DECISION RECORD
Summit Gas Resources, Inc., Cabin Creek VIII Plan of Development (POD)
Environmental Assessment (EA), WY-070-13-17
Bureau of Land Management, Buffalo Field Office, Wyoming

DECISION. The BLM approves Summit Gas Resources, Inc. (SGR) 25 CBNG well applications for permit to drill (APDs) described in Alternative B of the environmental assessment (EA), WY-070-13-17. This approval includes the wells' support facilities.

Compliance. This decision complies with or supports:

- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701); DOI Order 3310.
- Mineral Leasing Act of 1920 (MLA) (30 U.S.C. 181); including the Onshore Oil and Gas Orders.
- National Environmental Policy Act of 1969 (NEPA) (42 USC 4321).
- National Historic Preservation Act of 1966 (NHPA) (16 USC 470).
- Buffalo and Powder River Basin Final Environmental Impact Statements (FEISs), 1985, 2003, 2011.
- Buffalo Resource Management Plan (RMP) 1985 and Amendments.

BLM summarizes the details of the approval of Alternative B, below. The EA includes the project description, including specific changes made at the onsites, and site-specific mitigation measures.

Table 1: Well Site. BLM approves the following APDs and support facilities:

#	Well Name & #	Twp	Rng	Sec	Qtr	Lease #
1	CB FED 07-07-57-77	57N	77W	7	SWNE	WYW144218
2	CB FED 03-08-57-77	57N	77W	8	NENW	WYW149973
3	CB FED 11-08-57-77	57N	77W	8	NESW	WYW149973
4	CB FED 13-08-57-77	57N	77W	8	SWSW	WYW144218
5	CB FED 01-15-57-77	57N	77W	15	NENE	WYW149974
6	CB FED 07-15-57-77	57N	77W	15	SWNE	WYW149974
7	CB FED 11-15-57-77	57N	77W	15	NESW	WYW149974
8	CB FED 01-18-57-77	57N	77W	18	NENE	WYW149973
9	CB FED 03-18-57-77	57N	77W	18	NENW	WYW149973
10	CB FED 07-18-57-77	57N	77W	18	SWNE	WYW149973
11	CB FED 15-18-57-77	57N	77W	18	SWSE	WYW144220
12	CB FED 11-19-57-77	57N	77W	19	NESW	WYW144220
13	CB FED 03-20-57-77	57N	77W	20	NENW	WYW144220
14	CB FED 05-20-57-77	57N	77W	20	SWNW	WYW144220
15	CB FED 11-20-57-77	57N	77W	20	NESW	WYW144220
16	CB FED 13-20-57-77	57N	77W	20	SWSW	WYW144220
17	CB FED 15-20-57-77	57N	77W	20	SWSE	WYW144220
18	CB FED 10-21-57-77	57N	77W	21	NWSE	WYW144220
19	CB FED 05-19-57-77	57N	77W	19	SWNW	WYW147369
20	CB FED 01-22-57-77	57N	77W	22	NENE	WYW149974
21	CB FED 09-22-57-77	57N	77W	22	NESE	WYW149974
22	CB FED 05-27-57-77	57N	77W	27	SWNW	WYW147369
23	CB FED 10-27-57-77	57N	77W	27	NWSE	WYW147370
24	CB FED 05-35-57-77	57N	77W	35	SWNW	WYW147370
25	CB FED 11-35-57-77	57N	77W	35	NESW	WYW147370

Left column administrative numbering is consistent in the EA, COAs, and DR.

Limitations. There are no denials or deferrals. Also see the conditions of approval (COAs).
THE FINDING OF NO SIGNIFICANT IMPACT (FONSI). Analysis of Alternative B of the EA, WY-070-13-17, and the FONSI (incorporated here by reference) found SGR's proposal for Cabin Creek VIII POD will have no significant impacts on the human environment, beyond those described in the PRB FEIS. There is no requirement for an EIS. This project tiers to the following EA's listed below in Table 2:

Overlapping and adjacent NEPA analyses within 4 miles, which BLM incorporates here by reference as similar drilling analyses or as similar analyses in the semi-arid sage-brush, short grass prairie.

#	POD / Well Name	NEPA Analysis #	# / Type Wells	Approved Mo/Yr/Update
1	Cabin Creek Phase 1	WY-070-07-057	20/CBNG	4/6/2007
2	Cabin Creek East Phase 2	WY-070-07-162	68/CBNG	10/24/2007
3	Cabin Creek Phase 3	WY-070-07-089	70/CBNG	8/23/2007
4	Cabin Creek Phase 5	WY-070-08-176	50/CBNG	9/22/2008
5	Cabin Creek Phase 6	WY-070-10-094	66/CBNG	3/11/2010
6	Cabin Creek Phase 7	WY-070-12-183	74/CBNG	8/8/2012
7	River 2 POD	WY-070-11-288	24/CBNG	8/31/2011

COMMENT OR NEW INFORMATION SUMMARY. BLM publically posted the APDs for 30 days except for APDs CB Fed #s 15-08-55-77 and 05-18-57-77, received no comments, and then internally scoped them. BLM incorporated all new or clarified BLM NEPA-relevant policies in the processing of the Cabin Creek VIII EA.

DECISION RATIONALE. BLM bases the decision authorizing the selected project on:
1. The proposed wells will cumulatively contribute to the potential for local Greater Sage-Grouse (GSG) extirpation, yet this impact is acceptable because it occurs outside preliminary priority habitats (core, focus and connectivity), is within the parameters of the PRB FEIS/ROD, and is consistent with the coordinated BLM and State of Wyoming GSG conservation strategies (BLM WY-2012-19 and WY Executive Order 2011-5, respectively.
2. BLM and SGR included mitigation measures to reduce environmental impacts while meeting the BLM's need. For a complete description of all site-specific COAs, see the COAs in Appendix A.
3. SGR will conduct operations to minimize adverse effects to surface and subsurface resources, prevent unnecessary surface disturbance, and conform to currently available technology and practice.
4. The selected alternative will help meet the nation's energy needs, and help stimulate local economies by maintaining workforce stability.
5. The operator committed to:
   - Comply with the approved APD, applicable laws, regulations, orders, and notices to lessees.
   - Obtain necessary permits from agencies.
   - Offer water well agreements to the owners of record for permitted wells.
   - Incorporate measures to alleviate resource impacts into their submitted surface use and drilling plans.
6. The operator certified it has a surface access agreement.
7. The project is clearly lacking in wilderness characteristics due to being amidst mineral development.
8. These APDs are pursuant to the Mineral Leasing Act for developing oil or gas and do not satisfy the categorical exclusion directive of the Energy Policy Act of 2005, Section 390 because of older NEPA is uncurrent with the scientific analysis and management for greater sage-grouse.

ADMINISTRATIVE REVIEW AND APPEAL. This decision is subject to administrative review according to 43 CFR 3165. 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. Parties 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: /s/ Duane W. Spencer Date: 8/5/14

FINDING OF NO SIGNIFICANT IMPACT
Summit Gas Resources, Inc., Cabin Creek VIII Plan of Development (POD)
Environmental Assessment (EA), WY-070-13-17
Bureau of Land Management, Buffalo Field Office, Wyoming

FINDING OF NO SIGNIFICANT IMPACT (FONSI). Based on the information in the EA, WY-070-EA13-17, which BLM incorporates here by reference; I find that: (1) the implementation of Alternative B will not have significant environmental impacts beyond those addressed in the Buffalo Final Environmental Impact Statement (FEIS) 1985, and the Powder River Basin (PRB) FEIS, 2003, 2011; (2) Alternative B conforms to the Buffalo Field Office (BFO) Resource Management Plan (RMP) (1985, 2001, 2003, 2011); and (3) Alternative B does not constitute a major federal action having a significant effect on the human environment. Thus an EIS is not required. I base this finding on consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), with regard to the context and to the intensity of the impacts described in the EA, and Interior Department Order 3310.

CONTEXT. Mineral development is a common PRB land use, sourcing over 42% of the nation's coal. The PRB FEIS foreseeable development analyzed the development of 54,200 wells. The additional development analyzed in Alternative B is insignificant in the national, regional, and local context.

INTENSITY. The implementation of Alternative B will result in beneficial effects in the forms of energy and revenue production however; there will also be adverse effects to the environment. Design features and mitigation measures included in Alternative B will minimize adverse environmental effects. The preferred alternative does not pose a significant risk to public health and safety. The geographic area of project does not contain unique characteristics identified in the 1985 RMP, PRB FEIS, or other legislative or regulatory processes. BLM used relevant scientific literature and professional expertise in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects have minor controversy, are not highly uncertain, or do not involve unique or unknown risks. The PRB FEIS predicted and analyzed oil development of the nature proposed with this project and similar projects. The selected alternative does not establish a precedent for future actions with significant effects. The proposal may relate to the PRB greater sage-grouse and its habitat decline having cumulative significant impacts; yet the small size of this project is within the parameters of the impacts in the PRB FEIS. There are no cultural or historical resources present that will be adversely affected by the selected alternative. The project area is clearly lacking in wilderness characteristics as it is amidst mineral development. No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected. The selected alternative will not have any anticipated effects that would threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment.

ADMINISTRATIVE REVIEW AND APPEAL. This finding is subject to administrative review according to 43 CFR 3165. Request for administrative review of this finding 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 FONSI is received or considered to have been received. Parties adversely affected by the State Director's finding may appeal that finding to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager: /s/ Duane W. Spencer Date: 8/5/14

Environmental Assessment (EA), WY-070-13-17
Cabin Creek VIII (27) Applications for Permit to Drill (APDs)
Summit Gas Resources, Inc., Cabin Creek VIII Plan of Development (POD)
Bureau of Land Management, Buffalo Field Office, Wyoming

1. INTRODUCTION

Summit Gas Resources, Inc. (SGR) requests BLM's approval for 25 applications for permit to drill (APDs). BLM incorporates the APDs here by reference; see the administrative record (AR). SGR proposes to drill coalbed natural gas (CBNG) wells as 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. All of the proposed wells are on split estate with the exception of 3 wells which are on federal BLM surface. Please refer to Table 1.1. below for detailed jurisdiction. This proposal clearly lacks wilderness characteristics and is amidst existing fee development. SGR proposes an initial disturbance including pad disturbance, cuts, fills, spoil piles, top soil piles, access roads, and buried utilities, of approximately 71.03 acres; disturbance summary in Table 2.3a. Please refer to the AR for further detail in regards to how and why the Cabin Creek VIII wells are replacing the said Cabin Creek V expired APD's and will be using the previously approved locations and infrastructure. Table 1.1. below illustrates what wells are being replaced.

Table 1.1. Proposed Wells

#	Well Name & #	Twp	Rng	Sec	Qtr	Lease #
1	CB FED 07-07-57-77	57N	77W	7	SWNE	WYW144218
2	CB FED 03-08-57-77	57N	77W	8	NENW	WYW149973
3	CB FED 11-08-57-77	57N	77W	8	NESW	WYW149973
4	CB FED 13-08-57-77	57N	77W	8	SWSW	WYW144218
5	CB FED 01-15-57-77	57N	77W	15	NENE	WYW149974
6	CB FED 07-15-57-77	57N	77W	15	SWNE	WYW149974
7	CB FED 11-15-57-77	57N	77W	15	NESW	WYW149974
8	CB FED 15-08-57-77	57N	77W	8	SWSE	WYW144226
9	CB FED 01-18-57-77	57N	77W	18	NENE	WYW149973
10	CB FED 03-18-57-77	57N	77W	18	NENW	WYW149973
11	CB FED 07-18-57-77	57N	77W	18	SWNE	WYW149973
12	CB FED 15-18-57-77	57N	77W	18	SWSE	WYW144220
13	CB FED 11-19-57-77	57N	77W	19	NESW	WYW144220
14	CB FED 03-20-57-77	57N	77W	20	NENW	WYW144220
15	CB FED 05-20-57-77	57N	77W	20	SWNW	WYW144220
16	CB FED 05-18-57-77	57N	77W	18	SWNW	WYW144226
17	CB FED 11-20-57-77	57N	77W	20	NESW	WYW144220
18	CB FED 13-20-57-77	57N	77W	20	SWSW	WYW144220
19	CB FED 15-20-57-77	57N	77W	20	SWSE	WYW144220
20	CB FED 10-21-57-77	57N	77W	21	NWSE	WYW144220
21	CB FED 05-19-57-77	57N	77W	19	SWNW	WYW147369
22	CB FED 01-22-57-77	57N	77W	22	NENE	WYW149974
23	CB FED 09-22-57-77	57N	77W	22	NESE	WYW149974
24	CB FED 05-27-57-77	57N	77W	27	SWNW	WYW147369
25	CB FED 10-27-57-77	57N	77W	27	NWSE	WYW147370
26	CB FED 05-35-57-77	57N	77W	35	SWNW	WYW147370
27	CB FED 11-35-57-77	57N	77W	35	NESW	WYW147370

Left column administrative numbering is consistent in the EA, COAs, and DR.

1.1. Background

BLM received the APDs and associated project components on May 23, 2014. The onsite inspection was held on June 9-10 and 24, 2014. BLM sent SGR the post onsite deficiency letter on July 1, 2014; SGR received and signed for the post onsite deficiency letter on July 4, 2014. Revisions were received from SGR on July 23-24, 2014. BLM shared the COAs with the operator in August 2014.

1.2. Need for the Proposed Project

The BLM's need for this project is to meet the management objectives of the Buffalo Resource Management Plan (RMP), 1985, 2001, 2003, and 2011 (to which this EA tiers). BLM must determine how and under what conditions to balance natural resource conservation with allowing SGR to exercise lease rights to develop fluid minerals, as described in their APDs associated plans. Conditional fluid mineral development supports the RMP, the Mineral Leasing Act of 1920, the Federal Land Policy Management Act (FLPMA), and other laws and regulations.

1.3. Decision to be Made

The BLM will decide whether or not to approve the proposed development, and if so, under what terms and conditions agreeing with the Bureau's multiple use mandate, environmental protection, and RMP.

1.4. Scoping and Issues

BLM posted the proposed APDs for 30 days, awaits the tolling of the public comment period for APDs CB FED #s 15-08-57-77 and 05-18-55-77, will timely publish the EA, any finding, and decision on the BFO website. This project is similar in scope to other fluid mineral development the BFO analyzed. External scoping is unlikely to identify new issues, as verified with recent fluid mineral EAs that BLM externally scoped. External scoping of the horizontal drilling in Crazy Cat East EA, WY-070-EA13-028, 2013, in the PRB area received 3 comments, revealing no new issues. The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposal, its location, and a resource (issue) list (see, AR), to identify potentially significantly affected resources, land uses, resource issues, regulations, and site-specific circumstances not addressed in the analyses incorporated by reference. This EA will not discuss resources and land uses that are not present, unlikely to receive significant or material affects, or that the PRB FEIS or other analyses adequately addressed. The extensive development in the area was material to this scoping; see Section 3, below.

2. PROPOSED PROJECT AND ALTERNATIVES

2.1. Alternative A – No Action

The no action alternative would deny these APDs requiring the operator to resubmit APDs that comply with statutes and the reasonable measures in the PRB RMP Record of Decision (ROD) in order to lawfully exercise conditional lease rights. The PRB FEIS considered a no action alternative, pp. 2-54 to 2-62. The BLM keeps the no action alternative current using the aggregated effects analysis approach – incorporating by reference the analyses and developments approved by the subsequent NEPA analyses for overlapping and intermingled developments to the proposal area. See, Table 3.1.

2.2. Alternative B Proposed Action (Proposal)

Overview: SGR requests BLM's approval for 27 APDs and supporting infrastructure; see Table 1.1. 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.
County: Sheridan
Applicant: Summit Gas Resources, Inc.
Surface Owners: Maestri, Yuhas/Black c/o Virgil Kinnaird, , Claiborne K. Rowley and Gayla J. Rowley, Russ Green, and BLM.

Project Description: The proposed action involves the following:

- Drilling of 27 total federal CBNG wells in Canyon, Cook, Wall, and Pawnee coal zones to depths of approximately 758 feet for the Canyon seam, 960 feet for the Cook seam, 1100 feet for the Wall seam and 1241 feet for the Pawnee seam. Multiple seams will be produced by co-mingling production (a single well per location cable of producing from multiple coal seams).
- Drilling and construction activities are anticipated to be completed within 2 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: The Cabin Creek VIII POD will use direct discharge to the Middle Powder River and its tributaries to manage the produced water. Summit will use 7 previously approved outfall structures to discharge water directly to the Middle Powder River. Additionally, Summit will use 5 previously approved off channel pits to impound produced water.
- An unimproved and improved roads. Improved roads were built for the existing fee development.
- The existing above ground power line network will be used. The proposed route has not been reviewed by the contractor.
- SGR will construct the remainder of any proposed above ground power line network. 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 with each diesel generator. Generators are projected to operate 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.

Table 2.1. Anticipated Drilling and Completion Sequence and Timing (per well)

Drilling and Completion Step	Approximate Duration
Build Location (roads, pad, and other initial infrastructure)	14 days
Mob Rig	1-2 days [1]
Drilling (24/7)	2-4 days [2]
Completion (setup, completion, demobilization)	2-4 days

Table 2.2a. Disturbance Summary Cabin Creek VIII POD (Disturbance in acres)

Item	#	Length	Width (Ft)	Disturbance
Proposed Engineered Roads-Within Corridor (Initial Construction):		**3,101 Ft 0.58 Miles**	**50**	**3.6**
Proposed Engineered Roads-Within Corridor (Reclaimed):		**3,101 Ft 0.58 Miles**	**14**	**1.00**
Proposed Template B Roads- Within Corridor (Initial Construction):		**11,152 Ft 2.1 Miles**	**50**	**12.8**
Proposed Template B Roads-Within Corridor (Reclaimed):		**11,152 Ft 2.1 Miles**	**14**	**3.6**
Proposed Primitive w/Utilities Corridor: (Initial Construction):		**21,376 Ft 4.04 Miles**	**50**	**24.53**

Item	#	Length	Width (Ft)	Disturbance
Proposed Primitive w/Utilities Corridor (Reclaimed):		**21,376 Ft 4.04 Miles**	**12**	**6.00**
Number of Wells with Constructed Pad Locations: (Initial Construction):	**3**	**250 Ft**	**250**	**4.3**
Number of Wells with Constructed Pad Locations: (Reclaimed):	**3**	**100 Ft**	**120**	**0.83**
Number of Wells with Slot Locations: (Initial Construction):	**8**	**208 Ft**	**208**	**8.0**
Number of Wells with Slot Locations: (Reclaimed):	**8**	**50 Ft**	**50**	**0.5**
Number of Wells Location: (Initial Construction):	**16**	**208 Ft**	**208**	**16**
Number of Wells Location: (Reclaimed):	**16**	**50 Ft**	**50**	**0.91**
Proposed/Estimated Third Party Power Drops	**0**	**0**	**0**	**0**
Number of Proposed Compressors:	**0**	**NA**	**NA**	
Number of Proposed Impoundments (Initial Construction)	**Off Channel**	**723 Ft**	**723**	**0.00**
Number of Proposed Impoundments (Reclaimed):	**Off Channel**	**467 Ft**	**467**	**0.00**
Existing Template Roads- (No Disturbance Required):	**88,791 Ft 16.81 Miles**	**14**	**28.5**	**Existing**
Existing Primitive Roads / Utilities Corridor: (Initial Construction):	**1,560 Ft 0.30 Miles**	**50**	**1.8**	**Existing**
Existing Primitive Roads / Utilities Corridor: (Reclaimed):	**1,560 Ft 0.30 Miles**	**12**	**0.43**	**Existing**
Disturbance Summary Below:				
Total Disturbed Acreage for Initial Construction:				71.03
Total Disturbed Acreage after Reclamation:				13.27

Plan of Operations.
The proposal conforms to all Bureau standards and incorporates appropriate best management practices, required and designed mitigation measures determined to reduce the effects on the environment. BLM reviewed and approved a surface use plan of operations describing all proposed surface-disturbing activities pursuant to Section 17 of the Mineral Leasing Act, as amended. This analysis also incorporates and analyzes the implementation of committed mitigation measures in the SUP, drilling plan, and the standard conditions of approval (COAs) found in the PRB FEIS ROD, Appendix A.

2.3. Conformance to the Land Use Plan and Other Environmental Assessments

This proposal does not diverge from the goals and objectives in the Buffalo Resource Management Plan (RMP), 1985, 2001, 2003, 2011, and generally conforms to the terms and conditions of that land use plan, its amendments, supporting FEISs, 1985, 2003 (2011), and laws including the Clean Air Act, 42 USC 7401-7671q (2006), the Clean Water Act, 33 USC 1251 et seq. (1972), etc.

3. AFFECTED ENVIRONMENT

This section briefly describes the physical and regulatory environment that may be significantly affected by the alternatives in Section 2, or where changes in circumstances or regulations occurred since the approval of analyses to which this EA incorporates by reference; see Table 3.1. The PRB FEIS considered a no action alternative (pp. 2-54 to 2-62) in evaluating a development of up to 54,200 fluid mineral wells. BLM determined a minimum of 115 townships from the northern borders of Sheridan and Campbell Counties to the southern border of Campbell County are a developed field for fluid minerals because of

the existing federal developments. These APD proposals are in the developed field. The State of Wyoming and BLM also approved approximately 372 + wells within 5 miles of the project area that operators may develop in the near future. In addition, other operators are likely to continue seeking permits to develop unconnected leases in or in the affects analysis areas near the project area; decisions to approve or deny future proposals will occur following APD submittal. Development occurring on non-federal surface and non-federal mineral estate would continue.

Table 3.1. Overlapping and adjacent NEPA Analyses within 4 miles, which BLM Incorporates Here by Reference either as similar drilling analyses or as substantially similar analyses in the semi-arid sage-brush, short grass prairie

#	POD / Well Name	NEPA Analysis #	# / Type Wells	Approved Mo/Yr/Update
1	Cabin Creek Phase 1	WY-070-07-057	20/CBNG	4/6/2007
2	Cabin Creek East Phase 2	WY-070-07-162	68/CBNG	10/24/2007
3	Cabin Creek Phase 3	WY-070-07-089	70/CBNG	8/23/2007
4	Cabin Creek Phase 5	WY-070-08-176	50/CBNG	9/22/2008
5	Cabin Creek Phase 6	WY-070-10-094	66/CBNG	3/11/2010
6	Cabin Creek Phase 7	WY-070-12-183	74/CBNG	8/8/2012
7	River 2 POD	WY-070-11-288	24/CBNG	8/31/2011

3.1. Air Quality

BLM incorporates by reference the air quality affected environment section from the nearby and upwind Cabin Creek V EA, WY-070-08-176, Section 3.7, pp.51, along with that from the Bison 1, 2, 3 PODs EA, WY-070-EA14-339, Section 3.1 for a further update on the regulatory and environmental effects.

3.2. Soils, Ecological Sites, and Vegetation

BLM incorporates by reference the soils and vegetation sections in the Cabin Creek V EA, WY-070-08-176, pp. 30-32, and Section 3.2. Soils, ecological sites, and vegetation found in the areas of this Cabin Creek V POD are similar to those occurring in Cabin Creek VIII POD area.

Table 3.2. Dominant Ecological Sites within the POD

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

NOTE: area of analysis includes access (proposed, new disturbance) to well location

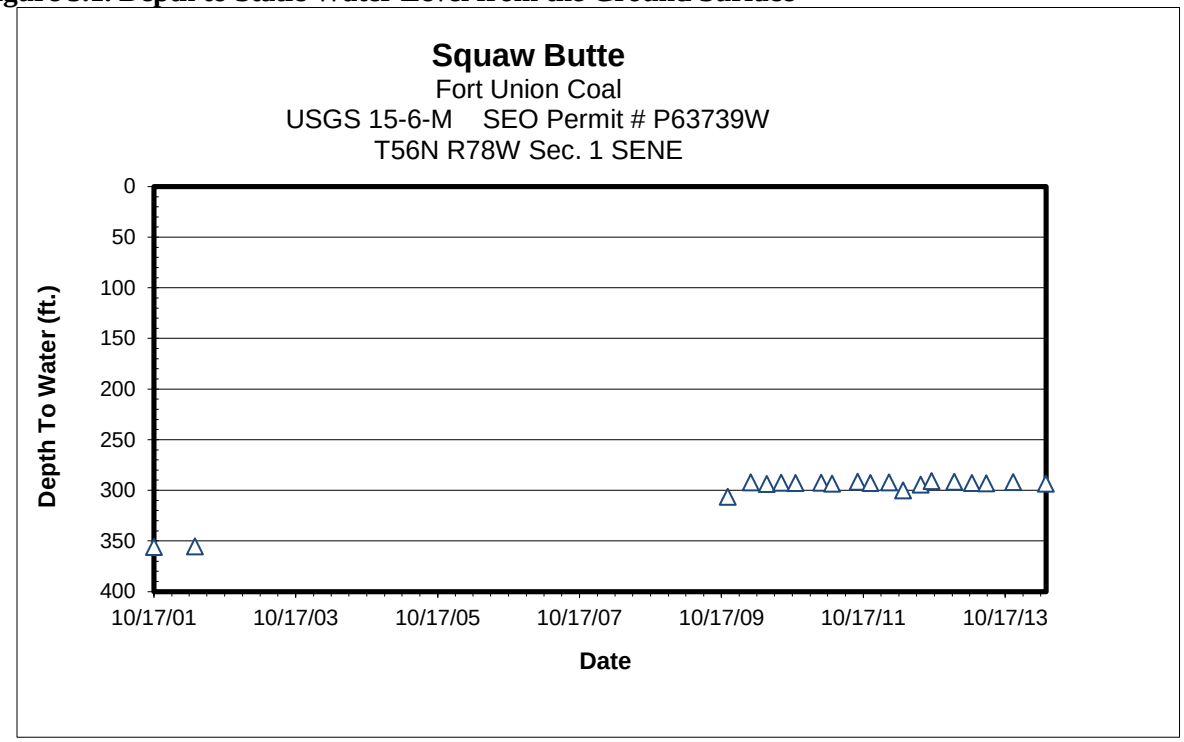
3.3. Water Resources

The Cabin Creek VIII POD is in the Cabin Creek drainage - a tributary of Clear Creek which in turn flows into the Middle Powder River. Ephemeral drainages, which flow into Cabin Creek, dissect the area. The ephemeral drainages have gentle slope with well vegetated bottoms with numerous small head-cut features. WY Department of Environmental Quality (WDEQ) regulates the State's water quality with oversight from the U.S. Environmental Protection Agency. The WY State Engineer's Office (WSEO) has authority for regulating water rights issues and permitting impoundments for the containment of the State's surface waters. The WY Oil and Gas Conservation Commission (WYOGCC) has authority for permitting and bonding off channel pits located over state and fee minerals.

3.3.1 Groundwater

The historical use for groundwater in this project area was for stock water or domestic water. A search of the 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, refer to the PRB FEIS, pp. 3-1 to 3-36. WDEQ water quality parameters for groundwater classifications (Chapter 8 – Quality Standards for Wyoming Groundwater) define the following general limits for total dissolved solids (TDS): 500 mg/l TDS for drinking water (Class I), 2000 mg/l for agricultural use (Class II) and 5000 mg/l for livestock use (Class III). For additional water quality limits for groundwater, please refer to the WDEQ web site. The production of CBNG requires the removal of some degree of the water saturation in the coal zones to temporarily reduce the hydraulic head in the coal. BFO has monitored coal zone pressures and water levels since the early 1990s in the PRB.

Figure 3.1. Depth to Static Water Level from the Ground Surface



The Cabin Creek VIII POD is surrounded by many approved federal, fee, and state CBNG projects. The Squaw Butte groundwater monitoring well, at T56N R78W Section 1, is within 2.5 miles of the Cabin Creek VIII POD and is a part of the BLM deep groundwater monitoring program. The initial water level of the Fort Union seam, measured in October of 2001, which is indicative of the pressure in the target coal zone, was recorded at 355 feet below ground level. The most recent measurement, from May, 2014, recorded the water level at 293 feet below ground level, for a rise of 62 feet since the well was completed.

This level of change is within the potential predicted in the PRB FEIS; determined through the regional groundwater model for that document. Refer to the PRB FEIS, Chapter 4, Groundwater, for further information and to the WY State Geological Survey's Open File Report 2009-10 titled, "1993-2006 CBNG Regional Groundwater Monitoring Report: Powder River Basin, Wyoming," which is available at: http://www.wsgs.uwyo.edu.

3.3.2 Surface Water

Most of the area drainages are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS, Glossary). The channels are primarily well vegetated grassy swales, without defined bed and bank. The PRB FEIS presents the historic mean electrical conductivity (EC, in µmhos/cm) and sodium adsorption ratio (SAR) by watershed at selected USGS Gauging Stations in Table 3-11 (PRB FEIS, p. 3-49). These water quality parameters "illustrate the variability in ambient EC and SAR in streams in the project area. The representative stream water quality is used in the impact analysis presented in Section 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM [CBNG] produced water of varying chemical composition to surface drainages within the project area" (PRB FEIS, p. 3-48). For the Middle Powder River, the EC ranges from 1,421 at maximum monthly flow to 2,154 at low monthly flow; and the SAR ranges from 3.92 µS/cm at maximum monthly flow to 4.62 µS/cm at low monthly flow. The USGS station at Moorhead, MT determined these values (PRB FEIS, p. 3-49).

SGR identified 3 natural springs in this POD boundary during the field investigations. The tabulation below shows their locations and status at the time the field investigations were being conducted. For more information on surface water refer to the PRB FEIS, pp. 3-36 to 3-56.

Spring Name	Qtr	Sec	Twp	Rng	Flow Rate	Sampled
SP 01	NWNE	7	57N	77W	Flowing	Yes
SP 02	NWNE	6	57N	77W	DRY	NO
SP 03	SESE	4	57N	77W	DRY	NO

3.3.3 Wetlands/Riparian

The National Wetland Inventory (NWI) identifies approximately 46.3 acres of sporadic, isolated wetlands in the POD. These wetlands have for the most part formed in low lying areas where surface water accumulates for extended periods of time. Some of the wetlands are adjacent to streams and others may be the result of leaking livestock water facilities.

3.4. Invasive or Noxious Species

BLM incorporates by reference the invasive species subsections from the Cabin Creek V EA, WY-070-08-176, p. 32, Section 3.2.2. Field conditions remain materially similar to these analyses.

3.5. Wildlife

A habitat assessment and wildlife inventory surveys were performed by Grouse Mountain during 2014 survey season (see AR). BLM reviewed the proposed APDs and determined that the proposals, combined with the COAs (and design features), are: (1) consistent with the FEIS and its supplements, the RMP and the above incorporated EAs; and (2) consistent with the programmatic biological opinion (ES-6-WY-02-F006), which is an update from the PRB FEIS, Appendix K. The affected environment for wildlife are discussed in, and anticipated to be similar to that analyzed in the EAs in Table 3.1. The affected environment for project is the same as Cabin Creek V project area.

3.5.1. Threatened, Endangered, Candidate, Special Status (Sensitive) Species

The Buffalo BLM receives a species list periodically from the FWS concerning threatened, endangered, proposed, and candidate species. Species included on that list that would be impacted by the proposed project will be discussed below.

3.5.1.1. Northern Long-Eared Bat

The FWS proposed the Northern long-eared bat (*Myotis septentrionalis*) for listing under the ESA, October 2, 2013; 78 FR 61046. The bat is threatened by white-nose syndrome (WNS), a disease caused by the cold-loving fungus, *Psuedogymnoascus* (*Geomyces*) *destructans*. Throughout the range of WNS, up to 99% of infected bats die from the disease. Yet, other threats (the present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; other natural or manmade factors affecting its existence) when combined with WNS heighten the risk to the species (FWS 2013b). The species occurs in northeastern Wyoming and is documented in Campbell, Crook, and Weston Counties; however, population information is limited, and the species is considered uncommon or rare outside of the Black Hills (FWS 2013b). Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch in flight using echolocation, or by gleaning (picking) from vegetation. In the summer, male and reproductive female bats roost singly or in colonies in cracks, crevices, cavities, and under the bark of live and dead trees, while other males and non-reproductive females roost in cooler places like caves and mines (FWS 2013A, Adams 2003). Suitable habitat is not present, and the project area is outside the bat's known range.

3.5.2. Greater Sage-Grouse (GSG)

No GSG leks are within two miles of the project proposal. BLM incorporates by reference the GSGsections in the Cabin Creek V EA, WY-070-08-176;Affected Environment: pp. 41-45. Since the approval of Cabin Creek V EA, scientists updated information about GSG, as summarized in the Sahara POD EA, WY-070-EA13-72 and this analysis is incorporated here by reference: Affected Environment (Section 3.7.4.1, p.18-19). In March, 2012, WY BLM provided additional information on the population viability analysis and its influence on cumulative effects from energy development - found in the affected environment, Section 3.7.12 of the Mufasa Fed 11-31H Well EA, WY-070-EA12-062, incorporated here by reference.

3.5.3. Special Status (Sensitive) Species (SSS)

The PRB FEIS discussed the affected environment for SSS, p. 3-174 to 201. The administrative record (AR) lists those SSS that may occur in the project area. It also includes a brief description of the habitat requirements for each species. BLM discusses those SSS impacted beyond the level analyzed in the PRB FEIS, below.

3.5.4. Migratory Birds

All of the proposed well pads are in productive migratory bird habitat for sage-brush obligate species. Nesting season for Brewer's sparrows (a BLM Special Status (Sensitive) Species (SSS)) typically occurs mid-May to mid-July. Some young fledge in late July. Sage thrashers (BLM sensitive species) may lay a second clutch of eggs as late as mid-July. Lark sparrows in northern latitudes lay eggs from early May to mid-July (information on breeding habits available on the Birds of North America Online website: http://bna.birds.cornell.edu/bna).

3.5.5. Raptors

During the 2014 spring survey, Grouse Mountain recorded 5 active raptor nesting pairs (2014) in the project area. BLM incorporates by reference the raptor sections in the Cabin Creek V EA, WY-070-08-176; Affected Environment: pp. 34-36, Section 3.3.4., Direct/Indirect: 56-61, Section 4.2.4., Cumulative: pp. 61, Section 4.2.4.1.

3.6. Cultural.

Per Section 106 of the National Historic Preservation Act, BLM must consider impacts to historic properties (sites that are eligible for or listed on the National Register of Historic Places (NRHP)). For an overview of cultural resources that are generally found in the area, refer to the *Draft Cultural Class I*

Regional Overview, Buffalo Field Office (BLM, 2010). A previous Class III (intensive) cultural resource inventory (BFO project no. 70080072) covered the proposal. No cultural resources are in the proposal.

4. ENVIRONMENTAL EFFECTS

No Action Alternative. BLM analyzed the no action alternative as Alternative 3 in the PRB FEIS and it subsequently received augmentation of the effects analysis in this EA through the analysis of mineral projects, their approval, and construction; and through the analysis and approval of other projects. BLM incorporates by reference these analyses in this EA; see Table 3.1. This updated the no action alternative and cumulative effects. The project area has surface disturbance from existing roads, well pads, and oil and gas facilities. Under the no action alternative, on-going well field operations would continue as would the development of approved single and multi-well pads, consisting of horizontal wells with approved APDs and other approved APDs. The production and the drilling and completion of these new wells would result in noise and human presence that could affect resources in the project area; these effects could include the disruption of wildlife, the dispersal of noxious and invasive weed species, and dust effects from traffic on unpaved roads. Present fluid mineral development in the PRB is under half of that envisioned and analyzed in the PRB FEIS. There is only a remote potential for significant effects above those identified in the PRB FEIS to resource issues as a result of implementing the no action alternative.

Alternative B, Proposed Action (Proposal)

4.1. Air Quality

BLM incorporates by reference the air quality direct, indirect, cumulative, and residual effects from the analyses in Table 3.1, above as they are materially similar to those for these proposals. BLM incorporates by reference the analysis found in the August 2012 Lease Sale EA, WY-070-EA12-44, pp. 45-51 (air quality, greenhouse gas emissions, and visibility). Air quality impacts modeled in the PRB FEIS and Cumulative Air Quality Effects, 2009 concluded that PRB projected fluid and solid development would not violate state, or federal air quality standards and this project is within the development parameters.

4.2. Soils, Ecological Sites, and Vegetation

Impacts anticipated occurring and mitigation considered with this proposal will be similar to those analyzed in the following EA which has the same characteristics to the Cabin Creek V POD: Cabin Creek V POD EA WY-070-08-176. Affected Environment (pp. 51); and Direct and Indirect, Cumulative, Residual Effects (pp. 51-53) – all incorporated here by reference. These incorporated EA sections analyze the historical values and settings for soils, ecological sites, and vegetation. The soil types in the Cabin Creek V POD are identical to the soils in the Cabin Creek VIII POD due to the fact that the Cabin Creek VIII POD wells are using the same utilized in the expired Cabin Creek V POD; therefore the effects and mitigation are the same; see AR for a cross-walk of the substituted well locations, through which, the BLM documented specific needs for heightened reclamation.

4.3. Water Resources

The operator 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 in the Middle Powder River watershed and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. 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 Cabin Creek VIII POD incorporates by reference water management strategies and facilities that were approved for use in the Cabin Creek V and VII PODs (EA's WY-070-08-176 and WY-070-12-183 respectively). The Cabin Creek VIII POD will use direct discharge to the Middle Powder River and its tributaries to manage the produced water. Summit will use 7 previously approved outfall structures to

discharge water directly to the Middle Powder River. Additionally, Summit will use 5 previously approved off channel pits to impound produced water. These pits were approved as a secondary water handling options, and will only be constructed if direct discharge is insufficient to handle all the produced water within permit limitations. Summit will submit reclamation bonds for the pits prior to construction or use of them.

The maximum water production is predicted to be 14.6 gpm per well or 394 gpm (0.9 cubic feet per second (cfs) or 635 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that anticipated from CBNG development per year, (Table 2-8, p. 2-26). For the Middle Powder River drainage, the projected volume produced in the watershed area was 1,797 acre-feet in 2013 (maximum production is estimated in 2005 at 12,328 acre-feet). As such, the volume of water resulting from the production of these wells is 35% of the total volume projected for 2013. This volume of produced water is within the predicted parameters of the PRB FEIS.

4.3.1. Groundwater

4.3.1.1. Direct and Indirect Effects

The PRB FEIS predicts an infiltration rate of 37% to groundwater aquifers and coal zones in the Middle Powder River drainage area (PRB FEIS, p. 4-5). For this project BLM assumes that a maximum of 146 gpm will infiltrate at or near the discharge points and impoundments (235 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, p. 4-54) Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of CBNG production is possible impacts to the groundwater. "The effects of development of CBM[NG] 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, p. 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 CBNG wells produce from depths which range between 1080 and 1500 feet compared to 2 to 1300 feet deep Wasatch sands in the water wells. The operator committed to offer water well agreements to holders of properly permitted domestic and stock wells in the circle of influence (0.5 mile of a federal CBNG producing well) of the proposed wells.

The PRB FEIS anticipated that recovery of the coal bed aquifer as follows: ". . . storage areas outside the areas of CBM[NG] development would resaturate and repressurize the areas that were partially depressurized during operations. The amount of groundwater stored 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 sands and coals (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, p. 4-38)

4.3.1.2. 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, p. 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, p. 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, p. 4-65)

4.3.1.3. Mitigation Measures

Adherence to the requirement in Onshore Oil and Gas Order #2, the drilling COAs, setting casing at appropriate permitted depths, following safe remedial procedures in the event of casing failure, and using proper cementing procedures should protect any 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 address the potential impacts from infiltration on shallow ground water, the WDEQ has developed a guidance document, "Compliance Monitoring and Siting Requirements for Unlined Impoundments Receiving Coalbed Methane Produced Water" (November, 2008). For all new WYPDES permits, the WDEQ requires that the proponent investigate the shallow groundwater at the proposed impoundment locations. Drilling at proposed impoundments began in the spring of 2004. Based on information received from the WDEQ, as of December, 2011, over 2017 impoundment sites have been investigated with more than 2306 borings. Of these impoundments, 237 met the criteria to require "compliance monitoring" if constructed and used for CBNG water containment. Only 125 impoundments requiring monitoring are presently being used. As of the fourth quarter of 2011, only 26 of those monitored impoundments (20.8%) caused a change in the "Class of Use" of any parameter in the underlying aquifer water.

4.3.1.4. Residual Effects

As described in Section 3.4.1, the production of CBNG in this project area may cause groundwater levels to drop due to the CBNG dewatering. The PRB FEIS analyzed groundwater recharge post-CBNG development. An estimated 40% of the groundwater removed would infiltrate the surface and recharge the shallow aquifers above the coal, PRB FEIS, p. 4-68.

4.3.2. Surface Water

4.3.2.1. Direct and Indirect Effects

Produced Water Quality

Average values of EC and SAR as measured at selected USGS stream gauging stations at high and low monthly flows as well as the Wyoming groundwater quality standards for TDS and SAR for Class I to Class III water (there is no current standard for EC) are in Table 4.2, below. It also shows constituent limits for TDS, SAR, and EC detailed in the project area WYPDES permit, and the concentrations in the POD's representative water sample.

The total assimilative capacity allocated to the permittee is based on PRB lease holding information provided to the WDEQ by the permittee. Ambient concentration values are set by the WDEQ using USGS data. It is expected TDS concentrations discharged to the Powder River be at their lowest in the months of May and June (956 mg/l, 860 mg/l respectively) and at their highest in August and September (1,524 mg/l). For complete description of the calculations and parameters set by WDEQ see the individual WYPDES permits in the WMP.

Table 4.2. Comparison of Regulated Water Quality Parameters to Predicted Water Quality

Sample location or Standard	TDS mg/l	SAR	EC µmhos/cm
Primary Watershed at Moorehead, MT Gauging Station			
Historic Data Average at Maximum Flow		3.92	1,421
Historic Data Average at Minimum Flow		4.62	2,154

Sample location or Standard	TDS mg/l	SAR	EC µmhos/cm
WDEQ Quality Standards for WY Groundwater (Chapter 8) Drinking Water (Class I) Agricultural Use (Class II) Livestock Use (Class III)	 500 2,000 5,000	 # 	
WDEQ Water Quality Requirement for WYPDES Permit # WY0056162: At discharge point	AC	AC	AC
Predicted Produced Water Quality from the comingled Canyon, Cook, Wall, and Pawnee coal zones	1500	48.6	2260

AC = Assimilative Capacity Requirements (values vary per month)

Based on the analysis in the PRB FEIS, the primary beneficial use of the surface water in the PRB is the irrigation of crops (p. 4-69). The water quality projected for this POD is within the WDEQ criteria for agricultural use (2,000 mg/l TDS). However, direct land application is not included in the WMP. 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 assessment and approval by the BLM.

Table 4.3. Applicable WYPDES Permit Limits

Effluent Characteristic	Daily Maximum Permit #
pH	6.5 to 9.0
Specific Conductance (µS/cm)	AC
Sulfates (mg/l)	3000
Radium 226 + 228 (pCi/l)	1
Dissolved Iron (µg/l)	300
Total Barium (µg/l)	1800
Total Arsenic (µg/l)	8.4
Chlorides (mg/l)	150

AC-Variable limit set by Assimilative Capacity Credits

BLM analyzed the results from a representative water sample from a well drilled to the same coal zones near to the named POD. BLM predicts the water quality for the water produced from the named target coal zone from these wells to be similar to the sample water quality collected. For complete analysis and results see the company laboratory analytical report in the WMP's Attachment 6.1.

Surface discharge of the produced water 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 obtained WYPDES permits (Permit WY0056162, WY0056537, WY0056332) from the WDEQ for the discharge of water produced from this project. Those permits' maximum effluent limits are described in Table 4.3, above.

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 committed to designate a reference well to each coal zone within the POD boundary. The operator is required to sample the reference well at

the wellhead for analysis within 60 days of initial production and submit a copy of the water analysis to the BLM Authorized Officer. For more information refer to this POD's WMP.

Produced Water Control
There are 7 discharge points proposed for use with this project that were approved for use under previously submitted projects. They have been appropriately sited and use acceptable water energy dissipation measures. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

The company would potentially build 5 off-channel impoundments to manage the produced water. These impoundments are proposed as secondary facilities and have all been approved and accounted for under previously submitted projects. The off-channel impoundments would result in evaporation and infiltration of CBNG water. Criteria identified in "Off-Channel, Unlined CBNG Produced Water Pit Siting Guidelines for the Powder River Basin, Wyoming" (WDEQ, 2002) were used to locate these impoundments. Monitoring may be required based upon shallow groundwater investigations required for new impoundments by the WDEQ. The impoundments will be built to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner. BLM evaluated all water management facilities for compliance with best management practices during the onsite.

SGR designated the off-channel impoundment as "secondary". Although the "secondary" impoundment meets environmental standards for BLM authorization, Summit will not construct it under this initial approval. The secondary designation allows them to forgo bonding of the impoundment until they are certain of their need for produced water management. If Summit determines that they need to construct the impoundment, they will submit sundry notices to that effect with the associated bonds.

Produced Water Quantity
SGR committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Sedimentation will occur in the impoundments, but would be controlled through a concerted monitoring and maintenance program. BFO recommends that SGR submit phased reclamation plans for the impoundments and that BFO approve these on a site-specific, case-by-case basis as the impoundments are no longer needed for disposal of CBNG water, see BLM applied COAs.

Alternative (2A) of the approved alternative in the PRB FEIS Record of Decision, reads that the peak production of water discharged to the surface will occur in 2005 at a total contribution to the main-stem of the Middle Powder River of 86 cfs, p. 4-102). The predicted maximum discharge rate from these wells is anticipated to total 635 gpm or 0.9 cfs. Since the produced water will discharge directly to the Middle Powder River this project may add a maximum 0.9 cfs to the Middle Powder River flows, or 0.1% of the predicted total CBNG produced water contribution. For more information on the maximum predicted water impacts resulting from the produced water discharge, see Table 4-11 (PRB-FEIS, p. 4-101).

SGR provided an analysis of the potential development in the watershed above the project area in the WMP, p. 8. Based on the area of the Fence Creek watershed above the POD (48.46 sq mi) and an assumed density of 1 well per location every 80 acres, the potential exists for the development of 388 wells which could produce a maximum flow rate of 5665 gpm (12.6 cfs) of water. The BLM agrees with the Operator that this is not expected to occur because:
1. Some of these wells are drilled and are producing.
2. The phasing in of new wells takes several years.
3. A decline in well water discharge generally occurs after several months of operation.

The potential maximum flow rate of produced water in the watershed upstream of the project area, 11.4 cfs, is much less than the volume of runoff estimated from the 2-year storm event 180 cfs of the drainage (WMP, p. 9).

The WMP for the Cabin Creek VIII POD addressed in-channel downstream impacts. Potential downstream impacts are negligible because no water is proposed to be discharged to tributaries of the Middle Powder River, but directly to the river itself.

Springs
There are 3 natural springs identified by the operator within 1 mile radius of the Cabin Creek VIII POD boundary. The operator will monitor the spring for water quality and quantity for the life of the project.

4.3.2.2. Cumulative Effects

This analysis includes cumulative data from fee, state, and federal CBNG development in the Middle Powder River watershed. BLM obtained these data from the WOGCC.

As of December, 2013, all producing CBNG wells in the Middle Powder River watershed discharged a cumulative volume of 61,968 acre-feet of water compared to the predicted 97,308 acre-feet disclosed in the PRB FEIS (Table 2-8, p. 2-26). The figures are in Table 4.4, below. This volume is 63.7 % of the total predicted produced water analyzed in the PRB FEIS for the Middle Powder River watershed.

Table 4.4. Actual vs predicted water production in the Middle Powder River watershed 2011 Data Update 03-30-12

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	7,023	71.0	29,315	45.4
2008	9,689	74,276	7,624	78.7	36,939	49.7
2009	6,030	80,306	6,253	103.7	43,192	53.8
2010	6,030	86,336	5,649	93.7	48,841	56.6
2011	5,899	92,235	4,764	80.8	53,605	58.1
2012	3,276	95,511	4,072	124.3	57,677	60.4
2013	1,797	97,308	4,299	239.2	61,976	63.7
2014	964	98,272			61,976	
2015	495	98,767			61,976	
2016	231	98,998			61,976	
2017	82	99,080			61976	
Total	99,080		61976			

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 PRB FEIS water quality analysis used produced water quality data, where available, from existing wells within each of the 10 primary watersheds in the PRB. These predictions of EC and SAR can only be reevaluated when additional water quality sampling is available.

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur as a result of discharged produced CBNG water. The cumulative effects relative to this project are within the 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, which is approximately 63% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the WYPDES permit protects downstream irrigation.
3. The commitment by the operator to manage the volume of water discharged.

Refer to the PRB FEIS, pp. 4-115 – 117 and Table 4-13 for cumulative effects relative to the watershed and p. 117 for cumulative effects common to all sub-watersheds.

4.3.2.3. Mitigation Measures

Channel crossings by road and pipelines will be perpendicular to flow. Channel crossings by pipelines will be so that the pipe is buried at least 4 feet below the channel bottom.

The operator committed to monitor the water discharge points and the channels downstream for stability. If erosion is noted, the operator will be required to repair and stabilize the area using selected mitigation techniques. The operator also committed to expediently stabilize and revegetate disturbance within channel and floodplain associated with this project.

BLM require the operator to sample the active springs listed below annually for the duration of production to ascertain changes in water quality or quantity. Analysis will follow the WYPDES Permit initial quality criteria suite. The operator should send copies of water quality and quantity data to the BLM BFO.

List of Springs and locations.

Spring Name	Qtr	Sec	Twp	Rng
SP 01	NWNE	7	57N	77W
SP 02	NWNE	6	57N	77W
SP 03	SESE	4	57N	77W

4.3.2.4. Residual Effects

"Streams enhanced by large volumes of CBNG produced water may begin to establish meander patterns on longer wavelengths in response to increased flows. Stream drainages would readjust to their existing natural flows at the end of the project's life. Down cutting (stream erosion) and sediment deposition (aggradation) are natural processes that occur as stream drainages age through time. Down cutting occurs within the upper reaches of a drainage system as the stream channel becomes incised through erosion, until the slope of the stream and its velocity are reduced and further erosion is limited. Sediment is deposited within the lower, slower reaches of a stream.

Surface drainages could be degraded from erosion caused by increased surface flow, unless rates of CBNG produced water discharge and outfall locations are carefully controlled. Increased flows could cause down cutting in fluvial environments, resulting in increased channel capacity over time within the upper and middle reaches of surface drainages." (PRB FEIS, p. 4-118)

The development of CBNG 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.

4.4. Wetland/Riparian

The National Wetland Inventory identifies approximately 46.3 acres of sporadic isolated wetlands. None of the identified areas are near project facilities and it is unlikely that the project will affect the wetland in

any way. "Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. Continuous high stream flows into wetlands and riparian areas would change the composition of species and dynamics of the food web. The shallow groundwater table would rise closer to the surface with increased and continuous stream flows augmented by produced water discharges. Vegetation in riparian areas, such as cottonwood trees, that cannot tolerate year-round inundated root zones would die and 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 ground 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, p. 4-175).

The cumulative impacts of the proposed action, when considered with other existing and proposed development in the project area are not expected to be significant. The application of mitigation measures will ensure that the incremental impacts of this well, when considered with any existing development are insignificant. For more information on cumulative impacts, please refer to the PRB FEIS.

4.5. Invasive Species

BLM anticipates the proposal's direct, indirect, residual, and cumulative effects to invasive species proliferation will be materially similar to those found in the Cabin Creek V EA, WY-070-EA08-176, Section 4.1.2, pp.53-54 incorporated here by reference. SGR committed measures to negate a need for mitigation.

4.6. Wildlife

Alternative B – the Proposal: The impacts associated with Alternative B are discussed below. BLM reviewed the proposed APDs and determined that the proposals, combined with the COAs (and design features), are consistent with the programmatic biological opinion (ES-6-WY-02-F006), which is an update from the PRB FEIS, Appendix K. The affected environment for wildlife are discussed in, and anticipated to be similar to that analyzed in the EAs in Table 3.1. The environmental effects for wildlife are discussed in, and anticipated to be similar to the Sahara POD EA, WY-070-EA13-72, incorporated here by reference.

4.6.1. Wildlife Threatened, Endangered, Proposed and Candidate Species

4.6.1.1. Northern Long-eared Bat

4.6.1.1.1. Direct and Indirect Effects

Suitable roosting habitat for Northern long-eared bat is not present in the project area. Implementation of the proposed project will have "*no effect*" on the species.

4.6.1.1.2. Cumulative Effects

The Northern long-eared bat is not discussed in the PRB FEIS; however, the PRB FEIS discussed the cumulative effects to special status species (p. 4-272 to 4-273). Although there is uncertainty about the spread of White Nose Syndrome, experts agree that the fungus will likely spread throughout the US. The Northern long-eared bat is also threatened by the loss and degradation of summer habitat caused by human development, and by collision with or barotrauma (injury to the lungs due to a change in air pressure) caused by wind turbines. Mine closures, vandalism of roosts, and hibernacula also threaten to this species (FWS 2013b).

4.6.1.1.3. Mitigation Measures

The BLM recommends that measures are taken to ensure that all bats are excluded from facilities that pose a mortality risk, including, but not limited to, heater treaters, flare stacks, secondary containment, and standing water, or chemicals where escape may be difficult or toxic substances are present.

4.6.1.1.4. Residual Effects

No residual impacts are anticipated.

4.6.1.2. Greater Sage-Grouse (GSG)

BLM incorporates by reference the GSG sections in the Cabin Creek V EA, WY-070-08-176; Direct/Indirect: 68-70, Section 4.2.5.2.4.1., Cumulative: pp. 70-75, Section 4.2.5.2.4.1.1. BLM analyzed and considered mitigation for two leks in the Sahara POD EA, WY-070-EA13-72 and this analysis is incorporated here by reference: Direct and Indirect Effects (Section 4.6.4.1.1, p. 34-39); Cumulative Effects (Section 4.6.4.1.2, pp.49-50); Mitigation (Section 4.6.4.1.3, p. 37); Residual Effects (Section 4.6.4.1.4, p. 37). The proposed wells will cumulatively contribute to the potential for local GSG extirpation, yet this impact is acceptable because it occurs outside preliminary priority habitats (core, focus and connectivity), is within the parameters of the PRB FEIS/ROD, and is consistent with the coordinated BLM and State of Wyoming GSG conservation strategies (BLM WY-2012-19 and WY Executive Order 2011-5, respectively).

4.6.1.3. Special Status (Sensitive) Species (SSS)

BLM anticipates no direct, indirect, residual, or cumulative effects to SSS (aside from some species discussed below). BLM requires no mitigation for SSS.

4.6.2. Migratory Birds

Direct and indirect effects to migratory birds from surface disturbing and disruptive activities associated with development of the proposed wells are similar to the wells analyzed in the consolidated CX3 for Bonita Federal Com. 11H-WY-070-390CX3-13-41, et al., incorporated here by reference. The BLM determined that the proposal complies with Instruction Memorandum No. WY-2013-005 Interim Management Guidance for Migratory Bird Conservation Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands Including the Federal Mineral Estate. BLM would apply a survey and timing limitation that pad construction (vegetation removal) occur outside of the breeding season for the greatest quantity of BLM sensitive passerines (May 1- July 31) where suitable nesting habitat for sagebrush obligates is present. This mitigating restriction would apply to habitat removal, unless a pre-construction nest search (within approximately 10 days of construction planned May 1-July 31) is completed. If surveys will be conducted, the operator will coordinate with BLM biologists to determine protocol. The nest search will be performed in areas where vegetation will be removed or destroyed. The cumulative and residual effects of the proposals may contribute to the long term declines of prairie passerines. BLM recommends taking measures to ensure excluding migratory birds from facilities posing a mortality risk, including, but not limited to, heater treaters, flare stacks, secondary containment, and standing water or chemicals where escape may be difficult or hydrocarbons or toxic substances are present.

4.6.3. Raptors

BLM incorporates by reference the Raptor sections in the Cabin Creek V EA, WY-070-08-176; Affected environment: pp. 34-36, Section 3.3.4., Direct/Indirect: 56-61, Section 4.2.4., Cumulative: pp. 61, Section 4.2.4.1.

4.7. Cultural Resources

BLM policy states that a decision maker's first choice should be avoidance of historic properties (BLM Manual 8140.06(C)). If historic properties cannot be avoided, mitigation measures must be applied to

resolve the adverse effect. No historic properties will be impacted by the proposal. Following the *State Protocol Between the Wyoming Bureau of Land Management State Director and The Wyoming State Historic Preservation Officer*, 2006: VI(A)(1), the BLM notified the Wyoming State Historic Preservation Officer (SHPO) on July 31, 2014 that no historic properties exist in the area of potential effect (APE). If any cultural values (sites, features or artifacts) are observed during operation, they will be left intact and the Buffalo Field Manager notified. If human remains are noted, the procedures described in Appendix L of the PRB FEIS and ROD must be followed. Further discovery procedures are explained in Standard COA (General)(A)(1).

List of Preparers: Persons and Agencies Consulted (BFO unless otherwise noted)

Position/Organization	Name	Position/Organization	Name
NRS/Team Lead	Andy Perez	Archaeologist	Clint Crago
Supr NRS	Casey Freise	Wildlife Biologist	Scott Jawors
Petroleum Engineer	Matthew Warren	Geologist	Kerry Aggen
LIE	Karen Klaahsen	Supr NRS	Kathy Brus
Assistant Field Manager	Clark Bennett	Assistant Field Manager	Chris Durham
NEPA Coordinator	John Kelley	Wyoming State Historic Preservation Officer	Mary Hopkins

1. References and Authorities (BLM incorporates by reference here the references and authorities from the Porsche Wells EA, WY-070-EA14-84, pp. 29-33.)

Annex A. Table W.1. Summary of Sensitive Species Habitat and Project Effects Associated with Alternative B.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (*Rana pipiens*)	Beaver ponds and cattail marshes from plains to montane zones.	S	MIIH	Additional water will affect existing waterways.
Columbia spotted frog (*R*anus pretiosa)	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R tributaries.	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
Fish				
Yellowstone cutthroat trout (*Oncoryhynchus clarki bouvieri*)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	NI	The project area is outside the species' range, and the species is not expected to occur.
Birds				
Baird's sparrow (*Ammodramus bairdii*)	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S	MIIH	Foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	S	MIIH	Project includes overhead power.
Brewer's sparrow (*Spizella breweri*)	Sagebrush shrubland	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Loggerhead shrike (*Lanius ludovicianus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	NP	NI	Habitat is not present.
Mountain Plover	Short-grass prairie with slopes < 5%	NS	NI	A small prairie dog town is located within 0.25 miles of the project. However, the town is inactive and vegetation height and topography in the area preclude use by plovers.
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	NP	NI	Habitat not present.
Peregrine falcon (*Falco peregrinus*)	Cliffs	NP	NI	Habitat not present.
Sage sparrow (*Amphispiza billneata*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Sage thrasher (*Oreoscoptes montanus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Trumpeter swan (*Cygnus buccinator*)	Lakes, ponds, rivers	NP	NI	Habitat not present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Western Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	NS	NI	A small prairie dog town is located within 0.25 miles of the project. However, the town is inactive.
White-faced ibis (*Plegadis chihi*)	Marshes, wet meadows	NP	NI	Habitat not present.
Yellow-billed cuckoo (*Coccyzus americanus*)	Open woodlands, streamside willow and alder groves	NP	NI	Habitat not present.
Mammals				
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	S	NI	A small prairie dog town is located within 0.25 miles of the project. However, the town is inactive.
Fringed myotis (*Myotis thysanodes*)	Conifer forests, woodland chaparral, caves and mines	NP	NI	Habitat not present.
Long-eared myotis (*Myotis evotis*)	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Swift fox (*Vulpes velox*)	Grasslands	NP	NI	Habitat is not present.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	NP	NI	Habitat not present.
Plants				
Limber Pine (*Pinus flexilis*)	Mountains, associated with high elevation conifer species	NP	NI	Habitat not present.
Porter's sagebrush (*Artemisia porteri*)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Project area outside of species' range.

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

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