DECISION RECORD
Peak Powder River Resources, LLC, Bridle Bit 1 POD
Environmental Assessment (EA), WY-070-EA15-66
Bureau of Land Management, Buffalo Field Office, Wyoming

The BLM approves Peak Powder River Resources', Bridle Bit 1 POD, which consists of 36 (4 wells/location) gas and oil well applications for permit to drill (APDs) described in Alternative B of the environmental assessment listed above. 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).
- Powder River Basin Oil and Gas Project Final Environmental Impact Statement (FEIS), 2003.
- Buffalo Resource Management Plan (RMP) 1985 and Amendments (2003, 2011).
- Greater Sage-Grouse Habitat Management Policy on Wyoming BLM Administered Public Lands (WY-IM-2012-019) and Greater Sage-Grouse Interim Management Policies and Procedures (WO-IM-2012-043).

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

Well Site. BLM approves 36 APDs and support facilities at the following locations:

	Well Name & #	Twp	Rng	Sec	Qtr	Surface Hole Lease:
	PAD 1-18					
1	BRIDLE BIT FED 1-18NH	42N	71W	18	SESE	Federal
2	BRIDLE BIT FED 1-18PH	42N	71W	18	SESE	Federal
3	BRIDLE BIT FED 1-18MH	42N	71W	19	NENE	Federal
4	BRIDLE BIT FED 1-18TH	42N	71W	19	NENE	Federal
	PAD 1-19					Federal
5	BRIDLE BIT FED 1-19MH	42N	71W	19	SESE	Federal
6	BRIDLE BIT FED 1-19NH	42N	71W	19	SESE	Federal
7	BRIDLE BIT FED 1-19PH	42N	71W	19	SESE	Federal
8	BRIDLE BIT FED 1-19TH	42N	71W	19	SESE	Federal
	PAD 2-18					Federal
9	BRIDLE BIT FED 2-18MH	42N	71W	19	NENW	Federal
10	BRIDLE BIT FED 2-18NH	42N	71W	19	NENW	Federal
11	BRIDLE BIT FED 2-18PH	42N	71W	19	NENW	Federal
12	BRIDLE BIT FED 2-18TH	42N	71W	19	NENW	Federal
	PAD 2-19					Federal
13	BRIDLE BIT FED 2-19MH	42N	71W	19	SESW	Federal
14	BRIDLE BIT FED 2-19NH	42N	71W	19	SESW	Federal
15	BRIDLE BIT FED 2-19PH	42N	71W	19	SESW	Federal
16	BRIDLE BIT FED 2-19TH	42N	71W	19	SESW	Federal
	PAD 2-20					Federal
17	BRIDLE BIT FED 2-20MH	42N	71W	20	SESW	Federal
18	BRIDLE BIT FED 2-20NH	42N	71W	20	SESW	Federal
19	BRIDLE BIT FED 2-20PH	42N	71W	20	SESW	Federal

	Well Name & #	Twp	Rng	Sec	Qtr	Surface Hole Lease:
20	BRIDLE BIT FED 2-20TH	42N	71W	20	SESW	Federal
	PAD 1-13					Federal
21	BRIDLE BIT FED 1-13MH	42N	72W	13	SESE	Federal
22	BRIDLE BIT FED 1-13NH	42N	72W	13	SESE	Federal
23	BRIDLE BIT FED 1-13PH	42N	72W	13	SESE	Federal
24	BRIDLE BIT FED 1-13TH	42N	72W	13	SESE	Federal
	PAD 2-13					Federal
25	BRIDLE BIT FED 2-13MH	42N	72W	13	SESW	Federal
26	BRIDLE BIT FED 2-13NH	42N	72W	13	SESW	Federal
27	BRIDLE BIT FED 2-13PH	42N	72W	13	SESW	Federal
28	BRIDLE BIT FED 2-13TH	42N	72W	13	SESW	Federal
	PAD 1-14					Federal
29	BRIDLE BIT FED 1-14MH	42N	72W	14	SESE	Federal
30	BRIDLE BIT FED 1-14NH	42N	72W	14	SESE	Federal
31	BRIDLE BIT FED 1-14PH	42N	72W	14	SESE	Federal
32	BRIDLE BIT FED 1-14TH	42N	72W	14	SESE	Federal
	PAD 2-14					Federal
33	BRIDLE BIT FED 2-14MH	42N	72W	14	SESW	Federal
34	BRIDLE BIT FED 2-14NH	42N	72W	14	SESW	Federal
35	BRIDLE BIT FED 2-14PH	42N	72W	14	SESW	Federal
36	BRIDLE BIT FED 1-13TH	42N	72W	14	SESW	Federal

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-EA15-66, and the FONSI (incorporated here by reference) found that the operator's proposal for this project will have no significant impacts on the human environment, beyond those described in the PRB FEIS. There is no requirement for an EIS.

BLM publically posted the APDs for 30 days, received no comments, and then internally scoped them.

DECISION RATIONALE. BLM bases the decision authorizing the selected project on:

1. BLM and Peak included design features and mitigation measures (conditions of approval (COAs)) to reduce environmental impacts while meeting the BLM's need. For a complete description of all site-specific COAs, see the COAs.
   a. The impact of this development cumulatively contributes to the potential for local extirpation of the Greater Sage Grouse (GSG) yet its effect is acceptable because it is outside priority habitats and is within the parameters of the PRB FEIS/ROD and current BLM (WO-IM-2012-043) and Wyoming (WY-IM-2012-019) GSG conservation strategies.
   b. With application of Standard Operating Procedures (SOPs), applied mitigation, Required Design Features, and COAs identified for Greater Sage-Grouse under the [proposed action], impacts caused by surface-disturbing and disruptive activities would be minimized.
   c. There are no conflicts anticipated or demonstrated with current uses in the area.
2. The Resource Management Plan (RMP) for the Buffalo Field Office is currently undergoing revision. The Draft RMP and Environmental Impact Statement was released in June 2013.
   The proposed action was screened against the Draft RMP to ensure that the proposed action would not preclude BLM's ability to select any alternative in a ROD. The proposed action was also determined to not be inconsistent with the direction outlined in the RMP's Preferred Alternative.
3. Peak will conduct operations to minimize adverse effects to surface and subsurface resources, prevent unnecessary surface disturbance, and conform with 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 several measures to alleviate resource impacts into their submitted surface use plan and drilling plan.
6. The operator certified it has a surface access agreement.
7. The project lacks wilderness characteristics. A wilderness characteristics inventory was completed in 2013; no lands with wilderness characteristics were identified outside the Big Horn Mountains. The inventory is available at: http://www.blm.gov/wy/st/en/programs/Planning/rmps/buffalo/docs.html.
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.

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: 4/29/2015

FINDING OF NO SIGNIFICANT IMPACT
Peak Powder River Resources, LLC, Bridle Bit 1 POD
Environmental Assessment (EA), WY-070-EA15-66
Bureau of Land Management, Buffalo Field Office, Wyoming

FINDING OF NO SIGNIFICANT IMPACT (FONSI). Based on the information in the EA listed above, 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 Powder River Basin (PRB) Oil and Gas Project Final Environmental Impact Statement (FEIS) (2003), to which the EA tiers; (2) Alternative B conforms to the Buffalo Field Office (BFO) Resource Management Plan (RMP) (1985) and amendments (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 reduce 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 as identified in the 1985 RMP, the 2003 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 proven 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 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. 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.

Field Manager: /s/ Duane W. Spencer Date: 4/29/2015

ENVIRONMENTAL ASSESSMENT (EA), WY-070-EA15-66
Peak Powder River Resources, LLC, Bridle Bit 1 POD (Horizontal Wells)
Bureau of Land Management, Buffalo Field Office, Wyoming

1. INTRODUCTION

BLM provides this EA for Peak Powder River Resources, LLC, **Bridle Bit 1 POD,** oil and gas well applications for permit to drill (APDs), 36 wells (4 wells per location) and associated infrastructure. BLM's jurisdiction for this proposal is split estate, wells drilled from fee surface into underlying federal minerals on lease numbers listed below. This site-specific analysis tiers into and incorporates by reference the information and analysis in the Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project (PRB FEIS), WY-070-02-065, 2003, 2011 and the PRB FEIS Record of Decision (ROD) per 40 CFR 1508.28 and 1502.21. One may review these documents at the BLM Buffalo Field Office (BFO) and on our website:
http://www.blm.gov/wy/st/en/field_offices/Buffalo.html. These APD(s) are pursuant to the Mineral Leasing Act for the purpose of exploring or developing oil or gas and do not satisfy the categorical exclusion directive of the Energy Policy Act of 2005, Section 390.

1.1. Background

The operator submitted this project on 4/10/2014. The operator and BLM completed onsite inspections on 6/24/2014. The parties evaluated the APDs, modifying them to reduce environmental impacts. The BLM sent a post onsite deficiency letter to the operator on October 8, 2014.

1.2. Need for the Proposed Project

BLM's need for this project is to determine whether, how, and under what conditions to support the Buffalo Resource Management Plan's (RMP) goals, objectives, and management actions with allowing the exercise of the operator's conditional lease rights to develop fluid minerals on federal leases. BLM incorporates by reference here, the APD information (40 CFR 1502.21). Conditional fluid mineral development supports the RMP and 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 and 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 the Crazy Cat East EA, WY-070-EA13-028, 2013, generated 3 comments, and revealed no new issues.

The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposal, its location, and a resource (issue) list (see administrative record, AR), to identify potentially affected resources, land uses, resource issues, regulations, and site-specific circumstances. The APD and associated plans as well as the AR are available for review at the BFO. This EA will not discuss resources and land uses that are not present, not affected, or that the PRB FEIS or other analyses adequately addressed. This EA addresses the project's site-specific impacts to help the decision maker come to a reasoned decision. Project issues include: soils and vegetation, wildlife, cultural, air quality, water quality. 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 FEIS 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 – tiering to or incorporating by reference the analyses and developments approved by the subsequent NEPA analyses for adjacent and intermingled developments to the proposal area.

2.1. Alternative B –Proposed Action

The operator's project proposes to drill 36 (horizontal) oil and gas wells, on 9 locations, with 4 wells/location and construct their associated infrastructure. BLM's jurisdiction for this proposal is standard split estate, wells drilled from fee surface into underlying federal minerals. The proposal is to explore for, and develop federal oil and gas reserves from the Mowry, Niobrara, Parkman, and Turner formations. Total vertical depths range from 6,900' to 10,700'.

The project area is approximately 7.5 miles south of Wright, WY. The area is characterized by rolling, sagebrush and grasslands with ephemeral drainages. Main drainages include Porcupine Creek which is north of the POD.

Table 2.1. Well Name/#/Lease/Location:

	Well Name & #	Twp	Rng	Sec	Qtr	Surface Hole Lease
	PAD 1-18					
1	BRIDLE BIT FED 1-18NH	42N	71W	18	SESE	Federal
2	BRIDLE BIT FED 1-18PH	42N	71W	18	SESE	Federal
3	BRIDLE BIT FED 1-18MH	42N	71W	19	NENE	Federal
4	BRIDLE BIT FED 1-18TH	42N	71W	19	NENE	Federal
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15	BRIDLE BIT FED 2-19PH	42N	71W	19	SESW	Federal
16	BRIDLE BIT FED 2-19TH	42N	71W	19	SESW	Federal
	PAD 2-20					Federal
17	BRIDLE BIT FED 2-20MH	42N	71W	20	SESW	Federal
18	BRIDLE BIT FED 2-20NH	42N	71W	20	SESW	Federal
19	BRIDLE BIT FED 2-20PH	42N	71W	20	SESW	Federal
20	BRIDLE BIT FED 2-20TH	42N	71W	20	SESW	Federal
	PAD 1-13					Federal
21	BRIDLE BIT FED 1-13MH	42N	72W	13	SESE	Federal
22	BRIDLE BIT FED 1-13NH	42N	72W	13	SESE	Federal
23	BRIDLE BIT FED 1-13PH	42N	72W	13	SESE	Federal

	Well Name & #	Twp	Rng	Sec	Qtr	Surface Hole Lease
24	BRIDLE BIT FED 1-13TH	42N	72W	13	SESE	Federal
	PAD 2-13					Federal
25	BRIDLE BIT FED 2-13MH	42N	72W	13	SESW	Federal
26	BRIDLE BIT FED 2-13NH	42N	72W	13	SESW	Federal
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35	BRIDLE BIT FED 2-14PH	42N	72W	14	SESW	Federal
36	BRIDLE BIT FED 1-13TH	42N	72W	14	SESW	Federal

Drilling, Construction and Production Design Features Include:

Drilling, Construction & Production design features include:

Access

- Access is primarily WY Hwy 59 and Matheson county road.
- A road network will consist of existing improved all-weather roads and newly constructed, improved, crown and ditch template roads.
- All roads will be maintained to meet BLM standards during the entire life of the project area.
- Temporary surface water lines will follow access roads.
- The road ditches will be seeded to minimize erosion.
- Culverts will be installed as appropriate.

Well Locations

- The well pads will be constructed with cuts/fills and topsoil/spoil piles surrounding the edges of the pad surfaces. Areas not needed for production will be reclaimed and cut and fill slopes will be reduced as much as possible during interim reclamation.
- The wells will use a semi-closed loop drilling mud system. Lined pits at the pads will hold the cuttings.
- No staging areas, man camps/housing facilities are anticipated to be used off-site. Working trailers and sleeping trailers will be placed on the well pad during the drilling and completion of the well.
- If the well becomes a producer, production facilities will be located at the well site and will include a pumping unit, storage tanks, buildings, oil-water separator (heater-treater) and production flare. There will be no pits at these producing well locations.
- Dikes will be constructed completely around production facilities, i.e. production tanks, water tanks, and heater treater. The dikes will be constructed of corrugated steel, approximately 3 feet high, and hold capacity of the largest tank plus 10%. The load-out line will be outside of the dike area. A drip barrel or “Getty-Box” will be installed under the end of all load-out lines.

Drilling and Completion Operations Estimations

- Hydraulic fracturing (HF) operations are planned as a ‘plug & perf’ operation done in stages. All fresh water will be contained in large capacity storage tanks. No additional well pad disturbance is anticipated for HF operations. Completion flowback water will be held in tanks on location and trucked to a disposal facility permitted by Wyoming Department of Environmental Quality (WDEQ). See the AR for water sources and proposed disposal facilities.

- All HF water, including excess, is present before starting.
- Flowback equipment and tanks are spotted 2-3 days before pumping. Sand silos are spotted and filled 2-3 days prior to pumping.
- Next pump trucks and chemical mixing equipment arrives and, when ready, operations continue for 36-48 hours or 3-5 days depending on the type of stimulation stage isolation (i.e. packers/sleeves or plug/perf respectively).
- Sand is continuously brought on site in semi-truck loads during pumping. It is necessary to have a safe turning radius available for these trucks. Pumping water may require heating in the winter months.
- A detailed completion operations plan is outlined in the surface use plan (SUP).
- Peak truck traffic to fill HF tanks for completion operations is estimated to be 700 roundtrips per well.

Drilling and Completion Water Sources and Amounts

For a detailed description of design features and construction practices associated with the proposed project, refer to the surface use plan (SUP) and drilling plan included with the APD. Also see the APD for maps showing the proposed well location and associated facilities described above. Temporary surface waterlines will be placed in existing and proposed road disturbance corridors.

The operator estimates that during the drilling and completion phase of each individual well, it may use approximately 15,000 barrels of water for drilling and 60,000 for completion. The operator estimates the average daily truck traffic (ADT) for drilling to and from the location is approximately 15 large trucks (water haulers, cement trucks, etc.) and 10 personal pickup trucks per day. During the well completion process, the ADT is approximately 6 large trucks and 6 personal pickup trucks per day. Finally, during the production phase the ADT will decrease to 1-2 large trucks and 1 pickup truck per day. BLM incorporated and analyzed the implementation of committed mitigation measures in the SUP and drilling plan, in addition to the COAs in the PRB FEIS ROD, as well as changes made at the onsite.

Table 2.2. Anticipated Drilling and Completion Sequence and Timing (per well)

Drilling and Completion Step	Approximate Duration
Build location (roads, pad, and other initial infrastructure)	30 days
Mobilize rig	2-4 days[1]
Drilling (24/7)	30 days
Schedule/logistics for completion	30 days
Completion (setup, completion, demobilization)	5-8 days

[1] Depending on distance and need to add supplemental drilling equipment, such as skidding plates.

Additionally, the operator, in their APD, 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 in their submitted surface use and drilling plans.
- Certify it has a surface access agreement with the landowners.

Table 2.3. Disturbance Summary for this projects wells and associated infrastructure.:

Facility	Number or Miles	Initial Disturbance	Disturbance After Interim Reclamation
Engineered Pad/Staging Areas co-located with Pads	9 Pads, 4 wells/pad. Average disturb./pad = 7.3ac.	65.74 ac.	39.3 ac.
Improved Existing Roads Corridor	0.80 miles x 52 ft. wide	5.80 ac.	0.96 ac (18 ft. wide)
Proposed New Improved Roads	2.5 miles x 60 ft. wide	17.78 ac.	5.33 ac. (18 ft. wide)
Proposed Turnouts	14 @ 200 ft. x 10 ft. wide	6.42	6.42 ac.
Total Surface Disturbance		**95.72 acres**	52.02 acres

The reasonably foreseeable activity (RFA) for this and adjacent areas includes oil/gas exploration on 320 to 640 acre spacing or more for horizontal wells and 40 to 80 acre spacing for vertical wells. (This does not preclude the RFA spacing analysis in the PRB FEIS or applying to drill multiple wells from this pad further reducing the surface disturbance per well.) The RFA in the project analysis area is well within the RFA of the PRB FEIS total of 54,200 fluid mineral wells. Potential APD submittals or reasonably foreseeable activity included in this analysis could consist of more, multiple wells on existing or proposed pads and would, as much as possible, tie into existing supporting infrastructure; tank batteries, pipelines, power lines, and transportation networks.

2.2. 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 and generally conforms to the terms and conditions of that land use plan, and its amendments (2001, 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 affected by the alternatives in Section 2, or where changes in circumstances or regulations occurred since adoption of analyses to which the EA tiers or incorporates by reference. 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.

There are 15,121 producing oil and gas wells in the project area, Wyoming Oil and Gas Conservation Commission (WOGCC) December, 2014. The total number of conventional wells in the Buffalo planning area is 2855, which includes 845 horizontal wells (federal, fee, and state) (as of December 2014). This represents 38% of the projected 3,200 in the 2003 PRB ROD. (See Table 2.3 for an approximation of the disturbance in the current situation.) This agrees with the PRB FEIS which analyzed the reasonably foreseeable development of 51,000 CBNG and 3,200 natural gas and oil wells.

3.1. Air Quality

Refer to the PRB FEIS pp. 3-291 to 3-299, for a 2003-era description of the air quality conditions. BLM incorporates by reference, Update of Task 3A Report for the Powder River Basin Coal Review Cumulative Air Quality Effects for 2020, BLM (AECOM), 2009, (Cumulative Air Quality Effects, 2009) (available at http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/prbdocs.html) as it captures the cumulative air quality effects of present and projected PRB fluid and solid mineral development.

Four sites monitor the air quality in the PRB: Cloud Peak in the Bighorn Mountains, Thunder Basin

northeast of Gillette, Campbell County south of Gillette, and Gillette. In addition, the Wyoming Air Resource Monitoring System (WARMS) measures meteorological parameters from 9 sites throughout the State, and particulate concentrations from 5 of those sites, monitors speciated aerosol (3 locations), and evapotranspiration rates (1 location). The sites monitoring air quality for the Powder River Basin are located at Sheridan, South Coal Reservoir, Buffalo, Fortification Creek, and Newcastle. The northeast Wyoming visibility study is ongoing by the Wyoming Department of Environmental Quality (WDEQ). Sites adjacent to the Wyoming PRB-area are at Birney on the Tongue River 24 miles north of the Wyoming-Montana border, Broadus on the Powder River in Montana, and Devils Tower.

Existing air pollutant emission sources in the region include:

- Exhaust emissions (primarily CO and nitrogen oxides (NOx)) 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;
- PM (dust) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas, road sanding during the winter months, coal mines, and trains;
- Transport of air pollutants from emission sources located outside the region;
- NOx, PM, and other emissions from diesel trains and,
- SO_2 and NOx from power plants.

3.2. Soils, Ecological Sites and Vegetation

Project area soils developed in alluvium and residuum derived mainly from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams resulting in a wide variety of surface and subsurface textures. Soil depths vary from deep on lesser slopes to shallow and very shallow on steeper slopes. Differences in lithology produced topographic and geomorphic variations in the area. Parent material chemistry may result in local concentration of salts.
Soils differ with topographic location, slope, and elevation. Topsoil depths available for reclamation range from shallow on ridges to 12+ inches in bottomland. Erosion potential varies depending on the soil type, vegetative cover, and slope. Reclamation potential of soils also varies throughout the project area. The area's main soil limitations include: depth to bedrock, low organic matter content, and high erosion potential especially in areas of steep slopes. Main soils affected by the project include sandy loams, clays and loams.

The Campbell County Survey Area, Wyoming Soil Survey Geographic (SSURGO) Database WY605 provides detailed soils identification and data. NRCS performed the soil survey according to National Cooperative Soil Survey standards. The BLM uses county soil survey information to predict soil behavior, limitations, or suitability for a given activity or action. The agency's long term goal for soil resource management is to maintain, improve, or restore soil health and productivity, and to prevent or minimize soil erosion and compaction. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities. Many of the soils and landforms of this area present distinct challenges for development, and /or eventual site reclamation. See the NRCS Soil Survey (SSURGO) data. The Ecological Site interpretations include additional site-specific soil information.

3.3. Vegetation and Ecological Sites

BLM staff identified the dominant vegetation community types in the project area are mixed-grass prairie and sagebrush shrubland. Species typical of these community types are: Western wheatgrass, prairie junegrass, Sandberg bluegrass, blue grama, green needlegrass, needle & thread, threadleaf sedge, pricklypear cactus, Wyoming big sagebrush, and cheatgrass. The project area has Sandy, Clayey and Loamy Ecological Sites. These sites occur on gently undulating rolling land. Landform: Hill sides, alluvial fans, ridges & stream terraces.

Sandy Ecological Site
This site occurs on nearly level to 50% slopes. Landform: Alluvial fans, hillsides, plateaus, ridges & stream terraces.
The soils of this site are moderately deep (greater than 20" to bedrock) to very deep, well-drained soils that formed in alluvium or alluvium over residuum. These soils have moderate, moderately rapid, or rapid permeability. The surface soil will vary from 3 to 6 inches deep and have one of the following textures: fine sandy loam, sandy loam, or loamy very fine sand. Coarser topsoils may be included if underlain by finer textured subsoil. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick.
The main soil limitations include: depth to bedrock, low organic matter content, soil droughtiness, low water holding capacity, and high wind erosion potential. The low annual precipitation should be considered when planning a seeding.

Clayey Ecological Site
This site occurs on nearly level to 30% slopes. Landform: Hill sides, alluvial fans & stream terraces.
The soils of this site are moderately deep (greater than 20" to bedrock) to very deep, well-drained soils that formed in alluvium or alluvium over residuum. These soils have slow permeability. The layers of soil having the most influence on plants vary from 4 to 8 inches thick. The surface soil will vary from 2 to 5 inches deep and have one of the following textures: silty clay, sandy clay, clay, and the finer portions of silty clay loam, clay loam, and sandy clay loam. These soils may develop severe cracks.
The main soil limitations include: low organic matter content and soil droughtiness. The low annual precipitation should be considered when planning a seeding.

Loamy Ecological Site
The soils of this site are deep to moderately deep (greater than 20 inches to bedrock), well drained and moderately permeable. Layers of the soil most influential to the plant community varies 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 main soil limitations include: low organic matter content and soil droughtiness. The low annual precipitation should be considered when planning a seeding.

Mixed Sagebrush/Grass Plant Community
This mixed sagebrush/grass community is under moderate, season-long livestock grazing in the absence of fire or brush management. Wyoming big sagebrush is a significant component of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grasses, and miscellaneous forbs. Dominant grasses may include needleandthread, western wheatgrass, 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 also occurs.

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 sagebrush canopy protects the cool-season mid-grasses, 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.

Rhizomatous Wheatgrasses, Needleandthread, Blue Grama Plant Community
This plant community is the interpretive plant community for this site and is considered to be the Historic Climax Plant Community (HCPC). This plant community evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. The potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants. This state is dominated by cool season mid-grasses.

The major grasses include western wheatgrass, needleandthread, and green needlegrass. Other grasses occurring in this state include Cusick's and Sandberg's bluegrass, bluebunch wheatgrass, and blue grama. A variety of forbs and half-shrubs also occur. Big sagebrush is a conspicuous element of this state, occurs in a mosaic pattern, and makes up 5 to 10% of the annual production. Plant diversity is high.

This plant community is extremely stable and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).

3.4. Water Resources

WDEQ regulates Wyoming's water quality with EPA oversight. The Wyoming 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 WOGCC has authority for permitting and bonding off channel pits located over state and fee minerals.

3.4.1. Groundwater

The area's historical use of groundwater was for stock or domestic water. A search of the WSEO Ground Water Rights Database showed 2 registered stock water wells within 1 mile of the proposed wells with a depth of 175 feet. Refer to the PRB FEIS for additional information on groundwater, pp. 3-1 to 3-36. The EPA has an expansive, on-going study looking at more aspects of hydraulic fracturing and has yet to issue findings. A 2011-2012 Geological Survey study found no groundwater effects from thousands of deep horizontally fractured oil and gas wells. Another study found no direct link between hydraulic fracturing and studied aquifers (Warner, 2012). Adgate, et. al., and news sources reveal a minor controversy over a state's non-disclosure of proprietary HF fluids while release decisions receive administrative and court reviews.

The Fox Hills, the deepest penetrated fresh water zone in the PRB at approximately 5,700 feet, lies well above the target formations which are between 6,900 feet in depth to 10,700 feet in depth.

3.4.2. Surface Water

The project area is in the Upper Porcupine Creek drainage, which is a tributary of Antelope Creek. 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. See the PRB FEIS for a surface water quality discussion, pp. 3-48 to 3-49.

3.5. Wetlands/Riparian

This project is almost 1 mile to the SW of Porcupine Creek. Project is in an unnamed drainage - a tributary of Antelope Creek. Ephemeral drainages flow into this intermittent creek. The ephemeral drainages have gentle slopes with well vegetated bottoms. The proposed project is not expected to affect Porcupine Creek.

The National Wetland Inventory shows 39.6 acres of freshwater emergent wetlands within the POD boundary, however, none of them will be impacted by the proposed project.

3.6. Invasive or Noxious Species

The operator discovered state-listed noxious weed infestations by a search of inventory maps and/or databases or during subsequent field investigation. Weeds noted are Canada thistle and Scotch thistle. Other weeds occurring in the project area include spotted knapweed. Gelbhard (2003) and Duniway (2010) showed that surface disturbances increase the proliferation of invasive or noxious species out to 0.5 mile or more from the disturbance while correspondingly compromising native communities in the same footprint. Cheatgrass (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) exist in the affected environment. These species are found in high densities and numerous locations throughout NE Wyoming. Balch (2013) linked the proliferation of cheatgrass in semi-arid environments to the increased frequency and severity of wildfire.

3.7. Fish and Wildlife

The PRB FEIS identified wildlife species occurring in the PRB, pp. 3-113 to 3-206. BLM performed a habitat assessment in the project area on July 8, 2014. The biologist evaluated impacts to wildlife resources and recommended project modifications where wildlife issues arose. BLM wildlife biologists also consulted databases compiled and managed by BLM BFO wildlife staff, the PRB FEIS, WY Game and Fish Department (WGFD) datasets, and the Wyoming Natural Diversity Database (WYNDD) to evaluate the affected environment for wildlife species that may occur in the area. A wildlife survey and habitat report was submitted by the operator which was performed by Grouse Mountain Environmental Consultants during the 2014 survey season (see AR). Site specific information is described below for known species suspected to occur and become impacted beyond the analysis of the PRD EIS 2003. Rationale for species not discussed in detail below can be referenced in the administrative record ((Table W.1. (Summary of Sensitive Species Habitat and Project Effects) and Table W.2. (Summary of Threatened and Endangered Species Habitat and Project Effects).

Land uses and other disturbances occurring within the proposed project area include, livestock grazing, ranching operations, overhead power lines, conventional oil and gas, and improved and unimproved roads. Habitats within the proposal are comprised of sagebrush grassland and mixed-grass prairie. The dominant vegetation is Wyoming big sagebrush and the understory is a mix of pasture grasses (Crested wheatgrass, blue gramma, western wheatgrass, threadleaf sedge, and cheatgrass). The habitat is similar in nature to the habitats (sagebrush obligate migratory birds and Greater sage-grouse habitat) discussed in the Lance Oil and Gas Company's Sahara POD EA, WY-070-EA13-72, incorporated here by reference.

3.7.1. Threatened, Endangered, Candidate, Special Status (Sensitive) Species (SSS)

3.7.1.1. Candidate Species – Greater Sage-Grouse (GSG)

Nesting GSG habitat exists within the proposal area. The majority of the sagebrush stands have been fragmented by oil and gas development. One lek, the 59 lek is within two miles of the proposal but the lek has been classified as unoccupied by WGFD in 2014. The affected environment for this proposal is similar to a recent approved project (Sahara POD) BLM analyzed. Therefore, the Sahara POD EA, WY-070-EA13-72 analysis is incorporated here by reference: Affected Environment (Section 3.7.4.1, p.18-19). The BLM IM WY-2012-019 establishes interim management policies for proposed activities on BLM-administered lands, including federal mineral estate, until RMP updates are complete.

3.7.1.2. Migratory Birds

The PRB FEIS discussed the affected environment for migratory birds, pp. 3-150 to 3-153. A wide variety of migratory birds may occur in the proposal area at some point during the year. Migratory birds are birds that migrate for breeding and foraging at some point in the year. The BLM-Fish and Wildlife Service (FWS) Memorandum of Understanding (MOU) (2010) promotes the conservation of migratory

birds, complying with Executive Order 13186 (Federal Register V. 66, No. 11). BLM must include migratory birds in every NEPA analysis of actions that have potential to affect migratory bird species of concern to fulfill obligations under the Migratory Bird Treaty Act (MBTA). The MBTA (and Bald and Golden Eagle Protection Act) are strict liability statutes so require no intent to harm migratory birds through prosecuting a taking. Recent prosecutions or settlements in Wyoming, and the west, cost companies millions of dollars in fines and restitution (which was usually retrofitting power lines to discourage perching to minimize electrocution or shielding ponds holding toxic substances). BLM encourages voluntary design features and conservation measures supporting migratory bird conservation, in addition to appropriate restrictions.

Habitats occurring near the proposed well locations include sagebrush steppe grasslands, and mixed grass prairie. Many species that are of high management concern use these areas for their primary breeding habitats (Saab and Rich 1997). Nationally, grassland and shrubland birds declined more consistently than any other ecological association of birds over the last 30 years (WGFD 2009). The FWS's Birds of Conservation Concern (BCC 2008) report identifies species of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act. Species in this list that have the potential to occur in the project area are: Brewer's sparrow, sage thrasher, loggerhead shrike, short-eared owl, and grasshopper sparrow. Of these, Brewer's sparrow, sage thrasher, and loggerhead shrike are BLM WY Sensitive Species (PRB FEIS WY-070-02-065, pp 3-189). Brewer's sparrows were observed during the 7/8/14 onsite at the 1-14, 2-13 and 2-18 pad locations.

3.7.1.3. Raptors

Raptor nests documented in the project area include; golden eagle, red-tailed hawk, Swainson's hawk and ferruginous hawk. The PRB FEIS discussed the affected environment for raptors present in the project area in pp. 3-145-146, and for ferruginous hawk on 3-183. Ferruginous hawks warrant further mention due to their special status designation. Ferruginous hawks are widely distributed; however, their population status and trends are unknown but are suspected to be stable. Populations are experiencing habitat loss, and they are sensitive to human disturbance. This species typically nests on the ground in grass and sage-shrub lands, increasing its exposure to ground predators. The proposal area includes suitable nesting and foraging habitats. The proposal is within one mile of 11 ferruginous hawk nests. Two of these nests, BLM # 2480 and 5482, have been documented as being active within the last three years. Seven nests, including two Swainson's hawk nests are within 0.5 miles of the project.

3.8. Cultural Resources

In accordance with 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 within BFO the reader is referred to the *Draft Cultural Class I Regional Overview, Buffalo Field Office* (BLM, 2010). A Class III (intensive) cultural resource inventory (BFO project no. 70140112) was performed in order to locate specific historic properties which may be impacted by the proposed project. No cultural resources are located in the proposed project area.)

3.9. Coal

BLM has reviewed the proposed locations and determined that they fall within the lands previously identified as suitable for further coal leasing consideration in the BFO RMP 2001 update. There are no pre-existing coal leases or pending BLM coal-related actions (leases by application, leases by modification, emergency leases or exchanges) overlapping the locations. None of the proposed locations fall within any existing Wyoming Department of Environmental Quality, Land Quality Division mine permit boundaries.

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. BLM incorporates by reference these analyses in this EA. 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 and ranching activities. 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 vertical and 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

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 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. 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

4.2.1. Direct and Indirect Effects

Anticipated impacts occurring include soil rutting and mixing, compaction, increased erosion potential, and loss of soil productivity. The most notable impacts would occur in association with the construction of well pads, staging areas, and roads. Construction of these facilities requires grading and leveling, with the greatest level of effort required on more steeply sloping areas. Construction activities mix the soil profiles with a corresponding loss of soil structure. Mixing may result in removal, dilution, or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Less desirable inorganic compounds such as carbonates, salts, or weathered materials could be relocated and have a negative impact on re-vegetation. Successful reclamation is expected with the application of the operator and the BLM's mitigation and COAs, adequate moisture, sound grazing practices and time. Soils compaction results from the construction of wells and associated facilities, continued vehicle and foot traffic as well as operational activities. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction leads to a loss of soil structure; decreased infiltration, permeability, and soil aeration; as well as increased runoff and erosion.

Increased erosion can lead to a decrease in soil fertility and an increase in sedimentation. The duration and intensity of these impacts would vary according to the type of construction activity to be completed and the inherent characteristics of the soils to be impacted. The potential for erosion would increase through the loss of vegetation cover and soil structure as compared to an undisturbed state. Soil productivity would decrease, primarily as a result of profile mixing and compaction along with the loss in

vegetative cover. These impacts would begin immediately as the soils would be subjected to grading and construction activities and impacts would continue for the term of operations. The impacts on soils would move to a steady state as construction activities were completed and well production/maintenance operations begin.

An important component of soils in Wyoming's semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (Belnap et al. 2001). They adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily damaged or destroyed by surface disturbances associated with construction activities.

Rutting affects the surface hydrology of a site as well as the rooting environment. The process of rutting physically severs roots, thus reducing soil aeration and infiltration thereby degrading the rooting environment. Rutting may result in topsoil and subsoil mixing, thereby reducing soil productivity. Rutting also disrupts natural surface water hydrology by diverting and concentrating water flow thus accelerating erosion. Soil mixing typically results in a decrease in soil fertility and a disruption of soil structure. Operator proposed engineered sections of road to gain access to the wells due to steep slopes, with cuts/fills exceeding 5 feet. The operator is responsible for having the licensed professional engineer certify that the construction of those roads meet the design criteria and are built to Bureau standards. These engineered road segments should be completed, including any culverts, low water crossings and required surfacing, before the drilling rig or other drilling equipment moves onto the pad in order to protect erodible soils.

Low water crossings (LWC) are a BLM approved construction technique to allow all weather access though drainages where culverts are not appropriate or desired. BLM recommends specific design criteria for a typical LWC which must be shown in proposed road designs. Construction completed to BLM approvable standards will reduce down drainage sedimentation, erosion, and scouring caused by frequent failure of in-channel structures.

Operator recommended a seed mix for this POD, based on soil map unit types, the dominant ecological sites found in the project area, and the mixing of soil horizons in disturbed areas. The BLM will evaluate reclamation success using the requirements in the BLM State Wide Reclamation Policy found at: http://www.blm.gov/wy/st/en/programs/reclamation, incorporated here by reference. Expanded gas, water, and electric ROW infrastructure linking POD support facilities are part of reasonably foreseeable development (RFD) additions to the proposed action (PRB ROD, p. 2). A foreseeable addition may be a request for a ROW to connect roads, gas and water utility lines.

4.2.1. Cumulative Effects

For details on expected cumulative impacts, refer to the referenced PRB FEIS, Chapter 4. The PRB FEIS defines the designation of the duration of disturbance (pp. 4-1 and 4-151). Most soil disturbances would be short term impacts with expedient interim reclamation and site stabilization.

4.2.2. Mitigation Measures

BLM will consider the following:

1. Constructed roads used in conjunction with accessing the project wells must be fully built (including all water control structures such as wing ditches, culverts, relief ditches, low water crossings, surfacing, etc.) and functional to BLM standards as outlined in the BLM Manual 9113 prior to drilling of the well. This applies to the entire project area.

2. Before replacing topsoil on heavily disturbed surfaces and on all other compacted surfaces compaction will be remediated by subsoiling, paraplowing, or ripping with a winged shank to the depth of compaction. Scarification will only be used on shallow soils.
3. If a dry hole, all rehabilitation work, including seeding, will be initiated within 30 days after plugging operations are completed (pending seasonal conditions).
4. A 30 day stabilization requirement from initial disturbance is applied to all wells and access/pipelines for the entire project. Stabilization BMPs include, but are not limited to; straw waddles, rock check dams, surface roughening, ditch and berms, erosion matting/blankets, seeding and mulching, and spraying tackifier on cut/fill slopes and top/soil piles.

4.2.3. Residual Effects

Residual effects across the POD would include a long-term loss of soil productivity associated with well pads and roads. The PRB FEIS identified residual effects (p. 4-408) such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established. In spite of the above residual effects, the BLM considers that Alternative B is within the parameters for surface disturbance and surface disturbance reclamation in PRB FEIS ROD.

4.3. Vegetation and Ecological Sites

4.3.1. Direct and Indirect Effects

The PRB FEIS discusses most direct and indirect effects to ecological sites and vegetation (p. 4-153 to 4-164). The proposed action would impact the common plant communities that occur on the site and the transition between the communities. Other impacts anticipated to occur include those in the direct and indirect effects listed above under soils section. Direct effects to ecological sites would occur from ground disturbance caused by construction of well pads, ancillary facilities, associated pipelines, and roads. Short term effects would occur where vegetated areas are disturbed but later reclaimed within 1 to 3 years of the initial disturbance. Long-term effects would occur where well pads, compressor stations, roads, water-handling facilities or other semi-permanent facilities would result in loss of vegetation and prevent reclamation for the life of the project. Sagebrush may not regenerate easily after human disturbance such as urban or agricultural development, or even after natural occurrences such as wildfire. It may take years, even generations, for sagebrush to fully grow back. Sagebrush still has not returned to some areas of the Columbia Basin burned by a large fire 40 years ago (Pacific Northwest National Laboratory Shrub Steppe Ecology Series May 2010).

4.3.2. Cumulative Effects

The PRB FEIS discusses the cumulative effects to ecological sites (pp. 4-153 to 4-172). Cumulative effects to ecological sites include the further alteration of disturbance regimes from the increased disturbance, increase in noxious weeds, and alterations in vegetation community's diversity and cover.

4.3.3. Mitigation Measures

The proponents operated committed measures and design features are sufficient to not warrant the application of site specific conditions of approval (COAs).

4.3.4. Residual Effects

Residual effects identified in the PRB FEIS, p. 4-408 such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established. The alteration of biodiversity of ecological sites could result from disturbance, alterations in vegetation in reclaimed areas, and the spread and establishment of weed species. BLM developed a site specific loamy seed mix for the proposed disturbance area. BLM can only require their use on BLM surface. The seed mix selected on private land is selected by the surface owner and may be designed to be more beneficial to cattle grazing than to soil stabilization. The result may be long term wind and water erosion on the loamy soils with little or no re-vegetation success. The BLM considers these residual effects from Alternative B for this

proposed well are likely within the parameters for acceptable surface disturbance and surface disturbance reclamation in PRB FEIS ROD and Onshore Order Number 1.

4.4. Water Resources

Peak's drilling program provides protection for the Fox Hills formation as well as other shallow aquifers. The casing design and cement program includes centralizers on every joint of casing through the Fox Hills to facilitate adequate cement covering. The volume of cement pumped is calculated to provide cement across the Fox Hills from 100 feet above to 100 feet below the aquifer. Adherence to the drilling COAs, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and using proper cementing procedures will protect fresh water aquifers above the drilling target zone. The operator will set surface casing at 2,500 feet to provide additional protection for shallow groundwater aquifers and coal zones. Compliance with the drilling and completion plans and Onshore Oil and Gas Orders Nos. 2 and 7 minimize an adverse impact on ground water.

The volume of water produced by this federal mineral development is unknowable at the time of permitting. Peak will have to produce the wells for a time to be able to estimate the volume and quality of water production. To comply with Onshore Order Oil and Gas Order No. 7, Disposal of Produced Water, Peak will submit a Sundry to the BLM within 90 days of first production which includes a representative water analysis and the final proposal for water management. The quality of water produced in association with conventional oil and gas historically was such that surface discharge would not be possible without treatment. Initial water production is quite low in most cases. There are 3 common alternatives for water management: re-injection, deep disposal, or disposal into pits. All alternatives would be protective of groundwater resources when performed in compliance with state and federal regulations.

4.4.1. Groundwater

4.4.1.1. Direct and Indirect Effects

Cumulative industry and regulatory experience shows that thousands of wells pierce the nation's largest aquifer in western Texas, Oklahoma, and Kansas with essentially no direct or indirect impact to that groundwater, see, http://www.spe.org/jpt/print/archives/2010/12/10Hydraulic.pdf. Lastly, the EPA 2004 study and its on-going, detailed study of hydraulic fracturing yielded, thus far, no immediate cautions, concerns, or warnings that present industry and regulatory practices endanger ground water or require immediate changes.

4.4.1.2. Mitigation Measures

Adherence to the drilling COAs, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and utilizing proper cementing procedures would protect fresh water aquifers above the target coal zone. Adherence to WDEQ permits and regulations will also mitigate impacts from produced water. This will ensure that groundwater will not be adversely impacted by well drilling and completion operations.

4.5. Invasive Species

4.5.1. Direct and Indirect Effects

The operator committed to the control of noxious weeds and species of concern using the following measures identified in their Integrated Pest Management Plan (IPMP): 1) Control Methods, including frequency; 2) Preventive practices; and 3) Education. Cheatgrass (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) exist in the affected environment. The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, and related facilities would present opportunities for weed invasion and spread. 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, applicant committed measures will reduce potential impacts from noxious weeds and invasive plants.

4.5.2. Cumulative Effects

Cumulative effects across the project area would include a long-term loss of soil productivity associated with well pads and road construction. 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.

4.5.3. Mitigation Measures

The proponents operated committed measures and design features are sufficient to not warrant the application of site specific conditions of approval (COAs).

4.5.4. Residual Effects

Peak's control efforts are limited to the surface disturbance associated the project's implementation. Cheat grass and other invasive species that are present in non-physically disturbed project areas are anticipated to continue to spread unless control efforts are expanded. Cheatgrass and to a lesser extent, Japanese brome are found in such high densities throughout NE Wyoming that a control program is not considered feasible at this time; these annual bromes would continue to be found within the project area.

4.6. Fish and Wildlife

4.6.1. Greater Sage-Grouse

Effects (Direct and indirect, Cumulative, Mitigation, and Residual) to GSG from surface disturbing and disruptive activities associated with development of horizontal oil wells were analyzed in Lance's Sahara POD EA, WY-070-EA13-72, 2013, Section 4.6.4.1, pp. 34-37, incorporated here by reference. Activities associated with development of this project are anticipated to be similar in nature, with the following additional site-specific information.

The proposal area contains suitable nesting habitat but is outside of Wyoming designated priority habitat. Construction of the well pads and associated infrastructure will cause fragmentation of sagebrush stands and result in the direct loss of an estimated 95.72 acres of GSG habitat (see Table 2.3. Disturbance Summary). Noise and human disturbance associated with roads, construction, drilling, and completion will be disruptive to GSG. Implementation of the project will adversely impact nesting habitat, both through direct loss of suitable habitats and avoidance of the area by GSG due to fragmentation and anthropogenic activity.

With application of Standard Operating Procedures (SOP's), applied mitigation, Required Design Features and Conditions of Approval identified for Greater Sage-Grouse under the proposed action, impacts caused by surface-disturbing and disruptive activities would be minimized.

4.6.1. Migratory Birds

4.6.1.1. Direct and Indirect Effects

The PRB FEIS discussed direct and indirect effects to migratory birds on pp. 4-231 to 4-235. Construction of the well pad and associated infrastructure will cause fragmentation of sagebrush stands and result in the direct loss of an estimated 95.72 acres of migratory bird habitat. BLM analyzed the effects to migratory birds from surface disturbing and disruptive activities associated with development of horizontal oil wells in the Sahara POD EA, WY-070-EA13-72, 2013, Section 4..6.2.2, pp. 31-33, incorporated here by reference. Effects and mitigation associated with this project are similar in nature, with the following additional site-specific information. During the onsites, the BLM biologist identified suitable nesting habitat present for several BLM sensitive sagebrush obligates. Construction of the well pads within the proposal and associated infrastructure will remove habitat and could kill BLM sensitive migratory birds, or destroy eggs, if the habitat is removed during the nesting season.

Heater treaters, and similar facilities with vertical open-topped stacks or pipes, can attract birds. Facilities without exclusionary devices pose a mortality risk. Once birds crawl into the stack, escape is difficult and the bird may become trapped (U.S. v. Apollo Energies Inc., 611 F.3d 679 (10th Cir. 2010); see also Colorado Oil and Gas Commission, Migratory Bird Policy, accessed February 13, 2012). To minimize these effects, the operator will equip all open-top pits, tanks, and pipes containing hydrocarbons with nets, screens, or other avian exclusion devices to prevent injury or death to migratory birds.

4.6.1.2. Cumulative Effects

The cumulative effects associated with alternative B are within the analysis parameters and impacts described in the PRB FEIS, p. 4-235.

4.6.1.3. Mitigation Measures

Construction of the proposal (vegetation removal) will occur outside of the breeding season (May 1- July 31) since suitable nesting habitat for sagebrush obligates is present. This restriction will apply to habitat removal, unless a pre-construction nest search (within 10 days of construction planned May 1-July 31) is completed. If surveys will be conducted, the operator will follow "2012 Sage-brush BLM Sensitive Migratory Bird Nest Protocol" found at the following web address:
http://www.blm.gov/wy/st/en/field_offices/Buffalo/wildlife.html.

The operator will equip all open-top pits, tanks, and pipes containing hydrocarbons with nets, screens, or other avian exclusion devices to prevent injury or death to migratory birds.

4.6.1.4. Residual Effects

Nests initiated after the first week in July may be destroyed by construction after August 1st. Migratory birds nesting adjacent to the well pad or road may be disturbed by construction and production activities. A timing limitation does nothing to mitigate loss and fragmentation of habitat. Suitability of the project area for migratory birds will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with oil and gas development.

4.7.1. Raptors

4.7.1.1. Direct and Indirect Effects

The PRB FEIS discussed impacts to raptors, pp.4-216 – 4 -220, and ferruginous hawks on p. 4-262. Implementing Alternative B would have the potential to cause similar direct and indirect effects on the one active ferruginous nest #2480 which is 0.4 miles to the south of the proposed 1-19 well pad location. Proposed pad 1-14 is 0.1 miles north of ferruginous nest 5839. The nest has been surveyed every year since 2008 with no activity being observed. The BLM biologist recommended that the pad design include visual screening in the event that the nest becomes active in the future. Representatives from Grouse Mountain, consultants for Peak, indicated that because of the terrain and the fact that the area between the pad and the nest would be "fill", that it would be unsafe to construct a screen at this location. Because of the history of inactivity, BLM will allow the proposed well location for this particular case. All raptors using nests in the vicinity of the project will likely be impacted to some extent by the human disturbance associated with operation and maintenance. 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 disruptive activities occur during nesting, they could be sufficient to cause adult birds to remain away from eggs or chicks causing overheating or chilling. This can result in egg or chick death. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Routine human activities near these nests can also draw increased predator activity resulting in increased nest predation. Out-of-vehicle activities are generally considered more disturbing to raptors than in-vehicle activities (French 1972, Garber 1972, Kahl, 1972, Skagen 1980, Fraser et al. 1985, Holmes et al. 1993). Stopped vehicles, particularly when occupants leave the vehicle, provoke negative

responses from nesting or perching raptors more often than moving vehicles (Steenhof 1976, Beck 1980, Scott 1985, White and Thurow 1985). The magnitude and duration of potential effects would be reduced with application of the 0.5-mile timing limitation stipulation during the breeding season (February 1 – July 31).

4.7.1.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS, Volume 2, Chapter 4, p. 4-221. Existing and reasonably foreseeable conventional oil development in the PBR would affect raptor populations due to increased human activity and fragmentation of foraging habitat.

4.7.1.3. Mitigation Measures

To reduce the risk of decreased productivity or nest failure, the BLM BFO will require a 0.5 mile radius timing limitation for surface disturbing activities during the breeding season (February 1-July 31) around active/biologically important raptor nests.

4.7.1.4. Residual Impacts

Even with timing restrictions, raptors may abandon nests due to foraging habitat alteration associated with development or sensitivity to well or infrastructure placement. A decline in the breeding population of raptors within the area may occur.

4.8. Cultural Resources

4.8.1. Direct and Indirect Effects

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 proposed project. Following the *State Protocol Between the Wyoming Bureau of Land Management State Director and The Wyoming State Historic Preservation Officer*, Section V(E)(iv) and V (B) (i), the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on December 1, 2014, that no historic properties exist within 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 must be followed. Further discovery procedures are explained in Standard COA (General)(A)(1) and in Appendix K of the Wyoming Protocol.

4.8.2. Cumulative Effects

Construction and development of oil and gas resources impacts cultural resources through ground disturbance, unauthorized collection, and visual intrusion of the setting of historic properties. This results in fewer archaeological resources available for study of past human life-ways, changes in human behavior through time, and interpreting the past to the public. Additionally, these impacts may compromise the aspects of integrity that make a historic property eligible for the National Register of Historic Places. Recording and archiving basic information about archaeological sites and the potential for subsurface cultural materials in the proposed project area serve to partially mitigate potential cumulative effects to cultural resources.

Fee actions constructed in support of federal actions can result in impacts to historic properties. Construction of large plans of coalbed natural gas development on split estate often include associated infrastructure that is not permitted through BLM. Project applicants may connect wells draining fee minerals, or previously constructed pipelines on fee surface with a federal plan of development. BLM has no authority over such development which can impact historic properties. BLM has the authority to modify or deny approval of federal undertakings on private surface, but that authority is limited to the

extent of the federal approval. Historic properties on private surface belong to the surface owner and they are not obligated to preserve or protect them. The BLM may go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally impacted by the landowner at any time. The cumulative effect of numerous federal approvals can result in impacts to historic properties. Archeological inventories reveal the location of sites and although the BLM goes to great lengths to protect site location data, information can potentially get into the wrong hands. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public.

4.8.3. Mitigation Measures

If operators observe any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS and ROD)] during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Standard COA (General)(A)(1) further explains discovery procedures.

4.8.4. Residual Effects

During the construction phase, there will be numerous crews working across the project area using heavy construction equipment without the presence of archaeological monitors. Due to the extent of work and the surface disturbance caused by large vehicles, it is possible that unidentified cultural resources can be damaged by construction activities. The increased human presence associated with the construction phase can also lead to unauthorized collection of artifacts or vandalism of historic properties.

4.9. Coal

Effects of the proposed action to the federal coal estate will be minimal. It is unlikely the lands will be developed for coal mining in the foreseeable future. If such development occurs it would likely be after a number of years of production from these wells (assuming production occurs) and the value of the wells would be such that negotiations between the oil & gas and the coal operators would prevent any federal coal from being stranded or bypassed.

5. CONSULTATION/COORDINATION:

BLM Consulted or Coordinated with the Following on this Analysis; OSP (Onsite Presence):

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