UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Buffalo Field Office
Buffalo, Wyoming

Optional Environmental Assessment (EA), FONSI/DR
For Coal Bed Methane Related Actions

EA#-WY-070-08-187

Proposed Action Title/Type: Willow Creek Add 1POD and Willow Creek Add 1 SGP POD dated 03/18/08
Location of Action: Campbell and Johnson T45N & T46N, R76W, Section(s): 4, 19, 20, 28, 29, 32, & 33
Applicant (if any): Bill Barrett Corporation

	Well Name	Well #	TWP	RNG	SEC	QTR	Lease
1	WILLOW CR ADD I CHRISTENSEN	12-4	45N	76W	4	SWNW	WYW89855
2	WILLOW CR ADD I CHRISTENSEN	32-4	45N	76W	4	SWNE	WYW89855
3	WILLOW CR ADD I BRUBAKER	32-19	46N	76W	19	SWNE	WYW89856
4	WILLOW CR ADD I BRUBAKER	41-19	46N	76W	19	NENE	WYW89856
5	WILLOW CR ADD I CHRISTENSEN	12-20	46N	76W	20	SWNW	WYW20290
6	WILLOW CR ADD I CHRISTENSEN	14-20	46N	76W	20	SWSW	WYW74160
7	WILLOW CR ADD I CHRISTENSEN	14-28	46N	76W	28	SWSW	WYW18925A
8	WILLOW CR ADD I CHRISTENSEN	23-28	46N	76W	28	NESW	WYW18925A
9	WILLOW CR ADD I CHRISTENSEN	34-28	46N	76W	28	SWSE	WYW18925A
10	WILLOW CR ADD I CHRISTENSEN	43-28	46N	76W	28	NESE	WYW18925A
11	WILLOW CR ADD I CHRISTENSEN	21-29	46N	76W	29	NENW	WYW18925
12	WILLOW CR ADD I CHRISTENSEN	23-29	46N	76W	29	NESW	WYW18925
13	WILLOW CR ADD I CHRISTENSEN	32-29	46N	76W	29	SWNE	WYW18925
14	WILLOW CR ADD I CHRISTENSEN	34-29	46N	76W	29	SWSE	WYW18925
15	WILLOW CR ADD I CHRISTENSEN	41-29	46N	76W	29	NENE	WYW18925
16	WILLOW CR ADD I CHRISTENSEN	43-29	46N	76W	29	NESE	WYW18925
17	WILLOW CR ADD I CHRISTENSEN	43-32	46N	76W	32	NESE	WYW18925
18	WILLOW CR ADD I CHRISTENSEN	23-33	46N	76W	33	NESW	WYW41488
19	WILLOW CR ADD I SGP CHRISTENS	12-28	46N	76W	28	SWNW	WYW18925A
20	WILLOW CR ADD I SGP CHRISTENS	21-28	46N	76W	28	NENW	WYW18925A
21	WILLOW CR ADD I SGP CHRISTENS	32-28	46N	76W	28	SWNE	WYW18925A
22	WILLOW CR ADD I SGP CHRISTENS	41-28	46N	76W	28	NENE	WYW18925A

Conformance with Applicable Land Use Plan:
The proposed action is in conformance with the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office, April 2001 and the Powder River Basin Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS), #WY-070-02-065 (approved April 30, 2003).

The Plan has been reviewed to determine if the proposed action conforms with the land use plan terms and conditions as required by 43 CFR 1610.5.
Remarks: The Plan conforms to 43 CFR 1610.5 terms and conditions.

Relationship to Other Environmental Documents:
This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the PRB FEIS and the Willow Creek POD EA#-WY-070-06-211 (9/13/06).

Purpose & Need for Proposed Action:
The purpose for the proposal is to produce coal bed natural gas (CBNG) on 7 federal oil and gas mineral leases issued to the applicant by the BLM. The need exists because without approval of the Applications for Permit to Drill (APDs), federal lease royalties will be lost and the lessee will be deprived of the federal gas they have the rights to develop. It is the continuing policy of the Federal Government to foster and encourage private enterprise in the development of a stable domestic minerals industry and the orderly and economic development of domestic mineral resources; as set forth in the Mining and Minerals Policy Act of 1970. In addition the Energy Policy Act of 2005 encourages the development of the nation's domestic energy resources to reduce the United States dependence of foreign energy sources.

Description of Proposed:
The project area is located 35 southwest of Gillette, Wyoming and is composed of infill drilling of 22 wells to the Big George Coal Seam to depths of approximately 1350' to 1425' in the existing Willow Creek POD. As part of the overall water management strategy, eight outfalls (4 recently built as part of fee action and 4 proposed) and 7 impoundments, including 2 proposed off-channel pits, 1 existing off-channel pit, 1 proposed on-channel reservoir and 3 existing on-channel reservoirs, will be added to the Willow Creek POD infrastructure to help manage the additional water produced as a result of these two PODs. One of the existing reservoirs (EX28-1-4676) will be upgraded. Potentially a total of 129.7 acre feet of storage will be added to the system to manage a maximum of 30 gpm from 22 wells for a total of 660 gallons per minute (gpm) in Willow Creek Adds I and SGP PODs. Discharge is projected to drop to approximately 10 gpm per well after the first year of water production. Discharge of CBNG production water is permitted under the Wyoming Pollutant Discharge Elimination System (WYPDES) Pumpkin Creek General Permit, WPG280000 as was the Willow Creek POD. The Water Management Plan (WMP) describes how water collected in on-channel reservoirs will be periodically released in surges or pulses so that water fills next downstream reservoir. This strategy is being adopted to reduce channel impacts. The WYPDES permit does not allow water to flow downstream past the most downstream reservoir in the system.

The following impoundment locations were inspected and approved for use in association with the water management strategy for the POD. Bonding is in place for the impoundments over federal mineral leases.

IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
P19-2	NWNE	19	46	76	8.5	1.5	WYW89856
Pit 21-1	NWSW	21	46	76	28.24	4.4	FEE
Pit 20-1	**SESE**	**20**	**46**	**76**	**26.53**	**5.2**	**FEE**
Pit 33-1	W/2NW	33	46	76	40.25	6	FEE
EX28-1-4676	**NWSE**	**28**	**46**	**76**	**17**	**2**	**WYW18925A**
EX21-1	**NESW**	**21**	**46**	**76**	**7.4**	**Na**	**FEE**

IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
P21-4	**NWNE**	**21**	**46**	**76**	**16.8**	**Na**	**FEE**

Notes: Bold text refers to existing structures.

Refer to EA#-WY-070-06-211 for more information regarding this action.

Environmental Impacts:

Critical Element	Potentially Affected	Critical Element	Potentially Affected
Air Quality	Yes ☐ No ☒	T&E Species	Yes ☐ No ☒
ACEC	Yes ☐ No ☒	Wastes, Haz./Solid	Yes ☐ No ☒
Cultural Resources	Yes ☐ No ☒	Water Resources	Yes ☒ No ☐
Farmlands, Prime/Unique	Yes ☐ No ☒	Wetlands/Riparian	Yes ☒ No ☐
Floodplains	Yes ☐ No ☒	Wild and Scenic Rivers	Yes ☐ No ☒
Nat. Amer. Rel. Concerns	Yes ☐ No ☒	Wilderness	Yes ☐ No ☒
Environmental Justice	Yes ☐ No ☒	Invasive Species	Yes ☒ No ☐

Description of Impacts:

The 22 infill wells can be drilled without a constructed well pad. Surface disturbance associated with the drilling of the 22 wells without constructed pads would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes); reserve pit construction (estimated approximate size 20 x 60 feet), and compaction (from vehicles driving/parking at the drill site). The working area needed for each well is estimated at a maximum 150' x 150'. The total surface disturbance associated with the 22 wells will be 11.4 acres. This would be a short-term, minor impact with expedient, successful reclamation and site-stabilization, as committed by the operator in their POD MSUP and as required by BLM in COAs.

Approximately 1.6 miles of new and existing primitive road would be utilized to access well sites. The majority of proposed pipelines (gas and water) have been located in "disturbance corridors." Disturbance corridors involve the combining of 2 or more utility lines (water, gas, power) in a common trench, usually along access routes. This practice results in less surface disturbance, reduction in wildlife habitat fragmentation and overall environmental impacts. Approximately 12.40 miles of utilities would be constructed in a disturbance corridor. Approximately 1.4 miles of pipeline would be constructed outside of corridors. Approximately 1.7 miles of overhead powerlines would be constructed by a third party contractor in association with the federal development. Expedient reclamation of disturbed land with stockpile topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measure (e.g., waterbars, water wings, culverts, rip-rap, etc.) would ensure land productivity/stability is regained and maximized.

New impoundment and improved existing impoundment construction will disturb 14.7 acres, and new outfalls will disturb about 0.08 acres. Water will be discharged at various outfalls to flow in approximately 3 miles of ephemeral channels to downstream impoundments; there will be a potential for new channel impacts in these reaches as discussed in the Willow Creek POD EA# WY-070-06-211. While the existing impoundments were built for fee action, they are recent construction and very little fee water has flowed down channels to fill them at the time of the onsite. Like the original Willow Creek POD, this POD uses an approach to periodically surge or pulse flow from impoundments so that the exposure of channel soils and vegetation to CBNG production water is reduced, and so the potential for

channel and riparian impacts is reduced. Flow between outfalls and reservoirs will be sustained, therefore the risk of such impacts will not be reduced in those stream reaches, which are equal to approximately one-half mile of stream channel on private surface (the operator indicated that the landowner favored this approach). See the Willow Creek POD EA# WY-070-06-211 for more discussion on channel and riparian impacts.

Invasive Species
The following noxious weeds were identified by the proponent as having potential of being present within the project area:

- black henbane
- Scotch thistle
- Russian knapweed
- saltcedar
- leafy spurge
- diffuse knapweed
- spotted knapweed

No noxious weeds were identified by the proponent or the BLM during the pre-approval onsite visits.

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

An Integrated Pest Management Plan was provided by Bill Barrett Corporation (BBC). BBC will use preventive practices to avoid the transport and spread of noxious weeds into the area The preventive practices outlined in "Coal Bed Natural Gas Well-Application for Permit to Drill and Plan of Development Preparation Guide" Many 9, 2003, Part II, Section VIII, Heading B, will be distributed to , and followed by all BBC filed employees and contractors.

For more information on impacts, please refer to Willow Creek POD EA# WY-070-06-211.

Cultural Resources:
A Class III inventory was conducted for the Willow Creek Additions 1 project prior to on-the-ground project work (BFO project # 70080112). North Platte Archaeological Services conducted the Class III inventory following the Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48FR190) for the proposed project. Clint Crago, BFO archaeologist, reviewed the report for technical adequacy and for compliance with BLM and Wyoming State Historic Preservation Office standards, and determined it to be adequate. The following resources are located within or near the Area of Potential Effect (APE).

Cultural Resource Sites Identified within or near the Willow Creek Additions 1 project area

Site Number	Site Type	Eligibility
48JO172	Homestead	Not Eligible
48JO3578	Prehistoric Lithic Scatter	Not Eligible

No historic properties exist in the area of potential effect. 48JO3578 may be impacted by the project, but is considered not eligible to the NRHP. On 9/30/08, the Bureau will electronically notify the Wyoming State Historic Preservation Office (SHPO), following section VI(A)(1) of the Wyoming State Protocol, of a finding of no effect to historic properties for the proposed project.

If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the ***Standard COA*** (General)(A)(1).

Wildlife:
A habitat assessment and wildlife inventory surveys were performed by Big Horn Environmental Consultants (BHEC) (2008a, 2008b). BHEC performed surveys for bald eagle roosts, raptor nests, greater sage-grouse, sharp-tailed grouse, black-tailed prairie dog colonies, mountain plovers, and BLM Wyoming Sensitive species. A habitat assessment for Ute Ladies'-tresses orchid was also performed. All surveys were conducted according to the Powder River Basin Interagency Working Group's (PRBIWG) accepted protocol, which is available on the CBM Clearinghouse website (www.cbmclearinghouse.info).

A BLM biologist conducted field visits on August 4 and 5, 2008. During that time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project modification recommendations where wildlife issues arose. Two tables were created to summarize and evaluate Sensitive species habitat and project effects and Threatened and Endangered species habitat and project effects. These tables are located in the project file. This environmental assessment includes analysis only for those species whose status has changed since the Willow Creek POD EA, where effects have changed since the Willow Creek POD EA, or that were not covered in the Willow Creek POD EA.

Big Game
Effects on pronghorn and mule deer will be similar to those identified in the Willow Creek POD EA.

Aquatics
Produced water will be discharged through five new outfalls, one existing reservoir, and two new reservoirs. Effects to aquatics will be similar to those identified in the Willow Creek POD EA.

Migratory Birds
Effects to migratory birds will be similar to those identified in the Willow Creek POD EA.

Raptors
Eleven nests were identified by BHEC in 2008, six of which were active (Table 1). Golden eagles, red-tailed hawks, and great-horned owls used nests within the Willow Creek Add and SGP project areas (project area). A discrepancy exists for nest 3994 in 2008. BHEC reported the nest as active with golden eagles, but another consultant reported it as inactive. A discrepancy also exists with nest 4317 in 2008. BHEC reported this nest as inactive, but it was reported as active with red-tailed hawks by another consultant. In order to maximize protection of the raptors in the area, BLM will consider both of these nests as being active in 2008. BHEC reported that nest 4315 was a black-billed magpie nest that is no longer there. BLM requests one more year of surveys to confirm that this substrate is not used by raptors.

During the onsite several wells were moved to reduce impacts to raptors. Wells 32-19, 21-29, 32-29, and 41-19 were moved to minimize their visibility from the nests. Outfalls 008, 101, and reservoir P19-1 were dropped from the project because of their proximity to nest 4161. Bill Barrett also agreed to take extra precautions to minimize disturbance around nest 3994, including limiting visitation between 9:30 and 3:30. Nest 3994 is a golden eagle nest and has been active for the three years for which BLM has survey data. These precautions will include minimal visitation to infrastructure and visits to wells only during the middle of the day.

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around raptor nests and recommends all infrastructure requiring human visitation to be located greater than 0.25 mile from occupied raptor nests.

Table 1. Raptor Nests Identified in the Willow Creek Additions and SGP Project Area

BLM ID	UTMs	Legal	Sub-strate[1]	Year	Condition	Status[2]	Species[3]
3994	418379E 4865696N	S20 T46N R76W	CTL	2008	Excellent	INAC	
				2008	Good	ACTI	GOEA
				2007	Good	ACTI	GOEA
				2006	Good	ACTI	GOEA
4161	417268E 4866846N	S19 T46N R76W	CTL	2008	Fair	INAC	
				2007	Unknown	OCCU	GRHO
				2007	Good	INAC	
				2006	Good	INAC	
4314	416852E 4867946N	S18 T46N R76W	CTL	2008	Fair	ACTI	GRHO
				2008	Good	ACTI	GRHO
				2007	Good	ACTI	GRHO
				2006	Good	ACTI	RETA
4315	416128E 4865910N	S19 T46N R76W	CTL	2008	Gone	INAC	
				2008	Remnants	INAC	
				2006	Poor	INAC	
4317	417834E 4866153N	S20 T46N R76W	CTL	2008	Good	ACTI	RETA
				2008	Good	INAC	
				2006	Good	ACTI	RETA
4382	419489E 4861466N	S4 T45N R76W	CTL	2008	Good	INAC	
				2006	Poor	INAC	
4904	417958E 4866439N	S20 T46N R76W	CTD	2008	Fair	ACTI	GRHO
				2008	Poor	ACTI	GRHO
				2007	Fair	ACTI	GRHO
5338	417213E 4867727N	S18 T46N R76W	CTL	2008	Good	ACTI	RETA
5670	417805E 4866274N	S20 T46N R76W	CTL	2008	Good	ACTI	RETA
				2007	Good	ACTI	RETA
5744	417426E 4867088N	S20 T46N R76W	CTL	2008	Fair	INAC	
5746	419561E 4863782N	S33 T46N R76W	CTL	2008	Fair	ACTI	GRHO

Notes:
1 CTD = Cottonwood dead; CTL = Cottonwood live
2 ACTI = Active; INAC = Inactive; OCCU = Occupied
3 GOEA = Golden eagle; GRHO = Great-horned owl; RETA = Red-tailed hawk

Black-footed Ferret

Black-footed ferret habitat is not present within the project area. Three black-tailed prairie dog colonies were identified during site visits by BHEC within the project area. Table 2 lists the location and size of these colonies. Historical records indicate that colonies have existed in at least four additional locations as mapped by WGFD. These are also listed in Table 2. At least 24 mapped prairie dog colonies occur within 1.5 km of each other, beginning with colonies in the project area. These colonies, some of which overlap, cover an area approximately 287 acres in size.

Table 2. Black-tailed Prairie Dog Colonies in the Willow Creek Addition and SGP Project Area

Legal Location	Acreage	Source
SWSW S17, NENE S19, NW S20 T47N R76W	51 acres	BHEC
SWNW S20, NWNW S20 T47N R76W	19 acres	BHEC
SENW, E SW S29 T47N R76W	44 acres	BHEC
SWNW S33 T46N R76W	2 acres	WGFD
NWNW S29, SWSW S20 T46N R76W	6 acres	WGFD
SWSE S19, NWNE S30 T46N R76W	2 acres	WGFD
SESW S19 T46N R76W	10 acres	WGFD

Ute Ladies'-tresses Orchid

The project area does not contain suitable Ute ladies'-tresses habitat. Well locations and infrastructure are located in dry upland vegetation with no source of perennial water. No known populations occur in the project area. The ephemeral drainages (e.g., Craney Draw) have heavy clay soils and immediately rise to upland vegetation, reducing potential for this species. Perennial water sources occur in School Section Spring, Willow Creek, and in isolated pools in Craney Draw. These sources are characterized by heavy clay soils typical of the area, with little emergent vegetation, and rise immediately to upland vegetation. Based on the lack of suitable habitat, BLM has determined that implementation of the project will have "no effect" on the Ute Ladies'-tresses orchid.

Sensitive Species

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

Prairie Dog Colony Obligates

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

Forty percent of wildlife taxa in South Dakota (134 vertebrate species) are associated with prairie dog colonies (Agnew 1983, Apa 1985, McCracken et al. 1985, Agnew 1986, Uresk and Sharps 1986, Deisch et al. 1989). Of those species regularly associated with prairie dog colonies, three are on the Wyoming BLM sensitive species list that are expected to occur in the project area: ferruginous hawk (discussed in

the *Raptors* section), burrowing owl (discussed below), and loggerhead shrike. The loggerhead shrike is a predatory songbird found in basin-prairie shrub and mountain-foothill shrub habitats. It preys upon other songbirds, insects, small mammals and reptiles. Declines are believed to be a result of environmental contaminants, habitat loss, and habitat degradation (Yosef 1996).

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

Sagebrush Obligates
Sagebrush obligates are species that require sagebrush for some part of their life cycle. They cannot survive without sagebrush and its associated perennial grasses and forbs. Shrubland- and grassland-dependent birds are the fastest-declining group of species in North America (Knick et al. 2003).

Sagebrush obligates that may occur in the project area and that are listed as Sensitive species by BLM Wyoming include sage thrasher, Brewer's sparrow, and greater sage-grouse. Sage thrasher and Brewer's sparrow require sagebrush for nesting, with nests typically located within or under the sagebrush canopy. Sage thrashers usually nest in tall dense clumps of sagebrush within areas having some bare ground for foraging. Brewer's sparrows are associated closely with sagebrush habitats having abundant scattered shrubs and short grass (Paige and Ritter 1999). Greater sage-grouse are discussed in more detail below.

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

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

Bald Eagle
Suitable bald eagle roosting habitat is not present in the project area. No bald eagles were noted during two years worth of winter surveys (BHEC 2008). Effects are as described in the Willow Creek POD EA.

Black-tailed prairie dog
Three black-tailed prairie dog colonies, totaling approximately 114 acres, were identified during site visits

by BHEC within the project area, and at least four additional colonies have been reported in the area, according to WGFD records (Table 2). At the onsite, the BLM biologist noted prairie dogs in the vicinity of reservoir 33-1 in SWSW S33 T47N R76W. Attempts were not made to move facilities for protection of black-tailed prairie dogs based on the landowner's request. Direct habitat loss and mortalities will occur with the construction of the reservoir. Additional effects are described in the Willow Creek POD EA.

Greater Sage-grouse

Suitable greater sage-grouse (sage-grouse) habitat is present throughout the project area. Mature stands of sparse to moderately dense sagebrush interspersed with open grasslands provide year-round forage and habitat for sage-grouse. The numerous draws in the area provide good forage for brood-rearing hens. Relatively recent winter and non-winter sage-grouse sign were observed in the vicinity of wells 23-33, 32-4, 12-4, and 34-29.

Sage-grouse habitat models indicate that 84% of the project area contains high quality sage-grouse nesting habitat and all of the area contains high quality sage-grouse wintering habitat (Walker et al. 2007). BLM records indicate that six sage-grouse leks are located within four miles of the project area (Table 3). The 4-mile distance was recommended by the State wildlife agencies' ad hoc committee for consideration of oil and gas development effects to nesting habitat (WGFD 2008).

Table 3. Sage-grouse Leks within 4 Miles of the Willow Creek Addition and SGP Project Area

Lek Name	Legal Location	Distance from Project Area (mi)	Year: Peak Males
County Line N	S05 T46N R76W	2.7	2008: 9 2007: 29 2006: 23 2005: 24 2004: 14
County Line	S16 T46N R76W	1.5	2008: 9 2007: 18 2006: 21 2005: 30
Innes	S30 T46N R75W	3.4	2008: 34 2007: 39 2006: 35 2005: 41
Pumpkin Creek II	S02 T46N R77W	2.6	2008: 19 2007: 27 2006: 26 2005: 10 2004: 0
Willow Creek	S23 T45N R76W	3.4	2008: 8 2007: 7 2006: 12

Lek Name	Legal Location	Distance from Project Area (mi)	Year: Peak Males
Christensen Ranch 4	S19 T45N R76W	3.3	2004: 14 2005: 24 2006: 23 2007: 29 2008: 17

The proposed action will adversely impact breeding, nesting, brood rearing, late summer, and winter habitat. Proposed project elements that are anticipated to negatively impact grouse are approximately 22 CBNG wells on 22 locations, 3 miles of new roads, 7 miles of new pipelines, 1.7 miles of new overhead power, two new reservoirs, and increased vehicle traffic on established roads. Using a 0.6 mile buffer around wells as a metric for for evaluating impacts (Holloran et al. 2007, Aldridge and Boyce 2007), effective sage-grouse habitat loss will be approximately 8.8 square miles.

Based on the best available science, which is summarized below, the proposed action will likely contribute to a decline in male attendance at the six leks that occur within four miles of the project area, and, potentially, extirpation of the local grouse population.

At the onsite, five wells were moved in order to mitigate impacts to sage-grouse habitat. Well 12-4 was moved out of a sagebrush stand to reduce fragmentation of high quality sage-grouse habitat. Well 32-19 was moved to minimize disturbance to sage-grouse habitat. Well 3-32 was moved to avoid sage-grouse habitat fragmentation. Well 23-33 was moved to reduce further sage-grouse habitat fragmentation. Well 41-28 was moved out to the edge of a stand of sagebrush that provided high-quality sage-grouse habitat. Other infrastructure was also moved or re-routed to mitigate for impacts to sage-grouse. Pit 33-1 was moved to the edge of a sagebrush stand and into a disturbed area to avoid disturbance to sage-grouse habitat. Access to well 34-29 was rerouted to minimize disturbance to a sagebrush stand. The pipeline that accessed well 32-29 was rerouted to avoid fragmentation of a sagebrush stand. Two powerlines were moved to avoid travel across sage-grouse habitat. The access corridor for well 41-28 was moved to an existing two-track road and out of high-quality sage-grouse habitat. Bill Barrett also agreed to place a timing limitation on wells 34-29 and 32-19, which are out of a two-mile radius of leks but that are in high-quality habitat, and BLM will not place timing limitations on wells 41-29, 12-28, and 12-20, which are in a two-mile radius of leks, but that are in poor sage-grouse habitat.

In addition to the direct impacts to sage-grouse habitat that will be created by the federal wells and associated infrastructure the project area contains existing fee, State, and Federal fluid mineral development. Attendance at five of the six leks within four miles of the project area declined from 2007 to 2008. The amount of disturbance that has taken place in the vicinity of these leks may already have compromised the ability of sage-grouse that breed in this area to successfully rear their young.

The sage-grouse cumulative impact assessment area for this project encompasses a four mile radius from the six sage-grouse leks listed in Table 3. All of the wells and infrastructure in the project area are within four miles of the six leks - an area of 188 square miles. There are currently 1,084 wells (WOGCC 09/15/2008) within this area, at a density of approximately 5.8 wells per square mile. Due to this level of development there is a strong potential that the population(s) breeding at these leks may become extirpated without development of the project.

There are 615 proposed wells (AFMSS 09/15/08) (22 are the wells from this project) within four miles of the six leks. With the addition of the 593 proposed wells that are not associated with this proposed action,

the well density within four miles of the six leks increases to 1,677 wells at a density of 8.9 wells per square mile. With approval of alternative C (22 proposed well locations), the well density increases to 9.0 wells per square mile.

CBNG is a recent development, with the first well drilled in 1987 (Braun et al. 2002). In February 1998 there were 420 producing wells primarily restricted to eastern Campbell County (BFO 1999). By May 2003 there were 26,718 CBNG wells permitted within the BFO area (WGFD 2004a). The PRB FEIS estimated 51,000 additional CBNG wells to be drilled over a ten year period beginning in 2003 (BFO 2003).

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

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

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

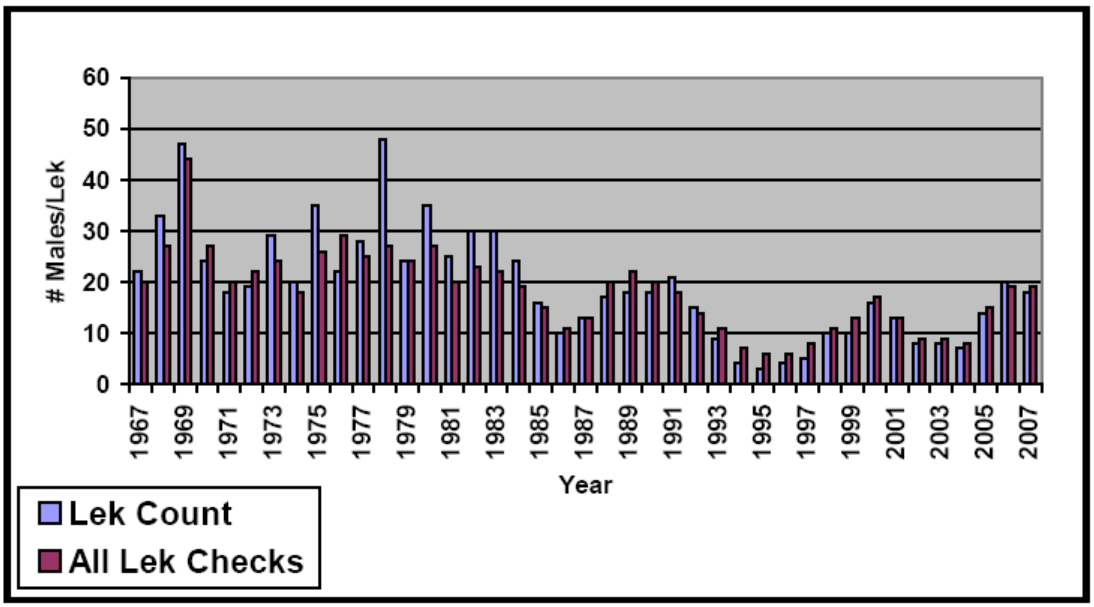
Noise can affect sage-grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003). In a study of greater sage-grouse population response to natural gas field development in western Wyoming, Holloran (2005) concluded that increased noise intensity, associated with active drilling rigs within 5 km (3.1 miles) of leks, negatively influenced male lek attendance. In 2002, Braun et al. documented approximately 200 CBNG facilities within one mile of sage-grouse leks. Sage-grouse numbers were found to be consistently lower for these leks than for leks without this disturbance. Direct habitat losses from the facilities themselves, roads and traffic, and the associated noise were found to be the likely reason for this finding.

Vegetation communities within the Powder River Basin are naturally fragmented, as they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. The Powder River Basin is also near the eastern edge of greater sage-grouse range. A sagebrush cover assessment within Wyoming basins estimated sagebrush coverage within the Powder River Basin to be 35% with an average patch size less than 300 acres (Rowland et al. 2005). The Powder River Basin patch size has decreased by more than 63% in the past forty years, from 820 acre patches and an overall coverage of 41% in 1964 (Rowland et al. 2005). The existing development within the cumulative impacts assessment area has further fragmented the sage-grouse habitat. Disturbance created by this project will contribute to additional fragmentation.

Another concern with CBNG development is that reservoirs created for water disposal provide habitat for mosquitoes associated with West Nile virus (WGFD 2004b). West Nile virus represents a significant new stressor, which in 2003 reduced late summer survival of sage-grouse an average of 25% within four populations including the Powder River Basin (Naugle et al. 2004). In northeastern Wyoming and southeastern Montana, West Nile virus-related mortality during the summer resulted in an average decline in annual female survival of 5% from 2003 to 2006 (Walker et al. 2007). Powder River Basin sage-grouse losses during 2004 and 2005 were not as severe. Summer 2003 was warm and dry, more conducive to West Nile virus replication and transmission than the cooler summers of 2004 and 2005 (Cornish pers. comm.).

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

Figure 1. Male sage-grouse lek attendance within northeastern Wyoming, 1967-2007.



The BFO Resource Management Plan (BLM 2001) and the Powder River Basin Oil and Gas Project Record of Decision (BLM 2003) include a two-mile timing limitation within sage-grouse nesting habitat. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). BLM Wyoming adopted the two-mile recommendation in 1990 (BLM 1990). The two-mile recommendation was based on early research which indicated between 59 and 87 percent of sage-grouse nests were located within two miles of a lek (BLM 2004). These studies were conducted within prime, contiguous sage-grouse habitat such as Idaho's Snake River plain.

Additional studies, across more of the sage-grouse's range, indicate that many populations nest much farther than two miles from the breeding lek (BLM 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported only 45% of their sage-grouse hens nested within 3 km (1.86 mi) of the capture lek. Moynahan and Lindberg (2004) found only 36% of their grouse nesting within 3 km of the capture lek. Moynahan's study area was north-central Montana in an area of mixed-grass prairie and sagebrush steppe, with Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) being the dominant shrub species (Moynahan et al. 2007). Habitat conditions and sage-grouse biology within the Buffalo Field Office are more similar to Moynahan's north-central Montana study area than the Upper Green River area.

A two-mile timing limitation, given the long-term population decline and that less than 50% of sage-grouse are expected to nest within the limitation area, is insufficient to reverse the population decline. Moynahan and Lindberg (2004) like WAFWA (Connelly et al. 2000), recommend increasing the protective distance around sage-grouse leks. The BLM and University of Montana are currently researching nest location and other sage-grouse questions and relationships between grouse and coalbed natural gas development. Thus far, this research suggests that impacts to populations, as measured by males attending leks, from energy development are discernable out to a minimum of four miles, and that some leks within this radius have been extirpated as a direct result of energy development (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008). Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production. In a typical landscape in the Powder River Basin, energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87% to 5% percent (Walker et al. 2007).

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

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

Sharp-tailed Grouse
The project area does not contain sharp-tailed grouse habitat. No sharp-tailed grouse were observed during surveys (BHEC 2008).

Mountain plover
Suitable mountain plover habitat is not present within the project area. The prairie dog colonies within the project area are characterized by tall residual grass with very few areas of bare flat ground. No mountain plover were observed in the project area (BHEC 2008). This is consistent with results for the Willow Creek POD.

Western Burrowing Owl
Although habitat is present, the survey information provided by BHEC did not indicate that any burrowing owl nests were found in the POD. Burrowing owls could be impacted by the proposed action.

Cumulative Impact Analysis: For a complete description of cumulative impacts, please refer to the PRB Final EIS Volume 2, Chapter 4, pages 4-1 through 4-364. Specifically, groundwater cumulative impacts are discussed on pages 4-64 through 4-69 and surface water cumulative impacts are discussed on pages 4-115 through 4-117 and 4-122 through 4-124.

Description of Proposed Mitigation Measures (applied as Conditions of Approval):

Conditions of Approval

Site Specific:

1. The operator is committed to all pertinent plans, mitigation, and Conditions of Approval contained in Willow Creek POD approved 9/13/06.
2. All changes made at the onsite will be followed. They have been incorporated into the operator's plan of development.

3. To further minimize sage grouse habitat fragmentation, the following wells will have the clearing width of the disturbance corridors limited to no more than 20ft unless an exception is granted by the authorized officer.
    - Christensen Federal 32-4
    - Christensen Federal 32-28
    - Christensen Federal 21-28

- Christensen Federal 41-28
- Christensen Federal 12-4
- Brubaker Federal 41-19
- Brubaker Federal 32-19
- Christensen Federal 23-33
- Christensen Federal 43-32

4. The operator will contact Chris Williams (Hydrologist) 307-684-1195, at least one week before reservoir release activities begin for each reservoir within this POD to enable BLM personnel to observe the effectiveness surged or pulsed flow discharge. Notifications should continue until at least two releases from each reservoir have occurred. This requirement is similar to one placed on the Willow Creek POD EA and an explanation is provided in EA#-WY-070-06-211. This requirement applies to all substantial discharge events from impoundments.

5. The operator will contact Chris Williams (Hydrologist) 307-684-1195 at least one week prior to initial discharge from Outfalls 005 and 009. This requirement is similar to one placed on the Willow Creek POD EA, and an explanation is provided in EA#-WY-070-06-211.

Wildlife

Raptors

The following conditions will alleviate impacts to raptors:

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

Township/Range	Section	Wells and Infrastructure
T46N R76W	19	Wells 32-19, 41-19. Pipelines in NE.
	20	Wells 12-20, 14-20. All infastructure.
	28	Wells 14-28, 23-28, 34-28. Pipelines in SW. Outfall 015 in SE. Waterline in SWSW.
	29	Wells 21-29, 41-29, 32-29. Pipeline to 14-29 in NWNW. Pipeline to 21-29 in NENW. Pipeline to 41-29 in NENE. Two-track in NENE.
	33	Well 23-33. Outfall 016. Pit 331. Waterline in NW.
T45N R76W	4	Wells 12-4, 32-4. All infrastructure SE of intersection of two-track to well 14-33 with improved road.

2. Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a 0.5 mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within 0.5 mile of occupied raptor nests from February 1 to July 31.

3. Nest occupancy and productivity checks shall be completed for nests within a 0.5 mile of any surface disturbing activities (e.g., well drilling or pipeline installation) across the entire POD for as long as the POD is under construction. Once construction of the POD has ceased, nest occupancy and productivity checks shall continue for the first five years on all nests that are

within a 0.5 mile of locations where any surface-disturbing activities took place. Productivity checks shall be completed only on those nests that were verified to be occupied during the initial occupancy check of that year. The productivity checks shall be conducted no earlier than June 1 or later than June 30, and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. In 2009, this applies to the nests listed and is subject to change each year after that, pending surveys.

4. Visitation to infrastructure within 1 mile of nest 3994 will be minimized as much as possible between February 1 – July 1 of each year. Visitation to infrastructure within 0.5 mile of nest 3994 will occur between 9:30 and 3:30. This will affect the following infrastructure:

Township/Range	Section	Wells and Infrastructure
T46N R76W	20	Well 14-20. Pit 29-1.
	29	Wells 21-29, 32-29.

5. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

6. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31).

Sage Grouse
The following conditions will alleviate impacts to sage-grouse:

1. No surface disturbing activities are permitted within two miles of the County Line sage-grouse lek and at wells 34-29 and 32-19 between March 1 and June 15, prior to completion of a sage-grouse lek survey. This condition will be implemented on an annual basis for the duration of surface disturbing activities. This timing limitation will affect the following:

Township/Range	Section	Wells and Infrastructure
T46N R76W	19	Wells 41-19, 32-19. Pipeline segment starting at intersection of two-track to well 32-19 with improved road and ending at well 41-19.
	27	All infrastructure.
	28	Wells 21-28, 32-28, 41-28. All infrastructure in N, except infrastructure to well 12-28 in SWNW. .
	29	Well 34-29 and infrastructure from improved road that runs N-S in E of section (not from improved road that runs NW-SE).

2. At the onsite, BLM noted that some infrastructure that was proposed within two miles of leks was not in high quality habitat, while some infrastructure that was proposed farther than two miles of leks was in high quality habitat. BLM and Bill Barrett agreed to place limitations on some of the infrastructure outside a two-mile radius. A timing limitation will not affect the following infrastructure, which is located within two miles of leks:

Township/Range	Section	Wells and Infrastructure
T46N R76W	19	Pipeline to well 12-20 in E.
	20	Well 12-20 and infrastructure to the well starting from western boundary.
	28	Well 12-28 and infrastructure in SWNW.
	29	Well 41-29. Infrastructure in NE from well 41-29 to south.

3. If an active lek is identified during the survey, the 2 mile timing restriction (March 1-June 15) will be applied and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 2 mile buffer until the following breeding season (March 1). The required sage grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.

4. Well metering, maintenance and other site visits within 2.0 miles of documented sage grouse lek sites should be minimized as much as possible during the breeding season (March 1– June 15).

Burrowing Owls
The following conditions will alleviate impacts to burrowing owls:

1. No surface disturbing activity shall occur within 0.25 miles of all identified prairie dog colonies from April 15 to August 31, annually, prior to a burrowing owl nest occupancy survey for the current breeding season. A 0.25 mile buffer will be applied if a burrowing owl nest is identified. This condition will be implemented on an annual basis for the duration of surface disturbing activities within the prairie dog towns. This timing limitation will be in effect unless surveys determine the nest(s) to be inactive. This timing limitation will affect the following

Township/Range	**Section**	**Wells and Infrastructure**
T46N R76W	29	Well 32-29, 34-29, 23-29. Pipeline and two-track to well 23-29 in NESW. Pipelines along existing two-tracks in SW and S NW.
	20	Well 12-20 and pipeline to well from W border of section.
	19	Pipeline to well 12-20 in NESE and SENE.

LITERATURE CITED:

Big Horn Environmental Consultants. 2008. Willow Creek Unit POD, Additions 1. Wildlife Survey and Habitat Report. Received by Buffalo BLM 03/18/2008.

Consultation/Coordination:

Contact	Title	Organization	Phone Number	Present at Onsite?
Mary Hopkins	WY SHPO	WY State Historic Preservation Office		No
Brady Lewis	Project Engineer	WWC Engineering	307-683-0761	Yes

Reviewers:

Clint Crago, Archaeologist
Courtney Frost, Wildlife Biologist
Chris Williams, Hydrologist
Casey Freise, Supervisory NRS

Preparer(s): Mary Maddux

Date: 9/30/08

FINDING OF NO SIGNIFICANT IMPACT/DECISION RECORD

I have determined that the proposed action is in conformance with the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office, April 2001 and the Powder River Basin Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS), #WY-070-02-065 (approved April 30, 2003). I have reviewed this environmental assessment including the analyses of potentially significant environmental impacts. I have determined that the proposed action, with the mitigation measures described below, will not have any significant impacts on the human environment and that an EIS is not required. It is my decision to implement the project with the mitigation measures identified above as Conditions of Approval.

Authorized Official: _____ Date:_____