EA # WY-070- 07-057, is located in the NESE portion of section 20, Township 57 north, Range 76 west, and has been approved for

use as part of this water management strategy. Additionally, the following impoundment was inspected and approved for use with this POD.

	<b>IMPOUNDMENT Name / Number</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Capacity (Acre Feet)</b>	<b>Surface Disturbance (Acres)</b>	<b>Lease #</b>
1	SCHAUER #6 PIT	NWSW	16	57	77	49.28	9	FEE

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

The following rights-of-way were inspected and are required in association with the Master Surface Use Plan for the POD. They will fall within the constraints of the appropriate stipulations and conditions of approval of the POD:

	<b>Right-of- Way</b>	<b>Qtr/Qtr</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Width/ Length</b>	<b>Total Surface Disturbance (Acres)</b>	<b>Summary of Uses</b>
1	WYW-169875 Amendment #1	Lot 4	27	57N	77W	30'/400'	0.275	6" Poly low pressure gas pipeline
2	WYW-169876 Amendment #1	Lot 4	27	57N	77W	Varies/400'	0.643	Primitive Road Water Pipeline Buried Electric
3	WYW-169962	Lot 1, SE1/4SE1/4  Lots 1, 2, NE1/4NE1/4, E1/2NW1/4, S1/2NE1/4	10  15	57N	77W	40'/1,350' 20'/1,318'  40'/1,566' 20'/3,227 varies/9,122'	15.234	Template Road Primitive Road  Template Road Primitive Road Water line & Buried Power
4	WYW-169963	Lot 1, SE1/4SE1/4  Lots 1, 2, NE1/4NE1/4, E1/2NW1/4, S1/2NE1/4	10  15	57N	77W	40'/10,930'	10.036	12" (or less) poly low pressure gas pipeline

**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. The Operator has provided a reclamation bond for the water impoundment to the Wyoming Oil and Gas Conservation Commission (WOGCC).
  4. Alternative C will not result in any undue or unnecessary environmental degradation.
  5. 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.
  6. Mitigation measures applied by the BLM will alleviate or minimize environmental impacts.
  7. Alternative C is the environmentally-preferred Alternative.
  8. 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  
Pinnacle Gas Resources, Inc.  
Cabin Creek Phase V  
PLAN OF DEVELOPMENT  
WY-070-08-176**

## **INTRODUCTION**

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

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

The purpose for the proposal is to produce coal bed natural gas (CBNG) on 7 federal oil and gas mineral leases issued to the applicant by the BLM.

#### **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: Pinnacle Gas Resources, Inc.’s Cabin Creek Phase V Plan of Development (POD) for 76 coal bed natural gas well APD’s and associated infrastructure.

Proposed Well Information: There were 76 wells proposed within this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location. Each well will produce from Cook, Canyon, Wall and Pawnee coal seams. Proposed well house dimensions are 6 ft wide x 7 ft length x 7 ft height. Proposed wells are located as follows:

	<b>Well Name</b>	<b>Well #</b>	<b>QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease</b>
1	CABIN CREEK V CB	03CCWP-4	NENW	4	57N	77W	WYW141874
2	CABIN CREEK V CB	05CCWP-4	SWNW	4	57N	77W	WYW149973
3	CABIN CREEK V CB	13CCWP-4	SWSW	4	57N	77W	WYW141874
4	CABIN CREEK V CB	14CCWP-4	SESW	4	57N	77W	WYW141874
5	CABIN CREEK V CB	15CCWP-4	SWSE	4	57N	77W	WYW141874
6	CABIN CREEK V CB	1CCWP-5	NENE	5	57N	77W	WYW141874
7	CABIN CREEK V CB	3CCWP-5	NENW	5	57N	77W	WYW141874
8	CABIN CREEK V CB	7CCWP-5	SWNE	5	57N	77W	WYW141874
9	CABIN CREEK V CB	04CCWP-6	NWNW	6	57N	77W	WYW141874
10	CABIN CREEK V CB	01CCWP-7	NENE	7	57N	77W	WYW144218
11	CABIN CREEK V CB	07CCWP-7	SWNE	7	57N	77W	WYW144218
12	CABIN CREEK V CB	03CCWP-8	NENW	8	57N	77W	WYW149973
13	CABIN CREEK V CB	11CCWP-8	NESW	8	57N	77W	WYW149973
14	CABIN CREEK V CB	13CCWP-8	SWSW	8	57N	77W	WYW144218
15	CABIN CREEK V CB	15CCWP-8	SWSE	8	57N	77W	WYW144218
16	CABIN CREEK V CB	01CCWP-9	NENE	9	57N	77W	WYW141874
17	CABIN CREEK V CB	03CCWP-9	NENW	9	57N	77W	WYW149973
18	CABIN CREEK V CB	05CCWP-9	SWNW	9	57N	77W	WYW149973
19	CABIN CREEK V CB	07CCWP-9	SWNE	9	57N	77W	WYW141874
20	CABIN CREEK V CB	09CCWP-9	NESE	9	57N	77W	WYW149973
21	CABIN CREEK V CB	10CCWP-9	NWSE	9	57N	77W	WYW149973
22	CABIN CREEK V CB	05-09 I	SWNW	9	57N	77W	WYW149973
23	CABIN CREEK V CB	05CCWP-10	SWNW	10	57N	77W	WYW144217
24	CABIN CREEK V CB	13CCWP-10	SWSW	10	57N	77W	WYW144217
25	CABIN CREEK V CB	14CCWP-10	SESW	10	57N	77W	WYW144217
26	CABIN CREEK V CB	01CCWP-15	NENE	15	57N	77W	WYW149974
27	CABIN CREEK V CB	03CCWP-15	NENW	15	57N	77W	WYW149974
28	CABIN CREEK V CB	05CCWP-15	SWNW	15	57N	77W	WYW149974
29	CABIN CREEK V CB	07CCWP-15	SWNE	15	57N	77W	WYW149974
30	CABIN CREEK V CB	09CCWP-15	NESE	15	57N	77W	WYW149974
31	CABIN CREEK V CB	11CCWP-15	NESW	15	57N	77W	WYW149974
32	CABIN CREEK V CB	13CCWP-15	SWSW	15	57N	77W	WYW149974
33	CABIN CREEK V CB	15CCWP-15	SWSE	15	57N	77W	WYW149974
34	CABIN CREEK V CB	11CCWP-17	NESW	17	57N	77W	WYW149973
35	CABIN CREEK V CB	01CCWP-18	NENE	18	57N	77W	WYW149973
36	CABIN CREEK V CB	03CCWP-18	NENW	18	57N	77W	WYW149973
37	CABIN CREEK V CB	05CCWP-18	SWNW	18	57N	77W	WYW149973
38	CABIN CREEK V CB	07CCWP-18	SWNE	18	57N	77W	WYW149973
39	CABIN CREEK V CB	15CCWP-18	SWSE	18	57N	77W	WYW144220
40	CABIN CREEK V CB	03CCWP-19	NENW	19	57N	77W	WYW144220
41	CABIN CREEK V CB	05CCWP-19	SWNW	19	57N	77W	WYW144220
42	CABIN CREEK V CB	11CCWP-19	NESW	19	57N	77W	WYW144220
43	CABIN CREEK V CB	13CCWP-19	SWSW	19	57N	77W	WYW144220
44	CABIN CREEK V CB	01CCWP-20	NENE	20	57N	77W	WYW144220
45	CABIN CREEK V CB	03CCWP-20	NENW	20	57N	77W	WYW144220
46	CABIN CREEK V CB	05CCWP-20	SWNW	20	57N	77W	WYW144220
47	CABIN CREEK V CB	07CCWP-20	SWNE	20	57N	77W	WYW144220

	<b>Well Name</b>	<b>Well #</b>	<b>QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease</b>
48	CABIN CREEK V CB	09CCWP-20	NESE	20	57N	77W	WYW144220
49	CABIN CREEK V CB	11CCWP-20	NESW	20	57N	77W	WYW144220
50	CABIN CREEK V CB	13CCWP-20	SWSW	20	57N	77W	WYW144220
51	CABIN CREEK V CB	15CCWP-20	SWSE	20	57N	77W	WYW144220
52	CABIN CREEK V CB	05CCWP-21	SWNW	21	57N	77W	WYW144220
53	CABIN CREEK V CB	10CCWP-21	NWSE	21	57N	77W	WYW144220
54	CABIN CREEK V CB	11CCWP-21	NESW	21	57N	77W	WYW144220
55	CABIN CREEK V CB	13CCWP-21	SWSW	21	57N	77W	WYW144220
56	CABIN CREEK V CB	01CCWP-22	NENE	22	57N	77W	WYW149974
57	CABIN CREEK V CB	03CCWP-22	NENW	22	57N	77W	WYW141874
58	CABIN CREEK V CB	07CCWP-22	SWNE	22	57N	77W	WYW149974
59	CABIN CREEK V CB	09CCWP-22	NESE	22	57N	77W	WYW149974
60	CABIN CREEK V CB	15CCWP-22	SWSE	22	57N	77W	WYW149974
61	CABIN CREEK V CB	01CCWP-27	NENE	27	57N	77W	WYW149974
62	CABIN CREEK V CB	05CCWP-27	SWNW	27	57N	77W	WYW144221
63	CABIN CREEK V CB	10CCWP-27	NWSE	27	57N	77W	WYW144221
64	CABIN CREEK V CB	11CCWP-27	NESW	27	57N	77W	WYW144221
65	CABIN CREEK V CB	13CCWP-27	SWSW	27	57N	77W	WYW144221
66	CABIN CREEK V CB	03CCWP-33	NENW	33	57N	77W	WYW141874
67	CABIN CREEK V CB	05CCWP-33	SWNW	33	57N	77W	WYW141874
68	CABIN CREEK V CB	07CCWP-33	SWNE	33	57N	77W	WYW144223
69	CABIN CREEK V CB	12CCWP-33	NWSW	33	57N	77W	WYW141874
70	CABIN CREEK V CB	16CCWP-33	SESE	33	57N	77W	WYW141874
71	CABIN CREEK V CB	09CCWP-33	NESE	33	57N	77W	WYW141874
72	CABIN CREEK V CB	06CCWP-34	SENE	34	57N	77W	WYW141874
73	CABIN CREEK V CB	12CCWP-34	NWSW	34	57N	77W	WYW141874
74	CABIN CREEK V CB	14CCWP-34	SESW	34	57N	77W	WYW141874
75	CABIN CREEK V CB	05CCWP-35	SWNW	35	57N	77W	WYW144221
76	CABIN CREEK V CB	11CCWP-35	NESW	35	57N	77W	WYW144221

Water Management Proposal: The following four impoundments were proposed for use in association with the water management strategy for the POD. Additionally, an injection well and an EMIT water treatment facility were also proposed for use as part of this POD. The EMIT facility was approved as part of the Cabin Creek Phase I plan of development, EA# WY-070- 07-057.

	<b>IMPOUNDMENT Name / Number</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Capacity (Acre Feet)</b>	<b>Surface Disturbance (Acres)</b>	<b>Lease #</b>
1	SCHAUER #2 PIT— Proposed Secondary	SESW	16	57	77	98.81	15	FEE
2	SCHAUER #6 PIT— Proposed Primary	NWSW	16	57	77	49.28	9	FEE
3	SCHAUER #9 PIT— Proposed Secondary	SENE	17	57	77	37.35	6	FEE
4	SCHAUER #11 PIT— Proposed Secondary	NENW	7	57	77	5.04	4	FEE
5	CB State 07-16-57-77i Proposed Injection Well	SWNE	16	57	77			

	<b>IMPOUNDMENT Name / Number</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Capacity (Acre Feet)</b>	<b>Surface Disturbance (Acres)</b>	<b>Lease #</b>
6	NWSE S20, T57N, R76W EMIT Water Existing Treatment Facility	NWSE	20	57	76			

The following Rights-of-Ways were required in association with the Master Surface Use Plan for the POD.

	<b>Right-of-Way</b>	<b>Qtr/Qtr</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Width/Length</b>	<b>Total Surface Disturbance (Acres)</b>	<b>Summary of Uses</b>
1	WYW-169875 Amendment #1	Lot 4	27	57N	77W	30'/400'	0.275	6" Poly low pressure gas pipeline
2	WYW-169876 Amendment #1	Lot 4	27	57N	77W	Varies/400'	0.643	Primitive Road Water Pipeline Buried Electric
3	WYW-169962	Lot 1, SE1/4SE1/4	10	57N	77W	40'/1,350'	1.240	Template Road Primitive Road
			15			40'/1,566'	1.438	
		Lots 1, 2, NE1/4NE1/4, E1/2NW1/4, S1/2NE1/4	15			20'/3,227'	1.481	Template Road Primitive Road Water line & Buried Power
						30'/9,122'	6.282	
						20'/9,122'	4.188	
4	WYW-169963	Lot 1, SE1/4SE1/4	10	57N	77W	40'/10,930'	10.036	12" (or less) poly low pressure gas pipeline

County: Sheridan

Applicant: Pinnacle Gas Resources, Inc.

Surface Owners: Schauer Enterprises, Inc, c/o Mike Schauer, PeeGee Ranch c/o Giles Prichard-Gordon, Yuhas/Black c/o Virgil Kinnaird, Jane Kemble Dunbar, Claiborne K. Rowley and Gayla J. Rowley, Russ Green, US DOI BLM, Padlock Ranch Company, Inc., Sussex Cattle Company

Project Description:

The proposed action involves the following:

- Drilling of 76 total federal CBM wells in Canyon, Cook, Wall, and Pawnee coal zones to depths of approximately 758' for the Canyon seam, 960' for the Cook seam, 1100' for the Wall seam and 1241' for the Pawnee seam. Multiple seams will be produced by co-mingling production (a single well per location capable of producing from multiple coal seams).

- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners may impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.
- Well metering shall be accomplished by telemetry/well visitation. Metering would entail daily visits to each well. This would be for the life of the project.
- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 4 proposed discharge points and 4 proposed off-channel impoundments, 1 previously approved EMIT treatment facility with discharge directly to the Powder River, and 1 Class V injection well facility within the Middle Powder River watershed.
- An unimproved and improved road network. The improved road network was built for the existing fee development.
- An above ground power line network to be constructed by the operator. The proposed route has not been reviewed by the contractor. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction has not been scheduled and will not be completed before the CBNG wells are producing. If the power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the 14 power drops.
- A storage tank of 1000 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation for 6 months or until overhead powerlines are installed. Fuel deliveries are anticipated to be every 7 days. Noise level is expected to be 49 decibels at 600 feet to one-half mile in distance.
- A buried gas, water and power line network, and 2 compression facilities.

The overhead powerline network as proposed will not be approved due to lack of cultural inventory. The proponent will have to submit a sundry notice with the appropriate cultural inventory to BLM for review. Additional NEPA analysis may be required at that time.

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

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

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

1. Comply with all applicable Federal, State and Local laws and regulations.
2. Obtain the necessary permits for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge

- permits, and relevant air quality permits.
3. Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD
  4. Provide water analysis from a designated reference well in each coal zone.

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

### 2.3. Alternative C – Environmentally Preferred

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

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

##### Water

The operator’s initial proposal indicated that 3 off-channel impoundments would be developed in this POD. During the onsite investigation, 7 potential off-channel impoundments were evaluated. After the onsite the operator proposed 4 off-channel impoundments, one as primary and three as secondary.

##### Surface Use

Well Name	Well No	TWP	RNG	SEC	QTR	Onsite Date	Comments
CB FED	15-4	57N	77W	4	SWSE	4/23/2008	Well moved 130' to South to move outside 1/4 mile of raptor nest. Road will require a template design.
CB FED	7-7	57N	77W	7	SWNE	4/22/2008	Well moved 110' to West to get off pipeline that was being installed for the fee wells. Turnout for road will be installed at this location
CB FED	3-8	57N	77W	8	NENW	4/22/2008	Engineered road design required- climb on hill estimated at 15%.
CB FED	3-9	57N	77W	9	NENW	4/22/2008	Engineered road design required- primitive road not adequate due to side slopes and erosive soils.
CB FED	13-10	57N	77W	10	SWSW	4/23/2008	Access road rerouted to follow old reclaimed road and to avoid habitat fragmentation.

Well Name	Well No	TWP	RNG	SEC	QTR	Onsite Date	Comments
CB FED	7-15	57N	77W	15	SWNE	4/24/2008	Moved well 50ft to NW to a flatter location. Location will require a slot design as a stock tank will be located on the location also. A gate will be installed where the topography narrows to the West to prevent use of existing primitive road by oil and gas traffic.
CB FED	13-15	57N	77W	15	SWSW	4/24/2008	Moved Well 230ft to SW to put out line of sight of several raptor nests.
CB FED	1-18	57N	77W	18	NENE	4/22/2008	At low spot on proposed road a low water crossing with a 36" culvert and a spillway over the top will be installed.
CB FED	7-18	57N	77W	18	SWNE	4/22/2008	Access road was changed from road only to a corridor with the pipeline to be buried in the roadway.
CB FED	15-18	57N	77W	18	SWSE	4/28/2008	Additional road engineering required as a primitive road is not suitable due to topography and soils.
CB FED	1-20	57N	77W	20	NENE	4/28/2008	Moved well 50-75ft to Northeast to protect drainage; A road design needed as a primitive road not suitable due to topography and soils.
CB FED	7-20	57N	77W	20	SWNE	4/28/2008	Turnout required at beginning of access road and a drainage control structure is need where a headcut is present as you come onto the location,
CB FED	9-20	57N	77W	20	NESE	4/28/2008	Access road was changed from an engineered road to a template design to reduce the amount of surface disturbance the road is only accessing 2 wells and dead ends.
CB FED	5-21	57N	77W	21	SWNW	4/28/2008	Road was moved to the North to avoid a headcut, a new gate will be installed and the existing primitive road will be reclaimed. The change was made by the landowner. Additionally the location will be a drive-thru as the access road will continue to the 11-21 location.
CB FED	10-21	57N	77W	21	NWSE	4/30/2008	Access road moved to come from the fee well per landowner.

Well Name	Well No	TWP	RNG	SEC	QTR	Onsite Date	Comments
CB FED	11-21	57N	77W	21	NESW	4/30/2008	Moved well 300ft to North as the access route was not permitable. A new route from the 5-21 location is proposed.
CB FED	7-22	57N	77W	22	SWNE	4/30/2008	Moved Well 125 ft Southwest to avoid building a constructed pad.
CB FED	15-22	57N	77W	22	SWSE	5/6/2008	Access road moved slightly to the West.
CB FED	5-35	57N	77W	35	SWNW	4/30/2008	Road design required as a primitive road is not suitable due to topography and soils.
CB FED	11-35	57N	77W	35	NESW	5/6/2008	Moved gate to the East
	Compressor Fac.	57N	77W	22	NWNW	4/30/2008	The compressor location will be built by 3 <sup>rd</sup> Party
	Compressor Fac.	57N	77W	6	SENE	7/8/2008	Location was moved from the section line of sec 31 58/77 and sec 6 57/77 as it was located in high quality sage grouse habitat. The compressor location will be built by 3 <sup>rd</sup> Party
CB FED	1-5	57N	77W	5	NENE	4/23/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation is needed.
CB FED	3-5	57N	77W	5	NENW	4/23/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation is needed.
CB FED	7-5	57N	77W	5	SWNE	4/23/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation is needed.
CB FED	1-9	57N	77W	9	NENE	4/23/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation is needed.
CB FED	9-9	57N	77W	9	NESE	4/23/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation is needed.
CB FED	10-9	57N	77W	9	NWSE	4/23/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation is needed.
CB FED	14-10	57N	77W	10	SESW	4/23/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation is needed.
CB FED	3-15	57N	77W	15	NENW	4/23/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation

Well Name	Well No	TWP	RNG	SEC	QTR	Onsite Date	Comments
							is needed.
CB FED	3-19	57N	77W	19	NENW	5/7/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation is needed.
CB FED	13-19	57N	77W	19	SWSW	5/7/2008	Well location is located in high quality sage grouse habitat. Recommend additional mitigation is needed.
CB FED	4-6	57N	77W	6	NWNW	dropped by Operator	Dropped by Operator prior to onsite
CB FED	13-27	57N	77W	27	SWSW	5/6/2008	Location Dropped from POD as proposed road not feasible for use per landowner; no other alternate access proposed by Operator
CB FED	3-33	57N	77W	33	NENW	4/29/2008	Location dropped from POD as the access route was not adequate as proposed, Operator dropped the location
CB FED	5-33	57N	77W	33	SWNW	4/29/2008	Location dropped from POD as the access route was not adequate as proposed, Operator dropped the location
CB FED	7-33	57N	77W	33	SWNE	4/29/2008	Location dropped from POD as the access route was not adequate as proposed, Operator dropped the location
CB FED	12-33	57N	77W	33	NWSW	4/29/2008	Location dropped from POD as the access route was not adequate as proposed, Operator dropped the location
CB FED	9-33	57N	77W	33	SWNE	4/29/2008	Location dropped from POD as access route went through an cultural site, which would require additional mitigation measures, the Operator dropped the location
CB FED	16-33	57N	77W	33	SESE	4/29/2008	Location dropped from POD as access route went through an cultural site, which would require additional mitigation measures, the Operator dropped the location
CB FED	12-34	57N	77W	34	NWSW	4/29/2008	Location dropped from POD as access route went through an cultural site, which would require additional mitigation measures, the Operator dropped the location

Well Name	Well No	TWP	RNG	SEC	QTR	Onsite Date	Comments
CB FED	14-34	57N	77W	34	SESW	4/29/2008	Location dropped from POD as access route went through an cultural site, which would require additional mitigation measures, the Operator dropped the location
CB FED	6-34	57N	77W	34	SESW	4/29/2008	Location Dropped from POD as proposed road not feasible for use per landowner; no other alternate access proposed by Operator
CB FED	15-15	57N	77W	15	SWSE	4/24/2008	Location dropped from POD. The original location was not adequate for a constructed pad location; the operator moved the location to an alternate site, but it is also not adequate as it is at the mouth of a side drainage.
CB FED	9-15	57N	77W	15	NESE	4/24/2008	Location dropped from POD. The location was too tight in order to conduct operations safely and erosive soils were present.
CB FED	5-10	57N	77W	10	SWNW	4/23/2008	Location dropped due to proximity to a raptor nest
CB FED	5-9I	57N	77W	9	SWNW	4/22/2008	Location dropped due to proximity to a raptor nest
CB FED	5-9	57N	77W	9	SWNW	4/22/2008	Location dropped due to proximity to a raptor nest

The majority of the roads associated with the Cabin Creek V POD were originally proposed as primitive. In numerous areas, a primitive road was not suitable and a template or engineered design was required. Additionally the main access roads were built for fee development and were in various stages of construction during the pre-approval onsites.

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

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

**2.3.2.1. Groundwater**

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

**2.3.2.2. Surface Water**

1. Channel Crossings:
  - a) Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed

perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.

- b) Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.
3. 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. A copy of the approved Class V Injection Well permit (UIC) will be provided to the BLM when it is issued by the WDEQ.

#### **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/Floodplains**

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

#### **2.3.2.6. 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. The Companies will locate aboveground power lines, where practical, at least 0.5 mile from any sage grouse breeding or nesting grounds to prevent raptor predation and sage grouse collision with the conductors. Power poles within 0.5 mile of any sage grouse breeding ground will be raptor-proofed to prevent raptors from perching on the poles.
5. 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.

### **2.3.2.7. Threatened, Endangered, or Sensitive Species**

#### **2.3.2.7.1. Black-footed Ferret**

1. Prairie dog colonies will be avoided wherever possible.
2. If any black-footed ferrets are located, the USFWS will be consulted. Absolutely no disturbance will be allowed within prairie dog colonies inhabited by black-footed ferrets.
3. Additional mitigation measure may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to black-footed ferrets or their habitat. In the event that a mountain plover is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

#### **2.3.2.7.2. Mountain Plover**

1. A disturbance-free buffer zone of 0.25 mile will be established around all occupied mountain plover nesting habitat between March 15 and July 31.
2. Project-related features that encourage or enhance the hunting efficiency of predators of mountain plover will not be constructed within ½ mile of occupied mountain plover nesting habitat.
3. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.
4. Creation of hunting perches or nest sites for avian predators within 0.5 mile of identified nesting areas will be avoided by burying power lines, using the lowest possible structures for fences and other structures and by incorporating perch-inhibiting devices into their design.

#### **2.3.2.7.3. 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.

#### **2.3.2.8. Visual Resources**

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

#### **2.3.2.9. 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**

##### **General**

1. All changes made at the onsite will be followed. They have all been incorporated into the operator's POD. Refer to section 2.3.1 "Changes as result of the on-sites" on pages 10-14 of EA# WY-070-08-176. See Attachment 1.
2. 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.
3. No surface disturbing activities will be authorized on federal lands prior to the approval of a Pesticide Use Permit (WY-070-08-043) unless Pinnacle Gas Resources Inc. provides documentation of:
  - a. Current year weed survey with photos showing that no state listed invasive species are present in the areas to be disturbed.
4. All overhead powerlines associated with Cabin Creek V POD are **NOT** approved. Pinnacle will be required to submit a sundry notice (Form 3160-5) to the BLM for approval.
5. Please contact Mary Maddux, Natural Resource Specialist, @ (307) 684-1164, Bureau of Land Management, Buffalo, if there are any questions concerning these COAs.

## Surface Use

1. The operator is responsible for having a licensed professional engineer certify that the actual construction of the roads in and accessing Cabin Creek Phase V meets the design criteria and is constructed to Bureau standards.
2. All roads used in conjunction with accessing federal wells must be fully built (including all water control structures such as wingditches, culverts, relief ditches etc.) and functional to BLM standards prior to drilling of the well.
3. All roads, well pads, rig slots, culverts, spot upgrades and locations where engineered construction will occur will be completely slope staked for review prior to construction.
4. Adequate drainage control must be in place at all stages of construction and culverts installed as soon as feasible.
5. Final grading and surfacing shall occur immediately after utility installation is complete. All rills, gullies, and other surface defects shall be ripped to the full depth of erosion across the entire width of the roadway prior to final grading and surfacing.
6. The following wells will have their reserve pits lined:
  - 1-15
  - 15-8
  - 15-4
  - 13-8
  - 7-7
  - 13-15
  - 7-18
7. Operator must engineer design, slope stake, and field review with BLM prior to approval for the following well location access roads and road sections:
  - 15-4
  - 3-9
  - 13-10
  - 1-15
  - 11-15
  - 3-18
  - 15-18
  - 7-20
  - 13-20
  - 15-20
  - 5-21
  - 10-21
  - 7-22
  - 9-22
  - 11-27
  - Road segment for Section 8 & 9
8. For all wells spudded after November 1, 2008, the reserve pit fluids must be removed immediately following completion activities unless an exception is granted by the BLM Authorized Officer.

9. All trees salvaged from the construction of the well locations/access roads will be clearly segregated from the spoil material, to prevent burying of trees in the spoil material.
10. No salvaged trees will be pushed up against live trees or buried in the spoil material.
11. All salvaged trees will either be chipped and used in reclamation of the well location/access road, hauled off, used for erosion control or per the surface owner's wishes.
12. Noise mufflers will be installed on the exhaust of all generators to reduce the exhaust noise.
13. The culvert locations will be staked prior to construction. The culvert invert grade and finished road grade will be clearly indicated on the stakes. Culverts will be installed on natural ground, or on a designed flow line of a ditch. The minimum cover over culverts will be 12" or one-half the diameter whichever is greater. Drainage laterals in the form of culverts or waterbars shall be placed according to the following spacing:

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

14. Topsoil will be segregated for all excavation including the entire disturbance area for constructed pads and excavated areas for rig leveling, reserve pits, constructed roads, spot upgrades, reservoir upgrades, outfalls and utility trenches. This requirement will not be applied for trenches installed with wheel trenchers.
15. If produced water is to be applied to road surfaces as dust abatement, the operator needs an approved Wyoming Oil & Gas Commission Facility Information for Road Application of Waste and Waste Water (Form 20) along with the proposed action describing locations, application rates, etc. Form 20 is available at <http://wogcc.state.wy.us>.
16. All rig slots locations approved with the POD will be reclaimed back to approximate original contour following well completion. This includes the following locations: 7-7, 7-15, 11-15, 5-18, 7-18, 15-18, 1-20, 11-20, 7-22, 15-22, 5-35, and the 11-35,
17. All pipelines and/or utility corridor will be installed in the roadway or immediately adjacent to the access roads. If placed immediate adjacent to the access roads the disturbance will be contained within the disturbance allowed for road construction.
18. Improved roads with utility corridor working width will not exceed 50 feet with a clearing and blading not to exceed 40 feet in width unless a specific design is included in the plan and profile section of the master surface use plan.
19. Primitive roads (2-tracks) with utility corridor working width will not exceed 40 feet with a clearing and blading not to exceed 30 feet in width. Construction of primitive roads access/utility corridor within the Cabin Creek V POD will minimize impact to sagebrush by minimizing road width, mowing and wheel trenching.

20. Pipeline installation and/or corridors without road access working width will not exceed 35 feet with clearing and blading not to exceed 20 feet.
21. A minimum 20 foot undisturbed vegetative buffer will be maintained for erosion features along all access roads unless addressed with proper mitigation in the detailed road designs.
22. Mowing at the well site where a constructed pad is not approved as designed will be minimized to a radius of 75 feet or less from the well stake.
23. All stock water tanks installed on BLM surface will be installed with a rock apron of 4 inch aggregate surrounding the tank and extending a minimum of 8 feet out from the tank.
24. 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 Cabin Creek Phase V POD is Covert Green for locations located in sagebrush shrublands and Beetle for locations located in Ponderosa and Juniper Trees.
25. Provide 4" of aggregate where grades exceed 8%. Surface material must meet requirements set forth in Wyoming Supplement to BLM Road Manual 9113.
26. The following well locations and access road/corridor in the project area have been identified to have limited reclamation potential that will require disturbed areas to be stabilized (stabilization efforts may include mulching, matting, soil amendments, etc.) in a manner which eliminates accelerated erosion until a self-perpetuating 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.

<b>Lease</b>	<b>Well #</b>	<b>Aliquot</b>	<b>Sec</b>	<b>T</b>	<b>R</b>
WYW141874	15-4	SWSE	4	57N	77W
WYW144218	7-7	SWNE	7	57N	77W
WYW144218	13-8	SWSW	8	57N	77W
WYW149973	3-9	NENW	9	57N	77W
WYW149974	5-15	SWNW	15	57N	77W
WYW149974	7-15	SWNE	15	57N	77W
WYW149973	3-18	NENW	18	57N	77W
WYW149973	7-18	SWNE	18	57N	77W
WYW144220	15-18	SWSE	18	57N	77W
WYW144220	1-20	NENE	20	57N	77W
WYW144220	5-20	SWNW	20	57N	77W
WYW144220	7-20	SWNE	20	57N	77W

<b>Lease</b>	<b>Well #</b>	<b>Aliquot</b>	<b>Sec</b>	<b>T</b>	<b>R</b>
WYW144220	13-20	SWSW	20	57N	77W
WYW144220	15-20	SWSE	20	57N	77W
WYW144220	5-21	SWNW	21	57N	77W
WYW144220	10-21	NWSE	21	57N	77W
WYW144220	11-21	NESW	21	57N	77W
WYW149974	1-22	NENE	22	57N	77W
WYW141874	3-22	NENW	22	57N	77W
WYW149974	7-22	SWNE	22	57N	77W
WYW149974	9-22	NESE	22	57N	77W
WYW149974	1-27	NENE	27	57N	77W
WYW144221	5-27	SWNW	27	57N	77W
WYW144221	11-27	NESW	27	57N	77W
WYW144221	5-35	SWNW	35	57N	77W
Fee	Compressor Fac.	SENW	6	57N	77W

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

Reclamation Standards:

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

orientation of major landscape features and meet the needs of the planned post disturbance land use.

28. 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:

<b>Species – Cultivar</b>	<b>Full Seeding (lbs/ac PLS )</b>	<b>% in Mix</b>	<b>Lbs PLS</b>
Western Wheatgrass - <i>Rosana</i>	6	20	1.2
Bluebunch Wheatgrass – <i>Secar or P-7</i>	7	30	2.1
Idaho fescue - <i>Joseph</i>	4	30	1.2
American vetch <b>OR</b> Cicer Milkvetch - <i>Lutana</i>	7	10	0.70
White – <i>Antelope</i> or Purple Prairie Clover - <i>Bismarck</i>	3	5	0.15
Lewis - <i>Appar</i> , Blue, or Scarlet flax	4	5	0.20
Totals		<b>100%</b>	<b>5.25 lbs/acre</b>

**This is a recommended seed mix based on the native plant species listed in the NRCS Ecological Site descriptions, U.W. College of Ag. and seed market availability.**

**Wildlife**

*Bald Eagles*

- The following conditions will alleviate impacts to bald eagles:  
No project related actions shall occur within one mile of bald eagle habitat located along the Powder River annually from November 1 through April 1 (CM9), prior to a winter roost survey or from February 1 through August 15 (CM8) prior to a nesting survey. This timing limitation will be in effect unless surveys determine the nest/roost to be inactive. This affects the following wells and infrastructure:

<b>Township/Range</b>	<b>Section</b>	<b>Wells and Infrastructure</b>
<b>T57N/R77W</b>	<b>35</b>	<b>Wells: 11-35-5777</b> <b>ALL</b> proposed road/corridor & overhead power within the <b>SENE, NESW, E ¼ SWNE &amp; S ¼ SENW</b> of this section.

- If a roost is identified and construction has not been completed, a year-round disturbance-free buffer zone of 0.5 mile will be established for all bald eagle winter roost sites (November 1 - April 1). Additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 AM and 3:00 PM may be necessary to prevent disturbance.

- b. If a nest is identified and construction has not been completed, a disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) would be established year round for all bald eagle nests. A seasonal minimum disturbance buffer zone of 1 mile will be established for all bald eagle nest sites (February 1 - August 15).
- c. Additional mitigation measures may be necessary if the site-specific project is determined by a Bureau biologist to have an adverse affect to bald eagles or their habitat.

*Burrowing Owls*

1. The following conditions will alleviate impacts to burrowing owls:  
A burrowing owl survey will be required in suitable burrowing owl habitat (i.e. active and inactive prairie dog colonies listed below) between April 15 and June 15. If a burrowing owl nest is identified, a 0.25 mile buffer will be applied to the nest and no surface disturbing activity shall occur within 0.25 miles of all identified prairie dog colonies from April 15 to August 31, annually, prior to a burrowing owl nest occupancy survey for the current breeding season. This condition will be implemented on an annual basis for the duration of surface disturbing activities within the prairie dog town(s). This timing limitation will then be in effect, annually, unless surveys determine the nest(s) to be inactive.

Town #	Status	Legal Location	Acres
1	Active	NWSW Sec. 26, T57N/R77W	26
2	Inactive	NENW Sec. 27, T57N/R77W	6
3	Inactive	SWSW Sec. 22, T57N/R77W	< 1
4	Inactive	NWSW Sec. 22, T57N/R77W	3
5	Inactive	NWSW Sec. 22, T57N/R77W	3
6	Inactive	NENE Sec. 21, T57N/R77W	12
7	Inactive	E1/2 SE1/4 Sec.16, T57N/R77W	35
8	Inactive	SWSW Sec. 9, T57N/R77W	11
9	Inactive	NWSW Sec. 9, T57N/R77W	2
10	Inactive	NENW Sec. 7, T57N/R77W	5
11	Inactive	NESW Sec. 31, T57N/R78W	8

*Raptors*

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

Township/Range	Section	Wells and Infrastructure
T57N/R77W	4	Wells: 3-4-5777, 5-4-5777, 13-4-5777, 14-4-5777 & 15-4-5777 ALL project related activities within this <b>Entire</b> section.
T57N/R77W	5	Wells: 1-5-5777, 3-5-5777 & 7-5-5777 ALL project related activities within this <b>Entire</b> section.
T57N/R77W	6	ALL project related activities within this <b>Entire</b> section except the <b>SESE &amp; SWSE</b> .
T57N/R77W	7	ALL project related activities within the <b>SESE</b> of this section.
T57N/R77W	8	Wells: 3-8-5777, 11-8-5777, 13-8-5777 & 15-8-5777 ALL project related activities within this <b>Entire</b> section.
T57N/R77W	9	Wells: 1-9-5777, 3-9-5777 & 7-9-5777

<b>Township/Range</b>	<b>Section</b>	<b>Wells and Infrastructure</b>
		ALL project related activities within this <b>Entire</b> section <b>Except the S<sup>1</sup>/<sub>2</sub>NESE, NWSE &amp; E<sup>1</sup>/<sub>2</sub>SWNE</b> of the section.
<b>T57N/R77W</b>	<b>15</b>	<b>Wells: 5-15-5777, 11-15-5777 &amp; 13-15-5777</b> ALL project related activities within this <b>Entire</b> section <b>Except the NW</b> of this section.
<b>T57N/R77W</b>	<b>16</b>	ALL project related activities within the <b>SESE, NESE &amp; E<sup>1</sup>/<sub>2</sub>SWNE</b> of this section.
<b>T57N/R77W</b>	<b>17</b>	<b>Wells: 11-17-5777</b> ALL project related activities within the <b>SWSW, N<sup>1</sup>/<sub>2</sub>SESW, NESW, W<sup>1</sup>/<sub>2</sub>NWSE, SWNE, NW</b> of this section.
<b>T57N/R77W</b>	<b>18</b>	<b>Wells: 1-18-5777, 5-18-5777, 7-18-5777 &amp; 15-18-5777</b> ALL project related activities within this <b>Entire</b> section <b>Except the NWNW &amp; SWSE</b> of this section.
<b>T57N/R77W</b>	<b>20</b>	<b>Wells: 9-20-5777</b> ALL project related activities within the <b>SESE &amp; NESE</b> of this section.
<b>T57N/R77W</b>	<b>21</b>	<b>Wells: 11-21-5777 &amp; 13-21-5777</b> ALL project related activities within the <b>SWSW &amp; NESW</b> of this section.
<b>T57N/R77W</b>	<b>22</b>	<b>Wells: 1-22-5777, 3-22-5777, 7-22-5777, 9-22-5777 &amp; 15-22-5777</b> ALL project related activities within this <b>Entire</b> section <b>Except the NWNW</b> of this section.
<b>T57N/R77W</b>	<b>26</b>	ALL project related activities within this <b>Entire</b> section.
<b>T57N/R77W</b>	<b>27</b>	<b>Wells: 1-27-5777, 5-27-5777, 10-27-5777, 11-27-5777 &amp; 13-27-5777</b> ALL project related activities within this <b>Entire</b> section.
<b>T57N/R77W</b>	<b>35</b>	<b>Wells: 5-35-5777 &amp; 11-35-5777</b> ALL project related activities within this <b>Entire</b> section.
<b>T57N/R78W</b>	<b>13</b>	ALL proposed utility corridor within the <b>SESE &amp; NESE</b> of this section.
<b>T57N/R78W</b>	<b>24</b>	ALL proposed utility corridor within the <b>NENE</b> of this section.
<b>T58N/R77W</b>	<b>29</b>	ALL proposed utility corridor within the <b>NW</b> of this section.
<b>T58N/R77W</b>	<b>30</b>	ALL proposed utility corridor within the <b>SE</b> of this section.
<b>T58N/R77W</b>	<b>31</b>	ALL proposed utility corridor within the <b>NE</b> of this section.
<b>T58N/R77W</b>	<b>32</b>	ALL proposed utility corridor within the <b>South Half of NWNE</b> of this section.

- 1) Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a 0.5

mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within 0.5 mile of occupied raptor nests from February 1 to July 31.

- 2) Nest productivity checks shall be completed for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. This applies to the following nest(s):
  - b. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
  - c. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31).
2. The following proposed well(s) and associated access and/or infrastructure have the potential to have the potential to cause adverse effects to identified raptor nests;  
Proposed wells: 11-8-5777, 15-8-5777, 05-15-5777, 11-15-5777, 13-21-5777, 10-27-5777 & 11-27-5777
  - o Following nest productivity surveys (no earlier than April 15 or later than June 15), if the nest (BLM ID#'s 5311, 5316, 5296, 5306, 4842, 4843, 5301, 4300 & 5303) is active, the operator will monitor the activity of the nest at the nest for the remainder of the nesting period (until August 15 or the young have fledged) during operations and maintenance visits to the well locations for the first **five years** following project completion. Monitoring will occur as follows:
    - o A biologist is required to monitor the nest during well metering, maintenance and other site visits (excluding emergencies) and document the birds' behavior in response to human activity, equipment activity and noise throughout the entire buffer. The biologist must be in position to monitor the nest at least ½ hour before the monitoring or maintenance crews arrive and begin work and ½ hour after the monitoring or maintenance crews leave for the day. The biologist will record all of the bird's activity and document weather conditions and submit a report of the activity to the BLM biologist.
    - o Further mitigation measures will be applied if adverse effects incur as a result of well visits i.e. adults being flushed from the nest when displaying nesting behavior, adults displaying defensive against visitors, adults being displaced from the nest with eggs or young.

#### *Sage Grouse*

1. The following conditions will alleviate impacts to sage-grouse:
  - a. A survey is required for sage-grouse between April 1 and May 7, annually, within the project area for the life of the project and results shall be submitted to a BLM biologist.
  - 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. The required sage-grouse survey will be conducted by a biologist following WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
  - c. 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 (April 1).
  - d. Creation of raptor hunting perches will be avoided within 0.25 miles of documented sage-grouse lek sites. Perch inhibitors will be installed on all new overhead power poles located within high quality sage-grouse habitat (identified below) to deter avian predators from preying on grouse.

Township/Range	Section	Proposed Overhead Powerline Segment Located within High Quality Sage Grouse Habitat (Qtr/Qtr)
T57N/R77W	4	NENW, SENW & SWSE
T57N/R77W	6	NENW, SENW, NESW, NWSE & SESE
T57N/R77W	9	NENW, SWNE, NWSE, NESE & SESE
T57N/R77W	10	SWSW

*Sharp-tailed Grouse*

1. The following conditions will alleviate impacts to sharp-tailed grouse:
  - a. No surface disturbing activities are permitted within 0.64 miles of the Fence Creek Road sharp-tailed grouse lek located NWSW section 29 T58N;R77W between April 1 and May 31, prior to completion of a grouse lek survey. **This condition will be implemented on an annual basis for the duration of surface disturbing activities.** This timing limitation will affect the following:

Township/Range	Section	Wells and Infrastructure
<b>T58N/R77W</b>	<b>29</b>	<b>ALL</b> proposed utility corridor within the NW of this section.
<b>T58N/R77W</b>	<b>30</b>	<b>ALL</b> proposed utility corridor within the SE of this section.
<b>T58N/R77W</b>	<b>31</b>	<b>ALL</b> proposed utility corridor within the NE of this section.
<b>T58N/R77W</b>	<b>32</b>	<b>ALL</b> proposed utility corridor within the South Half of NWNE of this section.

- 1) If an active lek is identified during the survey, the 0.64 mile timing restriction (April 1-May 31) will be applied and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 0.5 mile buffer until the following breeding season (April 1). The required sharp-tailed grouse survey will be conducted by a biologist following WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
- b. Creation of raptor hunting perches will be avoided within 0.64 miles of documented sharp-tailed grouse lek sites. Perch inhibitors will be installed to deter avian predators from preying on sage grouse.

*Migratory Birds*

1. All power lines will be built to protect raptors, including bald eagles, from accidental electrocution using the most recent edition of “Suggested Practices for Raptor Protection” by the Avian Power Line Interaction Committee (APLIC) (2006 edition or most recent edition) and any additional practices provided by the FWS. It should be noted that raptor protection can be achieved through insulation and/or wire spacing and that there are multiple configurations capable of protecting raptors.

**Water Management**

1. A sundry will be provided to BLM as the operator chooses to add secondary impoundments to its infrastructure. Proof of impoundment reclamation bonding will be provided with the sundry.

**Cultural**

1. All overhead power lines not previously culturally inventoried will not be authorized until the Bureau receives an acceptable Class III cultural inventory and completes the consultation process with the

Wyoming SHPO.

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

On page 6 of the water management plan, the operator states “Pinnacle analyzed numerous water management methods prior to selecting the options outlined in this plan. Methods analyzed included: on-channel containment, off-channel containment, treatment, direct discharge, managed irrigation, and injection.” For a complete discussion of these options and Pinnacle’s reasoning behind using or rejecting any particular option, see page 6 of the WMP.

**2.5. Summary of Alternatives**

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

**Table 2.5 Summary of the Alternatives**

<b>Facility</b>	<b>Alternative A (No Action) Existing Number or Miles</b>	<b>Alternative B (Original Proposal) Proposed Number or Miles</b>	<b>Alternative C (Environmental Alt.) Revised Number or Miles</b>
Total CBNG Wells	68	76	50
Total Locations	68	76	50
Nonconstructed Pads	N/A	43	30
Slotted Pads	N/A	19	12
Constructed Pads	N/A	14	8
Conventional Wells	0	0	0
Gather/Metering Facilities	0	0	0
Compressors	0	1	2
Monitor Wells	0	0	0
Impoundments			
On-channel	0	0	0
Off-channel	3	7	4
Water Discharge Points	3	7	4
Treatment Facilities	1	1	1
Injection Facilities	0	1	1
Improved Roads			
No Corridor	0	0	0
With Corridor	20.9	14.3	4.1
2-Track Roads			
No Corridor	0	0	0
With Corridor	4.5	12.7	8.2

<b>Facility</b>	<b>Alternative A (No Action) Existing Number or Miles</b>	<b>Alternative B (Original Proposal) Proposed Number or Miles</b>	<b>Alternative C (Environmental Alt.) Revised Number or Miles</b>
Buried Utilities			
No Corridor	0		
With Corridor	0.5	6.8	1.9
Overhead Powerlines	1.1	23.2	18.5
Communication Sites	0	0	0
Staging/Storage Areas	1	0	1
Other Disturbance			
Acres of Disturbance			

### 3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on December 21, 2007. Field inspections of the proposed Cabin Creek Phase V CBNG project were conducted on 4/22/2008, 4/23/2008, 4/24/2008, 4/28/2008, 4/29/2008, 4/30/2008, 5/6/2008, 5/7/2008, 7/8/2008, and 7/22/2008 by the following personnel:

<b>DATE</b>	<b>NAME</b>	<b>TITLE</b>	<b>AGENCY</b>
4/22/08, 4/23,4/24, 4/29,	Brian Deurloo	Development Manager	Pinnacle Gas Resources, Inc.
4/22/08, 4/23, 4/24, 4/28, 4/29, 4/30, 5/6, 5/7,	Jim Aksamit	Senior Project Manager	Western Land Services
4/30/08	Mark Deibert	Water Resources Dept. Manager	Western Land Services
4/22/08, 4/23, 4/24, 4/28, 4/29, 4/30, 5/6, 5/7, 7/22	Greg Tracy	Water Resource Specialist	Western Land Services
4/22/08, 4/23, 4/24, 4/28, 4/29, 4/30, 5/6, 5/7, 7/8, 7/18, 7/22	Scott Straessler	Project Manager	Pinnacle Gas Resources, Inc.
4/22/08, 4/23, 4/24, 4/28, 4/30, 5/6, 5/7	Allen Aksamit	Wildlife Biologist	Western Land Services
4/29/08	Kevin Jensen	Reservoir Engineer	Pinnacle Gas Resources, Inc.
4/29/08	April Kohler	GIS	Pinnacle Gas Resources, Inc.
4/28/08, 4/30, 5/6	Larry Sare	Landman	Pinnacle Gas Resources, Inc.
7/8/08, 7/22/08	Allen Jones	Hydrologist	Western Land Services
4/30/08	Terry Webster	Hydrologist	Pinnacle Gas Resources, Inc.
4/28/08, 4/29, 4/30, 5/6, 5/7	Jake Kendrick	Surveyor	Prestfeldt Surveying
4/24/08	Megan Crow	Civil Engineer	MC <sup>2</sup> Engineering
4/22/08, 4/23, 4/24	Mike Schauer		Landowner
4/30/08, 5/6	Clay Rowley		Landowner
4/28/08, 5/7	Russ Green		Landowner
4/22/08, 4/23, 4/24	Ray McConnell	Drilling Supervisor	Pinnacle Gas Resources, Inc.

4/22/08, 4/23, 4/24	Ryan Schillerman	Construction Manager	Pinnacle Gas Resources, Inc.
4/22/08, 4/23, 4/24	Clint Crago	Archaeologist	BLM-Buffalo Field Office
4/22/08, 4/23, 4/24, 4/28, 4/29, 4/30, 5/6, 5/7, 7/8,	Jim Verplancke	Wildlife Biologist	BLM-Buffalo Field Office
4/24/08	Hilaire Peck	Civil Engineer	BLM-Buffalo Field Office
4/30/08, 7/8, 7/22	Ben Adams	Hydrologist	BLM-Buffalo Field Office
4/22/08, 4/23, 4/24, 4/28, 4/29, 4/30, 5/6, 5/7, 7/8, 7/18, 7/22	Mary Maddux	NRS/Team Lead	BLM-Buffalo Field Office
4/24/08, 7/18	Ted Hamersma	Civil Engineer Tech	BLM-Buffalo Field Office

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

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

<b>Mandatory Item</b>	<b>Potentially Impacted</b>	<b>No Impact</b>	<b>Not Present On Site</b>	<b>BLM Evaluator</b>
Threatened and Endangered Species	X			Jim Verplancke
Floodplains	X			Ben Adams
Wilderness Values			X	Mary Maddux
ACECs			X	Mary Maddux
Water Resources	X			Ben Adams
Air Quality		X		Mary Maddux
Cultural or Historical Values		X		Clint Crago
Prime or Unique Farmlands			X	Mary Maddux
Wild & Scenic Rivers			X	Mary Maddux
Wetland/Riparian	X			Ben Adams
Native American Religious Concerns			X	Clint Crago
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 Cabin Creek V project area is located roughly 30 miles Northeast of Clearmont, Wyoming. The project area is accessed from 4 main entry points. The first is off of the Passaic County Road in Section of T57N/R78W, the second is again off of the Passaic County Road but farther north in Section 31 of T58N/R77W. The third entry point is off of the existing Fence Creek Oil Field road in Section 33 of T58N/R77W. The fourth entry point is off of the Lower Powder River Road in Section 31 of T57N/R76W, going through Pinnacle Phase 2. The differing entry points is due to landowner agreements

that Pinnacle Gas Resources, Inc has reached which prohibits any traffic over 1 ton from crossing from one landowner to a different landowner. There are various gates with locks that will allow pumper traffic to cross once the production phase is started.

The area varies from flat, grassy pastures that are next to the main drainages to moderately rough to rough terrain with many steep draws and ridges. For the most part the tops of the ridges are broad plateaus that are fairly flat with a mixture of grasses and sagebrush. The steep draws and side slopes are characterized with Juniper and Ponderosa pine trees. Some of the steeper draws have active headcuts and erosion due to snow runoff and precipitation events. The entire project area has been identified as having Leafy Spurge. Salt Cedar and Russian Knapweed have been identified adjacent to project area on the eastern side in Section 36 of T57N/R77W. The elevation varies in the area from 3,500 to 4,000 feet above sea level. Livestock grazing and CBNG development are the primary land uses at this time. The surface ownership is mostly fee with federal surface primarily on the Eastern and Southern portions of the POD.

### 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) publish soil survey soils information. The associated ecological sites found within the Cabin Creek Phase V POD boundary are listed in Table 3.2 below.

**Table 3.2-Ecological Sites with Acreage**

Ecological Site	Acres	Percent
CLAYEY (15-19 NP)	135	1
LOAMY (15-19 NP)	4029	36
SANDY (15-19 NP)	1579	14
SHALLOW LOAMY (15-19 NP)	4808	43
MISC/BADLANDS	600	6

#### **Loamy Ecological Site Description:**

Species typical of short grass prairie comprise the project area flora. Specific species observed throughout the project area include Western Wheatgrass, Cheatgrass, Wyoming Big Sagebrush, Bluebunch Wheatgrass and Pricklypear. Differences in dominant species within the project area vary with soil type, aspect and topography.

Using the Natural Resource Conservation Service, (NRCS, USDA), Technical Guides for the Major Land Resource Area 58B Northern Rolling High Plains, in the 15-19” Northern Plains precipitation zone, the landforms, the soils and the predominant ecological sites occurring within the proposed POD are found to be Loamy to Shallow Loamy. Loamy sites occur on hill slopes with assoc. alluvial fans & stream terraces and occur on land nearly level up to 50% slopes. Shallow Loamy sites generally occur on hill sides, ridges and escarpments and occur on steep slopes and ridge tops, but may occur on all slopes.

The loamy soils on the well locations are deep to moderately deep (greater than 20" to bedrock), well-drained & moderately permeable. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. These layers consist of the A horizon with very fine sandy loam, loam, or silt loam texture and may also include the upper few inches of the B horizon with sandy clay loam, silty clay loam or clay loam texture.

The remaining well locations, the soils are shallow (less than 20” to bedrock) well-drained soils formed in alluvium over residuum or residuum. These soils have moderate permeability and may occur on all slopes. The bedrock may be any kind which is virtually impenetrable to plant roots, except igneous. The surface soil will have one or more of the following textures: very fine sandy loam, loam, silt loam, sandy clay loam, silty clay loam, and clay loam. Thin ineffectual layers of other textures are disregarded. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick.

Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 2 to 4 inches on ridges to 6+ inches in bottomland. Erosion potential varies from none to minor depending on the soil type, vegetative cover and slope. The main soil limitations for both types of ecological sites includes that landslides may occur on all slopes, but they are dominant on the steep and very steep slopes that have a south or east facing aspect. An additional soil limitation for a shallow loamy ecological site includes depth to bedrock. Reclamation potential of soils also varies throughout the project area. The following table outlines the BLM reclamation potential associated with the Cabin Creek Phase V POD.

Reclamation Potential	Acres	Percent
Moderate	5004	43
Poor	6471	56
Well	166	1

### **Mixed Sagebrush/Grass Plant Community**

Historically, this plant community evolved under grazing by bison and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock in the absence of fire or brush management. Big sagebrush is a significant component of this plant community. A mix of warm and cool-season grasses make up the majority of the understory with the balance made up of annual cool-season grasses, and miscellaneous forbs.

Dominant grasses include needleandthread, western wheatgrass, little bluestem and green needlegrass. Grasses of secondary importance include blue grama, prairie junegrass, and Sandberg bluegrass. Forbs commonly found in this plant community include plains wallflower, hairy goldaster, slimflower scurfpea, and scarlet globemallow. Sagebrush canopy ranges from 20% to 30%. Fringed sagewort is commonly found. Plains pricklypear can also occur.

When compared to the Historic Climax Plant Community, sagebrush and blue grama have increased. Production of cool-season grasses, particularly green needlegrass, has been reduced. The cool-season mid-grasses are protected by the sagebrush canopy, but this protection makes them unavailable for grazing. Cheatgrass (downy brome) has invaded the site. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope.

This plant community is resistant to change. A significant reduction of big sagebrush can only be accomplished through fire or brush management. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

### **Western Wheatgrass/Cheatgrass Plant Community**

This plant community is created when the Mixed Sagebrush/Grass Plant Community or the Heavy Sagebrush Plant Community is subjected to fire or brush management not followed by prescribed grazing. Rhizomatous wheatgrasses and annuals will dominate the site.

Compared to the HCPC, cheatgrass has increased with western wheatgrass and thickspike wheatgrass maintaining at a similar or slightly higher level. Virtually all other cool-season mid-grasses are severely decreased. Blue grama is the same or slightly less than found in the HCPC. Plant diversity is low.

The soil series included in these areas are Cambria-Forkwood Complex, Cedak-Recluse Association, Cushman-Forkwood Association, Gayhart-Bahl Association, Hargreave-Moskee Association, Haverdad-Draknab Complex, Haverdad Very Fine Sandy Loam, Hiland-Bowbac Association, Hiland-Vonalee Complex, Jonpol-Platmak Association, Kishona-Cambria Complex, Moskee-Noden Complex, Parmleed-Bidman Association, Parmleed-Worfka Association, Renohill-Savageton Complex, Renohill, Moist-Ulm Association, Shingle-Nihill Complex, Shingle-Samday Clay Loams, Shingle-Taluce Complex, Shingle-Theedle-Kishona Association, Shingle-Theedle-Rock Outcrop Association, Shingle-Moist-Rock Outcrop Complex, Taluce-Tullock-Rock Outcrop Association, Taluce-Tullock-Vonalee Association, Theedle-Kishona Association-Moist, Worfka-Shingle-Samday Complex, and the Zigweid-Kishona-Cambria Complex. For more detailed soil information, see the NRCS Soil Survey WY633.

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

Cabin Creek and Big Remington Creek are large ephemeral systems typical of this part of the country. There are isolated portions of both these drainages where wetland/riparian areas are apparent. These isolated pockets can contain short reaches of flowing water, pockets of standing water and occasional stands of cottonwood trees. Within the project boundary, Big Remington Creek is mostly a deeply incised gully with nearly vertical sidewalls and a narrow (less than 100 feet wide) flat-bottomed floodplain. Any guide channel would only occur intermittently within this system. Flows in Big Remington Creek are due to snowmelt events or thunderstorms. The latter type of occurrence is characterized by a very large flow of water in a very short time, the proverbial “wall of water”.

Cabin Creek exhibits characteristics of ephemeral systems which border on intermittent. Within the project area the floodplain is much better developed and broader, grading into the first terrace, which abuts the steep gully sides. Cabin Creek has a primary flow channel throughout the project area which meanders through the floodplain/terrace features of the valley. Isolated individuals and small stands of cottonwoods occur along this system through the project area.

#### **3.2.2. Invasive Species**

The following state-listed noxious weeds and/or weed species of concern infestations were discovered by a search of inventory databases on the Wyoming Energy Resource Information Clearinghouse (WERIC) web site ([www.weric.info](http://www.weric.info)):

- Leafy Spurge

The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices. Additionally, the operator or BLM confirmed the following WRIC identified infestations and/or documented additional weed species during subsequent field investigations:

- Leafy Spurge

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

### 3.3. Wildlife

The Cabin Creek V project area topography consists of approximately 75% rough to moderately rough terrain with numerous ridges and deep draws. The remaining 25 % consists of rolling hills and flats cut by steep to moderately steep draws. Scattered cottonwood trees occur in draws within the project, ridge tops, and north facing aspects. The primary habitat is sagebrush grassland, dominated by big sagebrush. In creek and ravine bottoms, silver sagebrush is the primary type of sagebrush. Sagebrush communities occur throughout the project area. Clear Creek flows along the south eastern edge of the POD, but no portion of the POD encompasses the river. The Powder River is approximately 1.5 mile from the eastern POD boundary. The elevation within the project area ranges from approximately 3,500 to 4,000 feet above sea level. Livestock grazing and CBNG development are the current land uses in the area.

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 Western Land Services (2007, 2008). Western Land Services performed surveys for bald eagles, mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests, and prairie dog colonies according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol in 2006-2007 & 2007-2008 survey seasons. Surveys were conducted for Ute ladies'-tresses orchid. PRB IWG accepted protocol is available on the CBM Clearinghouse website ([www.cbmclearinghouse.info](http://www.cbmclearinghouse.info)).

A BLM biologist conducted field visits on April 22, 23, 24, 28, 29 & 30, May 6 & 7 and July 22, 2008. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project modification recommendations where wildlife issues arose.

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

#### 3.3.1. Big Game

Big game species expected to be within the Cabin Creek V POD project area include pronghorn antelope, mule deer, white-tailed deer and elk. Mule deer and pronghorn antelope were observed multiple times during field visits across the project area. Elk sign was observed during the field visits and individuals were documented by Western Lands Services in the wildlife reports. The WGFD has determined that the project area contains yearlong range for pronghorn antelope and white-tailed deer as well as winter-yearlong range for mule deer.

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

Populations of pronghorn antelope, mule deer, and white-tailed deer within their respective hunt areas are above WGFD objectives. The elk population in this area are not managed by WGFD allowing liberal harvest limits and extended season lengths to promote harvest and reduce agricultural damage in the area. The origin of the elk population is likely culmination of individuals that have immigrated from the

surrounding elk herds from the Big Horn National Forest, Fortification Creek and Custer National Forest. Big game range maps are available in the PRB FEIS (3-119-143), the project file, and from the WGFD.

### 3.3.2. Aquatics

The project area is drained by ephemeral tributaries of Clear Creek and Powder River. The majority of the POD lies within the Clear Creek watershed and Cabin Creek is the primary tributary. Clear Creek is a perennial stream tributary to the Powder River. The northwest edge of the project area falls within the Powder River watershed with Remington Creek being the primary tributary. Three natural springs were located within the project area. Two of the springs are dry. The third spring is located SWNE section 7, T57N, R77W is flowing. Fish that have been identified in both the Clear Creek and Powder River watersheds are listed in the PRB FEIS (3-156-159).

### 3.3.3. Migratory Birds

A wide variety of migratory birds may be found in the proposed project area at some point throughout the year. Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year. Many species that are of high management concern use shrub-steppe and shortgrass prairie areas for their primary breeding habitats (Saab and Rich 1997). Migratory bird species of management concern that may occur in the project area are listed in the PRB FEIS (3-151). Species observed by Western Land Services and the BLM biologist include bald eagles, golden eagles, meadow lark, blue bird and raven.

### 3.3.4. Raptors

Raptors species expected to occur in suitable habitats within the Powder River Basin include northern harrier, golden eagle, red-tailed hawk, Swainson’s hawk, ferruginous hawk, American kestrel, prairie falcon, short-eared owl, great horned owl, bald eagle, rough-legged hawk, merlin, Cooper’s hawk, northern goshawk, long-eared owl, and burrowing owl. Most raptor species nest in a variety of habitats including but not limited to; native and non-native grasslands, agricultural lands, live and dead trees, cliff faces, rock outcrops, and tree cavities.

In 2006, BLM documented one active raptor nest within 0.5 mile of the project area. Wildlife inventory for the project area was limited prior to the proposed CBNG development. Fifty-four raptor nest sites were identified by Western Land Services (2007, 2008) and BLM within 0.5 mile of the project area. Of these, 26 nests were active or occupied in 2007. At the time of preparing this document, 12 of the raptor nests surveyed during the 2008 season had been reported as active.

**Table 3.2.** Documented raptor nests within the Cabin Creek V POD project area in 2007 & 2008.

BLM ID	UTME	UTMN	Legal	Substrate	Year	Condition	Status	Species
518	404963	4978596	T57N R78W S1	UNK	2007	Unknown	Gone	Unknown Raptor
532	407828	4971298	T57N R77W S29	CLF	2008 2007	Good Good	Inactive Active	Golden Eagle Golden Eagle
541	408378	4969075	T57N R77W S32	CTL	2008	Good	Active	Red-tailed Hawk
4299	413897	4969052	T57N R77W S36	CTL	2006 2007	Good Good	Active Active	Unknown Raptor Unknown Raptor
4300	411234	4971647	T57N R77W S27	CTL	2008 2007	Good Good	Inactive Active	Great Horned Owl Great Horned Owl
4839	413966	4969616	T57N R77W S36	CTD	2008	Excellent	Active	Red-tailed Hawk
4840	412799	4970029	T57N R77W S35	CTL	2007	Good	Inactive	Unknown Buteo
4841	411128	4972606	T57N R77W S22	CTL	2007	Good	Active	Red-tailed Hawk
4842	411450	4971194	T57N R77W S27	CTL	2007	Fair	Inactive	Unknown Raptor
4843	411516	4971193	T57N R77W S27	CTL	2007	Good	Active	Unknown Buteo

BLM_ID	UTME	UTMN	Legal	Substrate	Year	Condition	Status	Species
4844	412941	4969488	T57N R77W S35	CTL	2007	Good	Active	Unknown Raptor
4845	413899	4969290	T57N R77W S36	CTD	2007	Poor	Inactive	Unknown Raptor
4846	414136	4969231	T57N R77W S36	CTL	2007	ACTI	Good	Unknown Raptor
4847	412512	4973931	T57N R77W S14	PON	2008 2007	Poor Poor	Inactive Inactive	Cooper's Hawk Cooper's Hawk
4848	412293	4973789	T57N R77W S14	PON	2008 2007	Excellent Excellent	Active Active	Red-tailed Hawk Red-tailed Hawk
4849	412674	4974208	T57N R77W S14	PON	2008 2007	Good Good	Active Active	Red-tailed Hawk Red-tailed Hawk
4850	412625	4974221	T57N R77W S14	PON	2007 2007	Poor Poor	Inactive Inactive	Red-tailed Hawk Red-tailed Hawk
5285	409608	4978414	T57N R77W S4	PON	2008 2007	Good Good	Inactive Active	Great Horned Owl Great Horned Owl
5287	409649	4978093	T57N R77W S4	PON	2008 2007	Excellent Excellent	Active Active	Red-Tailed Hawk Red-tailed Hawk
5288	409631	4977424	T57N R77W S4	PON	2008 2007	Good Good	Active Active	Great Horned Owl Great Horned Owl
5290	408030	4977217	T57N R77W S5	CTL	2008 2007	Good Good	Inactive Inactive	Red-tailed Hawk. Red-tailed Hawk
5291	407522	4977900	T57N R77W S5	CTD	2008 2007	Poor Poor	Inactive Inactive	Red-tailed Hawk Red-tailed Hawk
5292	406739	4978017	T57N R77W S6	PON	2008 2007	Good Good	Active Inactive	Red-tailed Hawk Red-tailed Hawk
5293	407427	4974749	T57N R77W S17	PON	2008 2007	Good Good	Inactive Active	Red-tailed Hawk Red-tailed Hawk
5294	405928	4974343	T57N R77W S18	PON	2008 2007	Good Good	Inactive Active	Red-tailed Hawk Red-tailed Hawk
5295	408423	4976545	T57N R77W S8	CTL	2008 2007	Good Good	Active Active	Red-tailed Hawk Red-tailed Hawk
5296	410427	4974610	T57N R77W S15	CLF	2008 2007	Good Good	Inactive Active	Prairie Falcon Prairie Falcon
5297	411536	4973941	T57N R77W S15	PON	2008 2007	Good Good	Active Active	Red-tailed Hawk Red- tailed Hawk
5298	413859	4969532	T57N R77W S36	CTD	2008 2007	Good Good	Inactive Active	Red-tailed Hawk Red-tailed Hawk
5299	413539	4969691	T57N R77W S36	CTD	2008 2007	Good Good	Inactive Inactive	Red-tailed Hawk Red-tailed Hawk
5301	411532	4971344	T57N R77W S27	CTL	2008 2007	Poor Poor	Inactive Inactive	Red-tailed Hawk Red-tailed Hawk
5302	412782	4969178	T57N R77W S35	POL	2008 2007	Good Good	Inactive Inactive	Unknown Raptor Unknown Raptor
5303	410885	4970428	T57N R77W S34	PON	2008 2007	Good Good	Inactive Active	Red-tailed Hawk Red-tailed Hawk.
5304	409327	4971716	T57N R77W S28	PON	2008 2007	Good Good	Inactive Inactive	Golden Eagle Golden Eagle
5305	408804	4971534	T57N R77W S28	PON	2008 2007	Good Good	Active Active	Golden Eagle Golden Eagle
5306	408828	4972242	T57N R77W S21	CLF	2008 2007	Poor Good	Inactive Active	Prairie Falcon Prairie Falcon
5307	410537	4976682	T57N R77W S10	PON	2008 2007	Good Good	Inactive Inactive	Unknown Raptor Unknown Raptor

BLM_ID	UTME	UTMN	Legal	Substrate	Year	Condition	Status	Species
5308	410735	4977211	T57N R77W S3	PON	2008	Good	Inactive	Unknown Raptor
					2007	Good	Inactive	Unknown Raptor
5309	410872	4977211	T57N R77W S3	PON	2008	Good	Inactive	Red-tailed Hawk
					2007	Good	Active	Red-tailed Hawk
5310	411345	4969876	T57N R77W S34	CLF	2008	Good	Inactive	Prairie Falcon
					2007	Good	Active	Prairie Falcon
5311	407680	4975681	T57N R77W S8	CLF	2008	Good	Inactive	Prairie Falcon
					2007	Good	Active	Prairie Falcon
5312	408684	4976058	T57N R77W S8	CTL	2008	Good	Active	Red-tailed Hawk
					2007	Good	Active	Red-tailed Hawk
5313	408023	4977210	T57N R77W S5	CTL	2008	Good	Inactive	Red-tailed Hawk
					2007	Good	Unknown	Red-tailed Hawk
5314	407262	4969420	T57N R77W S32	PON	2007	Good	Inactive	Red-tailed Hawk
5316	408306	4975770	T57N R77W S8	PON	2008	Good	Inactive	Red-tailed Hawk
					2007	Good	Inactive	Red-tailed Hawk
5341	408191	4978807	T58N R77W S32	CTL	2007	Good	Unknown	Unknown Raptor
					2007	Unknown	Unknown	Unknown Raptor
5372	408191	4969307	T57N R77W S32	CTL	2007	Good	Inactive	Red-tailed Hawk
5373	408430	498430	T57N R77W S32	PON	2007	Good	Occupied	Red-tailed Hawk
5729	408136	4978763	T57N R77W S32	CTL	2007	Fair	Inactive	Unknown Raptor
5738	406739	4978017	T57N R77W S6	PON	2007	Good	Inactive	Red-tailed Hawk
5740	412864	4970014	T57N R77W S35	CTL	2008	Fair	Unknown	Red-tailed Hawk
					2007	Fair	Inactive	Red-tailed Hawk
5741	412028	4970852	T57N R77W S26	CTL	2008	Fair	Inactive	Red-tailed Hawk
					2007	Fair	Inactive	Red-tailed Hawk
5742	411230	4971676	T57N R77W S27	CTL	2007	Good	Active	Great Horned Owl
6099	411116	4971925	T57N R77W S27	CTL	2008	Excellent	Active	Red-tailed Hawk

CTL=Live Cottonwood Tree  
CTD=Dead Cottonwood Tree  
PON=Ponderosa Pine Tree  
CLF=Cliff Nest  
UNK=Unknown

### 3.3.5. Threatened and Endangered and Sensitive Species

#### 3.3.5.1. Threatened and Endangered Species

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

##### 3.3.5.1.1. Black-footed ferret

The USFWS listed the black-footed ferret as Endangered on March 11, 1967. Active reintroduction efforts have reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 2004, the WGFD identified six prairie dog complexes (Arvada, Sheridan, Pleasantdale, Four Corners, Linch, Kaycee, and, Thunder Basin National Grasslands) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Grenier et al. 2004).

This nocturnal predator is closely associated with prairie dogs, depending almost entirely upon them for its food. The ferret also uses old prairie dog burrows for dens. Current science indicates that a black-footed ferret population requires at least 1000 acres of black-tailed prairie dog colonies separated by no more than 1.5 km 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 have also concluded that black-tailed prairie dog colonies within Wyoming are unlikely to be inhabited by black-footed ferrets (Kelly 2004).

Eleven black-tailed prairie dog colonies encompassing approximately 112 acres were identified during site visits by Western Land Services within the project area (2007, 2008). Table 3.3 below describes the locations and sizes of colonies identified and mapped within project area. These colonies are isolated by more than 1.5 km from the other colonies. The project area is located approximately 3.5 miles from the Arvada complex, the nearest potential reintroduction area. Black-footed ferret habitat is not present within the Cabin Creek V POD project area.

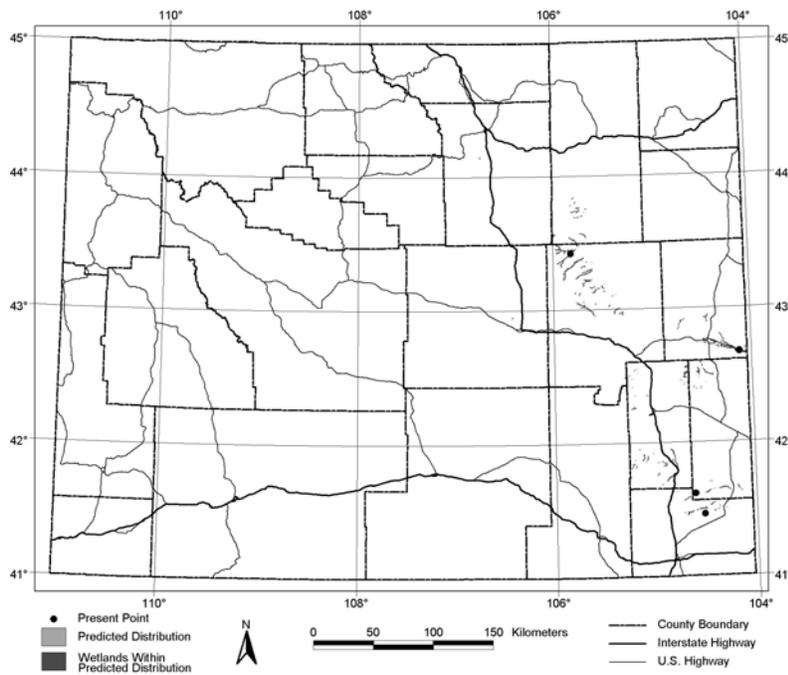
Table 3.3 Black-Tailed Prairie Dog Colonies within the Cabin Creek V POD.

<b>Town #</b>	<b>Status</b>	<b>Legal Location</b>	<b>Acres</b>
<b>1</b>	Active	NWSW Sec. 26, T57N/R77W	26
<b>2</b>	Inactive	NENW Sec. 27, T57N/R77W	6
<b>3</b>	Inactive	SWSW Sec. 22, T57N/R77W	< 1
<b>4</b>	Inactive	NWSW Sec. 22, T57N/R77W	3
<b>5</b>	Inactive	NWSW Sec. 22, T57N/R77W	3
<b>6</b>	Inactive	NENE Sec. 21, T57N/R77W	12
<b>7</b>	Inactive	E1/2 SE1/4 Sec. 16, T57N/R77W	35
<b>8</b>	Inactive	SWSW Sec. 9, T57N/R77W	11
<b>9</b>	Inactive	NWSW Sec. 9, T57N/R77W	2
<b>10</b>	Inactive	NENW Sec. 7, T57N/R77W	5
<b>11</b>	Inactive	NESW Sec. 31, T57N/R78W	8

**3.3.5.1.2. Ute Ladies'-Tresses Orchid**

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

**Figure1. Predicted Distribution of Ute ladies'-tresses in Wyoming**



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

Cabin Creek and Remington Creek and their tributaries are ephemeral. Three natural springs have been documented within the project area. One of these springs located SWNE section 7, T57N, R77W is free flowing. The other 2 springs located NWNE section 6, T57N, R77W and NESW section 4, T57N, R77W are dry. Western Land Services conducted surveys for Ute ladies' tresses orchid September 12, 2007. The surveys completed at 40 proposed and existing low water crossings and one culvert crossing exhibited characteristics not suitable for Ute ladies' tresses orchid. Little associated vegetation was identified due to a high abundance of upland vegetation (i.e. silver sagebrush, Japanese brome, cheatgrass) and noxious weed species (i.e. leafy spurge) within and adjacent to the channels, no surface hydrology was present at any of the sites, and the soils were more loamy than sands or silty sands (Western Land Services, 2007). Suitable orchid habitat is not present within the Cabin Creek V POD project area.

### 3.3.5.2. Sensitive Species

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

guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A.

#### **3.3.5.2.1. Prairie dog colony obligates**

Prairie dog colonies create habitat for many species of wildlife (King 1955, Reading et al. 1989). Agnew (1986) found that bird species diversity and rodent abundance were higher on prairie dog towns than on mixed grass prairie sites. Several studies (Agnew 1986, Clark 1982, Campbell and Clark 1981 and Reading et al. 1989) suggest that species richness increases with colony size and regional colony density. Prairie dog colonies attract many insectivorous and carnivorous birds and mammals because of the concentration of prey species (Clark 1982, Agnew 1986, Agnew 1988).

In South Dakota, forty percent of the wildlife taxa (134 vertebrate species) are associated with prairie dog colonies (Agnew 1983, Apa 1985, McCracken et al. 1985, Agnew 1986, Uresk and Sharps 1986, Deisch et al. 1989). Of those species regularly associated with prairie dog colonies, six are on the Wyoming BLM sensitive species list: swift fox (*Vulpes velox*), mountain plover (*Charadrius montanus*), ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), and long-billed curlew (*Numenius americanus*).

#### **3.3.5.2.2. Sagebrush obligates**

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

#### **3.3.5.2.3. Bald eagle**

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

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

Field surveys and research of existing databases found no bald eagle nests within or influenced by the POD. Communications with Tim Thomas wildlife biologist with the WGFD indicated that the nearest known bald eagle nest site is located in SESW section 15 T56N R77W. The nest was surveyed by Tim Thomas and was found to be active in 2006 and inactive in 2007. The nest site is located approximately 3 miles southwest of the POD (Western Land Service, 2007).

Field surveys conducted within the project area by airplane, vehicle and foot found roosting habitat present along the Powder River and Clear Creek. In upland areas containing mature ponderosa. Roosting habitat is found in the form of cottonwood trees or large ponderosa pine (both alive and dead). The POD was not surveyed in the winter of 2006-2007 for roosting bald eagles. Individual eagle were observed on the Powder River approximately 1 mile from the POD boundary and roosting habitat is available in and around the POD (Western Land Service, 2007). A bald eagle winter roost survey was conducted by Western Land Service during the 2007-2008 survey period. Three roosting bald eagle were observed December 27, 2007, two on January 2, 2008 and two on January 16, 2008. The results of bald eagle roost surveys conducted during the 2007-2008 season by Western Land Service are illustrated below in Table 3.4. These winter roost survey results support “consistent winter use” extending one mile from proposed activities.

Galleries of mature cottonwood trees along Clear Creek and Powder River and the perennial stream flow provide for suitable bald eagle nesting as well as winter roosting habitat. Prey species for bald eagles within the Clear Creek and Powder River watersheds are numerous including yearling deer and pronghorn antelope, wild turkeys, cottontail rabbits and other small mammals found in the under story vegetation along Clear Creek and Powder River, black-tailed prairie dogs in colonies lying above the floodplain as well as fish and waterfowl utilizing the perennial waters.

**Table 3.4 2007-2008 Bald Eagle Winter Roost Survey Cabin Creek V POD**

Survey Date	Time	UTM E	UTM N	Location	Observations/ Comments
12/18/07	0700-0900	413500	4967733	T56N/R76W, sec. 1	1 mature
12/27/2007	0730-0915	416688	4969460	T57N/R76W, sec. 31	2 mature
		409151	4973380	T57N/R77W, sec. 21	1 immature
1/2/2008	0730-0900	410641	4970414	T57N/R77W, sec. 34	1 immature
-		410649	4972525	T57N/R77W, sec. 22	1 immature
1/16/2008	0700-0900	412332	4969258	T57N/R77W, sec. 35	1 mature
		410806	4971081	T57N/R77W, sec. 34	2 mature soaring
-		414834	4969154	T57N/R77W, sec. 36	1 mature

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

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

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

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

Eleven black-tailed prairie dog colonies, totaling approximately 112 acres were identified during site visits by Western Land Services within the project area. See table 3.1 above for locations and site specific size.

#### **3.3.5.2.5. Burrowing owl**

The burrowing owl is a small, long-legged owl found throughout open landscapes of North and South America. Burrowing owls can be found in grasslands, rangelands, agricultural areas, deserts, or any dry open area with low vegetation where abandoned burrows dug by mammals such as ground squirrels (*Spermophilus spp.*), prairie dogs (*Cynomys spp.*), and badgers (*Taxidea taxus*) are available. Black-tailed prairie dog colonies provide the primary habitat for burrowing owls (Klute et al. 2003).

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

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

Although habitat exists within the project area, the BLM BFO databases and the survey information provided by Western Land Services indicate that there are no known nests within or within 0.25 mile of the Cabin Creek V POD project area in 2008.

#### **3.3.5.2.6. Grouse**

##### **3.3.5.2.6.1. Greater sage-grouse**

The greater sage-grouse is listed as a sensitive species by BLM (Wyoming). In recent years, several petitions have been submitted to the USFWS to list greater sage-grouse as Threatened or Endangered. On January 12<sup>th</sup>, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was "not warranted" following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse. In 2007, the U.S. District Court remanded that decision, stating that the USFWS' decision-making process was flawed and ordered the

USFWS to conduct a new Status Review as a result of a lawsuit and questions surrounding the 2005 review (Winmill Decision Case No. CV-06-277-E-BLW, December 2007).

Greater sage-grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas; they depend upon substantial sagebrush stands for nesting and winter survival (BLM 2003). Suitable sage-grouse habitat is present throughout the project area. Dense to moderately dense sagebrush is present in patches of the northern portion of the project area. Sections 4, 5, 6, 7, 8, 9, 10, 15, 18, 19 & 20 contain large stands of sagebrush and moderate topography. Approximately 36% (4,235 acres) of the project area meets seasonal habitat requirements and are large enough to meet the landscape scale requirements of the bird (BLM 2008). Sage-grouse habitat models indicate that 26% (3,076 acres) of the project area contains high quality sage-grouse nesting habitat and 10% (1,159 acres) contains high quality sage-grouse wintering habitat (Walker et al. 2007). At the onsite, BLM biologists found sage-grouse sign SE section 4 and NE section 5 T57N/R77W. Individual birds were seen on multiple occasions off Sheridan County's Passaic Road located SESE section 36 T58N/R78W a distance of 0.26 mile from the project boundary. Passaic Road is planned as the main access to the north and west portions of the project area. BLM records identified 6 sage-grouse leks within 4 miles of the project area. The 4-mile distance was recommended by the State wildlife agencies' ad hoc committee for consideration of oil and gas development effects to nesting habitat (WGFD 2008). Three of the leks exist in Wyoming and 4 leks are located in Montana. These 6 lek sites are identified below (Table 3.4).

**Table 3.4 Sage-grouse leks surrounding the Cabin Creek V POD project area.**

<b>LEK NAME</b>	<b>LEGAL LOCATION</b>	<b>OCCUPANCY AND ACTIVITY STATUS IN (YEAR) (PEAK MALES)</b>	<b>DISTANCE FROM PROJECT AREA</b>
Iron Springs	NENW Sec. 35 T58N/R78W	1991 – 14 1992 – not surveyed 1993 – 14 1994 – 17 1995 – not surveyed 1996 – 13 1997 – 7 1998 – 11 1999 – 6 2000 – 1 2001-2004 – 0 2005 – 3 2006 - 6 2007 – 4 2008 – 4	1.70 miles
Passaic	NWSW Sec.35 T58N/R78W	1981 – 10 1982 – not surveyed 1983 – 20 1984 – not surveyed 1985 – 9 1986 – 14 1987 – 9 1988 – 42 1989 – not surveyed 1990 – 12	1.80 miles

LEK NAME	LEGAL LOCATION	OCCUPANCY AND ACTIVITY STATUS IN (YEAR) (PEAK MALES)	DISTANCE FROM PROJECT AREA
		1991 – 16 1992-1996 – not surveyed 1997 – 7 1998-1999 – not surveyed 2000 – 0 2001-not surveyed 2002 – 0 2003 - 0 2004 – 0 2005 – 1 2006 – 4 2007 – 0 2008 – 0	
Remington Creek	SWNW Sec.19 T57N/R76W	2005 – 13 2006 – 21 2007 – 7 2008 - 7	2.13 miles
MT State Line	NESE Sec.34 T9N/R45W	2000 – 25 2001 – 17 2002 – 10 2003 – 12 2004 – 20 2005 – 29 2006 – 0 2007 - 34 2008 - 16	3.48 miles
Montana Fish, Wildlife & Parks PO-41	NESE Sec.34 T9N/R45W	1975 – 25 1976-1979 – not available 1980 – 7 1981 – not available 1982 – 6 1983 - 22 1984 – 17 1985 – 16 1986 - 0 1987 – 24 1988 – 50 1989 – 48 1990 – 50 1991-1992 – not surveyed 1993-1994 – 0 1996-1999 – not surveyed 2000 – 35 2001 – 30 2002 – 10 2003 – 13 2004 – not surveyed	3.46 miles

LEK NAME	LEGAL LOCATION	OCCUPANCY AND ACTIVITY STATUS IN (YEAR) (PEAK MALES)	DISTANCE FROM PROJECT AREA
		2005 – 21 2006 – 0 2007 - 26 2008 – 34	
Montana Fish, Wildlife & Parks PO-42	NWNW Sec.36 T9N/R45W	1984 – 30 1985 – 10 1986 – 10 1987 – 22 1988 – 22 1989 – 43 1990 – 34 1991 – 14 1992 – not surveyed 1993-1994 – 0 1996 – not surveyed 1997 – 11 1998-1999 – not surveyed 2000 – 35 2001 – 6 2002 – not surveyed 2003 – 0 2004 – not surveyed 2005-2007 – 0 2008 – not available	3.75 miles

In 2006, Naugle, used satellite imagery to identify priority habitats for sage-grouse in the PRB. This information coupled with digital elevation models and ground verified, identified areas of high value sage-grouse habitat. This mapping used several components, including roughness, sagebrush coverage (height/abundance) and distance from conifers. Much of the recent research conducted by Naugle, et al. focused on the impact of CBNG development on male sage-grouse attendance on strutting grounds. Sage-grouse hens near active development moved twice as far in search of undisturbed nesting habitat as did hens in areas with no development. Holloran also found nest success was lower, the closer hens nested to development.

Montana BLM has identified four crucial sage-grouse habitat areas within the study area, two of which extend into Wyoming. These areas are considered to be of crucial importance to maintaining viable populations of sage-grouse within the Montana portion of the PRB. The goal of this designation was to identify non-fragmented, core habitats in which existing sage-grouse populations could be maintained (BLM – MCFO 2008).

Maintaining core populations is important to conserve sage-grouse throughout this area. Genetic diversity is necessary for the sage-grouse to adapt to changes within its environment. Loss of genetic diversity will limit a population’s ability to overcome stressors such as habitat change, disease and climate. Maintaining the ability of the sage-grouse to disperse (corridors) is the most efficient way to ensure genetic diversity. In addition, these small populations may be an important source of birds needed to repopulate those portions of the PRB, once energy development has been completed (Naugle 2006).

Montana BLM initiated a sage-grouse study along the Montana – Wyoming border beginning May 2008 were 18 sage-grouse hens were captured from lek sights and Montana and collared with VHF radio

collars. Within a week following the capture operation, 5 of the hens were located in Wyoming including one hen within the Cabin Creek V project area. Individual hens migrated as far as 16 miles from their capture/collar locations. It is assumed that the hens sought out their fraternal nesting sites to nest and rear their broods. As of August 2008, these 5 hens have remained within Wyoming. One of the sage-grouse hens has been located NE section 9 T57N/R77W within the Cabin Creek V POD throughout the brood rearing season.

### 3.3.5.2.6.2. Sharp-tailed grouse

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

The Cabin Creek V project area has the potential to support sharp-tailed grouse during most of the year. The mosaic of grasslands and sagebrush-grasslands could provide habitat from April through October. Cottonwoods and junipers could provide buds and berries, respectively, to sustain grouse through the winter. Western Lands Services and BLM identified one sharp-tailed grouse lek (Table 3.6).

**Table 3.6. Sharp-tailed grouse leks surrounding the Cabin Creek V POD project area.**

LEK NAME	LEGAL LOCATION	OCCUPANCY AND ACTIVITY STATUS IN (YEAR) (PEAK MALES)	DISTANCE FROM PROJECT AREA
Fence Creek Road	SWSW sec.29 T58N/R78W	2008 – 32	1.24 miles

### 3.3.5.2.7. Mountain plover

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

Suitable mountain plover habitat is not present within the project area. Mountain plovers typically inhabit relatively flat terrain (slope less than 5 %) with short and sparse vegetation (less than 4 inches tall and at least 30% bare ground). Most of the terrain in the POD area is either too steep or covered with too dense or too tall of vegetation to be considered preferred habitat for mountain plovers. Ground surveys revealed that the POD has eleven prairie dog colonies, which are covered with tall cheat grass and other grass species. The historic prairie dog colonies are largely inactive and do not create suitable habitat for mountain plover (Western Land Service, 2007).

## 3.4. West Nile Virus

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

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

The human health issues related to WNV are well documented and continue to escalate. Historic data collected by the CDC and published by the USGS at [www.westnilemaps.usgs.gov](http://www.westnilemaps.usgs.gov) are summarized below (Table 3.7). Reported data from the Powder River Basin (PRB) includes Campbell, Sheridan and Johnson counties.

**Table 3.7 Historical West Nile Virus Information**

<b>Year</b>	<b>Total WY Human Cases</b>	<b>Human Cases PRB</b>	<b>Veterinary Cases PRB</b>	<b>Bird Cases PRB</b>
2001	0	0	0	0
2002	2	0	15	3
2003	392	85	46	25
2004	10	3	3	5
2005	12	4	6	3
2006	65	0	2	2
2007*	155	22	Unk	1

\*Wyoming Department of Health Records September 12, 2007.

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

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

Mosquitoes can potentially breed in any standing water that 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 Middle Powder River watershed. It lies primarily in the Cabin Creek watershed, with a limited amount of infrastructure in the Big Remington Creek watershed.

#### **3.5.1. Groundwater**

Wyoming Department of Environmental Quality (WDEQ) water quality parameters for groundwater classifications (Chapter 8 – Quality Standards for Wyoming Groundwater) define the following limits for Total Dissolved Solids (TDS) and the classes of groundwater; 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 PRB FEIS Record of Decision 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 related to groundwater, the plan identified the following (PRB EIS ROD page E-4):

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

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

The BLM installed shallow groundwater monitoring wells at five impoundment locations throughout the PRB to assess ground-water quality changes due to infiltration of CBNG produced water. The most intensively monitored site had a battery of nineteen wells which were installed and monitored jointly by the BLM and USGS starting in August of 2003. Water quality data has been sampled from these wells on a regular basis. That impoundment site, which has since been reclaimed, lies atop approximately 30 feet of unconsolidated deposits (silts and sands) which overlie non-uniform bedrock on a side ephemeral tributary to Beaver Creek and is approximately one and one-half miles from the Powder River. Baseline

investigations showed water in two sand zones, the first was at a depth of 55 feet and the second was at a depth of 110 feet. The two water bearing zones were separated by a fifty-foot thick shale layer. The water quality of the two water bearing zones fell in the WDEQ Class III and Class I classifications respectively. Preliminary results from this sampling indicated increasing levels of TDS and other inorganic constituents over a six month period resulting in changes from the initial WDEQ classifications.

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

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

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 32 registered stock and domestic water wells within 1 mile of this federal plan of development with depths ranging from 2 to 1300 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

### **3.5.2. Surface Water**

The project area is primarily within the Cabin Creek drainage. A small portion of the federal development will also occur in the Big Remington Creek watershed. Both of these are tributaries to the Middle Powder River. All drainages within the project are ephemeral (flowing only in response to a precipitation event or snow melt). Cabin Creek is ephemeral, but also seems to exhibit some characteristics of intermittent systems (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 PRB FEIS presents the historic mean Electrical Conductivity (EC, in  $\mu\text{mhos/cm}$ ) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters “...illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM produced water of varying chemical composition to surface drainages within the Project Area” (PRB FEIS page 3-48). For the Middle Powder River watershed, the EC ranges from 1421  $\mu\text{mhos/cm}$  at Maximum monthly flow to 2154  $\mu\text{mhos/cm}$  at Low monthly flow and the SAR ranges from 3.92 at Maximum monthly flow to 4.62 at Low monthly flow. These values were determined at the USGS station located on the Powder River at Moorhead, Montana (PRB FEIS page 3-49).

The operator has identified three natural springs within this POD boundary during the field investigations. The tabulation below shows their locations and status at the time the field investigations were being conducted.

<b>Spring Name</b>	<b>QTR/QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Flow Rate</b>	<b>Sampled</b>
SP 01	NWNE	7	57N	77W	Flowing	Yes
SP 02	NWNE	6	57N	77W	DRY	NO
SP 03	SESE	4	57N	77W	DRY	NO

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 inventories were conducted for most of the Cabin Creek V project prior to on-the-ground project work (BFO project #s 70080072, 70080189). Western Land Services, Inc. conducted the Class III inventories following the Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48FR190) for the proposed project. Clint Crago, BFO archaeologist, reviewed the reports for technical adequacy and for compliance with BLM and Wyoming State Historic Preservation Office standards, and determined them to be adequate. However, a portion of the proposed project area has not been inventoried at this time. A Condition of Approval for this project will be that all overhead power outside of previous cultural inventory will not be approved. The following resources are located within or near the Area of Potential Effect (APE).

**Table 3.6 Cultural Resource Sites Identified within or near the Cabin Creek V project area**

<b>Site Number</b>	<b>Site Type</b>	<b>Eligibility</b>
48SH159	Prehistoric Lithic Scatter	Eligible
48SH160	Prehistoric Lithic Scatter	Not Eligible
48SH161	Prehistoric Lithic Scatter	Not Eligible
48SH162	Prehistoric Lithic Scatter	Not Eligible
48SH163	Historic Stock Herding Camp	Not Eligible
48SH164	Prehistoric Lithic Scatter	Not Eligible
48SH165	Historic Homestead	Eligible
48SH166	Prehistoric Lithic Scatter	Not Eligible
48SH170	Prehistoric Lithic Scatter	Not Eligible
48SH171	Prehistoric Lithic Scatter	Not Eligible
48SH172	Prehistoric Lithic Scatter	Not Eligible
48SH220	Prehistoric Lithic Scatter	Not Eligible
48SH221	Prehistoric Lithic Scatter	Not Eligible
48SH643	Historic Homestead	Not Eligible
48SH742	Historic Homestead	Not Eligible
48SH1616	Historic Dugout	Not Eligible

<b>Site Number</b>	<b>Site Type</b>	<b>Eligibility</b>
48SH1617	Historic Dugout	Not Eligible
48SH1618	Historic Cabin and Corral	Not Eligible
48SH1619	Prehistoric Lithic Scatter	Not Eligible
48SH1620	Historic Dump	Not Eligible
48SH1621	Prehistoric Lithic Scatter and Hearths	Eligible
48SH1622	Prehistoric Lithic Scatter	Not Eligible
48SH1623	Prehistoric Lithic Scatter	Not Eligible
48SH1624	Prehistoric Lithic Scatter	Not Eligible
48SH1625	Prehistoric Lithic Scatter	Not Eligible
48SH1626	Historic/Modern Graffiti	Not Eligible
48SH1627	Prehistoric Lithic Scatter	Not Eligible
48SH1628	Prehistoric Lithic Scatter and Historic/Modern Graffiti	Not Eligible
48SH1629	Prehistoric Lithic Scatter	Not Eligible
48SH1630	Prehistoric Lithic Scatter	Not Eligible
48SH1631	Prehistoric Lithic Scatter	Not Eligible
48SH1632	Prehistoric Lithic Scatter	Not Eligible
48SH1633	Historic Graffiti	Not Eligible
48SH1634	Historic Graffiti	Not Eligible
48SH1635	Prehistoric Lithic Scatter	Not Eligible
48SH1636	Prehistoric Lithic Scatter	Not Eligible
48SH1637	Prehistoric Lithic Scatter	Not Eligible
48SH1638	Prehistoric Lithic Scatter	Eligible
48SH1639	Historic Cabin	Not Eligible
48SH1640	Prehistoric Lithic Scatter and Campsite and Historic Homestead	Eligible
48SH1641	Historic Foundation and Machinery	Not Eligible
48SH1713	Prehistoric Lithic Scatter	Eligible

### **3.7. Air Quality**

Existing air quality throughout most of the Powder River Basin is in attainment with all ambient air quality standards. Although specific air quality monitoring is not conducted throughout most of the Powder River Basin, air quality conditions in rural areas are likely to be very good, as characterized by limited air pollution emission sources (few industrial facilities and residential emissions in the relatively small communities and isolated ranches) and good atmospheric dispersion conditions, resulting in relatively low air pollutant concentrations.

Existing air pollutant emission sources within the region include following:

- Exhaust emissions (primarily CO and nitrogen oxides [NO<sub>x</sub>]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;
- NO<sub>x</sub>, particulate matter, and other emissions from diesel trains and,
- SO<sub>2</sub> and NO<sub>x</sub> from power plants.

For a complete description of the existing air quality conditions in the Powder River Basin, please refer to the PRB Final EIS Volume 1, Chapter 3, pages 3-291 through 3-299.

## **4. ENVIRONMENTAL CONSEQUENCES**

The changes to the proposed action (Alternative B) resulted in development of Alternative C as the preferred alternative. The changes have reduced impacts to the environment which will result from this action. The environmental consequences of Alternative C are described below.

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

Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator's plans and BLM applied mitigation. Of the 50 proposed well locations, 1 is on existing or reclaimed conventional well pads, 30 can be drilled without a well pad being constructed, 12 will require a slotted pad (30' wide X 120' long X 4' deep) and 8 will require a constructed (cut & fill) well pad. Surface disturbance associated with the drilling of the (30) 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 (12'x 30')), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 30 wells not requiring a constructed pad would involve approximately 0.2 acre/well for 6.9 total acres. The estimated disturbance associated with the 12 wells requiring a slotted well pad would involve approximately 0.08 acre/well for 1.0 acre. The other 8 wells requiring cut & fill pad construction would disturb approximately 0.28 acres/well pad for a total of 2.2 acres. The total estimated disturbance for all 50 wells would be 10.1 acres.

Approximately 4.1 miles of improved roads would be constructed to provide access to various well locations. Approximately 8.2 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 1.9 miles of pipeline would be constructed outside of corridors. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques,

and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, gabions etc.) would ensure land productivity/stability is regained and maximized.

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

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

Table 4.1 summarizes the proposed surface disturbance.

**Table 4.1 - SUMMARY OF DISTURBANCE**

<b>Facility</b>	<b>Number or Miles</b>	<b>Factor</b>	<b>Acreage of Disturbance</b>	<b>Duration of Disturbance</b>
Nonconstructed Pad	30	0.23acre/well	10.1	Long Term
Constructed Pad	8	0.28 acre/well		
Slotted Pad	12	0.08acre/well		
Gather/Metering Facilities	0	Site Specific	0	Long Term
Screw Compressors	2	Site Specific	6.0	Long Term
Monitor Wells	0	0.1/acre	0	Long Term
Impoundments				Long Term
On-channel	0	Site Specific	0.0	
Off-channel	4	Site Specific	34	
Water Discharge Points	4	Site Specific or 0.01 ac/WDP	1.0	
Channel Disturbance				
Headcut Mitigation*		Site Specific	0.0	
Channel Modification		Site Specific	0.0	
Improved Roads		50' Width or Site Specific		Long Term
No Corridor				
With Corridor	4.1		24.6	
2-Track Roads		12' Width or Site Specific		Long Term
No Corridor				
With Corridor	8.2	40' Width or Site Specific	39.9	
Pipelines				Short Term
No Corridor		35' Width or Site Specific		
With Corridor	1.9		8.5	
Buried Power Cable		12' Width or Site		Short Term

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
No Corridor	0	Specific		
Overhead Powerlines	18.5	30' Width	67.2	Long Term
Additional Disturbance	1 staging area	Site Specific	2	Short 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/Floodplains

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. Continuous flows into these ephemeral systems could potentially create wetlands and riparian areas and would change the composition of species and dynamics of the food web. The shallow groundwater table would rise closer to the surface with stream flows caused by produced water seepage discharge. Vegetation such as cottonwood trees, which cannot tolerate year-round inundated root zones, could die and likely would not be replaced. Other plant species in riparian areas and wetland edges that favor inundated root zones would flourish, thus changing the plant community composition and the associated animal species. A rise in the shallow groundwater table would also influence the hydrology of wetlands by reducing or eliminating the seasonal drying periods that affect recruitment of plant species and species composition of benthic and water column invertebrates. These changes to the aquatic food web base would affect the higher trophic levels of fish and waterfowl abundance and species richness for wetlands and riparian areas.” (PRB FEIS Page 4-175).

Much of the infrastructure follows Cabin Creek and is situated within its floodplain. Large runoff events have a very high probability of removing roads, culverts, rupturing pipelines, and generally wreaking havoc upon the Cabin Creek ecosystem. This concern also applies, but to a lesser degree, to Big Remington Creek.

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

#### 4.1.2. Invasive Species

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

1. Control Methods which would include Cultural, Physical/Mechanical, Chemical and Biological
2. Preventive practices
3. Education

The Integrated Pest Management Plan (IPM) identified Leafy Spurge and Salt Cedar as species of concern within the Cabin Creek Phase V Project area. The proponent submitted a Pesticide Use Plan

(PUP) to the BLM which outlined the treatment of approximately 36.25 acres of BLM administered lands would be treated on an annual basis for Leafy Spurge and Salt Cedar. At this time a Pesticide Use Permit (WY-070-08-043) is being processed and approval is anticipated within the next 2 weeks. Treatments would primarily take place in the spring but fall treatments are also another opportunity for treatment if needed. Many areas throughout the project area were observed to have moderate to large infestations of Leafy Spurge during the pre-approval onsite inspections conducted in the Spring of 2008. Although no Salt Cedar was observed by the BLM, Natural Resource Specialist does not mean that it is not there. In order to prevent the further spread of Leafy Spurge, Salt Cedar or other noxious weeds with the onset of CBNG development, a Condition of Approval has been applied that no surface disturbing activities will take place without an approved PUP unless the proponent can provide documentation that no state listed noxious weeds are present in the areas to be disturbed.

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

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

#### **4.1.3. 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 Middle Powder River drainage and the total amount that was predicted in the PRB FEIS, which is only approximately 45% of that total (see section 4.4.2.1).
- The WDEQ enforcement of the terms and conditions of the WYPDES permits that are designed to protect irrigation downstream.
- The WMP for the Cabin Creek Phase V proposes that produced water will not contribute significantly to flows downstream.
- The commitment by the operator to monitor the volume of water flowing into Cabin Creek and prevent significant volumes of water from flowing into the Middle Powder River Watershed.

Additional mitigation measures may be required and added as this and other PODs are developed in the Cabin Creek and Big Remington Creek areas.

## **4.2. Wildlife (Alternative C – Environmentally Preferred)**

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

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

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

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

Winter big game diets are sub-maintenance, meaning they lose weight and body condition as the winter progresses. Survival below the maintenance level requires behavior that emphasizes energy conservation. Canfield et al. (1999) pointed out that forced activity caused by human disturbance exacts an energetic disadvantage, while inactivity provides an energetic advantage for animals. Geist (1978) further defined effects of human disturbance in terms of increased metabolism, which could result in illness, decreased reproduction, and even death.

Reclamation activities that occur within big game habitats during the spring will likely displace does and fawns due to the human presence in the area. This may cause reduced survival rate of does and fawns that must expend increased energies to avoid such activities.

#### **4.2.1.1. Big Game Cumulative effects**

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-211.

#### **4.2.2. Aquatics Direct and Indirect Effects**

Produced water is to be managed by utilizing an existing water treatment facility and discharging to the Powder River, containment in 4 proposed off-channel pits and re-injected into shallow sand formations above the coal seams. If a reservoir were to discharge, it is unlikely that the produced water will reach a fish-bearing stream, and that downstream species would be affected.

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

#### **4.2.3. Migratory Birds Direct and Indirect Effects**

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

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

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

Overhead power lines may affect migratory birds in several ways. Power poles provide raptors with perch sites and may increase predation on migratory birds. Power lines placed in flight corridors may result in collision mortalities. Some species may avoid suitable habitat near power lines in an effort to avoid predation.

A condition of approval has been applied requiring that all new overhead power is constructed to meet 2006 APLIC standards to minimize losses of migratory birds due to collisions with overhead electrical lines.

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

##### **4.2.3.1. Migratory Birds Cumulative effects**

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, Page 4-235.

#### **4.2.4. Raptors Direct and Indirect Effects**

Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to

remain away from the nest and their chicks for the duration of the activities. This absence can lead to overheating or chilling of eggs or chicks. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Both actions can result in egg or chick mortality. In addition, routine human activities near these nests can draw increased predator activity to the area and increase nest predation.

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

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.

**Table 4.2 describes changes to the project to minimize effects to nesting raptors.**

Well # or Project Component	Changes to the project to minimize effects to nesting raptors.
15CCWP-4	<u>Nest 5288-GRHO @ 0.26 and nest 5307-UNRA @ 0.48 from the proposed well location. Operator agreed to move the well out of line of sight of the 5288 nest.</u>
15CCWP-8	Nest 5311-PRFA @ 0.25 mile, 5316 @ 0.22 mile from the proposed well location and in line of sight. The access road is less than 0.10 from the 5311 nest. BLM and the operator agreed to a raptor nest monitoring plan for the POD as a Condition of Approval. The operator withdrew the cross country utility corridor the SW.
05CCWP-9 & 05-09I	The location and the access road were mowed prior to the onsite inspection and without BLM authorization. Nest 5312-RETA @ 0.20 miles with 1 adult on the nest & nest 5295-RETA@0.25 mile. Both nests are in direct line of sight with the location slightly above the nests. No feasible alternative location was evident therefore BLM recommended that the operator withdraw the APD's due to the unavoidable effects to the nesting raptors. The operator agreed and withdrew the APD's.
05CCWP-10	Nest 5307-RETA @ 0.11 mile from the proposed well location is above the nest and well in line of sight. There is quality SG habitat along the proposed access route. BLM recommended that the operator consider an alternate location or withdraw the APD's. The operator agreed to withdraw the APD's.
09CCWP-15	Nest 5297-RETA @ 0.30 mile of the proposed well location and 0.20 mile of existing trail/proposed corridor, both in line of sight. BLM recommended that both the APD's and the proposed corridor be withdrawn due to steep slopes and effects to the raptor nest. The operator agreed and withdrew them from the project.
11CCWP-15	Nest 5296-PRFA @ 0.26 and in line of sight. The nest is at the end of the ridge on a cliff face overlooking the access road and proposed well location. BLM recommended that the operator consider an alternate location or withdraw the APD's. The operator was unable to find a feasible alternative location. BLM and the operator agreed to a raptor nest monitoring plan for the POD as a Condition of Approval.

Well # or Project Component	Changes to the project to minimize effects to nesting raptors.
15CCWP-15	Nest 5297-RETA @ 0.22 mile of the proposed well location; out of line of sight. Nest 5296 PRFA less than 0.25 from well access. Recommend not approving the proposed access due to effects to multiple raptor nests. This location was looked at again on 7-8-08 at an alternate location that was also not acceptable. The operator agreed to withdraw the APD's.
15CCWP-20	Nest 5306-PRFA is out of line of sight @ 0.49 mile. Recommended the operator relocate the proposed power drop to this well location and realign the proposed line to run directly to the 13-20 and then to the Fee 09-19 well.
11CCWP-27	Nest 4300-RETA @ 0.32 mile, 4842-UNK @ 0.38 mile, 4843-BUTEO @ 0.42 mile, 5301-RETA @ 0.42 mile; all are in line of sight but there are some trees to screen it and the sage covered hill in the background should obscure the visibility. The operator agreed to a Condition of approval that the pumper park on the west side to the well location and out of line of sight of the nests during well visits.
Schauer #4 pit	Nest 5296-PRFA less than 0.25 mile of and in line of sight of the proposed pit. Recommended that the operator propose mitigation of withdraw the pit. The operator withdrew this impoundment from the federal action.
Section 6 Alt. to sec. 31 Compressor site	Originally the compressor was proposed in section 31 T58N/R77W in an area identified as high quality sage grouse habitat. The operator identified an alternative site within 0.25 mile of red-tailed hawk nest 5292 and in line of sight. The operator relocated the site to a third alternate site located SENW section 6 T57N/R77W out of line of sight and greater than 0.25 mile of the nest.
General Comments	BLM recommended to the operator that a mitigation plan needs to be proposed to minimize the effects to raptor nest within 0.25 mile and within line of sight of the following well locations: 11-8-5777, 15-8-5777, 5-15-5777, 11-15-5777, 13-21-5777, 10-27-5777, 11-27-5777. Pinnacle Gas Resources agreed to a Condition of Approval requiring the operator to have a certified wildlife biologist monitor the raptor nest when active during well visits and report to BLM. Further mitigation measure will be applied if adverse effects incur as a result of well visits.

**Table 4.3.** Infrastructure within close proximity (0.5 mile) to documented raptor nests within the Cabin Creek V project area (Timing limitations will apply to this infrastructure).

BLM ID#	INFRASTRUCTURE	DISTANCE (MILES)
4299	Overhead Power	0.44
4300	5-27-5777 well location	0.44
	11-27-5777 well location	0.32
	1-27-5777 well location	0.32
	10-27-5777 well location	0.36
	15-27-5777 well location	0.46
	Overhead Power	0.02
	Improved access w/corridor	0.02
4839	Overhead power	0.29
	Improved access w/ corridor	0.30
4840	5-35-5777 well location	0.47
	11-385-5777 well location	0.31
	Overhead power	0.02
	Improved access w/ corridor	0.02
4841	15-22-5777 well location	0.20
	9-22-5777 well location	0.37
	7-22-5777 well location	0.34

<b>BLM ID#</b>	<b>INFRASTRUCTURE</b>	<b>DISTANCE (MILES)</b>
	Overhead power	0.31
	Improved access w/ corridor	0.30
4842	11-27-5777 well location	0.37
	1-27-5777 well location	0.49
	10-27-5777 well location	0.12
	Overhead Power	0.13
	Improved access w/ corridor	0.15
4843	11-27-5777 well location	0.42
	1-27-5777 well location	0.49
	10-27-5777 well location	0.18
	Overhead Power	0.12
	Improved access w/ corridor	0.14
4844	11-35-5777 well location	0.27
	Overhead Power	0.25
	Improved access w/ corridor	0.27
4845	Overhead power	0.32
	Improved access w/ corridor	0.37
4846	Overhead power	0.47
	Improved access w/ corridor	0.49
4847	Primitive access w/corridor	0.37
4848	1-22-5777 well location	0.34
5285	3-4-5777 well location	0.20
5287	3-4-5777 well location	0.34
5288	15-4-5777 well location	0.24
	14-4-5777 well location	0.28
5290	Over head Power	0.02
	Improved access w/corridor	0.03
5291	Improved access w/corridor	0.03
5292	Compressor station	0.29
	Improved access w/corridor	0.02
5293	Over head Power	0.23
	11-17-5777 well location	0.24
	1-18-5777 well location	0.44
5294	5-18-5777 well location	0.31
	7-18-5777 well location	0.44
5295	Over head Power	0.04
	Improved access w/corridor	0.03
5296	5-15-5777 well location	0.23
	11-15-5777 well location	0.25
	Over head Power	0.24
5297	1-22-5777 well location	0.28
	3-22-5777 well location	0.40
5298	Over head Power	0.01
5299	Over head Power	0.04
	Improved access w/corridor	0.03
5301	11-27-5777 well location	0.42
	1-27-5777 well location	0.39
	10-27-5777 well location	0.26

<b>BLM ID#</b>	<b>INFRASTRUCTURE</b>	<b>DISTANCE (MILES)</b>
	Overhead Power	0.03
	Improved access w/ corridor	0.05
5302	11-35-5777 well location	0.31
	Overhead Power	0.46
	Improved access w/ corridor	0.48
5303	10-27-5777 well location	0.45
5306	13-21-5777 well location	0.12
	9-20-5777 well location	0.34
	15-20-5777 well location	0.47
	Over head Power	0.48
5307	1-9-5777 well location	0.23
5308	1-9-5777 well location	0.38
5309	1-9-5777 well location	0.44
5310	5-35-5777 well location	0.42
5311	Improved access w/corridor	0.05
	11-8-5777 well location	0.23
	15-8-5777 well location	0.26
	13-8-5777 well location	0.27
5312	Over head Power	0.03
	Improved access w/corridor	0.08
5313	Over head Power	0.02
	Improved access w/corridor	0.03
5316	Over head Power	0.33
	15-8-5777 well location	0.22
5341	3-5-5777 well location	0.30
	1-5-5777 well location	0.36
5729	3-5-5777 well location	0.34
	1-5-5777 well location	0.35
5738	Compressor station	0.29
	Improved access w/corridor	0.02
5740	11-35-5777 well location	0.33
	Overhead power	0.01
	Improved access w/ corridor	0.02
5741	Overhead Power	0.03
	Improved access w/corridor	0.06
5742	5-27-5777 well location	0.43
	11-27-5777 well location	0.31
	1-27-5777 well location	0.30
	10-27-5777 well location	0.39
	15-27-5777 well location	0.02
	Overhead Power	0.44
	Improved access w/corridor	0.03
6099	5-27-5777 well location	0.42
	11-27-5777 well location	0.42
	1-27-5777 well location	0.32
	15-27-5777 well location	0.37
	Overhead Power	0.08
	Improved access w/corridor	0.09

All the nesting raptors utilizing the nests listed in the table above will be affected by the Cabin Creek V CBNG development due to the increase in human activity. BLM made recommendation to modify the proposed plan to minimize those effects and Conditions of Approval are applied to restrict surface disturbing activities within 0.5 miles of active nests during the nesting period.

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

The following proposed well(s) and associated access and/or infrastructure have the potential to cause impacts to identified raptor nests;

Proposed wells: 11-8-5777, 15-8-5777, 05-15-5777, 11-15-5777, 13-21-5777, 10-27-5777 & 11-27-5777

- Following nest productivity surveys (no earlier than April 15 or later than June 15), if the nest (BLM ID#'s 5311, 5316, 5296, 5306, 4842, 4843, 5301, 4300 & 5303) is active, the operator will monitor the activity of the nest at the nest for the remainder of the nesting period (until August 15 or the young have fledged) during operations and maintenance visits to the well locations for the first **five years** following project completion. Monitoring will occur as follows:
- A biologist is required to monitor the nest during well metering, maintenance and other site visits (excluding emergencies) and document the birds' behavior in response to human activity, equipment activity and noise throughout the entire buffer. The biologist must be in position to monitor the nest at least ½ hour before the monitoring or maintenance crews arrive and begin work and ½ hour after the monitoring or maintenance crews leave for the day. The biologist will record all of the bird's activity and document weather conditions and submit a report of the activity to the BLM biologist.
- Further mitigation measures will be applied if adverse effects incur as a result of well visits i.e. adults being flushed from the nest when displaying nesting behavior, adults displaying defensive against visitors, adults being displaced from the nest with eggs or young.

**4.2.4.1. Raptors Cumulative effects**

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-221. Additional mitigation measures have been applied.

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

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

**4.2.5.1. Threatened and Endangered Species**

**Table 4.2.5.1 Summary of Threatened and Endangered Species Habitat and Project Effects.**

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

<i>diluvialis</i> )				
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**Presence**

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

*Project Effects*

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

**4.2.5.1.1. Black-Footed Ferret Direct and Indirect Effects**

Because the black-tailed prairie dog colonies within and adjacent to the Cabin Creek V POD project area is of insufficient size for supporting ferrets and is isolated from any prairie dog complexes, implementation of the proposed development will have “no effect” on the black-footed ferret.

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

The Ute ladies’-tresses orchid is threatened by energy developments, noxious weeds, and water developments. Prolonged idle conditions in the absence of disturbance (flooding, grazing, mowing) may be a threat just as repeated mowing and grazing during flowering may lead to decline (Hazlet 1996, 1997, Heidel 2007). Heavy equipment used in energy development construction could dig up plants. Invasive weeds transplanted by vehicle and foot traffic in habitat could outcompete this fragile species. Restricting work from areas of Ute ladies’-tresses orchid habitat reduces these impacts.

None of the reservoirs utilized for management of CBNG produced water are located within ephemeral drainages. The 4 proposed reservoirs are off-channel pits located in upland habitats. There is existing or proposed disturbance related to the federal undertaking in proximity of the 3 springs. One of these springs located SWNE section 7, T57N, R77W is free flowing. The other 2 springs located NWNE section 6, T57N, R77W and NESW section 4, T57N, R77W are dry. There is existing or proposed disturbance related to the federal undertaking in proximity of the 3 springs. Western Land Services conducted surveys for UTE ladies’ tresses orchid September 12, 2007. The surveys completed at 40 proposed and existing low water crossings and one culvert crossing exhibited characteristics not suitable for Ute ladies’ tresses orchid Little associated vegetation was identified due to a high abundance of upland vegetation (i.e. silver sagebrush, Japanese brome, cheatgrass) and noxious weed species (i.e. leafy spurge) within and adjacent to the channels, no surface hydrology was present at any of the sites, and the soils were more loamy than sands or silty sands (Western Land Services, 2007). Suitable habitat is not present within the Cabin Creek V POD project area.

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

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

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

categories would not be necessary.”

#### **4.2.5.2.1. Prairie dog colony obligates**

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

#### **4.2.5.2.2. Sagebrush obligates**

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

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

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

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Sage sparrow ( <i>Amphispiza billneata</i> )	Basin-prairie shrub, mountain-foothill shrub	NS	MIIH	Sagebrush cover will be affected.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	Basin-prairie shrub, mountain-foothill shrub	K	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	NP	NI	Habitat not present.
Long-eared myotis ( <i>Myotis evotis</i> )	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Spotted bat ( <i>Euderma maculatum</i> )	Cliffs over perennial water.	NP	NI	Cliffs & perennial water not present.
Swift fox ( <i>Vulpes velox</i> )	Grasslands	NP	NI	Habitat not present.
Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> )	Caves and mines.	NP	NI	Habitat not present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
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

#### **4.2.5.2.1. Bald eagle Direct and Indirect Effects**

Direct impacts associated with the Cabin Creek V POD to occupied habitat of winter roosting bald eagles will result from the installation of additional overhead power lines, increase human activity within winter roosting habitat and increased CBNG discharge to the Powder River. To reduce the risk of disruption to the winter roosting activities of bald eagles, the BLM BFO requires a 0.5 mile no surface occupancy radius and a one mile radius timing limitation of all winter roosts (either communal or consistent use).

There are 1.14 miles of existing overhead three-phase distribution lines within the project area. The wire spacing is likely in compliance with the Avian Power Line Interaction Committee's (2006) suggested practices and with the Service's standards (USFWS 2002); however other features may not be in compliance. Pinnacle Gas Resources is proposing an additional 18.5 miles of overhead three-phase distribution lines. There are currently 20.9 miles of improved roads within the project area, with 4.1 miles proposed.

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

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

Produced water will be stored in 4 proposed off-channel pits which may attract eagles if reliable prey is present, most likely in the form of waterfowl. The effect of the impoundments on eagles is unknown. The impoundments could prove to be a benefit (e.g. increased food supply) or an adverse effect (e.g. contaminants, proximity of power lines and/or roads to water). Eagle use of reservoirs should be reported to determine the need for any future management.

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

Prairie dog colonies were not avoided by the operator when planning the placement of impoundments, roads, utility corridors and well locations for the Cabin Creek V POD. The private surface owners did not support recommendations to avoid prairie dog colonies but encouraged surface use and surface disturbance through these areas. On federal surface, the use of existing access roads in proximity to prairie dog colonies will minimize impacts to the habitat. Recommendations by BLM to avoid and or minimize impacts to prairie dog colonies on privately owned surface estate were not accepted or incorporated into the design of the POD. Surface disturbance within prairie dog colonies associated with

this project include 7 road segments with corridor, 4 overhead powerline segments, 1 well location and 1 off-channel pit.

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

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

#### **4.2.5.2.3. Burrowing owl Direct and Indirect Effects**

Impacts to burrowing owl habitat will be the same as for prairie dog colonies however no burrowing owls were identified within the project area.

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

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

#### **4.2.5.2.4. Grouse**

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

BLM records identified 6 sage-grouse leks within 4 miles of the project area. The proposed action will

adversely impact identified nesting, brood rearing, late summer and winter habitat. Proposed project elements that are anticipated to negatively impact grouse are approximately: 60 CBNG wells on 60 locations, 12.3 miles of new roads with utility corridors, 1.9 miles of new pipelines, 18.5 miles of new overhead power, 4 new off-channel pits, increased vehicle traffic on established roads and increased noise from compressor stations. Using 0.6 miles as a distance for impacts (Holloran et al. 2007, Aldridge and Boyce 2007), effective sage-grouse habitat loss will be 7,104 acres from overhead power, 4,723 acres from roads, and 8,320 acres from 60 well locations (13 sections). These numbers are not additive since each well location has an associated road and power and in many cases wells are closer than 0.6 miles to each other. Therefore, the above numbers over-represent anticipated impacts within the project area if totaled, however since most well locations are within 0.6 miles of each other the entire project area (approximately 11,641 acres within the POD boundaries) can be considered affected. At this level of development the 4,236 acres of high quality sage-grouse habitat with the project are will be affected.

Based on the best available science, which is summarized below, the proposed action will most likely contribute to the extirpation of the local grouse population and subsequent abandonment of the 6 leks within 4 miles of the project area.

**Table 4.5 Changes to the project to minimize effects to high quality sage-grouse habitat.**

Well # or Project Component	Changes to the project to minimize effects to high quality sage-grouse habitat.
Section 6 Alt. to sec. 31 Compressor site	Originally the compressor was proposed in section 31 T58N/R77W in an area identified as high quality sage grouse habitat. The operator identified an alternative site within 0.25 mile of red-tailed hawk nest 5292 and in line of sight. The operator relocated the site to a third alternate site located SENW section 6 T57N/R77W out of line of sight and greater than 0.25 mile of the nest and outside of high quality sage-grouse habitat.
4-6-5777	BLM identified this well location as being in high quality sage-grouse habitat prior to the onsite inspection. Pinnacle withdrew the APD's prior to the onsite.
Overhead Powerline	The segment between the MD10-20-5777 and MD09-19-5777; BLM recommended realignment following the access road from the MD10-20-5777 to the 13CCWP-20 and continuing to MD 09-19-5777. Pinnacle agreed.
Overhead Powerline Alternatives	BLM recommended buried power throughout the project area where feasible and installation of perch preventers on all new power poles located within high quality sage-grouse habitat. Pinnacle agreed to bury powerlines from the metering point to the well locations as well as to consider the feasibility of buried primary power. Perch preventers will be used throughout the POD where appropriate.

At the initiation of processing the APD's associated with the Cabin Creek V POD, BLM outlined that numerous components of the project are proposed within identified high quality sage-grouse habitat. BLM communicated concerns to Pinnacle Gas Resources that portions of the proposal would have adverse effect to high quality sage-grouse habitat during the initial project coordination meeting. BLM identified the particular wells locations, access roads and associated infrastructure and made the following recommendation to the operator:

- The following wells, infrastructure, access road and/or facilities propose new disturbance and fragmentation within quality sage-grouse habitat confirmed during the onsite inspection; **Pinnacle Gas Resources should reconsider the location(s):**

- Wells: 01CCWP-5, 03CCWP-5, 07CCWP-5, 01CCWP-9, 09CCWP-9, 10CCWP-9, 14CCWP-10, 03CCwp-15, 03CCWP-19 and 13CCWP-19
  - These wells are associated with new proposed roads within the project area. It is the BLM's recommendation that the operator consider minimization/mitigation by pulling the well locations back to the existing access road, re-route the proposed access to avoid habitat or with draw the APD's where minimization/mitigation is not possible. Please note that this recommendation does not include well locations proposed to utilize existing trails and access roads within quality sage grouse habitat.
- Overhead Power line:
  - The segment between the MD10-20-5777 and MD09-19-5777; BLM recommends realignment following the access road from the MD10-20-5777 to the 13CCWP-20 and continuing to MD 09-19-5777.
  - Overhead Power: BLM recommends buried power throughout the project area where feasible and installation of perch preventers on all new power poles located within identified high quality sage-grouse habitat.

Pinnacle Gas Resources did agree to modify the overhead power plan as BLM recommended and will consider the feasibility of buried primary power. However, the operator did not adequately address the BLM's concerns related to the 10 wells, new roads and associated infrastructure proposed within high quality sage-grouse habitat. Pinnacle's response illustrated that the operator had considered alternatives to minimize the loss of high quality sage-grouse habitat however, *"Based on the reduced time available to develop the project and obligations to shareholders and employees, Pinnacle cannot afford further delays that might be incurred by well moves and road realignments."*

Without additional mitigation and/or minimization measures incorporated into the Cabin Creek V plan by Pinnacle Gas Resources, the BLM-BFO wildlife biologist recommends deferral of the APD's for the 01CCWP-5, 03CCWP-5, 07CCWP-5, 01CCWP-9, 09CCWP-9, 10CCWP-9, 14CCWP-10, 03CCwp-15, 03CCWP-19 and 13CCWP-19 and associated roads and infrastructure at this time.

#### **4.2.5.2.4.1.1. Greater sage-grouse Cumulative Effects**

In addition to the direct impacts to sage-grouse habitat that will be created by the federal wells and associated infrastructure, the project area does contain existing fee, state, and federal fluid mineral development. The sage-grouse cumulative impact assessment area for this project encompasses a four mile radius from the Iron Spring, Passaic, Remington Creek, Montana State Line, PO-41 and PO-42 sage-grouse leks. As of September 8, 2008, there are approximately 278 existing wells and associated infrastructure in Wyoming within four miles of the 6 leks - an area of 141.6 square miles in Wyoming and Montana. The existing well density is approximately 2 wells/section. This area of Wyoming is at the initial phase of CBNG development with no development yet occurring in this area of Montana. The total area within four miles of the 6 leks within Wyoming is 100.8 square miles with an approximate well density of 2.8 wells/section. Only 32.5 square miles of this total area associated with the 6 leks is over federal mineral estate in Wyoming. The remaining 68.4 square mile of mineral estate is either owned by the State of Wyoming or is privately owned. Full field development over the non-federal mineral estate is anticipated at 8 wells/ section or an additional 548 CBNG wells. Due to this level of development there is a potential that the population(s) breeding at these leks may become extirpated without the federal development.

There are 72 proposed wells in Wyoming (60 are the wells from this project) within four miles of the 6 leks. With the addition of the 12 proposed wells that are not associated with this proposed action, the well density within four miles of the 6 leks is 2.8 wells/section. With approval of alternative C (60 proposed well locations) the well density increases to 3.5 wells/section.

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 (WGFD 2004). The PRB FEIS estimated 51,000 additional CBNG wells to be drilled over a ten year period beginning in 2003 (BFO 2003).

The Powder River Basin Oil and Gas Project FEIS (BLM 2003) concluded that “Activities associated with the proposed project would affect sage-grouse in several ways. These effects may include: (1) increased direct mortality (including legal hunting, poaching, and collision with power lines and vehicles); (2) the introduction of new perches for raptors and thus the potential change in rate of predation; (3) direct loss or degradation of habitats; (4) indirect disturbance resulting from human activity (including harassment, displacement, and noise); (5) habitat fragmentation (particularly through construction of roads); and (6) changes in population (pg. 4-257).” The FEIS goes on to state that “implementation of several mitigation measures would reduce the extent of each impact addressed by those measures. Despite these measures, the synergistic effect of several impacts would likely result in a downward trend for the sage-grouse population, and may contribute to the array of cumulative effects that may lead to its federal listing. Local populations may be extirpated in areas of concentrated development, but viability across the Project Area (Powder River Basin) or the entire range of the species is not likely to be compromised (pg. 4-270).”

The Powder River Basin Oil and Gas Project Record of Decision (BLM 2003) included a Mitigation Monitoring and Reporting Plan (MMRP). The uncertainties as to where and at what level development was to proceed as well as the uncertainties associated with the assumptions that were used to predict impacts suggests that one-time determination of impacts that is included in the EIS may not occur as projected. The MMRP helps to continually assess the effects of the project and the adequacy of the mitigation. Such a plan/process provides a mechanism to continuously modify management practices in order to allow development while continuing to protect the environment (E-1).” In other words, development pace and patterns may not occur as predicted, and so the BLM may use the adaptive management process provided for in the BFO RMP.

Impacts from CBNG development are likely to be significant and additive to the long-term impacts afflicting the sage-grouse population (WGFD 2004). Greater sage-grouse habitat is being directly lost with the addition of well sites, roads, pipelines, powerlines, reservoirs and other infrastructure in the Powder River Basin (WGFD 2005, WGFD 2004). Sage-grouse avoidance of CBNG infrastructure results in even greater indirect habitat loss. In southwestern Wyoming, yearling female greater sage-grouse avoid nesting in areas within 0.6 miles of producing well pads (Holloran et al. 2007), and in southern Alberta, brood-rearing females avoid areas within 0.6 miles of producing wells (Aldridge and Boyce 2007). Doherty et al. (2008) demonstrated that sage-grouse in the Powder River Basin avoided otherwise suitable wintering habitats once they have been developed for energy production, even after timing and lek buffer stipulations had been applied. The 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). As interpreted by coordinated effort with state fish and wildlife agencies from Montana, Colorado, Utah, South Dakota, North Dakota and Wyoming, (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008), research indicates that oil or gas development exceeding approximately 1 well pad per square mile with the associated infrastructure, results in calculable impacts on breeding populations, as measured by the number of male sage-grouse attending leks (Holloran 2005, Walker et al. 2007)

Noise can affect sage-grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003). In a study of greater sage-grouse population response to natural gas field development in

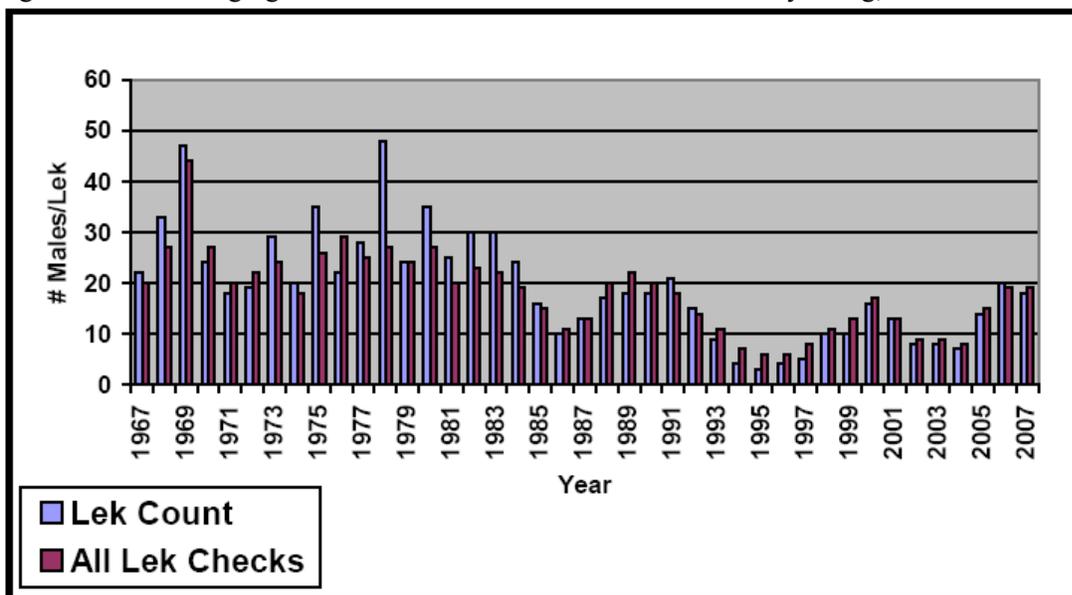
western Wyoming, Holloran (2005) concluded that increased noise intensity, associated with active drilling rigs within 5 km (3.1 miles) of leks, negatively influenced male lek attendance. In 2002, Braun et al. documented approximately 200 CBNG facilities within one mile of sage-grouse leks. Sage-grouse numbers were found to be consistently lower for these leks than for leks without this disturbance. Direct habitat losses from the facilities themselves, roads and traffic, and the associated noise were found to be the likely reason for this finding.

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. A sagebrush cover assessment within Wyoming basins estimated sagebrush coverage within the Powder River Basin to be 35% with an average patch size less than 300 acres (Rowland et al. 2005). The Powder River Basin patch size has decreased by more than 63% in the past forty years, from 820 acre patches and an overall coverage of 41% in 1964 (Rowland et al. 2005). The existing development within the cumulative impacts assessment area has further fragmented the sage-grouse habitat. Disturbance created by this project will contribute to additional fragmentation.

Another concern with CBNG development is that reservoirs created for water disposal provide habitat for mosquitoes associated with West Nile virus (WGFD 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). In northeastern Wyoming and southeastern Montana, West Nile virus-related mortality during the summer resulted in an average decline in annual female survival of 5% from 2003 to 2006 (Walker et al. 2007). Powder River Basin sage-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 sage-grouse population within northeast Wyoming is exhibiting a steady long term downward trend (Figure 4.1) (WGFD 2005). The figure illustrates a ten-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Long-term harvest trends are similar to that of lek attendance (WGFD 2005).

Figure 4.1. Male sage-grouse lek attendance within northeastern Wyoming, 1967-2007.



The BFO Resource 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) (BLM 2004). BLM Wyoming adopted the two-mile recommendation in 1990 (BLM 1990). The two-mile recommendation was based on early research which indicated between 59 and 87 percent of sage-grouse nests were located within two miles of a lek (BLM 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 breeding lek (BLM 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 only 36% of their grouse nesting within 3 km of the capture lek. 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. 2007). Habitat conditions and sage-grouse biology within the Buffalo Field Office are more similar to Moynahan's north-central Montana study area than the Upper Green River area.

A two-mile timing limitation, given the long-term population decline and that less than 50% of sage-grouse are expected to nest within the limitation area, is 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. The BLM and University of Montana are currently researching nest location and other sage-grouse questions and relationships between grouse and coalbed natural gas development. Thus far, this research suggests that impacts to leks from energy development are discernable out to a minimum of four miles, and that some leks within this radius have been extirpated as a direct result of energy development (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008). 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. In a typical landscape in the Powder River Basin, energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87% to 5% percent (Walker et al. 2007).

Walker et al, 2007 indicates the size of a no-development buffer sufficient to protect leks would depend on the amount of suitable habitat around the lek and the population impact deemed acceptable. Also, rather than limiting mitigation to only timing restrictions, research suggests more effective mitigation strategies include, at a minimum, burying power lines (Connelly et al. 2000 b); minimizing road and well pad construction, vehicle traffic, and industrial noise (Lyon and Anderson 2003, Holloran 2005); and managing produced water to prevent the spread of mosquitoes with the potential to vector West Nile Virus in sage grouse habitat (Walker et al 2007).

The multi-state recommendations presented to the WGFD for identification of core sage grouse areas acknowledges there may be times when development in important sage grouse breeding, summer, and winter habitats cannot be avoided. In those instances they recommend, "...infrastructure should be minimized and the area should be managed in a manner that effectively conserves sagebrush habitats (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008).

Guidelines recently developed by Connelly et al. (2000) to manage sage-grouse populations and their habitat indicate that the standard nesting stipulations are intended to avoid impacts on sage-grouse leks and nesting areas during exploration are not adequate to do so. Sage-grouse are extremely sensitive to human disturbance and habitat alteration and breeding populations have declined dramatically throughout much of their range (Connelly and Braun 1997) including south-central and southeastern Montana

(Eustace 2001). Montana Fish Wildlife and Parks (MFWP) has been monitoring certain sage-grouse leks in south-central Montana since the early 1980s. There has been an approximate 50 percent reduction in the number of these active leks since the monitoring began. Eustace attributes this decline to habitat loss and human disturbance and stated that he believes similar declines have occurred in other portions of Montana. Connelly et al. (2000) indicate energy-related facilities should be located at least two miles from sage-grouse leks. Connelly et al. further note sage-grouse populations display four types of migratory patterns: 1) distinct winter, breeding and summer areas; 2) distinct summer areas and integrated winter and breeding areas; 3) distinct winter areas and integrated breeding and summer areas; and 4) non-migratory populations. Furthermore, recent studies in eastern Idaho have found that sage-grouse wintering areas may vary considerably from year to year depending on snow accumulation (Kemner and Lowe 2002) (BLM – MCFO 2008).

Avoiding impacts to sage-grouse populations requires protecting the integrity of all seasonal ranges. Average distances between leks and nests vary from 0.7 to 3.9 miles (Autenreith 1981, Wakkinen et al. 1992, Fischer 1994, Hanf et al. 1994, Lyon 2000) and movements between seasonal ranges may exceed 45 miles (Dalke et al. 1963, Connelly et al. 1988). Furthermore, sage-grouse have high fidelity to all seasonal ranges (Keister and Willis 1986, Fischer et al. 1993). Females return to the same area to nest each year (Fischer et al. 1993) and may nest within 660 feet of their previous year's nest (Gates 1983). However, other studies by Lyon 2000, Fischer et al. 1993 and Berry and Eng 1985 found average distances of 683 meters (2,240 feet), 740 meters (2,427 feet) and 552 meters (1,811 feet), respectively. Therefore, while important, protecting a 1/4-mile (1,320 feet) radius area around leks as specified in the stipulations may be inadequate to avoid impacts on displaying and nesting birds. Furthermore, the nesting timing stipulation (March 1-June 15) does not provide sufficient protection of the breeding area or any wintering areas. This stipulation is not adequate to avoid all the impacts on sage-grouse from CBNG activities. Sage-grouse would be impacted by CBNG activities that occur within two miles of sage-grouse leks or within winter range (BLM – MCFO 2008).

Montana's Comprehensive Fish and Wildlife Conservation Strategy identifies the need to quantify impacts of energy development and determine ways to reduce, eliminate, or mitigate negative effects (MFWP, 2005). Recent and ongoing research has focused on these issues (BLM – MCFO 2008).

The objective in Montana is to manage CBNG development in crucial sage-grouse habitat requiring no displacement of sage-grouse within crucial habitat areas. This specifically calls for maintaining the connectivity of the habitats, managing habitat to maintain healthy sage-grouse populations to serve as source populations and within the crucial sage grouse areas, maintain sage-grouse habitat so that population trends follow the general magnitude of decline or increase on control leks (BLM – MCFO 2008).

In May 2008, Montana BLM captured sage-grouse from leks located in south central Montana along the Montana-Wyoming border and placed VHF radio collars on 18 mature sage-grouse hens. The collared hen's movements have been monitored to date. This data provides insight as to where the sage-grouse hens are nesting in relation to the lek sites. Five of the 18 hens chose sites in Wyoming to nest and rear broods. One of these five hens has been located within the Cabin Creek V project area. It can be assumed that the Cabin Creek V CBNG development will affect the sage-grouse population in Montana as nesting, early & late brood rearing as well as wintering habitat will be impacted displacing those sage-grouse with fraternal ties to the Cabin Creek V project area.

At a public meeting, the BLM Buffalo Field Office presented data identifying high quality sage-grouse habitat within the Powder River Basin in a proactive effort to conserve sage-grouse habitat. BLM Buffalo Field Office informed the public at this time that land management decisions concerning high quality sage-grouse habitat will be consider on a case by case basis. In relation to CBNG development, as it

continues to proceed across the Powder River Basin and within high quality sage-grouse habitat, typical 80 acre spacing and “business as usual” may not be feasible. The proponent will be asked to demonstrate that the proposal can be managed in a manner that effectively conserves sage-grouse habitats affected by the proposal. BLM continues to work with industry to include measurable conservation objective for use in project planning. Each proposal will be evaluated by BLM in ensure that BLM maintains habitat connectivity by addressing habitat loss, degradation and fragmentation.

#### **4.2.5.2.5. Sharp-tailed grouse Direct and Indirect Effects**

Effects to sharp-tailed grouse will be similar to sage-grouse.

The Fence Creek Road sharp-tailed grouse lek straddles the existing Fence Creek Oil Field Road. This road has been the access way for maintenance and production of the Fence Creek Oil Field wells. Traffic along the route prior to Pinnacle Gas Resources CBNG development has been minimal with an average daily traffic of 4 or less. Pinnacle Gas Resources plans to improve this road and utilize it as one of the main access ways into the northern portion of the Cabin Creek V POD as well as their non-federal development. During the construction phase of this POD, the traffic frequency will be as high as 10 or more and could persist for 3 or more years before full field development is complete.

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

Suitable mountain plover habitat is not present within the project area. The project should not impact mountain plovers.

#### **4.2.5.3. Sensitive Species Cumulative effects**

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

### **4.3. West Nile Virus Direct and Indirect Effects**

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

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

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

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

### **4.4. Water Resources**

The operator has submitted a comprehensive WMP for this project. It is incorporated-by-reference into this EA pursuant to 40 CFR 1502.21. The WMP incorporates sound water management practices, monitoring of downstream impacts within the Middle Powder River watershed and a commitment to

comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from proposed water management strategies.

The 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 Wyoming Oil and Gas Conservation Commission (WOGCC) authorizes the construction of off-channel impoundments under most circumstances.

The maximum water production is predicted to be 9.0 gpm per well or 530 gpm (1.2 cfs or 870 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 Middle Powder River drainage, the projected volume produced within the watershed area was 9689 acre-feet in 2008 (maximum production was predicted to occur in 2005 with 12,328 acre-feet). As such, the volume of water resulting from the production of these wells is 9% of the total volume projected for 2008. 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 37% to groundwater aquifers and coal zones in the Middle Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 200 gpm will infiltrate at or near the discharge points and impoundments (322 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, "...the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater." (PRB FEIS pg 4-54). However, there is potential for infiltration of produced water to influence the quality of the antecedent groundwater. The WDEQ requires that operators determine initial groundwater quality below impoundments to be used for CBNG produced water storage. If high quality water is detected (Class 3 or better) the operator is required to establish a groundwater monitoring program at those impoundments.

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 12 to 1300 feet compared to a range of 1050 to 1560 feet below ground surface for the targeted coal seams, the Canyon, Cook, Wall and Pawnee. 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.

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 was revised as the “Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments” which was approved in June, 2006. The Wyoming DEQ established an Impoundment Task Force which drafted an “Impoundment Monitoring Plan” to investigate the potential for existing impoundments to have impacted shallow groundwater. Drilling at selected existing impoundments began in the spring of 2006.

As of April of 2008, approximately 1774 impoundment sites have been investigated with more than 1988 borings. Of these impoundments, 259 met the criteria to require “compliance monitoring” if constructed and used for CBNG water containment. Only 109 impoundments requiring monitoring are presently being used. As of the first quarter of 2008, only 16 of those monitored impoundments caused a change in the “Class of Use” of the underlying aquifer water.

**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 4.6 Comparison of Regulated Water Quality Parameters to Predicted Water Quality**

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
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Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Most Restrictive Proposed Limit –		2	1000
Least Restrictive Proposed Limit		10	3200
Powder River at Moorhead, MT			
Historic Data Average at Maximum Flow		3.92	1421
Historic Data Average at Minimum Flow		4.62	2154
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 # WY0056537 (to impoundments)	NS**	NS**	7500
At discharge point			
WDEQ Water Quality Requirement for WYPDES Permit # WY0051934 (EMIT)	NS**	NS**	2000-2500
At discharge point			
Predicted Produced Water Quality Canyon, Cook, Wall, Pawnee	1820	45.2	2780

\*\* = Not stated in permit

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 1820.0 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the co-mingled Canyon, Cook, Wall and Pawnee 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 9.0 gallons per minute (gpm) is projected to be produced from these 60 wells, for a total of 540 gpm for the POD. See Table 4.6.

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

There are 4 proposed and one existing discharge points associated with 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, 4 impoundments (191 acre-feet of total storage) would potentially be constructed within the project area. These impoundments will disturb approximately 22.0 acres including the embankment structures. All of these impoundments would be off-channel. They would result in evaporation and infiltration of CBNG water. Criteria identified in “Off-Channel, Unlined CBNG Produced Water Pit Siting Guidelines for the Powder River Basin, Wyoming” (WDEQ, 2002) was used to locate these impoundments. Monitoring may be required based upon WYDEQ findings relative to “Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments” (June 14, 2004). All water management facilities were evaluated for compliance with best management practices during the onsite.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 0.2 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 accidental discharge. No outlet structures are planned for these impoundments. Sedimentation will not occur except from rill erosion of the inside embankments during major precipitation events. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific; case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2005 at a total contribution to the mainstem of the Middle Powder River of 86 cfs (PRB FEIS pg 4-99). The predicted maximum discharge rate from these 60 wells is anticipated to be a total of 540 gpm or 1.2 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment the produced water re-surfacing in Cabin Creek from this action (0.2 cfs) may add a maximum 0.16 cfs to the Middle Powder River flows, or 0.2% of the predicted total CBNG produced water contribution. This incremental volume is statistically below the measurement capabilities for flows in the Powder River without the use of specialized sensing equipment (refer to Statistical Methods in Water Resources U.S. Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

The operator did not provide an analysis of the potential development in the watershed above the project area in this WMP. However, based on the fact that this POD lies near the headwaters of Cabin and Big Remington creeks, limited potential for additional wells on 80 acre spacing exists. Based on the Cabin Creek total watershed area of 25 square miles and an assumed density of one well per location every 80 acres, the potential exists for the development of 200 wells which could produce a maximum flow rate of 1800 gpm (4 cfs) of water. The BLM agrees with the operator that this is not expected to occur because:

1. Some of these wells have already been drilled and are producing.
2. New wells will be phased in over several years, and
3. A decline in well discharge generally occurs after several months of operation.

The potential maximum flow rate of produced water within the watershed upstream of the project area, 4 cfs, is much less than the volume of runoff estimated from the 2-year storm event for Cabin Creek.

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

The operator has obtained a Wyoming Pollutant Discharge Elimination System (WYPDES) permit for the discharge of water through the EMIT facility and a permit to discharge into the off-channel impoundments.

WY0051934 Discharge from EMIT to Powder River	Daily Max	Monthly Avg
Outfall 012	at the outfall	at the outfall
-----		
Chlorides, mg/l	150	
Dissolved Iron, µg/l	250	
Dissolved Manganese, µg/l	630	
Dissolved Copper, µg/l	14.6	
Dissolved Lead, µg/l	7.7	
pH, standard units	6.5 - 9.0	
Dissolved Sodium, mg/l, March-October	270	
Dissolved Sodium, mg/l, November-February	350	
Specific Conductance, µS/cm, March thru Oct	2500	2000
Specific Conductance, µS/cm, Nov thru Feb	2500	2500
Sulfates, mg/l	3000	
Total Recoverable Arsenic, µg/l	8.4	
Total Recoverable Barium, µg/l	1800	
Total Recoverable Radium 226, pCi/l	1	
Total Flow, MGD, outfalls 012 & 013 (SUM 4)	4.2	

WY0056537 Discharge to Off-Channel Impoundments	Daily Max
Outfalls 001, 005, and 010	
-----	at the outfall
Chlorides, mg/l	2000
Dissolved Iron, µg/l	1000
pH, standard units	6.5 - 9.0
Specific Conductance µS/cm	7500

and

WY0056537 Discharge to Off-Channel Impoundments	Daily Max
Outfall 008	
-----	at the outfall
Chlorides, mg/l	2000
Specific Conductance µS/cm	7500
pH, standard units	6.5 - 9.0

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 boundary. The reference well will be sampled at the wellhead for analysis within sixty days of initial production. A copy of the water analysis will be submitted to the BLM Authorized Officer.

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

The development of coal bed natural gas and the production and discharge of water in the area surrounding the existing natural springs may affect the flow rate or water quality of the spring.

In-channel downstream impacts are addressed in the WMP for the “Cabin Creek Phase V Federal Plan of Development” POD prepared for Pinnacle Gas Resources by Western Land Services.

**4.4.2.1. Surface Water Cumulative Effects**

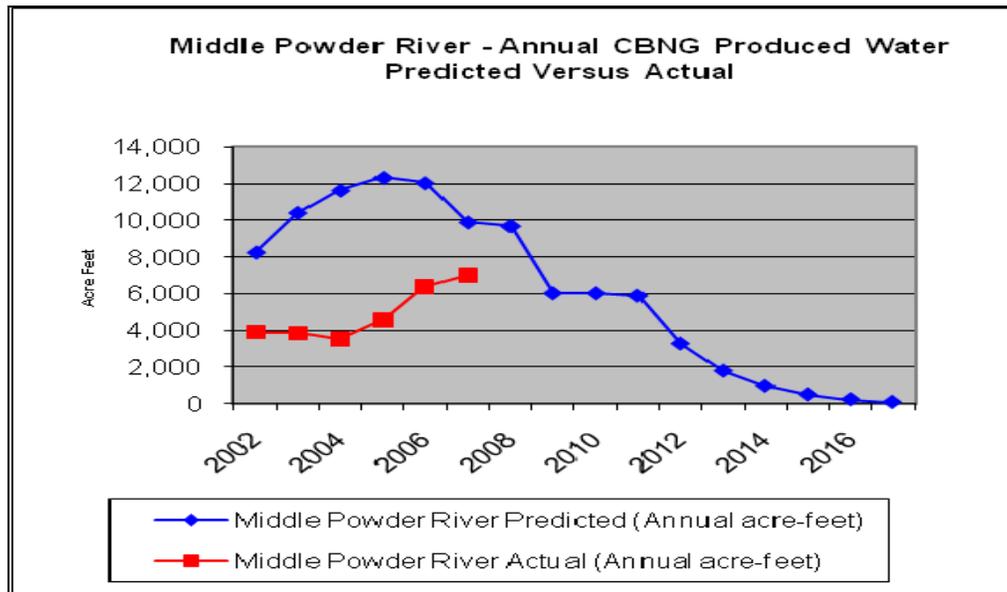
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Middle Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2007, all producing CBNG wells in the Middle Powder River watershed have discharged a cumulative volume of 29,312 acre-ft of water compared to the predicted 64,587 acre-ft disclosed in the PRB FEIS (Table 2-8 pages 2-26). These figures are presented graphically in Figure 4.2 and Table 4.7 following. This volume is 45% of the total predicted produced water analyzed in the PRB FEIS for the Middle Powder River watershed.

**Table 4.7 Actual vs. predicted water production in the Middle Powder River watershed 2007 Data Update 3-08-08**

Year	Middle Powder River Predicted (Annual acre-feet)	Middle Powder River Predicted (Cumulative acre-feet from 2002)	Middle Powder River Actual (Annual acre-feet)		Middle Powder River Actual (Cumulative acre-feet from 2002)	
			Actual Ac-ft	% of Predicted	Cum Ac-ft	% of Predicted
2002	8,257	8,257	3,929	47.6	3,929	47.6
2003	10,421	18,678	3,860	37.0	7,789	41.7
2004	11,640	30,318	3,547	30.5	11,336	37.4
2005	12,328	42,646	4,588	37.2	15,924	37.3
2006	12,044	54,690	6,368	52.9	22,292	40.8
2007	9,897	64,587	7,020	70.9	29,312	45.4
2008	9,689	74,276				
2009	6,030	80,306				
2010	6,030	86,336				
2011	5,899	92,235				
2012	3,276	95,511				
2013	1,797	97,308				
2014	964	98,272				
2015	495	98,767				
2016	231	98,998				
2017	82	99,080				
<b>Total</b>	<b>99,080</b>		<b>29,312</b>			

**Figure 4.2 Actual vs. predicted water production in the Middle 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 that “Cumulative effects to the suitability for irrigation of the Powder River would be minimized through the interim MOC (Memorandum of Cooperation) that the two DEQs (Wyoming and Montana 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 instream monitoring and adaptive management, water quality standards and interstate agreements can be met.” (PRB FEIS page 4-117) However, this MOC expired and has not been renewed. The EPA has approved the Montana Surface Water Standards for EC and SAR. Therefore the Wyoming DEQ is responsible for ensuring that the Montana standards are met at the state line under the Clean Water Act (CWA). Litigation between Wyoming and Montana which was entered into after issuing the PRB FEIS ROD will now determine the water quality and quantity parameters which will be applied to CBNG produced water disposal into waters flowing from Wyoming into Montana.

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 Middle Powder River drainage and the total amount that was predicted in the PRB FEIS, which is only approximately 45% of that total (see section 4.4.2.1).
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 Middle Powder River watershed and page 4 – 117 for cumulative effects common to all sub-watersheds.

**4.5. Cultural Resources**

48SH1620, and 48SH1641, will be impacted by the project as proposed, however both are considered not eligible to the NRHP. No historic properties will be impacted by the project as proposed within the culturally inventoried areas. The un-inventoried areas will not be authorized for project activities, until a cultural inventory can be conducted. On 9/30/08, the Bureau will electronically notify the Wyoming State Historic Preservation Office (SHPO), following section VI(A)(1) of the Wyoming State Protocol, of a finding of no effect to historic properties for the proposed project.

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).

**4.6. Air Quality**

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including non-CBM well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil & gas development would not violate any local, state, tribal or federal air quality standards.

**5. CONSULTATION/COORDINATION**

Contact	Title	Organization	Present at Onsite
Mary Hopkins	WY SHPO	Wyoming State Historic Preservation Office	NO
Brad Rogers	Wildlife Biologist	U.S. Fish & Wildlife Service	NO
Scott Straessler	Project Manager	Pinnacle Gas Resources, Inc.	YES
Jim Aksamit	Senior Project Manager	Western Land Services	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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